A Study on Impact of Legal System, Regulatory System, and Foreign Investment on Stock Price Synchronicity in China

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Using 7,566 firm-year observations of Chinese listed firms over the period 2003-2008, this study examines the impact of legal system, regulatory system and foreign investment on stock price synchronicity. We find that legal system and regulatory system are negatively associated with stock price synchronicity with the effect of legal system stronger than regulatory system. However, a positive relation between the participation of foreign institutional investors and the stock price synchronicity is found which is inconsistent with the general views in this regard.

1. Introduction

Amongst other factors affecting firm stock price synchronicity, the three important determinants are legal system such as the common law, French civil law, German civil law, Scandinavian law and socialist law origin (see, e.g. La Porta et al. 1997, 1998, 2002); regulatory system or requirements such as the rules and regulations established within a legal framework including requirements on information disclosure, competition, and restrictions on incentive schemes, on ownership, on harmful behaviors, as well as taxes designed to induce appropriate behaviors (see, e.g. Bushman and Smith 2001; Bai et al. 2004; Stiglitz 2009); and participation of foreign investors (see, e.g. Jiang and Kim 2004; Stulz 2005; Gul, Kim and Qiu 2010).

Legal system, regulatory system, and participation of foreign investors are not mutually exclusive and may interact with each other. In practice, these factors may appear in an integrated way to affect firm stock price synchronicity, which increases the difficulty to test the impact of each factor, in particular the participation of foreign investors. This renders the empirical findings on the informational role of foreign investors unconvincing.

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For example, Jiang and Kim (2004) document that foreign equity ownership in the Japanese stock market is associated with lower information asymmetry. However, as the Japanese stock market is developed with better investor protection laws and higher accounting standards (see, e.g. Aggarwal, Klapper and Wysocki 2005), it is hard to disentangle the effects of legal system, regulatory requirements and foreign investors on information asymmetry. Similar argument also applies to the finding in Gul, Kim and Qiu (2010) that the presence of foreign investors improve firms information environment because the stock price synchronicity for Chinese firms that issue both A-shares and B-shares at the same time is lower than those issue A-share only. As the Chinese B-share market is associated with more stringent regulatory requirements and is segmented from the Chinese A-share market (see, e.g. Calomiris, Fisman and Wang 2010), it is difficult to distinguish whether the lower stock price synchronicity is due to the presence of foreign investors or the more stringent regulatory requirements. Therefore, the net impact of the participation of foreign investors on firm's information environment remains ambiguous.

For testing the informational role of legal system, regulatory requirements and participation of foreign investors, we exploit situations/conditions conspired by the forces of China government policies and market to simulate control and manipulation. Specifically, Chinese listed firms are categorized into four groups that vary in the extent of exposure to legal system, regulatory requirements or participation of foreign investors (Please refer to Section 2 for more details). Group 1 Firms (firms that issue only A-shares and have no Qualified Foreign Institutional Investors (QFII) shareholdings) are subject to China's legal system, least stringent regulatory requirements and have no foreign investor participation. Group 2 Firms (firms that issue only A-shares and have QFII shareholdings) are identical with Group 1 Firms in terms of legal system and regulatory requirements but differ in terms of participation of foreign investors. Group 3 Firms (firms that issue both A-shares and B-shares) are also subject to China's legal system and have the participation of foreign investors as Group 2 Firms, but are exposed to more stringent regulatory requirements. Compared with Group 3 Firms, Group 4 Firms (firms that issue A-shares and are cross-listed on overseas stock exchanges in developed markets) also have the participation of foreign investors but are exposed to the legal system and more stringent regulatory requirements in the developed markets. Different groups of firms may serve as experimental and control groups to better identify and discriminate the informational role played by legal system, regulatory requirements and participation of foreign investors.

Our primary empirical result is that legal system and regulatory requirements are negatively associated with stock price synchronicity with the effect of legal system stronger than regulatory requirements, which is consistent with our expectations. However, the participation of foreign investors is positively associated with stock price synchronicity, which is inconsistent with the general views in this regard. This study contributes to the literature by disentangling the effects of three important factors, i.e. legal system, regulatory system or requirements and participation of foreign investors on stock price synchronicity. Particularly, this study provides a deeper understanding on whether and how the participation of foreign investors from developed markets affects stock price synchronicity of firms in emerging markets.

The rest of the paper proceeds as follows. Section 2 describes the uniqueness of Chinese listed firms, discusses the three being examined determinants of stock price synchronicity and formulates the hypotheses. Section 3 discusses the variable construction, data collection,

sample selection and descriptive statistics. Section 4 reports the regression results and robustness. Section 5 concludes the paper.

2. Literature Review and Hypothesis Development

2.1 Chinese Listed Firms

Chinese listed firms consist of ex-privately owned, ex-collectively owned and ex-state owned enterprises (SOEs). After share issue privatization, substantial non-tradable shares still exist in most Chinese listed firms which are mainly held by the government, government related institutions, or legal persons (see, e.g. Jiang, Laurenceson and Tang 2008; Calomiris, Fisman and Wang 2010; Jiang, Lee and Yue 2010). In terms of trading environment, all shares issued by Chinese listed firms can be categorized into three groups: A-shares, B-shares and shares cross-listed on overseas stock exchanges such as H-shares on the Hong Kong Stock Exchange (HKSE) or through ADRs on the New York Stock Exchange. Chinese listed firms that issue A-shares on Shanghai or Shenzhen Stock Exchange observe China's law, fulfill relevant regulatory requirements and are scrutinized and monitored by the Chinese Securities Regulatory Commission (CSRC). A-shares were traded only by Chinese investors before December 2002 and the A-share market is usually viewed as the Chinese domestic stock market. The aforementioned non-tradable shares would appear only on the A-share market when they become tradable (Calomiris, Fisman and Wang 2010).

Foreign investments in China were restricted due to foreign exchange control. In December 2002, China Securities Regulatory Commission (CSRC) and the People's Bank of China (PBOC) jointly issued the Provisional Measures on Administration of Domestic Securities Investment of Qualified Foreign Institutional Investors (QFII), initiating the pilot QFII scheme, allowing foreign investors to enter China's capital market directly. Hence, the Chinese A-shares, originally traded solely by domestic investors, were partially open for trading by foreign investors since then. Foreign institutions, wishing to set up as QFII to enter A-share market, have to get approval from the CSRC, and obtain investment quota from the State Administration of Foreign Exchange (SAFE). The main requirements for the qualifications of a QFII include type of institutions, minimum asset size, operating history and paid-in capital.[1]

Under the QFII regulation, within the investment quota obtained from the SAFE, the equity ownership of QFII is subject to ceilings in that 1) an individual QFII may not hold more than 10% of the total outstanding shares of any single listed company, and 2) in any single listed company, the total combined shareholding of all QFII may not exceed 20% of the total outstanding shares of such company.

In addition to A-shares, some Chinese listed firms also issue B-shares on Shanghai or Shenzhen Stock Exchange. Firms issuing B-shares observe China's law but are under more stringent regulatory requirements, such as adopting international accounting standards, and more stringent scrutiny compared with firms issuing only A-shares. B-shares, traded in US Dollar and Hong Kong Dollar on Shanghai and Shenzhen Stock Exchange respectively, were traded solely by foreign investors before February 2001, and now are primarily traded by foreign investors. A small number of domestic investors with trading accounts in foreign currency are currently allowed to trade B-shares.

Moreover, some firms incorporated in Mainland China are cross-listed on the HKSE by issuing H-shares or on other overseas stock exchanges such as the New York Stock Exchange through ADRs. Like other foreign firms that are cross-listed in U.S.[2], these Chinese firms must observe the law and regulatory requirements in the countries where these firms are cross-listed, and undergo the scrutiny associated with cross-listing in these countries.

The majority of Chinese firms cross-listed abroad are cross-listed on the HKSE. To deal with the different markets as well as the non-common law basis of the PRC (People's Republic of China) legal system, HKSE sets out Chapter 19A[3] in Main Board Listing Rules for issuers incorporated in Mainland China. Main requirements in Chapter 19A are that *"(a) PRC issuers are expected to present their annual accounts in accordance with HKFRS, IFRS or CASBE[4]; (b) the articles of association of PRC issuers must contain provisions which will reflect the different nature of domestic shares and overseas listed foreign shares (including H shares) and the different rights of their respective holders; and (c) disputes involving holders of H shares and arising from a PRC issuer's articles of association, or from any rights or obligations conferred or imposed by the Company Law and any other relevant laws and regulations concerning the affairs of the PRC issuer, are to be settled by arbitration in either Hong Kong or the PRC at the election of the claimant."* In summary, firms issuing only A-shares, firms issuing both A-shares and B-shares, and firms issuing both A-shares and are overseas listed foreign shares might display extremely differences in governance pattern, which are the consequences of different legal systems, regulatory requirements and enforcement mechanisms.

2.2 Determinants of Stock Price Synchronicity

Amongst other factors, this study considers three important determinants of firm stock price synchronicity, namely, legal system, regulatory requirements[5], and participation of foreign investors. Legal system mainly refers to the origin of commercial laws such as common law, French civil law, German civil law, Scandinavian law and socialist law (see e.g. La Porta et al. 1997, 1998, 2000, 2002). Coffee (2000) and La Porta et al. (1997, 1998, 2000, 2002) claim that common law system is associated with better corporate governance and investor protection than other legal systems such as civil law system. A substantial literature on the relation between legal system and corporate governance and price informativeness document evidence in support of this perspective (see, e.g. Coffee, 2000; La Porta et al. 1997, 1998, 2000, 2002).

Regulatory requirements mainly refer to the rules and regulations established within a legal framework including requirements on information disclosure, competition, and restrictions on incentive schemes, on ownership, and on harmful behaviors, as well as taxes designed to induce appropriate behaviors (see, e.g. Stiglitz 2009). The ultimate objectives of regulatory requirements are to maintain a market environment with appropriate incentives, high level of transparency, and effective competition (Stiglitz, 2009). In particular, a high level of transparency and disclosure are vital in improving corporate governance, reducing information asymmetry and facilitating market informativeness (see, e.g. Bushman and Smith 2001; Bai et al. 2004).

The legal bonding hypothesis holds that cross-listing of firms from a poor quality legal and regulatory institutional environment can benefit their governance by bonding themselves to an environment with better investor protection, stricter legal and regulatory enforcement and greater disclosure requirements (see, e.g. Coffee 2002). In particular, the bonding hypothesis is supported by the finding that cross-listing on the stock exchanges in U.S. affects stock price informativeness (see, e.g. Fernandes and Ferreira 2008). In addition, Fernandes and Ferreira (2009) find that the enforcement of insider trading laws has a positive effect on price informativeness in developed markets with good legal and regulatory protection to minority investors but has no significant or even a negative effect on price informativeness in emerging markets characterized as poor legal and regulation protection regime.

Foreign investors from developed markets, institutional investors in particular, are usually perceived to be more sophisticated and experienced and possess more resources and capacities in collecting, processing, and analyzing value-relevant information. The increased demand resulting from the participation of foreign investors and the domestic followers may raise the security prices and lowers the cost of capital for the firms invested by foreign investors, which creates incentives for firms to improve governance and enhance disclosure and transparency (see, e.g. Stulz 2005). Some empirical studies document a positive relation between foreign investors and firm information environment (see, e.g. Jiang and Kim 2004; Gul, Kim and Qiu 2010). However, it should be pointed out that these studies do not disentangle the informational role of legal system, regulatory requirements and participation of foreign investors. For example, the Japanese stock market is developed with better investor protection laws and higher accounting standards (see, e.g. Aggarwal, Klapper and Wysocki 2005), so the results in Jiang and Kim (2004) show the integrated effects of legal system, regulatory requirements and the participation of foreign investors on information asymmetry rather than the effect of the participation of foreign investors alone. Similarly, the evidence in Gul, Kim and Qiu (2010) demonstrates a combined effect of more stringent regulatory requirements and the participation of foreign investors on stock price synchronicity rather than the effect of the participation of foreign investors *per se*. Therefore, further empirical evidence is needed to clarify the ambiguity on the net impact of the participation of foreign investors.

We now assign all the Chinese listed firms issuing A-shares into four groups. Group 1 Firms refer to the Chinese listed firms with the issuance of only A-shares (A-share only firms) and without QFII shareholdings; Group 2 Firms refer to the A-share only firms with QFII shareholdings; Group 3 Firms refer to the Chinese listed firms with the issuance of both A-shares and B-shares at the same time; Group 4 Firms refer to the Chinese listed firms that issue A-shares and at the same time are cross-listed on overseas stock exchanges. The majority of Group 4 Firms are cross-listed on HKSE and the minority of Group 4 Firms are cross-listed on the stock exchanges in the developed markets such as U.S., U.K. and Singapore.

The four groups of firms vary in the exposure to legal system, regulatory requirements or participation of foreign investors. We scale each factor into two levels: common law or Chinese law for legal system; more stringent or less stringent regulatory requirements; and with or without the participation of foreign investors. First, in term of legal system, firms in Group 1, Group 2 and Group 3 are all listed on the Chinese domestic market and are thus under a uniform Chinese legal system. Group 4 Firms are cross-listed on overseas stock exchanges

and are exposed to the common law system in the developed markets. Second, in term of regulatory requirements, Group 1 and Group 2 Firms are subject to the identical regulatory requirements formulated in accordance with the Chinese law that are less stringent than the regulatory requirements for Group 3 Firms. Group 4 Firms are subject to the most stringent requirements formulated in accordance with the common law in the developed markets where the firms are cross-listed. For example, Group 1 and Group 2 Firms only need to follow China's accounting standards while Group 3 Firms are required to follow the IFRS. Group 4 Firms that are cross-listed on HKSE have to prepare financial reports in accordance with HKFRS, IFRS or CASBE and are required to follow other more stringent governance rules such as the rules on board structure and executive compensation (see, e.g. Bai et al. 2004; Chi and Zhang 2010). Third, there are only Chinese investors participating in Group 1 Firms while there are also foreign investors participating in Group 2, Group 3 and Group 4 Firms. Table 1 contrasts the four groups of firms in term of the types of shares that a firm issues, the legal system and regulatory requirements that a firm follows and whether there is the participation of foreign investors.

Table 1: Groups of Firms

Group of Firms	Type of Shares Issued	Legal System	Regulatory Requirements	Participation of Foreign Investors
Group 1	Only A-shares	Chinese civil law	Less stringent requirements	No
Group 2	Only A-shares	Chinese civil law	Less stringent requirements	Yes (QFII)
Group 3	A-shares & B-shares	Chinese civil law	More stringent requirements	Yes
Group 4	A-shares & H-shares or shares cross-listed on overseas stock exchanges	Common law in Hong Kong or other developed markets	More stringent requirements	Yes

2.3 Formulation of Hypotheses

As summarized above, the only difference between Group 1 Firms and Group 2 Firms is the participation of foreign investors i.e. QFII in Group 2 Firms. Foreign investors from developed markets, foreign institutional investors in particular, are usually viewed to be more sophisticated and experienced, and possess more resources and incentives to collect firm specific information. It is found that foreign institutional investors tend to hold firms with better corporate governance or lower price synchronicity in their portfolio (see, e.g. Dahlquist and Robertsson 2001; Edison and Warnock 2004; Aggarwal, Klapper and Wysocki 2005; Ferreira and Matos 2008; Huang and Shiu 2009; Leuz, Lins and Warnock 2009). Therefore, QFII, the top tier institutional long-term investors with good performance records in their own countries

as justified by the qualification criteria under the QFII scheme, would select firms with lower price synchronicity. Moreover, as argued by Yeo (2003) and Ferguson and McGuinness (2004), "the signals emitted by the QFII are likely to encourage secondary market trading in favor of the QFII-invested entities and the QFII scheme should offer an incentive for listed firms to become more transparent and accountable." In summary, our first hypothesis which focuses on the informational effect of the participation of foreign institutional investors is as follows:

H1: The participation of QFII is negatively related to stock price synchronicity, and the stock price synchronicity is lower for Group 2 Firms than for Group 1 Firms, ceteris paribus.

Both Group 2 and Group 3 Firms are under the identical law jurisdiction in the Chinese legal system and have the participation of foreign investors. However, Group 3 Firms have to follow more stringent regulatory requirements such as regulations on board structure, managerial compensation and financial disclosure which are found to be associated with lower stock price synchronicity as illustrated in Section 2.2 (see, e.g. Bai et al. 2004; Chi and Zhang 2010; Gul, Kim and Qiu 2010; Ferreira, Ferreira and Raposo 2011). Hence, our second hypothesis which focuses on the informational effect of regulatory requirements is as follows:

H2: The more stringent regulatory requirements associated with B-shares are negatively related to stock price synchronicity, and the stock price synchronicity is lower for Group 3 Firms than for Group 2 Firms, ceteris paribus.

Compared with Group 3 Firms observing Chinese law system that is deemed to be associated with low transparency, poor corporate governance and poor investor protection (see, e.g. La Porta et al. 1997, 1998, 2002; Bai et al. 2004), Group 4 Firms with cross-listings[6] in other developed markets are exposed to the common law jurisdiction with greater transparency, better corporate governance and better investor protection (see, e.g. La Porta et al. 1997, 1998, 2002; Foerster and Karolyi 1999; Miller 1999; Fernandes and Ferreira 2008). Thus our third hypothesis which focuses on the informational effect of legal system is as follows:

H3: Cross-listings on stock exchanges in developed markets are negatively related to stock price synchronicity, and the stock price synchronicity is lower for Group 4 Firms than for Group 3 Firms, ceteris paribus.

3. Data and Sample

3.1 Variable Definitions

3.1.1 Stock Price Synchronicity

Stock price synchronicity is examined as the dependent variable in this study. According to the existing literature, higher stock price synchronicity indicates lower firm-specific return variation or less firm-specific information incorporated into stock prices, which further implies a less efficient information environment[7] (see, e.g. Roll 1988; Morck, Yeung and Yu 2000; Wurgler 2000; Durnev et al. 2003; Li et al. 2004; Piotroski and Roulstone 2004; Jin and Myers 2006;

Fernandes and Ferreira 2008; Gul, Kim and Qiu 2010). In this study, stock price synchronicity for firm *i* in fiscal year *t* is defined as,

$$synchronicity = \log(\frac{R_{it}^2}{1 - R_{it}^2})$$

Where for firm *i* in year *t*, R^2 is the coefficient of determination from the estimation of the market model that is specified as below:

$$RETURN_{it} = \alpha_i + \beta_{1i}Market_t + \beta_{2i}World_t + \varepsilon_{it}$$

Where *RETURN* is the weekly return of A-shares of firm *i* traded on either the Shanghai or Shenzhen Stock Exchange; *Market* is the value-weighted A-share market return using the MSCI (Morgan Stanley Capital International) China A Index; *World* is the value-weighted world market return using the MSCI World Index. The weekly return data are retrieved from the China Stock Market and Accounting Research (CSMAR) database and the MSCI index data are extracted from the Datastream database.

3.1.2 QFII Participation

Our dataset includes all firms listed on the Chinese A-share market from 2003-2008. The data starts at 2003 since the QFII Scheme was only introduced in late 2002. The sample period ends at 2008 is due to two reasons: (1) the regulations on foreign exchange regarding QFII were substantially revised in 2009; and (2) the financial tsunami occurred and peaked in late 2008. In order to isolate our study from the potential impact, we choose to restrict our sample period from 2003 to 2008. Further, we believe that the first six years of data after the introduction of the QFII Scheme should be good enough to examine our hypotheses. For each firm, we manually collect the data on the equity holdings by QFII at the end of each year from the sources such as firms' annual reports, company websites, the CSMAR database and the Genius Securities Information System database. The information on the investment quota and the exchange rate between RMB and US dollars are obtained from the website of the SAFE (www.safe.gov.cn).

It should be noted that the overall equity holdings by QFII might be somewhat underestimated in our study due to the following reasons. First, only the ten largest shareholders are disclosed in firms' annual reports and we are not able to trace the equity holdings by QFII that do not appear among the ten largest shareholders. Second, we could not obtain information on QFII's use of the Chinese-registered investment vehicles. For example, if QFII invests in local funds which in turn hold shares of listed firms, we underestimate the ultimate equity ownership by QFII. Third, the concept of QFII strictly refers to the foreign institutional investors that are approved by the CSRC to invest in the tradable A-shares of the Chinese listed firms. As this study is concerned with the QFII Scheme in China and the role of QFII in the Chinese A-share market, the holdings of non-tradable shares or shares with sales restrictions[8] and the holdings of B-shares or H-shares by the same foreign institutional investors that have obtained the status of QFII are not counted as the holding of QFII. Therefore, the QFII shareholdings of Chinese listed firms in this study are the most conservative estimates.

Table 2 provides a summary of the QFII equity ownership. During the period 2003-2008, the total number of firms that have at least one QFII shareholder (hereafter referred to as QFII firms) first increases from 19 at the end of 2003 to 192 at the end of 2006 then falls to 115 at the end of 2008 as shown in Column 2. The percentage of tradable A-shares held by QFII is given in Column 3 and the cross-sectional standard deviation of the percentage of shares owned by QFII is provided in brackets. Column 4 and Column 5 report the total number and the total market capitalization of tradable A-shares held by QFII. Column 6 presents the percentage of market capitalization of tradable A-shares held by QFII, and the utilization rate of the investment quota is displayed in Column 7. As shown, all statistics follow a similar pattern during the period 2003-2008, that is, increases from 2003 to 2006 and then decreases from 2006 to 2008.

Table 2: Summary of QFII Equity Ownership

Column 1 and Column 2 show the year and the total number of firms held by QFII corresponding to each year. Column 3 shows the percentage of tradable A-shares held by QFII that is computed as the total number of tradable A-shares held by QFII divided by the total number of tradable A-shares for each firm and we average this percentage across the firms held by QFII. The cross-sectional standard deviation of the percentage of shares owned by QFII in each firm is provided in brackets. Column 4 and Column 5 show the total number and the total market capitalization of tradable A-shares held by QFII that are respectively the summation of the total number and the total market capitalization of tradable A-shares held by QFII for each firm at the end of each year. Column 6 shows the percentage of market capitalization of tradable A-shares held by QFII that is computed as the total market capitalization of tradable A-shares held by QFII divided by the total market capitalization of tradable A-shares of all the listed firms at the end of each year. Column 7 reports the utilization rate of investment quota for QFII computed as the ratio of the total market capitalization of tradable A-shares held by QFII to the cumulative investment quota obtained by QFII by the end of each year using the year-end exchange rate.

Year (1)	Total No. of firms held by QFII (2)	Percentage of tradable A-shares held by QFII (%) (Std. Dev) (3)	Total No. of tradable A-shares held by QFII (in Million) (4)	Total market capitalization of tradable A-shares held by QFII (in Million RMB) (5)	Percentage of market capitalization of tradable A-shares held by QFII (%) (6)	Utilization rate of Investment Quota (%) (7)
2003	19	1.80 (2.27)	134.87	1,264.14	0.10	8.98
2004	39	3.34 (3.43)	299.07	3,131.68	0.28	10.89
2005	124	3.95 (4.04)	1,692.78	10,246.21	1.02	21.95
2006	192	3.85 (3.37)	2,942.18	30,140.21	1.26	41.16
2007	134	3.30 (3.38)	940.89	23,345.18	0.26	29.12
2008	115	2.36 (2.18)	1,282.96	10,347.63	0.23	10.01

The QFII equity ownership is subject to ceilings under the QFII Scheme (see Section I.A.) and as shown in Table 2, the equity ownership of QFII is still relatively small in terms of the number of shares and in terms of market capitalization. Therefore, we use a dummy variable instead of the percentage of shares held by QFII in a firm as the measure of QFII shareholding. The dummy variable (*QFII*) equals 1 if QFII holds tradable A-shares of a firm and 0 otherwise. This dummy variable indicates the participation or presence of QFII (foreign investments) in a firm and serves well the purpose of this study that tests whether and how the participation of foreign investors would affect stock price synchronicity.

3.1.3 Other Firm Level Variables

BShare is a dummy variable, which indicates more stringent regulatory requirements and equals 1 if a firm issues A-share and B-shares at the same time and 0 otherwise; *Crosslist* is a dummy variable, which indicates the legal systems with better investor protection laws and equals 1 if a firm issues A-shares and other shares cross-listed on overseas stock exchanges at the same time and 0 otherwise; *Size* is computed as the log of total assets at the end of fiscal year; *Leverage (Lev)* is computed as total liabilities divided by total assets; *Book-to-market Ratio (B/M)* is computed as book value of assets divided by the market value of equity plus book value of assets minus book value of equity; *Return on Equity (ROE)* is computed as net income divided by book value of equity; *Ownership* is defined as the percentage of shares held by the largest shareholder at the year-end. All the data related to the aforesaid firm specific attributes are obtained from the CSMAR database supplemented with information hand-collected from the sources including firms' annual reports and company websites.

3.2 Sample Selection and Summary Statistics

The initial sample includes all firms listed on the Chinese A-share market for the years 2003 through 2008. Excluding firms with missing data, the final sample contains a total of 7,566 firm-year observations with data available for all the variables of interest. We compute the mean and median for all the variables of interest and conduct the one way ANOVA test and the Kruskal-Wallis test across the four groups of firms, i.e. Group 1 Firms (A-share only firms without QFII shareholding), Group 2 Firms (A-share only firms with QFII shareholding), Group 3 Firms (firms that issue A-shares and B-shares at the same time) and Group 4 Firms (firms that issue A-shares and are cross-listed at other stock exchanges at the same time). The mean and median stock price synchronicity are significantly different across the four groups of firms according to the one way ANOVA test and the Kruskal-Wallis test as shown in Table 3. It seems that the mean and median stock price synchronicity is lower for Group 1 Firms than for Group 2 Firms which is inconsistent with our first hypothesis, and the mean and median stock price synchronicity is lower for Group 3 Firms than for Group 4 Firms which is inconsistent with our third hypothesis.

Table 3: Mean (Median) Comparison between Four Groups of Firms

Group 1 Firms refer to the Chinese listed firms with the issuance of only A-shares (A-share only firms) and without QFII shareholdings; Group 2 Firms refer to the A-share only firms with QFII shareholdings; Group 3 Firms refer to the Chinese listed firms with the issuance of both A-shares and B-shares at the same time; Group 4 Firms refer to the Chinese listed firms that issue A-shares and at the same time are cross-listed on overseas stock exchanges. The sample period is from 2003 to 2008. The superscripts a and b indicate statistical significance at the 1% and 5% levels respectively for the one way ANOVA or Kruskal-Wallis tests across four groups of firms.

	Group 1 Firms		Group 2 Firms		Group 3 Firms		Group 4 Firms		One way ANOVA	Kruskal-Wallis test
	Mean (Std Dev)	Median	Mean (Std Dev)	Median	Mean (Std Dev)	Median	Mean (Std Dev)	Median	F statistic	Chi-Square
Synch	-0.593 (0.879)	-0.532	-0.526 (0.759)	-0.515	-0.658 (0.832)	-0.571	-0.440 (0.894)	-0.485	6.640[a]	16.373[a]
Size	21.244 (0.987)	21.160	21.945 (1.198)	21.817	21.757 (1.154)	21.727	23.572 (1.614)	23.438	513.987[a]	737.735[a]
Lev	0.494 (0.187)	0.508	0.474 (0.180)	0.476	0.519 (0.183)	0.518	0.498 (0.193)	0.489	0.466	28.162[a]
B/M	0.828 (0.230)	0.868	0.770 (0.243)	0.802	0.947 (0.258)	0.979	0.969 (0.150)	0.997	64.342[a]	226.494[a]
ROE	-0.037 (2.337)	0.063	0.117 (0.250)	0.117	-0.010 (0.663)	0.068	0.086 (0.185)	0.094	0.394	250.133[a]
Ownership	0.388 (0.161)	0.365	0.414 (0.168)	0.406	0.364 (0.161)	0.331	0.475 (0.129)	0.489	33.285[a]	106.914[a]
N	6350	6350	512	512	467	467	206	206		

4. Empirical Analysis

4.1 Multivariate Regression

The time-series dependence or the firm effect and the cross-sectional dependence or the time effect in panel data might produce biased standard errors when estimated by techniques such as OLS, White, Newey-West or Fama-MacBeth methods (Petersen 2009). Therefore, we draw on the approach described in Petersen (2009) by including time dummies and estimate standard errors clustered at the firm level. The regression in the generic form, with time and firm subscripts omitted, is specified as follows:

$$Synch = \beta_0 + \beta_1 QFII + \beta_2 Bshare + \beta_3 Crosslist + \beta_4 Size + \beta_5 Lev + \beta_6 B/M$$
$$+ \beta_7 ROE + \beta_8 Ownership + (IndustryDummies) + (YearDummies) + \varepsilon$$

Where all variables are as defined as in Section 3.1. According to our hypotheses, we expect β_1, β_2, β_3 to be negative and β_1 to be larger than β_2 which is larger than β_3, or β_1 should be the largest and β_3 should be the smallest (that is, most negative) among the three coefficients. Column 1 of Table 4 reports the regression result for Group 1 and Group 2 Firms. The coefficient for *QFII* is significantly positive at the 1% level, suggesting that QFII shareholding or the participation of foreign investors in the Chinese A-share market is associated with higher stock price synchronicity, which is inconsistent with our first hypothesis.

Column 2 of Table 4 presents the result when Group 3 Firms are included in the analysis. The coefficient for *Bshare* is significantly negative at the 1% level, the coefficient for *QFII* remains significantly positive at the 1% level and the difference in the coefficient for *Bshare* and the coefficient for *QFII* is significant at the 5% level. The result is consistent with our second hypothesis, suggesting that the more stringent regulatory requirements for firms that also issue B-shares are associated with lower stock price synchronicity and dominates the role of the participation of foreign investors in firm's private information environment.

Column 3 of Table 4 shows the result when all four groups of firms are included in the analysis. Both of the coefficient for *Bshare* and for *Crosslist* are significantly negative at the 1% level, and the coefficient for *Crosslist* (-0.344) is significantly smaller than the coefficient for *Bshare* (-0.170) at the 1% level. The result is consistent with our third hypothesis, suggesting that the common law legal system which the cross-listed firms get exposed to is associated with lower stock price synchronicity and dominates the role of regulatory requirements and participation of foreign investors in firm's private information environment. The coefficient for *QFII* remains significantly positive at the 5% level which is still inconsistent with our first hypothesis. So we further perform some robustness checks.

Table 4: Regression of Stock Price Synchronicity on Participation of Foreign Institutional Investors, Regulatory Requirements and Legal System

Column 1 reports the regression result for Group 1 and Group 2 Firms; Column 2 presents the result when Group 3 Firms are included in the analysis; Column 3 shows the result when all four groups of firms are included in the analysis. The sample period is from 2003 to 2008. Numbers in parentheses represent *t*-statistics that are adjusted using standard errors corrected for clustering at the firm level. The superscripts a, b and c indicate statistical significance at the 1%, 5% and 10% levels respectively.

	(1)	(2)	(3)
QFII	0.083	0.077	0.074
	$(2.71)^a$	$(2.63)^a$	$(2.56)^b$
Bshare		-0.172	-0.170
		$(-5.13)^a$	$(-5.07)^a$
Crosslist			-0.344
			$(-5.53)^a$
Difference in β_1, β_2 $(\beta_2 - \beta_1)$		-0.249	-0.244
		$(-2.12)^b$	$(-2.15)^b$
Difference in β_2, β_3 $(\beta_3 - \beta_2)$			-0.174
			$(-7.02)^a$
Size	0.157	0.161	0.151
	$(13.42)^a$	$(14.54)^a$	$(13.93)^a$
Lev	-0.802	-0.775	-0.763
	$(-14.45)^a$	$(-14.79)^a$	$(-14.70)^a$
B/M	0.759	0.729	0.725
	$(10.73)^a$	$(11.04)^a$	$(11.07)^a$
ROE	0.002	0.001	0.002
	(0.43)	(0.37)	(0.45)
Ownership	-0.145	-0.165	-0.176
	$(-2.28)^b$	$(-2.74)^a$	$(-2.94)^a$
Constant	-4.337	-4.380	-4.176
	$(-19.36)^a$	$(-20.64)^a$	$(-19.91)^a$
Industry dummies	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes
N	6892	7360	7566
Adj. R^2	36.67%	37.09%	36.88%

4.2 Robustness Checks

First, the existing literature documents that there is a nonlinear relation between ownership concentration and firm value and earnings informativeness (see, e.g. Fan and Wong 2002; Bai et al. 2004). To alleviate the concern that the nonlinearity of ownership concentration might influence the relation between legal system, regulatory requirements, participation of foreign investors and stock price synchronicity, we include $Ownership^2$ in the regression to control for

the potential nonlinearity and the result is shown in Column 1 of Table 5. The coefficient for $Ownership^2$ is not significant and the coefficients for *QFII*, *Bshare* and *Crosslist* are qualitatively similar to those in the full regression in Table 4.

Second, we exclude a special group of stocks, the "ST stocks", from the sample. In the Chinese A-share market, when the net income of a listed firm is negative in two most recent fiscal years or when a listed firm makes a loss for two consecutive years, the stock of the firm will be prefixed by "ST"- the acronym for "Special Treatment". The daily price change of these "ST stocks" is restricted within 5% rather than 10% for non-ST stocks in the Chinese A-share market, which might bias the level of stock price synchronicity and mislead the regression result. Therefore, we re-estimate the full model excluding these "ST stocks" and as shown in Column 2 of Table 5, the result is again qualitatively similar to the obtained results in Table 4. Third, we exclude financial firms from the sample to see if the benchmark regression result is influenced by the possible heterogeneity from financial firms. The regression result in Column 3 of Table 5 is once again qualitatively identical with the full regression results. Fourth, to avoid drawing spurious inferences from extreme values, we winsorize the observations at the bottom and top 1% of all the variables and Column 4 of Table 5 presents the result. The full regression result still holds when outliers are excluded, while the coefficient for *Return on Equity* becomes marginally significant.

Table 5: Robustness Checks of Stock Price Synchronicity on Participation of Foreign Institutional Investors, Regulatory Requirements and Legal System

We estimate the following regression:

$$Synch = \beta_0 + \beta_1 QFII + \beta_2 Bshare + \beta_3 Crosslist + \beta_4 Size + \beta_5 Lev + \beta_6 B/M$$
$$+ \beta_7 ROE + \beta_8 Ownership + (IndustryDummies) + (YearDummies) + \varepsilon$$

Column 1 considers the possible nonlinear relation between ownership concentration and stock price synchronicity by including another variable, i.e. *Ownership²* in the regression; Column 2 considers a sample excluding "ST stocks" or stocks with special treatment; Column 3 considers a sample excluding financial firms; Column 4 considers a sample excluding outliers. The sample period is from 2003 to 2008. Numbers in parentheses represent *t*-statistics that are adjusted using standard errors corrected for clustering at the firm level. The superscripts a, b and c indicate statistical significance at the 1%, 5% and 10% levels respectively.

	(1) Including Ownership²	(2) Excluding STstocks	(3) Excluding financials	(4) Excluding outliers
QFII	0.073	0.078	0.073	0.072
	(2.54)[b]	(2.67)[a]	(2.50)[b]	(2.39)[b]
Bshare	-0.169	-0.192	-0.172	-0.180
	(-5.03)[a]	(-5.22)[a]	(-5.12)[a]	(-5.08)[a]
Crosslist	-0.350	-0.338	-0.346	-0.299
	(-5.61)[a]	(-5.07)[a]	(-5.47)[a]	(-4.87)[a]
Difference in β_1,β_2 ($\beta_2-\beta_1$)	-0.242	-0.270	-0.245	-0.252
	(-2.15)[b]	(-2.43)[b]	(-2.19)[b]	(-2.60)[a]
Difference in β_2,β_3 ($\beta_3-\beta_2$)	-0.181	-0.146	-0.174	-0.119
	(-5.03)[a]	(-6.72)[a]	(-7.03)[a]	(-6.21)[a]
Size	0.154	0.143	0.155	0.153
	(13.90)[a]	(12.36)[a]	(13.62)[a]	(12.72)[a]
Lev	-0.766	-0.753	-0.767	-0.725
	(-14.72)[a]	(-13.10)[a]	(-14.78)[a]	(-12.73)[a]
B/M	0.721	0.791	0.726	0.794
	(10.94)[a]	(11.87)[a]	(11.02)[a]	(11.53)[a]
ROE	0.002	0.002	0.002	0.096
	(0.45)	(0.72)	(0.44)	(1.83)[c]
Ownership	0.164	-0.235	-0.187	-0.138
	(0.60)	(-3.82)[a]	(-3.08)[a]	(-2.22)[b]
Ownership²	-0.409			
	(1.27)			
Constant	-4.275	-3.989	-4.241	-4.264
	(-18.96)[a]	(-17.64)[a]	(-19.42)[a]	(-18.46)[a]
Industry dummies	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes
N	7566	6885	7503	7076
Adj. R^2	36.89%	37.47%	36.91%	36.93%

5. Conclusions

In a natural experimental setting of China, using 7,566 firm-year observations of listed firms in the Chinese A-share market over the period 2003-2008, this study examines three determinants of stock price synchronicity, namely legal system, regulatory requirements and the participation of foreign investors and provides a piece of preliminary evidence on their disentangled impacts on stock price synchronicity. We find that cross-listings of Chinese firms on overseas stock exchanges in the developed markets are negatively related to stock price synchronicity, and the more stringent regulatory requirements for the Chinese firms that issue A-shares and B-shares at the same time are also negatively related to stock price synchronicity, suggesting that legal system and regulatory requirements matter to firm's private information environment. The Chinese listed firms with cross-listings in the developed markets exhibit significantly lower stock price synchronicity than the Chinese listed firms without cross-listings, suggesting that the informational role of legal system dominates the informational role of regulatory requirements. The Chinese firms that issue both A-shares and B-shares present significantly lower stock price synchronicity than the Chinese listed firms that issue only A-shares with QFII holdings, implying that the informational role of regulatory requirements dominates the informational role of participation of foreign investors.

The findings provide evidence that cross-listings in a developed exchange with common law system (a more developed and stringent investor protection regime) improves the price informativeness of the firms, which is consistent with a recent cross-listing theory (Foucaultg and Gehrig, 2008) that a cross-listing enables managers to extract information from stock prices to make investment decisions and thus the sensitivity of investment decisions to stock prices should increase after a cross-listing. In the meanwhile, Fernances and Ferreira (2008) document that for developed market listed firms, cross-listing on US stock exchanges improves price informativeness, but cross-listing decreases price informativeness for emerging market listed firms. Our finding that overseas cross-listing of Chinese firms improves price informativeness does not contradict but compliments the previous literature in two aspects. First, the prior finding in Fernances and Ferreira (2008) targets the collective markets, developed and emerging, as research population rather than the individual market of each country/region. The feature of individual market may not be derived from, or equivalent to the feature of a set of markets. Second, specifically regarding Chinese firms, there are 1,152 non-cross-listed and 12 cross-listed firms in the sample of Fernances and Ferreira (2008), while our sample covers 6350 non-cross-listed firms and 206 cross-listed firms. Therefore, for Chinese firms, in terms of the improvement of the information environment through cross-listing in more developed and stringent legal and regulatory environments, our study provides more relevant and reliable evidence to the literature, which is consistent with bonding hypothesis (Coffee 2002).

Our finding that measured by price synchronicity, the information environment in a market with more stringent regulation is more efficient than that in a market with less stringent regulation implies that more stringent regulations monitor firm managers with enhanced disclosure and increased scrutiny and thus improve corporate governance. This is consistent with the finding in De Carvalho and Pennacchi (2012) that in Brazil, firms migrated to premium exchange that require more stringent shareholder protections can improve their governance behavior. Moreover, our finding that for the improvement of firm's information environment, a market with

both more developed legal system and more stringent regulations is more effective than market with only more stringent regulations, also enriches the literature in this area (see, e.g. Gugler, Mueller and Yurtoglu 2004).

Contrary to our hypothesis and the common views, we find that the participation of QFII is positively associated with stock price synchronicity and the results are qualitatively similar in several robustness checks considering the potential influences from the nonlinearity of ownership concentration, "ST" stocks, financial firms and outliers. This result indicates that the participation of foreign investors *per se* does not improve firm's private information environment. For future research on the potential explanation of this seemingly contradicting result, one may go for adding some other possible factors like the interaction or moderate effect of leverage on the relation between stock price synchronicity and QFII, the dividend payout policies, and the state ownership in firms. Our findings in this study would only suggest that the positive effect on the improvement of the information environment from the participation of sophisticated investors, QFII in particular, is dominated by the institutional environment of legal system and regulatory rules in investor protection regime. Without a good legal, regulatory and enforcement environment in investor protection, the participation of QFII *per se* might be difficult to impel the progress of information environment in a market. However, some limitations should also be noted. First, our results are based on one single market, and hence may not be perfectly applicable to other developing or developed market. Second, our measure of participation of foreign investors is on a conservative side, a more accurate measure can certainly improve the results. Finally, data sample period is rather short though we have justified our chosen sample period. Extending the sample period and using the percentage of actual holdings by foreign investors in the future studies is recommended.

Endnotes

[1] For more details of the QFII scheme, please refer to "Provisional Measures on Administration of Domestic Securities Investments of Qualified Foreign Institutional Investors (QFII)" on the website of Chinese Securities Regulatory Commission (www.csrc.gov.cn); For more explanations and interpretations of the QFII scheme from the perspectives of researchers and practitioners, please refer to Yeo (2003) and Ferguson and McGuinness (2004).

[2] Please refer to Karolyi (2006) for a good review of the literature on cross-listing.

[3] Website of HKSE: http://www.hkex.com.hk/eng/rulesreg/listrules/mbrules/vol1_2.htm

[4] HKFRS, IFRS and CASBE are acronyms of Hong Kong Financial Reporting Standards, International Financial Reporting Standards, and Chinese Accounting Standards for Business Enterprises respectively.

[5] We define legal system and regulatory requirements separately mainly out of the consideration that multiple stock markets often co-exist within one country/region such as the A-share and B-share markets in China or the main board market and growth enterprise market in Hong Kong which are exposed to the same legal system but different regulatory requirements within a country/region.

[6] The empirical results on the effect of cross-listing on firm stock price synchronicity are mixed. For example, Fernandes and Ferreira (2008) find that for firms from emerging markets, including 12 Chinese firms, cross-listing in U.S. increases stock price synchronicity. Contrary to it, Gul, Kim and Qiu (2009) find that for Chinese listed firms, cross-listing in Hong Kong decreases stock price synchronicity.

[7] Stock price efficiency is not directly observable and is difficult to measure empirically. Measures of information efficiency in the literature include, but are not limited to, stock return, price volatility, profits from various trading strategies, and stock price random walk. All measures of efficiency have weaknesses (Griffin, Kelly and Nardari 2010). We adopt stock price synchronicity because considerable research has established that stock price synchronicity and price informativeness are closely related. However, it should be noted that stock price synchronicity is by no means a perfect measure because it might catch the noise in the trading process (see, e.g. Kelly 2007) and might present controversial results (see, e.g. Griffin, Kelly and Nardari 2010).

[8] Some foreign institutional investors may also qualify as Foreign Strategic Investors (FSI) according to the "Measures for the Administration of Strategic Investment of Foreign Investors in Listed Companies" effective on 31 January 2006. QFII differentiates from FSI mainly in the following aspects: 1) QFII is only allowed to trade A-shares in the secondary market and FSI is only allowed to acquire A-shares in the primary market by means of contractual assignment or private placement of new shares; 2) In contrast with the equity ownership ceiling imposed on QFII, FSI must obtain at least 10% of the shares issued by the target company upon completion of the initial investment; 3) The A-shares traded by QFII are negotiable or without sales restrictions in nature but the acquired A-shares by FSI are subject to sales restrictions and may not be transferred within three years.

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