Margin Trading and Stock Index Futures Regulations and the Variation of Stock Return: Evidence from China

Abstract

This paper investigates the effects of margin trading and stock index futures regulations on stock price synchronicity and the moderating role of institutional characteristics on these relationships in the Chinese stock markets. We find that both margin trading and stock index futures regulations are positively related with stock price synchronicity, suggesting lower stock price information content. Margin trading regulations show a more significant impact than stock index futures regulations. Institutional characteristics exhibit significant moderating effects on the relationship between margin trading and stock index futures regulations and stock price synchronicity. State-owned and domestically-listed firms with male CEOs and chairpersons and political connections, firms located in regions with less efficient institutions, less government intervention and less legal enforcement exert significantly positive moderating effects. These moderating effects on stock price synchronicity are greater for margin trading regulations than for stock index futures regulations.

Keywords: Margin Trading; Stock Index Futures; Stock Price Synchronicity; Regulations; Institutional Characteristics

JEL classification: G18; G30; G14; K20; K22

1. Introduction

The Chinese economy has transformed from a centrally planned economy to a market-based system and away from an inward-orientated policies to ‘open-door’ policies aimed at integration with the global economy in the past several decades (Buckley et. Al. 2010; Wei et al., 2017). However, the political pressures of government and regulators significantly impact the operations and performance of firms (Li et al., 2008; Wu et al., 2012). Stock price synchronicity is defined as the variation of stock return explained by common factors, market based and industry based (Morck, et al., 2000). Jian et al. (2013) argue that regulations are supposed to be created to help enhance market efficiency and conditions; however, they may act to destabilize markets, especially if the regulatory restrictions are designed to control market risk during periods of financial turmoil. Further, new regulations may also affect the way in which information processed in capital markets and hence the efficiency of stock prices.

This study examines how firms’ the variation of stock return was affected when China introduced new regulations to allow margin trading and stock index futures. China Securities Regulatory Commission (CSRC) enacted regulations to allow margin trading in 2010 as a part of the continuing efforts of China to reform and liberalize its capital markets. Findings on the market impact of the introduction of margin trading are mixed with some finding that margin trading improved price efficiency while others finding that they reduced information content of stock prices and increased the speed of price adjustment.[1]

[1] Cheng et al. (2014) and Chen et al. (2016) find that the margin trading improved information environment, which helps new information be be incorporated in stock prices more efficiently. However, a recent study by Lv and Wu (2019) finds that margin trading reduces information content and increases the speed of price adjustment.

The CSRC also introduced new regulations in 2015 to allow stock index futures trading in China. Stock index futures regulation may impact efficient information processing and stock price synchronicity. Studies have theorized that stock index futures could have both positive and negative effects on the information content of stock prices (Gammill and Perold 1989; Subrahmanyam 1991; Choi and Subrahmanyam 1994). Stock index futures could also lead to uninformed traders migrating to the futures market, reducing their trading losses with informed traders, leading to less firm-specific information being infused into stock prices (Liu, 2008). On the other hand, the introduction of stock index futures can lead to more trading based on market-wide information, which can affect the prices of the underlying stocks. This is because informed traders can act in both the futures and spot markets to take advantage of their private information, or because of index-linked arbitrage trading between the two markets (Liu 2008). Frijns and Tse (2015) note that index futures can be less informative due to the diversification of private information[2], but can also attract informed traders. . Therefore, the effects of stock index futures on stock price synchronicity remain an empirical question.

Additionally, the effect of margin trading and short-selling activities on stock index futures is not entirely clear. Studies have shown that these restrictions can lead to mispricing of stock index futures, and the removal of margin trading restrictions can reduce the frequency and magnitude of mispricing stock index futures (Fung and Draper, 1999; Kempf, 1998; Fung and Jiang, 1999). However, Neal (1996) shows that margin trading restrictions may not have a significant impact on futures pricing, especially futures underpricing. Moreover, there is an

[2] This can be happen when "noise traders are a basket of securities and any private information on specific securities in the basket is diversified away".

empirical research vacuum about the effect of stock index futures regulations on stock price synchronicity in emerging markets due to underdeveloped institutional settings.

Since margin trading and stock index futures were initiated and implemented around the same time in China and shares of some of the firms are exposed to both regulations or one of regulations or neither regulations, it is interesting to examine the dual effects of margin trading and stock index futures on stock price synchronicity. Therefore, we empirically investigate the separate and joint effects of margin trading and stock index futures regulations on stock price synchronicity.[3] We attempt to see if the impact by margin trading and stock index futures are competing or complementary. Do both margin trading and stock index futures regulations help improve or worsen the stock price information content, or does one improve the efficiency of pricing while the other suppresses the efficiency of pricing of listed stocks in China?

Institutional characteristics and firm-level characteristics may moderate the relationship between these two regulations and the stock price synchronicity. The institutional efficiency, government and market regulations, and legal and political conditions vary vastly across China's provinces. The quality of information, availability of private information, and the cost of collecting private information are different for firms located in different regions in China. A poor institutional environment can increase information collection costs and reduce investors' incentives to collect private information. Therefore, we also investigate the moderating effects of the institutional characteristics on the relationship between margin trading and stock index futures regulations on stock price synchronicity. In addition, firm-level characteristics also may play an important role in influencing the effect of margin trading and stick index futures regulations on stock price

[3] This study first investigates the differences in stock price synchronicity between the margin trading and stock index futures and their joint effects on stock price synchronicity.

synchronicity. Hence, we also examine whether effects of margin trading and stock index futures regulations on stock price synchronicity vary with the differences of (1) firm-level characteristics such as SOE vs. non-SOE firms; firms with political connections vs. firms without political connections; firms with male-CEO/chairperson vs. firms with female-CEO/chairperson, and (2) firm's listing status and activities: domestic-listed firms vs. cross-listed firms; firms with M&A vs. firms without M&A.

This study contributes to the litertaure in a several ways. Frist, in contrast to prior studies which examine the impact of margin trading on liquidity, volatility, market quality, price efficiency, and the risk of a future stock price crash (Hardouvelis, 1990; Seguin & Jarrell, 1993; Alexander et al. (2004); Chang et al., 2014; Lv and Wu, 2019), we examine the effect of margin trading reulaitons on stock price synchroneity. The results show that that margin trading regulations has a positive effect on stock price synchronicity, suggesting that prices reflect more market-wide information and less firm-specific information.

Second, we find that stock index futures regulations also positively affect stock price synchronicity in the Chinese markets, providing further support of the theory of information asymmetry and market efficiency. In contrast, prior research explores the impact of information on the spot market and whether a futures market would improve the informational efficiency of stock prices (Powers, 1970; Grossman, 1977; Damodaran, 1990) and the value price discovery function and volatility spillover from the futures markets to spot markets (Zhong, 2004; Miao et al., 2017).

Third, we document that not only margin trading and stock index futures regulations are positively correcletd with stock price synchronity separately, but also they impact stock price synchronicity jointly, leading to less firm-sepefiic stock price information content, which is

consistent with the theory of regulatory arbitrage. Prior studies have not explored the joint effects of margin trading and stock index futures regulations, but this study does.[4]

Fourth, we levarege the unique institutional and firm-level characteristics that varies across Chinese provinces to study the cross-sectional variations in the impact of margin trading and stock index futures regulations on stock price synchronicity. Institutional characteristics include firm located in high institutional regions vs. low institutional regions (i.e., institutional efficiency, government and market regulation, and the development level of legal enforcement). Firm-level characteristics include SOE vs. non-SOE, firms with political connections vs. firms without political connections, firms with male-CEO/chairperson vs. firms with female-CEO/chairperson, domestic-listed firms vs. cross-listed firms, and firms with M&A vs. firms without M&A.[5]

The remainder of this paper is organized as follows. Section 2 discusses the institutional background of regulations of margin trading and stock index futures in China. Section 3 presents the theoretical analyses and develops the hypotheses. Section 4 describes the data and the research methodology. Section 5 presents the empirical findings, and Section 6 concludes the paper.

2. Institutional Background

Before 2010, margin trading and stock index futures trading were prohibited in the capital markets in China. On March 3, 2010, China allowed qualified stocks to buy eligible stocks on margin and to sell those stocks.[6] Then, in December 2011, the qualified stocks list was expanded,

[4] For example, Chang et al. (2007, 2014), Chen et al. (2016) and Li et al. (2017) explore the initial introduction of margin trading in China and Hong Kong, but do not consider the effect of margin trading regulation changes over time.
[5] The regulations of information disclosure are often not fully enforced in a region which has poor level of legal enforcement. Hence, the entrenched managers are able to withhold relevant information to cover their own self-serving behavior (see Chan and Hameed 2006; Fan and Wong, 2005).
[6] In total, 90 constituent stocks in the SSE 50 Index (on the Shanghai exchange) and SZSE Component Index (on the Shenzhen exchange) on a designated list were eligible for margin trading.

and the new list became effective in January 2012.[7] As such, margin trading have essentially become a routine practice in the stock markets in China. Stocks and ETFs must meet certain criteria to be eligible for margin trading along with specific margin requirements and implantation rules.[8] From March 2010 to August 2012, qualified stocks could trade from borrow money or stock, but only from securities companies. After August 27, 2012, investors could borrow money from investment banks, funds, and insurance companies through a centralized refinancing company. However, securities lending is still limited to securities companies only and margin trading is settled in a shared margin account. In the margin calculation, the collateral value is the discounted value of stocks purchased on margin, and the discount rate varies with the asset type and across individual stocks. An investor must keep the balance at or above the maintenance margin level. Otherwise, the margin account can be forced to close if the investor fails to meet the margin call within two trading days. Appendix Table A (available online) shows the timeline of the introduction and development of margin trading in China.

On April 16, 2010, China launched the CSI 300 stock index futures (SIF). The CSI 300 is The CSI 300 is a capitalization-weighted stock market index designed to replicate the performance of the top 300 stocks traded on the Shanghai Stock Exchange and the Shenzhen Stock Exchange. SIF contracts are traded on the China Financial Futures Exchange located in Shanghai. Furthermore, the SSE50 and CSI500 futures were introduced on April 16, 2015. In the same year, regulators placed tight restrictions on futures trading due to market fluctuations, including increasing margin requirements from 10% to 40% for non-hedgers. The intraday transaction fees also increased from 0.0015% to 0.23% and defining tick sizes of more than 10 as "abnormal trading", which had the

[7] The list to include 278 qualified constituent stocks in the SSE 180 Index and SZSE 100 Index as well as 7 exchange traded funds (ETFs).
[8] According to the implementation rules promulgated by the Shanghai Exchange, eligible stocks must satisfy size, liquidity, and volatility requirements. According to the administrative rules promulgated by the CSRC, only “qualified” investors can buy stocks on margin and the requirements differ across security companies.

effect of reducing the volume of futures trading. Appendix Table B (available online) shows the timeline of the introduction and development of stock index futures in China. The CSRC stated the purpose of these new regulations was to regulate these transactions, maintain the order of the securities market, and protect the legitimate rights and interests of investors.

3. Hypotheses Development

From a theoretical standpoint, effects of margin trading and stock index futures regulations on stocks can be generally categorized into two groups. The first group focuses on information asymmetry and market efficiency (Fama et al., 1969; Fama, 1970). Some view that regulations help dissemination of information and reduce information asymmetry, thereby improving informational efficiency of stock prices. Others view that regulations distort market mechanisms and impede information dissemination, leading to misallocation of capital (Coffee, 1984, 2001; Black, 2001).

The second group focuses on the frameworks for the effectiveness of securities laws and regulations (La Porta et al., 2006). A framework for securities laws could be established by mandating disclosures and specifying liabilities, thus improving market discipline and private litigation, which otherwise would be governed by contract and tort law, with their concomitant uncertainties about outcomes (see Hay and Shleifer, 1998; Glaeser and Shleifer, 2001). Another view is that a country's securities market is an independent public enforcer, free from political interference, a more credible enforcer of the law, and can develop appropriate rules and sanctions as market conditions change (Becker, 1968; Glaeser and Shleifer, 2001). La Porta et al. (2006) highlights that strict regulatory enforcement is essential for market development. Emerging stock

markets, however, are characterized by weak institutional underpinnings and need strong regulations to engender market efficiency (Ross, 1979; and Chen et al., 2017).

Chowdhry and Nanda (1998) predict that margin trading requirements caused increased market instability. Stocks purchased on margin serve as collateral, and large random fluctuations in stock prices may result in forced liquidation if the margin requirement is rigid, causing excess volatility. Margin trading involves more informed than uninformed traders (Bhojraj et al., 2009; Chang et al., 2014) and Hirose, Kato, and Bremer (2009) find that the margin trading is dominated by individual investors who are presumably uninformed traders, and these investors follow positive feedback trading behavior for small firm stocks and negative feedback trading behavior for large firms stocks. Chen, Hong, and Stein (2002) highlight that high transaction costs of margin trading might limit improvement of stock price efficiency.

Grossman and Stiglitz (1980) suggest that uninformed traders can observe or infer the private signals of informed traders and make their moves.[9] Following the lifting of margin trade restrictions, uninformed traders can make their moves much faster and more effective via a signaling mechanism. Stocks with fewer restrictions allow uninformed investors, who buy stocks on margin, to promptly engage in unrestricted selling to lock in a price or hedge the downside risk of a long position for the same stock. However, they may also prompt by observing the information flows from speculative sellers (Shyu et al., 2018). Removing margin trade restrictions provides traders opportunities to make a profit by offsetting sales and margin purchases (Abreu and Brunnermeier, 2002; Dechow et al., 2001; Pownall and Simko, 2005). Hence, the informed sellers

[9] An uninformed trader who observes a leaked signal before the public, corporate news announcement may also trade aggressively to exploit this private information and it allows traders who have private information on upcoming negative corporate news can exploit it before the information announcements (Desai et al. 2006; Christophe et al. 2010).

can serve as information intermediaries for other investors, who exploit an arbitrage opportunity and facilitate the equilibrating of stock prices.

Prior studies, such as Danthine (1978), Bessembinder and Seguin (1992), Berkman, Brailsford, and Frino (2005) and Subrahmanyam (1991) have demonstrated that futures markets can improve market depth and reduce volatility by reducing the cost for informed traders to respond to mispricing due to the increased liquidity and reduced transaction costs associated with futures markets. The informativeness of trades is essential because if the index futures market mainly attracts noise traders, it may destabilize the underlying cash market. However, if the index futures market attracts informed traders, they complete the underlying cash market and add to its price discovery and efficiency (Booth, So, Tse, 1999).

Thus, the theoretical arguments regarding the effects of margin trading and stock index futures are mixed, and empirical work could provide clarity on the direction of effects. Therefore, we propose the following unidirectional hypotheses to empirically investigate the effect of margin trading and stock index futures regulations on stock price synchronicity. Our first hypothesis relates to the separate impact of margin trading and stock index futures regulations on stock price synchroneity. In this case, we compare stocks that are allowed for margin trading with those that are not allowed for margin trading, and stock that are included in stock index futures vs those that are not included in stock index futures.

H_1: *Ceteris paribus,* margin trading and stock index futures regulations are negatively related with stock price synchronicity such that stocks that are allowed for margin trading or included stock index futures have stronger firm-specific information content.

According to the efficient market hypothesis, return shocks generated in one market can have spillover effects into another market, thereby creating price co-movement between two markets such as between China's spot and future foreign exchange markets (Ho et al., 2017). The introduction of stock index futures generally reduces the volatility of the underlying stocks (Chen et al., 2013; Hou and Li, 2014). Yang et al. (2012) finds no evidence of price discovery of stock index futures market while Hou and Li (2013) find dependence between the futures and spot market in price discovery. There is no empirical study investigating whether the effect of margin trading and stock index futures regulations on stock price synchronicity have complementary or competing effects. The regulatory arbitrage arguments suggest that when the margin trading regulations are introduced selling moves to the stock index futures market. The regulatory hypothesis suggests that margin regulations curtail selling in stock index futures markets.[10] Accordingly, our second hypotheses is related to the joint effect of margin trading and stock index future regulations on stock price synchroneity. We examine stocks that are the subject of both margin trading and stock index futures regulations vs. those that are exposed to only one of them.

H_2: *Ceteris paribus,* margin trading and stock index futures regulations together have a stronger negative impact on stock price synchronicity than either margin trading or stock index futures alone so that stocks that are exposed to both margin trading and stock index futures regulations have stronger firm-specific information content than stocks that are exposed one of them.

[10] In this current context, we study two different regulations that affect the efficient processing of information in stock markets and argue that one regulation may have a complementary or competing effect on the other. Regulatory arbitrage is where one regulation has a complementary effect on the other and we can assume that regulator is trying to strengthen the regulations. Regulatory reach occurs when one regulation has a competing effect on another regulation, and we can assume the regulator is trying to reduce the strength of the regulations. Jain et al. (2013) have used this theoretical setting to explain the impact of attempting to apply home country market regulations restricting selling on foreign countries that have their own regulations.

Next, we test for the the relative impact of margin trading vs stock index futures on stock price synchronicity to ascertain which one fo them is more strongly related with stock price synchroneity.

H_3: *Ceteris paribus,* margin trading regulations have a stronger negative impact on stock price synchronicity than stock index futures regulation such that stocks that are allowed for margin trading have a stronger firm-specific information content than stocks that are included in stock index futures.

Our next hypothesis focuses on testing the the effect before and after the introduction of margin trading or stock index regulations. In this case, we take firms that are subject to margin trading and examine the relation with stock price synchroneity before and after the introduction of margin trading. And we do the same for stock index futures as well.

H_4: *Ceteris paribus,* firms will exhibit weaker measures of stock price synchronicity after the firms' stocks are exposed to margin trading or stock index futures regulations relative when they were not subject of margin trading.

In addition to the four main hypotheses stated above, we also examine the the cross-sectional variations in firms' stock price synchronicity due to the differences of firm-level factors in (1) firm-level characteristics (2) firm's activities, and (3) firm's institutional environment. Firm-level characteristics include SOE vs. non-SOE; firms with political connections vs. firms without political connections; firms with male-CEO/chairperson vs. firms with female-CEO/chairperson. Firms' activities include domestic-listed firms vs. cross-listed firms; firms with M&A vs. firms without M&A. Firms' institutional environment factors include firm locates in high institutional regions vs. Low institutional regions (i.e., institutional efficiency, government and market regulation, and the development level of legal enforcement).

Although institutional reforms lead to increased transparency in the SOE sector, disclosure practices and accountability are still weak. Moreover, SOEs are often subject to a more ineffective disclosure regime than non-SOEs. Hence, a firm's ownership type may moderate the relationships of margin trading and stock index futures regulations on stock price synchronicity differently. Firms with top executives who are politically connected often face more favorable conditions than firms without political connections (Chen et al., 2014). According to the political asylum theory, politically connected firms are more likely to hide information from the market, hide valuable firm-specific information from investors, and undergo little scrutiny from regulators (Ebrahim et al., 2014). The opposing view supports resource dependence theory, establishing a beneficial relationship with the government to gain more resources by following government regulations and actively disclosing information (Harrison, 2017; Lin et al., 2015). However, information disclosure behavior is more effective for firms without political connections. Hence, the political connection moderates the relationships of margin trading and stock index futures on stock price synchronicity differently. A firm with a female CEO/chairperson has a richer information environment than a male CEO/chairperson. Further, the cost of collecting private firm-specific information is lower with a female CEO/chairperson than a male CEO/chairperson (Upadhyay and Zeng, 2014) . Hence, gender diversity moderates the relationships of margin trading and stock index futures on stock price synchronicity constructively.

Compared to domestically listed peers, cross-listed firms have a more transparent information environment (e.g., Lang et al., 2004) and better corporate governance (e.g., Reese and Weisbach, 2002). Hence, cross listing may create significant cross-sectional variations for the effects of margin trading and stock index futures on stock price synchronicity than firms listed only domestically. Merger and Acquisition activities (M&A) increase the target's stock price firm-

specific information and reduce acquirer managers' information disadvantage of the target's valuation (Hansen 1987). If stock price firm-specific information provides managers with new information about firms' fundamental value, then merger should be more aligned with the value of firm fundamentals. Hence, the firms with M&A moderate the relationship of margin trading and stock index futures regulations on stock price synchronicity differently.

The rapid development of Chinese institutions has increased the variation in institutional efficiency, government and market regulations, and legal and political developments across China's provinces. These developments relate to the quality of information, the availability of private information, and the cost of collecting private information. A poor institutional environment can increase information collection costs and reduce investors' incentives to collect private information. Therefore, firms in high institutional efficiency regions moderate the relationship of margin trading and stock index futures on stock price synchronicity than firms in low institutional efficiency regions.

A list of these specific firm-level characteristics, firm's activities, and institutional environment factors is described in Appendix 1. We develop the following common hypothesis (in non-directional form) regarding the moderating effects of these firm-level characteristics, firm's activities, and firm's institutional environment factors:

H_5: *Ceteris paribus,* margin trading and stock index futures regulations show stronger/weaker effects on stock price synchronicity for firms with certain characteristics than for firms without certain characteristics.

4. Methodology

4.1 Sample selection and data collection

Firstly, we collected data for all firms listed on the Shanghai and Shenzhen stock exchanges from 2007 to 2017.[11] We extract the following information from the China Stock Market and Accounting Research (CSMAR) database[12]: stock return and accounting data and lists of margin trading and stock index futures data for the same period. The initial sample includes 6,298,158 daily stock return data from 3519 non-financial firms. Then, the sample selection process removes firms with abnormal trading, firms trading for less than 200 days in each fiscal year, and stock returns of firms' list years. We then estimate every firm's SPI in each fiscal year resulting in a sample of 3,359 firms with 21,760 firm-year observations. After winsorizing all variables in the top and bottom 1% of their empirical distributions, we exclude the missing data for variables used in baseline regression. The final sample comprises 13,851 firm-year observations for 2229 firms. A description of the sample firms is presented in Table 1.

4.2 Empirical models

To empirically test the hypotheses, we have employed several regression models to examine how firms' exposure to margin trading stock index future regulations affect stock price synchronicity and hence stock price information content.

First, we apply the following regression models to the whole sample to examine the effects of margin trading (MT) and stock index future (SIF) regulations on stock price synchronicity (SPI):

$$SPI_{i,t} = \alpha_0 + \beta_{1a} REGU_{i,t} + \beta_2 AGE_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 LEV_{i,t} + \beta_5 ROE_{i,t} + \beta_6 VROE_{i,t} + \beta_7 STDROA_{i,t} + \beta_8 MTB_{i,t} + \beta_9 INDNUM_{i,t} + \beta_{10} INDSIZE_{i,t} + \beta_{11} DD_{i,t} + \beta_{12} MERGER_{i,t} + \beta_{13} LMVE_{i,t} + \beta_{14} INST_{i,t,} + \beta_{15} RET_{i,t} + \beta_{16} ISSUE_{i,t} + \beta_{17} VOL_{i,t} + \beta_{18} LIQUIDITY_{i,t} + \varepsilon_{i,t} \quad (1)$$

$SPI_{i,t,}$ is the stock price synchronicity measure for firm i in year t. The margin trading and stock index future regulations are proxied by three dummy variables as the independent variables. The

[11] We excluded firms that have only B-shares as very few firms have B-shares only and B-shares are issued in US Dollars, and trading and their supervision are different to A-share firms

[12] We excluded firms that have only B-shares as very few firms have B-shares only and B-shares are issued in US Dollars, and trading and their supervision are different to A-share firms

dummy variable, $REGU_{i,t}$ is specified with respect to margin trading only ($REGU1_{i,t}$), stock index futures only ($REGU2_{i,t}$) and both margin trading and stock index futures ($REGU3_{i,t}$). $REGU1_{it}$ is equal to 1 for firm *i* in year *t* if the firm is only exposed to margin trading (MT) regulations in time *t* or 0 otherwise. $REGU2_{i,t}$ is equal to 1 for firm *i* in year *t* if the firm is only exposed to stock index future (SIF) regulations in time *t* or 0 otherwise. REGU1 and REGU2 provide the test for hypothesis 1—the impact of margin trading and stock index futures regulations on stock price synchroneity. $REGU3_{i,t}$ is equal to 1 for firm *i* in year *t* if the firm is exposed to both margin trading and stock index future (MT and SIF) regulations in time *t* or 0 otherwise. This variable provides the test for hypothesis 3—the joint impact of margin trading and stock index future regulations on stock price synchroneity.

Based on previous related research (e.g., Gul et al., 2010; Gul et al., 2011; Crawford et al., 2012; Boubaker et al., 2014), we adopt a frequently used set of variables used in prior research to control for various characteristics affecting firm stock price synchronicity (SPI). These variables include firm age (*AGE*), firm size (*SIZE*), leverage (*LEV*), return on equity (*ROE*), volatility of earnings (*VROE*), market-to-book (*MTB*), the number of firms in the industry to which a firm belongs (*INDNUM*), industry size (*INDSIZE*), dividend dummy (*DD*), diversification dummy (*DIVER*), merger dummy (*MERGER*), the natural log of market value (*LMVE*), institutional ownership (*INST*), shares traded (*TURN*), market-adjusted return (*RET*), equity issue (*ISSUE*), annual trading volume turnover (*VOL*), and stock liquidity *(LQUIDITY)*. The definitions of these control variables and other variables are provided in Appendix 1.

In addition, we have included two dummy variables, IND and YR, to control for the influence of industry and time. To address potential heteroskedasticity and cross-sectional

correlation across firms or across time, we calculate t-statistics based on robust standard errors that are clustered by firms.

Next, in order to test our hypothesis 3—the relative or incremental effect of each of the two regulations on stock price synchroneity, we specifiy the following regression model to a sub-sample of firms only in the periods (years) when the firms are exposed to the margin trading and the stock index futures.

$$\begin{aligned} SPI_{i,t} = \alpha_0 + \beta_1 \ RELREGU_{i,t} + \beta_2 AGE_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 LEV_{i,t} + \beta_5 ROE_{i,t} + \beta_6 VROE_{i,t} \\ + \beta_7 STDROA_{i,t} + \beta_8 MTB_{i,t} + \beta_9 INDNUM_{i,t} + \beta_{10} INDSIZE_{i,t} + \beta_{11} DD_{i,t} \\ + \beta_{12} MERGER_{i,t} + \beta_{13} LMVE_{i,t} + \beta_{14} INST_{i,t} + \beta_{15} RET_{i,t} + \beta_{16} ISSUE_{i,t} + \beta_{17} VOL_{i,t} \\ + \beta_{18} LIQUIDITY_{i,t} + \varepsilon_{i,t} \end{aligned} \quad (2)$$

We have constructed three sub-samples. The first sub-sample includes firms that are exposed to only margin trading regulation or firms that are exposed to only stock index futures regulation. In the regression analysis, the dummy variable for firm i in year t, $RELREGU_{i,t}$, is assigned 1 if the firm is exposed to margin trading regulations or zero if the firm is exposed to stock index futures regulations. The second sub-sample includes firms that are exposed to both margin trading and stock index futures or with only margin trading. In the regression analysis, the dummy variable for firm i in year t, $RELREGU_{i,t}$, is assigned 1 if the firm is exposed to both margin trading and stock index futures or zero if the firm is exposed to margin trading regulation only. The third sub-sample includes firms that are exposed to both margin trading and stock index futures regulation or firms are exposed to only stock index futures. In the regression analysis, the dummy variable for firm i in year t, $RELREGU_{i,t}$, is assigned 1 if the firm is exposed to both margin trading and stock index futures regulations or zero if the firm is exposed to stock index futures only. The rest of the variables are similarly defined as in Equation (1).

In order to test for pre- and post effects on the firm's stock price synchroneity of introduction of margin trading and stock index futures regulaitons, the following regression model is applied to three sub-samples of firms depending on the type of events, that is, margin trading, stock index futures, and both margin trading and stock index futures.

$$SPI_{i,t} = \alpha_0 + \beta_1 POST_{i,t} + \beta_2 AGE_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 LEV_{i,t} + \beta_5 ROE_{i,t} + \beta_6 VROE_{i,t} + \beta_7 STDROA_{i,t} + \beta_8 MTB_{i,t} + \beta_9 INDNUM_{i,t} + \beta_{10} INDSIZE_{i,t} + \beta_{11} DD_{i,t} + \beta_{12} MERGER_{i,t} + \beta_{13} LMVE_{i,t} + \beta_{14} INST_{i,t,} + \beta_{15} RET_{i,t} + \beta_{16} ISSUE_{i,t} + \beta_{17} VOL_{i,t} + \beta_{18} LIQUIDITY_{i,t} + \varepsilon_{i,t} \quad (3)$$

The coefficient for dummy variable, $POST_{i,t}$, is used to capture the before and after event effect on stock price synchronicity. The first subsample includes firms with margin trading only; and the $POST_{i,t}$ is set to 1 for firm i in year t if margin trading is allowed in that year for the firm and to 0 otherwise. The second sub-sample includes firms with stock index futures only; and the $POST_{i,t}$ is set to 1 for firm i in year t if stock index futures includes the firm in that year and to 0 otherwise. The third subsample includes only firms with both margin trading and stock index futures; and the $POST_{i,t}$ is set to 1 for firm i in year t if the firm has both margin trading and stock index futures in that year and to 0 otherwise. Similarly, the rest of the variables are defined as those in the previous regression models and are explained in detail in the next section.

4.3. Measurement of the variables

4.3.1 Dependent variables

The dependent variable in our regression models is stock price synchronicity (SPI). We employ two alternative methods for estimating SPI. The first measure of SPI calculated using the method by Gul et al.'s (2010). For firm i, a two-factor model, as shown below, is used to estimate the firm's daily return with market-wide and industry-wide daily returns for each year.

$$RET_{i,t} = \alpha + \beta_1 MKTRET_t + \beta_2 MKTRET_{t-1} + \beta_3 INDRET_t + \beta_4 INDRET_{t-1} + \varepsilon_{i,t} \quad (4)$$

Where $RET_{i,t}$ is the daily return for firm i and *MKTRET* and *INDRET* are the market and the industry daily returns. *MKTRET* is based on the value-weighted composite A-share index and *INDRET* is created using all firms except firm i within the same industry. Lagged industry and market returns are included in Equation (4) to alleviate concerns over potential non-synchronous trading biases that may arise from the use of daily returns. The R^2 from the two-factor regression model for firm i in year t is then used to estimate the stock price information as follows:

$$SPI_{i,t} = log\left(\frac{R_{i,t}^2}{1 - R_{i,t}^2}\right) \quad (5)$$

Due to the unique characteristics of Chinese stock markets, following previous literature of Gul et al.'s (2010) on stock price synchronicity, we have also used the following three alternativer models to reflect the types of shares a firm has (A-shares only, both A+B shares, and both A+H shares).

$$RET_{i,t} = \alpha + \beta_1 MKTRET_t + \beta_2 WRDTRET_t + \varepsilon_{i,t} \quad (6)$$

$$RET_{i,t} = \alpha + \beta_1 MKTRET_t + \beta_2 MKTRET_t^B + \beta_3 WRDTRET_t + \varepsilon_{i,t} \quad (7)$$

$$RET_{i,t} = \alpha + \beta_1 MKTRET_t + \beta_2 MKTRET_t^H + \beta_3 WRDTRET_t + \varepsilon_{i,t} \quad (8)$$

In the above models, *WRDRET* denotes the world market return based on the MSCI World index, $MKRET^B$ is the value-weighted B-share market return based on the B-share composite index, and $MKRET^H$ is the value-weighted H-share market return using the Hong Kong Hang Seng index. *MKTRET* is similarly defined as in Equation (4). Equation (6) uses the daily stock returns for firms with A-shares only. Similarly, Equations (7) and (8) use the daily stock returns for firms with A+B shares and firms with A+H shares, respectively. With these alternative regression models, we calculate an alternative stock price synchronicity measure, denoted as *SPI2*. Accordingly, we use *SPI1* to denote the stock price synchronicity measure obtained from Equation (4).

4.4 Cross-sectional analyses: The effect of firm and institutional factors

We further explore if firms' specific characteristics, firms' important activities, and institutional features of Chinese capital markets may create significant cross-sectional variations in the effect of margin trading and stock index futures regulations on stock price synchronicity.

The specific firm characteristics examined in our analyses are (1) firm ownership type: state-owned vs. non-state-owned (2) CEO's political connection (3) CEO's gender: male vs. female. For important firm activities, we have used (1) cross-listing vs. domestic listing (2) M&A vs. No M&A as the criteria to divide the sample firms. To consider the impact of the institutional environment, we investigate the potential moderating effect of three factors: (1) the level of institutional efficiency, (2) the degree of government regulations, and (3) the degree of law enforcement. The definitions of variables used to divide the sample into two groups for cross-sectional variations analyses are shown in Appendix 1. Regression models (i.e., Equations (1) and (2)) are applied to each of the sub-samples of firms to examine how these characteristics affect the significance of the coefficients for dummy variables REGU1, REGU2, REGU3, and RELREGU.

5. Empirical Results

5.1. Descriptive statistics

Table 2 presents the descriptive statistics for variables in baseline regression and shows the mean, standard deviation, minimum, first quartile, median, third quartile, and maximum values, respectively.

<Insert Table 2 here>

5.2 Correlation results

The correlation matrix is presented in Table 3. Pearson and Spearman correlation results are respectively shown below and above the diagonal in Table 3. The Pearson and Spearman correlations of dependent variables SPI1 and SPI2 are 0.86 and 0.87, and they are positively

significant at the 5% or higher levels, which indicates that SPI1 and SPI2 can be alternative dependent variables for each other. Our main independent variable (*REGU*) is significantly positive, which confirms opposite evidence of the expected results of the regulations effects. There are also significant correlations between some of the control variables and the dependent variables SPI1 and SPI2. All the control variables are statistically significant at the 5% or higher levels. According to the correlation results and VIF, there is no multicollinearity problem among the explanatory variables.[13]

<Insert Table 3 here>

5.3 Regression results

5.3.1 The effect of margin trading and stock index futures on stock price synchronicity

Table 4 presents the regression results testing the effect of margin trading and stock index futures regulation on firms' stock price information content. All continuous variables are winsorized at the 1% level to avoid potential outlier effects. The coefficients for industry and year effects are not included in the table for the sake of brevity.

Column 1 of Table 4 shows the effects of margin trading and stock index futures regulations on the stock price information measure. All the coefficients of the three dummy variables, REGU1, REGU2, and REGU3 are statistically significant at the 1% level. The coefficient value of 0.131 for REGU1 means that margin trading regulation leads to increase firms' SPI measure by 0.131, indicating a higher stock market synchronicity level which lead to reduce stock price information content. Similarly, the coefficient value of 0.095 for REGU2 means that stock index futures regulations leads to increase firms' SPI measure by 0.095, indicating a higher

[13]We also compute variance inflation factors (VIFs) when estimating our regression models to test for signs of multicollinearity between the explanatory variables. Our untabulated results show that no VIFs exceed five and thus conclude that multicollinearity is not a problem in our study (e.g., Hair et al., 2006).

stock market synchronicity level which also lead to reduce the stock price information content. The coefficient value of 0.175 for REGU3 means that margin trading and stock index futures regulations jointly lead to increase firms' SPI measure by 0.175. That is, firms with both margin trading and stock index futures regulations will have a higher stock price synchronicity or market synchronicity level than firms are exposed only either margin trading or stock index futures regulation. Column 2 of Table 4 shows the effects of margin trading and stock index futures regulations on the alternative stock price synchronicity measure, SPI2, as a robustness test. We find that all the results are consistent with those for SPI1. Therefore, these testing results provide opposite evidence of the first hypothesis that margin trading or stock index futures regulations lead to reduce the firm's stock price information content. This finding supports the alternative view that regulations distort market mechanisms and impede information dissemination, encouraging the misallocation of resources (Coffee, 1984, 2001; Black, 2001).

<Insert Table 4 here>

The rest of Table 4 shows the empirical evidence on the differential effects of margin trading regulation over stock index future regulations.[14] Columns 3 and 4 presents the regression results comparing the effects of margin trading regulations with stock index futures regulation on SPI. In Column 3, the significantly (at the 5% level) positive value of 0.094 for variable RELREGU indicates that margin trading regulation increases stock price synchronicity which leads to reduction of firms' stock price information content (measured by SPI1) by 0.094 than stock index futures regulation. Column 4 shows similar results when we use the alternative stock price synchronicity measure SPI2. Firms exposed to both margin trading and stock index futures

[14] We exclude the sample firms that are not exposed to marginal trading or stock index features selling regulations and firms exposed to both marginal trading and stock index features selling regulations.

regulations are compared with firms exposed to either margin trading or stock index futures regulation and the results are reported in Columns 5 through 8. The significantly positive coefficients of RELREGU in these columns indicate that margin trading and stock index futures regulations jointly exert higher effect than either margin trading or stock index futures regulation alone on firms' stock price synchronicity measured by either SPI1 or SPI2. The differential impact is stronger and more evident for firms with stock index futures regulation than firms are exposed to the margin trading, which is consist with the results shown in Columns 3 and 4. Therefore, these regression results present oppose evidence to the second hypothesis. Hence, this results evidence that the margin trading regulation has reduced more firm's stock price information content than the stock index futures regulations do.

*5.3.2 Quasi-natural experiment result-**Robustness checks for endogeneity***

Taking advantage of the staggered margin trading and stock index futures introductions in Chinese stock markets as a natural experiment, we use quasi-natural experiment approach to further examine the effect of margin trading and stock index futures on firm stock price synchronicity (SPI). Essentially, using the introduction of margin trading and stock index futures as an experiment or event, we examine how firm SPI has change before and after the event for the same firms. Table 5 reports the regression results of the quasi-natural experiment using SPI1 as the measure of stock price synchronicity.

<Insert Table 5 here>

Column 1 of the table shows that the regression coefficient value of POST has a value of 0.175 and is significant at the 1% level. This indicates that firms' stock price synchronicity (SPI) has increased by 0.175 after the firms are allowed to have margin trading when compared with the firms prior to margin trading. Column 2 of the table shows that the regression coefficient value of

POST has a value of 0.145 and is significant at the 1% level. This indicates that firms' stock price synchronicity (SPI) has increased by 0.145 after the firms are included in the stock index futures regulation when compared with the firms prior to the inclusion. Column 3 of the table shows that the regression coefficient value of POST has a value of 0.149 and is significant at the 1% level. This indicates that firms' stock price synchronicity (SPI) has increased by 0.149 after the firms are allowed margin trading and included in the stock index futures when compared with the firms prior. These results are consistent with the regression results in Table 4, providing further support to the robustness of the testing results and evidence that margin trading and stock index futures regulations lead to increase firm stock price synchronicity resulting reduction of firm's stock price information content in the market.

5.3.3 Result of cross-sectional analyses

Tables 6 through 8 present the regression results of sample firm differences on the stock price synchronicity (SPI). Specifically, we explore how the effect of margin trading and stock index futures regulations on SPI may be affected by the sample firm differences in (1) firm characteristics (2) firm's activities and (3) firm's institutional environment.

Table 6 shows the effect of margin trading and stock index futures regulations on SPI when the whole sample is split into two groups by three firm level characteristics. Columns A1 to A4 of the table compare the results between SOE and non-SOE firms; Columns B1 to B4 of the table compare the results between firms with political connections with firms without political connections; and Columns C1 to C4 of the table compare the results between firms with male-CEO/chairperson with firms and firms with female-CEO/chairperson.

<Insert Table 6 here>

The regression coefficients of REGU1, REGU2, and REGU3 in both Columns A1 and A2 are all significant at either 1% or 5% levels. These results indicate that margin trading and stock index futures regulations leads to increase stock price synchronicity (SPI). They are consistent with the empirical results from baseline regression results, although the positive effect is slightly greater for the SOE firms. Columns A3 and A4 shows the differential effect when firms are exposed to only margin trading are compared with firms with only stock index futures. The significantly positive coefficients of RELREGU indicate that margin trading exerts great effect on firm SPI than stock index futures and are consistent with the results for the baseline analysis. The larger coefficient value in Column A3 implies and this differential effect is stronger for SOE firms than non-SOE firms.

Similarly, the regression coefficients of REGU1, REGU2, and REGU3 in both Columns B1 and B2 are all significant at either 1% or 5% levels. These results indicate that margin trading and stock index futures regulations increase firm stock price synchronicity (SPI). They are consistent with the empirical results from baseline regression results, although the positive effect is slightly greater for firms with political connections. Columns B3 and B4 show the differential effect when firms are expose to only margin trading regulation are compared with firms are exposed to only stock index futures regulation. The significantly positive coefficients of RELREGU indicate that margin trading regulation exerts a greater effect on firm SPI than stock index futures regulation, which is consistent with the results for the baseline analysis. The larger coefficient value in Column A3 implies, and this differential effect is stronger for firms with political connections than firms without political connections.

All the regression coefficients of REGU1, REGU2, and REGU3 in Column C2 are significant at the 1% level, all the regression coefficients of REGU1 in Column C1 are not

significant at the 5% level. Therefore, for firms with male-CEO/chairperson, the regression results are essentially the same as those for the baseline analysis. That is, margin trading and stock index futures regulations leads to increase firm stock price synchronicity (SPI). In addition, the differential effect between margin trading and stock index futures regulations is insignificant for firms with female-CEO/chairperson and significant at the 5% level for firms with male-CEO/chairperson, as evidenced in Columns C3 and C4.

In sum, Table 6 results supported that the margin trading and stock index futures regulations leads to increase firm stock price synchronicity (SPI) and their effect is grater for SOEs, politically connected firms and firms with male-CEO/chairperson than their counterparts. Hence, the regulations lead to reduce the release of firm's stock price information content to the market for SOEs, politically connected firms and firms with male-CEO/chairperson than their counterparts.

Table 7 shows the effect of margin trading and stock index futures regulations on SPI when the whole sample is split into two groups by the firm's two main activities. Columns A1 to A4 of the table compare the results between domestic-listed firms and cross-listed firms and Columns B1 to B4 of the table compare the results between firms with M&A and with firms without M&A.

<Insert Table 7 here>

In Columns A1 and A3 of Table 7 show the regression results for firms that are cross-listed in Hong Kong. Columns A2 and A4 of the table show the regression results for firms that are not cross-listed. All four coefficients for the the REGUs and one RELREGU variables are positive and significant at the 1%, 5%, or 10% level. These results clearly indicate that the empirical evidence from the baseline analysis is essentially due to firms that are only listed in mainland China. In both Columns B1 and B2, one or more coefficients of REGU1, REGU2, and REGU3

are significant at the 1% level. These results indicate that margin trading and stock index futures regulations seem to have a greater effect on firms' SPI for firms those with M&A than for those without M&A activities. Columns B3 and B4 show the differential effect is small and weak for firms with M&A and is not significant at all for firms without M&A activities.

In sum, Table 7 results supported that the margin trading and stock index futures regulations leads to increase firm stock price synchronicity (SPI) and their effect is grater for the mainland firms without cross listed other markets and firms those had M&A activities than their counterparts. Hence, these regulations lead to reduce the release of firm's information content to the local market for mainland firms with cross listed and firms those had M&A activities than their counterparts.

Table 8 shows the effect of margin trading and stock index futures regulations on SPI when the whole sample is split into two groups by three institutional characteristics in China. Columns A1 to A4 of the table compare the results between firms in regions of high institutional efficiency and firms in regions of low institutional efficiency; Columns B1 to B4 of the table compare the results between firms in region of high marketization improvements and low improvements; and Columns C1 to C4 of the table compare the results between firms in high law enforcement regions and firms in low law enforcement regions.

<Insert Table 8 here>

All the regression coefficients of REGU1, REGU2, and REGU3 in both Columns A2 and A1 except the one for REGU2 in Column A2 are significant at either the 1% level or the 5% level. These results indicate that margin trading and stock index futures regulations seem to have greater effect on firms' SPI for firms in regions of low institutional efficiency than for firms in regions of

high institutional efficiency. Columns A3 and A4 show that the differential effect is smaller and weaker for firms in regions of high institutional efficiency than for firms in regions of low institutional efficiency. The regression coefficients of REGU1, REGU2, and REGU3 in Columns B1 and B2 are all significant at either the 1% or the 5% levels. These results indicate that margin trading and stock index futures regulations lead to increase firm SPI. They are consistent with the empirical results from baseline regression results, although the positive effect is somewhat greater for firms in areas of high involvement in government regulation. Columns B3 and B4 show the differential effect is positive and significant at the 5% level for firms in high involvement of government regulations regions and is not significant for firms in low improvements regions. The most regression coefficients of REGU1, REGU2, and REGU3 in both Columns C1 and C2 and C2 are significant at the 1% level with higher positive values in Column C1. These results indicate that margin trading and stock index futures regulations seem to have greater effect on firms' SPI for firms in high law enforcement regions than for firms in low law enforcement regions. Columns C3 and C4 show the differential effect is positive and significant at the 5% level for firms in low law enforcement regions and is not significant for firms in high law enforcement regions.

In summary, margin trading and stock index futures regulations regulation leads increase the SPI, leading to reduce the release of information and stock price information content which is prominent in firms are in the regions of low institutional efficiency and low marketization (i.e., high government intervention) and low legal enforcement.

6. Conclusions

We investigate the effect of margin trading and stock index futures regulations on firm stock price synchronicity (SPI) individually and jointly in this research. Further, we analyze the

moderating effects of selected institutional characteristics on the relationships between margin trading and stock index futures regulations and the SPI. Our study finds an increase in firm stock price synchronicity after firms are exposed to margin trading and included in stock index futures regulations, which implies a reduction in stock price information. This finding supports an alternative view that margin trading and stock index futures regulations could have distorted market mechanisms and impeded information dissemination, encouraging the misallocation of resources (Coffee, 1984, 2001; Black, 2001). We find that margin trading is more likely to have a stronger effect on SPI than stock index futures because margin trading is more informative than stock index futures in the cash market. Further, SPI increases where firms are exposed to both margin trading and stock index futures jointly. These findings support the theory of regulatory arbitrage. Studies of Huang et al., (2019), Lu and Lu, (2017) and Sheng, (2019) highlighted that margin trading regulation and government interventions might have caused a crisis.[15]

This study found that margin trading and stock index futures regulations effects were greater for state-owned enterprises (SOEs), politically connected firms, and firms with male-CEO/chairperson than their counterparts. As a result, the regulations reduce the release of firm information to the market for these groups more than for other firms. These regulations have led to an increase in stock price synchronicity (SPI) for mainland firms with cross-listings and M&A activities, and this effect is greater than for other firms. It is also found that the effects of these regulations especially prominent in firms located in regions with low institutional efficiency, low marketization, and low legal enforcement.

[15] This crisis is known as the Shanghai Stock Exchange Composite Index plunged over 40% from 12th June 2015 within less than 60 trading days, wiping out over RMB21 trillion in share value, equivalent to over 30% of China's GDP in 2015. More than 50% of all the listed companies in China (over 1440 listed firms) suspended the trading in July 2015 (Jiang and Liu, 2015).

While we acknowledge that the information content is lower in China than in developed markets (Morck et al., 2000). The findings of this study provide some evidence about the effects of margin trading and stock index futures regulations which lead to further reduction of information content in China. Hence, we consider that these results provide significant guidance to the market regulators and policymakers formulating of these regulations and investors on their decision making on stocks which expose to these regulation.

References

Alexander, G.J., Ors, E., Peterson, M.A., Seguin, P.J., 2004. Margin regulation and market quality: a microstructure analysis. Journal of Corporate Finance 10, 549–574.

Abreu, D., Brunnermeier, M.K., 2002. Synchronization risk and delayed arbitrage. J. Financ. Econ. 66, 341–360.

Bae, K.H., Kim, J.M., Ni, Y., 2013. Is Firm-Specific Return Variation a Measure of Information Efficiency? International Review of Finance, 13, 407–45.

Becker, Gary S.,1968. Crime and Punishment: An Economic Approach, Journal of Political Economy 76, 169-217

Berkman, H., Brailsford, T., Frino, A., 2005. A note on execution costs for stock index futures: Information versus liquidity effects. Journal of Banking and Finance, 29, 565–577.

Bessembinder, H., Seguin, P. L., 1992. Futures-trading activity and stock price volatility. Journal of Finance, 47, 2015–2034.

Bhojraj, S., Bloomfield, R.J., Tayler, W.B., 2009. Margin trading, overpricing, and synchronization risk. Rev. Financ. Stud. 22, 2059–2085.

Black, B., 2001. The legal and institutional preconditions for strong securities markets. UCLA Law Rev. 48, 781-858.

Boehmer, E., Wu, J., 2013. Short selling and the price discovery process. Review of Financial Studies, 26, 287–322.

Boehmer, E., Jones, C.M., Zhang, X., 2008. Which shorts are informed? Journal of Finance, 63, 491–527.

Booth, G., So, R., Tse, Y., 1999. Price discovery in the German equity index derivatives market. Journal of Futures Markets, 19, 619–643.

Boubaker, S., Mansali, H., Rjiba, H., 2014. Large controlling shareholders and stock price synchronicity. Journal of Banking & Finance 40, 80-96.

Buckley, P.J., Wang, C., Clegg, J. (2010). The Impact of Foreign Ownership, Local Ownership and Industry Characteristics on Spillover Benefits from Foreign Direct Investment in China. In: Foreign Direct Investment, China and the World Economy. Palgrave Macmillan, London. https://doi.org/10.1057/9780230248328_14

Bris, A., Goetzmann, N.W., Zhu, N., 2007. Efficiency and the bear: short sales and markets around the world. J. Finance 62, 1029–1079.

Chang, E.C., Luo, Y., Ren, J., 2014. Short-selling, margin-trading, and price efficiency: Evidence from the Chinese market. Journal of Banking & Finance, 48, 411–424.

Chang, E.C., Cheng, J.W., Yu, Y., 2007. Short-sales constraints and price discovery: evidence from the Hong Kong market. The Journal of Finance 62 (5), 2097–2121.

Chan, K., Hameed, A., 2006. Stock price synchronicity and analyst coverage in emerging markets. Journal of Financial Economics 80 (1), 115–147.

Chan, K., Chan, Y.C., 2014. Price Informativeness and Stock Return Synchronicity: Evidence from the Pricing of Seasoned Equity Offerings. Journal of Financial Economics, 114, 36–53.

Chen, Y., Shen, C., Lin, C., 2014. The Benefits of Political Connection: Evidence from Individual Bank-loan Contracts. Journal of Financial Services Research 45(3), 287-305

Chen, J., Hong, H., Stein, J.C., 2002. Breadth of ownership and stock returns. Journal of Financial Economics 66 (2–3), 171–205.

Chen, J., Kadapakkam, P.-R., Yang, T., 2016. Short selling, margin trading, and the incorporation of new information into prices. Int. Rev. Financ. Anal. 44, 1–17.

Chen, Z., Huang, Y., Kusnadi, Y., Wei， K.C., 2017. The real effect of the initial enforcement of insider trading laws J. Corp. Finan., 45, 687-709.
Chen, H., Han, Q., Li, Y., Wu, K., 2013. Does index futures trading reduce volatility in the Chinese stock market? A panel data evaluation approach. Journal of Futures Market 33 (12), 1167–1190.
Chen, C.X., Rhee, S.G., 2010. Short sales and speed of price adjustment: Evidence from the Hong Kong stock market. Journal of Banking and Finance, 34, 471–483.
Choi H, Subrahmanyam A., 1994. Using intraday data to test for effects of index futures on the underlying stock markets. J Futures Mark 14, 293–322
Chowdhry, B., Nanda, V., 1998. Leverage and market stability: the role of margin rules and price limits The Journal of Business, 71 (2), 179-210
Christophe, S.E., Ferri, M.F.,Hsieh, J., 2010. Informed trading before analyst downgrades: Evidence from short sellers. Journal of Financial Economics 95(1), 85-106
Coffee, J., 1984. Market failure and the economic case for a mandatory disclosure system. Law Rev. 70, 717-753.
Coffee, J., 2001. The rise of dispersed ownership: the roles of law and the state in the separation of ownership control. Yale Law Rev. 111, 1–82.
Crawford S.S., Roulstone, D.T., 2012. So E C. Analyst initiations of coverage and stock return synchronicity. The Accounting Review 87(5), 1527-1553.
Damodaran, A., 1990. Index futures and stock market volatility. Review of Futures Markets 9 (2), 442-457
Danthine, J., 1978. Information, futures prices, and stabilizing speculation. Journal of Economic Theory, 17, 79–98.
Dasgupta, S., Gan, J., Gao, N., 2010. Transparency, Price Informativeness, and Stock Return Synchronicity: Theory and Evidence. Journal of Financial and Quantitative Analysis 45, 1189–220.
Dechow, P.M., Hutton, A.P., Meulbroek, L., Sloan, R.G., 2001. Short-sellers, fundamental analysis, and stock returns. J. Financ. Econ. 61, 77–106.
Desai, H., Krishnamurthy, S., Venkataraman, K., 2006. Do Short Sellers Target Firms with Poor Earnings Quality? Evidence from Earnings Restatements. Review of Accounting Studies volume, 11, 71-90
Diamond, D.W., Verrechia, R. E., 1987. Constraints on short-selling and asset price adjustment to private information. J. Financial Econ. 18, 277–311.
Ebrahim, M. S., Girma, S., Shah, M. E., & Williams, J., 2014. Dynamic
capital structure and political patronage: The case of Malaysia. International Review of Financial Analysis, 31, 117-128.
Fama, E., Fisher, L., Jensen, M., Roll, R., 1969. The adjustment of stock prices to new information. International Economic Review, 10, 1–21.
Fama, E.F., 1970. Efficient capital markets: a review of theory and empirical work. J. Finance 25 (2), 383–417.
Fan, G., Wang, X.L., Zhu, H.P., 2012. NERI Index of Marketization of China's Provinces: 2012 Report[R]. Chinese Edition, Economic Science Press, Beijing, China.
Frijin, B., Tse, Y. 2015. The Informativeness of trades and quotes in the FTSE 100 index futures market, The Journal of Futures Markets, 35 (2), 105–126.
Fung, J.K., Draper, P., 1999. Mispricing of index futures contracts and short sales constraints. Journal of Futures Markets, 19(6), 695–715.
Fung, J.K., Jiang, L., 1999. Restrictions on short-selling and spot-futures dynamics. Journal of Business Finance & Accounting 26(1-2), 227–248.
Glaeser, E., Shleifer, A., 2001. A reason for quantity regulation. Am. Econ. Rev.Papers Proc. 91, 431–435.
Gammill J., Perold, A., 1989. The changing character of stock market liquidity. J Portf Manage 15,13–18
Grossman, S. J., Stiglitz, J., 1980. On the impossibility of informationally efficient markets, American Economic Review 70, 393– 408.
Grossman, S. 1977. The Existence of Futures Markets, Noisy Rational Expectations and Informational Externalities. The Review of Economic Studies 44(3), 431- 449.
Gul FA, Kim JB, Qiu AA., 2010. Ownership concentration, foreign shareholding, audit quality, and stock price synchronicity: Evidence from China. Journal of financial economics 95(3),425-442.
Gul FA, Srinidhi B, Ng AC. 2011. Does board gender diversity improve the informativeness of stock prices? Journal of Accounting and Economics 51(3), 314-338.
Hair, J.F., Black, W.C., Babin, B.J., Anderson, R.E., Tatham, R.L., 2006. Multivariate Data Analysis, 6th Edition. Pearson Prentice-Hall, Upper Saddle River, NJ.
Hardouvelis, G.A., Peristiani, S., 1992. Margin requirements, speculative trading, and stock price fluctuations: the case of Japan. The Quarterly Journal of Economics 107 (4), 1333–1370.
Hansen RG., 1987. A theory for the choice of exchange medium in mergers and acquisitions. J Bus 60:75–95

Harrison, T., 2017. NGOs and Personal Politics: The Relationship between NGOs and political leaders in West Bengal, India. World Development, 98, 485–496.
Hay, J., Shleifer, A., 1998. Private enforcement of public laws: a theory of legal reform. Am. Econ. Rev.Papers Proc. 88, 398–403.
Hirose, T., Kato, H.K., Bremer, M., 2009. Can margin traders predict future stock returns in Japan? Pacific-Basin Finance Journal, 17, 41–57
Ho, K. Y., Shi, Y., Zhang, Z., 2017. Does news matter in China's foreign exchange market? Chinese RMB volatility and public information arrivals. International Review of Economics & Finance, 52, 302–321.
Hou, Y., Li, S., 2013. Price discovery in Chinese stock index futures market: new evidence based on intraday data. Asia-Pac. Financial Mark. 20 (1), 49–70.
Hou, Y., Li, S., 2014. The impact of the CSI 300 stock index futures: positive feedback trading and autocorrelation of stock returns. International Review of Economics & Finance 33, 319–337.
Huang Y, Miao J., Wang P., 2019. Saving China's stock market? IMF Economic Review 67(2), 349–394.
Jain, A., Jian, P.K., McInish, T.H., McKenzie, M. 2013. Worldwide reach of short selling regulations. Journal of Financial Economics 109, 177-197
Jiang F., Liu C., 2015. The bailout struggles of a-share market (A-Gu Jiushi Kuzhan). Caixin Weekly (Caixin Zhoukan) (27). Available at https://weekly.caixin.com/2015-07-10/100828060.html
Kempf, A., 1998. Short selling, unwinding, and mispricing. Journal of Futures Markets, 18(8), 903–923.
La Porta, R., Lopez-de-Silanes, F., Shleifer, A., 2006. What works in securities laws? J. Finance 61, 1–32.
Lang,M.H., Lins, K.V., Miller, D.P., 2004. Concentrated control, analyst following and valuation: do analysts matter most when investors are protected least? J. Account. Res. 42, 581-623
Liu. S., 2008. Index Futures and Predictability of the Underlying Stocks' Returns: The Case of the Nikkei 225, Journal of Financial Service Research 34, 77-91.
Li, R., Li, R., Li, J., Yuan, J., 2017. Short-sale prohibitions, firm characteristics and stock returns: evidence from Chinese market, China Finance Review International 7, 407–428
Li, B., Rajgopal, S., Venkatachalam , M., 2014. R2 and Idiosyncratic Risk Are Not Interchangeable, The Accounting Review, 89, 2261–95.
Lin, R., Xie, Z., Li, Y., Wang, C. 2015. Political Connection, Environmental Disclosure and Government Subsidy-The Perspective of Resource Dependence Theory. Journal of Public Management, 2, 30-41. (in Chinese)
Lv, D., Wu, W., 2019. Margin trading and price efficiency: Information content or price-adjustment speed? Accounting and Finanance, https://doi.org/10.1111/acfi.12403.
Lu L., Lu L 2017. Unveiling China's stock market bubble: margin financing, the leveraged bull and governmental responses. Journal of International Banking Law and Regulation 32(4), 146–160.
Miao, H., Ramchandera,S. Wang,T., Yang, D. (2017) Role of index futures on China's stock markets: Evidence from price discovery and volatility spillover. Pacific-Basin Finance Journal 44, 13-26.
Morck, R., Yeung, B., & Yu, W. (2000). The information content of stock markets: why do emerging markets have synchronous stock price movements?. Journal of financial economics, 58(1-2), 215-260.
Neal, R.,1996. Direct tests of index arbitrage models. Journal of Financial and Quantitative Analysis, 541–562.
Powers, M.J., 1970. Does futures trading reduce price fluctuations in the cash markets? American Economic Review 60 (3), 460–464.
Pownall, G., Simko, P.J., 2005. The information intermediary role of short sellers. Account. Rev. 80, 941–966.
Ross, S. 1977. Disclosure regulation in financial markets: Implication of modern finance theory and signaling theory F. Edwards (Ed.), Issues in Financial Regulation, McGraw-Hill, New York (1979)
Reese, W.A., Weisbach, M.S., 2002. Protection of minority shareholder interests, cross-listings in the United States, and subsequent equity offerings J. Financ. Econ. 66, 65-104
Seguin, P.J., Jarrell, G.A., 1993. The irrelevance of margin: evidence from the crash of'87. Journal of Finance 48, 1145–1173.
Seguin, P.J., 1990. Stock volatility and margin trading. Journal of Monetary Economics, 26, 101–121.
Saffi, P.A., Sigurdsson, K.., 2011. Price efficiency and short selling. Review of Financial Studies, 24(3), 821–852.
Sheng J., 2019. The a-share bailout and the role of China's securities watchdog in regulating a policy-driven market. In: Avgouleas E and Donald DC (eds) The Political Economy of Financial Regulation. Cambridge: Cambridge University Press, 479–509.
Shyu, Y-W., Chan, K. C. Liang 2018. Spillovers of price efficiency and informed trading from short sales to margin purchases in absence of uptick rule. Pacific-Basin Finance Journal 50 , 163–183
Subrahmanyam , A., 1991. A theory of trading in stock index futures. Rev Financ Stud 4, 17–51

Upadhyay, A. and Zeng, H., 2014. Gender and ethnic diversity on boards and corporate information environment. Journal of Business Research, 67(11), pp.2456-2463.
Yang, J., Yang, Z., Zhou, Y., 2012. Intraday price discovery and volatility transmission in stock index and stock index futures markets: evidence from China. Journal of Futures Market 32 (2), 99–121.
Zhong M.,Ali F.D, Rafael Otero 2004. Price discovery and volatility spillovers in index futures markets: Some evidence from Mexico. Journal of Banking & Finance 28, 3037–3054

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Table1. Description of sample selection

Procedure	Observations Type	Number
Initial Sample	Firm-day	6298158
(-)observations traded abnormally	Firm-day	5993193
(-)observations traded for less than 200 days	Firm-day	5276835
(-)observations of firms' list year	Firm-day	5189269
Sample after estimating synchronicity	Firm-year	21760
(-)observations missing data for variables used in baseline regression	Firm-year	13851

Note: Table shows the procedure of selecting the sample for this study. The final sample includes 13851 firm-year observations.

Table 2. Descriptive statistics of the variables in the baseline regression analysis.

Variable	N	Mean	SD	Min	P25	P50	P75	Max
SPI1	13851	-0.297	0.727	-2.331	-0.79	-0.261	0.24	1.333
SPI2	13851	-0.561	0.739	-3.813	-1.066	-0.523	-0.016	1.553
REGU1	13851	0.142	0.349	0	0	0	0	1
REGU2	13851	0.029	0.168	0	0	0	0	1
REGU3	13851	0.105	0.306	0	0	0	0	1
AGE	13851	10.429	6.02	1	5	10	15	24
SIZE	13851	22.194	1.132	19.822	21.372	22.064	22.885	26
LEV	13851	0.453	0.196	0.053	0.299	0.457	0.608	0.887
ROE	13851	0.077	0.091	-0.558	0.033	0.074	0.123	0.368
VROE	13851	0.046	0.053	0.001	0.014	0.028	0.057	0.478
MTB	13851	0.004	0.002	0.001	0.002	0.003	0.004	0.018
VOL	13851	5.289	3.56	0.465	2.595	4.342	7.104	20.017
INDNUM	13851	453.819	383.875	12	123	348	850	1272
INDSIZE	13851	28.499	1.278	24.021	27.795	28.561	29.591	30.266
DD	13851	0.736	0.441	0	0	1	1	1
DIVER	13851	0.385	0.487	0	0	0	1	1
LMVE	13851	15.317	0.934	12.908	14.676	15.274	15.907	18.121
MERGER	13851	0.763	0.425	0	1	1	1	1
SOE	13851	0.632	0.731	0	0	0	1	1
INST	13851	0.074	0.075	0	0.016	0.05	0.109	0.37
TURN	13851	25.402	41.513	0.076	4.026	11.12	28.128	441.597
RET	13851	0.077	0.431	-0.637	-0.201	-0.022	0.237	2.206

ISSUE	13851	0.325	0.469	0	0	0	1	1
LIQUIDITY	13851	-0.049	0.118	-0.937	-0.063	-0.02	0.001	0.35

Note: Table shows the descriptive statistics of the variables used in the baseline regression analysis. N, Mean, SD, Min, P25, P50, P75, Max represents the number, mean value, standard deviation, minimum value, the first quartile, median, the third quartile, and maximum value of each variable respectively.

Table 3. Correlation matrix

Variables		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	X	Y
SPI1	A	**1**	**0.8729**	**0.0397**	**0.0724**	**0.1121**	**0.0457**	**0.1518**	**0.0433**	**0.0399**	-0.0007	**-0.096**	**0.0914**	**-0.1302**	**-0.1386**	**0.0404**	**0.2149**	**0.1229**	-0.0039	**0.1263**	**0.0669**	**-0.0523**	**0.0233**	**-0.0434**	**-0.0218**
SPI2	B	**0.8598**	**1**	**0.0687**	**0.0664**	**0.1130**	**0.0993**	**0.1664**	**0.0774**	**-0.0450**	**0.0191**	**-0.1999**	**0.0313**	**-0.0495**	**-0.0188**	0.0029	**0.2048**	**0.0713**	**-0.0196**	**0.149**	**-0.0215**	**-0.1028**	**-0.0397**	**-0.084**	**-0.1467**
REGU1	C	**0.0372**	**0.0719**	**1**	**-0.0703**	**-0.1391**	**0.0439**	**0.2086**	**0.0045**	**0.0314**	**-0.0255**	0.0127	**-0.0525**	**0.0414**	**0.1125**	**0.0545**	**-0.2722**	**0.3196**	0.0081	-0.0084	0.0207	**-0.2032**	**-0.0521**	-0.0075	**0.1192**
REGU2	D	**0.0665**	**0.0632**	**0.0703**	**1**	**-0.0592**	**0.1116**	**0.1707**	**0.0676**	**0.0539**	0.0107	**-.00287**	**-0.0837**	0.0172	0.0055	**0.0196**	**0.0647**	**0.1664**	0.0185	**0.0680**	**0.0660**	**-0.1426**	**-0.0174**	**-0.0173**	0.0011
REGU3	E	**0.1085**	**0.1099**	**-0.1391**	**-0.0592**	**1**	**0.3242**	**0.4039**	**0.1087**	**0.0742**	-0.0021	**-0.1296**	**-0.1675**	**0.0295**	**0.1114**	**0.0833**	**-0.1385**	**0.4464**	0.0129	**0.1472**	**0.1702**	**-0.3630**	**-0.0548**	**-0.0345**	**0.1182**
AGE	F	**0.0307**	**0.0912**	**0.0406**	**0.1103**	**0.3290**	**1**	**0.3459**	**0.3128**	**-0.0781**	**0.0408**	**-0.1694**	**-0.1421**	**-0.1466**	**-0.0346**	**-0.1581**	**-0.0814**	**0.3123**	**-0.0201**	**0.3749**	**-0.0195**	**-0.3925**	**-0.0343**	**-0.1249**	0.0013
SIZE	G	**0.1445**	**0.1554**	**0.1554**	**0.1932**	**0.1661**	**0.3255**	**1**	**0.5024**	**0.1332**	**0.0321**	**-0.4344**	**-0.3515**	**-0.0517**	**0.1419**	**0.1401**	**-0.1383**	**0.6811**	**0.0472**	**0.2417**	**0.2085**	**-0.6825**	**-0.0665**	**-0.0452**	**0.1036**
LEV	H	**0.0401**	**0.0767**	**0.0059**	**0.0686**	**0.1070**	**0.3011**	**0.5044**	**1**	**-0.046**	**0.1716**	**-0.1299**	**-0.0698**	**-0.1399**	-0.013	**-0.1802**	**0.1278**	**0.1216**	**0.047**	**0.2568**	0.0115	**-0.2253**	**0.0244**	**0.1184**	**-0.0243**
ROE	I	**0.0281**	**-0.0523**	0.0199	**0.0530**	**0.0667**	**-0.0589**	**0.1055**	**-0.0864**	**1**	**-0.0336**	**0.21**	**-0.1415**	**-0.0845**	**-0.0883**	**0.4051**	**0.074**	**0.2318**	**0.0315**	**-0.06**	**0.3413**	**-0.0631**	**0.1883**	**0.0549**	**0.1444**
VROE	J	**-0.0194**	0.0053	-0.0183	0.0111	-0.034	**0.0797**	0.0249	**0.2004**	**-0.2306**	**1**	**0.0636**	**0.0465**	-0.0037	-0.0079	**-0.2649**	**0.1123**	**-0.0345**	**0.0284**	-0.005	-0.0124	**0.0215**	**-0.0282**	0.0079	**-0.0621**
MTB	K	**-0.0749**	**-0.1814**	0.0097	-0.0134	**-0.0916**	**-0.1183**	**-0.3804**	**-0.0847**	**0.1574**	**0.1079**	**1**	**0.3721**	**0.0425**	**-0.0705**	**-0.0867**	**-0.0321**	**0.0877**	**0.0733**	**-0.1409**	**0.1835**	**0.3868**	**0.3279**	**0.0798**	**0.3552**
VOL	L	**0.0889**	**0.0262**	**-0.0436**	**-0.0748**	**-0.1448**	**-0.1363**	**-0.3249**	**-0.0627**	**-0.1166**	**0.051**	**0.2993**	**1**	**0.0236**	**-0.0393**	**-0.1348**	0.0055	**-0.2635**	**0.0564**	**-0.0683**	**-0.1206**	**0.7674**	**0.2698**	**0.0411**	**0.3496**
INDNUM	M	**-0.147**	**-0.0538**	**0.0469**	-0.0157	**0.0362**	**-0.1426**	**-0.0239**	**-0.1288**	**-0.0767**	-0.0116	**0.0243**	0.0027	**1**	**0.8021**	**0.0526**	**-0.2074**	**0.0537**	0.0035	**-0.1465**	**0.0194**	**0.0334**	**-0.0399**	0.0138	**0.0449**
INDSIZE	N	**-0.1372**	-0.0032	**0.1010**	0.0162	**0.1072**	-0.0176	**0.1712**	0.0054	**-0.0524**	-0.0086	**-0.0779**	**-0.0663**	**0.7782**	**1**	**0.0743**	**-0.3205**	**0.1757**	0.0116	**-0.0685**	**-0.0215**	**-0.1077**	**-0.0835**	-0.0073	**0.0311**
DD	O	**0.0413**	0.0012	**0.0545**	**0.0196**	**0.0883**	**-0.1499**	**0.135**	**-0.1825**	**0.4146**	**-0.3222**	**-0.0987**	**-0.1258**	**0.0485**	**0.081**	**1**	**-0.117**	**0.1663**	**0.0207**	**-0.065**	**0.1877**	**-0.0799**	**0.0248**	0.0105	**0.0604**
DIVER	P	**0.2243**	**0.2127**	**-0.2722**	**0.0647**	**-0.1385**	**-0.0972**	**-0.1346**	**0.1246**	**0.0625**	**0.0828**	**-0.0269**	0.0139	**-0.2149**	**-0.2777**	**-0.117**	**1**	**-0.2947**	**-0.0561**	**0.1551**	-0.0037	**0.1287**	**0.0959**	**0.0304**	**-0.236**
LMVE	Q	**0.0968**	**0.043**	**0.2981**	**0.1523**	**0.4801**	**0.3013**	**0.7006**	**0.1337**	**0.2252**	**-0.0374**	**0.1197**	**-0.2481**	**0.0609**	**0.1675**	**0.1652**	**-0.2856**	**1**	**0.0772**	**0.1413**	**0.3611**	**-0.6582**	**0.0984**	**-0.066**	**0.3713**
MERGER	R	-0.0084	**-0.0234**	**0.0081**	**0.0185**	**0.0129**	**-0.0202**	**0.049**	**0.0482**	**0.0289**	**0.0202**	**0.0634**	**0.0486**	0.004	0.0063	**0.0207**	**-0.0561**	**0.0773**	**1**	**-0.1213**	**0.0692**	-0.0009	**0.0523**	**0.0383**	**0.0799**
SOE	S	**0.1186**	**0.1422**	**-0.0021**	**0.0676**	**0.1454**	**0.3345**	**0.2338**	**0.2392**	**-0.0578**	**0.0404**	**-0.0876**	**-0.0578**	**-0.1041**	**-0.022**	**-0.0578**	**0.1458**	**0.1547**	**-0.1161**	**1**	0.0003	**-0.1684**	**0.0205**	**-0.0684**	**-0.0186**
INST	T	**0.0312**	**-0.0637**	**0.0036**	**0.0521**	**0.1237**	**-0.024**	**0.1547**	**0.0171**	**0.309**	**-0.0522**	**0.1959**	**-0.1336**	**-0.0184**	**-0.0594**	**0.1637**	**0.0482**	**0.3104**	**0.0567**	0.0037	**1**	**-0.1107**	**0.1773**	**0.0503**	**0.1976**
TURN	U	**-0.0475**	**-0.0953**	**-0.1502**	**-0.0797**	**-0.1765**	**-0.3569**	**-0.4387**	**-0.1868**	**-0.0191**	0.0155	**0.2013**	**0.6078**	0.0163	**-0.0738**	-0.011	**0.0897**	**-0.4974**	**-0.0301**	**-0.1498**	**-0.1011**	**1**	**0.1944**	**0.0889**	**0.1035**
RET	V	0.0014	**-0.0725**	**-0.0484**	**-0.0228**	**-0.0705**	**-0.0727**	**-0.0779**	0.0131	**0.1786**	-0.0112	**0.3746**	**0.3109**	**-0.0474**	**-0.0703**	0.0156	**0.0955**	**0.1083**	**0.0587**	0.0054	**0.1913**	**0.1694**	**1**	**0.0946**	**0.3997**
ISSUE	X	**-0.0331**	**-0.0854**	**-0.0075**	-0.0173	**-0.0375**	**-0.1254**	**-0.0366**	**0.1205**	**0.0463**	0.0006	**0.0708**	**0.0295**	0.0052	-0.0099	0.0105	**0.0304**	**-0.0625**	**0.0383**	**-0.062**	**0.0577**	**0.0789**	**0.0913**	**1**	**0.0518**
LIQUIDITY	Y	**-0.0997**	**-0.1762**	**0.1230**	**0.0345**	**0.1049**	**0.057**	**0.158**	-0.0093	**0.0959**	**-0.0498**	**0.2332**	**0.2424**	**0.0552**	**0.0674**	**0.0564**	**-0.2908**	**0.4062**	**0.0732**	**-0.0183**	**0.1108**	**0.0233**	**0.2697**	**0.0214**	**1**

Note: Bold font statistical significance at the 5% or higher levels. The coefficients of Pearson and Spearman correlations are below and above the diagonal of the Table respectively

Table 4. Regression results of MT and SIF regulations on stock price synchronicity

Variables	(1) *SPI1*	(2) *SPI2*	(3) *SPI1*	(4) *SPI2*	(5) *SPI1*	(6) *SPI2*	(7) *SPI1*	(8) *SPI2*
REGU1	0.131***	0.113***						
	(7.85)	(7.55)						
REGU2	0.095***	0.085***						
	(3.26)	(2.89)						
REGU3	0.175***	0.179***						
	(8.32)	(8.73)						
RELREGU1			0.094**	0.168***				
			(2.19)	(4.23)				
RELREGU2					0.071***	0.084***		
					(2.79)	(3.34)		
RELREGU3							0.166***	0.211***
							(4.60)	(5.88)
AGE	-0.004***	0.002**	-0.005*	0.002	-0.005**	0.004**	-0.006	-0.003
	(-3.24)	(2.05)	(-1.94)	(0.88)	(-1.98)	(2.01)	(-1.29)	(-0.63)
SIZE	0.083***	0.044***	0.056*	0.016	0.108***	0.051**	0.057	-0.028
	(6.93)	(3.96)	(1.94)	(0.55)	(4.13)	(2.04)	(1.61)	(-0.82)
LEV	-0.219***	-0.064*	-0.261***	-0.077	-0.397***	-0.254***	-0.130	0.037
	(-5.46)	(-1.66)	(-2.62)	(-0.78)	(-4.44)	(-2.73)	(-1.05)	(0.26)
ROE	0.284***	0.101*	0.428***	-0.046	0.261**	-0.136	0.304*	0.019
	(4.41)	(1.71)	(2.82)	(-0.33)	(1.99)	(-1.16)	(1.67)	(0.11)
VROE	-0.141	-0.056	-0.103	-0.289	-0.083	-0.106	0.275	0.383*
	(-1.46)	(-0.59)	(-0.42)	(-1.30)	(-0.41)	(-0.53)	(1.22)	(1.67)
MTB	-0.276***	-0.510***	-0.267***	-0.532***	-0.194**	-0.464***	-0.236**	-0.635***
	(-7.48)	(-13.61)	(-3.21)	(-5.84)	(-2.53)	(-5.38)	(-2.09)	(-5.09)
VOL	-0.003	-0.013***	-0.005	-0.013**	-0.005	-0.015***	-0.008	-0.013*
	(-1.33)	(-6.81)	(-0.87)	(-2.52)	(-1.01)	(-3.18)	(-1.11)	(-1.96)
INDNUM	0.000	0.000***	0.000**	0.000***	0.000	0.000*	-0.000	-0.000
	(1.20)	(2.66)	(2.14)	(3.04)	(1.57)	(1.92)	(-0.03)	(-0.82)
INDSIZE	-0.114***	0.105***	-0.200*	0.496***	-0.219**	0.402***	-0.387***	0.367***
	(-3.19)	(2.91)	(-1.77)	(4.78)	(-2.12)	(4.00)	(-3.14)	(3.13)
DD	0.087***	0.071***	0.063*	0.042	0.054*	0.045*	0.062*	0.077**
	(7.17)	(6.32)	(1.95)	(1.45)	(1.87)	(1.73)	(1.68)	(2.09)
DIVER	-0.007	-0.034	0.017	-0.125	0.047	0.005	0.004	-0.102
	(-0.29)	(-1.60)	(0.19)	(-1.54)	(0.59)	(0.06)	(0.04)	(-1.26)
LMVE	-0.028**	-0.070***	-0.054	-0.132***	-0.094***	-0.155***	-0.109**	-0.127***
	(-2.00)	(-5.07)	(-1.58)	(-3.84)	(-2.98)	(-4.96)	(-2.41)	(-3.00)
MERGER	-0.051***	-0.051***	-0.055**	-0.043*	-0.024	-0.023	0.020	0.026
	(-5.04)	(-5.38)	(-2.11)	(-1.71)	(-1.12)	(-1.05)	(0.67)	(0.84)
SOE	0.019**	0.023***	0.034**	0.048***	0.027*	0.027**	0.029	0.012
	(2.26)	(3.05)	(2.08)	(3.23)	(1.81)	(2.00)	(1.45)	(0.64)
INST	-0.433***	-0.926***	-0.233	-0.864***	-0.229	-0.796***	-0.303	-0.730***
	(-5.71)	(-12.68)	(-1.31)	(-5.22)	(-1.54)	(-5.76)	(-1.45)	(-3.63)
TURN	-0.001***	-0.001***	-0.001	-0.004***	-0.001	-0.005***	-0.003	-0.006***
	(-3.85)	(-6.27)	(-0.74)	(-3.88)	(-0.49)	(-4.31)	(-1.42)	(-2.62)
RET	-0.243***	-0.245***	-0.282***	-0.232***	-0.282***	-0.255***	-0.285***	-0.319***
	(-20.40)	(-20.60)	(-8.96)	(-7.19)	(-9.72)	(-8.86)	(-6.39)	(-7.09)
ISSUE	-0.023**	-0.034***	-0.021	-0.043*	-0.018	-0.036*	-0.082***	-0.065**
	(-2.32)	(-3.62)	(-0.82)	(-1.79)	(-0.85)	(-1.72)	(-2.82)	(-2.14)
LIQUIDITY	0.107**	-0.020	-0.194	-0.693**	0.019	-0.552*	0.763	0.515
	(2.26)	(-0.45)	(-0.65)	(-2.39)	(0.06)	(-1.75)	(1.52)	(1.13)
_cons	1.920**	-2.477***	4.171	-12.485***	4.224	-10.302***	9.886***	-8.227***
	(2.20)	(-2.81)	(1.37)	(-4.61)	(1.53)	(-3.88)	(2.97)	(-2.61)
N	13851	13851	2366	2366	3416	3416	1854	1854
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Cluster	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm
Adjusted R^2	0.601	0.654	0.643	0.710	0.655	0.703	0.625	0.640

Note: All variables are as defined in the Appendix. Numbers in parentheses represent *t*-values that are adjusted using standard errors corrected for clustering at the firm level. The superscripts *, **, and *** denote the 10%, 5%, and 1% levels of significance, respectively.

Table 6. Results of Quasi-Natural Experiment

	(1) Margin Trading Firms	(2) Stock Index Futures Firms	(3) Firms with Both
POST	0.175***	0.145***	0.149***
	(8.22)	(5.47)	(5.39)
AGE	-0.001	-0.001	0.002
	(-0.82)	(-0.23)	(0.44)
SIZE	0.097***	0.071***	0.103***
	(5.73)	(3.17)	(4.18)
LEV	-0.259***	-0.201**	-0.239***
	(-4.28)	(-2.39)	(-2.65)
ROE	0.293***	0.136	0.164
	(3.23)	(1.16)	(1.26)
VROE	0.063	0.141	0.287
	(0.48)	(0.88)	(1.64)
MTB	-0.284***	-0.335***	-0.247***
	(-5.19)	(-4.44)	(-2.95)
VOL	0.001	0.010**	0.007
	(0.32)	(2.03)	(1.32)
INDNUM	0.000	-0.000	-0.000
	(1.01)	(-1.05)	(-0.74)
INDSIZE	-0.120***	-0.242***	-0.238***
	(-2.59)	(-4.32)	(-4.01)
DD	0.082***	0.080***	0.085***
	(4.48)	(3.28)	(3.17)
DIVER	-0.003	-0.032	-0.029
	(-0.09)	(-0.80)	(-0.71)
LMVE	-0.025	-0.004	-0.048
	(-1.23)	(-0.16)	(-1.56)
MERGER	-0.041***	-0.012	0.001
	(-2.67)	(-0.61)	(0.05)
SOE	0.017	0.007	-0.000
	(1.54)	(0.50)	(-0.03)
INST	-0.411***	-0.334**	-0.451***
	(-3.98)	(-2.56)	(-3.36)
TURN	-0.001***	-0.003***	-0.003***
	(-3.61)	(-5.00)	(-3.78)
RET	-0.205***	-0.185***	-0.179***
	(-12.91)	(-8.86)	(-8.10)
ISSUE	-0.028*	-0.046**	-0.057***
	(-1.95)	(-2.44)	(-2.85)
LIQUIDITY	0.011	-0.063	-0.067
	(0.13)	(-0.61)	(-0.53)
_cons	1.721	5.052***	4.904***
	(1.50)	(3.47)	(3.22)
N	6619	4021	3540
Industry FE	YES	YES	YES
Year FE	YES	YES	YES
Cluster	Firm	Firm	Firm

adj. R^2	0.589	0.571	0.570

Note: Numbers in parentheses represent t-values that are adjusted using standard errors corrected for clustering at the firm level. The superscripts *, **, and *** denote the 10%, 5%, and 1% levels of significance, respectively.

Table 7. Results of Cross-sectional Variation Analyses of Ownership, Political Connection and Gender Diversity

	(A1) SOE	(A2) Non-SOE	(A3) SOE	(A4) Non-SOE	(B1) With Political Connection	(B2) Without Political Connection	(B3) With Political Connection	(B4) Without Political Connection	(C1) Female CEO or Chairperson	(C2) Male CEO or Chairperson	(C3) Female CEO or Chairperson	(C4) Male CEO or Chairperson
Variables	*SPI1*	*SPI1*	*SPI1*	*SPI1*	SPI1	SPI1	SPI1	SPI1	*SPI1*	*SPI1*	*SPI1*	*SPI1*
REGU1	0.165***	0.147***			0.138***	0.126***			0.126*	0.132***		
	(5.29)	(6.61)			(5.13)	(6.15)			(1.71)	(7.69)		
REGU2	0.110***	0.095*			0.114***	0.087**			-0.105	0.103***		
	(2.69)	(1.73)			(2.59)	(2.33)			(-0.98)	(3.44)		
REGU3	0.203***	0.176***			0.213***	0.165***			0.113	0.181***		
	(5.77)	(5.17)			(6.54)	(6.18)			(1.59)	(8.23)		
RELREGU1			0.155**	0.139**			0.170**	0.107*			0.054	0.065**
			(2.19)	(2.42)			(2.24)	(1.96)			(0.61)	(2.43)
AGE	-0.004	-0.004**	-0.005	-0.002	-0.007***	-0.003*	-0.005	-0.006*	0.001	-0.004***	0.013	-0.005*
	(-1.59)	(-2.05)	(-1.34)	(-0.38)	(-3.27)	(-1.93)	(-1.07)	(-1.72)	(0.20)	(-3.42)	(1.45)	(-1.92)
SIZE	0.075***	0.067***	0.083*	0.028	0.091***	0.070***	0.126**	0.008	0.004	0.087***	0.057	0.058*
	(3.88)	(3.78)	(1.69)	(0.56)	(4.66)	(4.75)	(2.50)	(0.23)	(0.11)	(6.99)	(0.48)	(1.94)
LEV	-0.221***	-0.189***	-0.313**	-0.313*	-0.160***	-0.239***	-0.464***	-0.125	-0.200	-0.223***	-1.052**	-0.228**
	(-3.20)	(-3.43)	(-2.06)	(-1.78)	(-2.58)	(-4.76)	(-2.80)	(-1.05)	(-1.49)	(-5.35)	(-2.45)	(-2.21)
ROE	0.441***	0.259***	0.418*	0.497**	0.327***	0.243***	0.249	0.459**	0.399	0.282***	1.061	0.421***
	(4.19)	(2.60)	(1.76)	(1.99)	(3.00)	(3.13)	(0.94)	(2.53)	(1.51)	(4.28)	(1.53)	(2.71)
VROE	-0.209	-0.169	-0.245	-0.205	-0.150	-0.167	-0.688	0.284	-0.105	-0.145	-0.124	-0.030
	(-1.31)	(-1.10)	(-0.71)	(-0.47)	(-0.96)	(-1.42)	(-1.63)	(1.03)	(-0.28)	(-1.47)	(-0.16)	(-0.12)
MTB	-0.360***	-0.238***	-0.214*	-0.342**	-0.286***	-0.285***	-0.075	-0.322***	-0.402***	-0.270***	-0.453	-0.244***
	(-5.12)	(-4.48)	(-1.75)	(-2.25)	(-4.35)	(-6.63)	(-0.44)	(-4.13)	(-3.39)	(-7.00)	(-1.41)	(-2.84)
VOL	-0.002	-0.003	0.002	-0.004	-0.003	-0.003	-0.005	-0.008	-0.002	-0.003	0.018	-0.005
	(-0.44)	(-1.04)	(0.31)	(-0.38)	(-0.97)	(-1.00)	(-0.44)	(-1.21)	(-0.33)	(-1.11)	(0.80)	(-0.82)
INDNUM	-0.000	-0.000	0.000	0.000	0.000	0.000	0.000*	0.000	-0.000	0.000	-0.000	0.000**
	(-1.48)	(-0.20)	(0.13)	(1.38)	(1.01)	(0.88)	(1.90)	(0.96)	(-0.96)	(1.42)	(-0.43)	(2.11)
INDSIZE	-0.104*	-0.170***	-0.211	-0.327**	-0.119**	-0.075	-0.189	-0.167	-0.183	-0.113***	-1.071**	-0.197
	(-1.85)	(-2.84)	(-0.97)	(-2.05)	(-2.13)	(-1.56)	(-1.14)	(-1.10)	(-1.46)	(-3.04)	(-2.54)	(-1.61)
DD	0.091***	0.109***	0.082	0.108*	0.091***	0.082***	0.054	0.063*	0.159***	0.082***	0.063	0.071**
	(4.53)	(6.22)	(1.61)	(1.95)	(4.44)	(5.45)	(0.91)	(1.82)	(3.37)	(6.63)	(0.44)	(2.14)
DIVER	-0.033	0.028	-0.236**	-0.095	0.039	-0.052*	-0.018	0.084	-0.090	0.004	0.331	0.020
	(-0.93)	(0.67)	(-2.21)	(-0.82)	(0.97)	(-1.71)	(-0.12)	(1.05)	(-1.08)	(0.18)	(0.68)	(0.22)
LMVE	-0.026	-0.044**	-0.108**	-0.054	-0.016	-0.037**	-0.042	-0.070*	0.004	-0.032**	-0.026	-0.055
	(-1.04)	(-2.22)	(-1.99)	(-0.84)	(-0.71)	(-2.05)	(-0.72)	(-1.71)	(0.10)	(-2.17)	(-0.18)	(-1.54)
MERGER	-0.025	-0.063***	-0.066	-0.020	-0.048***	-0.052***	-0.059	-0.040	-0.053	-0.050***	-0.091	-0.055**
	(-1.44)	(-4.25)	(-1.52)	(-0.47)	(-2.90)	(-4.06)	(-1.24)	(-1.29)	(-1.60)	(-4.80)	(-0.84)	(-2.07)
SOE					0.019	0.021**	-0.001	0.048**	0.047	0.015*	0.010	0.030*
					(1.44)	(2.04)	(-0.03)	(2.35)	(1.36)	(1.77)	(0.11)	(1.77)
INST	-0.256*	-0.491***	-0.185	0.121	-0.572***	-0.338***	-0.299	-0.154	-0.208	-0.443***	-0.066	-0.172
	(-1.94)	(-4.91)	(-0.79)	(0.36)	(-5.03)	(-3.50)	(-1.04)	(-0.71)	(-0.85)	(-5.61)	(-0.11)	(-0.94)
TURN	-0.002***	-0.001***	-0.003**	-0.002	-0.001***	-0.001***	-0.003	0.000	0.000	-0.001***	0.000	-0.001
	(-3.47)	(-3.35)	(-2.30)	(-0.76)	(-2.85)	(-3.02)	(-1.47)	(0.28)	(0.04)	(-4.16)	(0.05)	(-1.17)
RET	-0.219***	-0.283***	-	-	-0.235***	-0.245***	-0.281***	-0.278***	-0.371***	-0.232***	-0.506***	-0.269***
			0.291***	0.227***								
	(-10.86)	(-16.30)	(-6.38)	(-3.66)	(-12.55)	(-15.77)	(-5.26)	(-7.09)	(-8.41)	(-18.63)	(-4.07)	(-8.32)
ISSUE	-0.045**	-0.010	0.021	-0.082*	-0.000	-0.040***	0.027	-0.054*	-0.013	-0.024**	0.150	-0.034
	(-2.53)	(-0.76)	(0.61)	(-1.73)	(-0.02)	(-3.09)	(0.67)	(-1.87)	(-0.38)	(-2.25)	(1.60)	(-1.31)
LIQUIDITY	-0.048	0.265***	0.170	-0.116	0.069	0.126**	-0.450	0.043	0.482***	0.082*	-0.319	-0.230
	(-0.59)	(4.08)	(0.42)	(-0.19)	(0.86)	(2.10)	(-0.89)	(0.11)	(2.67)	(1.67)	(-0.33)	(-0.74)
_cons	2.001	3.712**	4.617	8.391*	1.746	1.334	2.358	4.336	4.863	1.852**	25.917**	4.055
	(1.43)	(2.56)	(0.80)	(1.90)	(1.27)	(1.13)	(0.52)	(1.09)	(1.57)	(2.03)	(2.18)	(1.24)
N	4572	7187	1201	727	5467	8252	927	1424	1137	12714	177	2189

Industry FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Cluster	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm
Adjusted R^2	0.581	0.607	0.654	0.611	0.586	0.615	0.593	0.684	0.607	0.601	0.710	0.639

Note: Numbers in parentheses represent t-values that are adjusted using standard errors corrected for clustering at the firm level. The superscripts *, **, and *** denote the 10%, 5%, and 1% levels of significance, respectively.

Table 8. Cross-sectional Variation of cross-listed Vs. domestic peers and M&A Vs. Non-M & A

	(A1)	(A2)	(A3)	(A4)	(B1)	(B2)	(B3)	(B4)
	CROSS-LIST	DOMESTIC	CROSS-LIST	DOMESTIC	M&A=1	M&A=0	M&A=1	M&A=0
Variables	SPI1	SPI1	SPI1	SPI1	*SPI1*	*SPI1*	*SPI1*	*SPI1*
REGU1	0.093	0.136***			0.136***	0.115***		
	(0.75)	(8.07)			(7.49)	(3.60)		
REGU2	0.086*	0.329*			0.105***	0.077		
	(1.72)	(1.84)			(3.17)	(1.37)		
REGU3	0.138	0.173***			0.194***	0.111***		
	(1.05)	(8.10)			(8.28)	(2.74)		
RELREGU1			-0.101	0.112**			0.089*	0.092
			(-0.37)	(2.56)			(1.88)	(1.05)
AGE	0.006	-0.004***	0.006	-0.006**	-0.005***	-0.002	-0.005*	-0.004
	(0.75)	(-3.23)	(0.43)	(-2.19)	(-3.58)	(-0.76)	(-1.87)	(-0.78)
SIZE	0.234**	0.085***	0.154	0.069**	0.080***	0.087***	0.059*	0.017
	(2.53)	(6.91)	(1.29)	(2.20)	(5.81)	(4.42)	(1.77)	(0.31)
LEV	-0.688**	-0.218***	-0.845*	-0.259**	-0.187***	-0.279***	-0.249**	-0.193
	(-2.13)	(-5.38)	(-1.78)	(-2.48)	(-4.17)	(-4.12)	(-2.27)	(-0.97)
ROE	0.162	0.295***	-0.335	0.449***	0.285***	0.326***	0.427**	0.344
	(0.45)	(4.48)	(-0.66)	(2.83)	(3.97)	(2.69)	(2.55)	(1.17)
VROE	0.324	-0.148	1.928	-0.205	-0.196*	0.147	-0.232	0.651
	(0.60)	(-1.50)	(1.68)	(-0.81)	(-1.81)	(0.85)	(-0.84)	(1.31)
MTB	-0.166	-0.279***	-0.132	-0.250***	-0.278***	-0.287***	-0.264***	-0.253
	(-0.33)	(-7.45)	(-0.12)	(-2.93)	(-6.84)	(-4.10)	(-2.89)	(-1.47)
VOL	0.016	-0.004*	-0.040	-0.007	-0.003	-0.005	-0.003	-0.021*
	(0.64)	(-1.70)	(-0.65)	(-1.10)	(-1.08)	(-1.04)	(-0.44)	(-1.76)
INDNUM	0.000	0.000	0.002***	0.000	0.000	0.000	0.000	0.001*
	(1.20)	(1.02)	(3.72)	(1.55)	(1.16)	(0.12)	(1.59)	(1.70)
INDSIZE	-0.176	-0.127***	-0.421	-0.249**	-0.121***	-0.097	-0.244*	-0.100
	(-0.82)	(-3.51)	(-0.67)	(-2.13)	(-2.97)	(-1.28)	(-1.80)	(-0.48)
DD	0.068	0.086***	0.311*	0.058*	0.088***	0.080***	0.064*	0.104
	(0.67)	(6.96)	(1.99)	(1.76)	(6.55)	(3.70)	(1.72)	(1.61)
DIVER	-0.094	-0.006	0.155	0.012	-0.006	-0.011	-0.002	0.008
	(-0.65)	(-0.22)	(0.58)	(0.13)	(-0.19)	(-0.30)	(-0.02)	(0.07)
LMVE	-0.029	-0.029**	-0.096	-0.061*	-0.028*	-0.031	-0.059	-0.038
	(-0.34)	(-1.99)	(-0.55)	(-1.70)	(-1.75)	(-1.19)	(-1.53)	(-0.58)
MERGER	0.037	-0.053***	-0.196	-0.049*				
	(0.70)	(-5.24)	(-1.42)	(-1.83)				
SOE	-0.005	0.020**	-0.028	0.040**	0.024**	0.003	0.039**	-0.006
	(-0.09)	(2.33)	(-0.46)	(2.38)	(2.58)	(0.26)	(2.16)	(-0.18)
INST	-0.810	-0.440***	1.015	-0.288	-0.380***	-0.590***	-0.135	-0.552
	(-1.07)	(-5.72)	(1.09)	(-1.59)	(-4.60)	(-4.02)	(-0.70)	(-1.52)
TURN	0.006	-0.001***	0.016	-0.001	-0.001***	-0.001**	-0.002	0.001
	(1.62)	(-3.57)	(0.46)	(-0.56)	(-3.13)	(-2.28)	(-1.00)	(0.46)
RET	-0.229***	-0.244***	-0.234	-0.283***	-0.243***	-0.241***	-0.284***	-0.262***
	(-3.20)	(-20.09)	(-1.45)	(-8.78)	(-18.34)	(-9.03)	(-8.14)	(-3.91)
ISSUE	-0.022	-0.024**	-0.159	-0.017	-0.017	-0.045**	0.004	-0.128**
	(-0.25)	(-2.38)	(-1.21)	(-0.65)	(-1.54)	(-2.40)	(0.14)	(-2.52)
LIQUIDITY	-1.118**	0.119**	2.793	-0.228	0.101*	0.125	-0.080	-0.857
	(-2.62)	(2.49)	(1.18)	(-0.75)	(1.85)	(1.30)	(-0.23)	(-1.42)
_cons	0.865	2.203**	9.333	5.288*	2.107**	1.376	5.346	1.891
	(0.14)	(2.48)	(0.49)	(1.68)	(2.12)	(0.74)	(1.48)	(0.33)
N	325	13526	99	2267	10567	3284	1840	526
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Cluster	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm
Adjusted R^2	0.625	0.600	0.742	0.641	0.611	0.564	0.654	0.619

Note: Numbers in parentheses represent t-values that are adjusted using standard errors corrected for clustering at the firm level. The superscripts *, **, and *** denote the 10%, 5%, and 1% levels of significance, respectively.

Table 9. Results of Cross-sectional Variation Analysis of Institutional Efficiency, the government and market regulation development and legal enforcement

	(A2) High INST_EFF	(A1) Low INST_EFF	(A3) High INST_EFF	(A4) Low INST_EFF	(B1) High MAR_INDEX1	(B2) Low MAR_INDEX1	(B3) High MAR_INDEX1	(B4) Low MAR_INDEX1	(C1) High MAR_INDEX2	(C2) Low MAR_INDEX2	(C3) High MAR_INDEX2	(C4) Low MAR_INDEX2
Variables	*SPI1*	*SPI1*	*SPI1*	*SPI1*	*SPI1*	*SPI1*	*SPI1*	*SPI1*	*SPI1*	*SPI1*	*SPI1*	*SPI1*
REGU1	0.106***	0.149***			0.167***	0.098***			0.168***	0.100***		
	(3.89)	(7.16)			(7.22)	(4.24)			(7.39)	(4.17)		
REGU2	0.055	0.121***			0.096**	0.090**			0.144***	0.055		
	(1.06)	(3.52)			(2.31)	(2.22)			(3.58)	(1.29)		
REGU3	0.175***	0.179***			0.189***	0.160***			0.218***	0.135***		
	(5.35)	(6.65)			(5.91)	(5.62)			(7.43)	(4.60)		
RELREGU1			0.102*	0.204***			0.146**	0.069			0.083	0.129**
			(1.84)	(2.87)			(2.34)	(1.11)			(1.31)	(2.12)
AGE	-0.001	-0.006***	-0.006*	-0.003	-0.003*	-0.005***	-0.004	-0.006*	-0.006***	-0.001	-0.009**	-0.003
	(-0.67)	(-3.46)	(-1.76)	(-0.68)	(-1.88)	(-2.85)	(-1.12)	(-1.71)	(-3.63)	(-0.65)	(-2.21)	(-0.71)
SIZE	0.077***	0.091***	0.078**	0.059	0.107***	0.065***	0.122***	0.018	0.080***	0.089***	0.092**	0.039
	(4.20)	(5.68)	(1.99)	(1.30)	(5.91)	(4.20)	(2.77)	(0.48)	(4.58)	(5.49)	(2.09)	(0.99)
LEV	-0.259***	-0.218***	-0.320***	-0.237	-0.236***	-0.212***	-0.438***	-0.128	-0.168***	-0.281***	-0.419***	-0.120
	(-3.97)	(-4.25)	(-2.59)	(-1.35)	(-4.19)	(-3.83)	(-3.31)	(-0.94)	(-3.08)	(-4.83)	(-3.26)	(-0.78)
ROE	0.309***	0.287***	0.399**	0.403*	0.339***	0.253***	0.526**	0.299	0.288***	0.299***	0.450**	0.413*
	(3.17)	(3.36)	(2.08)	(1.65)	(3.49)	(2.98)	(2.37)	(1.48)	(3.11)	(3.41)	(2.19)	(1.88)
VROE	-0.016	-0.243*	0.236	-0.844**	-0.406***	0.078	0.125	-0.370	-0.374***	0.051	0.058	-0.391
	(-0.12)	(-1.85)	(0.87)	(-2.00)	(-2.72)	(0.62)	(0.45)	(-0.96)	(-2.64)	(0.39)	(0.21)	(-0.98)
MTB	-0.296***	-0.262***	-0.272**	-0.221*	-0.279***	-0.279***	-0.282**	-0.256**	-0.321***	-0.238***	-0.271**	-0.238**
	(-5.05)	(-5.49)	(-2.33)	(-1.72)	(-5.11)	(-5.61)	(-2.23)	(-2.37)	(-6.28)	(-4.56)	(-2.06)	(-2.17)
VOL	-0.007**	-0.002	-0.002	-0.009	-0.001	-0.005	-0.006	-0.004	0.001	-0.008**	0.001	-0.007
	(-2.03)	(-0.73)	(-0.31)	(-0.83)	(-0.42)	(-1.58)	(-0.83)	(-0.49)	(0.42)	(-2.38)	(0.11)	(-0.78)
INDNUM	0.000	0.000	0.000**	0.000	0.000	0.000	0.001***	0.000	0.000	0.000	0.001***	0.000
	(0.94)	(0.82)	(2.11)	(0.86)	(1.41)	(0.37)	(2.86)	(0.42)	(1.47)	(0.45)	(2.99)	(0.09)
INDSIZE	-0.205***	-0.072*	-0.050	-0.688***	-0.106**	-0.140***	-0.000	-0.390**	-0.057	-0.185***	0.003	-0.496***
	(-3.23)	(-1.67)	(-0.38)	(-3.00)	(-2.13)	(-2.67)	(-0.00)	(-2.33)	(-1.21)	(-3.27)	(0.02)	(-2.72)
DD	0.092***	0.080***	0.015	0.125***	0.070***	0.096***	0.009	0.081*	0.062***	0.100***	-0.002	0.095**
	(4.93)	(4.92)	(0.35)	(2.62)	(3.86)	(5.94)	(0.19)	(1.96)	(3.45)	(6.09)	(-0.05)	(2.17)
DIVER	0.011	-0.013	-0.018	0.066	-0.028	0.019	0.012	0.025	-0.033	0.015	-0.091	0.109
	(0.28)	(-0.40)	(-0.14)	(0.73)	(-0.81)	(0.54)	(0.08)	(0.23)	(-0.94)	(0.45)	(-0.62)	(1.31)
LMVE	-0.014	-0.050***	-0.077*	-0.072	-0.056***	-0.006	-0.121**	-0.018	-0.041**	-0.029	-0.115**	-0.022
	(-0.64)	(-2.69)	(-1.68)	(-1.39)	(-2.77)	(-0.31)	(-2.24)	(-0.41)	(-2.09)	(-1.43)	(-2.22)	(-0.49)
MERGER	-0.043***	-0.057***	-0.062*	-0.049	-0.043***	-0.060***	-0.065*	-0.053	-0.052***	-0.047***	-0.079*	-0.040
	(-2.68)	(-4.49)	(-1.77)	(-1.25)	(-2.97)	(-4.25)	(-1.66)	(-1.54)	(-3.62)	(-3.39)	(-1.93)	(-1.20)
SOE	0.014	0.021*	0.026	0.039	0.017	0.019*	0.018	0.054**	0.020*	0.023**	0.025	0.061**
	(1.13)	(1.81)	(1.19)	(1.40)	(1.24)	(1.76)	(0.72)	(2.41)	(1.65)	(1.98)	(1.08)	(2.41)
INST	-0.391***	-0.435***	-0.111	-0.151	-0.555***	-0.313***	-0.519*	0.043	-0.534***	-0.317***	-0.347	-0.054
	(-3.39)	(-4.37)	(-0.48)	(-0.54)	(-5.44)	(-2.99)	(-1.86)	(0.19)	(-4.93)	(-3.12)	(-1.32)	(-0.22)
TURN	-0.001***	-0.001***	-0.001	-0.001	-0.001***	-0.001***	-0.002	-0.001	-0.001***	-0.001***	-0.003*	-0.000
	(-2.59)	(-3.20)	(-0.99)	(-0.49)	(-2.72)	(-2.94)	(-0.92)	(-0.61)	(-2.96)	(-3.15)	(-1.71)	(-0.12)
RET	-0.225***	-0.251***	-0.297***	-0.236***	-0.241***	-0.240***	-0.245***	-0.305***	-0.232***	-0.253***	-0.270***	-0.287***
	(-11.08)	(-17.03)	(-8.34)	(-3.75)	(-13.98)	(-14.44)	(-5.57)	(-6.45)	(-14.31)	(-14.51)	(-6.44)	(-5.92)
ISSUE	-0.029*	-0.017	0.008	-0.030	-0.017	-0.027*	0.015	-0.049	-0.020	-0.023	0.036	-0.057
	(-1.79)	(-1.37)	(0.26)	(-0.72)	(-1.25)	(-1.89)	(0.45)	(-1.41)	(-1.43)	(-1.54)	(1.10)	(-1.50)

LIQUIDITY	0.061	0.129**	-0.373	-0.209	0.090	0.109	-0.095	-0.362	0.134**	0.066	-0.411	-0.229
	(0.77)	(2.18)	(-0.99)	(-0.42)	(1.45)	(1.48)	(-0.17)	(-0.98)	(2.15)	(0.92)	(-0.91)	(-0.57)
_cons	4.272***	0.812	-0.167	17.279***	1.498	2.662**	-2.192	9.484**	0.420	3.626***	-0.939	11.657**
	(2.74)	(0.77)	(-0.05)	(2.86)	(1.24)	(2.05)	(-0.51)	(2.15)	(0.36)	(2.61)	(-0.24)	(2.43)
N	5299	8552	1492	874	6828	7023	1076	1290	6974	6877	1198	1168
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Cluster	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm
Adjusted R^2	0.597	0.609	0.647	0.655	0.601	0.602	0.643	0.654	0.611	0.599	0.643	0.654

Note: Numbers in parentheses represent t-values that are adjusted using standard errors corrected for clustering at the firm level. The superscripts *, **, and *** denote the 10%, 5%, and 1% levels of significance, respectively.

Appendix 1. Description of Variables

Panel A: Dependent Variable	
SPI1	Logarithmic transformation of R^2 for the market model in Eq. (1), computed as log [R^2/(1-R^2)]
SPI2	Logarithmic transformation of R^2 for the market model in Eqs. (2)–(4), computed as log [R^2/(1-R^2)]
Panel B: Independent Variable	
REGUE1	A dummy variable REGU1 = 1 if firms only expose to MT and 0 not exposed to any regulations
REGUE2	A dummy variable REGU2 = 1 if firms only expose to SIF and 0 not exposed to any regulations
REGUE3	A dummy variable REGU3 = 1 if firms expose to both MT and SIF not exposed to any regulations
RELREGU1	RELREGU1 equals to 1, for firms expose to MT regulation and 0 for firms expose only to SIF.
RELREGU2	RELREGU2 equals to1 for firms expose to both MT and SIF regulations, and 0 for firms expose to only MT regulation.
RELREGU3	RELREGU3 equals to 1 for firms expose to both MT and SIF regulations, and 0 for firms expose to only SIF regulation.
Panel C: Control variables	
AGE	Defined as the number of years since the stock was listed
SIZE	Firm size computed as the log of total assets at the end of the fiscal year
LEV	Leverage computed as total liabilities divided by total assets
ROE	Return on equity=net profit / average total assets, average total assets=(total assets closing balance + total assets opening balance) / 2
VROE	Sample variance of annual ROE over the last 3 years
MTB	Percentage of Market-to-book, computed as the total market value of equity, divided by the total net assets at the end of the fiscal year
INDNUM	Natural log of the number of firms in the industry to which a firm belongs
INDSIZE	Industry size measured as the log of year-end total assets of all sample firms in the industry to which a firm belongs
DD	Annual dividend dummy, which equals 1 if the firms pays dividends, and 0 otherwise
DIVER	Annual dummy variable that equals 1 when a firm operates in multiple segments, and 0 otherwise
LMVE	Natural log of market value of equity in year t, calculated as price times the number of shares outstanding
MERGER	Annual dummy variable that equals 1 when merger or acquisition happens, and 0 otherwise
SOE	Dummy variable that equals 1 when a firm's ultimate controller is state, and 0 otherwise
INST	Number of shares held by institutions in year t divided by the total number of shares outstanding
TURN	Natural log of the number of shares traded in year t divided by total shares outstanding
RET	Market-adjusted return on the firm's stock in year t
ISSUE	Dummy variable set equal to 1 if the firm issued equity in year t, 0 otherwise
VOL	Trading volume computed as the total number of shares traded in a year, divided by the total number of shares outstanding at the end of the fiscal year
LIQUIDITY	Yearly average ratio of daily absolute returns to daily trading volume in monetary terms
Panel D: Variables for cross-sectional variation analyses	
INST_EFF	The World Bank (2006) ranks China's regions based on regional efficiency. In our analysis, the top two regions are classified as having high institutional efficiency and the bottom four as having low institutional efficiency. INST_EFF is a dummy variable and equals one if the firm's headquarters are in a high institutional efficiency region or province, and zero if the headquarters are in a low efficiency region.
MAR_INDEX1	The component of NERI Marketization Index indicates the development level of government and market regulation, filling the missing values of 2017 and 2018 with 2016 data.
MAR_INDEX2	The component of NERI Marketization Index indicates the development level of legal enforcement for the market, filling the missing values of 2017 and 2018 with 2016 data.
PC	If a firm's CEO or Chairperson is a former or present official in the government, a present deputy of the National People's Congress or Chinese People's Political Consultative Conference, a dummy variable PC equals one, otherwise zero.
CROSS-LIST	A dummy variable 1 for cross listed firms and 0 for domestic peers
M&A	If a firm is engaged in a merger and acquisition in the accounting year and thereafter the dummy variable M&A equals one, and zero if the firm did not engage in a merger and acquisition.
Gender Diversity	A firm has a female CEO or Chairperson is equal 1 and a male CEO or Chairperson is equal 0