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Does stock market liberalization improve stock price efficiency?

Evidence from China

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Abstract

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Keywords: stock market liberalization, stock price efficiency, non-synchronicity
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Abstract

In this study, we examine whether liberalization of the stock market improves stock price efficiency using China's market liberalization pilot program as a shock. We find that investible firms exhibit a significant increase in price efficiency, as proxied by stock price non-synchronicity, after stock market liberalization. The results are robust to a series of tests and remain unchanged after we address the issue of endogeneity. We identify two channels through which price efficiency can be improved: better disclosure by firms and the incorporation of more information into stock prices through the trading activities of foreign investors. We also find that investment becomes more sensitive to prices, further indicating that stock prices have become more efficient. Finally, we find that stock price informativeness also increases.

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1. Introduction

Stock market liberalization represents a government's decision to allow foreign investors to purchase shares of firms listed on its domestic stock exchange (e.g., Chari & Henry, 2004; Bae & Goyal, 2010). Regulators and standard-setters consider stock market liberalization to be beneficial to domestic firms because it encourages cross-border trade and acquisitions and attracts foreign direct investment (e.g., Bekaert & Harvey, 2000; Henry, 2000a, 2000b; Chari & Henry, 2004). Many studies document how openness affects security and capital investments, but stock price efficiency is rarely considered, although this can be an important mechanism through which secondary stock markets affect real economic activity (Bond et al., 2012). The recent market liberalization pilot program implemented in China enables foreign investors to buy eligible stocks more easily on the Shanghai Stock Exchange, and we use this as a natural experiment to investigate whether and how stock market liberalization affects the stock price efficiency of affected firms.

We define stock price efficiency as the extent to which share prices track firm fundamentals, referred to as forecasting price efficiency (FPE) by Bond et al. (2012). Bond et al. (2012) argue that secondary market prices have an impact on real

economic activity, as they can affect decisions in the real economy. Highly efficient stock prices lead to more efficient capital allocation, which is evidenced by research using U.S. data (Durnev et al., 2004; Chen et al., 2007) and international data (Wurgler, 2000). Brogaard et al. (2017) find that an increase in stock price informational efficiency is the main channel through which enhanced liquidity decreases default risk. The presence of foreign investors can have two main effects on stock price efficiency. First, their participation is likely to change the demand for information and thus alter the incentives of firms to supply it, particularly if the domestic market has a poor information environment. Second, as Kacperczyk et al. (2021) note, informed foreign investors contribute to price information that firms' managers do not possess, and they trade on such information.

We investigate the effect of stock market liberalization on stock price efficiency by examining the Shanghai–Hong Kong Stock Connect (*Hu Gang Tong*, or Stock Connect hereafter) program,[1] a recent pilot trading reform applied to selected firms of the Shanghai Stock Exchange, as a quasi-natural experiment. Allowing both Hong Kong and foreign investors to trade in eligible Chinese listed firms has led to changes both in firms' disclosure practices and in the extent to which information is traded and incorporated into stock prices. First, the legal oversight of eligible firms has been strengthened under the Stock Connect program. The memorandum of understanding (MoU) between the China Securities Regulatory Commission (CSRC) and the Securities and Futures Commission (SFC) of Hong Kong, signed on October 17, 2014, has brought the two security regulators into a closer cooperative relationship. Firms eligible in the Stock Connect scheme are subject to stricter regulation, including additional disclosure requirements, than ineligible firms. Second, foreign investors and those from Hong Kong are accustomed to trading in higher-quality information environments and are more able to collect and process firms' fundamental information (Ke et al., 2015; Deng et al., 2021; Chen et al., 2020). The information they possess may also be different from that of domestic institutional shareholders and managers (Kacperczyk et al., 2021). Thus, we propose that the Stock Connect program improves stock price efficiency by incentivizing firms to provide higher-quality financial information and

[1] In December 2014, Thomson Reuters published a white paper titled "The Through Train: Stock Connect's Impact and Future." They noted on page 6 of the white paper that "considering its unique structure, Stock Connect is an extraordinary development not only for China's markets but also for financial markets around the world."

attracting more foreign investors so that more firm-specific information is incorporated into stock prices.

However, the improvements to stock price efficiency brought about by the pilot reform may not be as significant as expected. The number of investors in A-share markets from Hong Kong and abroad increased after the establishment of the Stock Connect program, but the amount invested remains relatively small compared with that of domestic market participants. The firms eligible for Stock Connect are mainly listed on the Shanghai Stock Exchange, with very few cross-listed on the Hong Kong Stock Exchange, so demand for information by minority foreign investors may not be sufficiently strong. In addition, the Chinese capital market is characterized by a weak institutional environment. Although the central government has made efforts to improve the transparency of company disclosures by introducing more regulations, rules, and guidelines, investors still suffer from weak enforcement and protection (Ding & Su, 2008). Foreign shareholders may also have an information disadvantage as they are physically distant from the firms, so their trading may unintentionally increase noise in stock prices. Thus, China's stock market liberalization may not result in increased stock price efficiency. These arguments suggest that the question of whether stock market liberalization increases stock price efficiency should be empirically examined.

Following the literature (Durnev et al., 2003; Zhao & Chung, 2006; Chen et al., 2007; Fernandes & Ferreira, 2008, 2009; Alves et al., 2010; Dong & Ni, 2014; Kim et al., 2021; Kacperczyk et al., 2021), we use the non-synchronicity of stock prices as a proxy for their efficiency. French and Roll (1986) and Roll (1988) suggest that stock price non-synchronicity measures the incorporation rate of firm-specific information into prices via investor trading. A high level of non-synchronicity indicates that the stock price more closely reflects the fundamental value of the firm and that the specific stock market is efficient (Fernandes & Ferreira, 2009). We find that stock price non-synchronicity increased significantly after the establishment of Stock Connect. We address the potential endogeneity issue and validate our difference-in-differences analysis through a placebo test, and the results remain unchanged. Our results are also robust to alternative price efficiency measures, the inclusion of firm fixed effects and additional control variables, and different matching procedures. These findings indicate that a more liberal stock market facilitates the incorporation of firm-specific information into share prices and improves stock price efficiency.

We next examine two channels through which stock price efficiency is improved. We first investigate the channels of mandatory and voluntary disclosures by investible firms. We find that eligible firms provide higher-quality accounting information after the implementation of the Stock Connect program, and that the likelihood and accuracy of management earnings forecasts significantly increase, suggesting that the information available in the stock market increases.

We next examine whether the unique information that foreign investors may hold is a second potential channel. We assess changes in the likelihood of informed trading and the bid-ask spread after the establishment of the Connect program. If foreign investors incorporate their unique information into stock prices via their trading, we expect a higher likelihood of informed trading and wider bid-ask spread after they can trade on the eligible stocks. We find that both the likelihood of informed trading and bid-ask spreads increase after the establishment of Stock Connect. This supports the argument that foreign investors can bring unique information to the stock market, as proposed by Kacperczyk et al. (2021). Foreign investors may be better able to collect and process information than domestic investors. For example, Yoon (2021) finds that foreign investors will likely have more private meetings with eligible firms. In addition, we observe an increase in information about future profit in current prices, suggesting that the unique information is related to firm fundamentals. Last, we find that investments become more sensitive to prices, suggesting that Stock Connect improves the "Revelatory Price Efficiency" that Bond et al. (2012) identify by bringing in information to assist the investment decisions of firm managers.

Our research makes several contributions to the literature. First, we add to research on stock market liberalization and its consequences by examining its effect on the information content of prices. The literature examines how stock market openness promotes the efficient international allocation of resources (Solow, 1956) and how stock market liberalization reduces the cost of capital (Levine & Zervos, 1998), increases investment (Mitton, 2006; Gupta & Yuan, 2009; Moshirian et al., 2021), and attracts more foreign holdings (Levine & Zervos, 1994; Darrat & Benkato, 2003; Ghosh et al., 2008; Bae & Goyal, 2010; Gul et al., 2010). The stock market liberalization program initiated in 2014 by the Chinese government is of great interest to researchers. Yoon (2021) finds that the Chinese liberalization pilot program incentivizes the firms involved to increase the number of select private meetings they have with major foreign brokers, while Deng et al. (2021) find that liberalization

significantly decreases the frequency and magnitude of upward audit adjustments by eligible firms. However, the effect of liberalization on stock price efficiency, as a mechanism through which secondary stock markets affect real economic activity (Bond et al., 2012), is not fully explored. We complement these studies through our finding that stock price efficiency increases for eligible firms after liberalization.

Second, we contribute to the literature on the mechanisms through which price efficiency increases. Some studies indicate that adopting international financial reporting standards (IFRS)/international accounting standards (IAS) increases the information content of stock prices and reduces crash risk (e.g., Hung & Subramanyam, 2007; DeFond et al., 2015), while others find that the information incorporated in stock prices is affected by reporting incentives, which are determined by ownership structure, institutional factors, and capital market forces (e.g., Fan & Wong, 2002; Bushman et al., 2004). Although cross-listing can increase trading efficiency, as firms voluntarily subject themselves to higher disclosure standards and greater enforcement, the increase is not as great as initially expected (Lang et al., 2006). Our findings suggest that stock market liberalization can increase the level of firm-specific information contained in stock prices without any need for significant changes in a country's legal environment.

Third, although we focus on the Chinese capital market, our findings are relevant to other developing countries that have started or plan to start the liberalization process. The information environment in emerging markets is generally regarded as lower quality, with less firm-specific information in stock prices (e.g., Chaney et al., 2011; Piotroski et al., 2015; Hung et al., 2018). Some studies suggest that stock market liberalization in emerging economies helps capital allocation and informs firms' decisions (Moshirian et al., 2021). We extend this literature by finding that stock market liberalization affects price efficiency by changing the supply of firm-specific information to stock markets and enabling the incorporation of more information into prices. This supports the findings of Carpenter et al. (2021) that stock price efficiency improves significantly over time, as well as their argument that China has much to gain from lowering the explicit and implicit barriers to its market and by accelerating reforms, because such initiatives will attract more foreign capital.

2. Institutional background and hypothesis development

2.1. Institutional background of the Shanghai–Hong Kong Stock Connect Program

China's capital market has become the world's second-largest market in less than 30 years. Thus, it is relatively young and dominated by inexperienced retail investors. The Chinese government began liberalizing its market in 1992[2] by allowing certified Chinese firms to issue B-shares to foreign investors. However, this process developed relatively slowly, with only 99 firms issuing B-shares by the end of 2018. The domestically traded A-share market has grown rapidly, and the central government is eager to attract more foreign investors. The Stock Connect program was launched on November 17, 2014, with the aim of enhancing the efficiency of the capital market. This allowed Hong Kong and foreign investors to trade shares of eligible firms on the Shanghai Stock Exchange and Chinese mainland investors to trade on the Hong Kong stock market. Thus, Stock Connect provides an alternative channel through which foreign investors can invest directly in the Chinese capital market. The Stock Connect reform attracts more foreign investment. Figure 1 shows a dramatic increase in foreign shareholdings in eligible firms after the establishment of the Stock Connect program.

<Insert Figure 1 here>

To facilitate the implementation of Stock Connect, recognizing the importance of protecting investors, mainland regulators have enacted stricter rules and implemented initiatives to enhance cross-boundary cooperation with Hong Kong regulators for better investor protection.[3] For example, to better protect both Chinese and foreign investors, the CSRC and Hong Kong's SFC signed an MoU to strengthen cross-boundary regulatory and

[2] Chen et al. (2021) conduct an extensive review of the timeline of the Chinese stock market and its liberalization.

[3] These include restrictions on improper activities, such as related-party transactions, and cooperative investigations into the disclosure of misleading information and stock price manipulation. Other actions by the CSRC and Hong Kong Exchanges and Clearing Limited (HKEX) include implementing compensation schemes for investor losses, pushing forward an information-sharing mechanism for small investor appeals, and enhancing the cross-border enforcement of sanctions.

enforcement cooperation.[4] As Figure 2 shows, under the Stock Connect program, the top 10 investors of eligible firms include an increasing number of foreign investors, which indicates that these measures are effective in attracting foreign investment.[5]

<Insert Figure 2 here>

2.2. Hypothesis development

Under the liberalization program, foreign investors are permitted to trade eligible stocks with a sufficiently large quota. The entry of foreign investors into the market may have various effects on stock price efficiency. First, the establishment of the Stock Connect program might incentivize eligible firms to provide higher-quality information. Henry (2000a, 2000b) shows that foreign investors, particularly those from developed capital markets, demand more high-quality information. From the firms' perspective, the issuing of the MoU regarding the Stock Connect program on October 17, 2014, brought the CSRC and Hong Kong's SFC much closer together, establishing a cooperative relationship between these two security regulators in terms of market supervision, enforcement, and the sharing of information essential to both. Firms included in the program thus strive to provide higher-quality information to avoid penalties, thereby increasing the amount of firm-specific information available to investors in the Chinese stock market. An increase in public disclosure and available public information should therefore be evident after the implementation of Stock Connect.

Second, as Kacperczyk et al. (2021) argue, the decisions of foreign investors to participate in the domestic market are based on a trade-off between the costs and

[4] The agreement established a platform for cooperation between the two regulators in terms of information sharing, alerts, investigative assistance, and joint investigations. Details can be found at https://www.sfc.hk/edistributionWeb/gateway/EN/news-and-announcements/news/doc?refNo=14PR127.

[5] As shown, before the establishment of Stock Connect, the holdings of Hong Kong Securities Clearing were mainly H-shares in A+H companies. After Connect, these holdings represent the sum of the shares in a company held by foreign investors through Stock Connect and the original H-shares, if any. We calculate the number of eligible firms that have Hong Kong Securities Clearing as one of their 10 largest shareholders. Figure 2 shows a sharp increase in the number of shares held by Hong Kong Securities Clearing after the establishment of Stock Connect, indicating that foreign ownership of eligible firms has significantly increased since then.

benefits of entry. Those with more ability to acquire and process information, and those with better quality information, are more likely to enter. Yoon (2021) finds that foreign institutional investors may hold private meetings with target firms to communicate with their managers. More firm-specific information is then incorporated into stock prices via trading by these foreign investors. Stock prices would therefore be more efficient in capturing information regarding firm fundamentals.

However, this positive effect of stock market liberalization may not be observable in China, as the institutional environment is relatively weak. A country's disclosure infrastructure and corporate transparency evolve as complementary components of its economic, legal, and political infrastructures (Ball, 2001; Bushman et al., 2004), and China's complex political networks and extensive government intervention may reduce or even eliminate the benefits of liberalization. Business transactions are often carried out within social and political networks, which generally benefit little from corporate transparency (Piotroski & Wong, 2012). He et al. (2012) find that the intended benefits of international convergence may fail to materialize in China, and unintended consequences may instead arise due to weak enforcement. The potential conflicts between the reform and intervention may render the effects negligible. Chen et al. (2013) find that state-controlled red chip firms listed in Hong Kong granted their directors significant stock options in response to the demands of foreign investors. However, their research also reveals that the firms forced directors to forfeit significant proportions of their vested in-the-money stock options and offers little evidence that the directors' stock option compensation changed the behavior of state-controlled red chip firms. Most eligible firms in the Stock Connect program are listed on the Shanghai Stock Exchange and raise their capital mainly in the domestic market. Thus, foreign investors might not be their target financial providers. Eligible firms may not have the incentive to cater to demands for higher-quality information from foreign investors, thus diminishing the intended effects.

Second, the foreign investors are physically distant from the eligible firms. Although they can communicate with firm managers through channels such as private meetings and conference calls, as Yoon (2021) notes, they may still have disadvantages in processing some of the "softer" information. For example, Wong et al. (2019) find that although foreign analysts have good technical abilities, they may face significant

institutional barriers to incorporating political information into their forecasts. Thus, their trading may not lead to the incorporation of more firm-specific information. Based on the above arguments, we propose our main hypothesis in null form as follows:

H1: Stock market liberalization does not influence the firm-specific information incorporated into stock prices.

3. Research design, sample, and descriptive statistics

3.1. Sample and data

To investigate the impact of stock market liberalization on the stock price efficiency of investible firms, we first create a treatment sample of all Chinese listed firms selected to be investible by foreign investors under the Stock Connect program.[6] We drop all firms that entered or exited Stock Connect after November 17, 2014. We use propensity score matching (PSM) to minimize endogeneity concerns regarding omitted variables and potential selection bias, and match each treatment firm with one control firm listed on the A-share market but not included in the Shanghai–Hong Kong Stock Connect program.[7] The matching procedure is based on the closest propensity score calculated using data for 2013, one year before the implementation of Stock Connect. We use the following model to estimate the propensity score:

$$Logit(SHHK) = \beta_0 + \beta_1 MVALUE + \beta_2 RATE\_T + \beta_3 GROWTH + \beta_4 ROE + Industry.F.E. + \varepsilon \quad (1)$$

where *MVALUE* is a firm's market value, *RATE_T* is the annual trading volume deflated by common shares outstanding, *GROWTH* is annual sales growth, and *ROE* is return on equity. Industry fixed effects are included to control for invariant factors within each industry. The covariates are based on the factors that the Shanghai Stock Exchange considers

[6] A list of all firms eligible in Stock Connect is available on the Hong Kong Stock Exchange website. http://www.hkex.com.hk.

7 We also conduct the same analyses using an unmatched full sample (including the treatment firms and a control sample of all other A-share firms listed on the Shanghai and Shenzhen stock exchanges), and the findings remain qualitatively similar, suggesting that our results are not sensitive to the use of the PSM approach. Due to space limitations, we report the results using the unmatched full sample in the Online Appendix.

when selecting firms for inclusion in the SSE 180 Index and SSE 380 Index.[8] The dependent variable is a dummy variable that equals 1 for treatment firms and 0 for A-share firms not included in the Connect program. After calculating the propensity score, we require one-to-one matching without replacement and a caliper distance of 0.01. Financial and stock return data are obtained from the China Stock Market and Accounting Research (CSMAR) and WIND databases, respectively. We drop financial firms, as they are heavily regulated. We also delete observations from the event year of 2014 to eliminate market noise during the transitional period.[9] Observations with missing required financial data are also excluded. We finally obtain a sample of 540 firms (270 treatment and 270 control firms) with 2,160 firm-year observations.

3.2. Variables

We follow prior studies (Durnev et al., 2003; Chen et al., 2007; Fernandes & Ferreira, 2008, 2009; Chen et al., 2018; Kacperczyk et al., 2021) and use stock price non-synchronicity as a proxy for stock price efficiency, as this measures the amount of firm-specific information incorporated into stock prices. Stock price non-synchronicity is a widely accepted measure in the literature.[10] Durnev et al. (2003) confirm that higher levels of stock price

[8] Chinese firms selected for the Shanghai–Hong Kong Stock Connect are from the SSE 180 Index and SSE 380 Index in the Shanghai Stock Exchange. Details of these indices can be found at http://www.sse.com.cn/market/sseindex/indexlist/indexdetails/indexmethods/c/Index%20Handbook_CN_SSE%20180.pdf and http://www.sse.com.cn/market/sseindex/indexlist/indexdetails/indexmethods/c/Index%20Methodology_CN_000009.pdf.

[9] In our robustness check, we add observations from 2014, and the results remain the same.

[10] Prior studies have investigated the relationship between stock price (non-)synchronicity and property rights (Morck et al., 2000), country-level information asymmetry (Jin & Myers, 2006), firm-level opacity (Hutton et al., 2009), institutional investors and corporate insiders (Piotroski & Roulstone, 2004), gender diversity on the boards (Gul et al., 2011), and institutional shareholders' geographical distribution (Kim et al., 2018). Using Chinese data, Gul et al. (2010) show that foreign ownership and auditor quality reduce synchronicity, while Chang et al. (2014) indicate that intense short-selling activities are associated with improved price efficiency.

non-synchronicity signal more information-rich stock prices and more efficient stock markets. We calculate R^2 using two methods. Following Chan and Hameed (2006), we first calculate R^2_{ch} using the following model:

$$R_{it} = \alpha_i + \beta_{1i}R_{m,t-1} + \beta_{2i}R_{m,t} + \beta_{3i}R_{m,t+1} + \varepsilon_{it} \quad (2)$$

where $R_{i,t}$ is the return on stock i in week t, and $R_{m,t}$ is the market return in week t, calculated as the value-weighted return of all stocks in the Chinese A-share market.

Second, we follow Piotroski and Roulstone (2004) and Hutton et al. (2009) and calculate R^2_{mktind} using a market-industry model, as follows:

$$R_{it} = \alpha_i + \beta_{1i}R_{m,t-1} + \beta_{2i}R_{I,t-1} + \beta_{3i}R_{m,t} + \beta_{4i}R_{I,t} + \beta_{5i}R_{m,t+1} + \beta_{6i}R_{I,t+1} + \varepsilon_{it} \quad (3)$$

Equations (2) and (3) are the same, except that we add the item industry return in week t to model (3), calculated as the value-weighted return of all other firms in the same industry. In both equations, we allow for nonsynchronous trading by including lead and lag terms (Dimson, 1979).

The term 1-R^2 is a natural measure of firm-specific information embedded in the stock price. As this is bounded between 0 and 1, we follow common practice and take a logistic transformation of R^2, which can range from negative to positive infinity. We then obtain the stock price efficiency measures *NONSYN1* and *NONSYN2* after the following transformations:

$$NONSYN1 = \log\left[\frac{1 - R_{ch}^2}{R_{ch}^2}\right] \quad (4)$$

and

$$NONSYN2 = \log\left[\frac{1 - R_{mkt}^2}{R_{mkt}^2}\right] \quad (5)$$

As we conduct a difference-in-differences analysis, our three main variables of interest are dummy variables and their interaction. Specifically, *SHHK* is equal to 1 if the firm belongs to the Stock Connect program and 0 otherwise. The variable *POST* is equal to 1 if the year is 2015 or 2016 and to 0 if the year is 2012 or 2013. The interaction term between *SHHK* and *POST*, *SHHK*×*POST*, captures the difference-in-differences effect, i.e., how stock price efficiency changes for the treatment group after the establishment of Stock Connect compared with the control group.

Following the literature (Morck et al., 2000; Durnev et al., 2003), we control for various firm-level variables. *SIZE* is defined as the natural logarithm of total assets at the fiscal year-end *t*, *ROA* is net income over total assets in year *t*, *LEVERAGE* is total liabilities divided by total assets in year *t*, *GROWTH* is defined as annual sales growth, *TURNOVER* is the annual change in the stock turnover rate divided by turnover in year *t*, *SOE* is a dummy variable that equals 1 if a firm is a state-owned enterprise (SOE) and 0 otherwise, *TOP_HOLD* is the percentage of shares held by the controlling shareholders in year *t*, and

INST_HOLD is the percentage of shares held by institutional investors in year *t*. All of the continuous variables are winsorized at the top and bottom 1% levels.

3.3. Descriptive statistics

Panel A, Table 1 presents the descriptive statistics for the variables used in the main regression, including both the treatment and control samples. The mean value of *NONSYN1* is 0.365, and the median is 0.227, with corresponding R^2_{ch} values of 0.428 and 0.444, respectively.[11] The mean value of *NONSYN2* is -0.201, and the median is -0.258. These negative values are due to the mean/median values of R^2_{mktind} being greater than 0.5. In terms of firm-level controls, the mean (median) of *SIZE* is 22.91 (22.81). The profitability of the sample firms is 4.6% on average, with a range of -17% to 20%. We find that around 55.4% of our sample firms are SOEs. Controlling shareholders hold approximately 37.4% of the total shares of our sample firms.

The matching efficiency of our PSM approach is illustrated in Panel B of Table 1. Significant differences between the treatment and control samples are observed before matching for all of the matching variables. After PSM, we observe no significant differences between the samples for any of the four variables, suggesting that our first-stage model yields good matching quality.

<Insert Table 1 here>

Table 2 reports the Pearson correlation matrix for the main variables in the sample. The two stock price efficiency measures, *NONSYN1* and *NONSYN2*, are positively correlated with each other and both are negatively correlated with the corresponding R^2 by construction. In addition, both measures are significantly negatively correlated with *POST*, which implies that, in general, less firm-specific information is incorporated into stock prices over time. This may be due to the higher systematic risk present in the Chinese capital market in 2015 and 2016, which further illustrates that the market is still emerging. This phenomenon illustrates the importance of control sample matching in our research design and the need for government capital market reforms. Finally, we observe that non-synchronicity is negatively related to *SIZE*, *LEVERAGE*, and *SOE* and positively related to *ROA*, *GROWTH*, *TURNOVER*, and *INST_HOLD*.

[11] Morck et al. (2000) and Gul et al. (2010) report similar R^2 statistics for China.

<Insert Table 2 here>

4. Main empirical results

4.1. Model specification

Following the literature (Morck et al., 2000; Durnev et al., 2003), we use the following regression specification to test the effect of stock market liberalization on stock price non-synchronicity:

$$\begin{aligned} NONSYN1(or)NONSYN2 = {} & \alpha_0 + \alpha_1 SHHK + \alpha_2 POST + \alpha_3 SHHK \times POST + \alpha_4 SIZE + \alpha_5 ROA + \alpha_6 LEVERAGE \\ & + \alpha_7 GROWTH + \alpha_8 TURNOVER + \alpha_9 SOE + \alpha_{10} TOP\_HOLD + \alpha_{11} INST\_HOLD \\ & + Year\_FE + Industry\_FE + \varepsilon \end{aligned} \quad (6)$$

All of the variables are defined in the appendix. We include industry and year fixed effects in the regression to control for factors related to stock price efficiency that are invariant across industries and years. The standard errors are clustered at the firm level.

Our main interest in this analysis is the coefficient of the interaction term *SHHK*×*POST*, α_3, which captures the incremental change in the stock price non-synchronicity of the treatment sample relative to the control sample before and after the implementation of the Stock Connect program.

4.2. Baseline results

Table 3 presents the results of the regression. Columns (1) and (2) report the results including only the main variables of interest, and Columns (3) and (4) report those with all of the control variables included. In Column (1), where the dependent variable is *NONSYN1*, the coefficient of *SHHK*×*POST* is significantly positive (0.171, t=2.42), supporting our assumption that stock market liberalization generally increases the amount of firm-specific information incorporated into stock prices for the treatment firms relative to the control firms, indicating that price efficiency increases after the reform. The results are quantitatively the same in Column (2), where *NONSYN2* is the dependent variable. Consistent with the results of the correlation analysis, the coefficient of *POST* is significantly negative, which indicates that stock price efficiency deteriorates across the whole market, signaling the need for reform.

We further control for other variables, and the results reported in Column (3) of Table 3 remain qualitatively the same. The coefficient of *SHHK×POST* remains significantly positive, with a value of 0.144 and a *t*-value of 2.12. The results are similar in Column (4). In terms of economic significance, the Stock Connect program leads to increases of 7.1% (0.144*0.439/0.896) and 7.2% (0.119*0.439/0.724) in stock price non-synchronicity,[12] as shown respectively in Columns (3) and (4). The baseline results together indicate that although stock price non-synchronicity decreases for the entire market over time, the Stock Connect program increases the firm-specific information incorporated into the prices of the treatment sample relative to the control sample after 2014.

<Insert Table 3 here>

4.3. Robustness tests

We conduct several robustness tests, including a parallel trends assumption analysis, firm fixed effects modeling, placebo tests, controlling for additional factors, and alternative matching procedures.

4.3.1. Validity of the difference-in-differences analysis

A valid difference-in-differences test should fulfill the parallel trends assumption, in which the difference in the outcome variables between the treatment and control groups is constant over time before the event. Following Chen et al. (2012), we create four dummy variables, *Before2*, *Before1*, *After1*, and *After2*. The variables *Before2* and *Before1* equal 1 for two years and one year before Stock Connect, respectively, and *After1* and *After2* equal 1 for one year and two years after Stock Connect, respectively. We then interact the time variable with *SHHK* to capture the difference between the treatment and control samples for each year, with the event year as the benchmark. Panel A of Table 4 gives the results. In all four columns, the coefficients on the interaction terms *SHHK×Before2* and *SHHK×Before1* are not significant, suggesting that the trends in the treatment and control firms before the event are statistically similar. The significant coefficients on *SHHK×After1* and *SHHK×After2* indicate that the non-synchronicity of the treatment and control samples differs

[12] The value of 7.1% = 0.144×0.439/0.896, where 0.144 is α_3 in Column (3) of Table 3, 0.439 is the standard deviation of *SHHK×POST*, and 0.896 is the standard deviation of *NONSYN1.* Similarly, for *NONSYN2,* the economic significance is 7.2% = 0.119×0.439/0.724.

only after Stock Connect. Thus, the results show that our difference-in-differences analysis is consistent with the parallel trends assumption.

4.3.2. Endogeneity

Although we use the establishment of Stock Connect as a quasi-natural experiment and conduct a difference-in-differences analysis, endogeneity may be still a concern in our study. First, firms and investors should have been prepared for the program before it was officially implemented by the government, as it was discussed at length. Therefore, it may not have been a complete shock, and some firms may have already provided additional information in their disclosures before 2014. Second, although we implement PSM to control for fundamental differences between the treatment and control samples, we may have omitted factors from the regression. We therefore use a firm fixed effects model and run a placebo test to address endogeneity concerns.

In the first two columns of Panel B in Table 4, we include firm and year fixed effects to control for factors that are invariant across firms and years. The results remain unchanged. We then run a placebo test in which the pseudo-event year is 2011, so *POST_p* equals 1 for the years 2012 and 2013 and 0 for the years 2009 and 2010. If firms begin to provide more information to the public before the official establishment of Stock Connect, we should also observe a decrease in synchronicity around the pseudo-events. The coefficients on *SHHK×POST_p* in Columns (3) and (4) are not significant, indicating that the use of Stock Connect as a shock is appropriate and that no increasing trend in price efficiency occurs before the event.

<Insert Table 4 here>

4.3.3. Additional robustness tests

We then conduct several robustness tests, initially by including three additional control variables. The first is *BETA*, which is the annual systematic risk coefficient calculated using the capital asset pricing model (CAPM). *BETA* is controlled because systematic risks may affect information incorporated in prices (Warfield et al., 1995). We then include *DA*, which is a firm's discretionary accrual calculated using a modified Jones model. Finally, we include *SENTIMENT*, which is a firm-specific sentiment measure, following Rhodes-Kropf et al. (2005). *DA* and *SENTIMENT* are included to control for firms' disclosure practices. The results are reported in Panel A of Table 5. The variable *BETA* is significantly negatively related to our non-synchronicity measure, which indicates that stock price efficiency is lower

for firms with high systematic risks. The coefficients on *DA* are statistically negative, which is consistent with the finding of Hutton et al. (2009) that firms with high accounting quality have higher stock price efficiency. The coefficient on *SENTIMENT* is significantly positive. Our main results remain unchanged when we include these three additional control variables, either separately (in Columns (1) to (6)) or simultaneously (Columns (7) and (8)).

Second, we use alternative control samples to address concerns regarding the control sample used in the main analyses. First, we use all the firms listed on the Shanghai Stock Exchange but not included in the Stock Connect program. The results reported in Columns (1) and (2) of Panel B in Table 5 again reveal a significantly positive coefficient for the interaction term *SHHK×POST*. We then use all firms in the A-share market as the control sample, and the results in Columns (3) and (4) remain unchanged. We further use all eligible firms under the Shenzhen–Hong Kong Stock Connect program as the control sample, and the results in Columns (5) and (6) again remain unchanged.

Third, we use a different matching method to identify our control sample. We match each treatment firm with one control firm based on the closest foreign shareholdings in the same industry in the same year. Foreign shareholding is an appropriate matching criterion, as it represents the goal of liberalization. The proportions of foreign shareholdings vary across firms after foreign investors enter the Chinese market. Firms with relatively higher percentages of foreign shareholdings may have more information incorporated into their stock prices, as foreign investors have a greater ability to acquire and process information. Thus, our matching based on foreign ownership can control for such influences. The results are reported in Columns (7) and (8) of Panel B in Table 5, and the coefficients of *SHHK×POST* remain significantly negative in both columns.

We then examine whether our main evidence is robust to different sample periods. In Columns (1) and (2) of Panel C in Table 5, we extend the sample period to 2011–2017, i.e., three years before and three years after liberalization. As the market crash in China in 2015 might affect stock price synchronicity, we drop 2015 from our sample period. We continue to observe a significant decrease in synchronicity after extending the sample period. We further extend the post-liberalization period to 2018, as shown in Columns (3) and (4) of Panel C in Table 5, and the results remain unchanged.

Finally, we show that our main evidence is not sensitive to other price efficiency measures. We follow Hou and Moskowitz (2005) and construct two alternative efficiency

measures using price delays. Specifically, we estimate the following base model (Equation (7)) and the extended market model (Equation (8)), respectively:

$$r_{i,t} = \alpha_i + \beta_i r_{m,t} + \varepsilon_{i,t}, \quad (7)$$

$$r_{i,t} = \alpha_i + \beta_i r_{m,t} + \sum_{n=1}^{4} \delta_{i,n} r_{m,t-n} + \varepsilon_{i,t}, \quad (8)$$

where $r_{i,t}$ represents the returns from stock i in day t; $r_{m,t}$ is the corresponding value-weighted market return in day t; $r_{m,t-n}$ denotes the value-weighted market return n days prior to day t. The first price delay measure is *D1*, which is defined as the ratio of the R-squared estimated from the above extended market model over that of the above base model. The second price delay measure is a coefficient-based delay (*D2*), which is constructed as the ratio of the sum of the absolute values of each coefficient on the lagged market returns over the sum of the absolute values of all coefficients in the above extended market model (Equation (8)):

$$D2_i = \frac{\sum_{n=1}^{4} |\delta_{i,n}|}{|\beta_i| + \sum_{n=1}^{4} |\delta_{i,n}|} \quad (9)$$

Decreases in price delays suggest low friction on the price process of a stock and thus high price efficiency. The results are presented in Panel D of Table 5. The coefficients on *SHHK* ×*Post* are significantly negative in both columns, indicating that price delays decrease after liberalization. These results provide supporting evidence for our main findings. Thus, we can conclude that our main evidence is not sensitive to alternative control samples, matching procedures, sample periods, or measures of price efficiency.

<Insert Table 5 here>

5. Additional analysis

5.1. Information mechanism

Our analysis demonstrates the causal effect of stock market liberalization on price efficiency. In this section, we suggest mechanisms through which this liberalization can affect price efficiency. If firms take foreign investors into account and disclose more and higher-quality information after liberalization, then we should observe an increase in information quality. We now examine whether overall disclosure by eligible firms improves after liberalization. We use three proxies for firm-level disclosure. First, we use mandatory

firm-level financial information disclosure. Following other studies (Bhattacharya et al., 2003; Liao et al., 2021), we calculate accounting quality (*ERANK*) as the negative value of the average percentile rank of three measures of the transparency of reported earnings: income smoothing, earnings aggressiveness (i.e., total accruals), and earnings management. A higher value of this variable indicates better quality in reported earnings. The results presented in Column (1) of Table 6 show that earnings quality improves significantly after stock market liberalization in our treatment sample. We next consider voluntary financial information disclosure in terms of the likelihood of issuing voluntary management earnings forecasts and their accuracy. The results in Columns (2) and (3) of Table 6 indicate that relative to the control sample, investible firms under the Stock Connect program are more likely to provide voluntary earnings forecasts (Column (2)), and that these forecasts are likely to be more accurate (Column (3)). These results support our argument that investible firms under the Stock Connect program provide more and higher-quality financial information to meet the demands of foreign investors and avoid possible enforcement measures. Incorporating this larger volume of higher-quality financial information into stock prices leads to lower synchronicity in terms of firm-specific information.

<Insert Table 6 here>

5.2. Stock market liberalization and the incorporation of private information

We then investigate whether private information is a channel through which stock market liberalization affects investor trading and price efficiency. Following Chen et al. (2007) and Easley et al. (2011, 2012), we examine whether stock market liberalization affects the probability of informed trading (PIN). *PIN* measures the probability that a trade will be conducted by an informed trader. Chen et al. (2007) use the PIN and non-synchronicity to measure firm-specific information in stock prices. They find that increased non-synchronicity in stocks suggests that more private information is produced by sophisticated investors, and that the information is new and informative to managers. In addition, as foreign investors are typically more sophisticated than domestic retail investors, they collect and interpret firm information more effectively.[13] Thus, information asymmetry in the capital market and the bid-ask spread are likely to increase.

[13] For example, Yoon (2021) finds that foreign institutional investors directly gather company information via private meetings.

The results are presented in Table 7. Column (1) shows an increase in *PIN* for the treatment sample after liberalization, suggesting an increase in informed trading and in firm-specific information in stock prices[14]. Column (2) shows a significant increase in *BASPREAD*, which is the bid-ask spread as applied by Roll and Subrahmanyam (2010) and Chung and Zhang (2014). These findings are consistent with the view that foreign investors who participate in the Stock Connect program possess information outside of the information sets of domestic investors, thus resulting in higher information asymmetry. In general, the results indicate that after stock market liberalization, foreign investors trade on their superior information and improve the level of firm-specific information incorporated into stock prices through their trading.

<Insert Table 7 here>

We further look at the feedback effects of stock prices (Bond et al., 2012). If informed investors possess and trade on superior private information, managers will learn from stock prices to increase their investment efficiency. Our learning hypothesis test is based on that of Chen et al. (2007). If stock price efficiency improves after Stock Connect and contains private information from outside investors, then the sensitivity of a firm's capital investment to its stock price should increase for eligible firms.

The results are presented in Table 8, in which the dependent variable is next-period investment. We observe a significantly positive coefficient on *SHHK*×*POST*×*TOBINQ*, which implies that managers do learn more from stock prices, and thus the investment efficiency of eligible firms improves after the Stock Connect program.

<Insert Table 8 here >

5.3. Stock price efficiency and stock price informativeness

Durney et al. (2003) find that greater variations in firm-specific stock returns is associated with more informative stock prices, where price informativeness is defined as the

[14] To estimate *PIN*, we use the intraday stock high-frequency trading data from RESST. Following Chen et al. (2007) and Easley et al. (2011, 2012), we estimate a firm-year *PIN* based on the number of sells and buys for each trading day in year *t*. Trade prices are compared with the midpoint of the bid-ask spread five seconds before the trades. If a trade occurs above the prevailing quote midpoint, it is regarded as buyer-initiated. If a trade occurs below the prevailing quote point, it is regarded as seller-initiated. For trades occurring exactly at the midpoint, we compare the prices with the preceding trade price and classify those at a higher price than the preceding trades as buys and those at a lower price as sells. We also deleted trades occurring exactly at the quote midpoint (Sadka, 2006), and the results remain the same.

level of future earnings information contained in stock prices. Bai et al. (2016) use a similar measure of stock price informativeness and find that it increases with longer horizons in the U.S. capital market. In a similar vein, Carpenter et al. (2021) find that stock price informativeness increases over time in China, where stock prices since 2004 have become as informative about future profit as they are in the U.S. This increase is attributed to the Chinese government's capital market reforms. Stock market liberalization represents a milestone reform in the Chinese capital market, and so we investigate whether stock price informativeness increases after Stock Connect using a similar measure.

The results are reported in Table 9, in which the dependent variables are one-year leading *EBIT*, *Net Income*, and *EBITDA*. The positive coefficients on *SHHK×POST×PRICE* indicate that prices are more informative in predicting future profit after liberalization, which is consistent with the findings of Carpenter et al. (2021). The results from the feedback effect and stock price informativeness tests together imply that stock prices capture firms' fundamentals more efficiently after the Stock Connect program, which validates our use of stock price non-synchronicity as a proxy of stock price efficiency in the Chinese capital market.

<Insert Table 9 here >

6. Conclusion

In this study, we examine how stock market liberalization affects stock price efficiency. We regard the Stock Connect program launched in China in 2014 as a quasi-natural experiment and conduct a difference-in-differences analysis. Using stock price non-synchronicity as a proxy for stock price efficiency, we find that after the establishment of Stock Connect, the stock price efficiency of eligible firms increases significantly. We then provide evidence that this increase in efficiency is a result of greater disclosure of higher-quality information by eligible firms and the incorporation of more firm-specific information into stock prices via foreign investors' trading. Our results are robust to the inclusion of additional control variables and different control samples, and they remain robust after addressing potential endogeneity. We acknowledge that increased stock price efficiency is a combined effect of increased public disclosure and informed foreign investors' trading, but we do not suggest that one is more dominant or assess their specific contributions to the increase in efficiency.

Our findings have important policy implications for practitioners and regulators. Many studies (Aggarwal et al., 1999; Henry, 2000a, 2000b; Bekaert et al., 2005) note that China, as the world's largest emerging market, is attracting much interest from foreign investors, while our study indicates that the liberalization process is essential for China's ongoing capital market development. In this study, we demonstrate that opening up China's capital market is beneficial to both investors and firms. The liberalization of this emerging market will help increase market efficiency and price informativeness, which will encourage investors from developed regions and have significant policy implications for subsequent reforms. These include the Shenzhen–Hong Kong Stock Connect program implemented in December 2016, the inclusion of China's stock market in the Morgan Stanley Capital International (MSCI) Emerging Market Index in June 2018, and the London–Shanghai Stock Connect program established in June 2019. The Stock Connect program also has implications for other developing countries that are embarking on or planning the liberalization of their capital markets.

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Appendix: Variable Definitions

Variable	Definition
NONSYN1	Stock price efficiency measure. *NONSYN1* = $\log[(1-R^2_{ch})/R^2_{ch})]$, where R^2_{ch} is the R-squared value from estimating the model according to Chan and Hameed (2006) using weekly return data. We allow for nonsynchronous trading by including lead and lag terms (Dimson, 1979).
NONSYN2	Stock price efficiency measure. *NONSYN2* = $\log[(1-R^2_{mktind})/R^2_{mktind})]$, where R^2_{mktind} is the R-squared value from estimating the market-industry model using weekly return data. We allow for nonsynchronous trading by including lead and lag terms (Dimson, 1979).
SHHK	A dummy variable that equals 1 if a firm is investible by foreign investors under the Stock Connect program, and 0 otherwise.
POST	A dummy variable that equals 1 if the year is 2015 or 2016, and 0 if the year is 2012 or 2013.
SIZE	A measure of firm size, calculated as the natural logarithm of total assets at the end of year *t*.
ROA	A measure of profitability, calculated as net income divided by total assets at the end of year *t*.
LEVERAGE	Book leverage, calculated as the ratio of total liabilities to total assets at the end of year *t*.
GROWTH	Annual change in sales scaled by lagged total sales.
TURNOVER	Annual change in the stock turnover rate divided by the turnover

	rate in year *t*.
SOE	A dummy variable that equals 1 if a firm is state-owned, and 0 otherwise.
TOP_HOLD	Percentage of shares held by the controlling shareholder at the end of year *t*.
INST_HOLD	Percentage of shares held by institutional shareholders at the end of year *t*.
MVALUE	Firm market value at the end of year *t.*
RATE_T	Annual trading volume deflated by common shares outstanding.
ROE	Return over equity, calculated as net income divided by total equity at the end of year *t*.
POST_p	A dummy variable that equals 1 if the year is 2012 or 2013, and 0 if the year is 2009 or 2010.
BETA	Annual systematic risk coefficient, calculated according to the CAPM model.
DA	Discretionary accruals, calculated according to Kothari et al. (2005).
SENTIMENT	A firm-specific sentiment measure, calculated according to Rhodes-Kropf et al. (2005).
D1	Price delay measure, calculated as the ratio of the R-squared estimated from the extended market model over that of the base model.
D2	Coefficient-based price delay measure, which is defined as the ratio of the sum of the absolute values of each coefficient of the lagged market returns over the sum of the absolute values of all coefficients in the extended market model (Equation (8)), namely, $D2=\sum^{4}_{n=1}\lvert\delta_{i,n}\rvert / (\lvert\beta_i\rvert+\sum^{4}_{n=1}\lvert\delta_{i,n}\rvert)$, where β_i, $\delta_{i,n}$ are the coefficients in the extended market model (Equation (8)).
MGMT_HOLD	Percentage of shares held by managers at the end of year *t*.

QFII_HOLD	Percentage of shares held by qualified foreign institutional investors (QFIIs) at the end of year *t*.
ANALYST	Analyst coverage of a firm in year *t*, measured as the natural logarithm of 1 plus the number of analysts following a firm.
ERANK	A measure of earnings quality. Following Bhattacharya et al. (2003) and Liao et al. (2021), this is measured as the negative value of the average percentile rankings of three individual earnings transparency measures, including income smoothing, total accruals scaled by beginning total assets, and the absolute value of discretionary accruals estimated based on the modified Jones model. Income smoothing is the volatility of reported earnings scaled by the volatility of operating cash flows, multiplied by -1.
VOLUNTARY	A dummy variable that equals 1 if top management voluntarily provides an annual earnings forecast in year *t*, and 0 otherwise.
MANDATORY	A dummy variable that equals 1 if top management has to provide earnings forecasts in year *t*, and 0 otherwise. A firm must provide earnings forecasts if it satisfies one of the following three conditions: (1) it expects a loss, (2) its net income will increase or decrease by 50% relative to the previous year, or (3) the firm's performance will turn around from a loss to a profit.
PRECISION	The precision of management earnings forecasts, where we assign values of 4, 3, 2, and 1 to point forecasts, range forecasts, open-ended forecasts, and qualitative forecasts, respectively. A firm that does not voluntarily forecast earnings is assigned a value of 0.
PIN	The probability of informed trading, calculated according to Easley et al. (2011, 2012).
BASPREAD	Bid-ask spread, calculated according to Roll and Subrahmanyam (2010) and Chung and Zhang (2014).
INV	Firm's investment in year *t*, measured as capital expenditure scaled by beginning-of-year total assets.
EBIT	Earnings before interest and taxes, scaled by beginning-of-year

	assets.
NI	Net income, scaled by beginning-of-year assets.
EBITDA	Earnings before interest, taxes, depreciation, and amortization, scaled by beginning-of-year assets.
TOBINQ	Market value of equity plus the book value of assets minus the book value of equity, scaled by the book value of assets.
ZSCORE	The value of Z score, calculated according to Altman's Z-Score model.
FCF	A firm's free cash flow in year *t*, calculated as (Operating net cash flow + Net cash flow generated from investing activities - Interest expense)/Revenues.
VOLUME	Natural logarithm of the annual trading volume.
ZONE	A dummy variable that equals 1 if a firm is located in the eastern province, and 0 otherwise.
HORIZON	Natural logarithm of the average number of days between the release date of analysts' forecasts and the disclosure date of the company's financial report.
BIG4	A dummy variable that equals 1 if a firm is audited by a Big 4 firm, and 0 otherwise.
PRICE	The log-ratio of market capitalization to total assets.

Table 1
Summary statistics
Panel A Descriptive statistics of the main variables

Variable	*N*	Mean	P75	Median	P25	Std. Dev.
NONSYN1	2,160	0.365	0.886	0.227	-0.273	0.896
NONSYN2	2,160	-0.201	0.267	-0.258	-0.727	0.724
R^2_{ch}	2,160	0.428	0.568	0.444	0.292	0.182

R^2_{mktind}	2,160	0.546	0.674	0.564	0.434	0.165
SHHK	2,160	0.500	1	1	0	0.500
POST	2,160	0.500	1	0.500	0	0.500
SIZE	2,160	22.910	23.632	22.811	22.118	1.139
ROA	2,160	0.046	0.071	0.038	0.018	0.048
LEVERAGE	2,160	0.485	0.647	0.491	0.333	0.201
GROWTH	2,160	0.156	0.235	0.095	-0.021	0.372
TURNOVER	2,160	-0.274	0.420	0.041	-0.685	0.972
SOE	2,160	0.554	1	1	0	0.497
TOP_HOLD	2,160	0.374	0.490	0.361	0.248	0.156
INST_HOLD	2,160	0.494	0.664	0.520	0.336	0.220

Panel B Results of the covariate balance tests of propensity score matching

Variable	Sample	Mean (*SHHK* = 1)	Mean (*SHHK* = 0)	%bias	*t*-test
MVALUE	Unmatched	16.051	15.111	120.8	20.30***
	Matched	15.848	15.862	-1.7	-0.22
RATE_T	Unmatched	3.731	5.821	-57.6	-8.43***
	Matched	3.986	3.869	3.2	0.48
GROWTH	Unmatched	0.155	0.179	-7.4	-1.18
	Matched	0.168	0.188	-5.9	-0.73
ROE	Unmatched	0.101	0.069	47.5	7.80***
	Matched	0.099	0.105	-8.6	-0.95

Note: Table 1 reports the summary statistics. Panel A presents the descriptive statistics of the main variables used in this paper based on the sample of listed firms in the A-share market from 2012 to 2016. Panel B shows the results of the covariate balance tests of propensity score matching (PSM). Variable definitions are provided in the appendix.\

Table 2

Correlation matrix

Variable	1	2	*3*	*4*	5	6	7	8	9	10	11	12	13	14
NONSYN1	1													
NONSYN2	**0.81**	1												
R^2_{ch}	**-0.97**	**-0.87**	1											
R^2_{mktind}	**-0.81**	**-0.79**	**0.83**	1										
SHHK	**-0.17**	**-0.10**	**0.10**	**0.10**	1									

	10	**04**	**8**	**4**										
POST	**-0.3**	**-0.3**	**0.37**	**0.33**										
	71	**35**	**6**	**9**	0	1								
SIZE	**-0.2**	**-0.2**	**0.24**	**0.24**		**0.19**								
	37	**39**	**2**	**0**	**0.16**	**3**	1							
ROA	**0.21**	**0.14**	**-0.2**	**-0.1**	**-0.0**	**-0.1**	**-0.1**							
	0	**9**	**03**	**49**	**60**	**22**	**93**	1						
LEVER	**-0.0**	-0.0	**0.08**	0.04	**0.11**		**0.54**	**-0.4**						
AGE	**92**	41	**7**	2	**9**	0	**2**	**88**	1					
GROW	**0.14**	**0.11**	**-0.1**	**-0.1**	-0.0	**-0.0**		**0.11**	**0.07**					
TH	**0**	**2**	**40**	**12**	34	**76**	0	**1**	**6**	1				
TURNO	**0.14**	**0.08**	**-0.1**	**-0.0**	-0.0	**-0.1**	**-0.1**	**0.04**	-0.0	0.01				
VER	**5**	**7**	**47**	**86**	28	**40**	**31**	**5**	16	9	1			
SOE	**-0.1**	**-0.1**	**0.13**	**0.14**	**0.24**	-0.0	**0.28**	**-0.1**	**0.21**	**-0.0**	-0.0			
	40	**44**	**8**	**1**	**3**	07	**1**	**45**	**6**	**71**	36	1		
TOP_H	0.01	-0.0	-0.0	0.01	0.02	**-0.0**	**0.18**	**0.07**	0.01	**-0.0**	-0.0	**0.19**		
OLD	9	19	19	8	8	**92**	**6**	**4**	2	**57**	32	**9**	1	
INST_H	**0.04**	-0.0	**-0.0**	0.00	**0.10**	0.01	**0.32**	**0.14**	**0.11**	-0.0	**-0.1**	**0.30**	**0.45**	
OLD	**5**	10	**45**	9	**5**	7	**3**	**0**	**1**	41*	**11**	**8**	**7**	1

Note: Table 2 reports the Pearson correlations for the main variables used in this paper. Boldface indicates a significant correlation at the 5% level. Numbers 1–14 represent *NONSYN1*, *NONSYN2*, R^2_{ch}, R^2_{mktind}, *SHHK*, *POST*, *SIZE*, *ROA*, *LEVERAGE*, *GROWTH*, *TURNOVER*, *SOE*, *TOP_HOLD*, and *INST_HOLD*, respectively. Variable definitions are provided in the appendix.

Table 3

Stock market liberalization and stock price efficiency: Baseline results

Variable	(1) *NONSYN1*	(2) *NONSYN2*	(3) *NONSYN1*	(4) *NONSYN2*
SHHK	-0.276***	-0.198***	-0.196***	-0.134***
	(-4.62)	(-4.12)	(-3.62)	(-3.01)
POST	-1.015***	-0.610***	-0.756***	-0.413***
	(-15.33)	(-12.33)	(-10.34)	(-7.24)
SHHK×POST	0.171**	0.133**	0.144**	0.119**
	(2.42)	(2.38)	(2.12)	(2.15)
SIZE			-0.156***	-0.159***
			(-7.10)	(-8.37)
ROA			2.213***	1.522***
			(4.94)	(3.76)
LEVERAGE			0.548***	0.627***

			(4.29)	(5.55)
GROWTH			0.214***	0.135***
			(3.82)	(3.06)
TURNOVER			0.104***	0.069***
			(4.90)	(3.99)
SOE			-0.167***	-0.123***
			(-4.05)	(-3.33)
TOP_HOLD			-0.006	-0.015
			(-0.05)	(-0.13)
INST_HOLD			0.519***	0.269***
			(5.27)	(3.14)
Constant	1.226***	0.155	4.139***	3.232***
	(11.87)	(1.28)	(9.17)	(8.19)
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
# of Obs.	2,160	2,160	2,160	2,160
Adj. R^2	0.27	0.20	0.34	0.27

Note: Table 3 reports the results of the following regressions of stock market liberalization on stock price efficiency:

NONSYN1 or *NONSYN2*=$\alpha_0+\alpha_1 SHHK+\alpha_2 POST+\alpha_3 SHHK \times POST$+ Controls+Year FE + Industry FE + ε where *NONSYN1* and *NONSYN2* are proxies for a firm's stock price efficiency, calculated as $log[(1-R^2_{ch})/R^2_{ch})]$ and $log[(1-R^2_{mktind})/R^2_{mktind})]$, respectively. R^2_{ch} is the R-squared value from estimating the model according to Chan and Hameed (2006) using weekly return data, and R^2_{mktind} is the R-squared value from estimating the market-industry model using weekly return data. The key explanatory variable is the interaction term *SHHK*×*POST*, where *SHHK* is a dummy variable that equals 1 if a firm is investible by foreign investors under the Stock Connect program, *POST* is a dummy variable that equals 1 if the year is 2015 or 2016. The sample uses a four-year window (from year -2 to year +2) around the Stock Connect. Variable definitions of all variables are provided in the appendix. The *t*-statistics in parentheses are based on robust standard errors clustered at the firm level. Coefficients marked with *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table 4

Validity of the difference-in-differences design and endogeneity issues

Panel A Parallel trends analysis

	(1)	(2)	(3)	(4)
	NONSYN1	*NONSYN2*	*NONSYN1*	*NONSYN2*
SHHK	-0.292***	-0.196***	-0.217***	-0.135**
	(-4.07)	(-3.35)	(-3.14)	(-2.36)
SHHK×Before2	0.038	-0.007	0.058	0.003
	(0.42)	(-0.10)	(0.67)	(0.05)
SHHK×Before1	-0.012	0.008	0.003	0.016
	(-0.12)	(0.11)	(0.03)	(0.22)

SHHK×After1	0.185**	0.100	0.147*	0.077
	(2.31)	(1.42)	(1.82)	(1.08)
SHHK×After2	0.176*	0.157**	0.163*	0.149*
	(1.78)	(2.04)	(1.67)	(1.92)
SIZE			-0.179***	-0.166***
			(-8.39)	(-8.87)
ROA			2.028***	1.203***
			(4.82)	(3.24)
LEVERAGE			0.587***	0.566***
			(4.71)	(5.14)
GROWTH			0.256***	0.149***
			(4.97)	(3.56)
TURNOVER			0.008	0.002
			(0.93)	(0.22)
SOE			-0.143***	-0.102***
			(-3.69)	(-2.88)
TOP_HOLD			-0.050	-0.082
			(-0.42)	(-0.75)
INST_HOLD			0.426***	0.237***
			(4.61)	(2.88)
Constant	0.538***	-0.203*	3.958***	3.071***
	(5.87)	(-1.68)	(9.24)	(8.05)
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
# of Obs.	2,670	2,670	2,670	2,670
Adj. R^2	0.38	0.26	0.43	0.31

Panel B Endogeneity issues

	(1)	(2)	(3)	(4)
	NONSYN1	*NONSYN2*	*NONSYN1*	*NONSYN2*
SHHK×POST	0.150**	0.116**		
	(2.44)	(2.27)		
SHHK			-0.129**	-0.092**
			(-2.45)	(-2.09)
POST_p			0.408***	0.510***
			(5.88)	(9.33)

SHHK×POST_p			-0.031	-0.010
			(-0.45)	(-0.19)
SIZE	-0.246***	-0.186***	-0.279***	-0.262***
	(-3.62)	(-3.30)	(-12.15)	(-14.06)
ROA	1.854***	1.566***	2.692***	1.014***
	(2.92)	(2.97)	(6.18)	(2.78)
LEVERAGE	0.646**	0.454**	0.845***	0.853***
	(2.57)	(2.18)	(6.01)	(7.51)
GROWTH	0.119**	0.074*	0.315***	0.214***
	(2.36)	(1.77)	(4.60)	(3.73)
TURNOVER	0.118***	0.078***	0.141***	0.074***
	(5.77)	(4.63)	(5.72)	(3.52)
SOE	-0.282	-0.169	-0.099**	-0.051
	(-1.52)	(-1.09)	(-2.24)	(-1.37)
TOP_HOLD	-0.423	-0.254	-0.065	0.034
	(-1.13)	(-0.81)	(-0.47)	(0.28)
INST_HOLD	0.712***	0.452***	0.705***	0.166**
	(4.78)	(3.65)	(7.20)	(2.05)
Constant	5.474***	3.705***	5.935***	5.106***
	(3.45)	(2.81)	(12.50)	(13.14)
Year FE	Yes	Yes	Yes	Yes
Industry FE	No	No	Yes	Yes
Firm FE	Yes	Yes	No	No
# of Obs.	2,160	2,160	1,886	1,886
Adj. R^2	0.54	0.52	0.34	0.29

Note: Table 4 reports the results of the validity analysis of the difference-in-differences design and endogeneity issues. Panel A shows the results of the following regressions of the parallel trends analysis:

$$NONSYN1 \text{ or } NONSYN2=\alpha_0+\alpha_1 SHHK+\alpha_2 SHHK\times Before2+\alpha_3 SHHK\times Before1+\alpha_4 SHHK\times After1 +\alpha_5 SHHK\times After2+ \text{Controls+Year FE + Industry FE + } \varepsilon$$

In Panel B, Columns (1)–(2) show the results of the following difference-in-differences regressions:

$$NONSYN1 \text{ or } NONSYN2=\alpha_0+\alpha_1 SHHK\times POST+ \text{Controls+Year FE + Firm FE + } \varepsilon$$

Columns (3)–(4) show the results of the following regressions for the placebo test:

$$NONSYN1 \text{ or } NONSYN2=\alpha_0+\alpha_1 SHHK+\alpha_2 POST\_p+\alpha_3 SHHK\times POST\_p+ \text{Controls+Year FE + Industry FE + } \varepsilon$$

where *NONSYN1* and *NONSYN2* are proxies for a firm's stock price efficiency, *SHHK* is a dummy variable that equals 1 if a firm is investible by foreign investors under the Stock Connect program, *Beforej* (*Afterj*) is a dummy variable for the j^{th} year prior to (after) the year of the reform; *POST* is a dummy variable that equals 1 if the year is 2015 or 2016, *POST_p* is a dummy variable that equals 1 if the year is 2012 or 2013, and 0 if the year is 2009 or 2010. Variable definitions are provided in the appendix. The *t*-statistics in parentheses are based on robust standard errors clustered at the firm level. Coefficients marked with *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table 5

Additional robustness tests

Panel A Controlling additional variables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	NONSYN1	*NONSYN2*	*NONSYN1*	*NONSYN2*	*NONSYN1*	*NONSYN2*	*NONSYN1*	*NONSYN2*
SHHK	0.056	0.047	-0.194***	-0.133***	-0.080*	-0.066*	0.122***	0.076*
	(1.21)	(1.18)	(-4.21)	(-3.40)	(-1.80)	(-1.68)	(2.74)	(1.91)
POST	-0.542***	-0.246***	-0.758***	-0.418***	-0.653***	-0.341***	-0.547***	-0.286***
	(-8.91)	(-4.69)	(-12.29)	(-7.96)	(-10.94)	(-6.53)	(-9.52)	(-5.56)
SHHK×POST	0.137**	0.115**	0.148**	0.120**	0.111*	0.100*	0.100*	0.093*
	(2.25)	(2.18)	(2.33)	(2.23)	(1.82)	(1.88)	(1.72)	(1.80)
SIZE	-0.195***	-0.190***	-0.142***	-0.151***	-0.154***	-0.160***	-0.300***	-0.267***
	(-10.87)	(-12.30)	(-7.71)	(-9.60)	(-8.70)	(-10.30)	(-8.87)	(-8.84)
ROA	1.920***	1.160***	3.859***	2.600***	0.996*	0.789*	-0.282	-0.085
	(3.74)	(2.62)	(7.22)	(5.72)	(1.89)	(1.72)	(-0.54)	(-0.18)
LEVERAGE	0.532***	0.614***	0.633***	0.673***	0.641***	0.696***	0.349***	0.409***
	(4.61)	(6.18)	(5.28)	(6.61)	(5.56)	(6.91)	(3.25)	(4.26)
GROWTH	0.004***	0.002***	0.004***	0.003***	0.004***	0.003***	0.004***	0.002**
	(3.47)	(2.65)	(3.93)	(3.05)	(4.25)	(3.26)	(3.53)	(2.48)
TURNOVER	0.134***	0.097***	0.106***	0.070***	0.117***	0.083***	0.147***	0.107***
	(7.34)	(6.15)	(5.61)	(4.34)	(6.40)	(5.20)	(8.46)	(6.90)
SOE	-0.159***	-0.114***	-0.179***	-0.127***	-0.108***	-0.084***	-0.122***	-0.101***
	(-4.45)	(-3.68)	(-4.82)	(-4.00)	(-2.99)	(-2.66)	(-3.57)	(-3.30)
TOP_HOLD	0.032	0.026	-0.051	-0.043	-0.088	-0.057	-0.104	-0.093
	(0.29)	(0.27)	(-0.44)	(-0.43)	(-0.78)	(-0.58)	(-0.97)	(-0.97)
INST_HOLD	0.306***	0.101	0.493***	0.259***	0.349***	0.152**	0.124	-0.035
	(3.48)	(1.34)	(5.44)	(3.37)	(3.99)	(1.99)	(1.48)	(-0.47)
BETA	-1.254***	-0.917***					-1.085***	-0.787***
	(-17.42)	(-14.78)					(-15.88)	(-12.86)
DA			-0.375*	-0.408**			-0.344*	-0.405**
			(-1.70)	(-2.17)			(-1.70)	(-2.24)
SENTIMENT					0.682***	0.422***	0.636***	0.391***
					(17.53)	(12.42)	(17.12)	(11.74)
Constant	6.317***	4.879***	3.821***	3.045***	4.011***	3.184***	2.104***	0.837***
	(15.65)	(14.03)	(9.69)	(9.08)	(10.57)	(9.60)	(13.79)	(6.13)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
# of Obs.	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160
Adj. R^2	0.42	0.33	0.34	0.27	0.42	0.32	0.48	0.35

Table 5

Panel B Different matching procedures

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Shanghai Stock Exchange		A-Share Market		Shenzhen–Hong Kong Connect		Foreign Ownership Matching	
Variable	*NONSYN1*	*NONSYN2*	*NONSYN1*	*NONSYN2*	*NONSYN1*	*NONSYN2*	*NONSYN1*	*NONSYN2*
SHHK	-0.098	-0.148***	-0.108***	-0.123***	-0.165***	-0.127***	-0.142***	-0.075**
	(-1.60)	(-2.84)	(-2.70)	(-3.85)	(-3.73)	(-3.57)	(-3.30)	(-2.05)
POST	-0.611***	-0.559***	-0.608***	-0.507***	-0.638***	-0.489***	-0.544***	-0.401***
	(-11.61)	(-11.70)	(-27.45)	(-26.46)	(-19.43)	(-17.78)	(-13.48)	(-11.72)
SHHK×POST	0.135**	0.225***	0.139***	0.170***	0.161***	0.147***	0.124**	0.079*
	(2.01)	(3.85)	(3.00)	(4.41)	(3.13)	(3.47)	(2.24)	(1.68)
SIZE	-0.119***	-0.154***	-0.121***	-0.140***	-0.107***	-0.120***	-0.109***	-0.142***
	(-6.61)	(-9.68)	(-10.40)	(-13.60)	(-6.69)	(-8.17)	(-7.74)	(-11.93)
ROA	1.516***	1.117***	1.060***	0.515**	1.848***	1.093***	1.183**	0.879**
	(3.96)	(3.70)	(4.52)	(2.54)	(5.02)	(3.43)	(2.51)	(2.20)
LEVERAGE	0.583***	0.610***	0.298***	0.431***	0.204**	0.375***	0.306***	0.464***
	(5.40)	(6.90)	(4.55)	(7.93)	(2.10)	(4.49)	(3.28)	(5.86)
GROWTH	0.082***	0.087***	0.132***	0.114***	0.205***	0.132***	0.500***	0.329***
	(3.35)	(3.97)	(6.46)	(6.93)	(5.73)	(4.80)	(6.62)	(5.13)
TURNOVER	0.074***	0.018	0.091***	0.029***	0.076***	0.026***	0.082***	0.017
	(5.05)	(1.50)	(9.23)	(3.77)	(6.74)	(2.94)	(5.53)	(1.36)

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Table 5

Panel B Different matching procedures (continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)

	Shanghai Stock Exchange		A-Share Market		Shenzhen–Hong Kong Connect		Foreign Ownership Matching	
Variables	*NONSYN1*	*NONSYN2*	*NONSYN1*	*NONSYN2*	*NONSYN1*	*NONSYN2*	*NONSYN1*	*NONSYN2*
SOE	-0.198***	-0.167***	-0.249***	-0.168***	-0.223***	-0.166***	-0.138***	-0.110***
	(-4.47)	(-4.39)	(-10.13)	(-7.91)	(-6.70)	(-5.66)	(-4.13)	(-3.90)
TOP_HOLD	-0.000	-0.000	0.000	0.001	-0.000	0.000	0.001	0.001
	(-0.20)	(-0.10)	(0.29)	(0.81)	(-0.20)	(0.44)	(0.99)	(1.25)
INST_HOLD	0.539***	0.229***	0.498***	0.255***	0.565***	0.243***	0.436***	0.227***
	(4.89)	(2.44)	(9.00)	(5.52)	(7.86)	(4.05)	(5.60)	(3.43)
Constant	2.950***	3.020***	3.220***	2.859***	2.844***	2.426***	2.679***	2.732***
	(8.17)	(8.96)	(13.25)	(13.00)	(8.52)	(7.84)	(8.60)	(10.35)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
# of Obs.	2,312	2,312	6,628	6,628	3,948	3,948	2,716	2,716
Adj. R^2	0.20	0.24	0.21	0.22	0.24	0.22	0.21	0.21

Table 5

Panel C Extending the sample period and excluding the year 2015

Variable	(1) *NONSYN1*	(2) *NONSYN2*	(3) *NONSYN1*	(4) *NONSYN2*
SHHK	-0.203***	-0.131***	-0.211***	-0.139***
	(-4.46)	(-3.36)	(-4.61)	(-3.55)
POST	0.913***	0.690***	-0.087	-0.107**
	(16.05)	(13.67)	(-1.63)	(-2.24)
SHHK×POST	0.164**	0.136**	0.182***	0.132***
	(2.53)	(2.44)	(3.16)	(2.62)
SIZE	-0.125***	-0.149***	-0.142***	-0.157***
	(-6.05)	(-8.11)	(-7.19)	(-9.01)
ROA	2.540***	1.529***	1.584***	0.959***
	(5.71)	(3.91)	(3.93)	(2.71)
LEVERAGE	0.519***	0.537***	0.548***	0.590***
	(4.31)	(5.03)	(4.80)	(5.91)
GROWTH	0.222***	0.156***	0.206***	0.139***

	(5.36)	(4.45)	(5.47)	(4.24)
TURNOVER	0.115***	0.078***	0.133***	0.090***
	(5.62)	(5.22)	(6.53)	(6.20)
SOE	-0.194***	-0.134***	-0.200***	-0.144***
	(-4.78)	(-3.78)	(-5.12)	(-4.09)
TOP_HOLD	0.000	0.000	-0.000	-0.000
	(0.41)	(0.29)	(-0.05)	(-0.22)
INST_HOLD	0.593***	0.302***	0.612***	0.352***
	(6.59)	(3.77)	(7.08)	(4.54)
Constant	2.814***	2.815***	3.312***	3.069***
	(6.64)	(7.34)	(8.29)	(8.58)
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
# of Obs.	2,608	2,608	3,123	3,123
Adj. R^2	0.35	0.28	0.34	0.28

Table 5

Panel D Alternative measures of price efficiency

Variable	(1) *D1*	(2) *D2*
SHHK	0.002	-0.011**
	(0.87)	(-2.21)
POST	0.003	-0.009
	(0.94)	(-1.38)
SHHK×POST	-0.013***	-0.014**
	(-3.45)	(-1.99)
SIZE	-0.009***	-0.017***
	(-5.71)	(-6.00)
ROA	-0.007	-0.010
	(-0.27)	(-0.22)
LEVERAGE	0.018**	0.045***
	(2.56)	(3.44)
GROWTH	0.007**	0.019***
	(2.54)	(4.02)
TURNOVER	0.000	0.001

	(0.01)	(0.85)
SOE	-0.003	-0.011***
	(-1.51)	(-2.81)
TOP_HOLD	0.002	0.005
	(0.22)	(0.40)
INST_HOLD	0.020***	0.046***
	(3.44)	(4.29)
Constant	0.215***	0.567***
	(6.40)	(9.12)
Year FE	Yes	Yes
Industry FE	Yes	Yes
# of Obs.	2,160	2,160
Adj. R^2	0.10	0.17

Note: Table 5 gives the results of the following regressions for the robustness tests:

NONSYN1 or *NONSYN2* $=\alpha_0+\alpha_1 SHHK+\alpha_2 POST+\alpha_3 SHHK \times POST+$ Controls +Year FE + Industry FE + ε

where *NONSYN1* and *NONSYN2* are proxies for a firm's stock price efficiency. The key explanatory variable is the interaction term *SHHK*×*POST*, where *SHHK* is a dummy variable that equals 1 if a firm is investible by foreign investors under the Stock Connect program, *POST* is a dummy variable that equals 1 if the year is 2015 or 2016. Panel A reports the results of controlling for additional variables, namely, annual systematic risk (*BETA*), discretionary accruals (*DA*). and firm-specific sentiment (*SENTIMENT*). Panel B reports the results of the impact of stock market liberalization on stock price efficiency when using different matching approaches. Panel C reports the results of excluding the year 2015 and extending the sample period to 2011–2017 (Columns (1) and (2)) and 2011–2018 (Columns (3) and (4)). Panel D reports the results of using price delays (*D1* and *D2*) as alternative efficiency measures following Hou and Moskowitz (2005).The variable *D1* is defined as the ratio of the R-squared estimated from the extended market model over that of the base model, while the variable *D2* is the ratio of the sum of the absolute values of each coefficient of the lagged market returns over the sum of the absolute values of all coefficients in the extended market model (Equation (8)), namely, $D2=\sum^{4}_{n=1}|\delta_{i,n}| / (|\beta_i|+\sum^{4}_{n=1}|\delta_{i,n}|)$. Variable definitions are provided in the appendix. The *t*-statistics in parentheses are based on robust standard errors clustered at the firm level. Coefficients marked with *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table 6

Additional analysis: Information mechanism

Variable	(1) *ERANK*	(2) *VOLUNTARY*	(3) *PRECISION*
SHHK	0.680**	-1.311***	-1.267***
	(2.20)	(-9.34)	(-13.69)
POST	-0.466*	0.065	0.052
	(-1.67)	(0.65)	(0.68)
SHHK×POST	0.598**	0.289**	0.200**
	(1.98)	(1.98)	(2.57)
SIZE	0.052	-0.096	-0.048
	(0.36)	(-1.60)	(-1.11)

LEVERAGE	3.392***	-0.287	-0.162
	(3.58)	(-0.88)	(-0.71)
ROA	-11.051***	1.433*	-1.985**
	(-2.88)	(1.71)	(-2.50)
BTM	-0.311	-0.059	0.094
	(-1.05)	(-0.53)	(1.56)
SOE	-0.302	-0.270**	-0.314***
	(-0.96)	(-2.43)	(-3.68)
TOP_HOLD	-0.559	0.198	0.130
	(-0.84)	(0.83)	(0.75)
INST_HOLD	-2.210**	1.631***	1.675***
	(-2.07)	(5.35)	(6.96)
MGMT_HOLD	0.692	0.264	0.539**
	(0.81)	(0.80)	(2.21)
QFII_HOLD	34.307**	2.002	0.473
	(1.99)	(0.35)	(0.12)
ANALYST		0.127**	0.055
		(2.34)	(1.62)
MANDATORY		-0.778***	1.063***
		(-7.26)	(14.99)
Constant	-14.220***	1.589	2.563***
	(-4.42)	(1.27)	(2.81)
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
# of Obs.	2,160	2,160	2,160
Adj. R^2/Pseudo-R^2	0.12	0.31	0.54

Note: Table 6 reports the results of examining the possible mechanisms through which stock market liberalization affects firms' stock price efficiency. The following Ordinary Least Squares (OLS) models are used in Columns (1) and (3):

$ERANK$ or $PRECISION = \alpha_0 + \alpha_1 SHHK + \alpha_2 POST + \alpha_3 SHHK \times POST$ + Controls +Year FE + Industry FE + ε

The following logit model is used in Column (2):

$VOLUNTARY = \alpha_0 + \alpha_1 SHHK + \alpha_2 POST + \alpha_3 SHHK \times POST$ + Controls +Year FE + Industry FE + ε

where *ERANK* is a measure of accounting quality, calculated as the negative value of the average percentile rank of three measures of the transparency of reported earnings: income smoothing, earnings aggressiveness (i.e., total accruals), and earnings management. *VOLUNTARY* and *PRECISION* refer to the likelihood of issuing voluntary management earnings forecasts and their accuracy, respectively. The key explanatory variable is the interaction term *SHHK*×*POST*, where *SHHK* is a dummy variable that equals 1 if a firm is investible by foreign investors under the Stock Connect program, *POST* is a dummy variable that equals 1 if the year is 2015 or 2016. Variable definitions are provided in the appendix. The *t*-statistics (z-statistics) in parentheses are based on robust standard errors clustered at the firm level. Coefficients marked with *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table 7

Additional analysis: Stock market liberalization and the probability of informed trading

	(1) *PIN*	(2) *BASPREAD*
SHHK	-0.024***	-0.002***
	(-4.37)	(-8.75)
POST	-0.066***	0.000
	(-13.54)	(0.97)
SHHK×POST	0.141***	0.003***
	(25.23)	(11.60)
SIZE	-0.013***	0.000***
	(-5.30)	(2.65)
ROA	-0.171***	0.003*
	(-4.10)	(1.77)
LEVERAGE	0.031**	-0.000
	(2.27)	(-0.22)
GROWTH	0.009**	-0.000
	(2.13)	(-1.03)
TURNOVER	-0.008***	-0.000***
	(-4.78)	(-4.27)
SOE	-0.003	-0.000**
	(-0.64)	(-2.57)
TOP_HOLD	0.045***	-0.001**
	(3.17)	(-2.25)
INST_HOLD	0.043***	0.001**
	(3.96)	(2.45)
Constant	0.658***	-0.005***
	(13.26)	(-2.89)
Year FE	Yes	Yes
Industry FE	Yes	Yes
# of Obs.	2,123	2,160
Adj. R^2	0.40	0.23

Note: Table 7 reports the results of the following regressions of the impact of stock market liberalization on the probability of informed trading:

PIN or *BASPREAD* $=\alpha_0+\alpha_1 SHHK+\alpha_2 POST+\alpha_3 SHHK \times POST+$ Controls +Year FE + Industry FE + ε

where *PIN* and *BASPREAD* refer to the probability of informed trading and the bid-ask spread, respectively. The key explanatory variable is the interaction term *SHHK×POST*, where *SHHK* is a dummy variable that equals 1 if a firm is investible by foreign investors under the Stock Connect program, *POST* is a dummy variable that equals 1 if the year is 2015 or 2016. Variable definitions are provided in the appendix. The *t*-statistics in parentheses are based on robust standard errors clustered at the firm level. Coefficients marked with *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table 8
Relation between stock market liberalization and investment-price sensitivity

	(1)
	INV_{t+1}
SHHK×POST×TOBINQ	0.005*
	(1.80)
SHHK×POST	-0.011
	(-1.60)
SHHK×TOBINQ	-0.005**
	(-2.30)
POST×TOBINQ	-0.005***
	(-2.80)
SHHK	0.010**
	(2.10)
POST	-0.012**
	(-2.33)
TOBINQ	0.004***
	(2.69)
SIZE	-0.001
	(-0.80)
LEVERAGE	-0.004
	(-0.63)
INST_HOLD	0.004
	(0.95)
TURNOVER	-0.001
	(-1.12)
ZSCORE	-0.000
	(-0.13)
FCF	-0.020***
	(-7.57)
VOLUME	0.005***
	(3.18)
BIG4	0.002
	(0.55)
ZONE	0.002
	(1.13)

HORIZON	-0.001
	(-0.17)
Constant	-0.044
	(-0.95)
Year FE	Yes
Industry FE	Yes
# of Obs.	2,086
Adj. R^2	0.24

Note: Table 8 reports the results of the following regression of the relation between stock market liberalization and investment-price sensitivity:

$$INV_{t+1} = \alpha_0 + \alpha_1 SHHK \times POST \times TOBINQ + \alpha_2 SHHK \times POST + \alpha_3 SHHK \times TOBINQ + \alpha_4 POST \times TOBINQ + \alpha_5 SHHK + \alpha_6 POST + \alpha_7 TOBINQ + \text{Controls} + \text{Year FE} + \text{Industry FE} + \varepsilon$$

where INV_{t+1} is a measure of a firm's investment in year t+1, measured as capital expenditure scaled by beginning-of-year assets. The key explanatory variable is the three-way interaction term *SHHK*×*POST*×*TOBINQ*, where *SHHK* is a dummy variable that equals 1 if a firm is investible by foreign investors under the Stock Connect program, *POST* is a dummy variable that equals 1 if the year is 2015 or 2016, *TOBINQ* is calculated as the market value of equity plus the book value of assets minus the book value of equity, scaled by the book value of assets. Variable definitions are provided in the appendix. The *t*-statistics in parentheses are based on robust standard errors clustered at the firm level. Coefficients marked with *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table 9

Relation between stock market liberalization and stock price informativeness

	(1) $EBIT_{t+1}$	(2) NI_{t+1}	(3) $EBITDA_{t+1}$
SHHK×POST×PRICE	0.014***	0.011**	0.016***
	(2.72)	(2.51)	(2.85)
SHHK×POST	0.003	0.002	0.004
	(0.63)	(0.55)	(0.82)
SHHK×PRICE	-0.012***	-0.011***	-0.013***
	(-3.31)	(-3.30)	(-3.16)
POST×PRICE	-0.020***	-0.018***	-0.021***
	(-5.72)	(-5.69)	(-5.44)
SHHK	0.001	0.002	0.000
	(0.38)	(0.69)	(0.10)
POST	-0.010**	-0.008**	-0.008*
	(-2.53)	(-2.43)	(-1.95)
PRICE	0.041***	0.041***	0.035***
	(12.57)	(14.35)	(10.05)

SIZE	0.002	0.002	-0.001
	(0.87)	(1.38)	(-0.33)
GROWTH	0.030***	0.022***	0.028***
	(6.54)	(5.38)	(5.86)
TURNOVER	-0.003***	-0.002***	-0.003***
	(-6.17)	(-6.10)	(-5.88)
MGNT_HOLD	-0.005	0.003	-0.015
	(-0.46)	(0.39)	(-1.48)
TOP_HOLD	0.000***	0.000***	0.000***
	(3.02)	(3.73)	(3.70)
INST_HOLD	0.009	0.008	0.006
	(1.18)	(1.26)	(0.76)
ANALYST	0.009***	0.009***	0.010***
	(8.84)	(9.58)	(9.23)
Constant	-0.014	-0.056	0.068
	(-0.33)	(-1.48)	(1.47)
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
# of Obs.	2,158	2,160	2,158
Adj. R^2	0.32	0.36	0.30

Note: Table 9 shows the following regression results of the relation between stock market liberalization and stock price informativeness about future earnings:

$$EBIT_{t+1} \text{ or } NI_{t+1} \text{ or } EBITDA_{t+1} = \alpha_0 + \alpha_1 SHHK \times POST \times PRICE + \alpha_2 SHHK \times POST + \alpha_3 SHHK \times PRICE + \alpha_4 POST \times PRICE + \alpha_5 SHHK + \alpha_6 POST + \alpha_7 PRICE + \text{Controls} + \text{Year FE} + \text{Industry FE} + \varepsilon$$

where $EBIT_{t+1}$, NI_{t+1}, and $EBITDA_{t+1}$ are different measures of a firm's one year leading earnings. The key explanatory variable is the three-way interaction term $SHHK \times POST \times PRICE$, where *SHHK* is a dummy variable that equals 1 if a firm is investible by foreign investors under the Stock Connect program, *POST* is a dummy variable that equals 1 if the year is 2015 or 2016, and *PRICE* is calculated as the log-ratio of market capitalization to total assets. Variable definitions are provided in the appendix. The *t*-statistics in parentheses are based on robust standard errors clustered at the firm level. Coefficients marked with *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Internet Appendix for

"Does stock market liberalization improve stock price efficiency? Evidence from China"

This appendix provides supplementary analyses to the paper titled "Does stock market liberalization improve stock price efficiency? Evidence from China". Table IA1 to Table IA7 provide robustness checks of the corresponding results in Table 3 to Table 9 of the paper using unmatched full sample (including the treatment firms and a control sample of all other A-share firms listed in the Shanghai and Shenzhen Stock Exchanges). The results using the unmatched full sample are qualitative similar to those reported in the paper using propensity score matching (PSM) approach.

In Table IA8, we explore the effect of the Stock Connect program on the Hong Kong stock market, which help us better understand the link between the program and price efficiency. We find that the establishment of Stock Connect does not influence the price efficiency of the Hong Kong market. The insignificant results are consistent with our argument. Compared with Hong Kong investors, mainland Chinese investors are relatively unsophisticated and have limited abilities to acquire and process information, and the information disclosure quality of Hong Kong listed firms is higher than that of firms listed in the Chinese capital market. Thus, Hong Kong listed firms do not have incentives to increase their disclosure to attract mainland investors, and so trading by mainland investors on Hong Kong stocks does not increase the private information incorporated into Hong Kong stocks. Consequently, Stock Connect has a trivial impact on stock price efficiency in the Hong Kong market.

Table IA1
Stock market liberalization and stock price efficiency: Baseline results

Variables	(1) *NONSYN1*	(2) *NONSYN2*	(3) *NONSYN1*	(4) *NONSYN2*
SHHK	-0.232***	-0.289***	-0.086**	-0.119***
	(-5.65)	(-8.85)	(-2.18)	(-3.72)
POST	-0.182***	-0.246***	-0.040	-0.114***
	(-6.72)	(-10.24)	(-1.39)	(-4.42)
SHHK×POST	0.090*	0.149***	0.152***	0.193***
	(1.87)	(3.78)	(3.29)	(5.00)
SIZE			-0.147***	-0.153***
			(-12.25)	(-14.66)
ROA			1.204***	0.559***
			(5.19)	(2.77)
LEVERAGE			0.357***	0.468***

			(5.52)	(8.70)
GROWTH			0.119***	0.100***
			(6.15)	(6.37)
TURNOVER			0.137***	0.099***
			(9.41)	(8.09)
SOE			-0.242***	-0.171***
			(-9.90)	(-8.05)
TOP_HOLD			0.123	0.119*
			(1.64)	(1.75)
INST_HOLD			0.464***	0.258***
			(8.53)	(5.59)
Constant	0.519***	-0.045	3.390***	2.961***
	(7.02)	(-0.57)	(13.58)	(13.27)
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
# of Obs.	6628	6628	6628	6628
Adj. R^2	0.24	0.21	0.31	0.27

Note: Table IA1 reports the results of the following regressions of stock market liberalization on stock price efficiency when using full sample.

NONSYN1 or *NONSYN2*=$\alpha_0+\alpha_1 SHHK+\alpha_2 POST+\alpha_3 SHHK \times POST$+ Controls+Year FE + Industry FE + ε where *NONSYN1* and *NONSYN2* are proxies for the firm's stock price efficiency, calculated as $log[(1-R^2_{ch})/R^2_{ch})]$ and $log[(1-R^2_{mktind})/R^2_{mktind})]$, respectively. R^2_{ch} is the R-squared value from estimating the model according to Chan and Hameed (2006) using weekly return data, and R^2_{mktind} is the R-squared value from estimating the market-industry model using weekly return data. The key explanatory variable is the interaction term *SHHK*×*POST*, where *SHHK* is a dummy variable that equals 1 if a firm is investible by foreign investors under the Stock Connect program, *POST* is a dummy variable that equals one if the year is 2015 or 2016. The sample uses a four-year window (from year -2 to year +2) around the Stock Connect. Variable definitions of all variables are provided in the appendix. The *t*-statistics in parentheses are based on robust standard errors clustered at the firm level. Coefficients marked with *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table IA2

Validity of the difference-in-differences design and endogeneity issues

	(1)	(2)
	NONSYN1	*NONSYN2*
SHHK	-0.090***	-0.021
	(-3.16)	(-0.83)
SHHK×*Before2*	0.065	-0.053

	(1.31)	(-1.26)
SHHK×Before1	0.044	-0.070
	(0.79)	(-1.62)
SHHK×After1	0.126***	0.095**
	(2.90)	(2.28)
SHHK×After2	0.195***	0.093*
	(3.33)	(1.92)
SIZE	-0.177***	-0.165***
	(-15.61)	(-16.15)
ROA	1.047***	0.449**
	(4.70)	(2.35)
LEVERAGE	0.415***	0.468***
	(6.74)	(8.80)
GROWTH	0.143***	0.115***
	(7.67)	(7.50)
TURNOVER	0.029	0.019
	(1.24)	(0.97)
SOE	-0.180***	-0.133***
	(-7.41)	(-6.15)
TOP_HOLD	0.071	0.062
	(0.98)	(0.93)
INST_HOLD	0.335***	0.195***
	(6.30)	(4.29)
Constant	4.037***	3.196***
	(17.10)	(14.70)
Year FE	Yes	Yes
Industry FE	Yes	Yes
# of Obs.	8145	8145
Adj. R^2	0.41	0.31

Panel B Endogeneity issues

	(1)	(2)	(3)	(4)
	NONSYN1	*NONSYN2*	*NONSYN1*	*NONSYN2*
SHHK×POST	0.146***	0.189***		
	(3.40)	(5.13)		
SHHK			0.090**	0.046

			(2.45)	(1.52)
POST_p			0.381***	0.457***
			(10.09)	(15.11)
SHHK×POST_p			-0.044	-0.026
			(-1.00)	(-0.74)
SIZE	-0.221***	-0.144***	-0.224***	-0.225***
	(-6.96)	(-5.26)	(-14.65)	(-17.21)
ROA	1.165***	0.869***	2.525***	0.791***
	(3.90)	(3.38)	(7.66)	(2.91)
LEVERAGE	0.309***	0.219**	0.400***	0.610***
	(2.67)	(2.19)	(4.45)	(7.97)
GROWTH	0.078***	0.055***	0.316***	0.230***
	(3.63)	(2.98)	(7.21)	(6.01)
TURNOVER	0.141***	0.102***	0.160***	0.105***
	(11.62)	(9.79)	(7.27)	(6.57)
SOE	-0.277***	-0.160*	-0.193***	-0.113***
	(-2.78)	(-1.87)	(-6.58)	(-4.54)
TOP_HOLD	-0.143	-0.003	0.107	0.115
	(-0.70)	(-0.02)	(1.19)	(1.47)
INST_HOLD	0.626***	0.415***	0.571***	0.198***
	(7.60)	(5.86)	(9.03)	(3.77)
Constant	5.055***	2.955***	4.896***	3.987***
	(7.22)	(4.90)	(15.97)	(14.75)
Year FE	Yes	Yes	Yes	Yes
Industry FE	No	No	Yes	Yes
Firm FE	Yes	Yes	No	No
# of Obs.	6628	6628	4418	4418
Adj. R^2	0.52	0.50	0.33	0.26

Note: Table IA2 reports the results of the validity analysis of the difference-in-differences design and endogeneity issues when using full sample. Panel A shows the results of the following regressions of the parallel trend analysis:

$$NONSYN1 \text{ or } NONSYN2=\alpha_0+\alpha_1 SHHK+\alpha_2 SHHK\times Before2+\alpha_3 SHHK\times Before1+\alpha_4 SHHK\times After1+\alpha_5 SHHK\times After2+\text{Controls}+\text{Year FE}+\text{Industry FE}+\varepsilon$$

In Panel B, Columns (1)–(2) show the results of the following difference-in-differences regressions:

$$NONSYN1 \text{ or } NONSYN2=\alpha_0+\alpha_1 SHHK\times POST+\text{Controls}+\text{Year FE}+\text{Firm FE}+\varepsilon$$

Columns (3) –(4) show the results of the following regressions for the placebo test:

$$NONSYN1 \text{ or } NONSYN2=\alpha_0+\alpha_1 SHHK+\alpha_2 POST\_p+\alpha_3 SHHK\times POST\_p+\text{Controls}+\text{Year FE}+\text{Industry FE}+\varepsilon$$

where *NONSYN1* and *NONSYN2* are proxies for a firm's stock price efficiency, *SHHK* is a dummy variable that equals 1 if a firm is investible by foreign investors under the Stock Connect program, *Beforej* (*Afterj*) is a dummy variable for the j^{th} year prior to (after) the year of the reform; *POST* is a dummy variable that equals 1 if the year is 2015 or 2016, *POST_p* is a dummy variable that equals 1 if the year is 2012 or 2013, and 0 if the year is 2009 or 2010. Variable definitions are provided in the appendix. The *t*-statistics in parentheses are based on robust standard errors clustered at the firm level. Coefficients marked with *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table IA3

Other robustness tests

Panel A Controlling additional variables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	NONSYN1	*NONSYN2*	*NONSYN1*	*NONSYN2*	*NONSYN1*	*NONSYN2*	*NONSYN1*	*NONSYN2*
SHHK	0.108***	0.031	-0.101***	-0.127***	-0.173***	-0.170***	-0.066**	-0.133***
	(3.18)	(1.03)	(-2.93)	(-4.25)	(-5.15)	(-5.73)	(-2.07)	(-4.59)
POST	0.060**	-0.034	-0.034	-0.105***	-0.024	-0.096***	-0.041	-0.143***
	(2.17)	(-1.40)	(-1.18)	(-4.19)	(-0.84)	(-3.88)	(-1.56)	(-5.96)
SHHK×POST	0.082*	0.137***	0.149***	0.189***	0.179***	0.206***	0.126***	0.170***
	(1.91)	(3.65)	(3.34)	(4.92)	(4.15)	(5.40)	(3.06)	(4.54)
SIZE	-0.171***	-0.180***	-0.134***	-0.148***	-0.124***	-0.147***	-0.252***	-0.238***
	(-18.05)	(-21.69)	(-13.62)	(-17.44)	(-12.95)	(-17.39)	(-12.44)	(-12.95)
ROA	1.262***	0.614***	2.188***	1.266***	0.475*	0.215	-0.266	-0.435*
	(4.87)	(2.70)	(7.92)	(5.31)	(1.77)	(0.91)	(-1.01)	(-1.82)
LEVERAGE	0.354***	0.496***	0.408***	0.517***	0.255***	0.442***	0.089*	0.237***
	(6.38)	(10.20)	(7.03)	(10.32)	(4.50)	(8.84)	(1.67)	(4.93)
GROWTH	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000*
	(0.98)	(1.55)	(0.95)	(1.53)	(0.97)	(1.53)	(1.27)	(1.86)
TURNOVER	0.167***	0.121***	0.138***	0.099***	0.142***	0.103***	0.172***	0.127***
	(15.38)	(12.68)	(12.14)	(10.15)	(12.94)	(10.57)	(16.32)	(13.36)
SOE	-0.221***	-0.160***	-0.248***	-0.179***	-0.175***	-0.134***	-0.175***	-0.140***
	(-10.53)	(-8.70)	(-11.34)	(-9.45)	(-8.20)	(-7.11)	(-8.57)	(-7.59)
TOP_HOLD	0.167**	0.159***	0.116*	0.121**	0.084	0.100*	0.026	0.015
	(2.50)	(2.70)	(1.66)	(2.01)	(1.24)	(1.67)	(0.40)	(0.26)
INST_HOLD	0.259***	0.112***	0.425***	0.241***	0.242***	0.121***	0.063	-0.042
	(5.42)	(2.68)	(8.53)	(5.60)	(4.97)	(2.83)	(1.35)	(-1.01)
BETA	-1.110***	-0.825***					-0.969***	-0.716***
	(-30.26)	(-25.62)					(-27.19)	(-22.17)

DA			-0.109	-0.110			-0.035	-0.076
			(-0.88)	(-1.02)			(-0.31)	(-0.73)
SENTIMENT					0.557***	0.353***	0.500***	0.314***
					(26.87)	(19.25)	(25.10)	(17.42)
Constant	5.190***	4.473***	3.115***	2.843***	3.019***	2.877***	1.770***	0.872***
	(24.84)	(24.39)	(15.02)	(15.88)	(15.04)	(16.21)	(20.84)	(11.33)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
# of Obs.	6628	6628	6620	6620	6618	6618	6618	6618
Adj. R^2	0.39	0.34	0.30	0.27	0.37	0.31	0.43	0.34

Table IA3

Panel B Extending the sample period and excluding the year 2015

Variables	(1) *NONSYN1*	(2) *NONSYN2*	(3) *NONSYN1*	(4) *NONSYN2*
SHHK	-0.130***	-0.125***	-0.105***	-0.122***
	(-3.86)	(-4.39)	(-3.16)	(-4.27)
POST	0.862***	0.612***	0.034	-0.054**
	(30.44)	(24.61)	(1.21)	(-2.12)
SHHK×POST	0.255***	0.226***	0.171***	0.164***
	(5.48)	(5.74)	(4.17)	(4.62)
SIZE	-0.118***	-0.146***	-0.128***	-0.151***
	(-10.58)	(-14.42)	(-12.25)	(-15.42)
ROA	1.078***	0.394**	0.286	-0.055
	(5.05)	(2.17)	(1.64)	(-0.36)
LEVERAGE	0.294***	0.409***	0.303***	0.418***
	(4.96)	(7.79)	(5.43)	(8.42)
GROWTH	0.151***	0.125***	0.149***	0.124***
	(7.62)	(7.79)	(8.25)	(8.26)
TURNOVER	0.138***	0.102***	0.148***	0.108***
	(10.04)	(9.77)	(11.79)	(11.36)
SOE	-0.230***	-0.158***	-0.228***	-0.159***
	(-9.88)	(-7.82)	(-10.59)	(-8.25)
TOP_HOLD	0.002**	0.001**	0.001**	0.001**
	(2.33)	(2.21)	(2.18)	(2.12)
INST_HOLD	0.570***	0.326***	0.576***	0.355***
	(11.37)	(7.42)	(12.17)	(8.44)

Constant	2.812***	2.869***	3.116***	3.030***
	(11.99)	(13.17)	(14.38)	(14.61)
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
# of Obs.	7887	7887	9468	9468
Adj. R^2	0.31	0.25	0.30	0.24

Table IA3

Panel C Alternative measures of price efficiency

	(1)	(2)
Variables	*D1*	*D2*
SHHK	-0.001	-0.007
	(-0.47)	(-1.46)
POST	0.015***	0.027***
	(5.91)	(6.72)
SHHK×POST	-0.005*	-0.013**
	(-1.72)	(-2.40)
SIZE	-0.013***	-0.022***
	(-9.24)	(-10.85)
ROA	-0.005	-0.027
	(-0.19)	(-0.72)
LEVERAGE	0.032***	0.061***
	(5.08)	(6.45)
GROWTH	0.009***	0.018***
	(5.58)	(7.74)
TURNOVER	-0.001***	-0.001
	(-2.59)	(-1.47)
SOE	-0.007***	-0.014***
	(-4.07)	(-5.03)
TOP_HOLD	0.010*	0.026***
	(1.89)	(2.97)
INST_HOLD	0.406***	0.704***
	(2.85)	(2.90)
Constant	0.322***	0.700***
	(10.37)	(15.74)
Year FE	Yes	Yes

Industry FE	Yes	Yes
# of Obs.	6628	6628
Adj. R^2	0.11	0.15

Note: Table IA3 gives the results of the following regressions for the robustness tests when using full sample:

NONSYN1 or *NONSYN2* $=\alpha_0+\alpha_1 SHHK+\alpha_2 POST+\alpha_3 SHHK \times POST+$ Controls +Year FE + Industry FE + ε

where *NONSYN1* and *NONSYN2* are proxies for a firm's stock price efficiency. The key explanatory variable is the interaction term *SHHK*×*POST*, where *SHHK* is a dummy variable that equals 1 if a firm is investible by foreign investors under the Stock Connect program, *POST* is a dummy variable that equals 1 if the year is 2015 or 2016. Panel A reports the results of controlling for additional variables, namely, annual systematic risk (*BETA*), discretionary accruals (*DA*). and firm-specific sentiment (*SENTIMENT*). Panel B reports the results of excluding the year 2015 and extending the sample period to 2011–2017 (Columns (1) and (2)) and 2011–2018 (Columns (3) and (4)). Panel C reports the results of using price delays (*D1* and *D2*) as alternative efficiency measures following Hou and Moskowitz (2005).The variable *D1* is defined as the ratio of the R-squared estimates of the extended market model and the base model, while the variable *D2* is the ratio of the sum of the absolute values of each coefficient of the lagged market returns over the sum of the absolute values of all coefficients in the extended market model (Equation (8)), namely, $D2=\sum^4_{n=1}|\delta_{i,n}| / (|\beta_i|+\sum^4_{n=1}|\delta_{i,n}|)$. Variable definitions are provided in the appendix. The *t*-statistics in parentheses are based on robust standard errors clustered at the firm level. Coefficients marked with *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table IA4

Additional analysis: Information mechanism

Variables	(1) *ERANK*	(2) *VOLUNTARY*	(3) *PRECISION*
SHHK	0.142	-1.503***	-1.347***
	(0.60)	(-13.09)	(-22.58)
POST	0.180	-0.027	0.097***
	(1.25)	(-0.53)	(2.76)
SHHK×*POST*	0.338*	0.489***	0.175***
	(1.73)	(4.01)	(3.63)
SIZE	-0.255***	-0.087***	-0.075***
	(-3.19)	(-2.76)	(-3.29)
LEVERAGE	3.956***	-0.510***	0.103
	(8.67)	(-3.55)	(0.90)
ROA	-2.547*	0.246	-0.397
	(-1.70)	(1.60)	(-1.28)
BTM	-0.561***	-0.155***	0.056**
	(-4.45)	(-3.84)	(2.26)
SOE	0.139	-0.430***	-0.385***
	(0.79)	(-6.62)	(-7.19)
TOP_HOLD	-0.834**	0.126	0.100
	(-2.24)	(1.01)	(1.08)
INST_HOLD	-1.485***	1.180***	1.255***

	(-3.23)	(7.98)	(10.92)
MGMT_HOLD	0.888*	0.620***	0.499***
	(1.69)	(3.36)	(3.51)
QFII_HOLD	-1.520	-2.552	-3.066
	(-0.17)	(-0.74)	(-1.18)
ANALYST		0.197***	0.072***
		(7.72)	(3.60)
MANDATORY		-1.022***	0.922***
		(-20.53)	(22.10)
Constant	-6.540***	1.546**	3.163***
	(-3.96)	(2.35)	(6.68)
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
# of Obs.	6620	6628	6628
Adj. R^2/Pseudo-R^2	0.07	0.31	0.48

Note: Table IA4 reports the results of examining the possible mechanisms through which stock market liberalization affects firms' stock price efficiency when using full sample. The following Ordinary Least Squares (OLS) models are used in Columns (1) and (3):

$ERANK$ or $PRECISION = \alpha_0 + \alpha_1 SHHK + \alpha_2 POST + \alpha_3 SHHK \times POST +$ Controls +Year FE + Industry FE + ε

The following logit model is used in Column (2):

$VOLUNTARY = \alpha_0 + \alpha_1 SHHK + \alpha_2 POST + \alpha_3 SHHK \times POST +$ Controls +Year FE + Industry FE + ε

where *ERANK* is a measure of accounting quality, calculated as the negative value of the average percentile rank of three measures of the transparency of reported earnings: income smoothing, earnings aggressiveness (i.e., total accruals), and earnings management. *VOLUNTARY* and *PRECISION* refer to the likelihood of issuing voluntary management earnings forecasts and their accuracy, respectively. The key explanatory variable is the interaction term *SHHK*×*POST*, where *SHHK* is a dummy variable that equals 1 if a firm is investible by foreign investors under the Stock Connect program, *POST* is a dummy variable that equals 1 if the year is 2015 or 2016. Variable definitions are provided in the appendix. The *t*-statistics (z-statistics) in parentheses are based on robust standard errors clustered at the firm level. Coefficients marked with *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table IA5

Additional analysis: Stock market liberalization and the probability of informed trading

	(1)	(2)
	PIN	*BASPREAD*
SHHK	-0.029***	-0.002***
	(-7.15)	(-10.86)
POST	-0.080***	-0.000
	(-31.67)	(-1.01)
SHHK×POST	0.136***	0.003***
	(33.19)	(14.35)
SIZE	-0.021***	0.000

	(-14.74)	(1.62)
ROA	-0.145***	-0.001
	(-5.86)	(-1.25)
LEVERAGE	0.036***	-0.001**
	(4.83)	(-2.49)
GROWTH	0.009***	0.000
	(4.35)	(0.95)
TURNOVER	-0.008***	-0.000***
	(-6.83)	(-5.71)
SOE	0.004	-0.000***
	(1.61)	(-4.58)
TOP_HOLD	0.039***	-0.000
	(4.60)	(-1.10)
INST_HOLD	0.037***	0.001***
	(6.56)	(3.07)
Constant	0.878***	-0.000
	(29.59)	(-0.36)
Year FE	Yes	Yes
Industry FE	Yes	Yes
# of Obs.	6540	6628
Adj. R^2	0.32	0.13

Note: Table IA5 reports the results of the following regressions of the impact of stock market liberalization on the probability of informed trading when using full sample:

PIN or *BASPREAD* $=\alpha_0+\alpha_1 SHHK+\alpha_2 POST+\alpha_3 SHHK \times POST+$ Controls +Year FE + Industry FE + ε

where *PIN* and *BASPREAD* refer to the probability of informed trading and the bid-ask spread, respectively. The key explanatory variable is the interaction term *SHHK*×*POST*, where *SHHK* is a dummy variable that equals 1 if a firm is investible by foreign investors under the Stock Connect program, *POST* is a dummy variable that equals 1 if the year is 2015 or 2016. Variable definitions are provided in the appendix. The *t*-statistics in parentheses are based on robust standard errors clustered at the firm level. Coefficients marked with *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table IA6

Relation between stock market liberalization and investment-price sensitivity

	INV_{t+1}
SHHK×*POST*×*TOBINQ*	0.013**
	(2.54)
SHHK×*POST*	-0.025**
	(-2.25)
SHHK×*TOBINQ*	-0.016***
	(-3.96)

POST×TOBINQ	-0.017***
	(-9.84)
SHHK	0.035***
	(4.15)
POST	0.012*
	(1.76)
TOBINQ	0.023***
	(13.73)
SIZE	-0.001
	(-0.52)
LEVERAGE	0.032***
	(4.08)
INST_HOLD	-0.003
	(-0.51)
TURNOVER	0.001
	(0.84)
ZSCORE	-0.000**
	(-2.18)
FCF	-0.042***
	(-11.64)
VOLUME	-0.003
	(-1.04)
BIG4	0.007
	(1.26)
ZONE	0.003
	(0.97)
HORIZON	-0.002
	(-0.25)
Constant	0.110*
	(1.75)
Year FE	Yes
Industry FE	Yes
# of Obs.	6009
Adj. R^2	0.10

Note: Table IA6 reports the results of the following regression of the relation between stock market liberalization and investment-price sensitivity when using full sample:

$$INV_{t+1} = \alpha_0 + \alpha_1 SHHK \times POST \times TOBINQ + \alpha_2 SHHK \times POST + \alpha_3 SHHK \times TOBINQ + \alpha_4 POST \times TOBINQ + \alpha_5 SHHK + \alpha_6 POST + \alpha_7 TOBINQ + \text{Controls} + \text{Year FE} + \text{Industry FE} + \varepsilon$$

where INV_{t+1} is a measure of a firm's investment in year t+1, measured as capital expenditure scaled by beginning-of-year assets. The key explanatory variable is the three-way interaction term *SHHK*×*POST*×*TOBINQ*, where *SHHK* is a dummy variable that equals 1 if a firm is investible by foreign investors under the Stock Connect program, *POST* is a dummy variable that equals 1 if the year is 2015 or 2016, *TOBINQ* is calculated as the market value of equity plus the book value of assets minus the book value of equity, scaled by the book value of assets. Variable definitions are provided in the appendix. The *t*-statistics in parentheses are based on robust standard errors clustered at the firm level. Coefficients marked with *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively

Table IA7

Relation between stock market liberalization and stock price informativeness

	(1)	(2)	(3)
	$EBIT_{t+1}$	NI_{t+1}	$EBITDA_{t+1}$
SHHK×POST×PRICE	0.003	0.005*	0.002
	(1.06)	(1.83)	(0.73)
SHHK×POST	-0.002	-0.000	-0.002
	(-0.78)	(-0.17)	(-0.71)
SHHK×PRICE	-0.001	-0.004	-0.002
	(-0.50)	(-1.62)	(-0.65)
POST×PRICE	-0.009***	-0.010***	-0.008***
	(-4.95)	(-6.35)	(-4.17)
SHHK	0.007***	0.006***	0.007**
	(2.62)	(2.59)	(2.34)
POST	-0.010***	-0.009***	-0.010***
	(-4.90)	(-5.20)	(-4.33)
PRICE	0.033***	0.034***	0.029***
	(14.41)	(17.23)	(11.71)
SIZE	0.005***	0.004***	0.004***
	(3.61)	(3.17)	(2.63)
GROWTH	0.011***	0.008***	0.010***
	(6.27)	(5.07)	(5.32)
TURNOVER	-0.002***	-0.002***	-0.002***
	(-6.91)	(-6.91)	(-6.49)
MGNT_HOLD	0.011**	0.014***	0.005
	(2.01)	(2.92)	(0.83)
TOP_HOLD	0.010	0.015***	0.017**
	(1.61)	(2.69)	(2.42)
INST_HOLD	0.014***	0.012***	0.014***
	(2.80)	(2.82)	(2.73)

ANALYST	0.009***	0.009***	0.009***
	(12.72)	(13.85)	(12.13)
Constant	-0.102***	-0.093***	-0.051
	(-3.24)	(-3.45)	(-1.47)
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
# of Obs.	5378	5378	5378
Adj. R^2	0.30	0.35	0.28

Note: Table IA7 shows the following regression results of the relation between stock market liberalization and stock price informativeness about future earnings when using full sample:

$$EBIT_{t+1} \text{ or } NI_{t+1} \text{ or } EBITDA_{t+1} = \alpha_0 + \alpha_1 SHHK \times POST \times PRICE + \alpha_2 SHHK \times POST + \alpha_3 SHHK \times PRICE + \alpha_4 POST \times PRICE + \alpha_5 SHHK + \alpha_6 POST + \alpha_7 PRICE + \text{Controls} + \text{Year FE} + \text{Industry FE} + \varepsilon$$

where $EBIT_{t+1}$, NI_{t+1}, and $EBITDA_{t+1}$ are different measures of a firm's one year leading earnings. The key explanatory variable is the three-way interaction term $SHHK \times POST \times PRICE$, where *SHHK* is a dummy variable that equals 1 if a firm is investible by foreign investors under the Stock Connect program, *POST* is a dummy variable that equals 1 if the year is 2015 or 2016, and *PRICE* is calculated as the log-ratio of market capitalization to total assets. Variable definitions are provided in the appendix. The *t*-statistics in parentheses are based on robust standard errors clustered at the firm level. Coefficients marked with *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table IA8

The effect of the Stock Connect on Hong Kong market

	(1) *NONSYN1*	(2) *NONSYN2*
SHHK	-0.473***	-0.447***
	(-4.57)	(-4.96)
POST	-0.316*	-0.053
	(-1.92)	(-0.37)
SHHK×POST	0.173	0.170
	(1.29)	(1.45)
SIZE	-0.213***	-0.214***
	(-6.85)	(-7.90)
ROA	0.128	0.067
	(0.31)	(0.19)
LEVERAGE	-0.121	-0.206

	(-0.68)	(-1.34)
GROWTH	0.147***	0.146***
	(2.94)	(3.34)
TURNOVER	0.032**	0.024**
	(2.45)	(2.08)
TOP_HOLD	-0.004**	-0.004**
	(-2.16)	(-2.39)
INST_HOLD	-0.237	-0.320**
	(-1.39)	(-2.15)
Constant	7.911***	7.146***
	(10.60)	(11.00)
Year FE	Yes	Yes
Industry FE	Yes	Yes
# of Obs.	1182	1182
Adj. R^2	0.27	0.26

Note: Table IA8 reports the results of the following regressions regarding the impact of the Stock Connect on Hong Kong market:

$NONSYN1 \text{ or } NONSYN2 = \alpha_0 + \alpha_1 SHHK + \alpha_2 POST + \alpha_3 SHHK \times POST +$ Controls +YearFE+IndustryFE+ε

where *NONSYN1* and *NONSYN2* are proxies for the firm's stock price efficiency. The key explanatory variable is the interaction term *SHHK*×*POST*, where *SHHK* is a dummy variable that equals 1 if a firm in Hong Kong market is investible by Chinese mainland investors under the Stock Connect program, *POST* is a dummy variable that equals one if the year is 2015 or 2016. The sample uses a four-year window (from year -2 to year +2) around the Stock Connect. Variable definitions of all variables are provided in the appendix. The *t*-statistics in parentheses are based on robust standard errors clustered at the firm level. Coefficients marked with *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Figure 1 The dynamics of the percentage of foreign shareholding

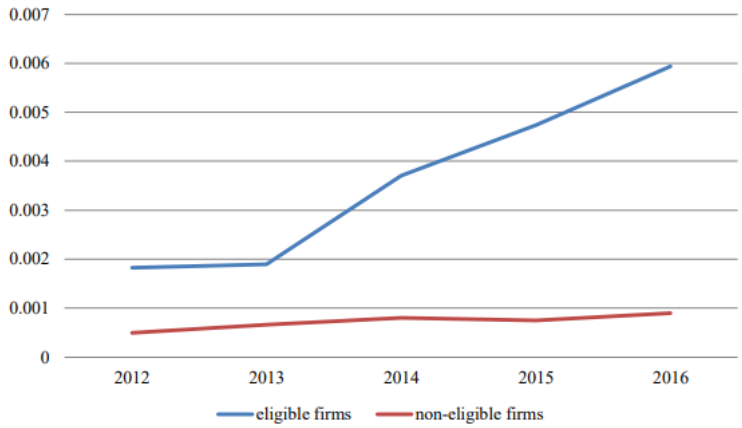

Figure 2 The number of eligible firms held by the Hong Kong Securities Clearing Company Limited (top 10 shareholdres)