# Homemade Foreign Trading*

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**Abstract**

Using cross-border holding data from all custodians in China's Stock Connect, we provide evidence that Chinese mainland insiders tend to evade the see-through surveillance by round-tripping via the Stock Connect program. Following the 2018 Northbound Investor Identification reform, the return predictability of northbound flows decays, as does the correlation between these flows and insider trading. This reduction is especially pronounced among less prestigious foreign custodians and cross-operating mainland custodians, behind which mainland insiders are more likely to hide. Furthermore, the reform erodes price informativeness, particularly in stocks with high exposure to homemade foreign investors. Our analysis sheds light on the role of regulatory cooperation over capital market integration.

**JEL Classification**: F38, F65, G11, G14, G15, G28

**Keywords**: Cross-border Flows, Insider Trading, Northbound-Southbound, See-through Surveillance, Regulatory Arbitrage

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# 1 Introduction

Global integration of capital markets provides essential benefits including international diversification, growth opportunities, and information efficiency (see, e.g., Karolyi and Stulz, 2003; Bekaert et al., 2007; and Kacperczyk et al., 2021). Over the past two decades, China has introduced a series of measures to facilitate international integration of its capital markets, including the Qualified Foreign Institutional Investor (QFII) and Renminbi Qualified Foreign Institutional Investor (RQFII) programs, which allow licensed international institutional investors to directly invest in Chinese securities. Among these access channels, the Stock Connect program—launched on November 17, 2014—represents the most recent "opening-up" initiative by Chinese policymakers and has quickly become the dominant channel for foreign investment in China's equity market.[1]

The Stock Connect program allows for trading in both directions; it works like a bridge that not only enables investors from Hong Kong and oversea areas—but also qualified investors from Mainland China—to directly trade eligible shares listed on the other market via their local exchanges, without the need to adapt to the operational practices on the other market. Importantly, the funds that investors employ can only be used to trade securities in the connect program without further access to the rest of the economy in the other market. Representing one of the greatest reforming innovations by China's top authorities, this program achieves the goal of international financial integration (in certain stock/bond markets) with the rest of world without opening up China's capital account fully.

This paper highlights one of the dark sides of the Stock Connect program. Echoing the literature on financial innovations (Tufano, 2003) where new financial products are often *created to exploit* regulatory arbitrage, we argue that the connect program *creates* regulatory loopholes for opportunistic mainland investors to arbitrage by round-tripping.[2] More specif-

[1]By the end of the first half of 2022, international investors hold RMB 2.5 trillion of A-shares through the Stock Connect, accounting for 2.7% of A-share total market capitalization, which stands at more than ten times the amount held through the other two channels combined (QFII and RQFII, 0.2 trillion).

[2]Borrowed from the long-standing research on international trade, "round-tripping" typically refers to the practice of registering a firm in an offshore financial center so that investment appears to be of foreign

ically, we present evidence that a group of "homemade" mainland investors—likely Chinese corporate insiders for the purpose of identity concealment— engage in cross-border tradings via the connect program as if "foreign investors."[3]

It is intriguing how the Stock Connect program serves to conceal investors' identities. As explained in Section 2.2, the mainland exchanges use a see-through surveillance system for trading and clearing that links every order to the trader's personal information. In contrast, under Hong Kong's jurisdiction, financial intermediaries (brokers or custodians) hold their clients' securities under the names of intermediaries. During the first three years following the launch of the Stock Connect program in 2014, northbound trading operated under a scheme consistent with Hong Kong's jurisdiction. As a result, during that time the program provided an opportunity for domestic traders in the mainland market to conceal their identities by indirectly trading eligible A-shares of connected firms.

The see-through regulatory reform of northbound trading, which introduced the Northbound Investor Identification System in the third quarter of 2018, marked a major turning point. Under this reform northbound custodians are required to assign a unique identifier to each of their northbound clients, enabling mainland regulators to identify the actual beneficial owners behind irregular northbound trades.

A natural question then arises: Who are more likely to exploit the opportunity to disguise their identities through the Stock Connect program? A clear candidate is mainland insiders, who possess valuable private information but face strict regulatory scrutiny when trading A-shares directly on mainland exchanges. Consequently, the correlation between mainland insider trading and northbound flows from "homemade" foreign investors is expected to be more sensitive to the see-through surveillance reform. As preliminary supporting evidence, in Section 2.3 we show that the return predictability of northbound flows declined noticeably in 2018. Moreover, the timing of this decline coincides closely with the implementation of

origin (Luo and Tung, 2007).

[3]On December 19, 2022, the mainland and Hong Kong exchanges reached an agreement on the further expansion of eligible stocks under Stock Connect; see news release. With the market integration, how the connected market defends itself from homemade foreign trading is increasingly important.

the policy reform, suggesting that at least part of the information advantage of northbound flows may have originated from round-tripping domestic investors.

It is challenging to perfectly distinguish "homemade" foreign investors from genuine northbound investors. Our main empirical analysis leverages a comprehensive dataset on northbound custodian holdings, which reports stock-level positions for each custodian operating on the Hong Kong exchange. This dataset enables us to identify potentially irregular trading activities by mainland insiders, using cross-sectional variation in custodians' reputational standing and their connections to mainland markets (and thus, to mainland insiders). For example, less prestigious foreign custodians may be less constrained by reputational concerns, while cross-border custodians with mainland operations tend to have stronger ties to mainland businesses. We call them problematic custodians, and hypothesize that such custodians are more likely to serve as conduits for round-tripping activities.

Using the northbound custodians' stock holding data from March 17, 2017 to December 31, 2019, we begin by examining the return predictability of northbound flows originating from different types of custodians in the Chinese A-share market. Based on standard cross-sectional portfolio analyses, we find that although the trading activities of less prestigious foreign custodians and cross-operating mainland custodians were informative in the early years of the Stock Connect, their northbound flows ceased to predict future stock returns after the third quarter of 2018. The sharp decline in predictive power coincides with the introduction of the Northbound Investor Identification reform—a regulatory policy aimed at curbing round-tripping activities facilitated by these two categories of custodians.

It is reasonable to conjecture that the informational advantage of homemade foreign investors primarily arises from information asymmetries during pre-announcement periods, if these homemade foreign investors are domestic insiders. Consistent with this view, we find that the reform more strongly attenuated the return predictability of problematic custodians around news releases. Examining ownership types, we further document that for both SOEs and non-SOEs, the return predictability of northbound flows from problematic custodians

declined after the reform. This is consistent with the idea that non-SOEs, due to weaker corporate governance, and SOEs, due to multiple administrative layers and lower information transparency, both provide environments conducive to homemade foreign trading.

Our hypothesis suggests that mainland insiders possess similar information with round-tripping ones. The results show that the aligned trading activities of northbound investors from problematic custodians and mainland insiders become relatively infrequent after the reform. Furthermore, the pattern is more pronounced in firms with a higher probability of earnings management and informed trading, consistent with the hypothesis that round-tripping insider trading is more likely to occur in a more opaque information environment.

As a natural extension of the preceding analysis on returns and trading behavior, we evaluate the impact of the regulatory reform on price informativeness in China's A-share market. The reform, intended to exclude homemade foreign investors from northbound flows, may have introduced an efficiency trade-off: while effectively curbing round-tripping trades, it could simultaneously impair price discovery by restricting certain informed trading in connected stocks. Empirically, we indeed find that connected stocks exhibit a more pronounced decline in price informativeness relative to unconnected stocks following the reform; and this effect is particularly salient among connected stocks that had been heavily traded by the problematic custodians.

## Literature Review

**Unintended consequences of economic reform: identity concealment.** Our study relates directly to the literature examining identity-concealing behaviors as an unintended consequence of policy reforms. Within the international trade literature, domestic capital often disguises itself as foreign direct investment (FDI) through "round-tripping," which involves routing capital from the home market (e.g., emerging economies such as mainland China and Russia) through offshore financial centers (e.g., Hong Kong and the British Virgin

Islands) before repatriation.[4] In the context of asset trading, our study aligns with Huang and Shiu (2009), who document that local firms in Taiwan engage in bogus foreign investments to mislead retail investors who disproportionately value foreign ownership. It also complements Hanlon et al. (2015), who demonstrate that for tax evasion purposes, U.S. individuals route capital through tax haven entities before reinvesting in U.S. stocks and bonds.[5]

Our paper differs from previous studies on bogus foreign trading behaviors in at least two respects. First, we present the first systematic evidence on custodian-level homemade foreign trading in the Chinese cross-border stock market, contrasting with previous studies on trade circumvention related to disguised FDI. Second, we empirically examine the effectiveness of penetrating regulation designed to enhance regulatory cooperation and safeguard market integrity, suggesting the possibility of a successful reform that disciplines homemade foreign investors without compromising the informational advantages of genuine foreign investors.

**Impact of China's stock/bond connect program.** There is an emerging literature studying the impact of the China's Stock Connect program. Connect firms not only experience demand-induced value appreciation (Liu et al., 2021a) but also expand their use of selective private meetings with major foreign brokers to facilitate capital raising in international markets (Yoon, 2021).[6] In addition, Ma et al. (2021) find that connected stocks with lower global market covariances exhibit greater price appreciation, consistent with Shan et al. (2022) who argue that Chinese stocks offer diversification benefits to international investors.

Existing studies also explore the informativeness of northbound trading (Bian et al., 2023; Chen et al., 2024; Lundblad et al., 2025). For example, Lundblad et al. (2025) demonstrate

[4]Round-tripping in FDI is likely driven by policy reforms designed to attract foreign capital through preferential treatment (e.g. lower tax, tariff reductions, credit access) relative to domestic capital (e.g., Dooley and Kletzer, 1994; Chor, 2009; Fung et al., 2011; Ledyaeva et al., 2015; Casi et al., 2020; and Liu et al., 2021b).

[5]Fisman and Wang (2015) document that during Chinese privatization, SOE sellers tend to disguise themselves as private companies in asset transfers, because sales by SOE face greater regulatory scrutiny. Silvers (2021) show that wrongdoers can exploit cross-border regulatory gaps to evade repercussions, as regulators lack the legal authority to obtain information for prosecution in foreign jurisdictions.

[6]For studies on the real effect of the Stock Connect program, see Carpenter et al. (2021) and Ma et al. (2021), among others. For instance, Ma et al. (2021) show that the Stock Connect can reduce domestic credit misallocation but increases sensitivity to funding cost volatility post-liberalization.

that order flows from Stock Connect, QFII, and RQFII can predict stock price movements, attributing this power to foreign investors' ability to process firm-level information that is "private" before its public release. Chen et al. (2024) find that northbound investors' information advantage, independent of site visits and analyst coverage, attracts mainland investors to copycat. Based on custodian-level daily trading information, we argue that a key information advantage for foreign investors in the Chinese stock market potentially comes from round-tripping mainland insiders. By documenting different trading behaviors of northbound investors from different origins of custodians, we uncover a new channel of identity concealing as one of the unintended consequences of China's market liberalization.[7]

**Insider trading.** Amid extensive literature on insider trading, our paper contributes to identifying irregular insider trading. Detecting irregular insider trades is inherently challenging , as illicit insiders have powerful incentives to conceal their identities (Cornell and Sirri, 1992). While prior studies distinguish opportunistic insider trades from routine ones based on trade seasonality (Cohen et al., 2012), the profitability of trades prior to earnings announcements (Ali and Hirshleifer, 2017), and opportunistic planning (Jagolinzer, 2009; Ye et al., 2025), identifying such behaviors remains a central empirical difficulty.

Despite the extensive literature on domestic insider trading, how insiders exploit cross-border channels to obfuscate their activities remains under-explored. The geographic separation between trading venues and regulatory oversight creates unique opportunities for such behaviors. Reflecting these challenges, recent incidents of cross-border insider trading have prompted the SEC and other authorities to pursue enforcement through enhanced international cooperation (Lehtman and White, 2013). Our paper thus provides timely evidence on the effectiveness and necessity of such cross-border supervisory collaboration.

[7]Our paper is also related to China's Bond Connect program, established in July 2017 (Amstad and He, 2020). Like Stock Connect, Bond Connect enables investors from mainland China and overseas to trade in each other's bond markets via related financial infrastructures. Clayton et al. (2025) emphasize that the introduction of Bond Connect reflects China's gradual approach to liberalizing capital inflows, balancing the desire for international currency status against the risks of sudden capital outflows.

# 2 Institutional Background and Policy Shock

This section provides the institutional background of the Stock Connect program. Before describing our data and sample construction, we explain the key institutional details about the regulatory differences between the Chinese mainland and Hong Kong stock markets, the regulatory reform on northbound investor identification, and its market impact.

## 2.1 The Stock Connect and Custodian Services

On April 10, 2014, the China Securities Regulatory Commission (CSRC, the regulator of the stock market on the side of mainland China) and the Securities and Futures Commission (SFC, the regulator on the side of Hong Kong) approved a pilot program for establishing mutual stock market access between the two stock exchanges in mainland China (Shanghai Stock Exchange, SSE, and Shenzhen Stock Exchange, SZSE) and Hong Kong Exchange (HKEX) in Hong Kong. Following this announcement, the "Shanghai-Hong Kong Stock Connect" and "Shenzhen-Hong Kong Stock Connect" were officially launched on November 17, 2014 and December 5, 2016, respectively. Throughout the paper we refer to these two programs as the Stock Connect program, or simply the connect program.

**Northbound and southbound flows.** Under these two programs, qualified investors in each market can trade eligible stocks on the other market, such as the constituent stocks of major indexes, through their local brokers and clearing houses. Take international investors as an example; via the connect program, they are able to place orders to the mainland exchanges through locally registered securities brokers and custodian banks in the central clearing and settlement system (CCASS) operated by Hong Kong Securities Clearing Company Limited (HKSCC), a wholly-owned subsidiary of the HKEX.[8]

[8] In this example, connected stocks in mainland exchanges are traded in RMB, with the HKSCC providing settlement as well as auxiliary currency exchange services. From the perspective of capital account liberalization, these funds in the Stock Connect program can only circle inside a closed system, as the connect program is "disconnected" from the rest of the economy on the other market. In light of this, as one of the most innovative reforms in the Chinese stock market, the Stock Connect program achieves the goal of international financial integration with the rest of world *without* opening up China's capital account.

All international investors are allowed to trade eligible A-shares through the connect program, while mainland investors with account balances above RMB 500,000 are allowed to trade eligible shares listed on the HKEX. Since Hong Kong lies in the south of China, international investor flow on A-shares is termed "northbound flow" originated from HKEX while mainland investor flow on Hong Kong shares is termed "southbound flow" originated from SSE and SZSE.

The exchanges on both sides of the connect program disclose certain trading information to their respective investors. Before March 17, 2017, investors on both sides could observe only the daily aggregate holdings after the market close. Starting March 17, 2017, the disclosure was expanded to include daily stock-level holdings.[9] Using data on stock-level northbound holding starting Chen et al. (2024) demonstrate that northbound investors possess an informational advantage over domestic traders in the Chinese mainland market. In this light, our paper further explores the informativeness of northbound investors from different origins and the potential sources of such information.

**Custodian services and see-through surveillance.** Because of its former colonial ties to Britain, Hong Kong has adopted an indirect holding system of securities, with the HKSCC providing securities depository service and acting as the central clearing house for transactions in the Hong Kong market. More specifically, securities are held in custody of brokers/banks, who are exchange/clearing participants of the CCASS operated by the HKSCC and provide custodian services for investors. Importantly, the depository system in Hong Kong keeps the identities of the actual beneficial holders behind a veil; in other words, financial intermediaries hold their clients' securities under the names of intermediaries and track the corresponding ownership records in their books.[10] As a result, the actual beneficial owner

[9]The exchanges in both regions kept the disclosure rules unchanged until 2024. Commencing on August 19, 2024, only the quarterly northbound custody details are to be disclosed on the fifth trading day of the subsequent quarter.

[10]The commom practice refers to "nominee accounts" in "Regulation of Nominee Accounts in Emerging Markets - Final Report" issued by the International Organization of Securities Commissions (IOSCO) in October 2011. For more details, see https://www.iosco.org/library/pubdocs/pdf/IOSCOPD362.pdf.

of a security would not appear as the security's owner on the security issuer's register.[11]

The arrangement, however, was quite different in the mainland market. The mainland markets adopt a so-called "see-through" market supervision model for trading and clearing. Under this model, investor accounts are registered with investors' real names at the China Securities Depository and Clearing Corporation (CSDC), the central securities depository on the mainland side. More precisely, orders originating from the mainland exchanges must be labeled with the account numbers mapping to the personal-level information. The term "see-through surveillance" is also referred to as "penetrating surveillance" and in this article we use these terms interchangeably.

During the early days of the connect program, northbound trading followed the arrangement on the Hong Kong side, so that when international investors place orders to the mainland exchanges through securities brokers and custodian banks registered in Hong Kong, only identifiers of these "northbound custodians" were submitted to the HKEX. That is to say, regulators on the mainland side can only see the names of custodians, instead of those of actual beneficial owners.[12] As a result, compared with trading directly on mainland exchanges, accessing them through Stock Connect can help mainland investors conceal their identities, sometimes for illicit purposes. On June 13, 2018, a news release from the CSRC credited the CSRC–SFC law-enforcement cooperation framework, reporting that 176 cases of suspicious Stock Connect trading had been investigated since 2017.[13]

[11]The SFC, Hong Kong's securities regulator, uses its investigative powers under Section 183 of the Securities and Futures Ordinance (SFO) when market misconduct is suspected. In these cases, the SFC compels custodians to identify and disclose clients, orders, and trades for regulatory purposes. However, this mechanism is inherently reactive, as client-level data is collected only in response to specific events or investigations. Fore more details, please refer to Page 12 of the HKEX report.

[12]Detailed custodian-level holdings are available to public investors via the website of "CCASS Shareholding Search." In terms of corporate governance issues, when aggregate northbound holdings rank among the top ten largest shareholders, the code "CCASS" would appear on the annual reports of firms listed on the mainland stock market as the nominee northbound owner.

[13]For instance, in the first ever illicit homemade foreign trading uncovered by the CSRC in November 2016, several local investors manipulated prices through the Stock Connect to intentionally mislead other retail investors, by controlling three HKEX accounts and one SSE account to create artificial trading volumes and inflated prices of a targeted A-share stock, Zhejiang China Commodities City Group (600415.SH). For more details, please refer to the news releases on the CSRC website, http://www.csrc.gov.cn/csrc/c100028/c1001259/content.shtml.

## 2.2 Regulatory Reform on Northbound Investor Identification

Since the launch of the connect program, Beijing has concerned about the regulatory discrepancy regarding investor identification between the two sides of the Stock Connect. In September 2016, the CSRC published a press release stating that mainland and Hong Kong regulatory authorities had reached a consensus on "Home Market Principle." According to that principle, "trading via Stock Connect has to observe the trading rules and arrangement of others' market," so international investors need to follow the see-through surveillance requirement on the Mainland market. As a result of this joint effort, in November 2017, the HKEX issued a document, announcing a later rollout of Northbound Investor Identification System from the third quarter of 2018.[14]

On August 24, 2018, the CSRC announced that the Northbound Investor Identification System would soon come into effect, and it was officially launched on September 26, 2018.[15] In this system, brokers assigned a unique number, known as the Broker-to-Client Assigned Number (BCAN), to each northbound client; every northbound order routed to the mainland exchanges was tagged with the BCAN on a real-time basis. Each BCAN was mapped to the Client Information Data (CID) of that particular client,and brokers are required to submit the BCAN-CID mappings for all of their northbound trading clients to the HKEX, who then send the mapping files to the mainland counterparts. According to follow-up press releases by the CSRC, the see-through surveillance based on BCAN has allowed the HKEX to actively assist mainland regulators when fighting against financial crimes and enhancing law enforcement in the Stock Connect program.[16]

[14]The announcement says: "The plan to implement a reciprocal investor identification regime for Stock Connect demonstrates the SFC and the CSRC's resolve to further strengthen regulatory cooperation in combating market misconduct through effective monitoring and surveillance. This is critical to safeguard market integrity and to strengthen the protection of investors in both markets." Please refer to the news release issued by the HKEX, and the press release in September 2016.

[15]On September 14, 2018, the Hong Kong Stock Exchange announced a new implementation date for the Northbound Investor Identification Code under the Stock Connect mechanism. The launch originally set for September 17, 2018, was postponed to September 26, 2018 due to Super Typhoon Mangkhut.

[16]For more details, please refer to the news releases on the CSRC website and the website of Shanghai Stock Exchange, http://www.csrc.gov.cn/csrc/c100028/c1000989/content.shtml.

The see-through surveillance mainly affects round-tripping mainland investors who are subject to domestic legal enforcement in China, while leaving genuine foreign investors in the Hong Kong Exchange largely unaffected. There are several reasons for this claim. First, the enhanced surveillance is designed to conform with the mainland regulatory environment and complement its supervision of mainland investors. Second, Hong Kong, thanks to its common-law origin inherited from the British colonial era, has earned a world-renowned reputation for its transparent and strong legal systems, together with its effective law-enforcement against criminal activities and trading misconduct in financial markets even before 2008 see-through surveillance reform.[17] Last but not least, post reform we observe very few SFC enforcement actions against genuine foreign investors in the Stock Connect.[18]

Taking a stock, the see-through surveillance system, which is established to conform the trading protocols of the northbound direction in the Stock Connect program to those in mainland exchanges,[19] significantly enhances the information that the regulators can see, while barely affects the information available to public investors. Any mainland investor can always observe the daily stock-level northbound tradings before and after the regulatory reform, while only after the reform the mainland regulator can identify whether some seemingly "foreign" beneficiary owners are in fact round-tripping mainland investors.

[17] According to the Reports on the Observance of Standards and Codes published under the Financial Sector Assessment Program jointly conducted by the International Monetary Fund and the World Bank, Hong Kong's regulatory framework demonstrates a high level of compliance with the International Organization of Securities Commissions Principles, with most principles rated as "Fully Implemented" or "Largely Implemented." In contrast, mainland China's overall implementation is assessed as "Largely Implemented" or "Partially Implemented," indicating a discernible comparative gap in the degree of adherence to these international standards.

[18] For more details, please refer to the website of the SFC, https://apps.sfc.hk/edistributionWeb/gateway/EN/news-and-announcements/news/enforcement-news/.

[19] In the same document issued in November 2017 mentioned in Section 2.2, the HKEX also noted that the CSRC has agreed to provide similar Investor ID information in respect of southbound trading to the SFC, which will be implemented as soon as possible after the implementation of the Investor Identification model for northbound trading; see this press release, Page 3. However, the establishment of the southbound trading surveillance system is much delayed. On December 20, 2019, which is almost the end of our sample period (12/31/2019), the CSRC published the rules and arrangements of the Southbound Investor Identification System, and the new system was officially launched on January 13, 2020.

## 2.3 Market Responses to the Policy Shock

One obvious candidate of "homemade foreign investors" are insiders of mainland listed companies, who are with tradable information but subject to heavy scrutiny in the mainland stock markets. Before the see-through surveillance, round-tripping via the Stock Connect program allows domestic insiders to exploit their private information for illicit but lucrative gains by concealing themselves behind their HKEX custodians. The policy goal of the reform is to deter these insiders from sending their orders (secretly) to the Stock Connect.

**The impact on return predictability.** The regulatory reform in August 2018, if curbs round-tripping activities successfully, should diminish the informational advantage and subsequent return predictability of northbound flows. Figure 1 plots the cumulative returns of a weekly-rebalanced long-short strategy that goes long the top decile and short the bottom decile portfolios sorted by northbound flows (see Section 4.1). The sample period spans from March 17, 2017, when daily stock-level northbound flow data first became publicly available, to December 31, 2019, prior to the outbreak of Covid-19 in China;[20] and we normalize the the cumulative returns to zero on the policy announcement day August 24, 2018. As shown, this long-short strategy generates an annualized return of 36.7% before the see-through surveillance reform on August 2018, consistent with Chen et al. (2024) and Lundblad et al. (2025). The performance is extraordinary: the contemporaneous annualized excess return of the market portfolio (relative to the risk-free rate) is -15.7%, and that of value-weighted portfolio of all Connect program stocks is -11.3%.

Intriguingly, a dramatic weakening of the return predictability lined up well with the timing of the see-through surveillance reform. As shown in Figure 1, during the post-reform period which spans about 16 months after August 2018, the excess return from the same long-short strategy is a mere 11.8% annualized (for comparison, the contemporaneous market excess return is 9.6%, and the contemporaneous excess return of the connected stock

[20]The pandemic brought extreme policy uncertainty and broad market disruptions in China, which altered many aspects of market behavior, particularly investor composition in the Stock Connect program, potentially confounding the interpretation of northbound flows.

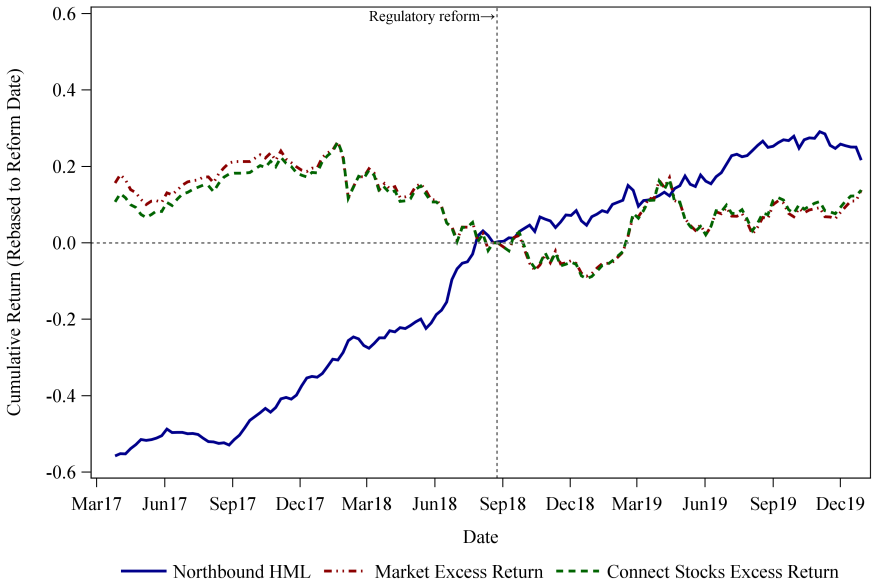



Figure 1: **Return predictability of northbound investor flows.** This figure plots the cumulative returns of a long-short strategy (Northbound HML, in blue solid lines) based on aggregate northbound flows. The strategy is constructed by taking a long (short) position in the top- (bottom-) decile portfolio, with weekly rebalancing. For comparison, the cumulative excess returns of the aggregate A-share market portfolio (dashed red line) and a value-weighted portfolio of all connected stocks (dashed green line) are plotted. Both are calculated relative to the one-month China Development Bank risk-free bond yield Amstad and He (2020). The sample period spans from March 17, 2017, the date the HKEX began releasing daily northbound holding data, to December 31, 2019. Stocks are weighted by their floating market capitalization, winsorized at the 5% and 95% levels. The vertical line indicates the announcement of the CSRC regulatory reform on August 24, 2018. The cumulative returns are normalized to zero on August 24, 2018.

portfolio is 10.1%). Given that see-through surveillance primarily affects mainland investors engaged in round-tripping, this empirical pattern suggests that a substantial portion of the informational advantage attributed to cross-border flows in China's A-share market (Chen et al., 2024; Lundblad et al., 2025) stems from "homemade" foreign investors.

**The effect on insider trading in the mainland market.** If the reform which targets at Chinese mainland insiders is effective, mainland insider trading should exhibit an initial post-Connect decline due to round-tripping, followed by a significant reversal after 2018 as see-through surveillance closes these regulatory loopholes.

Figure 2 presents how the wedge in insider trading between connected firms and unconnected firms evolves over time. To mitigate estimation bias from anticipation following the early 2014 pre-announcement of eligible firms, we use the period from November 17, 2012, to

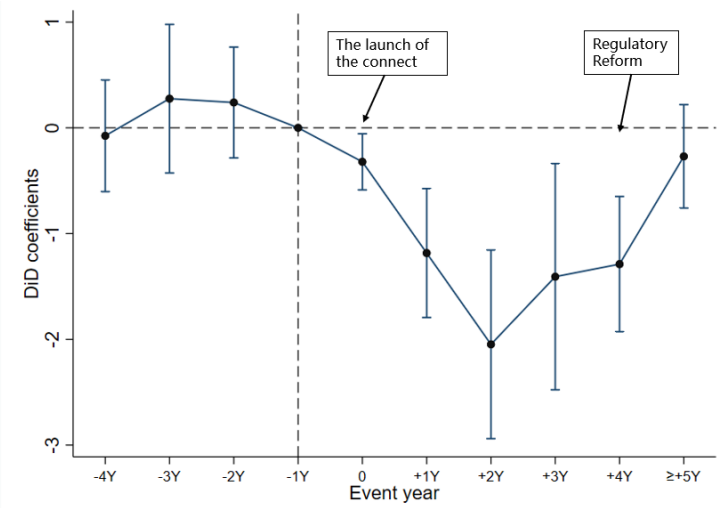



Figure 2: **Difference of insider trading amount between connected and unconnected firms.** We show the dynamic evolution of differences in insider trading between connected firms and unconnected firms and the associated 95% confidence intervals calculated from standard errors clustered by industry. The $x$-axis displays the years since the launch of the Shanghai-Hong Kong Connect Program (11/17/2014), spanning from 11/17/2009 to 11/17/2024. The $y$-axis displays the differences in the natural logarithm of one plus total RMB amount of insider trading. Since the list of connected firms was announced in early 2014, to alleviate the concern of market anticipation we take the year before the program launch (i.e., 11/17/2012 to 11/17/2013) as the benchmark year (i.e., "-1Y"). The firm fixed effects and event-year fixed effects are included.

November 17, 2013, as our pre-launch benchmark.[21] Our treatment group comprises stocks eligible at the program's inception, while unconnected firms serve as the control group. To mitigate potential contamination, here we focus on a constant cohort, excluding Shenzhen-listed stocks that gained eligibility during the late-2016 expansion from both groups.

We observe a significant drop in insider trading value for the connected (treated) firms following the program's launch in Figure 2, consistent with our hypothesis that mainland insiders substituted their direct trading in mainland exchanges with "indirect" northbound trading.[22] Interestingly, Figure 2 also shows that this "substitution" effect appears to be

[21] The CSRC and SFC jointly announced the approval of the Stock Connect pilot program on April 10, 2014, providing a seven-month preparation window during which the eligible stock list was determined and communicated to market participants. The official launch date for the Stock Connect program was 11/17/2014.

[22] For example, in the raw data, during the period from 11/17/2015 to 11/17/2016, the average logarithmic dollar value of insider trading rises by only 29 percentage points in connected firms relative to the benchmark year (i.e., 11/17/2012 to 11/17/2013), whereas unconnected firms see an increase of 271 percentage points. The difference of 242 percentage points roughly matches the coefficient of -2.04 for the dummy of 11/17/2015 to 11/17/2016.

only at work before the establishment of the see-through surveillance system. Combining with Figure 1 which shows the weakening of return predictability of northbound flows, the dynamics of insider trading can be rationalized as the regulatory reform effectively inhibits connected firms' insiders from disguising themselves in northbound flows, forcing insiders to circle their trades back onto the mainland market. We will provide more systematic evidence on this point later in Section 5.1.

Our perspective of homemade foreign trading has important policy implications. For instance, recent papers (e.g., Liu et al., 2023) have postulated that the capital market liberalization stems opportunistic insider trading thanks to improved corporate governance in the presence of sophisticated foreign investors. These papers, however, are inconsistent with "reverse" insider trading post reform. Our explanation provides new insights into understanding insider trading activities from the angle of regulatory arbitrage.

# 3 Northbound Custodians and Data Construction

Besides explaining data construction, this section discusses the custodians servicing northbound investors and how we differentiate the potentially problematic custodians that may "host" homemade foreign investors.

## 3.1 Categories of Northbound Custodians

In the indirect holding system adopted by Hong Kong, securities are held in custody of brokers/banks (i.e., custodians) who serve as exchange/clearing participants of the CCASS operated by the HKSCC.[23] In contrast to the mainland's see-through model, these custodians maintain the anonymity of their clients, who are the actual beneficiary holders of

[23]Licensed corporations and registered institutions can apply for exchange/clearing participantship in the CCASS, and the Stock Connect program is open to all exchange/clearing participants (i.e. northbound custodians). These institutions need to meet certain requirements regarding technology capability, risk management, and other areas specified by the relevant exchange and clearing house. Fore more details, please refer to the HKEX website. For the latest list of eligible participants for the Stock Connect, see this HKEX website.

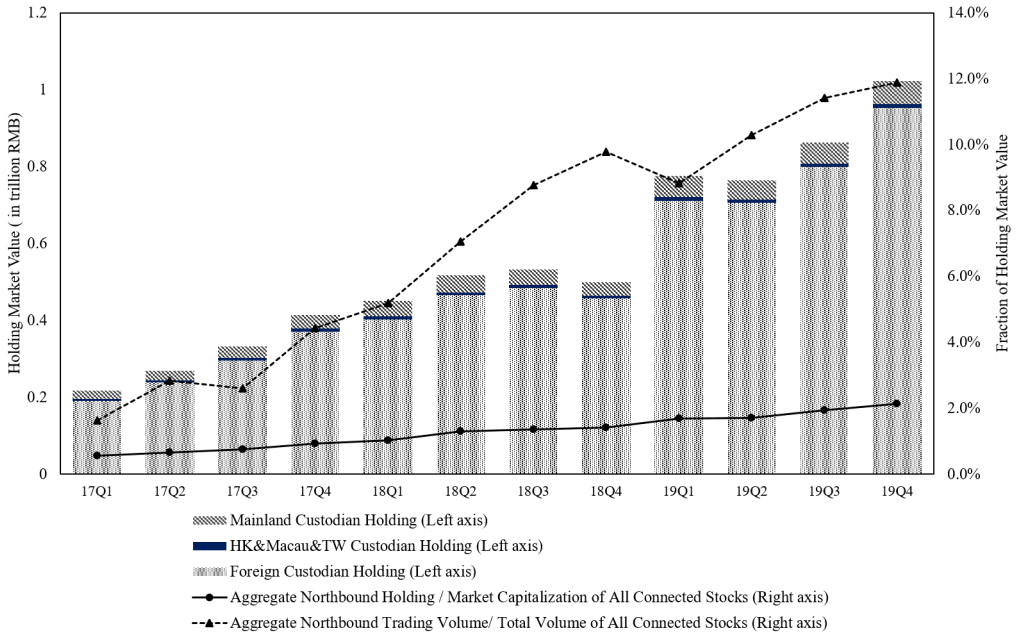



Figure 3: **Northbound stock holdings by market value.** We plot the northbound holdings' quarterly market value from different origins of northbound custodian. The solid line (right scale) plots the aggregate northbound holdings' market value as a fraction of all connected stocks listed on the mainland China's stock markets. The stacked bars illustrate the quarterly market value of northbound holdings (in trillion RMB, left scale), segmented from top to bottom into: Chinese mainland custodians, custodians from Hong Kong, Macau, and Taiwan, and foreign custodians. The dash line (right scale) plots the aggregate northbound trading volume as a fraction of all connected stocks.

the securities. This section classifies these northbound custodians based on their origins, a variation that we explore shortly for identification purposes.

We obtain daily stock-level holdings of all northbound custodians from the Choice database affiliated with East Money Information Co. Ltd.[24] In Figure 3, we plot the aggregate market value of northbound custodian holdings as a fraction of the total market capitalization of all connected stocks (in the solid line, the right scale), the aggregate trading volume of northbound custodians as a fraction of the total trading volume of all connected stocks (in the dash line, the right scale), and their outstanding balances (in trillion RMB) from different origins at the end of each quarter. As shown, the northbound holdings have been increasing

[24]We have verified that the detailed holdings data from the Choice database aligns with the stock-level northbound holding data published daily by HKEX. Additionally, we collect information on northbound custodians during our sample period from the HKEX website. The original Choice database includes "the Hong Kong Central Clearing and Settlement System" (CCASS), which has an insignificant amount of holdings. Nevertheless, this entity does not possess a dedicated participant ID for custodians that is assigned by HKEX. Therefore, we have excluded CCASS's holding records from our original data.

over time: at the end of 2019, northbound holdings (volume) reached about 2.13% (11.88%) of the market value (trading volume) of connected stocks. What is relevant to our study is that disproportionally large northbound trading volume suggests that northbound investors were likely short-term information driven traders.

We manually review the list of 188 custodians participating in northbound trading during our sample period to identify their origins based on their controlling shareholders. There are 32 foreign custodians, 83 Hong Kong, Macau, and Taiwan custodians, and 73 Chinese mainland custodians. Figure 3 shows that foreign custodians, which include UBS Securities (Hong Kong) Ltd. and J.P. Morgan Broking (Hong Kong) Ltd. as leading examples (Appendix Table A2), are dominating in the custodian market for the Stock Connect program. In 2019, about 93.12% (or 1.98% of total connected stocks) are intermediated by foreign custodians. The market share for mainland custodians, which include CITIC Securities Brokerage (Hong Kong) Ltd. and CCB International Securities Ltd. as leading examples (the left half of Appendix Table A3), is relatively small (about 5.93% in 2019). The market share for Hong Kong, Macau, and Taiwan custodians is even smaller (about 0.94% in 2019).[25]

**Foreign custodians: less vs more prestigious.** The relatively large scale of foreign custodian flows enables greater concealment of mainland investors' irregular trading activities prior to the reform. Among them, we conjecture that mainland investors were more likely to engage in homemade foreign trading via those foreign custodians who were perceived as less "prestigious." Being less prestigious, these custodians suffer less reputation damage for potential misconduct in their business dealings, and hence are more willing to provide camouflage for illicit tradings.

Specifically, we define a foreign custodian as being more prestigious, if it i) ranks above the median for "fee and commission income," or ii) is voted as a leader in custody in the emerging markets; otherwise, the custodian is classified as less prestigious and hence with a

[25]The detailed list for this category, which includes Ever-long Securities Co., Ltd. and President Securities (Hong Kong) Ltd., can be found in the right half of Appendix Table A3.

weaker reputation.[26] In our sample, 19 of 32 foreign custodians (e.g. Instinet Pacific Ltd.) are classified as less prestigious custodians and the other 13 custodians (e.g. UBS Securities Hong Kong Ltd.) are more prestigious.

**Mainland custodians: cross-operating vs non-cross-operating.** Despite their limited market share, mainland custodians are in a favorable position to accommodate "homemade" foreign trading, as they are likely more entrenched with stronger business ties within China. For instance, for the Chinese mainland custodian China International Capital Corporation (CICC), its mainland parent company is the powerhouse broker-dealer in the mainland market. This deep domestic entrenchment effectively bridges the gap between offshore brokerage services and mainland-based capital.[27]

We thus categorize mainland custodians based on their dual presence in the mainland and Hong Kong markets, hypothesizing that flows through these cross-operating entities are more representative of "homemade" foreign trading. There are at least two reasons for this hypothesis. First, it is natural that the greater exposure to the mainland market offers them better chances to serve mainland firm insiders (or their related parties) who are willing to exploit their private information. Second, as noted by McNally et al. (2017) and Li, Mukherjee and Sen (2021), cross-operating custodians' business ties facilitate access to material information. This allows clients to exploit such insights while bypassing the heightened litigation risks associated with trading directly on domestic venues.

We classify custodians as cross-operating based on the international business footprint of their parent securities firms, using official regulatory disclosures as our primary data source. All mainland brokerage firms are part of Securities Association of China; it publishes audited annual operational data for its members which allows us to identify mainland security firms with overseas revenue. Then, by manually matching each CCASS custodian to its mainland

[26]Data on custodians' fee and commission income are from the Bloomberg database and Data on leaders in custody awards are obtained from the website of Global Custodian Library, https://www.globalcustodian.com/events/leaders-in-custody-2021-04-may-london/.

[27]For more details about mainland custodians' performance rankings, please refer to the website of the Securities Association of China,https://www.sac.net.cn/hysj/zqgsyjpm/.

parent entity, we define a custodian as cross-operating if its parent firm reports oversea revenue, and non-cross-operating otherwise. As shown in Appendix Table A4, less than half of mainland custodians are classified as cross-operating.[28]

## 3.2 Data and Sample Construction

Our data on market capitalization, the historical list of connected stocks, financial statements and corporate announcements are from the CSMAR database, while adjusted opening prices and free-floating shares are from the WIND database. A detailed data appendix is provided in Appendix A.

The sample period spans from March 17, 2017, to December 31, 2019.[29] We construct stock-level northbound investor holdings ($NIH$, in percent) by scaling the aggregate shares held through each custodian origin by the firm's free-float shares as of the last trading day of each week. Weekly northbound investor flow ($NIF$) is defined as the weekly change in $NIH$. We further decompose $NIF$ into three components: $NIF_f$, $NIF_{hk}$, and $NIF_m$, representing flows from foreign, Hong Kong/Taiwan/Macau (hereafter HK), and Chinese mainland custodians, respectively. As discussed toward the end of Section 3.1, we further partition foreign custodians into more- versus less-prestigious subgroups, and mainland custodians into cross-operating versus non-cross-operating categories.

We incorporate a comprehensive set of firm-level controls and past returns to account for stock characteristics. These variables include firm size ($SIZE$), book-to-market ratio ($BM$), weekly turnover ($TOVER$), return on assets ($ROA$), and two indicator variables: one for

[28]For example, Haitong International Securities Co,. Ltd. is a cross-operating custodians while BOCI Securities Ltd. is non-cross operating. Our non-cross operating custodians include investment bank arms of Chinese state-owned commercial banks; these investment banks focus on the international market without corresponding domestic operations. It is well-known that large state-owned commercial banks play a pivotal role in Chinese financial system (He and Wei, 2022). Nevertheless, in accordance with law, commercial banks are not allowed to engage in security businesses in the mainland market—this is why BOCI Securities Ltd., who was incorporated in Hong Kong in 1998 as the investment bank arm of Bank of China, is only operating in the overseas market. For robustness, we also reclassify the northbound custodians affiliated with the big five banks to cross-operating with qualitatively similar results (untabulated but available upon request).

[29]As explained in Section 2.3, the HKEX started releasing daily stock-level northbound holdings of all custodians through the Stock Connect on March 17, 2017. We choose the end date as December 31, 2019 when COVID-19 hit China (see more explanation on this point in footnote 20).

state-owned enterprises ($SOE$) and another for MSCI China index constituents ($MSCI$). We also control for past performance using cumulative stock returns over the prior month ($Ret_{1m}$) and the prior year ($Ret_{12m}$) following Liu et al. (2019). Detailed variable definitions are provided in Table A1.

Table 1 presents the summary statistics, highlighting several key features of our sample. First, northbound holdings across all origins exhibit a pronounced right-skewness, with ownership concentrated in a relatively small subset of eligible stocks. Second, among the three custodian categories, foreign custodians maintain the highest presence. Third, the average AR(1) coefficients for connected stocks reveal that flows from mainland custodians are the least persistent across all origins, suggesting that investors routing through mainland custodians are more likely to be short-term or speculative in nature.

Table 2 presents the summary statistics for subcategories within mainland and foreign custodians. We find that more-prestigious foreign and cross-operating mainland custodians maintain a larger market presence than their respective peers. For instance, the mean $NIF$ for more-prestigious foreign custodians is 0.024%, compared to only 0.001% for their less-prestigious counterparts. Furthermore, the AR(1) coefficients reveal that flows from less-prestigious foreign custodians and cross-operating mainland custodians exhibit lower persistence than those of their counterparts, suggesting a higher concentration of short-term trading within these groups.

# 4 Return Predictability of Northbound Flows

We now present the main empirical results of the paper. We first document heterogeneity in how the "see-through" reform affects the return predictability of northbound flows across different categories of custodians. These heterogeneous responses persist across firms with different ownership structures and over sample periods around news releases.

## 4.1 Portfolio Analyses across and within Custodian Origins

**Portfolio sorting by custodian origins.** We begin by examining the return predictability of northbound investor flows by custodian origin. Each week, we sort all eligible stocks into quintiles based on the northbound flows from different custodian origins over the preceding week. We then form value-weighted and equal-weighted portfolios, using adjusted opening prices from the first trading day of the subsequent week to calculate returns. For our value-weighted portfolios, following Jensen et al. (2021), we weight stocks by their free-float market capitalization, winsorized at the 5% and 95% levels.[30] We hold the weekly-rebalancing long-short strategy that buys (sells) stocks in the top (bottom) quintile quintile, and calculate the portfolios' alphas based on the LSY-three-factor model (Liu, Stambaugh and Yuan, 2019).[31] Specifically, the average risk-adjusted returns in pre- and post-reform periods are estimates of $\alpha_{pre}$ and $\alpha_{post}$ in the following regression:

$$R_{i,t} = \alpha_{pre} \times d_{pre,t} + \alpha_{post} \times d_{post,t} + \beta' X_t + \varepsilon_{i,t}, \tag{1}$$

where $d_{pre,t}$ and $d_{post,t}$ are dummy variables indicating pre- and post-reform periods based on the announcement day (08/24/2018) of the regulatory reform; $X_t$ is the market factor, size factor, and value factor from the LSY-three-factor model, and $R_{i,t}$ is the excess return in week $t$ on the short leg, the long leg, and their difference. The t-statistics are computed with Newey-West standard errors.[32]

Table 3 reports the estimation results, with Panels A and B presenting value-weighted and equal-weighted portfolio returns, respectively. In the pre-reform period, the value-weighted long-short portfolio ($HML$) sorted by $NIF$ from foreign custodians yields an average alpha of 0.437% per week ($t$-stat = 3.02), translating to approximately 22.7% annually. In compar-

[30] The results are robust to alternative weighting schemes, such as different winsorization thresholds or capped weightings as suggested by Jensen et al. (2021).

[31] We also calculate the portfolios' simple excess returns over risk-free rates as well as alphas from the CAPM model, the Fama and French (1993) three-factor model and the Carhart (1997) four-factor model. As shown in Appendix Table A9, the results remain quantitatively similar.

[32] We use Newey-West standard errors with three lags throughout the sorting analysis in the article.

ison, the alpha for flows through mainland custodians is 0.254% per week ($t$-stat = 2.83), or 13.2% annually. Post-reform, the return predictability of foreign custodians persists, albeit at a smaller magnitude of 0.245% per week. Importantly, the predictive power of mainland custodian flows becomes statistically negligible, with the weekly alpha dropping to 0.097% and losing significance. The results are quantitatively similar for equal-weighted portfolios.

In contrast to foreign and mainland custodians, HK custodians exhibit no evidence of return predictability in either the pre- or post-reform periods. These null findings serve as a credible placebo, suggesting that the observed shifts in predictability for the other two groups are unlikely to be driven by broader market trends. Given their negligible market share (as shown in Table 1) and the lack of discernible informational advantages even prior to the reform, we exclude HK custodians from the subsequent analyses.

We further test the statistical significance of the return differences between pre- and post-reform for each custodian category. These Difference-in-Differences results are reported in the last column "Post-Pre HML" of Table 3. None of these return differences are significant, which seems to suggest that the regulatory reform had a negligible impact on the predictability of northbound flows. This conclusion, however, changes when we zoom in and decompose flows by exploiting within-origin custodian heterogeneity.

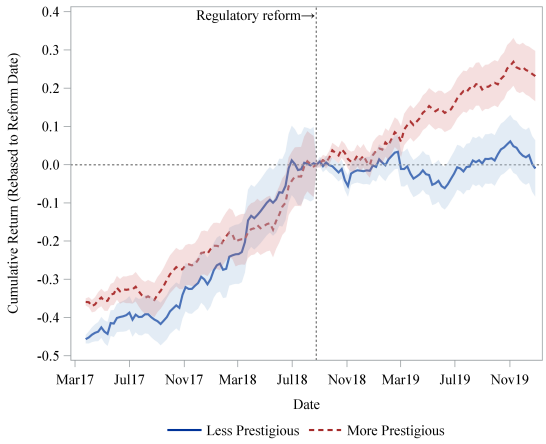
**Portfolio sorting within origin: problematic vs. normal custodians.** We posit that if homemade foreign trading indeed underlies the attenuated cross-sectional predictability observed after the reform, the effect should be stronger for these problematic custodians—namely, less-prestigious foreign custodians and cross-operating mainland custodians—as the reform curtails round-tripping activities conducted through northbound channels. As discussed in Sections 3.1, the former face lower reputational penalties for facilitating misconduct, while the latter leverage institutional ties with mainland entities. Consequently, the reform's disciplining effect should be most pronounced for these two groups, which represent the most plausible conduits for round-tripping capital.

We find strong support for this hypothesis. As reported in Table 4, before the reform,

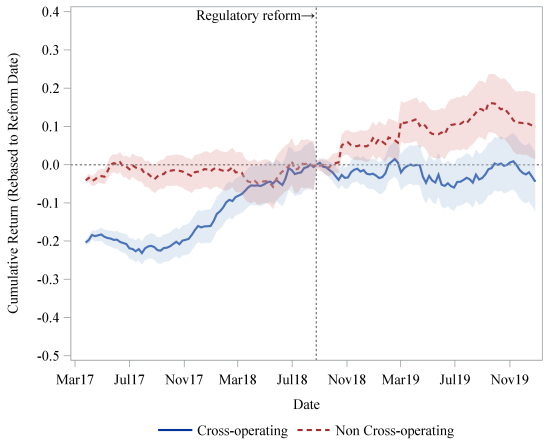
a long-short strategy based on flows from less prestigious foreign custodians generates a value-weighted LSY three-factor alpha of 0.591% per week ($t$-stat = 4.05), translating to a substantial 30.7% on an annualized basis. Following the reform, however, the returns from the same strategy virtually vanishes, becoming statistically and economically insignificant at 0.006% per week ($t$-stat = 0.05). In contrast, the return predictability of more-prestigious foreign custodians remains relatively resilient. While their alpha exhibits a slight post-reform decline, the difference is statistically insignificant, consistent with the full-sample results in Section 4.1. Crucially, the weakening in predictability for less-prestigious foreign custodians is significantly more pronounced than that for their more-prestigious counterparts; this between-group difference is both economically and statistically significant at -0.449% per week ($t$-stat = $-2.69$). We obtain comparable results using equal-weighted portfolios, which yield a between-group difference of -0.298% per week ($t$-stat = $-2.33$).

Similarly, Table 5 shows that the return predictability of northbound flows through cross-operating mainland custodians vanishes following the reform. In contrast, predictability of non-cross-operating custodians slightly increases; a Difference-in-Differences test, comparing cross- versus non-cross-operating custodians across the pre- and post-reform periods, reveals a significant reduction in return differentials. These findings support our conjecture that the see-through surveillance markedly eroded the informational advantages of investors utilizing cross-operating custodians as conduits.

Figure 4 presents the above regression results in a visual way, by plotting the cumulative returns of a long-short strategy between extreme quintiles sorted by $NIF$ originating from different custodians. Again, the regulatory reform in the third quarter of 2018 appears to mark a watershed in terms of the information advantage of northbound flows from more problematic custodians.




Panel A: More vs. less prestigious foreign custodians




Panel B: Cross-operating vs non cross-operating mainland custodians

Figure 4: **Return predictability of a long-short strategy: within origin.** This figure plots the cumulative returns of a long-short strategy between the top- and bottom-quintile value-weighted portfolios sorted by $NIF$ originated from different custodians with weekly rebalancing. Panel A shows the cumulative returns of a long-short strategy based on more prestigious and less prestigious foreign custodians, and one-standard deviation intervals around the sample mean during the pre- and post-reform periods, respectively. Panel B presents analogous metrics for cross-operating and non-cross-operating mainland custodians. The sample spans from March 17, 2017 to December 31, 2019. Stocks are weighted by their floating market capitalization, winsorized at the 5% and 95% levels. The vertical line indicates the announcement of the CSRC regulatory reform on August 24, 2018. The cumulative returns are normalized to zero on August 24, 2018.

**Formal panel regressions.** Table 6 presents the results from panel regressions of weekly excess returns on $NIF$ from different origins:

$$\begin{aligned} R_{i,t+1} =& \alpha + \beta_1 Treat_j \times Post_t \times NIF^j_{i,t} + \beta_2 Treat_j \times Post_t + \beta_3 Treat_j \times NIF^j_{i,t} \\ &+ \beta_4 Post_t \times NIF^j_{i,t} + \beta_5 Treat_j + \beta_6 NIF^j_{i,t} + X'_{i,t} c + \gamma_i + \eta_t + \varepsilon_{i,t+1}, \end{aligned} \tag{2}$$

where the dependent variable $R_{i,t+1}$ denotes the weekly excess return of stock $i$ over week $t+1$. $NIF^j_{i,t}$ is defined as weekly northbound flow from custodian type $j$ on firm $i$ over week $t$. $Treat_j$ is a dummy variable for "problematic custodian," equal to one if $NIF^j_{i,t}$ is constructed by flows from less prestigious foreign custodians (columns (1) and (2)) or cross-operating mainland custodians (columns (3) and (4)), and zero otherwise. The dummy variable $Post_t$ equals one for the period following the announcement of the regulatory reform on August

24, 2018, and zero otherwise. We include firm fixed effects ($\gamma_i$) and week fixed effects ($\eta_t$) in all specifications to control for time-invariant firm characteristics and common temporal shocks. Standard errors are clustered by industry to account for potential within-industry residual correlation.

Table 6 reports the results. We begin with a benchmark regression of future returns on northbound flows with no controls (in columns (1) and (3)). Firm characteristics and stocks' past returns are then added (in columns (2) and (4)) as control variables ($X_{it}$). We hypothesize that the return predictability of northbound flows from genuine foreign investors should persist, whereas that from problematic (treated) custodians should weaken following the reform. Column (2) supports this conjecture. The triple-interaction coefficient is negative and significant, indicating that the reform's impact on predictability is markedly more adverse for less-prestigious foreign custodians than for their more-prestigious counterparts.

We stress that the economic magnitude is substantial. An interquartile increase in weekly northbound flows corresponds to a 0.59% lower next-week return ($6.457 \times 0.091\%$, or 30.6% annualized) for less prestigious custodians from the pre- to post-reform period, relative to more prestigious ones. Column (4) shows a similar pattern for cross-operating mainland custodians, confirming that the reform effectively reduced their predictive power as well.[33]

## 4.2 Economic Channel and Robustness Tests

**Channel of information advantage: corporate announcements.** Northbound flows from problematic custodians are likely to manifest their informational advantages, particularly in the lead-up to major corporate announcements. Using the CSMAR database which covers a wide range of firm-specific news, we now examine return predictability surrounding official corporate filings in Chinese stock market.

Table 7 reports the average weekly returns of long-short portfolios sorted on northbound

[33] As a robustness check, we further incorporate contemporaneous northbound flows to control for potential flow-induced price pressure, and our main findings remain qualitatively unchanged. We also examine the relationship between northbound flows and future stock returns using Fama-MacBeth regressions. As reported in Appendix Table A5, the results are consistent with those obtained from our baseline panel specifications.

flows across different custodians, partitioned into announcement and non-announcement weeks. Pre-reform, a strategy tracking flows from less-prestigious foreign custodians in the week preceding an announcement outperforms its more-prestigious counterpart by 0.310% ($t$-stat = 1.84) in the subsequent announcement week (Panel A). Post-reform, this spread reverses to $-0.251\%$ ($t$-stat = $-1.84$), resulting in a significant pre-to-post difference of $-0.524\%$ ($t$-stat = $-2.63$). While a similar decline is observed during non-announcement periods, the magnitude is markedly weaker. Panel B exhibits comparable patterns for mainland custodians, where the erosion of return predictability for cross-operating custodians is notably more pronounced during announcement weeks. Collectively, these findings suggest that the informational advantages of problematic custodians deteriorate disproportionately around corporate announcements in the wake of the regulatory reform.

**Ownership heterogeneity.** Given the institutional background of China, it is natural to ask: Does the reform's impact vary with the ownership structure of the underlying firms? Intuitively, since non-state-owned enterprises (non-SOEs) are subject to less stringent government oversight, they might be more conducive to "homemade" foreign trading. However, such activities could also be prevalent within SOEs for two reasons. First, SOEs in Chinese stock markets often exhibit lower informational transparency due to their hierarchical, multi-layered organizational structures, creating more opportunities for insiders (Piotroski et al. 2015; Leippold et al. 2022). Second, senior SOE executives are frequently high-level government officials whose domestic trading accounts face tight restrictions, providing a stronger incentive to conceal their identities when trading.[34]

To assess this possibility, we categorize firms into SOEs and non-SOEs each year and re-estimate the panel regressions from Section 4.1. Table 8 shows that for both groups, the predictive power of northbound flows from problematic custodians declines markedly after

[34]Compelling evidence for the existence of foreign custodians intimately connected with insiders in Chinese SOEs is provided by media reports. Foreign custodians offered jobs and consulting contracts to the children of well-connected officials including the heads of SOEs and senior government officials to win business deals in China. For some high-profile example, see this news release.

the reform. For non-SOEs, the triple-interaction coefficient in Column (2) is significantly negative, indicating that the reform disproportionately weakens the return predictability of less prestigious foreign custodians. In terms of economic magnitude, an interquartile increase in weekly flows corresponds to a 0.54% reduction in next-week returns ($-5.882 \times 0.091\%$, or 27.8% annualized) from the pre- to post-reform period. SOEs exhibit a similarly strong pattern: the triple-interaction coefficient in Column (6) is $-6.203$ ($t$-stat $= -3.39$), confirming a substantial post-reform drop in predictability within SOEs as well.

**Robustness tests.** We conduct several robustness tests based on our baseline results. First, northbound holdings vary across custodians, and we therefore conduct a robustness test confirming that our results are not driven by any single custodian. Fixing one stock for each custodian, we first scale its stock-level northbound holdings by its own dollar amount of HKEX trading in 2021, and then aggregate this scaled holding to the custodian category level.[35] We repeat the same excises as in Table 4 and Table 5, and report the results in Appendix Tables A6 and A7. Second, following Jensen et al. (2023), we also try capped value-weighting in our portfolio construction to ensure that our portfolio-based results are not driven by a few mega stocks. Specifically, we weight stocks by their market values winsorized at the $80^{th}$ percentile of the entire A-share market, with results reported in Appendix Table A8. In addition, Appendix Table A9 presents the portfolio's simple excess returns over the risk-free rate, along with alphas from alternative benchmark adjustments, yielding quantitatively similar results.

# 5 Mainland Insider Trading and Northbound Flows

Recall Figure 2 in Section 2.3 shows that the insider trading dynamics of connected firms (relative to their unconnected peers) align closely with the launch of the Stock Connect program. Furthermore, the subsequent regulatory reform appears to effectively curb insider

[35] Data on the dollar amount of broker trading in the year of 2021 are from the website of AiIPO, https://aipo.myiqdii.com/broker/index.

round-tripping activities. Motivated by these observations, in this section we study the impact of "see-through" surveillance reform on insider trading in the Chinese stock market.

## 5.1 Insider Trading at Mainland Markets and Northbound Flows

If some mainland corporate insiders camouflage themselves as homemade foreign investors in the connect program, their trading direction prior to the regulatory reform should align with that of mainland-based insiders, as both groups exploit the same underlying private information.[36] Following the regulatory reform that curbs round-tripping activities, the alignment between northbound flows and mainland insider trades is expected to fade. This decoupling should be particularly pronounced for northbound flows originating from problematic custodians, which previously served as primary conduits for homemade foreign investors.

To formally examine the relationship between insider trading and northbound flows, and its interaction with different custodians, we run the panel regressions as follows:

$$\begin{aligned} InsiderTrading_{k,i,t} =& \alpha + \beta_1 Treat_j \times Post_t \times NIF^j_{i,t} + \beta_2 Treat_j \times Post_t \\ &+ \beta_3 Treat_j \times NIF^j_{i,t} + \beta_4 Post_t \times NIF^j_{i,t} + \beta_5 Treat_j \\ &+ \beta_6 NIF^j_{i,t} + X^{'}_{i,t} c + \gamma_i + \eta_t + \epsilon_{i,t}. \end{aligned} \tag{3}$$

Here, the dependent variable is the net insider trading volume for insider $k$ in firm $i$ on day $t$, scaled by the firm's total market capitalization and expressed as a percentage. Positive (negative) values denote insider purchases (sales). $NIF^j_{i,t}$ is defined as the daily northbound flow for custodian type $j$ for firm $i$ on the insider transaction's commencement date. As in our previous analysis, we define $Treat_j$ as a dummy variable that equals one if $NIF^j_{i,t}$ is

[36] This requires that mainland insiders, who could route their transactions through the Stock Connect in an inconspicuous way, still choose to conduct some of their information-based trades in the mainland market before the reform. There could be two reasons for this. First, to mitigate price impact, a single insider may split his/her trades into smaller orders, executing one portion domestically and channeling another portion through northbound flows. Second, different insiders of the same firm may exhibit heterogeneous risk appetites. While more aggressive insiders might exploit Hong Kong-based accounts to engage in round-trip trading within regulatory gray zones, others likely restrict their activities to the domestic exchange.

constructed from flows originating from problematic custodians, and zero otherwise. $Post_t$ is a dummy variable equal to one for observations following the reform. $\gamma_i$ and $\eta_t$ represent firm and week fixed effects, respectively, and we cluster standard errors at the industry level.

Our hypothesis posits a positive correlation between northbound flows from problematic custodians and mainland insider trades before the reform ($\beta_3 > 0$), followed by a decline in this correlation post-reform ($\beta_1 < 0$). Column (1) in Table 9 confirms both predictions. As shown in Column (1), the coefficient $\hat{\beta}_3 = 0.075$ ($t$-stat = 1.22) suggests that on average, northbound flows from less-prestigious foreign custodians exhibited a slightly higher correlation with mainland insider trading than their more-prestigious counterparts. More importantly, the triple-interaction coefficient $\hat{\beta}_1 = -0.174$ ($t$-stat = $-3.28$) implies that, following the reform, the flow correlation with insider trading attenuates much more sharply for less-prestigious foreign custodians.

Quantitatively, consider the northbound flows from less prestigious foreign custodians. A one-standard-deviation increase in daily northbound net inflows from foreign custodians is associated with 0.022% (= -0.174×0.127%) less insider net purchases compared to that with more prestigious ones, which is about 40% of the interquartile range of $InsiderTrading$ (0.055%). Taken together, the results in Columns (1) suggest that the directional co-movement between northbound flows from problematic custodians and mainland insiders become less pronounced after the regulatory reform.

Somewhat surprisingly, cross-operating mainland custodians do not exhibit similar qualitative patterns; $t$-statistic for $\hat{\beta}_3$ is virtually zero in Column (2) of Table 9. To reconcile these nuanced results, we decompose mainland insider trading further into purchases and sales. As reported in Columns (3) to (4), when focusing specifically on insider *sales*, the empirical patterns align closely with our primary findings. Specifically, prior to the reform, both cross-operating mainland custodians and less-prestigious foreign custodians tended to align their northbound net sales with mainland insider selling, as evidenced by the positive $\hat{\beta}_3$; but this alignment weakened significantly ($\hat{\beta}_1 < 0$) post reform.

We observe a muted policy effect when repeating the same exercise for mainland insider *purchases* in Columns (5) to (6). This suggests that insider purchases are less likely to be deliberately masked within northbound flows, a phenomenon that may stem from the unique institutional environment of China. In contrast to evidence from the U.S. (Lakonishok and Lee, 2001; Jeng et al., 2003), insider sales in China are highly informative about stock returns, and even exhibit greater sensitivity to firm fundamentals than insider purchases (He and Rui, 2016; Lian et al., 2018; Chang et al., 2024; Ye et al., 2025).[37]

## 5.2 Information Environment Heterogeneity

If our mechanism is at work, then the link between insider trading and northbound flows should depend on the firm's broader information environment. For firms with more opaque disclosures, the information asymmetry between insiders and external investors is larger, which exacerbates the opportunities for insiders to exploit private information through round-trip trading. Consequently, the regulatory reform should be more effective for firms with lower transparency.

Following Ali and Hirshleifer (2017), we identify firms with opaque disclosures by their tendency of earnings management. We measure this tendency using the absolute value of discretionary accruals (DA) as proposed by Dechow et al. (1995), where higher DA values indicate a less transparent information environment. To supplement this measure, we also employ the volume-synchronized probability of informed trading (VPIN) to capture firms characterized by greater information asymmetry (Easley et al., 2012). Based on these two metrics, we partition A-share firms into two groups DA (annually) and VPIN (weekly), and repeating the same regression as in Equation (3).

We report the results in Table 10. As shown in Column (3), the key coefficient for triple interaction is much larger in magnitude than the full-sample estimate, implying that the

[37] Another potential driver for the disparity between insider buying and selling is the difference in how these trades are executed. For profitable purchases, insiders may simply tip off their social or business connections such as distant relatives, friends, or related parties, to trade on their behalf. In contrast, for opportunistic selling, insiders must directly divest their own private stakes in the firms in question.

policy effect on the correlation between northbound flows from problematic custodians and mainland insider trading is more pronounced among firms with more opaque information environments. Take less prestigious foreign custodians as example, $\hat{\beta}_1 = -0.224$ implies that a one-standard-deviation increase in daily net inflows is associated with a 0.028% ($= -0.224 \times 0.127\%$) reduction in insider net trading relative to more prestigious custodians, which represents approximately 51% of the interquartile range of $InsiderTrading$. A similar pattern emerges for cross-operating mainland custodians when using VPIN as the proxy. Overall, the results support our conjecture that the concurrent trading activities of northbound investors from problematic custodians and mainland insiders are more sensitive to the regulatory reform among firms with greater information asymmetry.

## 5.3 The Impact of Policy Shock on Price Informativeness

Finally we address a broader question: What does the regulatory reform imply for price discovery in China's A-share market? Although the policy aimed to eliminate masked insider tradings, these investors were not merely noise traders—they were often corporate insiders who possessed significant informational advantages. Consequently, restricting their participation may have had the unintended consequence of reducing price informativeness of the connected stocks.

**Price informativeness and heterogeneity test.** Following Kacperczyk et al. (2021), we measure price informativeness using price nonsynchronicity to empirically test this conjecture, calculated as $1 - R^2$ from a regression of weekly stock returns on the market factor for each stock-year. By construction, higher values of $1 - R^2$ imply prices incorporate more firm-specific information, thereby representing greater price informativeness.

Table 11 reports the difference-in-differences estimates, comparing the evolution of price informativeness for connected versus unconnected stocks around the regulatory reform. In Panel A, $Treat_i$ is a dummy variable equal to one for connected stocks, while $Post_t$ equals one

for the post-reform period starting in 2018.[38] The interaction term is significantly negative. For instance, Column (2) shows that connected stocks experience a 4.7% greater decline in price nonsynchronicity relative to unconnected stocks following the reform, aligning with our conjecture that connected stocks suffer a more pronounced loss in price informativeness post-reform.

Panel B of Table 11 further examines heterogeneity within connected stocks regarding policy impact on informativeness. We compare firms with high versus low exposure to homemade foreign investors; that is, the treatment group consists of connected firms whose pre-reform trading volume, measured as the absolute northbound flows from problematic custodians, ranks above the median during the 12 weeks preceding the reform. The remaining connected firms serve as the control group, and we expect a significantly negative interaction coefficient from this exercise. Panel B confirms this conjecture; in Column (2), this effect amounts to a 3.0% reduction, representing 4.2% of the sample mean, relative to connected stocks with lower exposure.

**Robustness test.** Finally, we conduct robustness tests by excluding 2015 to ensure our results are not driven by that period's extreme boom-bust conditions (An et al., 2022; Bian et al., 2024). Such volatility can contaminate the price informativeness metrics and bias our estimates. As shown in Columns (3) and (4) of Table 11, the reform's effects remain qualitatively consistent and become even more pronounced.

# 6 Conclusion

Using daily stock-level holdings for all northbound custodians, this paper examines how the Investor Identification reform reshapes northbound trading behavior. Our analyses demonstrate the ability of regulators to reconcile wedges arising from capital market integration, highlighting the necessity of cross-border cooperation in curbing regulatory arbitrage.

[38] To ensure a clean identification, we exclude pre-2016 observations of Shenzhen-listed stocks from the treatment group because these firms were not yet eligible for the Stock Connect program during that period.

We present three results. First, we show weakening return predictability of northbound flows from less prestigious foreign custodians and cross-operating mainland custodians after the see-through surveillance reform, which presumably inhibits round-tripping insider trades. Second, the synchronized trading between northbound flows from problematic custodians and mainland insiders fell sharply following the regulatory reform. Third, the regulatory reform disproportionately reduces price informativeness in connected stocks, particularly those with high exposure to homemade foreign investors. All pieces of evidence point to the presence of homemade "foreign" investors who are likely to be mainland insiders concealing themselves behind northbound flows, and hence urge caution regarding the conclusions of prior studies showing the informativeness of foreign investors in China.

In the era of global regulatory cooperation, the effort to crack down on cross-border regulatory arbitrage continues. On June 24, 2022, the CSRC made an amendment to the regulations on investor eligibility: starting July 25, 2022, northbound brokers are no longer allowed to set up trading accounts for mainland investors.[39] This presumably leads to an elevated transaction cost and litigation risk for engaging in homemade foreign trading in China, and hopefully can encourage the flow of genuine foreign investment into the emerging capital market and improve market efficiency.

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[39]This supplementary regulation establishes a one-year transition period for existing mainland investors with offshore accounts, during which, starting July 24, 2023, they are prohibited from participating in northbound buying, but may sell their existing A-share holdings. For more details, please refer to the news release on the CSRC website, http://www.csrc.gov.cn/csrc/c101953/c3874209/content.shtml.

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Table 1: Summary statistics: northbound holdings and flows by origin and control variables

Panel A reports the summary statistics of our key variables by origin. $NIH$ denotes the level of northbound investor holdings (in percent) as of the end of each week. The variable is calculated as the ratio of northbound equity holdings to free-float shares. $NIF$ denotes weekly northbound investor flows (in percent). The variable is computed as the difference between $NIH$ as of the last trading day of week $t$ and week $t-1$. The subscript "$hk$" denotes northbound custodians originating from Hong Kong, Macau and Taiwan. The subscript "$m$" denotes Chinese Mainland custodians and the subscript "$f$" denotes foreign custodians.Panel B shows the summary statistics of the control variables. We include a set of firm characteristics and past stock returns as control variables, including firm size ($SIZE$), book-to-market ratio ($BM$), weekly turnover ($TOVER$), return on assets ($ROA$), a dummy variable indicating state-owned enterprises ($SOE$), a dummy variable indicating MSCI-China index constituents ($MSCI$), stock returns over the past four weeks ($Ret_{1m}$), and stock returns over the past one year ($Ret_{12m}$) following Liu et al. (2019).The sample spans from March 17, 2017 to December 31, 2019.

Panel A: Northbound Holdings and Flows

| | Obs | EW mean | VW Mean | Std. Dev | P1 | P25 | Median | P75 | P99 | AR(1) |
|---|---|---|---|---|---|---|---|---|---|---|
| $NIF_f$ | 190602 | 0.019 | 0.024 | 0.288 | -0.701 | -0.032 | 0.003 | 0.059 | 0.840 | 0.037 |
| $NIF_{hk}$ | 149133 | 0.000 | 0.000 | 0.027 | -0.027 | 0.000 | 0.000 | 0.000 | 0.029 | -0.111 |
| $NIF_m$ | 185253 | 0.002 | 0.001 | 0.081 | -0.211 | -0.008 | 0.000 | 0.010 | 0.227 | -0.153 |
| $NIH_f$ | 190602 | 1.509 | 2.568 | 3.056 | 0.002 | 0.137 | 0.459 | 1.383 | 17.044 | 0.946 |
| $NIH_{hk}$ | 149133 | 0.044 | 0.047 | 0.157 | 0.000 | 0.003 | 0.011 | 0.032 | 0.617 | 0.891 |
| $NIH_m$ | 185253 | 0.190 | 0.239 | 0.384 | 0.000 | 0.022 | 0.075 | 0.200 | 2.020 | 0.894 |

Panel B: Control Variables

| | Obs | Mean | Std. Dev | P1 | P25 | Median | P75 | P99 |
|---|---|---|---|---|---|---|---|---|
| $SIZE$ | 188929 | 23.108 | 1.050 | 21.044 | 22.424 | 22.938 | 23.655 | 26.430 |
| $BM$ | 188929 | 0.635 | 0.259 | 0.090 | 0.430 | 0.640 | 0.850 | 1.130 |
| $Ret_{1m}$ | 188929 | -0.004 | 0.111 | -0.244 | -0.069 | -0.011 | 0.051 | 0.324 |
| $Ret_{12m}$ | 188929 | -0.040 | 0.359 | -0.603 | -0.269 | -0.096 | 0.114 | 1.182 |
| $TOVER$ | 188929 | 0.053 | 0.064 | 0.003 | 0.018 | 0.033 | 0.062 | 0.318 |
| $ROA$ | 188929 | 0.013 | 0.035 | -0.037 | 0.004 | 0.011 | 0.021 | 0.071 |
| $SOE$ | 188929 | 0.388 | 0.487 | 0.000 | 0.000 | 0.000 | 1.000 | 1.000 |
| $MSCI$ | 188929 | 0.146 | 0.353 | 0.000 | 0.000 | 0.000 | 0.000 | 1.000 |

Table 2: Summary statistics: northbound custodians within origin

This table presents the summary statistics of $NIF$ and $NIH$ of different categories of mainland and foreign custodians. $NIH$ denotes the level of northbound investor holdings (in percent) as of the end of each week. The variable is calculated as the ratio of northbound equity holdings to free-float shares. $NIF$ denotes weekly northbound investor flows (in percent) computed as the difference between northbound holding as of the last trading day of week $t$ and week $t-1$. We classify a foreign custodian as more prestigious if it ranks above the median for "fee and commission income," or if it is voted as leaders in custody in emerging markets; and we classify a mainland custodian as cross-operating if it reports both mainland and overseas brokerage revenues to the Securities Association of China. The sample spans from March 17, 2017 to December 31, 2019.

Panel A: Foreign custodians

| | Obs | EW mean | VW Mean | Std. Dev | P1 | P25 | Median | P75 | P99 | AR(1) |
|---|---|---|---|---|---|---|---|---|---|---|
| $NIF_f^{lessprestigious}$ | 171690 | 0.001 | 0.001 | 0.052 | -0.128 | -0.005 | 0.000 | 0.007 | 0.137 | -0.145 |
| $NIF_f^{moreprestigious}$ | 190490 | 0.018 | 0.024 | 0.277 | -0.666 | -0.028 | 0.003 | 0.053 | 0.807 | 0.043 |
| $NIH_f^{lessprestigious}$ | 171690 | 0.080 | 0.110 | 0.236 | 0.000 | 0.004 | 0.020 | 0.068 | 1.093 | 0.796 |
| $NIH_f^{moreprestigious}$ | 190490 | 1.438 | 2.463 | 2.967 | 0.001 | 0.119 | 0.419 | 1.298 | 16.318 | 0.945 |

Panel B: Mainland custodians

| | Obs | EW mean | VW Mean | Std. Dev | P1 | P25 | Median | P75 | P99 | AR(1) |
|---|---|---|---|---|---|---|---|---|---|---|
| $NIF_m^{Cross\text{-}operating}$ | 180955 | 0.001 | 0.001 | 0.077 | -0.201 | -0.008 | 0.000 | 0.010 | 0.214 | -0.175 |
| $NIF_m^{NonCross\text{-}operating}$ | 148829 | 0.000 | 0.000 | 0.031 | -0.046 | 0.000 | 0.000 | 0.000 | 0.051 | -0.040 |
| $NIH_m^{Cross\text{-}operating}$ | 180955 | 0.147 | 0.168 | 0.333 | 0.000 | 0.013 | 0.049 | 0.145 | 1.752 | 0.871 |
| $NIH_m^{NonCross\text{-}operating}$ | 148829 | 0.058 | 0.079 | 0.185 | 0.000 | 0.002 | 0.014 | 0.048 | 0.659 | 0.895 |

Table 3: Portfolio analysis: northbound flows by origin

This table presents the LSY-three-factor adjusted returns of portfolios sorted by weekly $NIF$ from different origins of custodians. We first classify all northbound custodians into foreign custodians, custodians originating from Hong Kong, Macau and Taiwan, and Chinese mainland custodians. Each week, we sort all connected stocks into five quintiles based on $NIF$ during the past week, and construct value-weighted as well as equal-weighted quintile portfolios using opening price on the first trading day of the next week. We hold the portfolios for one week. The sample period is from March 17, 2017 to December 31, 2019. The pre- and post-reform sub-samples are divided based on the announcement day of penetrating regulatory reform, August 24, 2018. Column "Post-Pre" reports the return differences of a long-short strategy between pre- and post-reform periods. The t-statistics are computed with Newey-West standard errors with three lags. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Value weighted

| | Pre | | | Post | | | Post-Pre |
|---|---|---|---|---|---|---|---|
| | Low | High | HML | Low | High | HML | HML |
| Foreign | -0.090 | 0.347*** | 0.437*** | 0.022 | 0.266*** | 0.245*** | -0.192 |
| | (-0.91) | (3.17) | (3.02) | (0.18) | (2.70) | (3.00) | (-1.20) |
| Hong Kong | 0.036 | 0.054 | 0.018 | 0.065 | 0.087 | 0.022 | 0.004 |
| | (0.44) | (0.64) | (0.23) | (0.60) | (0.68) | (0.31) | (0.04) |
| Mainland | -0.035 | 0.219** | 0.254*** | -0.036 | 0.061 | 0.097 | -0.157 |
| | (-0.40) | (2.38) | (2.83) | (-0.33) | (0.48) | (0.91) | (-1.14) |

Panel B: Equal weighted

| | Pre | | | Post | | | Post-Pre |
|---|---|---|---|---|---|---|---|
| | Low | High | HML | Low | High | HML | HML |
| Foreign | 0.013 | 0.389*** | 0.377*** | 0.039 | 0.270** | 0.232*** | -0.145 |
| | (0.13) | (3.66) | (3.33) | (0.35) | (2.43) | (2.86) | (-1.04) |
| Hong Kong | 0.035 | 0.040 | 0.005 | 0.081 | 0.086 | 0.005 | 0.000 |
| | (0.45) | (0.51) | (0.08) | (0.74) | (0.70) | (0.09) | (0.00) |
| Mainland | 0.089 | 0.212*** | 0.122* | 0.058 | 0.057 | -0.001 | -0.124 |
| | (1.05) | (2.61) | (1.80) | (0.57) | (0.45) | (-0.01) | (-0.98) |

Table 4: Portfolio analysis: more / less prestigious foreign custodians

This table presents the LSY-three-factor adjusted returns of portfolios by sorting on weekly $NIF$ from more prestigious and less prestigious foreign custodians. A custodian is classified as more prestigious based on whether it ranks above the median for "fee and commission income," or it is voted as a leader in custody in emerging markets. Each week, we sort all connected stocks into five quintiles based on $NIF$ during the past week, and construct value-weighted as well as equal-weighted quintile portfolios using opening price on the first trading day of the next week. We hold the portfolios for one week. The sample period is from March 17, 2017 to December 31, 2019. The pre- and post-reform sub-samples are divided based on the announcement day of penetrating regulatory reform, August 24, 2018. Column "Post-Pre" reports the return differences of a long-short strategy between pre- and post-reform periods. The t-statistics are computed with Newey-West standard errors with three lags. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Value weighted

| | Pre | | | Post | | | Post-Pre |
|---|---|---|---|---|---|---|---|
| | Low | High | HML | Low | High | HML | HML |
| Less prestigious | -0.122 | 0.469*** | 0.591*** | 0.159 | 0.164 | 0.006 | -0.585*** |
| | (-1.37) | (4.00) | (4.05) | (1.23) | (1.63) | (0.05) | (-3.51) |
| More prestigious | -0.059 | 0.312*** | 0.370*** | 0.023 | 0.257** | 0.234*** | -0.136 |
| | (-0.58) | (2.85) | (2.60) | (0.19) | (2.53) | (2.90) | (-0.86) |
| Less - More | -0.064 | 0.157* | 0.221 | 0.136 | -0.093* | -0.228** | -0.449*** |
| | (-0.85) | (1.87) | (1.61) | (1.60) | (-1.87) | (-2.03) | (-2.69) |

Panel B: Equal weighted

| | Pre | | | Post | | | Post-Pre |
|---|---|---|---|---|---|---|---|
| | Low | High | HML | Low | High | HML | HML |
| Less prestigious | -0.012 | 0.483*** | 0.495*** | 0.158 | 0.236** | 0.078 | -0.417*** |
| | (-0.12) | (4.27) | (4.38) | (1.51) | (2.08) | (0.92) | (-3.22) |
| More prestigious | 0.013 | 0.363*** | 0.350*** | 0.038 | 0.268** | 0.231*** | -0.119 |
| | (0.14) | (3.56) | (3.19) | (0.33) | (2.33) | (2.74) | (-0.87) |
| Less - More | -0.025 | 0.120 | 0.145* | 0.121 | -0.032 | -0.153 | -0.298** |
| | (-0.45) | (1.51) | (1.73) | (1.50) | (-0.64) | (-1.36) | (-2.33) |

Table 5: Portfolio analysis: cross-operating / non cross-operating mainland custodians

This table presents the LSY-three-factor adjusted returns of portfolios by sorting on weekly $NIF$ from cross-operating and non cross-operating mainland custodians. Custodians are classified based on Securities Association of China's list. Each week, we sort all connected stocks into five quintiles based on $NIF$ during the past week, and construct value-weighted as well as equal-weighted quintile portfolios using opening price on the first trading day of the next week. We hold the portfolios for one week. The sample period is from March 17, 2017 to December 31, 2019. The pre- and post-reform sub-samples are divided based on the announcement day of penetrating regulatory reform, August 24, 2018. Column "Post-Pre" reports the return differences of a long-short strategy between pre- and post-reform periods. The t-statistics are computed with Newey-West standard errors with three lags. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Value weighted

| | Pre | | | Post | | | Post-Pre |
|---|---|---|---|---|---|---|---|
| | Low | High | HML | Low | High | HML | HML |
| Cross-operating | 0.005 | 0.283*** | 0.278*** | 0.057 | 0.021 | -0.036 | -0.314** |
| | (0.05) | (3.11) | (2.88) | (0.54) | (0.16) | (-0.34) | (-2.19) |
| Non Cross-operating | -0.029 | 0.043 | 0.072 | -0.007 | 0.142 | 0.149 | 0.077 |
| | (-0.37) | (0.48) | (0.70) | (-0.06) | (1.03) | (1.10) | (0.51) |
| Cross - Non Cross | 0.034 | 0.240*** | 0.206 | 0.064 | -0.121 | -0.185 | -0.391* |
| | (0.43) | (2.58) | (1.36) | (0.69) | (-1.14) | (-1.05) | (-1.89) |

Panel B: Equal weighted

| | Pre | | | Post | | | Post-Pre |
|---|---|---|---|---|---|---|---|
| | Low | High | HML | Low | High | HML | HML |
| Cross-operating | 0.113 | 0.254*** | 0.141* | 0.113 | 0.044 | -0.069 | -0.209* |
| | (1.31) | (2.94) | (1.87) | (1.14) | (0.35) | (-0.74) | (-1.68) |
| Non Cross-operating | 0.060 | 0.015 | -0.045 | 0.006 | 0.084 | 0.078 | 0.123 |
| | (0.77) | (0.19) | (-0.54) | (0.05) | (0.68) | (0.77) | (1.19) |
| Cross - Non Cross | 0.053 | 0.239*** | 0.186 | 0.106 | -0.040 | -0.146 | -0.332** |
| | (0.79) | (2.84) | (1.46) | (1.16) | (-0.6) | (-1.13) | (-2.06) |

Table 6: Northbound flows' return predictability: panel regressions

This table presents the results from panel regressions using a stock-week-custodian category panel. The dependent variable is the weekly excess returns. In Columns (1) and (2), $Treat$ is a dummy variable equal to one if $NIF$ is that of less prestigious foreign custodians, and zero for more prestigious foreign custodians. In Columns (3) and (4), $Treat$ is a dummy variable equal to one if $NIF$ is that of cross-operating mainland custodians, and zero for non cross-operating mainland custodians. The $Post$ dummy equals one after the announcement day of penetrating regulatory reform, August 24, 2018. Firm characteristics and stocks' past returns are then added as control variables, including firm size ($SIZE$), book-to-market ratio ($BM$), return on assets ($ROA$), weekly turnover ($TOVER$), a dummy variable indicating state-owned enterprises ($SOE$), a dummy variable indicating MSCI-China index constituents ($MSCI$), stock returns over the past four weeks ($Ret_{1m}$), and stock returns over the past one year ($Ret_{12m}$). The sample period is from March 17, 2017 to December 31, 2019. All continuous explanatory variables are winsorized at the 5% and 95% levels. We include firm fixed effects and week fixed effects, and cluster standard errors by industry. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | Foreign | | Mainland | |
| $Treat \times Post \times NIF$ | -6.249*** | -6.457*** | -32.850*** | -36.120*** |
| | (-3.89) | (-4.04) | (-2.97) | (-3.19) |
| $Treat \times Post$ | -0.035*** | -0.033*** | 0.010 | -0.000 |
| | (-4.11) | (-3.70) | (0.72) | (-0.04) |
| $Treat \times NIF$ | 5.918*** | 5.819*** | 12.117*** | 11.751*** |
| | (5.57) | (5.53) | (3.33) | (2.88) |
| $Post \times NIF$ | -1.052*** | -0.954*** | 30.731*** | 34.108*** |
| | (-5.68) | (-5.65) | (2.77) | (2.99) |
| $Treat$ | 0.043*** | 0.053*** | 0.010** | 0.000 |
| | (6.50) | (6.87) | (2.01) | (0.03) |
| $NIF$ | 1.512*** | 1.463*** | -10.739*** | -10.449*** |
| | (5.66) | (5.75) | (-3.05) | (-2.65) |
| Control | No | Yes | No | Yes |
| Observations | 347,782 | 347,782 | 317,464 | 317,464 |
| Stock FE | Yes | Yes | Yes | Yes |
| Week FE | Yes | Yes | Yes | Yes |
| Adj. $R^2$ | 0.310 | 0.315 | 0.307 | 0.312 |

Table 7: Portfolio analysis: return predictability around the news release

This table presents the average LSY-three-factor adjusted returns of portfolios during announcement periods and non-announcement periods by sorting on weekly $NIF$ from from different categories of custodians. The classification of foreign and mainland custodians is the same as in Table 4 and Table 5. Each week, we sort all connected stocks into five quintiles based on $NIF$ during the past week, construct value-weighted portfolios, and hold the portfolios for one week. The announcement periods are defined as the weeks when the company news are released, while the remaining weeks are defined as non-announcement periods.The sample period is from March 17, 2017 to December 31, 2019. The pre- and post-reform sub-samples are divided based on the announcement day of penetrating regulatory reform, August 24, 2018. The t-statistics are computed with Newey-West standard errors with three lags. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Foreign custodians

| | | Pre | | | Post | | | Post-Pre |
|---|---|---|---|---|---|---|---|---|
| | | Low | High | HML | Low | High | HML | HML |
| Non-announcement periods | Less prestigious | -0.165 | 0.455*** | 0.620*** | -0.065 | -0.041 | 0.024 | -0.596*** |
| | | (-1.50) | (3.10) | (4.35) | (-0.50) | (-0.32) | (0.19) | (-3.37) |
| | More prestigious | -0.165 | 0.246* | 0.411** | -0.100 | 0.127 | 0.227** | -0.185 |
| | | (-1.39) | (1.88) | (2.55) | (-0.74) | (1.06) | (2.20) | (-0.99) |
| | Less-More | 0.001 | 0.209* | 0.209 | 0.035 | -0.168** | -0.202 | -0.411** |
| | | (0.01) | (1.73) | (1.33) | (0.36) | (-2.07) | (-1.26) | (-1.98) |
| Announcement periods | Less prestigious | -0.066 | 0.544*** | 0.610*** | 0.235* | 0.228** | -0.008 | -0.617*** |
| | | (-0.66) | (4.02) | (3.36) | (1.74) | (2.23) | (-0.06) | (-3.00) |
| | More prestigious | 0.047 | 0.347*** | 0.300* | 0.076 | 0.282*** | 0.207** | -0.093 |
| | | (0.40) | (3.06) | (1.87) | (0.58) | (2.69) | (2.02) | (-0.52) |
| | Less-More | -0.112 | 0.197** | 0.310* | 0.160* | -0.055 | -0.215* | -0.524*** |
| | | (-1.10) | (2.07) | (1.84) | (1.67) | (-0.93) | (-1.84) | (-2.63) |

Panel B: Mainland custodians

| | | Pre | | | Post | | | Post-Pre |
|---|---|---|---|---|---|---|---|---|
| | | Low | High | HML | Low | High | HML | HML |
| Non-announcement periods | Cross Operating | 0.049 | 0.177 | 0.129 | -0.057 | -0.056 | 0.001 | -0.128 |
| | | (0.32) | (1.57) | (0.81) | (-0.46) | (-0.35) | (0.01) | (-0.65) |
| | Non-cross Operating | -0.033 | 0.033 | 0.066 | -0.123 | 0.026 | 0.149 | 0.083 |
| | | (-0.28) | (0.25) | (0.45) | (-0.84) | (0.16) | (1.00) | (0.41) |
| | Cross- Non Cross | 0.081 | 0.144 | 0.063 | 0.066 | -0.082 | -0.148 | -0.211 |
| | | (0.53) | (1.14) | (0.24) | (0.63) | (-0.61) | (-0.78) | (-0.69) |
| Announcement periods | Cross Operating | 0.077 | 0.381*** | 0.304*** | 0.107 | 0.006 | -0.101 | -0.405** |
| | | (0.75) | (3.62) | (2.59) | (1.00) | (0.05) | (-0.83) | (-2.32) |
| | Non-cross Operating | 0.032 | 0.071 | 0.038 | 0.032 | 0.132 | 0.100 | 0.061 |
| | | (0.39) | (0.70) | (0.32) | (0.26) | (1.02) | (0.67) | (0.36) |
| | Cross- Non Cross | 0.045 | 0.310*** | 0.266 | 0.076 | -0.125 | -0.201 | -0.467* |
| | | (0.45) | (2.79) | (1.47) | (0.73) | (-1.01) | (-1.00) | (-1.87) |

Table 8: Return predictability: ownership heterogeneity

This table presents the results from panel regressions using a stock-week-custodian category panel. Each year, we first sort stocks into non-SOEs and SOEs. The dependent variable is the weekly excess returns. For foreign custodians, $Treat$ is a dummy variable equal to one if $NIF$ is that of less prestigious foreign custodians, and zero for more prestigious foreign custodians. For mainland custodians, $Treat$ is a dummy variable equal to one if $NIF$ is that of cross-operating mainland custodians, and zero for non cross-operating mainland custodians. The $Post$ dummy equals one after the announcement day of penetrating regulatory reform, August 24, 2018. Firm characteristics and stocks' past returns are then added as control variables, including firm size ($SIZE$), book-to-market ratio ($BM$), return on assets ($ROA$), weekly turnover ($TOVER$), a dummy variable indicating MSCI-China index constituents ($MSCI$), stock returns over the past four weeks ($Ret_{1m}$), and stock returns over the past one year ($Ret_{12m}$). The sample period is from March 17, 2017 to December 31, 2019. All continuous explanatory variables are winsorized at the 5% and 95% levels. We include firm fixed effects and week fixed effects, and cluster standard errors by industry. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| | non-SOEs | | | | SOEs | | | |
| | Foreign | | Mainland | | Foreign | | Mainland | |
| $Treat \times Post \times NIF$ | -5.651*** | -5.882*** | -30.092*** | -34.017*** | -6.015*** | -6.203*** | -32.780* | -34.993* |
| | (-4.47) | (-4.79) | (-2.70) | (-3.22) | (-3.37) | (-3.39) | (-1.65) | (-1.80) |
| $Treat \times Post$ | -0.906*** | -0.786*** | 27.161** | 31.200*** | -1.247*** | -1.198*** | 32.158 | 34.504* |
| | (-4.33) | (-4.30) | (2.48) | (3.01) | (-7.06) | (-6.69) | (1.59) | (1.74) |
| $Treat \times NIF$ | 5.684*** | 5.605*** | 13.278** | 13.467** | 5.454*** | 5.310*** | 11.372* | 9.952 |
| | (7.62) | (8.03) | (2.52) | (2.54) | (3.34) | (3.13) | (1.66) | (1.44) |
| $Post \times NIF$ | -0.055*** | -0.048*** | 0.022 | 0.008 | -0.007 | -0.011 | -0.003 | -0.008 |
| | (-5.75) | (-4.40) | (1.10) | (0.37) | (-0.85) | (-1.06) | (-0.54) | (-0.96) |
| $Treat$ | 1.277*** | 1.203*** | -11.229** | -11.552** | 1.889*** | 1.895*** | -11.091* | -9.700 |
| | (4.41) | (4.60) | (-2.16) | (-2.25) | (8.83) | (8.30) | (-1.68) | (-1.45) |
| $NIF$ | 0.055*** | 0.059*** | 0.012 | 0.007 | 0.025*** | 0.042*** | 0.008 | -0.014** |
| | (6.32) | (6.74) | (1.37) | (0.88) | (3.92) | (5.95) | (1.45) | (-2.30) |
| Control | No | Yes | No | Yes | No | Yes | No | Yes |
| Observations | 212,180 | 212,180 | 187,783 | 187,783 | 135,602 | 135,602 | 129,681 | 129,681 |
| Stock FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Week FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Adj. $R^2$ | 0.311 | 0.316 | 0.306 | 0.311 | 0.326 | 0.332 | 0.325 | 0.331 |

Table 9: Correlation between insider trading and northbound flows

This table shows the results of regressing individual-level insider trading on the contemporaneous northbound flows. The dependent variable is the signed ratio of insider trading amount to market capitalization (%) in Columns (1)–(2), and the signed ratios of insider sales and purchases to market capitalization (%) in Columns (3)–(4) and (5)–(6), respectively. In Columns (1) (3) and (5), $Treat$ is a dummy variable equal to one if $NIF$ is that of less prestigious foreign custodians, and zero for more prestigious foreign custodians. In Columns (2) (4) and (6), $Treat$ is a dummy variable equal to one if $NIF$ is that of cross-operating mainland custodians, and zero for non cross-operating mainland custodians. $NIF$ is defined as daily northbound flow at the firm at the beginning date of insider transactions (in percent). The $Post$ dummy equals one after the announcement day of penetrating regulatory reform, August 24, 2018. Firm characteristics and stock past returns are then added as control variables, including firm size ($SIZE$), book-to-market ratio ($BM$), return on assets ($ROA$), weekly turnover ($TOVER$), a dummy variable indicating state-owned enterprises ($SOE$), a dummy variable indicating MSCI-China index constituents ($MSCI$), stock returns over the past four weeks ($Ret_{1m}$), and stock returns over the past one year ($Ret_{12m}$). The sample period is from March 17, 2017 to December 31, 2019. All continuous variables are winsorized at the 5% and 95% levels. We include firm fixed effects and week fixed effects, and cluster standard errors by industry. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | All | | Sales | | Purchases | |
| | Foreign | Mainland | Foreign | Mainland | Foreign | Mainland |
| $Treat \times Post \times NIF$ | -0.174*** | -2.776** | -0.095* | -3.746*** | -0.102 | 2.089* |
| | (-3.28) | (-2.21) | (-1.69) | (-4.46) | (-1.21) | (1.80) |
| $Treat \times Post$ | 0.003*** | -0.004*** | 0.001* | -0.002** | 0.001** | -0.001* |
| | (4.85) | (-3.78) | (1.77) | (-2.28) | (2.57) | (-1.88) |
| $Treat \times NIF$ | 0.075 | 0.101 | 0.022 | 1.759* | 0.010 | -2.136*** |
| | (1.22) | (0.14) | (0.33) | (1.74) | (0.14) | (-2.92) |
| $Post \times NIF$ | 0.034 | 2.854** | 0.036 | 3.863*** | 0.037*** | -2.078* |
| | (1.42) | (2.26) | (1.32) | (4.65) | (2.95) | (-1.71) |
| $Treat$ | -0.002*** | 0.002*** | 0.000 | -0.001 | -0.003*** | 0.002*** |
| | (-3.62) | (3.92) | (0.85) | (-1.12) | (-10.15) | (7.88) |
| $NIF$ | -0.052*** | -0.195 | -0.066*** | -1.885* | -0.030*** | 2.084*** |
| | (-3.08) | (-0.27) | (-4.19) | (-1.92) | (-4.28) | (2.73) |
| Control | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 23,812 | 20,716 | 13,115 | 11,422 | 10,618 | 9,188 |
| Stock FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Week FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Adj. $R^2$ | 0.440 | 0.441 | 0.389 | 0.400 | 0.538 | 0.550 |

Table 10: Correlation between insider trading and northbound flows: heterogeneity analysis

This table shows results of regressing insider trading on the contemporaneous northbound flows in heterogeneous samples. We rank firms into halves based on their absolute value of discretionary accruals (DA) proposed by Dechow et al. (1995) each year, and their value of volume-synchronized probability of informed trading (VPIN) proposed by Easley et al. (2012) each week, respectively. The dependent variable is the signed ratio of insider trading amount to firms' market capitalization (in percent). $Treat$ is a dummy variable equal to one if $NIF$ is that of less prestigious foreign custodians (cross-operating mainland custodians) and zero otherwise. $NIF$ is defined as daily northbound flow at the firm at the beginning date of insider transactions (in percent). The $Post$ dummy equal one after the announcement day of penetrating regulatory reform, August 24, 2018. Firm characteristics and stock's past returns are then added as control variables, including firm size ($SIZE$), book-to-market ratio ($BM$), return on assets ($ROA$), weekly turnover ($TOVER$), a dummy variable indicating state-owned enterprises ($SOE$), a dummy variable indicating MSCI-China index constituents ($MSCI$), stock returns over the past four weeks ($Ret_{1m}$), and stock returns over the past one year ($Ret_{12m}$). The sample period is from March 17, 2017 to December 31, 2019. All continuous variables are winsorized at the 5% and 95% levels. We include firm fixed effects and week fixed effects, and cluster standard errors by industry. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| | Low abs(DA) | | High abs(DA) | | Low VPIN | | High VPIN | |
| | Foreign | Mainland | Foreign | Mainland | Foreign | Mainland | Foreign | Mainland |
| $Treat \times Post \times NIF$ | -0.042 | 1.365 | -0.224*** | -3.796*** | -0.013 | 2.684 | -0.210** | -5.648*** |
| | (-0.57) | (1.11) | (-3.51) | (-3.10) | (-0.21) | (1.16) | (-2.27) | (-3.54) |
| $Treat \times Post$ | 0.003*** | -0.004*** | 0.002*** | -0.003*** | 0.002*** | -0.004*** | 0.003*** | -0.002*** |
| | (5.89) | (-4.87) | (3.08) | (-3.59) | (4.13) | (-5.04) | (3.29) | (-2.69) |
| $Treat \times NIF$ | 0.059 | -4.237*** | 0.034 | 1.545 | -0.003 | -2.027* | 0.138* | 1.480 |
| | (0.73) | (-6.70) | (0.46) | (1.48) | (-0.04) | (-1.79) | (1.86) | (0.91) |
| $Post \times NIF$ | 0.002 | -1.400 | 0.058*** | 3.921*** | 0.003 | -2.531 | 0.027 | 5.699*** |
| | (0.06) | (-1.14) | (3.06) | (3.14) | (0.11) | (-1.12) | (1.70) | (3.51) |
| $Treat$ | -0.003*** | 0.004*** | -0.002*** | 0.001* | -0.001*** | 0.002*** | -0.002** | 0.001 |
| | (-4.11) | (4.61) | (-2.80) | (1.84) | (-4.29) | (6.32) | (-2.47) | (1.38) |
| $NIF$ | -0.012 | 4.205*** | -0.090*** | -1.641 | -0.014 | 1.894* | -0.050*** | -1.611 |
| | (-0.37) | (6.38) | (-7.69) | (-1.55) | (-0.61) | (1.74) | (-2.86) | (-0.97) |
| Control | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 11,083 | 9,432 | 12,335 | 10,871 | 11,801 | 10,243 | 10,608 | 9,142 |
| Stock FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Week FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Adj. $R^2$ | 0.542 | 0.550 | 0.444 | 0.438 | 0.487 | 0.494 | 0.502 | 0.501 |

Table 11: Pricing informativeness and policy shock

This table shows results of a difference-in-differences regression model for price informativeness. The dependent variable is price nonsynchronicity, calculated as $1 - R^2$ with $R^2$ being the R-squared from a regression of individual stock returns on the market factor. In Panel A, $Treat$ is a dummy variable equal to one if the stock is on the list of connected firms on August 24, 2018, and zero otherwise. In Panel B, the treated group consists of connected stocks with above-median higher trading volume (measured by the sum of the absolute value of northbound flow) associated with problematic custodians over the pre-reform window spanning 12 weeks before the policy shock, while the remaining connected stocks serve as controls. The $Post$ dummy equals one for all years starting from 2018 onward, and 0 for all preceding years. Firm characteristics are added as control variables, including firm size ($SIZE$), book-to-market ratio ($BM$), return on assets ($ROA$), annual turnover ($TOVER$), a dummy variable indicating state-owned enterprises ($SOE$), a dummy variable indicating MSCI-China index constituents ($MSCI$) and stock returns over the past one year ($Ret_{12m}$). Given the annual frequency of the panel data, we exclude stock returns over the past four weeks ($Ret_{1m}$) from our control set. All continuous variables are winsorized at the 5% and 95% levels. The sample period spans 2014 to 2024 in columns (1) and (2). The sample in columns (3) and (4) omits 2015 due to the stock market bubble crash. We include firm fixed effects and year fixed effects, and cluster standard errors by industry. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Connected v.s. Unconnected Stocks

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | 2014-2024 | | w/o 2015 | |
| $Treat \times Post$ | -0.058*** | -0.047*** | -0.061*** | -0.048*** |
| | (-9.73) | (-8.93) | (-11.95) | (-9.28) |
| Control | No | Yes | No | Yes |
| Observations | 38,984 | 33,362 | 36,954 | 31,653 |
| Firm FE | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes |
| Adj. $R^2$ | 0.459 | 0.508 | 0.436 | 0.497 |

Panel B: Heterogeneity within Connected Stocks

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | 2014-2024 | | w/o 2015 | |
| $Treat \times Post$ | -0.033*** | -0.030*** | -0.035*** | -0.031*** |
| | (-5.73) | (-4.52) | (-6.10) | (-5.43) |
| Control | No | Yes | No | Yes |
| Observations | 14,152 | 13,112 | 13,648 | 12,671 |
| Firm FE | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes |
| Adj. $R^2$ | 0.457 | 0.494 | 0.447 | 0.489 |

# Appendix A Data and Replication Manual

## A.1 Portfolio Analysis

For stock $i$, equity holdings are aggregated over all custodians within custodian category $j$ to obtain northbound investor holding ($NIH_{it}^{j}$) at the end of week $t$. For custodian category $j$, weekly northbound investor flow ($NIF_{it}^{j}$) is computed as the weekly change of $NIH_{it}^{j}$.

The mainland and Hong Kong exchanges are responsible for the semi-annual review of eligible stocks listed on the other market based on the changes in specific indices. For forming portfolios, we keep stock-date observations only when the stock was on the connected list on that day. For example, the Yonyou Network Technology (600588) was deleted from the eligible stock list for northbound investors on June 12, 2017 as a result of deletion from SSE 180 index (announced on May 31, 2017), and was added back on June 11, 2018 as a result of addition to SSE 180 index (announced on May 28, 2018). We thus exclude it from June 12, 2017 to June 11, 2018.

We then drop stocks that cannot be traded normally (with the variable of "trading status" from the CSMAR database not equal to one) when forming portfolios. We sort all remaining connected stocks into five quintiles based on $NIF_{it}^{j}$ with weekly rebalancing. Since weekly northbound investor flow over week $t-1$ becomes public after the market closes on the last trading day of week $t-1$, we calculate the percent change of adjusted opening prices from the first trading day of week $t$ to that of week $t+1$ as weekly stock returns. We consider both equal-weighting and value-weighting for portfolio analysis. In terms of value-weighting, the floating market capitalization at the end of week $t-1$ are used as weights, and all weights are winsorized at the 5% and 95% levels.

In Section 4.2, we sort sample firms into SOEs and non-SOEs each year based on the variable of "firm ownership" from the CSMAR database.

## A.2 Insider Trading

The insider trade data are from WIND database. We drop insider trades that are i) with missing values in beginning dates (i.e., the dates when the insider trade starts), ii) through the block trading system, and iii) from institutional shareholders. Following the literature (Lakonishok and Lee, 2001; Ali and Hirshleifer, 2017), we also exclude insider trades of less than 1,000 shares to focus on significant insider transactions.

1. In the difference-in-differences specification in Section 2.3, we first aggregate all transactions by firm and trading beginning date to calculate the insider trading amount. We define the event year based on the launch of the Shanghai-Hong Kong Connect Program (November 17, 2014). The period from November 17, 2013, to November 17, 2014, corresponds to "0Y"; the period from November 17, 2012, to November 17, 2013, corresponds to "-1Y"; and the period from November 17, 2014, to November 17, 2015, corresponds to "+1Y". Other event years are defined similarly. Each event year, for each firm, we then calculate the natural logarithm of one plus the total amount of insider trading as our dependent variables. We take eligible stocks at the inception of the Stock Connect Program as the treated group, while contemporaneously unconnected firms serve as the control group. To minimize the potential contamination of control firms by the launch of the Shenzhen-Hong Kong Stock Connect, we exclude Shenzhen-listed firms that became eligible on the implementation day of the Shenzhen-Hong Kong Stock Connect (12/5/2016). Since the list of connected firms was announced in advance in early 2014, we take the period from 11/17/2012 to 11/17/2013 (i.e., "-1Y") as the benchmark period to reduce the contamination caused by market anticipation. The point estimate then is normalized to zero.

2. In Section 5.1, we run panel regressions of signed insider trading on the contemporaneous northbound flows from different origins of custodians. When decomposing mainland insider trading into purchases and sales, we first aggregate all transactions by insider and trading beginning date to calculate the net trading amount, and classify each observation as sell (buy) based on its sign. The dependent variable is the signed ratio of insider trading

amount to firms' market capitalization at the insider-day level. The independent variable, i.e., $NIF$, is defined as daily northbound flow from one subdivided custodian group at a specific firm at the beginning date of insider transactions, which in our sample consistently precedes or coincides with the transaction announcement date.

Table A1: Variable construction and data sources

| Variable | Definition | Source |
|---|---|---|
| $NIH$ | Denotes the level of northbound equity holdings (in percent) at the end of each week for each category of northbound custodians. The variable is calculated as the ratio of northbound equity holdings from the Choice Database to free-floating shares from the WIND database. | Choice, WIND |
| $NIF$ | Denotes the stock-level weekly northbound investor flows (in percent) for each category of northbound custodians. The variable is computed as the weekly change in $NIH$. | Choice, WIND |
| $SIZE$ | Denotes the natural logarithm of the floating market capitalization at the end of each week, in thousands of RMB. | CSMAR |
| $BM$ | Denotes the book-to-market ratio (F101001A in CSMAR database). The variable is computed as the ratio of the book value to market value of total assets. The market value is the product of close price and total shares outstanding, plus total liability as of the end of each week. | CSMAR |
| $Ret_{1m}$ | Denotes the stock-level cumulative return from week $t-4$ to week $t-1$. | CSMAR |
| $Ret_{12m}$ | Denotes the stock-level cumulative return from week $t-52$ to week $t-5$. | CSMAR |
| $TOVER$ | Denotes weekly turnover, which is measured using weekly trading volume divided by total shares outstanding at the end of each week. | CSMAR |
| $ROA$ | Denotes firm-level return on assets at the quarterly frequency, which is measured as net income divided by the most recent book value of total assets. | CSMAR |
| $SOE$ | Denotes a dummy variable that equals one if a firm is classified as a state-owned enterprise each year, and 0, otherwise. | CSMAR |
| $MSCI$ | Denotes an indicator variable for MSCI members, which equals one if a firm is in the MSCI A-share index at the end of week $t$, and 0, otherwise. | Choice, WIND |
| $1-R^2$ | Denotes the price nonsynchronicity, where the $R^2$ is the R-squared from a regression of individual stock returns on the market factor. | CSMAR |

Table A2: Foreign custodian list

| Participant ID | Participant name | Category | Prestigious |
|---|---|---|---|
| B01089 | HSBC BROKING SECURITIES (HONG KONG) LTD | Foreign | More |
| B01110 | J.P. MORGAN BROKING (HONG KONG) LTD | Foreign | More |
| B01121 | SG SECURITIES (HK) LTD | Foreign | Less |
| B01161 | UBS SECURITIES HONG KONG LTD | Foreign | More |
| B01224 | MERRILL LYNCH FAR EAST LTD | Foreign | More |
| B01264 | MIB SECURITIES (HONG KONG) LTD | Foreign | Less |
| B01265 | OCBC WING HANG SHARES BROKERAGE CO. LTD | Foreign | Less |
| B01274 | MORGAN STANLEY HONG KONG SECURITIES LTD | Foreign | More |
| B01323 | DEUTSCHE SECURITIES ASIA LTD | Foreign | More |
| B01345 | PHILLIP SECURITIES (HONG KONG) LTD | Foreign | Less |
| B01353 | UOB KAY HIAN (HONG KONG) LTD | Foreign | Less |
| B01451 | GOLDMAN SACHS (ASIA) SECURITIES LTD | Foreign | More |
| B01491 | CREDIT SUISSE SECURITIES (HONG KONG) LTD | Foreign | Less |
| B01555 | ABN AMRO CLEARING HONG KONG LTD | Foreign | Less |
| B01590 | INTERACTIVE BROKERS HONG KONG LTD | Foreign | Less |
| B01607 | RHB SECURITIES HONG KONG LTD | Foreign | Less |
| B01762 | DBS VICKERS (HONG KONG) LTD | Foreign | Less |
| B01773 | TOYO SECURITIES ASIA LTD | Foreign | Less |
| B01777 | DAIWA CAPITAL MARKETS HONG KONG LTD | Foreign | Less |
| B01824 | INSTINET PACIFIC LTD | Foreign | Less |
| B01830 | MIRAE ASSET SECURITIES (HK) LTD | Foreign | Less |
| B01914 | JEFFERIES HONG KONG LTD | Foreign | Less |
| B01951 | GENTING SECURITIES LTD | Foreign | Less |
| B02104 | MAGPIE SECURITIES LTD | Foreign | Less |
| C00010 | CITIBANK N.A. | Foreign | More |
| C00016 | DBS BANK LTD | Foreign | Less |
| C00019 | THE HONGKONG AND SHANGHAI BANKING | Foreign | More |
| C00039 | STANDARD CHARTERED BANK (HONG KONG) LTD | Foreign | More |
| C00074 | DEUTSCHE BANK AG | Foreign | More |
| C00093 | BNP PARIBAS SECURITIES SERVICES | Foreign | More |
| C00100 | JPMORGAN CHASE BANK, NATIONAL | Foreign | More |
| C00102 | MACQUARIE BANK LTD | Foreign | Less |

Table A3: Mainland/HK custodian list

| Mainland Custodians | |
|---|---|
| ID | Name |
| B01086 | SUN HUNG KAI INVESTMENT SERVICES LTD |
| B01115 | SHENWAN HONGYUAN SECURITIES (H.K.) LTD |
| B01130 | BOCI SECURITIES LTD |
| B01138 | CLSA LTD |
| B01143 | HAITONG INTERNATIONAL SECURITIES CO LTD |
| B01148 | CHINA MERCHANTS SECURITIES (HK) CO LTD |
| B01181 | FOSUN HANI SECURITIES LTD |
| B01183 | CHONG HING SECURITIES LTD |
| B01184 | CHINA TONGHAI SECURITIES LTD |
| B01217 | TAIPING SECURITIES (HK) CO LTD |
| B01228 | CITIC SECURITIES BROKERAGE (HK) LTD |
| B01256 | SINOLINK SECURITIES (HONG KONG) CO LTD |
| B01347 | CGS-CIMB SECURITIES (HONG KONG) LTD |
| B01355 | CHINA EVERBRIGHT SECURITIES (HK) LTD |
| B01447 | WONDERLAND INTERNATIONAL SECURITIES LTD |
| B01462 | PING AN SECURITIES LTD |
| B01487 | CHINA RENAISSANCE BROKING SERVICES (HONG |
| B01508 | SOUTHWEST SECURITIES (HK) BROKERAGE LTD |
| B01551 | YUE XIU SECURITIES CO LTD |
| B01564 | ABCI SECURITIES CO LTD |
| B01565 | GUOTAI JUNAN SECURITIES (HONG KONG) LTD |
| B01649 | CINDA INTERNATIONAL SECURITIES LTD |
| B01654 | CHINA INTERNATIONAL CAPITAL CORPORATION |
| B01727 | ICBC (ASIA) SECURITIES LTD |
| B01813 | CCB INTERNATIONAL SECURITIES LTD |
| B01825 | GUOYUAN SECURITIES BROKERAGE (HONG KONG) |
| B01826 | GF SECURITIES (HONG KONG) BROKERAGE LTD |
| B01829 | HUATAI FINANCIAL HOLDINGS (HONG KONG) |
| B01842 | BOCOM INTERNATIONAL SECURITIES LTD |
| B01853 | CMBC SECURITIES CO LTD |
| B01866 | ICBC INTERNATIONAL SECURITIES LTD |
| B01875 | GUODU SECURITIES (HONG KONG) LTD |
| B01885 | HAFOO SECURITIES LTD |
| B01886 | CNI SECURITIES GROUP LTD |
| B01890 | GUOSEN SECURITIES (HK) BROKERAGE CO LTD |
| B01900 | ORIENT SECURITIES (HONG KONG) LTD |
| B01901 | CMB INTERNATIONAL SECURITIES LTD |
| B01904 | VALUABLE CAPITAL LTD |
| B01905 | ESSENCE INTERNATIONAL SECURITIES |
| B01929 | CHINA GALAXY INTERNATIONAL SECURITIES |
| B01937 | CHANGJIANG SECURITIES BROKERAGE (HK) LTD |
| B01938 | CHINA INDUSTRIAL SECURITIES |
| B01939 | SOOCHOW SECURITIES INTERNATIONAL |
| B01948 | CAITONG INTERNATIONAL SECURITIES CO LTD |
| B01955 | FUTU SECURITIES INTERNATIONAL |
| B01959 | ZHONGTAI INTERNATIONAL SECURITIES LTD |
| B01962 | CHINA SECURITIES (INTERNATIONAL) |
| B01963 | TFI SECURITIES AND FUTURES LTD |
| B01967 | YUNFENG SECURITIES LTD |
| B01969 | CHINA VERED SECURITIES LTD |
| B01971 | HGNH INTERNATIONAL SECURITIES CO LTD |
| B01978 | FOUNDER SECURITIES (HONG KONG) LTD |
| B01980 | SHANXI SECURITIES INTERNATIONAL LTD |
| B01986 | HUAJIN SECURITIES (INTERNATIONAL) LTD |
| B01998 | FIRST CAPITAL SECURITIES LTD |
| B01999 | CF SECURITIES LTD |
| B02000 | TIAN YUAN FINANCE LTD |
| B02003 | DONGXING SECURITIES (HONG KONG) CO LTD |
| B02023 | DONGHAI INTERNATIONAL SECURITIES |
| B02029 | HONOR SECURITIES (HK) LTD |
| B02046 | CHINA ZHONG HENG FINANCE GROUP LTD |
| B02072 | SBI E2-CAPITAL SECURITIES LTD |
| B02089 | TONGFANG SECURITIES LTD |
| B02099 | DA INTERNATIONAL FINANCIAL SERVICE LTD |
| B02141 | XIN YONGAN INTERNATIONAL SECURITIES |
| B02145 | CIF SECURITIES FUTURES LTD |
| C00026 | CHONG HING BANK LTD |
| C00033 | BANK OF CHINA (HONG KONG) LTD |
| C00036 | CHINA CONSTRUCTION BANK (ASIA) |
| C00040 | INDUSTRIAL AND COMMERCIAL BANK OF CHINA |
| C00042 | CMB WING LUNG BANK LTD |
| C00058 | CHINA CITIC BANK INTERNATIONAL LTD |
| C00088 | CHINA MERCHANTS BANK CO LTD |

| HK Custodians | |
|---|---|
| ID | Name |
| B01080 | VMS SECURITIES LTD |
| B01118 | EAST ASIA SECURITIES CO LTD |
| B01119 | CELESTIAL SECURITIES LTD |
| B01129 | WOCOM SECURITIES LTD |
| B01137 | CHOW SANG SANG SECURITIES LTD |
| B01192 | SEEKERS MARKETS LTD |
| B01213 | MALAHON SECURITIES LTD |
| B01231 | HONG KONG INTERNATIONAL SECURITIES LTD |
| B01284 | HANG SENG SECURITIES LTD |
| B01289 | SOUTH CHINA SECURITIES LTD |
| B01298 | GET NICE SECURITIES LTD |
| B01338 | EMPEROR SECURITIES LTD |
| B01372 | FIRST WORLDSEC SECURITIES LTD |
| B01373 | CHRISTFUND SECURITIES LTD |
| B01385 | FAIRWIN BROKING LTD |
| B01386 | SBI CHINA CAPITAL FINANCIAL SERVICES LTD |
| B01392 | TAIFAIR SECURITIES LTD |
| B01413 | CORE PACIFIC - YAMAICHI INTERNATIONAL |
| B01423 | PRUDENTIAL BROKERAGE LTD |
| B01434 | BEEVEST SECURITIES LTD |
| B01438 | KINGSTON SECURITIES LTD |
| B01445 | VICTORY SECURITIES CO LTD |
| B01469 | KAISER SECURITIES LTD |
| B01472 | SUN GROWTH SECURITIES LTD |
| B01489 | GRAND CARTEL SECURITIES CO LTD |
| B01497 | SINOPAC SECURITIES (ASIA) LTD |
| B01505 | SHACOM SECURITIES LTD |
| B01523 | EVER-LONG SECURITIES CO LTD |
| B01550 | HUAYU SECURITIES LTD |
| B01556 | LUK FOOK SECURITIES (HK) LTD |
| B01576 | SIU ON SECURITIES LTD |
| B01580 | OSHIDORI SECURITIES LTD |
| B01584 | CHIEF SECURITIES LTD |
| B01585 | SINO GRADE SECURITIES LTD |
| B01600 | THOMAS GLOBAL FINANCIAL SERVICES LTD |
| B01601 | CSC SECURITIES (HK) LTD |
| B01610 | KGI ASIA LTD |
| B01623 | TAI FUNG KUENTAI SECURITIES CO LTD |
| B01650 | KAM LUEN SECURITIES LTD |
| B01666 | GLORY SUN SECURITIES LTD |
| B01668 | BRIGHT SMART SECURITIES INTERNATIONAL |
| B01673 | FULBRIGHT SECURITIES LTD |
| B01677 | ANUENUE SECURITIES LTD |
| B01686 | FIRST SHANGHAI SECURITIES LTD |
| B01695 | DAH SING SECURITIES LTD |
| B01696 | HANTEC SECURITIES CO LTD |
| B01699 | MASTERLINK SECURITIES (HONG KONG) |
| B01700 | REALINK FINANCIAL TRADE LTD |
| B01715 | PRESIDENT SECURITIES (HONG KONG) LTD |
| B01739 | CHUNG LEE SECURITIES CO LTD |
| B01810 | ASTRUM CAPITAL MANAGEMENT LTD |
| B01814 | WELL LINK SECURITIES LTD |
| B01815 | T & F EQUITIES LTD |
| B01818 | I-ACCESS INVESTORS LTD |
| B01848 | CATHAY SECURITIES (HONG KONG) LTD |
| B01851 | RICHE BRIGHT SECURITIES LTD |
| B01852 | FREEMAN SECURITIES LTD |
| B01858 | YUANTA SECURITIES (HONG KONG) CO LTD |
| B01897 | CENTRAL WEALTH SECURITIES INVESTMENT LTD |
| B01910 | ALPHA INTERNATIONAL SECURITIES (HONG |
| B01912 | THE CORE SECURITIES COMPANY LTD |
| B01917 | CHINA TIMES SECURITIES LTD |
| B01928 | ENHANCED SECURITIES LTD |
| B01935 | STUDIUM SECURITIES LTD |
| B01943 | PO SANG SECURITIES AND FUTURES LTD |
| B01947 | FUBON SECURITIES (HONG KONG) LTD |
| B01949 | GRAND CHINA SECURITIES LTD |
| B01974 | ARISTO SECURITIES LTD |
| B02014 | YUET SHEUNG INTERNATIONAL SECURITIES LTD |
| B02030 | SR WEALTH SECURITIES LTD |
| B02032 | FORTHRIGHT SECURITIES CO LTD |
| B02061 | GRAND PARTNERS SECURITIES LTD |
| B02065 | AMC WANHAI SECURITIES LTD |
| B02068 | CANFIELD SECURITIES CO LTD |
| B02091 | RUIFENG SECURITIES LTD |
| B02102 | ZINVEST GLOBAL LTD |
| B02120 | LIVERMORE HOLDINGS LTD |
| B02136 | HS SECURITIES LTD |
| B02162 | GAMMA SECURITIES LTD |
| C00012 | DAH SING BANK LTD |
| C00037 | SHANGHAI COMMERCIAL BANK LTD |
| C00092 | CTBC BANK CO LTD |
| C00099 | TAISHIN INTERNATIONAL BANK CO., LTD |

Table A4: List of cross-operating mainland custodians

| Participant ID | Year | Participant Name |
|---|---|---|
| B01115 | 2017 | SHENWAN HONGYUAN SECURITIES (H.K.) LTD |
| B01138 | 2017 | CLSA LTD |
| B01143 | 2017 | HAITONG INTERNATIONAL SECURITIES CO LTD |
| B01148 | 2017 | CHINA MERCHANTS SECURITIES (HK) CO LTD |
| B01256 | 2017 | SINOLINK SECURITIES (HONG KONG) CO LTD |
| B01355 | 2017 | CHINA EVERBRIGHT SECURITIES (HK) LTD |
| B01508 | 2017 | SOUTHWEST SECURITIES (HK) BROKERAGE LTD |
| B01565 | 2017 | GUOTAI JUNAN SECURITIES (HONG KONG) LTD |
| B01654 | 2017 | CHINA INTERNATIONAL CAPITAL CORPORATION |
| B01825 | 2017 | GUOYUAN SECURITIES BROKERAGE (HONG KONG) |
| B01826 | 2017 | GF SECURITIES (HONG KONG) BROKERAGE LTD |
| B01829 | 2017 | HUATAI FINANCIAL HOLDINGS (HONG KONG) |
| B01875 | 2017 | GUODU SECURITIES (HONG KONG) LTD |
| B01890 | 2017 | GUOSEN SECURITIES (HK) BROKERAGE CO LTD |
| B01900 | 2017 | ORIENT SECURITIES (HONG KONG) LTD |
| B01905 | 2017 | ESSENCE INTERNATIONAL SECURITIES |
| B01929 | 2017 | CHINA GALAXY INTERNATIONAL SECURITIES |
| B01937 | 2017 | CHANGJIANG SECURITIES BROKERAGE (HK) LTD |
| B01938 | 2017 | CHINA INDUSTRIAL SECURITIES |
| B01939 | 2017 | SOOCHOW SECURITIES INTERNATIONAL |
| B01948 | 2017 | CAITONG INTERNATIONAL SECURITIES CO LTD |
| B01959 | 2017 | ZHONGTAI INTERNATIONAL SECURITIES LTD |
| B01962 | 2017 | CHINA SECURITIES (INTERNATIONAL) |
| B01963 | 2017 | TFI SECURITIES AND FUTURES LTD |
| B01978 | 2017 | FOUNDER SECURITIES (HONG KONG) LTD |
| B02003 | 2017 | DONGXING SECURITIES (HONG KONG) CO LTD |
| B02023 | 2017 | DONGHAI INTERNATIONAL SECURITIES |
| B01115 | 2018 | SHENWAN HONGYUAN SECURITIES (H.K.) LTD |
| B01138 | 2018 | CLSA LTD |
| B01143 | 2018 | HAITONG INTERNATIONAL SECURITIES CO LTD |
| B01148 | 2018 | CHINA MERCHANTS SECURITIES (HK) CO LTD |
| B01256 | 2018 | SINOLINK SECURITIES (HONG KONG) CO LTD |
| B01355 | 2018 | CHINA EVERBRIGHT SECURITIES (HK) LTD |
| B01462 | 2018 | PING AN SECURITIES LTD |
| B01508 | 2018 | SOUTHWEST SECURITIES (HK) BROKERAGE LTD |
| B01565 | 2018 | GUOTAI JUNAN SECURITIES (HONG KONG) LTD |
| B01654 | 2018 | CHINA INTERNATIONAL CAPITAL CORPORATION |
| B01825 | 2018 | GUOYUAN SECURITIES BROKERAGE (HONG KONG) |
| B01826 | 2018 | GF SECURITIES (HONG KONG) BROKERAGE LTD |
| B01829 | 2018 | HUATAI FINANCIAL HOLDINGS (HONG KONG) |
| B01875 | 2018 | GUODU SECURITIES (HONG KONG) LTD |
| B01890 | 2018 | GUOSEN SECURITIES (HK) BROKERAGE CO LTD |
| B01900 | 2018 | ORIENT SECURITIES (HONG KONG) LTD |

| Participant ID | Year | Participant Name |
|---|---|---|
| B01905 | 2018 | ESSENCE INTERNATIONAL SECURITIES |
| B01929 | 2018 | CHINA GALAXY INTERNATIONAL SECURITIES |
| B01937 | 2018 | CHANGJIANG SECURITIES BROKERAGE (HK) LTD |
| B01938 | 2018 | CHINA INDUSTRIAL SECURITIES |
| B01939 | 2018 | SOOCHOW SECURITIES INTERNATIONAL |
| B01948 | 2018 | CAITONG INTERNATIONAL SECURITIES CO LTD |
| B01959 | 2018 | ZHONGTAI INTERNATIONAL SECURITIES LTD |
| B01962 | 2018 | CHINA SECURITIES (INTERNATIONAL) |
| B01963 | 2018 | TFI SECURITIES AND FUTURES LTD |
| B01978 | 2018 | FOUNDER SECURITIES (HONG KONG) LTD |
| B01980 | 2018 | SHANXI SECURITIES INTERNATIONAL LTD |
| B02003 | 2018 | DONGXING SECURITIES (HONG KONG) CO LTD |
| B02023 | 2018 | DONGHAI INTERNATIONAL SECURITIES |
| B01115 | 2019 | SHENWAN HONGYUAN SECURITIES (H.K.) LTD |
| B01138 | 2019 | CLSA LTD |
| B01143 | 2019 | HAITONG INTERNATIONAL SECURITIES CO LTD |
| B01148 | 2019 | CHINA MERCHANTS SECURITIES (HK) CO LTD |
| B01256 | 2019 | SINOLINK SECURITIES (HONG KONG) CO LTD |
| B01355 | 2019 | CHINA EVERBRIGHT SECURITIES (HK) LTD |
| B01462 | 2019 | PING AN SECURITIES LTD |
| B01508 | 2019 | SOUTHWEST SECURITIES (HK) BROKERAGE LTD |
| B01565 | 2019 | GUOTAI JUNAN SECURITIES (HONG KONG) LTD |
| B01649 | 2019 | CINDA INTERNATIONAL SECURITIES LTD |
| B01654 | 2019 | CHINA INTERNATIONAL CAPITAL CORPORATION |
| B01825 | 2019 | GUOYUAN SECURITIES BROKERAGE (HONG KONG) |
| B01826 | 2019 | GF SECURITIES (HONG KONG) BROKERAGE LTD |
| B01829 | 2019 | HUATAI FINANCIAL HOLDINGS (HONG KONG) |
| B01875 | 2019 | GUODU SECURITIES (HONG KONG) LTD |
| B01890 | 2019 | GUOSEN SECURITIES (HK) BROKERAGE CO LTD |
| B01900 | 2019 | ORIENT SECURITIES (HONG KONG) LTD |
| B01905 | 2019 | ESSENCE INTERNATIONAL SECURITIES |
| B01929 | 2019 | CHINA GALAXY INTERNATIONAL SECURITIES |
| B01937 | 2019 | CHANGJIANG SECURITIES BROKERAGE (HK) LTD |
| B01938 | 2019 | CHINA INDUSTRIAL SECURITIES |
| B01939 | 2019 | SOOCHOW SECURITIES INTERNATIONAL |
| B01948 | 2019 | CAITONG INTERNATIONAL SECURITIES CO LTD |
| B01959 | 2019 | ZHONGTAI INTERNATIONAL SECURITIES LTD |
| B01962 | 2019 | CHINA SECURITIES (INTERNATIONAL) |
| B01963 | 2019 | TFI SECURITIES AND FUTURES LTD |
| B01978 | 2019 | FOUNDER SECURITIES (HONG KONG) LTD |
| B01980 | 2019 | SHANXI SECURITIES INTERNATIONAL LTD |
| B02003 | 2019 | DONGXING SECURITIES (HONG KONG) CO LTD |
| B02023 | 2019 | DONGHAI INTERNATIONAL SECURITIES |

Table A5: Fama-MacBeth regressions

This table presents the time-series averages of weekly coefficients from Fama-MacBeth regressions of weekly excess returns (in percent) on northbound flows from different categories of custodians. In Columns (1), (3), (5) and (7), only northbound flows are included as our independent variable. Firm characteristics and stocks' past returns are then added as control variables in Columns (2), (4), (6) and (8), including firm size ($SIZE$), book-to-market ratio ($BM$), return on assets ($ROA$), weekly turnover ($TOVER$), a dummy variable indicating state-owned enterprises ($SOE$), a dummy variable indicating MSCI-China index constituents ($MSCI$), stock returns over the past four weeks ($Ret_{1m}$), and stock returns over the past one year ($Ret_{12m}$). The sample period is from March 17, 2017 to December 31, 2019. The pre- and post-reform sub-samples are divided based on the announcement day of penetrating regulatory reform, August 24, 2018. The t-statistics are computed with Newey-West standard errors with three lags. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Foreign custodians

| | Pre-reform | | | | Post-reform | | | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| | Less Prestigious | | More Prestigious | | Less Prestigious | | More Prestigious | |
| $NIF_{t-1}$ | 5.62*** | 4.208*** | 1.490*** | 1.043*** | 1.347 | 2.000** | 0.630*** | 0.514*** |
| | (3.12) | (3.50) | (3.67) | (3.54) | (1.25) | (2.55) | (2.61) | (3.06) |
| Control | No | Yes | No | Yes | No | Yes | No | Yes |
| Average Obs. | 1054 | 1047 | 1289 | 1281 | 1161 | 1153 | 1218 | 1210 |
| No. of weeks | 73 | 73 | 73 | 73 | 69 | 69 | 69 | 69 |
| Average Adj. $R^2$ | 0.001 | 0.100 | 0.0002 | 0.110 | 0.001 | 0.094 | 0.003 | 0.090 |

Panel B: Mainland custodians

| | Pre-reform | | | | Post-reform | | | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| | Cross-operating | | Non cross-operating | | Cross-operating | | Non cross-operating | |
| $NIF_{t-1}$ | 1.222 | 0.586 | -4.081 | -3.210 | -1.080 | -0.737 | 14.284* | 14.892** |
| | (1.53) | (1.03) | (-0.46) | (-0.45) | (-1.19) | (-1.15) | (1.71) | (2.07) |
| Control | No | Yes | No | Yes | No | Yes | No | Yes |
| Average Obs. | 1152 | 1145 | 944 | 936 | 1217 | 1209 | 997 | 989 |
| No. of weeks | 73 | 73 | 73 | 73 | 69 | 69 | 69 | 69 |
| Average Adj. $R^2$ | 0.001 | 0.100 | 0.002 | 0.110 | 0.003 | 0.090 | 0.002 | 0.094 |

Table A6: Portfolio analysis using scaled flows: more / less prestigious foreign custodians

This table presents the LSY-three-factor adjusted returns of portfolios by sorting on scaled $NIF$ from more prestigious and less prestigious foreign custodians. A custodian is classified as more prestigious based on whether it ranks above the median for "fee and commission income," or it is voted as a leader in custody in emerging markets. On the first trading day in each week, we sort all connected stocks into five quintiles based on scaled $NIF$ during the past week. The sample period is from March 17, 2017 to December 31, 2019. The pre- and post-reform sub-samples are divided based on the announcement day of penetrating regulatory reform, August 24, 2018. Column "Post-Pre" reports the return differences of a long-short strategy between pre- and post-reform periods. The t-statistics are computed with Newey-West standard errors with three lags. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Value weighted

| | Pre | | | Post | | | Post-Pre |
|---|---|---|---|---|---|---|---|
| | Low | High | HML | Low | High | HML | HML |
| Less prestigious | -0.092 | 0.450*** | 0.542*** | 0.158 | 0.173* | 0.016 | -0.526*** |
| | (-1.07) | (3.74) | (3.85) | (1.34) | (1.81) | (0.17) | (-3.21) |
| More prestigious | -0.022 | 0.281*** | 0.303** | 0.019 | 0.251** | 0.232** | -0.072 |
| | (-0.24) | (2.80) | (2.47) | (0.17) | (2.35) | (2.52) | (-0.50) |
| Less - More | -0.070 | 0.169** | 0.239** | 0.139** | -0.077 | -0.216** | -0.455*** |
| | (-1.17) | (2.38) | (2.22) | (2.35) | (-1.27) | (-2.17) | (-3.19) |

Panel B: Equal weighted

| | Pre | | | Post | | | Post-Pre |
|---|---|---|---|---|---|---|---|
| | Low | High | HML | Low | High | HML | HML |
| Less prestigious | 0.013 | 0.473*** | 0.460*** | 0.193* | 0.267** | 0.073 | -0.387*** |
| | (0.12) | (4.11) | (4.18) | (1.85) | (2.33) | (0.90) | (-2.99) |
| More prestigious | 0.007 | 0.355*** | 0.348*** | 0.053 | 0.278** | 0.225*** | -0.123 |
| | (0.08) | (3.63) | (3.53) | (0.49) | (2.34) | (3.10) | (-1.00) |
| Less - More | 0.006 | 0.118* | 0.112 | 0.141*** | -0.011 | -0.152** | -0.264** |
| | (0.08) | (1.76) | (1.42) | (2.69) | (-0.23) | (-1.99) | (-2.40) |

Table A7: Portfolio analysis using scaled flows: cross-operating/non cross-operating mainland custodians

This table presents the LSY-three-factor adjusted returns of portfolios by sorting on scaled $NIF$ from cross-operating/non-cross-operating mainland custodians. Custodians are classified based on Securities Association of China's list. On the first trading day in each week, we sort all connected stocks into five quintiles based on scaled $NIF$ during the past week. The sample period is from March 17, 2017 to December 31, 2019. The pre- and post-reform sub-samples are divided based on the announcement day of penetrating regulatory reform, August 24, 2018. Column "Post-Pre" reports the return differences of a long-short strategy between pre- and post-reform periods. The t-statistics are computed with Newey-West standard errors with three lags. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Value weighted

| | Pre | | | Post | | | Post-Pre |
|---|---|---|---|---|---|---|---|
| | Low | High | HML | Low | High | HML | HML |
| Cross-operating | -0.030 | 0.284*** | 0.313*** | 0.108 | 0.017 | -0.091 | -0.405*** |
| | (-0.33) | (3.10) | (3.27) | (1.06) | (0.12) | (-0.99) | (-3.01) |
| Non Cross-operating | -0.035 | 0.080 | 0.115 | -0.009 | 0.129 | 0.137 | 0.022 |
| | (-0.43) | (0.90) | (1.13) | (-0.07) | (0.92) | (0.98) | (0.14) |
| Cross - Non Cross | 0.005 | 0.204** | 0.198 | 0.117 | -0.112 | -0.229 | -0.427** |
| | (0.08) | (2.31) | (1.39) | (1.43) | (-1.06) | (-1.46) | (-2.15) |

Panel B: Equal weighted

| | Pre | | | Post | | | Post-Pre |
|---|---|---|---|---|---|---|---|
| | Low | High | HML | Low | High | HML | HML |
| Cross-operating | 0.094 | 0.234*** | 0.140* | 0.100 | 0.079 | -0.021 | -0.161 |
| | (1.08) | (2.74) | (1.74) | (1.05) | (0.63) | (-0.25) | (-1.30) |
| Non Cross-operating | 0.063 | 0.037 | -0.026 | 0.008 | 0.120 | 0.112 | 0.138 |
| | (0.75) | (0.47) | (-0.33) | (0.07) | (0.94) | (1.00) | (1.23) |
| Cross - Non Cross | 0.031 | 0.197*** | 0.166 | 0.092 | -0.041 | -0.133 | -0.299** |
| | (0.51) | (2.67) | (1.47) | (1.09) | (-0.62) | (-1.12) | (-2.04) |

Table A8: Portfolio analysis: capped value-weighting

This table presents the LSY-three-factor adjusted returns of capped value-weighted portfolios by sorting on $NIF$ from more / less prestigious foreign custodians in Panel A, and cross-operating / non cross-operating mainland custodians in Panel B. On the first trading day in each week, we sort all connected stocks into five quintiles based on $NIF$ during the past week. Following Jensen et al. (2023), we weight stocks by their market value winsorized at the A-share market 80th percentile. The sample period is from March 17, 2017 to December 31, 2019. The pre- and post-reform subsamples are divided based on the announcement day of penetrating regulatory reform, August 24, 2018. Column "Post-Pre" reports the return differences of a long-short strategy between pre- and post-reform periods. The t-statistics are computed with Newey-West standard errors with three lags. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Foreign custodians

| | Pre | | | Post | | | Post-Pre |
|---|---|---|---|---|---|---|---|
| | Low | High | HML | Low | High | HML | HML |
| Less prestigious | -0.041 | 0.472*** | 0.513*** | 0.143 | 0.215** | 0.072 | -0.441*** |
| | (-0.46) | (4.34) | (4.68) | (1.31) | (2.06) | (0.86) | (-3.55) |
| More prestigious | 0.004 | 0.336*** | 0.332*** | 0.019 | 0.247** | 0.228*** | -0.104 |
| | (0.04) | (3.26) | (2.95) | (0.16) | (2.24) | (2.92) | (-0.76) |
| Less - More | -0.046 | 0.136* | 0.181** | 0.124 | -0.031 | -0.156 | -0.337** |
| | (-0.81) | (1.85) | (1.96) | (1.58) | (-0.67) | (-1.42) | (-2.56) |

Panel B: Mainland custodians

| | Pre | | | Post | | | Post-Pre |
|---|---|---|---|---|---|---|---|
| | Low | High | HML | Low | High | HML | HML |
| Cross-operating | 0.077 | 0.258*** | 0.181** | 0.077 | 0.013 | -0.063 | -0.244* |
| | (0.88) | (2.98) | (2.36) | (0.76) | (0.10) | (-0.64) | (-1.87) |
| Non Cross-operating | 0.078 | 0.032 | -0.046 | 0.002 | 0.083 | 0.081 | 0.127 |
| | (0.99) | (0.39) | (-0.56) | (0.02) | (0.67) | (0.84) | (1.27) |
| Cross - Non Cross | 0.000 | 0.226*** | 0.227* | 0.074 | -0.070 | -0.144 | -0.371** |
| | (-0.01) | (2.82) | (1.86) | (0.82) | (-0.98) | (-1.10) | (-2.31) |

Table A9: Portfolio analysis: alternative benchmark adjustment

This table presents the excess returns and alphas from the Fama and French (1993) three-factor model and the Carhart (1997) four-factor model of portfolios by sorting on $NIF$. On the first trading day in each week, we sort all connected stocks into five quintiles based on $NIF$ during the past week. The sample period is from March 17, 2017 to December 31, 2019. The pre- and post-reform sub-samples are divided based on the announcement day of penetrating regulatory reform, August 24, 2018. Reported in Columns "Pre" and "Post" are value weighted long-short portfolio returns during the pre-reform and post-reform periods, respectively. Column "Post-Pre" reports the return differences of a long-short strategy between pre- and post-reform periods. The t-statistics are computed with Newey-West standard errors with three lags. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Foreign custodians

| | Excess return | | | FF3 alpha | | | Carhart4 alpha | | |
|---|---|---|---|---|---|---|---|---|---|
| | Pre | Post | Post-Pre | Pre | Post | Post-Pre | Pre | Post | Post-Pre |
| Less prestigious | 0.526*** | -0.010 | -0.536*** | 0.572*** | -0.037 | -0.610*** | 0.570*** | -0.035 | -0.605*** |
| | (4.18) | (-0.10) | (-3.32) | (4.03) | (-0.38) | (-3.47) | (4.02) | (-0.35) | (-3.44) |
| More prestigious | 0.413*** | 0.238*** | -0.175 | 0.373*** | 0.241*** | -0.132 | 0.389*** | 0.222*** | -0.167 |
| | (3.28) | (2.80) | (-1.15) | (2.68) | (2.97) | (-0.80) | (2.89) | (2.63) | (-1.03) |
| Less - More | 0.114 | -0.248** | -0.362** | 0.199 | -0.278*** | -0.478*** | 0.181 | -0.257** | -0.438*** |
| | (0.84) | (-2.37) | (-2.11) | (1.41) | (-2.68) | (-2.76) | (1.29) | (-2.52) | (-2.62) |

Panel B: Mainland custodians

| | Excess return | | | FF3 alpha | | | Carhart4 alpha | | |
|---|---|---|---|---|---|---|---|---|---|
| | Pre | Post | Post-Pre | Pre | Post | Post-Pre | Pre | Post | Post-Pre |
| Cross-operating | 0.245*** | -0.043 | -0.288** | 0.290*** | -0.047 | -0.337** | 0.296*** | -0.053 | -0.349** |
| | (2.66) | (-0.41) | (-2.07) | (2.99) | (-0.45) | (-2.34) | (3.01) | (-0.48) | (-2.26) |
| Non Cross-operating | 0.056 | 0.141 | 0.085 | 0.080 | 0.161 | 0.081 | 0.080 | 0.162 | 0.083 |
| | (0.61) | (1.11) | (0.55) | (0.86) | (1.26) | (0.56) | (0.86) | (1.25) | (0.56) |
| Cross - Non Cross | 0.189 | -0.184 | -0.374* | 0.210 | -0.208 | -0.418** | 0.216 | -0.216 | -0.432** |
| | (1.38) | (-1.15) | (-1.77) | (1.53) | (-1.27) | (-2.07) | (1.58) | (-1.26) | (-2.07) |