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Foreign institutional ownership and liquidity commonality around the world

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ABSTRACT

In this study, we identify the relation between foreign institutional ownership and stock liquidity commonality in 39 countries from 2000 to 2014. Our results show a negative and robust linkage between foreign institutional ownership and global stock liquidity commonality. Corporate transparency is a key mechanism through which foreign institutional investors can reduce stock liquidity commonality. Independent and U.S.-based foreign institutional investors have a greater effect on reducing stock liquidity commonality. Additionally, there is a U-shaped relation between foreign institutional ownership and stock liquidity commonality. Next, we provide evidence that foreign institutional investors mitigate the effects of local culture, exaggerate the impacts of economic policy uncertainty, and substitute the role of a country's corporate governance level. Finally, it is evident that stock liquidity commonality mediates the relation between foreign institutional ownership and firm valuation. Foreign institutional investors can enhance firm valuation through stock liquidity commonality and stock illiquidity.

Keywords: Foreign institutional ownership; liquidity commonality; international finance

JEL classification: G14; G15; G18; G23; G32; N2

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1. Introduction

Stock liquidity commonality refers to co-movement across stocks' liquidity and is critical to understanding portfolio selection, asset pricing, market efficiency, and resource allocation (Acharya & Pedersen 2005; Karolyi *et al.* 2012; Bai & Qin 2015). Our work is motivated by Karolyi *et al.* (2012), who propose that the commonality in liquidity exists globally and that the fundamental sources from the supply and demand sides cause stock liquidity commonality to vary over time. Supply-side sources mainly refer to financial intermediaries' funding constraints, which make limited contributions to stock liquidity commonality. Demand-side sources, including correlated trading activity, institutional ownership, and investor sentiment, have more important effects on stock liquidity commonality in both U.S. and global markets. We intend to shed more light on this issue by exploring the determinants of the demand-side factors. Specifically, we investigate whether foreign institutional ownership is a key demand-side factor that can significantly influence stock liquidity commonality, particularly around the world.

In contrast to the literature concentrating on the U.S. market (Kamara *et al.* 2008; Koch *et al.* 2016), we use international data (39 countries) from 2000 to 2014 and provide evidence to establish the relation between foreign institutional ownership and stock liquidity commonality. The international setting helps us to study the influence of foreign institutional investors on stock liquidity commonality in countries with heterogeneous cultures, openness, corporate governance, and market information environments. Compared to domestic institutional investors, foreign institutional investors face higher monitoring costs and information bias due to geographic distance, cultural differences, and different legal systems (La Porta *et al.* 1998; Chan *et al.* 2005; Kang & Kim 2010). Hence, foreign institutional investors cautiously select investment targets and leverage their management experience to improve target firms' corporate governance and corporate information quality (Gillan & Starks 2003; Ferreira *et al.* 2009; Kang & Kim 2010; Aggarwal *et al.* 2011). For example, foreign institutional investors are motivated to increase corporate transparency by increasing the number of independent directors (Gilson & Milhaupt 2005; Aggarwal *et al.* 2011), reducing executives' opportunistic behaviors (Chung *et al.* 2005), enhancing accounting disclosure timeliness (Jiang & Kim 2004), adopting high-quality accounting standards, and using high-quality auditors (Sami & Zhou 2004). In addition, a significant and negative association exists between corporate information quality and stock liquidity commonality or liquidity risk (Lang & Maffett 2011; Ng 2011). Combining these findings, it stands to reason that foreign institutional ownership can play a significant role in enhancing corporate information quality, thereby affecting stock liquidity commonality. Therefore, we adopt international firm-monthly panel data to examine the roles of foreign institutional ownership influencing stock liquidity commonality around

the world.[1] Our results show that foreign institutional investors can significantly reduce stock liquidity commonality in the international setting. The baseline regressions incorporate country-, year-, calendar-month- and industry-fixed effects to control for potential omitted unobservable variables and clustering standard errors at the country, industry, and year levels. These results are consistent when (i) we denominate variables in either U.S. dollars or local currencies, (ii) we use dummy variables to indicate foreign institutional investors, and (iii) we exclude countries that dominate our sample. Next, subsample analyses show that foreign institutional investors decrease stock liquidity commonality before and after the 2008 financial crisis and play significant roles in reducing stock commonality in both developed and emerging markets. In addition, we examine the relation among foreign institutional ownership and other measures of stock liquidity uncertainty (Lang & Maffett 2011). It is evident that foreign institutional ownership is negatively associated with liquidity variances, liquidity skewness, extreme liquidity events, loadings with market liquidity, and co-movement between stock illiquidity and market returns.

To address concerns over the causal relation between foreign institutional ownership and stock liquidity commonality, we use the 2003 U.S. Jobs and Growth Tax Relief Reconciliation Act (JGTRRA) as an exogenous shock to implement an endogeneity test (Fang *et al.* 2015; Luong *et al.* 2016; Ng *et al.* 2016). The passage of the 2003 JGTRRA lowered the dividend tax rate of JGTRRA-eligible companies, including companies domiciled in countries that have tax treaties with the United States. In comparison, the dividends of JGTRRA-ineligible companies are still imposed according to the ordinary personal income tax rate. Therefore, we expect that although the enactment of the JGTRRA can change foreign institutional ownership, it is not intended to affect stock liquidity commonality. The difference-in-differences method shows that in response to the enactment of the JGTRRA, a significant increase occurred in foreign institutional ownership of JGTRRA-eligible companies relative to that of JGTRRA-ineligible companies (the control group). This is consistent with the findings of Desai and Dharmapala (2011), Fang *et al.* (2015), Luong *et al.* (2016), and Ng *et al.* (2016). In addition, Desai and Dharmapala (2011) exclude other factors that could enhance foreign institutional ownership of JGTRRA-eligible companies. Hence, in this paper, we use the JGTRRA as an instrumental variable to examine the relation between foreign institutional ownership and global stock liquidity commonality. Two-stage regressions indicate a significant increase in foreign institutional ownership and a negative relation between foreign institutional ownership and stock liquidity commonality. In addition, we

[1] Karolyi *et al.* (2012) and Moshirian *et al.* (2017) use country-year (average) observations to study the relation between foreign institutional ownership and stock liquidity commonality. However, we concern their samples have limited statistical power and might cause potential bias. There are other studies using firms' monthly data to investigate stock liquidity risks. For example, Lang and Maffett (2011) adopt a firm-monthly sample to study the relation between firm transparency and liquidity uncertainty during a financial crisis. Ng (2011) uses a firm-monthly sample to test the effects of information quality on liquidity risk. Pástor and Stambaugh (2003) and Lee (2011) use firm-monthly data to examine the pricing implications of liquidity risk.

construct a counterfactual test based on 2009, a year selected at random, to examine the effect of the JGTRRA as an exogenous shock. We find no significant relation between foreign institutional ownership and stock liquidity commonality. These findings show that the 2003 JGTRRA is effectively a quasi-experiment to control endogeneity, and therefore foreign institutional investors can reduce global stock liquidity commonality. In addition, we use a difference-in-differences test to provide evidence of a significant decrease in the stock liquidity commonality of JGTRRA-eligible companies relative to that of JGTRRA-ineligible companies.

Agarwal (2009) points out a non-linear relation between U.S. institutional ownership and stock liquidity. This inspires us to study the marginal effect of foreign institutional ownership and examine how the effect on stock liquidity commonality varies with foreign institutional ownership size. We identify a U-shaped relation between foreign institutional ownership and stock liquidity commonality, indicating that as foreign institutional ownership increases, its negative effect on stock liquidity commonality attenuates. This finding implies that the role of foreign institutional investors in enhancing price efficiency decreases and that homogeneous foreign institutional ownership increases information asymmetry and causes an adverse selection effect (Agarwal 2009). These effects induce a decrease in the marginal effect of foreign institutional ownership on stock liquidity commonality. The U-shaped relation also indicates that stock liquidity commonality may increase when foreign institutional ownership increases past a certain threshold, which can be attributed to the weakened monitoring roles of homogenous institutional ownership (Agarwal 2009; Koch *et al.* 2016; Luong *et al.* 2016). We conclude that a nonlinear relation exists between foreign institutional ownership and stock liquidity commonality around the world.

Next, we consider differences among foreign institutional investors. Based on the strength of potential business ties to a corporation, we classify foreign institutional investors as gray and independent (Chen *et al.* 2007; Ferreira & Matos 2008; Aggarwal *et al.* 2011). Gray foreign institutional investors mainly include bank trusts and insurance companies whose monitoring abilities may be compromised due to business interests, whereas independent foreign institutional investors, including mutual funds and investment advisors, are pressure-resistant (Chen *et al.* 2007; Ferreira & Matos 2008; Aggarwal *et al.* 2011). We find that independent foreign institutional investors can decrease stock liquidity commonality. However, we find little evidence of a relation between gray foreign institutional ownership and stock liquidity commonality. In addition, based on geographic origin, we classify foreign institutional investors into U.S.- and non-U.S.-based categories. Our results show that U.S.-based foreign institutional investors outperform non-U.S.-based peers in reducing stock liquidity commonality.

Lang and Maffett (2011) and Ng (2011) show a significant and negative association between corporate transparency and stock liquidity commonality or liquidity risk. Market participants such as market makers, investors, and speculators are not prone to trade stocks with low information quality, and this can cause higher stock liquidity commonality or liquidity risk. Therefore, we propose the enhancement of corporate transparency as a key mechanism via which foreign institutional investors can reduce stock liquidity commonality. In this paper, we use analysts' forecast accuracy to proxy for corporate transparency and information quality. To bridge the relation between foreign institutional ownership, corporate transparency, and stock liquidity commonality, we first provide evidence of a negative relation between corporate transparency and stock liquidity commonality around the world, which supports the findings of Ng (2011) in the U.S. domestic market. Next, we show that foreign institutional investors can significantly enhance global corporate transparency and information quality. This finding supports the positive findings that foreign institutional investors can enhance corporate governance to offset the costs caused by geographic distance, cultural differences, and different legal systems (La Porta *et al.* 1998; Gillan & Starks 2003; Chan *et al.* 2005; Ferreira *et al.* 2009; Kang & Kim 2010). Overall, our two-stage regressions show that enhancement of corporate transparency is a key mechanism, through which foreign institutional investors can reduce stock liquidity commonality around the world.

Little evidence is available regarding the interaction between foreign institutional ownership and other market-level factors that affect stock liquidity commonality. We fill this void by investigating the relation between foreign institutional ownership and stock liquidity commonality against a heterogeneous background of local culture, economic policy uncertainty (EPU), and a country's corporate governance level. The management and behavioral finance literature documents that the local culture, rather than deliberate policies, imposes informal constraints on investors' decisions (North 1990) and causes biased views and sentiments (Barberis *et al.* 2005) that influence a commonality not only in price (Eun *et al.* 2015) but also in liquidity (Moshirian *et al.* 2017). Foreign institutional investors export diversified opinions and thoughts, which can serve as proxies of international multiculturalism (Eun *et al.* 2015). Therefore, we test the effects of interaction between local culture and foreign institutional ownership on stock liquidity commonality. We explore two key cultural dimensions that can externally and internally affect investors' strategies (Eun *et al.* 2015). The first is cultural tightness versus looseness, which is constructed based on survey data from 33 countries and indicates the strength of a country's social norms and society's tolerance for deviant behavior (Gelfand *et al.* 2011). We show that higher commonality in liquidity is seen in culturally tight countries, where investors' behaviors tend to be homogeneous than in culturally loose countries (Gelfand *et al.* 2011). Additionally, we highlight that in culturally

tight countries, stock liquidity commonality decreases as foreign institutional ownership increases. The second dimension is cultural collectivism versus individualism, which is sourced from Hofstede (2001)[2] and indicates the internal attributes of investors. We document that stock liquidity commonality is lower in culturally individualistic countries, where investors make decisions more confidently and independently (Hofstede 2001). In addition, in individualistic countries, stock liquidity commonality increases as foreign institutional ownership increases. Our findings are consistent with Eun *et al.* (2015), who provide evidence that culture can affect price commonality. We show that these two key cultural dimensions also affect liquidity commonality around the world. Moreover, foreign institutional ownership, as an important proxy for a country's openness and international multiculturalism, can significantly mitigate the influence of local culture on stock liquidity commonality from a global viewpoint.

With respect to the uncertainty surrounding global economic policy, Brogaard *et al.* (2015) state that U.S. EPU can systematically affect the expectations of a global firm's fundamental value and drive capital markets. Therefore, we posit that as U.S. EPU increases, the divergence in international investors' opinions on firm value also increases, which can increase global stock liquidity commonality. Based on the EPU index for fiscal policy, government spending, and financial regulation developed by Baker *et al.* (2014), our results show that U.S. EPU significantly increases stock liquidity commonality around the world. The impacts of U.S. EPU on stock liquidity are exaggerated by foreign institutional investors due to the global market integration promoted by foreign institutional investors.

Foreign institutional investors actively engage in enhancing corporate governance worldwide (Gillan & Starks 2003; Aggarwal *et al.* 2011). However, there are two competing hypotheses on how the interaction between country-level corporate governance quality and foreign institutional investors affects stock liquidity commonality. The first hypothesis is that foreign institutional investors have substitutionary effects on stock liquidity commonality. In countries with good corporate governance quality, domestic institutional investors play dominant roles in improving firm information efficiency. Therefore, the incremental effects of foreign institutional investors are limited. In comparison, foreign institutional investors domiciled in countries with good institutional environments can export advanced management experience to companies in countries with poor corporate governance mechanisms and promote these companies' information efficiency. Hence, foreign institutional investors substitute the effects of country-level corporate governance mechanisms on improving market information environments and reducing stock liquidity commonality. The second hypothesis

[2] Other than collectivism, Hofstede (2001) investigates masculinity, power distance, and uncertainty avoidance. However, there is little evidence supporting their effects on stock liquidity commonality around the world (Moshirian *et al.* 2017).

is that foreign institutional investors have complementary effects on stock liquidity commonality. Due to their information disadvantage, foreign institutional investors perform well only in countries with good corporate governance mechanisms. Hence, foreign institutional investors complement the roles of country-level corporate governance mechanisms in reducing stock liquidity commonality. It remains an open question whether the substitutionary or complementary effect is predominant. We test the effects of foreign institutional ownership on stock liquidity commonality in different countries with high and low levels of market information efficiency or market information environments. Our results support the substitutionary view and show that, compared with countries with stronger market information efficiency and more transparent market information environments, foreign institutional investors reduce stock liquidity commonality to a larger extent in countries with weaker market information efficiency and more opaque market information environments.

Regarding the economic consequences, we show that there is a positive and significant association between foreign institutional ownership and firm valuation. However, identifying the working channel is problematic. Ng *et al.* (2016) point out that stock illiquidity is a channel through which foreign ownership can affect firm valuation. Our work examines the effects of stock liquidity commonality on the relation between foreign institutional ownership and firm valuation. Mediation analysis shows that in addition to stock illiquidity (Ng *et al.* 2016), stock liquidity commonality is a key channel through which foreign institutional ownership can improve firm valuation around the world. Specifically, foreign institutional investors can improve firm valuation by reducing stock liquidity commonality in the international setting.

This study contributes in several important ways to the growing literature on international stock liquidity commonality. First, prior studies either concentrate on demand-side sources in the U.S. domestic market (Kamara *et al.* 2008; Koch *et al.* 2016) or view foreign institutional ownership as a proxy of correlated trading (Karolyi *et al.* 2012; Moshirian *et al.* 2017) in the international setting. In this paper, we show that foreign institutional investors play significant monitoring roles in corporate governance and thereby reduce stock liquidity commonality in global markets. The enhancement of corporate transparency is a key mechanism by which foreign institutional investors can significantly and robustly reduce stock liquidity commonality around the world.

Our work is related to but distinct from the studies of Karolyi *et al.* (2012) and Moshirian *et al.* (2017). Those studies assume that the correlated trading of foreign institutional investors can increase stock liquidity commonality around the world. Karolyi *et al.* (2012) mainly use U.S. equity flows and capital flows to proxy correlated trades of foreign institutional investors with

mixed findings[3]. Our concern is that such macro data can only act as a proxy for U.S.-based foreign institutional investors and that they fail to reflect the nested financial globalization. Although Karolyi *et al.* (2012) also use foreign institutional ownership in their cross-country analysis, the ownership data is static[4] and cannot reflect time-varying effects of foreign institutional ownership on stock liquidity commonality. Moshirian *et al.* (2017) also use foreign institutional ownership to proxy correlated trading but they document a week negative relation between foreign institutional ownership and stock liquidity commonality. In addition, they lack endogenous analysis for foreign institutional ownership. We highlight the importance of firm-level factors, particularly foreign institutional ownership, in causing cross-sectional variations in stock liquidity commonality, and we provide evidence of a significant negative association between foreign institutional ownership and stock liquidity commonality. The JGTRRA is used as an instrumental variable to examine endogeneity, and our conclusions are robust.

We emphasize the important role of foreign institutional investors worldwide instead of isolating effects between market-level and firm-level factors, as shown in Karolyi *et al.* (2012) and Moshirian *et al.* (2017). Specifically, we identify the interplay between foreign institutional ownership and various market-level characteristics, such as culture, EPU and the market-level information environment. We extend the work of Eun *et al.* (2015) and find that cultural tightness and collectivism increase stock liquidity commonality, but foreign institutional investors as a proxy of international multiculturalism can reduce the effects of domestic culture on stock liquidity commonality. Next, we find that U.S. EPU increases global stock liquidity commonality and foreign institutional investors exaggerate the impacts of U.S. EPU around the world. Last, we find that foreign institutional investors substitute for the role of a country's corporate governance level, which means that foreign institutional investors reduce stock liquidity commonality to a greater extent in countries with weaker market information efficiency and more opaque market information environments.

Our work also contributes to discussions about the role of foreign institutional investors in the process of global financial integration and liberalization. Although the literature supports the positive roles of foreign institutional investors in reducing stock volatility (Li *et al.* 2011) and improving corporate governance (Gillan & Starks 2003; Ferreira *et al.* 2009; Kang & Kim 2010; Aggarwal *et al.* 2011), concerns persist. For example, Stiglitz (1999) and Bae *et al.* (2004) state that sensitive foreign investors may make emerging markets more vulnerable to

[3] Overall, Karolyi *et al.* (2012) report positive coefficients of equity flows and negative coefficients of capital flows.

[4] Karolyi *et al.* (2012) use foreign institutional ownership as of December 2005. Karolyi *et al.* (2012) only include the foreign institutional ownership variable in the analysis of cross-variation in stock liquidity commonality (see Table 5). In other parts, they adopt U.S. equity and capital flows as proxies for correlated trading of foreign institutional investors.

financial turmoil. We gauge the economic consequences of foreign institutional investors on firm valuation. We show that stock liquidity commonality is a key mediation variable through which foreign institutional investors can improve firm value. These findings are consistent with Bena et al., (2017), who find that foreign institutions play disciplinary and monitoring roles in corporate governance worldwide and that foreign institutional ownership promotes long-term investment and innovation outputs, internationalization of a firm's operations, and firm valuation. We conclude that the globalization of shareholder structures is a positive force for stabilization of stock markets and increases in firm value.

The remainder of this paper proceeds as follows. Section 2 presents our data and sample selection. Section 3 details the key variables and descriptive statistics. In Sections 4-10, we analyze the effects of foreign institutional ownership on stock liquidity commonality around the world. Section 11 concludes the paper.

2. Data and sample selection

We source firm-level institutional ownership data from FactSet Ownership (LionShares) and accounting data from the Worldscope database. We obtain international stock trade data from Datastream, including the daily total return index (RI), daily trading volume (Vol, in thousands of shares), and daily adjusted closed price (P). Our sample comprises 39 countries, including 21 developed countries (Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Hong Kong, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Singapore, Spain, Sweden, Switzerland, the United Kingdom, and the United States) and 18 developing countries (Brazil, Chile, China, Egypt, Greece, India, Israel, Malaysia, Mexico, Peru, Philippines, Poland, Portugal, South Africa, South Korea, Taiwan, Thailand, and Turkey) (Lee 2011). Our sample excludes financial and utility firms, which are heavily regulated (Ferreira and Matos, 2008; An *et al.*, 2014; An *et al.*, 2016; Bena *et al.*, 2017). The sample spans from 2000 to 2014.

We take the following steps to clean the Datastream data. First, Datastream misfiles non-trading days with padding values. Hence, we identify and remove a non-trading day by examining whether more than 90% of stocks have zero returns in a given exchange on that day (Lee 2011). Next, Datastream repeats the last valid trading value until the end of the sample for delisted stocks. To address this issue, we remove repeated records from the end of the sample for a delisted stock (Ince & Porter 2006). Third, we remove daily returns that are greater than or equal to 100% and the reverse on the following trading day. Specifically, we remove the daily returns in consecutive trading days $t-1$ and t if $\left(1+R_{i,t-1}\right)*(1+R_{i,t})-1<=0.5$, where $R_{i,t}$ is the daily return at day t and at least one of these two returns is 100% or greater. Based on this rule, we exclude daily returns above 100% that are exaggeratedly

reversed on the following day. Additionally, we remove daily returns if the total return index is less than 0.01 on both the current and previous days. Fourth, we require that a stock in a given month has more than 10 non-zero return days or that the ratio of number of non-zero return days to the number of non-missing trading days be greater than 80%. Fifth, we require a stock to have at least 12 months of observation during our sample period. Finally, we winsorize the stock prices for every country-year section. Specifically, in a given year, we exclude stocks whose prices at the end of the previous year fall in the top or bottom 2.5% of the cross-section in a country.

We consistently study the common stocks in the major exchanges in each country and exclude depository receipts, real estate investment trusts, preferred shares, investment funds and other stocks with special features (Lee, 2011 and Karolyi *et al.* 2012). [5] With respect to cross-listed companies, we use only their stocks with the type "equity," and these stocks are primary quotes. Additionally, we keep a cross-listed firm's geographical country consistent with its listed country. For example, we study Google stocks only in the U.S. exchange even though Google is also cross-listed in France and Romania. Finally, we keep dead stock data to avoid survivorship.

3. Key variables and descriptive statistics

In this section, we present definitions of the key variables, including stock liquidity commonality, foreign institutional ownership, foreign institutional investors' natures, and stock characteristics. Appendix A summarizes the definitions of variables used in this paper.

3.1. Stock liquidity commonality

To measure stock liquidity commonality, we start by defining stock liquidity from the angle of price impact. We use the illiquidity indicator $Illiq$ proposed by Amihud (2002) to proxy for a stock's liquidity (Karolyi *et al.* 2012). $Illiq$ is the (Amihud) ratio of the absolute return to dollar trading volume, which can effectively measure the price impacts of the unit trading volume (in dollars) in international stock markets (Kang & Zhang 2010; Fong *et al.* 2017). $Illiq_{i,t} = \frac{|R_{i,t}|}{P_{i,t}Vol_{i,t}}$, where $R_{i,t}$ is stock i's daily return at day t, $P_{i,t}$ is the stock price (in U.S. dollars), and $Vol_{i,t}$ is the daily trading volume (measured in thousands). The higher the Amihud ratio $Illiq$ is, the higher the stock's illiquidity. We remove observations with zero returns to mitigate concerns that we misclassify days without trade into our sample (Daske *et al.* 2008; Lang & Maffett 2011).

[5] We remove stocks with names including keywords such as "REIT", "REAL EST", "GDR", "PF", "PREF" and "PRF" which represent depository receipts, real estate investment trusts, and preferred shares. In the United States, we remove American depository receipts by examining the names of stocks.

In this study, we use $R^2_{(FL,ML)}$ estimated from a regression of stock illiquidity to market illiquidity to measure the commonality in liquidity within a country (Lang & Maffett 2011). Specifically, we measure stock liquidity commonality in each country by modeling a stock's percentage change in $Illiq$ as a function of the percentage change in market-level illiquidity as per below (Roll 1988; Morck *et al.* 2000; Lang & Maffett 2011; Karolyi *et al.* 2012):

$$\%\Delta Illiq_{i,t} = \beta_{0,i} + \beta_{1,i}\%\Delta Illiq_{m,t-1} + \beta_{2,i}\%\Delta Illiq_{m,t} + \beta_{3,i}\%\Delta Illiq_{m,t+1} + \varepsilon_{i,t} \quad (1)$$

where $\%\Delta Illiq_{i,t}$ is the daily percentage change in $Illiq_{i,t}$ of stock i at day t, which is a proxy for liquidity innovation (Hameed *et al.* 2010). We equally weight the average $Illiq_{i,t}$ across stocks in country m to have a market level $Illiq_{m,t}$ (Lang & Maffett, 2011). $\%\Delta Illiq_{m,t}$ is the daily percentage change in market illiquidity $Illiq_{m,t}$. We also use the lead term $\%\Delta Illiq_{m,t+1}$ and lag term $\%\Delta Illiq_{m,t-1}$ to mitigate non-synchronicity (Jin & Myers 2006). We require at least 10 observations in each month to obtain firm-monthly $R^2_{(FL,ML)}$ and then define a stock's monthly liquidity commonality $COM(FL,ML)_{i,t}$ by the logistic transformation on $R^2_{(FL,ML),i,t}$ (Morck et al. 2000; Karolyi e*t al.* 2012; Moshirian *et al.* 2017). For the sake of concision, we omit the subscript as follows:

$$COM(FL,ML) = ln\left(\frac{R^2_{(FL,ML)}}{1-R^2_{(FL,ML)}}\right) \quad (2)$$

3.2. Foreign institutional investors

Guided by Ferreira and Matos (2008), if an institutional investor whose registration country is different from the country in which it invests, we refer to this investor as a foreign institutional investor.[6] We aggregate the holding ratios (holding shares divided by total shares outstanding) across foreign institutional investors to define the foreign institutional ownership IO_FOR of a given firm. Additionally, based on geographic origin, we assign foreign institutional investors to U.S.-based foreign institutional investors IO_FOR_US and non-U.S.-based foreign institutional investors IO_FOR_NUS.

Next, we classify foreign institutional investors as independent foreign institutional investors IO_FOR_INDEP and "gray" foreign institutional investors IO_FOR_GRTAY according to the potential business ties between foreign institutional investors and listed companies (Ferreira & Matos 2008; Aggarwal *et al.* 2011). The independent foreign institutional investors, which mainly include mutual funds and investment advisors, have fewer potential ties with listed

[6] Similarly, we define the domestic institutional investor as one whose registration country is the same as the country where it invests. We aggregate the holding ratios across domestic institutional investors to define the domestic institutional investors' ownership IO_DOM for a given firm. The holding ratio is holding shares divided by total shares outstanding.

companies, as they actively collect firm-level information and face less managerial pressure. Brickley *et al.* (1988) refer to the independent foreign institutional investor as a pressure-resistant investor. However, gray foreign institutional investors, which mainly include banks, trusts, pension funds, and insurance companies, have closer ties with executives in listed companies and thereby face more pressure from executives. Hence, Ferreira and Matos (2008) hold that there is a conflicting interest between gray foreign institutional investors and other types of investors. Brickley *et al.* (1988) refer to the gray foreign institutional investor as a pressure-sensitive investor.

3.3. Stock characteristics

In this subsection, we illustrate stock characteristics as control variables that can affect stock liquidity commonality. First, we use monthly market capitalization (in dollars and with log function applied) to measure stock $Size$. Big firms have more analyst coverage, which can promote corporate information quality and influence their liquidity commonality. Second, we calculate stock standard deviation $STDRET$ using the daily returns in a month to proxy for monthly volatility. Third, we use the log difference of the stock price at the beginning and end of a month to measure the monthly holding return RE. We use RE to control for investors' momentum trades. Fourth, we use the book-to-market ratio BM to proxy for the long-term growth ability of a firm. It is calculated based on the book value in the last fiscal year divided by monthly market value. Fifth, we use loss frequency $LOSS\_FRE$ to measure a firm's financial risk. We expect that a firm with a high loss frequency tends to have worse corporate governance and a high liquidity commonality. We define loss frequency as the number of years a firm's net income is less than zero over the past five years. Sixth, we use the standard deviation of sales over the past five years to proxy for sales volatility STD_SALES, which we use to control for a firm's operational risk. Seventh, the rise in closely held shares ($CLHLD$) can lead to an increase in firm information asymmetry and the likelihood of insider trading. Therefore, we use the ratio of closely held shares to total shares outstanding as a control variable that can affect stock liquidity commonality (Lang & Maffett 2011). Finally, for non-U.S. companies, an ADR presence is a key feature that may cause liquidity differences among firms (Lang *et al.* 2003; Lang *et al.* 2012; Ng *et al.* 2016). To address this issue, we have added two dummy variables, ADR_EX and ADR_NEX, to indicate whether a firm has ADRs traded in American markets. ADR_EX equals one if a firm has ADRs traded in Level II or III markets and zero otherwise. ADR_NEX equals one if a firm has ADRs traded in Level I markets and zero otherwise. There are differences in information transparency between Level-I ADRs and Level II and III ADRs. Firms that issue Level-I ADRs generally qualify for financial reporting exemptions, whereas those that issue Level II and III ADRs must disclose financial statements in accordance with the U.S. Generally Accepted Accounting Principles (GAAP). The latter firms also receive wide analyst coverage, investor scrutiny and potential

legal exposure (Baker *et al.* 2002; Lang *et al.* 2003; Bailey *et al.* 2006; Lang *et al.* 2012; Fang *et al.* 2015). Using Datastream, we collected the effective dates of ADR issues by non-U.S. firms in either Level I or Level II and III markets. We then followed the procedures of Lang *et al.* (2003), Ferreira and Matos (2008), Doidge *et al.* (2009) and Lang *et al.* (2012) to cross-check the data using information from various sources including the Bank of New York, Citibank, J.P. Morgan, the New York Stock Exchange (NYSE), the American Stock Exchange (AMEX), Nasdaq, the Over-The-Counter Bulletin Board (OTCBB), the Center for Research in Security Prices (CPSR) and the OTC markets database, firms' annual reports, and SEC Form 20-F filings.

3.4. Descriptive statistics

Table 1 presents summary statistics of sample size, stock liquidity commonality measured by $R^2_{(FL,ML)}$ and foreign institutional ownership (in percentage) for each of the 39 countries from 2000 to 2014. Countries are ranked alphabetically. Column (1) reports the sample size in each country. Overall, we have 610,111 firm-month observations. Column (2) reports each country's sample as a percentage of the total sample size. The United States accounts for about 18.11% of the total sample, followed by Japan (14.63%), the United Kingdom (12.52%), Taiwan (6.11%), Australia (5.94%), and France (5.54%). The United States and Japan together, account for around one third of the total sample size, and the six jurisdictions mentioned above account for around 60% of the total sample size. Column (3) reports the values of $R^2_{(FL,ML)}$ in each country. The $R^2_{(FL,ML)}$ is obtained from the regression of firm illiquidity on market illiquidity (see Eq. (1)). The global average is 0.24, comparable to the 0.19 of Lang and Maffett (2011) (sample period: 1997 to 2008), and the 0.23 of Karolyi *et al.* (2012) (sample period: 1995 to 2009)[7]. In addition, the range of stock liquidity commonality in our sample (minimum, 0.20, [Netherlands]; maximum, 0.31, [China]) is also similar to the range reported by Karolyi *et al.* (2012) (minimum, 0.21, [Netherlands]; maximum, 0.42, [China]). Column (4) reports foreign institutional ownership IO_FOR in percentages. We show that the global average is 6.07%. The foreign institutional ownership in European markets (e.g., Ireland, 19.45%; Netherlands, 17.42%; Switzerland, 12.76%; Norway, 11.15%) is significantly higher than that in Asian markets (e.g., China, 0.35%; India, 1.52%; Malaysia, 3.18%), which can be attributed to capital regulations in Asian countries. Columns (5) and (6) report $R^2_{(FL,ML)}$ and IO_FOR for the pre-crash period (2000-2008) and columns (7) and (8) report $R^2_{(FL,ML)}$ and IO_FOR for the post-crash period (2009-2014). Average foreign institutional ownership increases from 5.59% to 6.70%, whereas stock liquidity commonality increases slightly from 0.23 to 0.24.

[7] Karolyi *et al.* (2012) do not directly report this value. We take the simple average of each country's commonality figures to calculate this overall average value.

INSERT TABLE 1

Guided by Karolyi *et al.* (2012), Figure 1 illustrates the cross-country variations in stock liquidity commonality. The data are from Table 1. The bars representing stock liquidity commonality are ranked from high to low. Panel A illustrates results for the full sample period. In their sample, Karolyi *et al.* (2012) show that developing countries like China, Pakistan, Malaysia and India rank higher in stock liquidity commonality. In our sample, we find that East Asian countries (e.g., China, Japan, South Korea and Taiwan) rank higher, with stock liquidity commonality greater than 0.25. Karolyi *et al.* (2012) show that developed countries like Australia, the United Kingdom, Switzerland, France, and Netherlands have lower stock liquidity commonality. We also report lower stock liquidity commonality for developed countries (e.g., Belgium, Denmark, Germany, Israel and Netherlands). Panel B shows results for the pre-crash period (2000-2008) and Panel C illustrates results for the post-crash period (2009-2014). We find that stock commonality in the United States increases markedly after year 2008. Karolyi *et al.* (2012) also report that U.S. stock liquidity commonality increased when the crisis occurred in October 2008.

INSERT FIGURE 1

Figure 2 presents scatter diagrams to illustrate a preliminary and intuitive relation between foreign institutional ownership and stock liquidity commonality around the world. The data are from Table 1. The X-axis shows the foreign institutional ownership and the Y-axis is stock liquidity commonality. We can observe a downward fitted line, indicating that stock liquidity commonality decreases as foreign institutional ownership increases.

INSERT FIGURE 2

In Table 2, we illustrate the summary statistics of key variables, including institutional ownership, firm characteristics, stock liquidity statistics, and country-level characteristics. We document that the global average domestic institutional ownership is 18.3% higher than the foreign institutional ownership (6%). The independent foreign institutional ownership (5.4%) is higher than the gray foreign institutional ownership (0.5%), and the U.S.-based foreign institutional ownership (2.1%) is lower than the non-U.S.-based foreign institutional ownership (3.6%).

INSERT TABLE 2

4. Foreign institutional ownership and stock liquidity commonality

In this section, we propose our baseline regression to examine the relation between foreign institutional ownership and stock liquidity commonality. We model stock liquidity commonality $COM(FL,ML)_{i,t}$ as a function of foreign institutional ownership $IO\_FOR_{i,t-1}$ and firm characteristics as control variables:[8]

$$COM(FL,ML)_{i,t} = \alpha_0 + \alpha_1 IO\_FOR_{i,t-1} + \alpha_2 IO\_DOM_{i,t-1} + \gamma Controls_{i,t-1} + \varepsilon_{i,t} \quad (3)$$

where the dependent variable $COM(FL,ML)_{i,t}$ is stock i's monthly liquidity commonality as defined in Eqs. (1)-(2) and the other variables are defined as shown in Appendix A.

Table 3 reports the panel regression results of Eq. (3). We include country-, industry-, and year-fixed effects in the regression. Column (1) of Panel A presents the full sample results. We find a negative (-0.27) and significant relation (t=-8.36, at the 1% level) between foreign institutional ownership and stock liquidity commonality. As a comparison, we document that domestic institutional investors increase stock liquidity commonality. As one third of our sample comprises American and Japanese listed companies, we remove these companies in case they dominate the results. Column (2) shows that foreign institutional ownership significantly decreases stock liquidity commonality after American and Japanese firms are removed. However, domestic investors decrease stock liquidity commonality. In further, we exclude observations from the United States, Japan, the United Kingdom, Taiwan, Australia and France, because these six jurisdictions account for 60% of sample observations. Column (3) also reports a significant negative relation between foreign institutional ownership and stock liquidity commonality excluding these six jurisdictions. Specifically, the coefficient of IO_FOR is -0.26 and significant at the 1% level (t=-6.34). In column (4), we replace IO_FOR with a dummy variable. If a listed company is subject to foreign institutional ownership, we define $IO\_FOR = 1$; otherwise, $IO\_FOR = 0$. We find a negative coefficient of IO_FOR (-0.061; t=-6.25), which implies that foreign institutional investors significantly decrease stock liquidity commonality. Additionally, domestic investors significantly increase stock liquidity commonality. In columns (1)-(4), the variables are denominated in U.S. dollars. In column (5), the variables are denominated in local currencies. We also find that foreign (domestic) institutional investors significantly decrease (increase) stock liquidity commonality. In columns (1)-(5), we cluster the standard errors at the firm level. Columns (6)-(8) report the results after clustering the standard errors at the country, industry, and year levels, respectively. The coefficients of IO_FOR are negative and significant at the 1% level (the t-statistics are -4.09, -10.69, and -7.16, respectively). However, the coefficients of IO_DOM are positive (the t-statistics are 1.62, 2.85, and 3.18, respectively). Column (9) adopts calendar-

[8] In this paper, we use lagged independent variables to alleviate endogeneity concerns. The results are consistent if we use current period values.

month-fixed effects instead of year-fixed effects, and column (10) reports results of the Fama-Macbeth regression. The coefficients of IO_FOR are also negative and significant. The coefficient of IO_DOM is significantly positive in column (9) but insignificantly negative in column (10). Because our sample excludes financial and utility firms, which are heavily regulated (Ferreira and Matos, 2008; An *et al.*, 2014; An *et al.*, 2016; Bena *et al.*, 2017), in column (11), we report results when including financial and utility firms to alleviate sample concerns.[9] We find that after including financial and utility firms, a significant negative association also exists between foreign institutional ownership and stock liquidity commonality. We conclude that foreign institutional ownership is significantly and negatively associated with stock liquidity commonality around the world.

Panel B of Table 3 reports the results of subsample analyses. First, we divide our sample into two sub-periods using 2008, the year in which the global financial crisis adversely impacted the international stock markets, as a cutoff point. Column (1) reports results for the period before the financial crisis and column (2) reports results for the period after the financial crisis. There is a negative relation between foreign institutional ownership and stock liquidity commonality. In contrast, we document that domestic institutional investors increase stock liquidity commonality. In addition, the absolute value of the coefficient of foreign institutional ownership decreases from 0.33 (before the financial crisis) to 0.26 (after the financial crisis). Next, we split the countries in our sample into developed countries (column (3)) and emerging countries (column (4)) using the World Bank Group criteria. The coefficients of foreign institutional ownership are -0.21 and -0.60, both of which are significant at the 1% level. This finding means that foreign institutional investors decrease stock liquidity commonality in both developed and emerging countries. Additionally, foreign institutional investors decrease stock liquidity commonality more in emerging counties (-0.60) than in developed countries (-0.21), which is consistent with the findings of Kho *et al.* (2009) and Aggarwal *et al.* (2011). In addition, we document that domestic institutional investors increase stock liquidity commonality in developed countries but decrease it in emerging countries.

Panel C of Table 3 adopts five alternative stock liquidity uncertainty measures as dependent variables to test the robustness of our results (Lang & Maffett 2011; Lee 2011). The first alternative measure is $BETA$, which is the sum of the coefficients β_1, β_2, and β_3 obtained from Eq. (1) (Lee 2011). Column (1) shows that the coefficient of IO_FOR is negative (-0.27) and significant at the 1% level. The coefficient of IO_DOM is 0.46 and significant (t=5.29).

The second alternative measure is the liquidity commonality between firm illiquidity and

[9] In an un-tabulated table, we also test the sample for comprising only financial and utility firms and the results are also robust. These results are available upon requests.

market returns $COM(FL, MR)$. To calculate $COM(FL, MR)$, we regress firm illiquidity on market returns as follows to obtain $R^2_{(FL,MR)}$:

$$\%\Delta Illiq_{i,t} = \beta_{0,i} + \beta_{1,i}R_{m,t-1} + \beta_{2,i}R_{m,t} + \beta_{3,i}R_{m,t+1} + \varepsilon_{i,t} \quad (4)$$

We then define $COM(FL, MR) = \ln(\frac{R^2_{(FL,MR)}}{1-R^2_{(FL,MR)}})$. Column (2) shows the results when we use $COM(FL, MR)$ as the dependent variable. The coefficient of IO_FOR is -0.20 (*t*=-6.62) and significant at the 1% level. The coefficient of IO_DOM is -0.039 (*t*=-2.83) and significant at the 1% level.

The third measure is the monthly standard deviation of daily stock illiquidity $LIQVOL$. The fourth measure is the monthly skewness of daily stock illiquidity $LIQSKEW$. Columns (3) and (4) show the results using $LIQVOL$ and $LIQSKEW$ as the dependent variables, respectively. We find significant and negative associations between IO_FOR and $LIQVOL$ or $LIQSKEW$. The coefficients of IO_FOR in columns (3) and (4) are -1.12 and -0.63, both significant at the 1% level. The coefficients of IO_DOM in columns (3) and (4) are 0.148 and 0.154, both significant at the 1% level. The fifth measure is the liquidity black hole $LIQBH$, which proxies for the extreme illiquidity events. $LIQBH$ is the percentage of trading days in a given month when the daily illiquidity measure is 50 times higher than the country-level median. Column (5) reports the results when $LIQBH$ is the dependent variable. The coefficient of IO_FOR is -0.037 and significant at the 1% level. The coefficient of IO_DOM is -0.05 and significant at the 1% level.

Overall, based on the findings in Table 3, we conclude that foreign institutional investors significantly decrease stock liquidity commonality. However, the findings related to domestic institutional investors are mixed. We assume that the typical nature of domestic institutional investors may produce probable conflicts arising from its roles in the domestic financial markets. Domestic institutional investors seek long-term investment and have incentives to increase firm-level information transparency by improving corporate governance; thus, domestic institutional investors decrease stock liquidity commonality. However, Barclay and Holderness (1991) argue that domestic institutional investors, as majority shareholders, have conflicting interests with other types of shareholders, which can increase information asymmetry and decrease corporate transparency. These two alternative perspectives may have countervailing effects on stock liquidity commonality. With respect to the other control variables, we find that the coefficients of $SIZE$ are negative, which means that there is a negative relation between firm size and stock liquidity commonality. As analysts tend to cover big companies, big companies have higher information disclosure quality, higher transparency,

and lower stock liquidity commonality. Additionally, there is a negative relation between BM and stock liquidity commonality, which implies that growth stocks have higher liquidity commonality. The coefficient of $CLHLD$ is significantly positive. This indicates that the agency cost increases with the rise in the closely held shares ratio, which leads to low information transparency and high liquidity commonality. With respect to past stock performance RE, the positive coefficient means that the momentum of investors' herding behavior increases stock liquidity commonality. With respect to the liquidity level, we find that stock illiquidity positively affects stock liquidity commonality. This finding also means that the stock liquidity level does not drive the relation between foreign institutional investors and stock liquidity commonality. The coefficients of $Loss\_FRE$ are positive. Companies with a higher loss probability have higher liquidity commonality. Finally, we find that the coefficients of ADR_EX are significantly negative, indicating that non-U.S. firms with ADRs traded in Level II or III markets have lower stock liquidity commonality. We attributed these findings to the stricter information disclosure requirements in Level II or III markets (Lang *et al.* 2003). Lang *et al.* (2012) also report that ADR_EX (i.e., ADR presence in Level II or III markets) improves stock liquidity. In comparison, we find a negative but insignificant relation between ADR_NEX and stock liquidity commonality. Lang *et al.* (2012) also find little evidence of ADR_NEX affecting stock liquidity.

INSERT TABLE 3

5. JGTRRA: A natural experiment

To address the potential endogeneity issue, we use the enactment of the JGTRRA in 2003 as an exogenous impact to test the association between foreign institutional ownership and stock liquidity commonality around the world (Fang *et al.* 2015; Luong *et al.* 2016; Ng *et al.* 2016). The JGTRRA reduced the dividend tax rate of equity investments in JGTRRA-eligible firms in tax-treaty countries. Table 4 illustrates the tax- and non-tax-treaty countries in our sample.

INSERT TABLE 4

To test the effectiveness of the JGTRRA as an instrumental variable, at the first stage, we intend to identify whether foreign institutional ownership of JGTRRA-eligible firms significantly increases after the passage of the JGTRRA in 2003 (Fang *et al.* 2015). Our benchmark is the foreign institutional ownership of JGTRRA-ineligible firms. The difference-in-differences identification is designed as follows (Fang *et al.* 2015; Ng *et al.* 2016):

$$IO\_FOR\_US_{i,t} = \beta_{0,i} + \beta_1 POST2003\_QUALIFIED_{i,t} + \beta_2 QUALIFIED_{i,t} + \varphi Controls_{i,t} + \varepsilon_{i,t} \quad (5)$$

where $IO\_FOR\_US_{i,t}$ represents U.S.-based foreign institutional ownership of company i. $POST2003$ is a dummy variable. $POST2003$ equals one if the year is after 2003 and zero otherwise. $QUALIFIED_{i,t}$ is a dummy variable. $QUALIFIED_{i,t}$ equals one if a company i is JGTRRA-eligible for investors and zero otherwise. $POST2003\_QUALIFIED_{i,t}$ is an intersection term between $POST2003$ and $QUALIFIED_{i,t}$. $Controls_{i,t}$ is used to control for firm-level characteristics. We include year and firm fixed effects into our regressions that absorb the dummy variable $POST2003$.

We also implement a change-on-change specification to address any issues caused by potential time-invariant variables (Fang *et al.* 2015).

$$\Delta IO\_FOR\_US_{i,t} = \beta_{0,i} + \beta_1 \Delta POST2003\_QUALIFIED_{i,t} + \beta_2 \Delta QUALIFIED_{i,t} + \Delta Controls_{i,t} + \varepsilon_{i,t} \quad (6)$$

Columns (1) and (2) of Table 5 report the regression results of Eqs. (5) and (6), respectively. The coefficients of the intersection term $POST2003\_QUALIFIED_{i,t}$ are of interest; they are 0.004 in column (1) and 0.001 in column (2). Both coefficients are significant at the 1% level, and the *t*-statistics are 4.93 and 5.96, respectively. We show that the passage of the JGTRRA has a significant and positive effect on foreign institutional ownership. These findings are also consistent with those of Desai and Dharmapala (2011) and Fang *et al.* (2015).

We also test the change in stock liquidity commonality around the passage of the JGTRRA. The difference-in-differences and change-on-change models are constructed as follows.

$$COM(FL, ML)_{i,t} = \beta_{0,i} + \beta_1 POST2003\_QUALIFIED_{i,t} + \beta_2 QUALIFIED_{i,t} + \varphi Controls_{i,t} + \varepsilon_{i,t} \quad (7)$$

$$\Delta COM(FL, ML)_{i,t} = \beta_{0,i} + \beta_1 \Delta POST2003\_QUALIFIED_{i,t} + \beta_2 \Delta QUALIFIED_{i,t} + \Delta Controls_{i,t} + \varepsilon_{i,t} \quad (8)$$

Columns (3) and (4) of Table 5 report the regression results of Eqs. (7) and (8). The coefficients of the intersection term $POST2003\_QUALIFIED_{i,t}$ are -0.12 in column (3) and -0.033 in column (4). Both coefficients are significant at the 1% level, and the *t*-statistics are -3.04 and -2.99, respectively. The negative coefficients mean that the global stock liquidity commonality significantly decreases around the enactment of the JGTRRA.

Next, we implement a two-stage least-squares regression to test whether foreign institutional investors can reduce stock liquidity commonality around the world. In the first-stage regression, we estimate the fitted value $\widehat{IO\_FOR\_US}_{i,t-1}$ from the regression in Eq. (5). Thereby, we construct the second-stage regression as follows.

$$COM(FL,ML)_{i,t} = \beta_{0,i} + \beta_1 IO\_\widehat{FOR}\_US_{i,t-1} + \beta_2 Controls_{i,t-1} + \varepsilon_{i,t} \quad (9)$$

Column (5) of Table 5 reports the results of Eq. (9). The coefficient of $IO\_\widehat{FOR}\_US$ is negative (-9.47) at the 1% significance level (*t*-statistic is -3.01). The two-stage regression shows a significant and negative association between foreign institutional ownership and stock liquidity commonality around the world.

Finally, we construct a counterfactual test to identify the validity of the JGTRRA as an instrumental variable. Specifically, we select a window from 2004 to 2009 and choose 2006 as a simulated JGTRRA-enacted year and construct the corresponding dummy variable $POST2006$ and the intersection term $POST2006\_QUALIFIED_{i,t}$. We re-run Eq. (7) and find no significant relation around 2006, which reflects the effectiveness of the JGTRRA as an instrumental variable. Overall, the natural experiment involving the enacted JGTRRA shows that foreign institutional investors can significantly reduce stock liquidity commonality around the world.

INSERT TABLE 5

6. The impact of the size of foreign institutional ownership on stock liquidity commonality

In this section, we test nonlinear relation foreign institutional ownership and stock liquidity commonality around the world. Specifically, we test the impact of size of foreign institutional ownership on stock liquidity commonality.

To test the impact of the size of foreign institutional ownership on stock liquidity commonality, we construct three variables to measure the effects of the increment in foreign institutional ownership. The first variable is $D(IO\_FOR > 10)$. $D(IO\_FOR > 10)$ equals one if foreign institutional ownership exceeds 10% and zero otherwise. The second dummy variable is $D(IO\_FOR > 20)$. $D(IO\_FOR > 20)$ equals one if foreign institutional ownership exceeds 20% and zero otherwise. The third dummy variable is $D(IO\_FOR > 30)$. $D(IO\_FOR > 30)$ equals one if foreign institutional ownership exceeds 30% and zero otherwise. We use these three variables as independent variables and run the regression as follows.

$$COM(FL,ML)_{i,t} = \alpha_0 + \alpha_1 D(IO\_FOR > threhold)_{i,t-1} + \Phi Controls_{i,t-1} + \varepsilon_{i,t} \quad (10)$$

where we replace $D(IO\_FOR > threhold)_{i,t-1}$ with $D(IO\_FOR > 10)_{i,t-1}$, $D(IO\_FOR > 20)_{i,t-1}$, and $D(IO\_FOR > 30)_{i,t-1}$, respectively.

Next, we add a square term Sqr_IO_FOR to the baseline in Eq. (3) to measure the nonlinear relation between foreign institutional ownership and stock liquidity commonality.

$$COM(FL,ML)_{i,t} = \alpha_0 + \alpha_1 IO\_FOR_{i,t-1} + \alpha_2 Sqr\_IO\_FOR_{i,t-1} + \Phi Controls_{i,t-1} + \varepsilon_{i,t} \quad (11)$$

Table 6 reports the results of Eqs. (10) and (11). Column (1) shows that the coefficient of $D(IO\_FOR > 10)$ is -0.03 (*t*=-6.08). Column (2) shows that the coefficient of D$(IO_FOR > 20)$ is -0.02 (*t*=-2.67). Column (3) shows that the coefficient of $D(IO\_FOR > 30)$ is 0.003 and is not significant. Through columns (1)-(3), we find that the absolute values of these three coefficients decrease, which means that the marginal impact of foreign institutional investors on stock liquidity commonality decreases with the increase in ownership. Column (4) shows that the coefficient of IO_FOR is significantly negative (-0.60) but that the coefficient of Sqr_IO_FOR is significantly positive (1.26). There is a U-type relation between foreign institutional ownership and global stock liquidity commonality. With the increase of foreign institutional ownership, the marginal effect on stock liquidity commonality decreases. The U-type relation also implies that when homogeneous foreign institutional ownership increases to some extent, stock liquidity commonality may increase in turn. This also supports the findings of Agarwal (2009), who documents that in U.S. markets, the high concentrated domestic institutional ownership increases stock liquidity risk. Overall, Table 6 shows that the marginal effects of foreign institutional ownership on global stock liquidity commonality decrease as the size of foreign institutional ownership increases.

INSERT TABLE 6

7. The natures of foreign institutional ownership and stock liquidity commonality

In this section, we compare the role of independent foreign institutional investors IO_FOR_INDEP with that of gray foreign institutional investors IO_FOR_GRAY in terms of reducing stock liquidity commonality. We also compare the effects of U.S.-based foreign institutional investors IO_FOR_US with those of non-U.S.-based foreign institutional investors IO_FOR_NUS.

Guided by Chen *et al.* (2013), Ferreira and Matos (2008) and Aggarwal *et al.* (2011), we assign mutual funds and investment advisors to independent foreign institutional investors. Independent foreign institutional investors actively collect firm information and positively participate in monitoring chosen firms. Therefore, we posit that independent foreign institutional ownership IO_FOR_INDEP can decrease stock liquidity commonality. In comparison, we define gray foreign institutional investors as banks, trusts, insurance companies, pension funds, and donation funds. These institutional investors are more sensitive

to managerial pressure. Hence, we posit that gray foreign institutional ownership IO_FOR_GRAY may increase stock liquidity commonality. Next, depending on the geographic origin, we classify foreign institutional investors into U.S.- and non-U.S.-based institutional investors to compare their effects on reducing stock liquidity commonality around the world.

Our regressions of stock liquidity commonality on different natures of foreign institutional ownership are designed as follows:

$$COM(FL,ML)_{i,t} = \alpha_0 + \alpha_1 IO\_FOR\_GRAY_{i,t-1} + \Phi Controls_{i,t-1} + \varepsilon_{i,t} \quad (12)$$

$$COM(FL,ML)_{i,t} = \alpha_0 + \alpha_1 IO\_FOR\_INDEP_{i,t-1} + \Phi Controls_{i,t-1} + \varepsilon_{i,t} \quad (13)$$

$$COM(FL,ML)_{i,t} = \alpha_0 + \alpha_1 IO\_FOR\_NUS_{i,t-1} + \Phi Controls_{i,t-1} + \varepsilon_{i,t} \quad (14)$$

$$COM(FL,ML)_{i,t} = \alpha_0 + \alpha_1 IO\_FOR\_US_{i,t-1} + \Phi Controls_{i,t-1} + \varepsilon_{i,t} \quad (15)$$

Table 7 shows the results of the regressions in Eqs. (12)-(15). Columns (1) and (2) report the results of Eqs. (12) and (13). The coefficient of IO_FOR_GRAY is positive but insignificant. However, the coefficient of IO_FOR_INDEP is significantly negative. These findings mean that independent foreign institutional investors can decrease stock liquidity, but there is no significant evidence that gray foreign institutional investor can affect stock liquidity commonality. The chi-square statistic for the difference between the coefficients of IO_FOR_GRAY and IO_FOR_INDEP is 3.74 and significant at the 10% level, which implies that independent foreign institutional investors outperform gray foreign institutional investors in decreasing stock liquidity commonality. In columns (3) and (4), we report the results of the regressions in Eqs. (14) and (15). Column (3) shows that the coefficient of IO_FOR_NUS is -0.16 and significant at the 1% level. As a comparison, column (4) shows that the coefficient of IO_FOR_US is -0.72 and significant at the 1% level. A chi-square test shows a significant difference at 1% level between these two coefficients ($\chi^2 = 66.74$). These findings mean that U.S.-based foreign institutional investors have a greater impact on decreasing global stock liquidity commonality than do non-U.S.-based foreign institutional investors. We conclude that independent foreign institutional investors and U.S.-based foreign institutional investors can reduce stock liquidity commonality to a greater extent than can gray and non-U.S.-based foreign institutional investors.

INSERT TABLE 7

8. The mechanism through which foreign institutional investors affect stock liquidity commonality.

In this section, we test the mechanism through which foreign institutional investors affect stock liquidity commonality. We highlight a key mechanism: foreign institutional investors reduce stock liquidity commonality by increasing corporate transparency and information quality, which is proxied for by analysts' forecast accuracy (Lang & Maffett 2011; Lang *et al.* 2012).

It is evident that there is a negative relation between corporate transparency and stock liquidity commonality (Lang & Maffett 2011) and liquidity risk (Ng 2011). Market participants are prone to providing liquidity to stocks with high-quality information, while opaque firm information causes higher liquidity risk. Therefore, we hypothesize a negative relation between corporate transparency and stock liquidity commonality. However, different from domestic institutional investors that can impose mixed effects on corporate transparency (Barclay & Holderness 1991), foreign institutional investors must address issues including geographic distance, cultural difference, and legal systems to decrease monitoring costs and information bias and to improve corporate governance (La Porta *et al.* 1998; Gillan & Starks 2003; Chan *et al.* 2005; Ferreira *et al.* 2009; Kang & Kim 2010; Aggarwal *et al.* 2011). Hence, we hypothesize a positive relation between foreign institutional ownership and corporate transparency.

To sum up, we posit that foreign institutional investors can enhance corporate transparency, which leads to lower stock liquidity commonality. Following Lang and Maffett (2011) and Lang *et al.* (2012), we use analysts' forecast accuracy to measure corporate transparency and information quality, as analysts can gather and aggregate information from public and private sources to assess firm value and to promote information efficiency (Brennan & Subrahmanyam 1995; Lang *et al.* 2004). Specifically, we measure analysts' forecast accuracy as follows:

$$Forecast\_accuracy_{i,t} = \frac{|\overline{Forcast\_EPS}_{i,t} - Actual\_EPS_{i,t}|}{P_{i,t}}$$

where $\overline{Forcast\_EPS}$ is the average analyst forecasts of earnings per share, while $Actual\_EPS$ is the actual value of earnings per share and P is the share price. For ease of interpretation in later analysis, we take a negative sign for $Forecast\_accuracy_{i,t}$. A greater value of $Forecast\_accuracy_{i,t}$ means a more accurate analyst forecast and greater corporate transparency.

We first model corporate transparency as a function of foreign institutional ownership as

follows:

$$Forecast\_accuracy_{i,t} = \alpha_0 + \alpha_1 IO\_FOR_{i,t-1} + \Phi Controls_{i,t-1} + \varepsilon_{i,t} \quad (16)$$

Next, we identify the relation between corporate transparency and global stock liquidity commonality:

$$COM(FL, ML)_{i,t} = \beta_0 + \beta_1 Forecast\_accuracy_{i,t-1} + \Phi Controls_{i,t-1} + \varepsilon_{i,t} \quad (17)$$

Finally, we carry out a two-stage analysis. In the first step, we obtain the fitted value of $Forecast\_accuracy$ from Eq. (16). In the second step, we substitute this fitted value $\widehat{Forecast\_accuracy}$ into Eq. (17) and obtain Eq. (18):

$$COM(FL, ML)_{i,t} = \gamma_0 + \gamma_1 \widehat{Forecast\_accuracy}_{i,t-1} + \Phi Controls_{i,t-1} + \varepsilon_{i,t} \quad (18)$$

In Eqs. (16)-(18), we control for calendar-month-, country-, and industry-fixed effects. If α_1 in Eq. (16) is significantly positive, this indicates that foreign institutional investors can promote analyst forecasts' accuracy, which proxies for corporate information quality. If β_1 is significantly negative in Eq. (17), this shows that the enhancement of corporate transparency can reduce stock liquidity commonality. If γ_1 is significantly negative in Eq. (18), this indicates that corporate transparency is a key mechanism through which foreign institutional investors can reduce stock liquidity commonality.

Table 8 presents the results of the mechanism analysis. Column (1) reports the results of Eq. (16). The coefficient of IO_FOR is 0.04, which is significant at the 1% level. This indicates that, consistent with our expectation, foreign institutional ownership can improve corporate transparency. The second column shows that the coefficient of $Forecast\_accuracy$ in Eq. (17) is -0.12 and significant at the 1% level. This means that corporate transparency can reduce stock liquidity commonality. The third column provides results for Eq. (18). The coefficient of the fitted variable $\widehat{Forecast\_accuracy}$ is still significantly negative at the 5% level. We conclude that foreign institutional investors can enhance corporate transparency and information quality and thereby reduce stock liquidity commonality around the world. In untabulated results, we adopt the median of the analyst forecast of earnings per share rather than the mean value to calculate analyst forecast accuracy. The results are consistent.

INSERT TABLE 8

9. Country-level characteristics, foreign institutional ownership, and stock liquidity

commonality

Based on the aforementioned analyses, we show a negative linkage between foreign institutional ownership and global stock liquidity commonality. In this section, we investigate the interplay amongst country-level characteristics, foreign institutional ownership, and stock liquidity commonality to test whether the roles of foreign institutional investors vary across heterogeneous countries. These country-level characteristics include culture, EPU, and country-level corporate governance practice.

9.1. Culture, foreign institutional ownership, and stock liquidity commonality

In this subsection, we first examine the impact of domestic culture on stock liquidity commonality. We then focus on studying the effects of interplay between domestic culture and foreign institutional ownership as an important proxy for international multiculturalism on stock liquidity commonality.

We measure domestic culture using two indexes that gauge investors' external social constraints and internal behavior attributes (Eun *et al.* 2015). The first index we adopt is the cultural tightness index. This index is constructed based on survey data from 33 countries (Gelfand *et al.* 2011). It measures the strength of a country's social norms and society's tolerance for deviant behavior. Gelfand *et al.* (2011) find that individual behaviors tend to be more homogeneous and exhibit a lower level of variation in culturally tight countries. Therefore, we expect that the trading strategy in culturally tight countries is more likely to be homogeneous and increase stock liquidity commonality. The second index we adopt is the individualism index, which is sourced from Hofstede (2001). This index measures the extent to which individual behavior is different from others. Investors in culturally individualistic countries perform more confidently in their own trading decisions and less-correlated trades. Therefore, we expect stock liquidity commonality to be lower in countries with higher individualism scores.

We examine the impact of domestic culture on stock commonality and then focus on the interplay between domestic culture and foreign institutional ownership by including the intersection term. The regressions are designed as follows:

$$COM(FL,ML)_{i,t} = \alpha_0 + \alpha_1 Culture_i + \alpha_2 IO\_FOR_{i,t-1} + \Phi Controls_{i,t-1} + \varepsilon_{i,t} \quad (19)$$

$$COM(FL,ML)_{i,t} = \alpha_0 + \alpha_1 Culture_i + \alpha_2 IO\_FOR_{i,t-1} + \alpha_3 FOR\_Culture_{i,t-1} + \Phi Controls_{i,t-1} + \varepsilon_{i,t} \quad (20)$$

Culture is a country-level cultural index representing the tightness or individualism index. $FOR\_Culture$ is the product of foreign institutional ownership and the cultural index. Table 9

presents the regression results for Eqs. (19) and (20). The first column shows that the coefficient of the culture tightness index is 0.03 and significant at the 1% level, indicating that there is a higher level of stock liquidity commonality in culturally tight countries. The coefficient of the culture individualism index (column (2)) is -0.003 and significant at the 1% level, indicating that countries with higher levels of culture individualism have lower levels of stock liquidity commonality. After both the culture tightness and individualism indexes are included in column (3), our results are consistent with those in columns (1) and (2).

In columns (4)-(6), we report the coefficients of the interaction terms in the regression in Eq. (20). The coefficient of the culture tightness index is positively significant, and the coefficient of $FOR\_Tightness$ is -0.17 and significant at the 1% level. This means that foreign institutional ownership can mitigate the positive effect of cultural tightness on stock liquidity commonality. Column (5) shows that the coefficient of cultural individualism is significantly negative and that the coefficient of $FOR\_Individualism$ is 0.012 and significant at the 1% level, indicating that foreign institutional ownership mitigates the negative effect of cultural individualism on stock liquidity commonality. After both the cultural indexes and interaction items are included in column (6), our results are consistent with columns (4) and (5).

Overall, this subsection shows that domestic culture significantly drives stock liquidity commonality. Specifically, stock liquidity commonality is higher in culturally tight countries and lower in culturally individualistic countries. Foreign institutional investors export diverse and varying cultures around the world, which can mitigate the impacts of domestic culture on stock liquidity commonality. Table 9 adopts all of the lagged explanation variables for our regression analysis. Our conclusions persist if we replace all of the independent variables with their current period values.

INSERT TABLE 9

9.2. *Economic policy uncertainty, foreign institutional ownership, and stock liquidity commonality*

Brogaard *et al.* (2015) show that U.S. EPU significantly drives the international financial markets and can affect the value of both U.S. and non-U.S. firms. In this section, we explore the relation between foreign institutional ownership and stock liquidity commonality when suffering from the shock of U.S. EPU. We measure U.S. EPU using the economic policy uncertainty index (Baker *et al.* 2014), which is constructed based on news, budget, and economic forecast analyses. When the level of U.S. EPU is higher, the divergence in investors' opinions about firm value increases. Therefore, we expect U.S. EPU to increase

global stock liquidity commonality. Moreover, foreign institutional ownership serves as an important proxy for financial integration, and we intend to examine its effects on global stock liquidity commonality when it suffers from the impacts of U.S. EPU. To test this effect, we include the interaction item, that is, the product of foreign institutional ownership and U.S. EPU, in our models:[10]

$$COM(FL,ML)_{i,t} = \alpha_0 + \alpha_1 EPU_{t-1} + \alpha_2 IO\_FOR_{i,t-1} + \Phi Controls_{i,t-1} + \varepsilon_{i,t} \quad (21)$$

$$COM(FL,ML)_{i,t} = \alpha_0 + \alpha_1 EPU_{t-1} + \alpha_2 IO\_FOR_{t-1} + \alpha_3 FOR\_EPU_{i,t-1} + + \Phi Controls_{i,t-1} + \varepsilon_{i,t} \quad (22)$$

EPU is the U.S. EPU index and FOR_EPU is the product of foreign institutional ownership and the U.S. EPU index. For the sake of space, we select three alternative U.S. EPU indexes for a robustness test. These indexes include the fiscal policy, financial regulation, and social welfare uncertainty indexes. The fiscal uncertainty index (EPU_{Fiscal}) reflects the uncertainty surrounding U.S. fiscal policy and the U.S. federal budget. The financial regulation uncertainty index ($EPU_{Financial}$) shows the uncertainty surrounding U.S. financial regulation policy. The social welfare uncertainty index ($EPU_{Entitlement}$) indicates the uncertainty surrounding social welfare policy and the labor market.

Table 10 shows the regression results for Eqs. (21) and (22) with alternative U.S. EPU measures. Column (1) reports the results of Eq. (21). The coefficient of EPU is 0.08 and significant at the 1% level. It is evident that U.S. EPU significantly increases global stock liquidity commonality. In columns (2)-(5), we include intersection terms between foreign institutional ownership and alternative U.S. EPU measures. All of the coefficients of the intersection terms, including FOR_EPU, FOR_EPU_{Fiscal}, $FOR\_EPU_{Financial}$, and $FOR\_EPU_{Entitlement}$, are positively significant. These findings show that foreign institutional ownership significantly exaggerates the positive impact of U.S. EPU on global stock liquidity commonality. We conclude that U.S. EPU can significantly increase stock liquidity commonality and that with the increase in global financial integration, foreign institutional investors amplify the impacts of U.S. EPU on stock liquidity commonality around the world.

INSERT TABLE 10

9.3. Country corporate governance level and foreign institutional investors: Substitutes or complements?

It is evident that country-level corporate governance can also reduce stock liquidity commonality (Karolyi *et al.* 2012; Moshirian *et al.* 2017). In this subsection, we examine

[10] The results are consistent if we replace the lagged period of independent variables with current values.

whether foreign institutional investors substitute or complement the roles of a country's corporate governance level in reducing stock liquidity commonality.

Aggarwal *et al.* (2011) argue that foreign institutional investors export good corporate governance practices around the world. In particular, foreign institutional investors from countries with high corporate governance levels are more effective at improving the market information environment of countries with low corporate governance levels. Therefore, from a substitution effect perspective, we expect foreign institutional investors to reduce stock liquidity commonality more in countries with low corporate governance levels. However, as foreign institutional investors have an information disadvantage in international markets (Kang 1997), the complementary effect argues that foreign institutional investors can reduce liquidity commonality to a larger extent only in countries with better governance practices.

We consider country-level market information efficiency and market information environment to measure a country's corporate governance level and thereby to examine the two competing predictions of the substitute or complement hypothesis. We split our sample based on the median of proxies for market information efficiency and market information environments. Subsequently, we build regressions for each group and compare the coefficients of each pair for foreign institutional ownership.

We use three variables to measure country-level market information efficiency. The first variable is $R^2_{(FR,MR)}$. We calculate the goodness of fit of regressions of stock returns on market returns for all stocks in a country and then take average values to obtain a country's $R^2_{(FR,MR)}$ (Morck *et al.* 2000; Durnev *et al.* 2003). $R^2_{(FR,MR)}$ reflects the degree of stock returns explained by market returns and it is higher when a country's stock prices contain less firm-specific information (Roll 1988). Therefore, the higher the $R^2_{(FR,MR)}$ value is, the lower is the country-level market information efficiency. The second variable is the accounting standards index ($ACCT$). This index is estimated as in La Porta *et al.* (1998)-by scoring companies' annual reports in terms of their inclusion/omission of 90 items covering general information, income statements, balance sheets, cash flow statements, accounting standards, stock data, and special items, among others. For ease of interpretation, we take a negative sign on $ACCT$, which means that the higher the level of $ACCT$, the lower the market information efficiency. The third variable is the country-level earnings management index (EMS) (Leuz *et al.* 2003), which is constructed by averaging the country rankings of the four individual earnings management measures: (i) a country's median ratio of the firm-level standard deviation of operating earnings divided by the firm-level standard deviation of cash flow from operations; (ii) a country's median correlation between changes in accounting accruals and changes in operating cash flows; (iii) a country's median of the absolute value of firms' accruals scaled

by the absolute value of firms' cash flow from operations; and (iv) a country's median ratio of small profits to small losses. The higher the level of EMS is, the lower is the market information efficiency.

We also have three variables for the country-level market information environment. The first variable is the intensity of financial disclosure ($Discl$) (Bushman *et al.* 2004). $Discl$ is the average ranking of the disclosure quality concentrating on R&D, capital structure, subsidiaries, segment-product, segment-geographic, and accounting policy. We multiply $Discl$ by -1 such that the higher the value of $Disc$, the worse the country information environment. The second variable is the legal system (Law). La Porta *et al.* (1998) state that the governance mechanism is poorer in countries with a civil law system than in countries with a common law system. We define Law as equal to one if the country has a civil law system and zero otherwise. Our last variable is anti-director rights index (AD), as proposed in Djankov *et al.* (2008). This index reflects shareholders' voting rights and minority shareholder protection. We also take a negative sign for AD such that the higher the AD score, the worse the investor protection.

Panel A of Table 11 shows the results of regressions for country-level market information efficiency. Columns (1)-(6) show that the coefficients of foreign institutional ownership are significantly negative. This means that foreign institutional investors can reduce stock liquidity commonality in countries with both strong and weak market information efficiency. In columns (1) and (2), the coefficients of foreign institutional ownership (IO) are -0.33 and -0.17, respectively, both of which are significant at the 1% level. Based on a chi-square test, the difference in these two coefficients is significant. These findings show that foreign institutional shareholders can reduce stock liquidity commonality to a larger extent in countries with higher levels of $R^2_{(FR,MR)}$, where individual stock returns contain less firm-specific information. This supports the substitution hypothesis. The coefficients of IO_FOR are -0.34 and -0.19 in columns (3) and (4), respectively. Both of the coefficients are significant at the 1% level. The chi-square test shows that the difference in these two coefficients is significant at the 5% level. As we take the negative value of $ACCT$, countries with higher $ACCT$ have less efficient information. It is evident that in countries with worse accounting standards, foreign institutional investors have greater effects on reducing stock liquidity commonality. In columns (5) and (6), the coefficients of IO_FOR are -0.34 and -0.16, respectively, both of which are significant at the 1% level. The chi-square test shows that these two coefficients are significant at the 1% level. This means that foreign institutional investors can reduce stock liquidity commonality to a larger extent in countries with more earnings management. Overall, foreign institutional investors have more of an effect on countries with weak market information efficiency in terms of reducing stock liquidity commonality, which supports the substitution hypothesis.

Panel B of Table 11 presents the regression results for countries with different market information environments. Columns (1)-(6) show that the coefficients of foreign institutional ownership are significantly negative. This means that foreign institutional investors can reduce stock liquidity commonality in countries with both good and bad market information environments. Columns (1) and (2) report the regression results for high and low $Discl$ countries. As we take the negative value of $Discl$, countries with higher $Discl$ have worse information environments. The coefficients of IO_FOR are -0.37 and -0.21, respectively, and the chi-square test is significant at the 5% level. This shows that foreign institutional investors can reduce stock liquidity commonality to a larger extent in countries with weaker financial disclosure intensity. Similarly, the results in columns (3) and (4) illustrate that foreign institutional investors have greater effects on reducing stock liquidity commonality in countries with civil law systems. Columns (5) and (6) show that foreign institutional investors can reduce stock liquidity commonality to a greater extent in counties with weaker investor protection mechanisms. Overall, Panel B shows that foreign institutional investors reduce stock liquidity commonality to a larger extent in countries with worse market information environments, which is consistent with the prediction of the substitution hypothesis.

INSERT TABLE 11

10. The economic consequences of foreign ownership effects on liquidity commonality

Thus far, we have shown that foreign institutional investors can significantly reduce stock commonality. The literature recognizes that stock liquidity commonality is a key factor that can determine firm value (Pástor & Stambaugh 2003; Acharya & Pedersen 2005; Lang & Maffett 2011; Lee 2011; Ng 2011). Hence, in this section, we investigate whether stock liquidity commonality can mediate the relation between foreign institutional ownership and firm valuation. Using mediation analysis (Hammersley 2006; Lang *et al.* 2012), we disentangle the value effects of foreign institutional ownership that works through stock liquidity commonality from the direct impact of foreign institutional ownership on firm valuation. Moreover, considering that stock illiquidity is also an important pricing factor (Amihud & Mendelson 1986, 1989, 2012), we compare the mediation effects between stock liquidity commonality and stock illiquidity.

We carry out our mediation analysis in three steps. In step 1, we regress the mediation variable (stock illiquidity or stock liquidity commonality) on the explanatory variable (foreign institutional ownership) to test the relation between the mediation and explanatory variables. In step 2, we regress the dependent variable (firm valuation) on the explanatory variable (foreign institutional ownership) to test the association between firm valuation and foreign

institutional ownership. In step 3, we regress firm valuation on foreign institutional ownership and stock illiquidity or stock liquidity commonality. If the coefficient of foreign institutional ownership in step 3 decreases significantly compared with the coefficient in step 2, this means that the explanatory power of foreign institutional ownership is absorbed by the mediation variable (stock illiquidity or stock liquidity commonality) and suggests that stock illiquidity or stock liquidity commonality is a path through which foreign institutional investors can impact firm value.

We start by studying stock liquidity commonality as a mediation variable and illustrate three regressions as follows:

$$COM(FL,ML)_{i,t} = \alpha_0 + \alpha_1 IO\_FOR_{i,t-1} + \Phi Controls_{i,t-1} + \varepsilon_{i,t} \quad (23)$$

$$Q_{i,t} = \beta_0 + \beta_1 IO\_FOR_{i,t-1} + \Phi Controls_{i,t-1} + \varepsilon_{i,t} \quad (24)$$

$$Q_{i,t} = \gamma_0 + \gamma_1 IO\_FOR_{i,t-1} + \gamma_2 COM(FL,ML)_{i,t-1} + \Phi Controls_{i,t-1} + \varepsilon_{i,t} \quad (25)$$

where $Q_{i,t}$ is the Tobin's Q of firm i in year t, $COM(FL,ML)_{i,t}$ is the annual stock commonality, and IO_FOR is foreign institutional ownership. Eq. (23) refers to step 1, Eq. (24) refers to step 2, and Eq. (25) refers to step 3. Based on a Sobel test, if γ_1 in Eq. (25) is significantly less than β_1 in Eq. (24), this means that $COM(FL,ML)$ is the variable that mediates the effect of foreign institutional investors on firm value. We also include stock illiquidity $Illiq$ as a control variable in Eqs. (23)-(25) to mitigate the correlation between stock illiquidity and stock liquidity commonality. We lag all of the control variables to mitigate the endogeneity problem and include year-, industry-, and country-fixed variables.

Columns (1)-(3) in Table 12 present the results of regressions (23)-(25), respectively. Column (1) shows that the coefficient of foreign institutional ownership is -0.41 and significant at the 1% level, which means there is a negative relation between foreign institutional ownership and stock liquidity commonality. Column (2) shows that the coefficient of foreign institutional ownership is 2.23 and significant at the 1% level, which means that foreign institutional investors can enhance firm value. These results are consistent with the findings of Ferreira and Matos (2008). Column (3) shows that the coefficient of foreign institutional ownership decreases from 2.23 to 2.19 and the Sobel examination is significant at the 1% level (Sobel 1982; Lang *et al.* 2012). These results reflect that after stock liquidity commonality is added, the impact of foreign institutional ownership on firm valuation decreases significantly. Stock liquidity commonality is the variable that mediates the effect of foreign institutional ownership on firm valuation, and it absorbs part of the effect of foreign institutional investors

on firm valuation. Moreover, we calculate the ratio of indirect effects of foreign institutional ownership (0.045) to direct effects (2.23), which is 2.02%. This result implies that stock liquidity commonality, as the mediation variable, accounts for about 2.02% of the effects of foreign institutional investors on firm valuation.

Similarly, we study stock illiquidity as a mediation variable and illustrate three regressions as follows:

$$Illiq_{i,t} = \alpha_0 + \alpha_1 IO\_FOR_{i,t-1} + \Phi Contorls_{i,t-1} + \varepsilon_{i,t} \quad (26)$$

$$Q_{i,t} = \beta_0 + \beta_1 IO\_FOR_{i,t-1} + \Phi Contorls_{i,t-1} + \varepsilon_{i,t} \quad (27)$$

$$Q_{i,t} = \gamma_0 + \gamma_1 IO\_FOR_{i,t-1} + \gamma_2 Illiq_{i,t-1} + \Phi Contorls_{i,t-1} + \varepsilon_{i,t} \quad (28)$$

where $Q_{i,t}$ is the Tobin's Q of firm i in year t, $Illiq_{i,t}$ is annual stock illiquidity, and IO_FOR is foreign institutional ownership.

Columns (4)-(6) in Table 12 present the results of regressions (26)-(28), respectively. Column (4) shows that the coefficient of foreign institutional ownership is -2.14 and significant at the 1% level, which means there is a negative relation between foreign institutional ownership and stock illiquidity around the world. Column (5) shows that the coefficient of foreign institutional ownership is 2.48 and significant at the 1% level, which means that foreign institutional investors can enhance firm valuation. Column (6) shows that the coefficient of foreign institutional ownership decreases from 2.48 to 2.19, and the Sobel test is significant at the 1% level. These results reflect that after adding stock illiquidity, the impact of foreign institutional ownership on firm valuation decreases significantly. Stock illiquidity is the variable that mediates the effect of foreign institutional ownership on firm valuation, and it absorbs part of the effect of foreign institutional investors on firm valuation. Moreover, we calculate the ratio of indirect effects of foreign institutional ownership (0.29) to direct effects (2.48), which is 11.67%. This result implies that stock illiquidity, as the mediation variable, accounts for about 11.67% of the effects of foreign institutional investors on firm valuation.

Table 12 reveals that foreign institutional investors can increase firm valuation. Both stock liquidity commonality and stock illiquidity are important mediation variables. The mediation effect of stock illiquidity is higher than that of stock commonality. Additionally, we document that stock liquidity commonality and stock illiquidity, as key pricing factors, can decrease firm valuation.

INSERT TABLE 12

11. Conclusion

In this paper, we furnish a better understanding of demand-side factors, particularly foreign institutional ownership, which can affect stock liquidity commonality from a global perspective. Karolyi *et al.* (2012) and Moshirian *et al.* (2017) view foreign institutional ownership as a proxy of correlated trading that can increase stock liquidity commonality, however, their empirical findings are not consistent with this premise. Based on prior findings that foreign institutions have positive effects on corporate governance in global markets (e.g., Ferreira *et al.* 2009; Kang & Kim, 2010; Aggarwal *et al.* 2011; Bena *et al.* 2017), we emphasize the monitoring roles of foreign institutional investors in reducing stock liquidity commonality. Specifically, we empirically identify corporate transparency as the key mechanism via which foreign institutional investors can significantly reduce stock liquidity commonality around the world.

Our work contributes in several important ways to the growing literature on international stock liquidity commonality. First, Karolyi *et al.* (2012) carry out market-level analysis and use U.S. macro equity flows and capital flows as proxies for foreign investors' correlated trades.[11] We argue that these can only serve as proxies for foreign institutions based in the United States while failing to reflect prevalent financial integration and nested globalization. In addition, the two indicators show mixed findings.[12] In this study, we emphasize the importance of firm-level institutional background and directly test the effects of foreign institutional ownership on stock liquidity commonality. Although Karolyi *et al.* (2012) also use foreign institutional ownership in an examination of cross-country averages and find a negative but insignificant result, their foreign institutional ownership measure is static[13] and cannot reflect time-varying effects of foreign institutional ownership on stock liquidity commonality. In addition, the cross-country-average observations have limited statistical power. Therefore, we adopt firm-monthly panel data to identify the effects of foreign institutional ownership on stock liquidity commonality. The 39-country-data are from 2000 to 2014. The extended period, which covers global financial crisis, helps to provide a fresher and more robust test environment. Our results indicate that foreign institutional ownership significantly reduces stock liquidity commonality in the international setting. Our results are robust after controlling for country-, industry-, and time-fixed effects; after clustering standard errors at the country, industry, and year levels; and after controlling for currency effects and

[11] Karolyi *et al.* (2012) only include the foreign institutional ownership variable in the analysis of cross-variation in stock liquidity commonality (see Table 5). In other parts, they adopt U.S. equity and capital flows as proxies for correlated trading of foreign institutional investors.
[12] Overall, Karolyi *et al.* (2012) report positive coefficients of equity flows and negative coefficients of capital flows.
[13] Karolyi *et al.* (2012) use foreign institutional ownership as of December 2005.

excluding dominant countries. We also replace stock liquidity commonality with alternative measures of stock liquidity uncertainty and find a negative link between foreign institutional ownership and stock liquidity uncertainty. We also show that a U-type relation exists between foreign institutional ownership and stock liquidity commonalty. As the size of foreign institutional ownership increases, its effect on reducing stock liquidity commonality decreases. Next, via subsample analysis, we find that foreign institutional investors can reduce stock liquidity commonality both before and after the global financial crisis and in both developed and emerging markets. Regarding differences between foreign institutional investors, we find that independent foreign institutional investors can reduce stock liquidity commonality, but we find no significant evidence of a relation between gray foreign institutional ownership and stock liquidity commonality. In addition, we show that U.S.-based institutional investors reduce stock liquidity commonality to a greater extent than do non-U.S.-based foreign institutional investors around the world.

Second, Moshirian *et al.* (2017) offer a comprehensive analysis of market-level and firm-level factors driving stock liquidity commonality. They also use foreign institutional ownership as a proxy for correlated trading, however, they find a negative relation between foreign institutional ownership and stock liquidity commonality. In addition, they do not provide endogenous tests for firm-level factors, including foreign institutional ownership. In this paper, we not only provide robust evidence of foreign institutional investors significantly reducing stock liquidity commonality but also empirically show the mechanism that is the corporate transparency through which foreign institutional investors can reduce stock liquidity commonality. To address the endogeneity issue, we adopt the JGTRRA as an exogenous shock to test the relation between foreign institutional ownership and stock liquidity commonality. A significant increase in foreign institutional ownership is evident after the passage of JGTRRA, which indicates that the JGTRRA is a valid instrument variable. Moreover, using instrumental variable analysis, we find a negative relation between foreign institutional ownership and stock liquidity commonality. Our results are robust after implementing a counterfactual test.

Third, unlike Karolyi *et al.*, (2012) and Moshirian *et al.* (2017), we not only exploit the rich variations in market-wide characteristics that can affect stock liquidity commonality (e.g. culture, EPU, and market-level information environment), we also explore the interplay between foreign institutional investors and these country-level characteristics. Our results show that cultural tightness can increase stock liquidity commonality, whereas cultural individualism can reduce it. However, foreign institutional ownership, as a proxy for international multiculturalism, can significantly mitigate the effects of domestic culture on stock liquidity commonality. Next, we show that U.S. EPU significantly increases global

stock liquidity commonality and that foreign institutional ownership, as a proxy for financial integration, exaggerates the impact of U.S. EPU on stock liquidity commonality around the world. Last, we find that foreign institutional investors substitute for the role of a country's corporate governance level and foreign institutional investors have greater effects in countries with worse market information efficiency and more opaque market information environments.

Finally, our work has important implications for policy makers. The experience of past financial crises suggests that foreign capital flows have destabilizing impacts on local markets. Protectionists portray foreign institutions as locusts, only interested in firm short-term profits and ignoring long-term development (Bena *et al.*, 2017). We, however, argue for removing the "locust" label from foreign institutions, as capital market openness can mitigate stock liquidity commonality in local markets and generate positive externalities for the real economy. Our mediation analysis suggests that both stock illiquidity and stock liquidity commonality, as key pricing factors, are mediation variables through which foreign institutional investors can enhance firm value. This view is consistent with Bena *et al.* (2017), who find that foreign institutions have disciplinary and monitoring roles in corporate governance worldwide and foreign institutional ownership promotes long-term investment and innovation outputs, internationalization of a firm's operations, and firm valuation. We conclude that the globalization of shareholder structures is a positive force for stabilizing stock markets and increasing firm value.

References

Acharya, V.V., Pedersen, L.H., 2005. Asset pricing with liquidity risk. *Journal of Financial Economics*, 77, 375-410.

Agarwal, P., 2009. Institutional ownership, liquidity and liquidity risk. Cornell University. PhD Thesis.

Aggarwal, R., Erel, I., Ferreira, M., Matos, P., 2011. Does governance travel around the world? Evidence from institutional investors. *Journal of Financial Economics*, 100, 154-181.

Amihud, Y., 2002. Illiquidity and stock returns: cross-section and time-series effects. *Journal of Financial Markets*, 5, 31-56.

Amihud, Y., Mendelson, H., 1986. Asset pricing and the bid-ask spread. *Journal of Financial Economics*, 17, 223-249.

Amihud, Y., Mendelson, H., 1989. The effects of beta, bid-ask spread, residual risk, and size on stock returns. *The Journal of Finance*, 44, 479-486.

Amihud, Y., Mendelson, H., 2012. Liquidity, the value of the firm, and corporate finance. *Journal of Applied Corporate Finance*, 24, 17-32.

An, Z., Huang, G., Li, D., Xiao, S., 2014. Foreign institutional ownership, risk-taking and crash risk around the world. Working Paper.

An, Z., Li, D., Huang, G., Xiao, S., 2016. Corporate risk-taking, foreign institutional ownership and the role of macro corporate governance. Working Paper.

Bae, K.-H., Chan, K., Ng, A., 2004. Investibility and return volatility. *Journal of Financial Economics*, 71, 239-263.

Bai, M., Qin, Y., 2015. Commonality in liquidity in emerging markets: Another supply-side explanation. *International Review of Economics and Finance*, 39, 90-106.

Bailey, W.G., Karolyi, A., Salva, C., 2006, The economic consequences of increased disclosure: Evidence from international cross-listings, *Journal of Financial Economics*, 81, 175–213.

Baker, H. K, Nofsinger, J.R., Weaver, D.G., 2002, International cross listings and visibility, *Journal of Financial and Quantitative Analysis*, 37, 495–521.

Baker, S.R., Bloom, N., Canes-Wrone, B., Davis, S.J., Rodden, J., 2014. Why has US policy uncertainty risen since

1960? *The American Economic Review*, 104, 56-60.

Barberis, N., Shleifer, A., Wurgler, J., 2005. Comovement. *Journal of Financial Economics*, 75, 283-317.

Barclay, M.J., Holderness, C.G., 1991. Negotiated block trades and corporate control. *The Journal of Finance*, 46, 861-878.

Bena J., Ferreira M.A., Matos P., Pires P., 2017. Are foreign investors locusts? The long-term effects of foreign institutional ownership. *Journal of Financial Economics*, 126, 122-146.

Brennan, M.J., Subrahmanyam, A., 1995. Investment analysis and price formation in securities markets. *Journal of Financial Economics*, 38, 361-381.

Brickley, J.A., Lease, R.C., Smith, C.W., 1988. Ownership structure and voting on antitakeover amendments. *Journal of Financial Economics*, 20, 267-291.

Brogaard, J., Dai, L., Ngo, P.T.H., Zhang, B., 2015. The world price of political uncertainty. Working Paper.

Bushman, R.M., Piotroski, J.D., Smith, A.J., 2004. What determines corporate transparency? *Journal of Accounting Research*, 42, 207-252.

Chan, K., Covrig, V., Ng, L., 2005. What determines the domestic bias and foreign bias? Evidence from mutual fund equity allocations worldwide. *The Journal of Finance*, 60, 1495-1534.

Chen, X., Harford, J., Li, K., 2007. Monitoring: Which institutions matter? *Journal of Financial Economics*, 86, 279-305.

Chen, Z., Du, J., Li, D., Ouyang, R., 2013. Does foreign institutional ownership increase return volatility? Evidence from China. *Journal of Banking and Finance*, 37, 660-669.

Chung, R., Firth, M., Kim, J.-B., 2005. Earnings management, surplus free cash flow, and external monitoring. *Journal of Business Research*, 58, 766-776.

Daske, H., Hail, L., Leuz, C., Verdi, R., 2008. Mandatory IFRS reporting around the world: Early evidence on the economic consequences. *Journal of Accounting Research*, 46, 1085-1142.

Desai, M.A., Dharmapala, D., 2011. Dividend taxes and international portfolio choice. *The Review of Economics and Statistics*, 93, 266-284.

Djankov, S., La Porta, R., Lopez-de-Silanes, F., Shleifer, A., 2008. The law and economics of self-dealing. *Journal*

of Financial Economics, 88, 430-465.

Doidge, C., Karolyi, G., Lins, K., Miller, D., Stulz, R., 2009. Private benefits of control, ownership and the cross-listing decision. *Journal of Finance*, 44, 425-466.

Durnev, A., Morck, R., Yeung, B., Zarowin, P., 2003. Does greater firm−specific return variation mean more or less informed stock pricing? *Journal of Accounting Research*, 41, 797-836.

Eun, C.S., Wang, L., Xiao, S.C., 2015. Culture and R2. *Journal of Financial Economics*, 115, 283-303.

Fang, V.W., Maffett, M., Zhang, B., 2015. Foreign institutional ownership and the global convergence of financial reporting practices. *Journal of Accounting Research*, 53, 593-631.

Ferreira, M.A., Massa, M., Matos, P., 2009. Shareholders at the gate? Institutional investors and cross-border mergers and acquisitions. *Review of Financial Studies*, 2010, 23, 601-644.

Ferreira, M.A., Matos, P., 2008. The colors of investors' money: The role of institutional investors around the world. *Journal of Financial Economics*, 88, 499-533.

Fong, K.Y., Holden, C.W., Trzcinka, C., 2017. What are the best liquidity proxies for global research? *Review of Finance*, 21, 1355-1401.

Gelfand, M.J., Raver, J.L., Nishii, L., Leslie, L.M., Lun, J., Lim, B.C., Duan, L., Almaliach, A., Ang, S., Arnadottir, J., 2011. Differences between tight and loose cultures: A 33-nation study. Science, 332, 1100-1104.

Gillan, S., Starks, L.T., 2003. Corporate governance, corporate ownership, and the role of institutional investors: A global perspective. *Journal of Applied Finance*, 13, 4-22.

Gilson, R.J., Milhaupt, C.J., 2005. Choice as regulatory reform: The case of Japanese corporate governance. The *American Journal of Comparative Law*, 53, 343-377.

Hameed, A., Kang, W., Viswanathan, S., 2010. Stock market declines and liquidity. *The Journal of Finance*, 65, 257-293.

Hammersley, J.S., 2006. Pattern identification and industry-specialist auditors. *The Accounting Review*, 81, 309-336.

Hofstede, G.H., 2001. Culture's consequences: Comparing values, behaviors, institutions and organizations across nations. Sage Publications.

Ince, O.S., Porter, R.B., 2006. Individual equity return data from Thomson Datastream: Handle with care! *Journal of Financial Research*, 29, 463-479.

Jiang, L., Kim, J.B., 2004. Foreign equity ownership and information asymmetry: evidence from Japan. *Journal of International Financial Management and Accounting*, 15, 185-211.

Jin, L., Myers, S.C., 2006. R2 around the world: New theory and new tests. *Journal of Financial Economics*, 79, 257-292.

Kamara, A., Lou, X., Sadka, R., 2008. The divergence of liquidity commonality in the cross-section of stocks. *Journal of Financial Economics*, 89, 444-466.

Kang, J.-K., 1997. Why is there a home bias? An analysis of foreign portfolio equity ownership in Japan. *Journal of Financial Economics*, 46, 3-28.

Kang, J.-K., Kim, J.-M., 2010. Do foreign investors exhibit a corporate governance disadvantage? An information asymmetry perspective. *Journal of International Business Studies*, 41, 1415-1438.

Kang W., Zhang, H., 2010. Measuring liquidity in emerging markets. *Pacific-Basin Finance Journal*, 27, 49-71.

Karolyi, G.A., Lee, K.-H., Van Dijk, M.A., 2012. Understanding commonality in liquidity around the world. *Journal of Financial Economics*, 105, 82-112.

Kho, B.C., Stulz, R.M., Warnock, F.E., 2009. Financial globalization, governance, and the evolution of the home bias. *Journal of Accounting Research*, 47, 597-635.

Koch, A., Ruenzi, S., Starks, L., 2016. Commonality in liquidity: a demand-side explanation. *Review of Financial Studies*, 29, 1943-1974.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A., Vishny, R.W., 1998. Law and finance. *Journal of Political Economy*, 106, 1113-1155.

Lang, M.H., Lins, K.V., Miller, D.P., 2003. ADRs, Analysts, and Accuracy: Does cross listing in the United States improve a firm's information environment and increase market value? *Journal of Accounting Research*, 41, 317-345.

Lang, M., Lins, K.V., Maffett, M., 2012. Transparency, liquidity, and valuation: International evidence on when transparency matters most. *Journal of Accounting Research*, 50, 729-774.

Lang, M., Maffett, M., 2011. Transparency and liquidity uncertainty in crisis periods. *Journal of Accounting and Economics*, 52, 101-125.

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? *Journal of Accounting Research*, 42, 589-623.

Lee, K.-H., 2011. The world price of liquidity risk. *Journal of Financial Economics*, 99, 136-161.

Leuz, C., Nanda, D., Wysocki, P.D., 2003. Earnings management and investor protection: an international comparison. *Journal of Financial Economics*, 69, 505-527.

Li, D., Nguyen, Q.N., Pham, P.K., Wei, S.X., 2011. Large foreign ownership and firm-level stock return volatility in emerging markets. *Journal of Financial and Quantitative Analysis*, 46, 1127-1155.

Luong, H.L., Moshirian, F., Nguyen, L.H.G., Tian, X., Zhang, B., 2016. How do foreign institutional investors enhance firm innovation? *Journal of Financial and Quantitative Analysis*, Forthcoming.

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, 215-260.

Moshirian, F., Qian, X., Wee, C.K.G., Zhang, B., 2017. The determinants and pricing of liquidity commonality around the world. *Journal of Financial Markets*, 33, 22-41.

Ng, J., 2011. The effect of information quality on liquidity risk. *Journal of Accounting and Economics*, 52, 126-143.

Ng, L., Wu, F., Yu, J., Zhang, B., 2016. Foreign investor heterogeneity and stock liquidity around the world. *Review of Finance*, 20, 1867-1910.

North, D.C., 1990. A transaction cost theory of politics. *Journal of Theoretical Politics*, 2, 355-367.

Pástor, L., Stambaugh, R.F., 2003. Liquidity risk and expected stock returns. *Journal of Political Economy*, 111, 642-685.

Roll, R., 1988. The Stochastic Dependence of Security Price Changes and Transaction Volumes: Implications for the Mixture - of - Distributions Hypothesis. *The Journal of Finance*, 43, 541-566.

Sami, H., Zhou, H., 2004. A comparison of value relevance of accounting information in different segments of the Chinese stock market. *The International Journal of Accounting*, 39, 403-427.

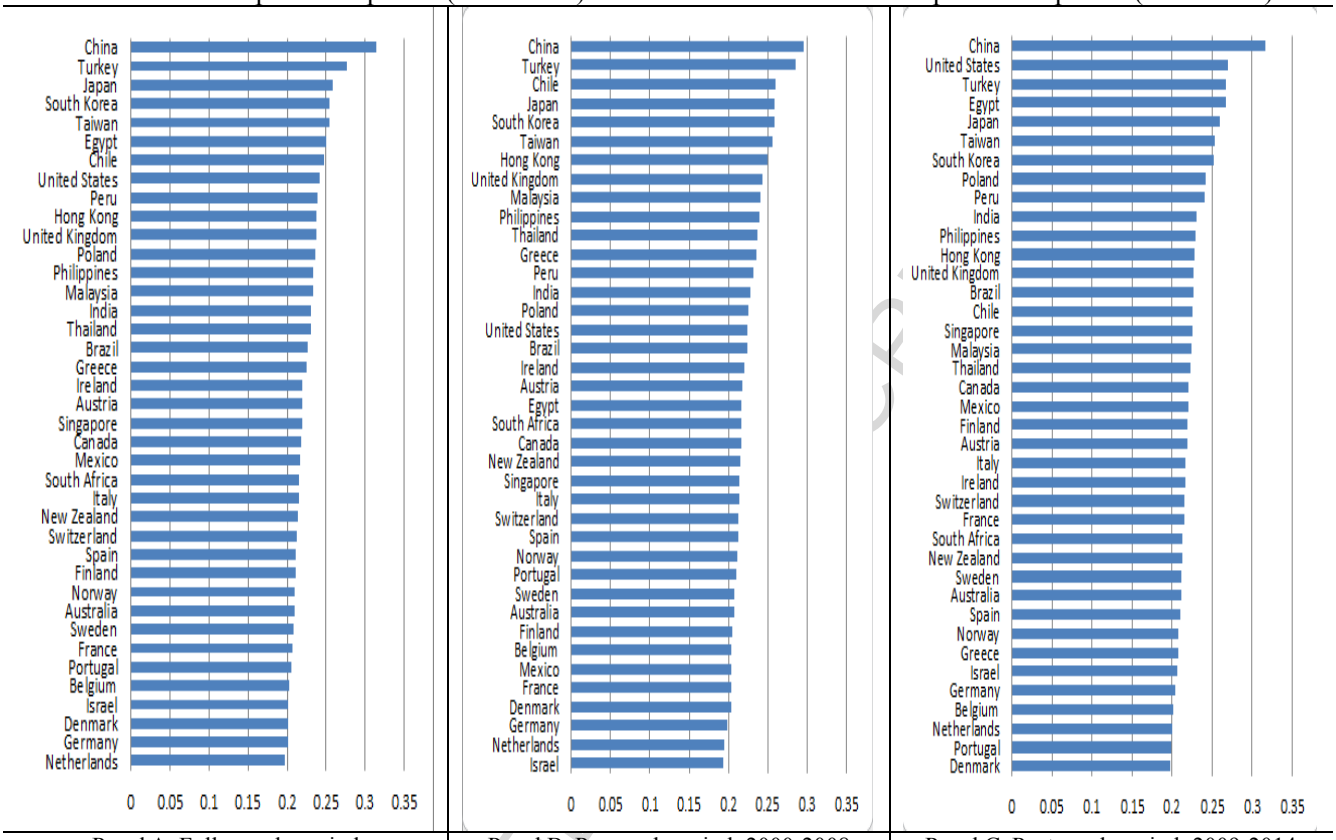
Sobel, M.E., 1982. Asymptotic intervals for indirect effects in structural equations models. *Sociological*

methodology, 13, 290-312.

Stiglitz, J.E., 1999. Reforming the global economic architecture: lessons from recent crises. *The Journal of Finance*, 54, 1508-1522.

Figure 1. Cross-country variation in stock liquidity commonality.

This figure presents the stock liquidity commonality ($R^2_{(FL,ML)}$) in 39 countries from 2000 to 2014. The bars represent stock liquidity commonality in each country. Panel A shows results for the full sample period. Panel B shows results for the pre-crash period (2000-2008). Panel C shows results for the post-crash period (2009-2014).



Panel A. Full sample period	Panel B. Pre-crash period: 2000-2008	Panel C. Post-crash period: 2009-2014

Figure 2. Scatter diagram of stock liquidity commonality around the world.
This scatter diagram illustrates the relation between foreign institutional ownership and stock liquidity commonality ($R^2_{(FL,ML)}$) in 39 countries from 2000 to 2014. The X-axis is the foreign institutional ownership in percentage. The Y-axis is the stock liquidity commonality.

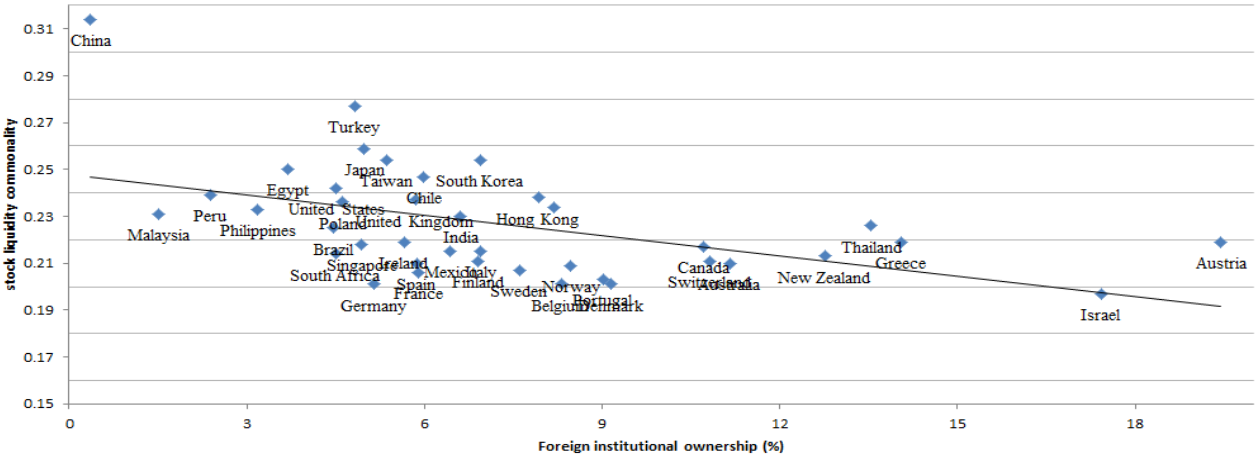


Table 1. Sample statistics of 39 countries

This table presents sample statistics of 39 countries from 2000 to 2014. Column (1) reports the sample size in each country. Column (2) reports each country's sample as a percentage of the total sample size. Column (3) reports each country's stock liquidity commonality $R^2_{(FL,ML)}$ obtained in a regression of firm illiquidity on market illiquidity (Eq. (1)). Column (4) reports foreign institutional ownership IO_FOR in each country. Columns (5) and (6) report $R^2_{(FL,ML)}$ and IO_FOR for the pre-crash period (2000-2008). Columns (7) and (8) report $R^2_{(FL,ML)}$ and IO_FOR for the post-crash period (2009-2014).

	Full period				Pre-2008		Post-2008	
Country	No. of obs.	Percentage	$R^2_{(FL,ML)}$	$IO\_FOR\%$	$R^2_{(FL,ML)}$	$IO\_FOR\%$	$R^2_{(FL,ML)}$	$IO\_FOR\%$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Australia	36,230	5.940	0.210	5.871	0.208	4.822	0.211	7.108
Austria	2,443	0.400	0.219	14.040	0.218	12.909	0.219	15.721
Belgium	5,412	0.890	0.203	9.017	0.204	8.744	0.202	9.430
Brazil	2,604	0.430	0.226	13.535	0.224	16.124	0.227	12.975
Canada	3,990	0.650	0.218	4.942	0.216	5.564	0.221	4.531
Chile	502	0.080	0.247	5.985	0.260	4.767	0.226	7.825
China	14,835	2.430	0.314	0.352	0.296	1.023	0.316	0.282
Denmark	4,297	0.700	0.201	8.308	0.203	7.356	0.197	9.606
Egypt	581	0.100	0.250	3.702	0.217	4.314	0.267	3.384
Finland	7,855	1.290	0.211	10.815	0.205	11.568	0.219	9.758
France	33,808	5.540	0.207	7.598	0.203	7.054	0.215	8.644
Germany	21,910	3.590	0.201	9.143	0.199	8.601	0.204	10.825
Greece	4,553	0.750	0.225	4.470	0.236	3.723	0.208	5.737
Hong Kong	21,038	3.450	0.238	7.924	0.249	7.676	0.228	8.159
India	1,558	0.260	0.231	1.518	0.228	1.593	0.230	1.138
Ireland	1,614	0.260	0.219	19.448	0.220	18.168	0.217	21.663
Israel	3,726	0.610	0.201	5.143	0.194	4.963	0.207	4.928
Italy	15,304	2.510	0.215	6.436	0.214	5.929	0.217	6.915
Japan	89,267	14.630	0.259	4.982	0.259	4.219	0.260	6.072
Malaysia	14,956	2.450	0.233	3.183	0.241	3.039	0.224	3.380
Mexico	917	0.150	0.217	10.712	0.203	9.572	0.220	10.762
Netherlands	6,666	1.090	0.197	17.424	0.195	17.151	0.200	17.563
New Zealand	4,035	0.660	0.214	4.497	0.215	4.505	0.213	4.510
Norway	5,419	0.890	0.210	11.151	0.211	12.132	0.208	10.099
Peru	439	0.070	0.239	2.383	0.232	0.695	0.241	2.666
Philippines	1,227	0.200	0.234	8.178	0.240	8.527	0.229	8.122
Poland	7,782	1.280	0.236	4.614	0.225	6.862	0.242	3.335
Portugal	2,598	0.430	0.206	5.902	0.210	5.113	0.199	7.212
Singapore	15,052	2.470	0.219	5.655	0.214	5.553	0.225	5.493
South Africa	9,382	1.540	0.215	6.949	0.216	5.576	0.213	8.635
South Korea	729	0.120	0.254	6.938	0.258	7.238	0.252	6.796
Spain	7,622	1.250	0.211	6.905	0.212	6.340	0.210	7.628
Sweden	12,324	2.020	0.209	8.465	0.208	8.580	0.211	8.494
Switzerland	10,013	1.640	0.213	12.756	0.212	12.716	0.215	12.741
Taiwan	37,294	6.110	0.254	5.357	0.256	5.300	0.253	5.405
Thailand	4,896	0.800	0.230	6.608	0.237	7.099	0.223	6.281
Turkey	10,336	1.690	0.277	4.820	0.286	4.111	0.267	5.704
United Kingdom	76,376	12.520	0.237	5.844	0.243	4.990	0.227	7.416
United States	110,521	18.110	0.242	4.503	0.224	3.396	0.270	6.207
Total (Average)	610,111	100.000	0.235	6.069	0.230	5.586	0.241	6.700

Table 2. Summary statistics of key variables

This table reports descriptive statistics of key variables across firm-month observations from 2000 to 2014. All of the variables are as defined in Appendix A.

Variable	N	Mean	Std	p25	Median	p75
Institutional ownership						
IO_FOR	608,209	0.060	0.070	0.009	0.033	0.085
IO_DOM	608,209	0.183	0.276	0.008	0.046	0.021
IO_FOR_INDEP	606,085	0.054	0.065	0.008	0.029	0.077
IO_FOR_GRAY	601,832	0.005	0.007	0.000	0.001	0.007
IO_FOR_US	605,161	0.021	0.034	0.000	0.006	0.027
IO_FOR_NUS	602,738	0.036	0.043	0.003	0.019	0.054
Firm characteristics						
$SIZE$	608,209	13.118	1.728	11.911	13.041	14.305
BM	608,209	0.822	1.211	0.270	0.592	1.048
$STDRET$	608,209	0.024	0.013	0.015	0.021	0.030
$CLHLD$	608,209	35.261	23.501	15.510	33.160	53.820
RE	608,209	-0.001	0.128	-0.061	0.006	0.070
STD_SALES	608,209	4,263,947	13,200,000	49,444	252,738	1,725,098
$LOSS\_FRE$	608,209	0.192	0.285	0.000	0.000	0.250
$Illiq$	608,209	0.606	1.734	0.003	0.029	0.300
ADR_EX	608,209	0.018	0.139	0.000	0.000	0.000
ADR_NEX	608,209	0.043	0.203	0.000	0.000	0.000
Stock liquidity commonality and other liquidity uncertainty proxies						
$R^2_{(FL,ML)}$	608,209	0.235	0.162	0.106	0.202	0.335
$COM(FL,ML)$	608,209	-1.465	1.121	-2.137	-1.375	-0.688
$BETA$	578,956	0.148	4.757	-2.013	0.570	3.005
$COM(FL,MR)$	603,382	-1.907	1.110	-2.568	-1.808	-1.131
$LIQVOL$	605,621	0.615	2.229	0.002	0.016	0.180
$LIQSKEW$	601,888	1.473	0.953	0.774	1.280	2.003
$LIQBH$	608,209	0.015	0.059	0.000	0.000	0.000
Country-level characteristics						
$Tightness$	514,118	6.747	1.876	5.100	6.800	8.600
$Individualism$	608,209	63.319	26.259	46.000	71.000	89.000
EPU	608,209	121.103	41.389	87.544	114.616	152.353
$R^2_{(FR,MR)}$	608,209	0.182	0.059	0.140	0.150	0.260
$ACCT$	584,103	-69.347	6.944	-75.000	-70.000	-65.000
EMS	562,595	12.773	8.216	4.800	13.500	20.500
$Discl$	585,136	91.478	13.350	87.320	100.000	100.000
AD	608,209	-3.773	0.998	-4.500	-3.500	-3.000
LAW	608,209	0.454	0.498	0.000	0.000	1.000

Table 3. Foreign institutional ownership and stock liquidity commonality

This table presents results of the panel regression in Eq. (3) using global firm-monthly observations. The dependent variable is stock liquidity commonality $COM(FL, ML)$, which is obtained in Eq. (1). The key independent variable is foreign institutional ownership IO_FOR. Column (1) reports the full sample test results. Column (2) reports the results after excluding observations from two jurisdictions: U.S. and Japan. Column (3) reports the results after excluding observations from six jurisdictions: U.S., Japan, UK, Taiwan, Australia and France. In column (4), we replace IO_FOR with a dummy variable. If a listed company is under foreign institutional ownership, we define $IO\_FOR = 1$; otherwise, $IO\_FOR = 0$. In column (5), we report the results when we denominate variables in domestic currencies instead of U.S. dollars. All of the variables are defined as described in Appendix A. In columns (1)-(5), we cluster standard errors at the firm level. In columns (6)-(8), we report the results when we cluster standard errors at the country, industry, and year levels, respectively. In column (9), we include calendar-month fixed effects together with country and industry fixed effects. In column (10), we report the results using the Fama-Macbeth method. Column (11) reports results when including heavily-regulated financial and utility firms. All of the continuous non-logarithmic variables are winsorized at the 1st and 99th percentiles. Statistical significance is indicated by ***p<0.01, **p<0.05, and *p<0.1 (two-sided).

Panel A. Baseline Regressions

	Full-sample	Excl-two	Excl-six	$D(IO\_FOR)$	Local currency	CCluster	ICluster	YCluster	C-M FE	Fama-Macbeth	Incl-F&U firms
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
IO_FOR	-0.266***	-0.275***	-0.263***	-0.061***	-0.288***	-0.266***	-0.266***	-0.266***	-0.268***	-0.271***	-0.241***
	(-8.362)	(-8.004)	(-6.336)	(-6.254)	(-8.593)	(-4.093)	(-10.689)	(-7.164)	(-8.394)	(-5.869)	(-8.840)
IO_DOM	0.095***	-0.109***	-0.144***	0.105***	0.043**	0.095	0.095**	0.095***	0.098***	-0.076	0.092***
	(5.545)	(-3.287)	(-3.103)	(6.187)	(2.499)	(1.620)	(2.845)	(3.180)	(5.708)	(-1.193)	(6.308)
SIZE	-0.019***	-0.026***	-0.017***	-0.021***	-0.026***	-0.019*	-0.019***	-0.019***	-0.019***	-0.052***	-0.018***
	(-11.794)	(-13.846)	(-7.092)	(-13.712)	(-15.778)	(-1.715)	(-5.700)	(-5.637)	(-11.983)	(-10.457)	(-13.047)
BM	-0.006***	-0.006***	-0.002	-0.006***	-0.008***	-0.006	-0.006***	-0.006**	-0.006***	-0.004*	-0.006***
	(-3.510)	(-3.280)	(-1.250)	(-3.588)	(-4.659)	(-1.036)	(-4.133)	(-2.989)	(-3.467)	(-1.926)	(-5.033)
STDRET	-1.371***	-1.666***	-0.640***	-1.423***	-0.512***	-1.371**	-1.371***	-1.371***	-1.011***	-1.271***	-0.992***
	(-9.592)	(-9.877)	(-2.900)	(-9.965)	(-3.106)	(-2.486)	(-6.049)	(-4.407)	(-6.534)	(-7.374)	(-7.717)
CLHLD	0.000***	0.000***	0.000	0.001***	-0.000	0.000*	0.000**	0.000**	0.000***	0.000	0.000***
	(3.843)	(3.596)	(0.401)	(5.486)	(-1.012)	(1.701)	(3.182)	(2.810)	(3.857)	(0.195)	(3.431)
RE	0.119***	0.070***	0.030	0.118***	0.056***	0.119***	0.119***	0.119***	-0.018	-0.044***	0.133***
	(10.143)	(5.085)	(1.608)	(10.043)	(4.134)	(2.902)	(5.291)	(3.312)	(-1.394)	(-3.511)	(11.958)
Illiq	0.015***	0.013***	0.009***	0.014***	0.023***	0.015***	0.015***	0.015***	0.018***	0.015***	0.016***
	(10.619)	(8.758)	(4.958)	(9.997)	(9.856)	(3.961)	(6.250)	(6.876)	(12.625)	(6.172)	(12.261)
STD_SALES	-0.000***	0.000	0.000	-0.000***	0.000***	-0.000	-0.000*	-0.000**	-0.000***	-0.000**	-0.000***
	(-4.450)	(0.390)	(0.646)	(-4.636)	(3.213)	(-1.434)	(-2.336)	(-2.848)	(-4.697)	(-2.381)	(-5.348)
LOSS_FRE	0.062***	0.057***	0.054***	0.065***	0.086***	0.062***	0.062***	0.062***	0.053***	-0.007	0.053***
	(8.487)	(6.726)	(4.677)	(9.076)	(10.701)	(6.570)	(4.892)	(6.408)	(7.267)	(-0.362)	(8.210)
ADR_EX	-0.018***	-0.003**	-0.009**	-0.026***	-0.035***	-0.018**	-0.018**	-0.018***	-0.018***	-0.022***	-0.013***
	(-3.212)	(-2.475)	(-2.224)	(-4.710)	(-5.790)	(-2.199)	(-2.385)	(-3.276)	(-3.240)	(-4.253)	(-2.739)
ADR_NEX	-0.000	0.006	-0.016	-0.017	-0.003	-0.000	-0.000	-0.000	0.001	-0.011	0.008
	(-0.020)	(0.460)	(-0.912)	(-1.402)	(-0.228)	(-0.017)	(-0.023)	(-0.017)	(0.116)	(-1.104)	(0.789)
Constant	-1.459***	-1.257***	-1.434***	-1.375***	-1.332***	-1.459***	-1.459***	-1.459***	-1.445***	-1.533***	-1.436***
	(-57.100)	(-42.378)	(-37.320)	(-52.901)	(-46.446)	(-7.507)	(-29.008)	(-32.349)	(-31.794)	(-17.628)	(-65.248)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Calendar Month									Yes		
Observations	608,209	408,421	225642	608,209	490,995	608,209	608,209	608,209	608,209	537,512	738583
Adj. R-sq	0.022	0.025	0.029	0.022	0.018	0.022	0.022	0.022	0.036		0.023
Avg. R-sq										0.072	

Panel B. Subsample regressions

This table presents results of subsample regressions of stock liquidity commonality ($COM(FL, ML)$) on foreign institutional ownership (IO_FOR). Columns (1) and (2) report results for before and after the financial crisis in 2008, respectively. Columns (3) and (4) report results using samples of developed and emerging counties, respectively. Robust standard errors, clustered at the firm level, are reported in brackets. We include country-, year-, and industry-fixed effects in the models as indicated. All of the continuous non-logarithmic variables are winsorized at the 1st and 99th percentiles. Statistical significance is indicated by ***p<0.01, **p<0.05, and *p<0.1 (two-sided).

	$COM(FL, ML)$			
	Pre-2008	Post-2008	Developed	Emerging
	(1)	(2)	(3)	(4)
IO_FOR	-0.333***	-0.256***	-0.207***	-0.602***
	(-7.979)	(-5.825)	(-6.001)	(-7.343)
IO_DOM	0.085***	0.090***	0.120***	-0.238***
	(4.335)	(3.273)	(6.848)	(-3.093)
$SIZE$	-0.024***	-0.012***	-0.020***	-0.006
	(-12.452)	(-5.249)	(-11.799)	(-1.343)
BM	-0.008***	-0.001	-0.009***	0.002
	(-3.533)	(-0.386)	(-4.996)	(0.570)
$STDRET$	-1.246***	-1.807***	-1.668***	-0.533
	(-6.287)	(-9.013)	(-10.579)	(-1.597)
$CLHLD$	0.000***	0.000***	0.001***	-0.001***
	(4.058)	(3.564)	(5.787)	(-3.575)
RE	0.064***	0.173***	0.143***	0.031
	(4.051)	(10.148)	(10.816)	(1.218)
$Illiq$	0.016***	0.017***	0.020***	0.001
	(7.814)	(9.204)	(12.150)	(0.222)
STD_SALES	-0.000	-0.000***	-0.000***	-0.000**
	(-1.233)	(-4.515)	(-3.961)	(-2.134)
$LOSS\_FRE$	0.069***	0.035***	0.058***	0.086***
	(7.613)	(3.212)	(7.335)	(4.482)
ADR_EX	-0.008	-0.006	-0.020***	-0.025*
	(-1.000)	(-0.789)	(-3.238)	(-1.744)
ADR_NEX	-0.001	0.013	0.008	-0.015
	(-0.079)	(0.631)	(0.540)	(-0.566)
Constant	-1.390***	-1.420***	-1.455***	-1.137***
	(-45.410)	(-38.103)	(-52.815)	(-15.722)
Country FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Observations	343,443	264,766	489,892	118,317
Adj. R-sq	0.021	0.029	0.019	0.033

Panel C. Five alternative liquidity uncertainty proxies

This table presents results of regressions of five liquidity uncertainty proxies on foreign institutional ownership (IO_FOR). The dependent variable in column (1) is the $BETA$, calculated as the sum of coefficients β_1, β_2, and β_3 obtained from Eq. (1). The dependent variable in column (2) is the log transformation of $R^2_{(FL,MR)}$ from the regressions of firm-level illiquidity on market returns (Eq. (4)). The dependent variable in column (3) is $LIQVOL$, calculated as the monthly standard deviation of daily stock illiquidity. The dependent variable in column (4) is $LIQSKEW$, defined as the monthly skewness of the illiquidity. The dependent variable in column (5) is $LIQBH$, which is the percentage of trading days in a month during which the daily illiquidity measure is 50 times higher than the country-level median. All of the variables are calculated as described in Appendix A. Robust standard errors, clustered at the firm level, are reported in brackets. We include country-, year-, and industry-fixed effects in the models as indicated. All of the continuous non-logarithmic variables are winsorized at the 1st and 99th percentiles. Statistical significance is indicated by ***p<0.01, **p<0.05, and *p<0.1 (two-sided).

Dependents	$BETA$	$COM(FL,MR)$	$LIQVOL$	$LIQSKEW$	$LIQBH$
	(1)	(2)	(3)	(4)	(5)
IO_FOR	-0.268**	-0.201***	-1.123***	-0.632***	-0.037***
	(-2.193)	(-6.617)	(-10.709)	(-12.245)	(-7.149)
IO_DOM	0.457***	-0.039***	0.148***	0.154***	-0.050***
	(5.285)	(-2.833)	(3.134)	(7.954)	(-9.753)
$SIZE$	0.003	-0.021***	-0.186***	-0.122***	-0.008***
	(0.437)	(-15.607)	(-29.160)	(-47.746)	(-21.827)
BM	-0.006	-0.005***	-0.068***	-0.032***	-0.002***
	(-1.086)	(-3.563)	(-9.539)	(-11.224)	(-7.752)
$STDRET$	-1.061*	-0.075	-2.380***	-4.139***	-0.058***
	(-1.731)	(-0.545)	(-5.614)	(-28.631)	(-3.397)
$CLHLD$	-0.001**	0.000***	0.003***	0.003***	0.000***
	(-2.288)	(4.011)	(8.440)	(19.654)	(6.376)
RE	-0.156***	0.056***	-0.109***	0.008	-0.006***
	(-3.103)	(4.757)	(-4.075)	(0.864)	(-8.935)
$Illiq$	-0.032***	0.014***	0.531***	0.040***	0.008***
	(-4.952)	(10.722)	(56.065)	(24.448)	(30.605)
STD_SALES	-0.000***	-0.000***	0.000***	0.000***	0.000***
	(-6.524)	(-4.048)	(19.439)	(3.375)	(12.504)
$LOSS\_FRE$	0.186***	0.056***	0.462***	-0.028***	0.016***
	(6.544)	(8.107)	(15.229)	(-2.851)	(11.166)
ADR_EX	-0.069***	-0.005	-0.093***	-0.118***	-0.002***
	(-3.166)	(-0.968)	(-4.558)	(-11.778)	(-3.412)
ADR_NEX	-0.040	0.026	0.064	-0.160***	-0.009*
	(-0.929)	(1.135)	(1.341)	(-6.981)	(-1.833)
Constant	-1.000***	-1.820***	3.024***	3.502***	0.084***
	(-8.940)	(-82.545)	(30.385)	(89.535)	(17.895)
Country FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes
Observations	581,268	605,962	608,331	604,617	609,368
Adj. R-sq	0.019	0.015	0.224	0.248	0.136

Table 4. JGTRRA tax-treaty and non-tax-treaty countries

Tax-treaty countries					Non-tax-treaty countries
Australia	Egypt	Italy	Austria	Thailand	Brazil
Germany	Finland	Japan	Philippines	Turkey	Chile
Belgium	France	Korea	Poland	The United Kingdom	Hong Kong
China	Greece	Mexico	Portugal		Malaysia
Canada	India	Netherlands	South Africa		Peru
Denmark	Ireland	Norway	Sweden		Singapore
Spain	Israel	New Zealand	Switzerland		Taiwan

Table 5. JGTRRA: A natural experiment

This table presents regression results using the JGTRRA as a natural experiment. Columns (1)-(4) report the difference-in-differences results (Eqs. (5) and (7)) or change-on-change identifications (Eqs. (6) and (8)). $POST2003$ is a dummy variable equal to one if the year is after 2003. $QUALIFIED$ indicates JGTRRA-eligible firms. Column (5) reports the results of a two-stage regression (see Eq. (9)). $IO\_\widehat{FOR}\_US$ is the fitted value obtained from Eq. (5). Column (6) reports the results of a counterfactual test. Robust standard errors, clustered at the firm level, are reported in brackets. We include country-, year-, and industry-fixed effects or firm and year fixed effects in the models as indicated. To make tabulation concise, we highlight that all of independent variables are at the change level in Columns (2) (Eq. (6)) and (4) (Eq. (8)),. All of continuous non-logarithmic variables are winsorized at the 1st and 99th percentiles. Statistical significance is indicated by ***p<0.01, **p<0.05, and *p<0.1 (two-sided).

	(1)	(2)	(3)	(4)	(5)	(6)
	Eq. (5)	Eq. (6)	Eq. (7)	Eq. (8)	Eq. (9)	Eq. (10)
	IO_FOR_US	ΔIO_FOR_US	$COM(FL,ML)$	$\Delta COM(FL,ML)$	$COM(FL,ML)$	$COM(FL,ML)$
$POST2003\_Quqlify$	0.004***	0.001***	-0.116***	-0.033***		
	(4.934)	(5.959)	(-3.035)	(-2.994)		
$IO\_\widehat{FOR}\_US$					-9.466***	
					(-3.013)	
$POST2006\_Quqlify$ (Counterfactual test)						-0.005
						(-0.454)
$Quqlify$	-0.002***	-0.001***	0.001	0.016		0.004
	(-3.051)	(-2.863)	(0.022)	(1.360)		(0.348)
IO_DOM	-0.013***	0.009***	-0.392*	-0.074	-0.198***	0.011
	(-3.753)	(4.274)	(-1.739)	(-1.224)	(-2.748)	(0.171)
$SIZE$	0.004***	0.001***	0.131***	0.002	0.041***	0.016***
	(13.771)	(11.763)	(5.256)	(0.399)	(2.868)	(2.873)
BM	0.001***	0.000**	0.027**	-0.002	0.003	-0.001
	(3.457)	(2.409)	(2.099)	(-0.842)	(0.802)	(-0.336)
$STDRET$	0.040***	0.001	-0.532	-0.507**	-0.130	-0.048
	(6.472)	(1.013)	(-1.487)	(-2.174)	(-0.483)	(-0.210)
$CLHLD$	-0.000***	-0.000	0.001	-0.000	-0.001***	0.000
	(-4.672)	(-1.566)	(0.666)	(-1.303)	(-2.917)	(1.400)
RE	-0.001***	-0.000***	-0.078***	0.037**	0.026	0.076***
	(-5.145)	(-2.584)	(-3.291)	(2.143)	(1.474)	(4.359)
$Illiq$	0.000***	-0.000	-0.007	-0.003	0.000	0.002
	(7.938)	(-0.469)	(-1.417)	(-1.420)	(0.033)	(0.954)
STD_SALES	0.000***	0.000**	0.000	-0.000	0.000	-0.000
	(4.187)	(2.207)	(0.377)	(-0.549)	(1.573)	(-0.569)
$LOSS\_FRE$	-0.001	-0.001	-0.105	0.070***	0.064***	0.033
	(-0.701)	(-1.028)	(-0.777)	(3.267)	(3.025)	(1.412)
ADR_EX	0.006***	0.001**	-0.206**	0.021	-0.081***	-0.128***
	(4.488)	(1.992)	(-2.162)	(1.188)	(-2.992)	(-3.538)
ADR_NEX	0.019***	-0.005	-0.042	0.021	-0.201**	-0.014
	(2.598)	(-1.383)	(-0.125)	(0.289)	(-2.169)	(-0.767)
Constant	-0.037***	0.000***	0.012	-1.492***	-1.845***	-1.718***
	(-9.561)	(3.275)	(1.113)	(-20.883)	(-12.796)	(-22.604)
Country FE		Yes	Yes			
Industry FE		Yes	Yes			
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes			Yes	Yes	Yes
Observations	392,951	332,327	275,382	218,902	275,382	253,739
Adj. R-sq	0.123	0.003	0.001	0.003	0.003	0.003

Table 6. The impacts of size of foreign institutional ownership on stock liquidity commonality

This table presents results of regressions of stock liquidity commonality ($COM(FL, ML)$) on increasing foreign institutional ownership (IO_FOR). $D(IO\_FOR > 10)$ equals one if the firm's foreign institutional ownership exceeds 10% and zero otherwise. Similar definitions apply for $D(IO\_FOR > 20)$ and $D(IO\_FOR > 30)$. Sqr_IO_FOR is the square of IO_FOR. All of the variables are calculated as described in Appendix A. Robust standard errors, clustered at the firm level, are reported in brackets. We include country-, year-, and industry-fixed effects in the models as indicated. All of the continuous non-logarithmic variables are winsorized at the 1st and 99th percentiles. Statistical significance is indicated by ***p<0.01, **p<0.05, and *p<0.1 (two-sided).

Dependent	$COM(FL, ML)$			
	(1)	(2)	(3)	(4)
$D(IO\_FOR > 10)$	-0.030***			
	(-6.076)			
$D(IO\_FOR > 20)$		-0.020***		
		(-2.666)		
$D(IO\_FOR > 30)$			0.003	
			(0.303)	
IO_FOR				-0.595***
				(-8.110)
Sqr_IO_FOR				1.262***
				(5.172)
IO_DOM	0.070***	0.074***	0.081***	0.103***
	(4.194)	(4.422)	(4.882)	(6.025)
$SIZE$	-0.020***	-0.022***	-0.022***	-0.017***
	(-13.049)	(-14.171)	(-14.574)	(-10.646)
BM	-0.006***	-0.006***	-0.006***	-0.005***
	(-3.608)	(-3.813)	(-3.840)	(-3.173)
$STDRET$	-1.401***	-1.427***	-1.437***	-1.359***
	(-9.853)	(-10.035)	(-10.107)	(-9.509)
$CLHLD$	0.000***	0.000***	0.000***	0.000***
	(4.227)	(4.727)	(5.212)	(3.804)
RE	0.119***	0.119***	0.119***	0.118***
	(10.195)	(10.221)	(10.213)	(10.052)
$Illiq$	0.015***	0.016***	0.016***	0.015***
	(10.952)	(11.025)	(11.024)	(10.436)
STD_SALES	-0.000***	-0.000***	-0.000***	-0.000***
	(-4.504)	(-4.495)	(-4.396)	(-4.257)
$LOSS\_FRE$	0.063***	0.065***	0.066***	0.060***
	(8.806)	(9.054)	(9.175)	(8.342)
ADR_EX	-0.022***	-0.025***	-0.027***	-0.018***
	(-4.001)	(-4.547)	(-4.881)	(-3.231)
ADR_NEX	-0.009	-0.013	-0.019*	-0.003
	(-0.830)	(-1.160)	(-1.661)	(-0.262)
Constant	-1.448***	-1.429***	-1.424***	-1.474***
	(-57.281)	(-56.710)	(-56.634)	(-57.455)
Country FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Observations	608,209	608,209	608,209	608,209
Adj. R-sq	0.022	0.022	0.022	0.022

Table 7. The natures of foreign institutional ownership on liquidity commonality

This table presents results of regressions of stock liquidity commonality ($COM(FL, ML)$) on different natures of foreign institutional ownership (IO_FOR). IO_FOR_GRAY is gray foreign institutional ownership, which is assumed to have a greater connection to domestic firms. IO_FOR_INDEP is independent foreign institutional ownership, which is assumed to have less of a connection to domestic firms. IO_FOR_US is U.S.-based foreign institutional ownership, while IO_FOR_NUS is non- U.S.-based foreign institutional ownership. All of the variables are calculated as described in Appendix A. Robust standard errors, clustered at the firm level, are reported in brackets. We include country-, year-, and industry-fixed effects in the models as indicated. All of the continuous non-logarithmic variables are winsorized at the 1st and 99th percentiles. Statistical significance is indicated by ***p<0.01, **p<0.05, and *p<0.1 (two-sided).

Dependent	$COM(FL, ML)$			
	（1）	（2）	（3）	（4）
	Eq. (12)	Eq. (13)	Eq. (14)	Eq. (15)
$Chi-square\ test$	3.74*		66.74***	
IO_FOR_GRAY	0.435			
	(1.464)			
IO_FOR_INDEP		-0.280***		
		(-8.392)		
IO_FOR_NUS			-0.158***	
			(-3.163)	
IO_FOR_US				-0.720***
				(-11.743)
IO_DOM	0.094***	0.093***	0.080***	0.085***
	(5.793)	(5.463)	(4.818)	(4.903)
$SIZE$	-0.023***	-0.019***	-0.021***	-0.019***
	(-14.385)	(-12.017)	(-13.065)	(-11.837)
BM	-0.006***	-0.006***	-0.006***	-0.005***
	(-4.012)	(-3.562)	(-3.742)	(-3.287)
$STDRET$	-1.436***	-1.368***	-1.400***	-1.390***
	(-10.021)	(-9.572)	(-9.771)	(-9.764)
$CLHLD$	0.001***	0.000***	0.000***	0.000***
	(5.689)	(3.868)	(4.478)	(3.881)
RE	0.119***	0.119***	0.119***	0.120***
	(10.146)	(10.145)	(10.106)	(10.244)
$Illiq$	0.015***	0.015***	0.015***	0.015***
	(10.838)	(10.628)	(10.941)	(10.456)
STD_SALES	-0.000***	-0.000***	-0.000***	-0.000***
	(-4.411)	(-4.461)	(-4.524)	(-4.379)
$LOSS\_FRE$	0.067***	0.062***	0.064***	0.060***
	(9.265)	(8.474)	(8.820)	(8.248)
ADR_EX	-0.028***	-0.018***	-0.025***	-0.014**
	(-5.025)	(-3.257)	(-4.507)	(-2.323)
ADR_NEX	-0.020*	-0.010	-0.014	0.019
	(-1.688)	(-0.026)	(-1.250)	(1.531)
Constant	-1.411***	-1.456***	-1.440***	-1.459***
	(-54.212)	(-57.161)	(-56.271)	(-57.570)
Country FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Observations	601832	606085	602738	605161
Adj. R-sq	0.022	0.022	0.022	0.023

Table 8. The mechanism based on which foreign institutional investors affect stock liquidity commonality

This table presents results of regressions of liquidity commonality ($COM(FL,ML)$) on analysts' forecast accuracy ($Forecast\_accuracy$) and the regression of analysts' forecast accuracy on foreign institutional ownership (IO_FOR). $\widehat{Forecast\_accuracy}$ is the fitted value of $Forecast\_accuracy$ from column (1). All of the variables are calculated as described in Appendix A. Robust standard errors, clustered at the firm level, are reported in brackets. We include country-, calendar-month-, and industry-fixed effects in the models as indicated. All of the continuous non-logarithmic variables are winsorized at the 1st and 99th percentiles. Statistical significance is indicated by ***p<0.01, **p<0.05, and *p<0.1 (two-sided).

	(1)	(2)	(3)
	Eq. (16)	Eq. (17)	Eq. (18)
	$Forecast\_accuracy$	$COM(FL,ML)$	$COM(FL,ML)$
IO_FOR	0.036***		
	(5.123)		
$Forecast\_accuracy$		-0.122***	
		(-4.057)	
$\widehat{Forecast\_accuracy}$			-0.381**
			(-2.039)
$Assets$	0.001**		
	(2.298)		
$N\_Analysts$	0.005***		
	(8.304)		
LEV	-0.000***		
	(-13.193)		
IO_DOM	-0.001	0.082***	0.082***
	(-0.512)	(4.534)	(3.826)
BM	-0.004***	-0.008***	-0.011***
	(-4.711)	(-3.393)	(-3.446)
$STDRET$	-0.674***	-1.276***	-1.407***
	(-18.292)	(-6.011)	(-5.716)
RE	0.045***	-0.004	-0.033*
	(22.666)	(-0.259)	(-1.689)
STD_SALES	-0.000***	-0.000***	-0.000***
	(-5.476)	(-4.457)	(-5.074)
$LOSS\_FRE$	-0.058***	0.048***	0.037**
	(-23.552)	(4.861)	(2.289)
$SIZE$		-0.018***	-0.016***
		(-9.359)	(-7.321)
$CLHLD$		0.000***	0.000***
		(3.969)	(3.069)
$Illiq$		0.023***	0.020***
		(9.350)	(7.772)
ADR_EX	0.002*	-0.017**	-0.009**
	(1.782)	(-2.483)	(-2.286)
ADR_NEX	0.003	-0.018	-0.009
	(0.854)	(-1.146)	(-0.500)
Constant	-0.094***	-1.295***	-1.564***
	(-6.233)	(-13.979)	(-15.710)
Calendar-month FE	Yes	Yes	Yes
Country FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
Observations	357,769	349,376	274,062
Adj. R-sq	0.147	0.039	0.040

Table 9. Culture, foreign institutional ownership, and liquidity commonality

This table presents results of regressions of stock liquidity commonality ($COM(FL, ML)$) on foreign institutional ownership (IO_FOR), the cultural index ($Culture$), and the interaction terms between these two variables ($FOR\_Culture$). $Culture$ is defined as the culture tightness index ($Tightness$) or individualism index ($Individualism$). Columns (1)-(3) are baseline models without interaction terms. Columns (4)-(6) are the regression results with the interaction terms of culture variables and foreign institutional ownership. All of the variables are calculated as described in Appendix A. Robust standard errors, clustered at the firm level, are reported in brackets. We include year- and industry-fixed effects in the models as indicated. All of the continuous non-logarithmic variables are winsorized at the 1st and 99th percentiles. Statistical significance is indicated by ***p<0.01, **p<0.05, and *p<0.1 (two-sided).

	$COM(FL, ML)$					
	Eq. (19)			Eq. (20)		
	(1)	(2)	(3)	(4)	(5)	(6)
$Tightness$	0.032***		0.016***	0.041***		0.020***
	(21.812)		(9.059)	(22.685)		(8.891)
$FOR\_Tightness$				-0.173***		-0.090***
				(-10.078)		(-4.701)
$Individualism$		-0.003***	-0.003***		-0.004***	-0.003***
		(-30.701)	(-16.860)		(-31.006)	(-15.457)
$FOR\_Individualism$					0.012***	0.009***
					(10.111)	(5.189)
IO_FOR	-0.732***	-0.704***	-0.681***	0.387***	-1.465***	-0.658***
	(-18.757)	(-21.393)	(-17.863)	(3.435)	(-17.448)	(-3.303)
IO_DOM	0.205***	0.269***	0.269***	0.214***	0.280***	0.278***
	(20.581)	(27.426)	(26.279)	(21.473)	(28.408)	(27.099)
$SIZE$	-0.011***	-0.015***	-0.015***	-0.011***	-0.017***	-0.017***
	(-5.700)	(-8.703)	(-8.121)	(-5.874)	(-9.609)	(-8.758)
BM	-0.007***	-0.012***	-0.013***	-0.007***	-0.013***	-0.014***
	(-3.523)	(-6.731)	(-6.261)	(-3.718)	(-7.087)	(-6.414)
$STDRET$	-0.868***	-1.074***	-1.136***	-0.848***	-1.081***	-1.127***
	(-5.349)	(-7.164)	(-6.984)	(-5.231)	(-7.211)	(-6.938)
$CLHLD$	0.000***	-0.000**	-0.000	0.000***	-0.000	-0.000
	(3.028)	(-2.013)	(-1.147)	(3.286)	(-1.358)	(-0.596)
RE	0.125***	0.112***	0.123***	0.124***	0.113***	0.123***
	(9.715)	(9.506)	(9.566)	(9.697)	(9.597)	(9.606)
$Illiq$	-0.001	0.002	0.000	-0.001	0.002	0.000
	(-0.834)	(1.183)	(0.277)	(-0.874)	(1.244)	(0.134)
STD_SALES	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***
	(11.052)	(12.476)	(10.229)	(11.922)	(13.755)	(11.413)
$LOSS\_FRE$	0.021**	0.055***	0.045***	0.019**	0.053***	0.042***
	(2.455)	(7.011)	(5.256)	(2.274)	(6.752)	(4.910)
ADR_EX	-0.063***	-0.055***	-0.063***	-0.059***	-0.052***	-0.057***
	(-9.501)	(-9.335)	(-9.620)	(-8.850)	(-8.836)	(-8.768)
ADR_NEX	-0.036**	-0.040***	-0.038**	-0.043***	-0.038**	-0.042**
	(-2.152)	(-2.616)	(-2.237)	(-2.661)	(-2.481)	(-2.361)
Constant	-1.649***	-1.117***	-1.274***	-1.704***	-1.057***	-1.261***
	(-53.584)	(-39.260)	(-34.865)	(-54.381)	(-36.632)	(-31.164)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	514,118	608,209	514,118	514,118	608,209	514,118
Adj. R-sq	0.012	0.012	0.013	0.012	0.013	0.013

Table 10. Economic policy uncertainty, foreign institutional ownership, and liquidity commonality

This table presents results of regressions of stock liquidity commonality ($COM(FL, ML)$) on foreign institutional ownership (IO_FOR), the U.S. economic policy uncertainty index (EPU), and the interaction term between the two variables (FOR_EPU). Column (1) is the baseline model without the interaction term. Column (2) reports the regression results with the interaction term of EPU and IO_FOR. Columns (3)-(5) are the regression results with different types of EPU index, including the fiscal policy uncertainty index (EPU_{Fiscal}), financial regulation uncertainty index ($EPU_{Financial}$), and social welfare uncertainty index ($EPU_{Entitlement}$). All of the variables are calculated as described in Appendix A. Robust standard errors, clustered at the firm level, are reported in brackets. We include country- and industry-fixed effects in the models as indicated. All of the continuous non-logarithmic variables are winsorized at the 1st and 99th percentiles. Statistical significance is indicated by ***p<0.01, **p<0.05, and *p<0.1 (two-sided).

Dependents	$COM(FL, ML)$				
	(1)	(2)	(3)	(4)	(5)
FOR_EPU		0.140**			
		(2.109)			
EPU	0.082***	0.073***			
	(16.216)	(10.895)			
FOR_EPU_{Fiscal}			0.068*		
			(1.951)		
EPU_{Fiscal}			0.043***		
			(12.120)		
$FOR\_EPU_{Financial}$				0.056**	
				(2.293)	
$EPU_{Financial}$				0.022***	
				(8.888)	
$FOR\_EPU_{Entitlement}$					0.051*
					(1.756)
$EPU_{Entitlement}$					0.021***
					(7.116)
IO_FOR	-0.392***	-1.056***	-0.696***	-0.644***	-0.627***
	(-12.277)	(-3.350)	(-4.259)	(-5.585)	(-4.508)
IO_DOM	-0.169***	-0.169***	-0.160***	-0.170***	-0.162***
	(-5.142)	(-5.155)	(-4.878)	(-5.204)	(-4.951)
$SIZE$	-0.025***	-0.025***	-0.025***	-0.024***	-0.024***
	(-13.996)	(-14.023)	(-13.899)	(-13.741)	(-13.413)
BM	-0.006***	-0.006***	-0.006***	-0.006***	-0.006***
	(-3.571)	(-3.552)	(-3.700)	(-3.375)	(-3.623)
$STDRET$	-1.537***	-1.546***	-1.564***	-1.502***	-1.380***
	(-10.383)	(-10.434)	(-10.559)	(-10.078)	(-9.367)
$CLHLD$	0.000***	0.000***	0.000***	0.000***	0.000***
	(2.686)	(2.693)	(2.838)	(2.789)	(2.849)
RE	0.082***	0.082***	0.082***	0.076***	0.081***
	(6.571)	(6.557)	(6.556)	(6.077)	(6.499)
$Illiq$	0.010***	0.010***	0.011***	0.011***	0.011***
	(7.417)	(7.420)	(7.477)	(7.916)	(7.716)
STD_SALES	-0.000***	-0.000**	-0.000***	-0.000***	-0.000**
	(-2.587)	(-2.554)	(-2.608)	(-2.666)	(-2.472)
$LOSS\_FRE$	0.044***	0.044***	0.045***	0.045***	0.041***
	(5.661)	(5.662)	(5.800)	(5.731)	(5.303)
ADR_EX	-0.004***	-0.004***	-0.004***	-0.002**	-0.003***
	(-3.670)	(-3.701)	(-3.772)	(-2.366)	(-3.562)
ADR_NEX	-0.015	-0.016	-0.013	-0.013	-0.011
	(-1.182)	(-1.252)	(-1.006)	(-0.997)	(-0.825)
Constant	-1.685***	-1.641***	-1.493***	-1.403***	-1.409***
	(-48.547)	(-40.166)	(-49.190)	(-50.044)	(-48.189)
Country FE	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes
Observations	497,379	497,379	497,379	494,352	497,379
Adj. R-sq	0.025	0.025	0.025	0.025	0.024

Table 11. Country-level corporate governance and foreign institutional investors: Substitutes or complements?

This table presents results of regressions of stock liquidity commonality ($COM(FL, ML)$) on foreign institutional ownership (IO_FOR) for countries with different country corporate governance levels. All of the variables are calculated as described in Appendix A. Robust standard errors, clustered at the firm level, are reported in brackets. We include country-, year-, and industry-fixed effects in the models as indicated. All of the continuous non-logarithmic variables are winsorized at the 1st and 99th percentiles. Statistical significance is indicated by ***p<0.01, **p<0.05, and *p<0.1 (two-sided).

Panel A. Regressions for country-level market information efficiency

Panel A reports results of regressions for markets with different country-level information efficiency. $R^2_{(FR,MR)}$ is the goodness of fit of regressions of stock returns on market returns and averaged within each country. $ACCT$ is an index of accounting standards obtained from LLSV (1998). We multiply $ACCT$ by -1. EMS is a measure of earning managements developed by Leuz et al. (2003). In this panel, the higher values of these three proxies mean lower country-level market information efficiency.

	$COM(FL, ML)$					
	$R^2_{(FR,MR)}\_high$	$R^2_{(FR,MR)}\_low$	$ACCT\_high$	$ACCT\_low$	EMS_high	EMS_low
	(1)	(2)	(3)	(4)	(5)	(6)
$Chi-square\ test$	7.53***		4.99**		7.17***	
IO_FOR	-0.325***	-0.174***	-0.336***	-0.189***	-0.343***	-0.164***
	(-9.350)	(-4.108)	(-7.839)	(-5.321)	(-9.187)	(-3.868)
IO_DOM	0.140***	-0.112***	-0.260***	0.119***	-0.225***	0.116***
	(9.093)	(-4.069)	(-4.073)	(8.362)	(-3.967)	(7.969)
$SIZE$	-0.008***	-0.034***	-0.022***	-0.022***	-0.017***	-0.027***
	(-5.295)	(-17.292)	(-9.559)	(-14.159)	(-8.945)	(-14.741)
BM	-0.001	-0.012***	-0.002	-0.011***	-0.003	-0.020***
	(-0.726)	(-4.871)	(-1.265)	(-5.640)	(-1.472)	(-7.375)
$STDRET$	-0.364**	-2.667***	-0.549**	-1.978***	-0.782***	-2.363***
	(-2.155)	(-12.337)	(-2.354)	(-11.921)	(-3.938)	(-12.332)
$CLHLD$	0.000**	0.001***	0.000***	0.000***	0.000***	0.000***
	(2.263)	(4.748)	(3.128)	(3.690)	(2.795)	(3.337)
RE	0.127***	0.102***	0.046**	0.175***	0.063***	0.198***
	(8.601)	(5.494)	(2.357)	(11.746)	(3.666)	(11.590)
$Illiq$	0.012***	0.014***	0.011***	0.018***	0.008***	0.023***
	(6.539)	(8.237)	(4.568)	(11.281)	(4.292)	(12.063)
STD_SALES	-0.000***	0.000***	-0.000***	0.000***	-0.000***	0.000***
	(-7.370)	(3.268)	(-3.789)	(3.139)	(-5.067)	(5.260)
$LOSS\_FRE$	0.074***	0.050***	0.031***	0.071***	0.044***	0.065***
	(9.158)	(5.549)	(2.910)	(9.636)	(4.673)	(7.900)
ADR_EX	-0.023***	-0.002	-0.009	-0.020***	-0.005	-0.032***
	(-3.519)	(-0.335)	(-1.227)	(-3.201)	(-0.771)	(-4.265)
ADR_NEX	-0.011	0.007	-0.009	0.006	0.003	-0.002
	(-0.606)	(0.436)	(-0.549)	(0.357)	(0.150)	(-0.093)
Constant	-1.390	-0.970***	-1.177***	-1.421***	-1.333***	-1.159***
	(-0.001)	(-14.962)	(-17.940)	(-45.194)	(-29.705)	(-26.843)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	397,312	210,897	234,067	350,036	298,245	264,350
Adj. R-sq	0.019	0.030	0.026	0.014	0.022	0.017

Panel B. **Regressions for country-level market information environment**

Panel B reports results of regressions for markets with country-level different market information environments. $Discl$ is calculated based on ratings of detailed disclosure data from the Center for Financial Analysis and Research (Bushman et al. 2004). We multiply $Discl$ by -1. LAW is a dummy variable that equals one when the country has a civil law system and zero when it has a common law system. (LLSV, 1998). AD is the revised anti-director rights index from Djankov et al. (2008). We also take the negative value of AD. In this panel, the higher values of these three proxies mean worse country-level market information environments.

	$COM(FL, ML)$					
	$Discl\_high$	$Discl\_low$	LAW_Civil	LAW_Common	AD_high	AD_low
	(1)	(2)	(3)	(4)	(5)	(6)
$Chi-square\ test$	6.52**		5.82**		4.81**	
IO_FOR	-0.365***	-0.209***	-0.346***	-0.191***	-0.350***	-0.176***
	(-7.474)	(-6.481)	(-8.748)	(-5.167)	(-7.595)	(-5.245)
IO_DOM	0.095***	-0.106***	-0.283***	0.121***	0.136***	-0.106***
	(5.957)	(-3.920)	(-6.414)	(8.422)	(8.377)	(-3.846)
$SIZE$	-0.001	-0.031***	-0.015***	-0.025***	-0.004*	-0.031***
	(-0.243)	(-20.149)	(-7.562)	(-15.292)	(-1.833)	(-19.402)
BM	0.002	-0.009***	-0.001	-0.013***	0.001	-0.009***
	(0.920)	(-5.256)	(-0.291)	(-6.322)	(0.519)	(-4.935)
$STDRET$	-0.457**	-1.766***	-0.908***	-1.896***	-0.387*	-1.872***
	(-1.999)	(-10.812)	(-4.257)	(-11.107)	(-1.767)	(-10.940)
$CLHLD$	-0.000	0.001***	0.000*	0.000***	-0.000	0.001***
	(-1.179)	(6.461)	(1.826)	(3.115)	(-0.964)	(6.769)
RE	0.137***	0.103***	0.056***	0.168***	0.135***	0.117***
	(7.160)	(7.078)	(3.175)	(10.968)	(7.185)	(7.654)
$Illiq$	0.004	0.013***	0.007***	0.019***	0.010***	0.015***
	(1.172)	(9.362)	(3.270)	(11.752)	(3.314)	(9.900)
STD_SALES	-0.000***	-0.000	-0.000***	0.000***	-0.000***	-0.000**
	(-3.426)	(-1.596)	(-5.951)	(4.627)	(-3.128)	(-2.236)
$LOSS\_FRE$	0.061***	0.051***	0.024**	0.076***	0.081***	0.044***
	(5.716)	(7.025)	(2.424)	(10.127)	(7.634)	(5.995)
ADR_EX	-0.044***	0.002	-0.009	-0.026***	-0.038***	0.003
	(-3.747)	(0.382)	(-1.251)	(-4.081)	(-4.084)	(0.517)
ADR_NEX	-0.029	0.010	0.001	-0.007	0.005	0.004
	(-1.213)	(0.733)	(0.065)	(-0.423)	(0.232)	(0.318)
Constant	-1.704***	-0.957***	-1.250***	-1.312***	-1.510***	-1.309***
	(-30.984)	(-17.140)	(-19.642)	(-34.669)	(-23.296)	(-41.492)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	233,378	351,758	275,883	332,326	229,023	379,186
Adj. R-sq	0.030	0.020	0.033	0.014	0.018	0.021

Table 12. Economic consequence of foreign institutional ownership, liquidity commonality, and liquidity

This table presents results of regressions of Tobin's Q (Q) on foreign institutional ownership (IO_FOR) and mediator ($COM(FL, ML)$ or $Illiq$). The significance of mediation effects are based on Sobel tests (Sobel, 1982). All of the variables are calculated as described in Appendix A. Robust standard errors, clustered at the firm level, are reported in brackets. We include country-, year-, and industry-fixed effects in the models as indicated. All of the continuous non-logarithmic variables are winsorized at the 1st and 99th percentiles. Statistical significance is indicated by ***p<0.01, **p<0.05, and *p<0.1 (two-sided).

	$COM(FL, ML)$ as mediator			$Illiq$ as mediator		
Dependents	$COM(FL, ML)$	Q		$Illiq$	Q	
	Eq. (23)	Eq. (24)	Eq. (25)	Eq. (26)	Eq. (27)	Eq. (28)
	(1)	(2)	(3)	(4)	(5)	(6)
$Indirect\ effects$		0.045***			0.289***	
$Indirect/total$		2.015%			11.667%	
IO_FOR	-0.407***	2.233***	2.188***	-2.141***	2.477***	2.188***
	(-12.962)	(11.182)	(10.946)	(-15.720)	(16.629)	(10.946)
$COM(FL, ML)$			-0.123***	0.217***	-0.171***	-0.123***
			(-14.785)	(16.625)	(-9.400)	(-14.785)
$Illiq$	0.030***	-0.141***	-0.137***			-0.137***
	(21.731)	(-3.527)	(-3.419)			(-3.419)
IO_DOM	0.012	0.031	0.026	-0.165**	0.050	0.026
	(0.729)	(0.381)	(0.324)	(-2.539)	(0.636)	(0.324)
$ASSETS$	-0.024***	-0.207***	-0.209***	-0.330***	-0.168***	-0.209***
	(-14.645)	(-19.127)	(-19.296)	(-44.707)	(-22.691)	(-19.296)
LEV	0.001***	-0.006***	-0.006***	0.006***	-0.007***	-0.006***
	(5.246)	(-7.095)	(-7.029)	(11.375)	(-6.430)	(-7.029)
$STDRET$	-1.949***	4.585**	4.254**	14.906***	-0.035	4.254**
	(-8.182)	(2.489)	(2.318)	(13.849)	(-0.042)	(2.318)
RE	-0.164***	1.909***	1.888***	-2.299***	1.914***	1.888***
	(-4.477)	(11.530)	(11.412)	(-16.459)	(11.085)	(11.412)
STD_SALES	-0.000***	0.000***	0.000***	0.000***	0.000***	0.000***
	(-4.590)	(8.330)	(8.205)	(24.601)	(9.241)	(8.205)
$LOSS\_FRE$	0.030***	-0.154*	-0.151*	0.221***	-0.155*	-0.150*
	(4.077)	(-1.692)	(-1.651)	(6.115)	(-1.669)	(-1.659)
ADR_EX	-0.031***	0.364***	0.362***	-0.142***	0.346***	0.362***
	(-5.766)	(5.271)	(5.255)	(-3.856)	(5.103)	(5.255)
ADR_NEX	-0.017	0.206***	0.202***	-0.169***	0.229***	0.202***
	(-1.342)	(8.520)	(8.310)	(-6.477)	(10.752)	(8.310)
Constant	-1.076***	3.984***	3.868***	4.199***	3.397***	3.868***
	(-27.687)	(20.913)	(20.390)	(22.724)	(21.020)	(20.390)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	96,016	96,088	96,088	95,736	96,088	96,088
Adj. R-sq	0.151	0.046	0.047	0.395	0.041	0.047

Appendix A. Variable definitions

Variable	Definition	Data source
IO_FOR	Foreign institutional ownership, calculated as the aggregate holding ratios (holding shares divided by shares outstanding) across foreign institutional investors of a given firm.	FactSet Ownership(LionShares)
IO_DOM	Domestic institutional ownership, calculated as the aggregate holding ratios (holding shares divided by shares outstanding) across domestic institutional investors of a given firm.	FactSet Ownership(LionShares)
$SIZE$	Log of market value of equity.	Worldscope
BM	Book to market ratio.	Worldscope
$STDRET$	Standard deviation of daily returns in a given month.	Datastream
$CLHLD$	Proportion of the firm's shares that are closely held.	Worldscope
RE	Log difference of stock price at the beginning and end of a month.	Datastream
STD_SALES	Standard deviation of sales over the past five years.	Worldscope
$LOSS\_FRE$	Frequency of accounting losses, calculated as the number of years a firm's net income is less than zero over the past five years.	Worldscope
$Illiq$	The stock daily Amihud (2002) ratio, calculated as absolute value of stock daily return divided by dollar trading volume.	Datastream
$R^2_{(FL,ML)}$	The goodness of fit of the regression of firm illiquidity on market illiquidity (see Eq. (1)).	Datastream
$COM(FL,ML)$	Log transformation of $R^2_{(FL,ML)}$.	Datastream
$BETA$	Sum of β_1, β_2, and β_3 from the regression of firm illiquidity on market illiquidity (see Eq. (1)).	Datastream
$R^2_{(FL,MR)}$	The goodness of fit of the regression of firm illiquidity on market returns (see Eq. (4)).	Datastream
$COM(FL,MR)$	Log transformation of $R^2_{(FL,MR)}$.	Datastream
$LIQVOL$	Monthly standard deviation of daily stock liquidity.	Datastream
$LIQSKEW$	Monthly skewness of the liquidity.	Datastream
$LIQBH$	Percentage of trading days in a month during which the daily illiquidity measure is 50 times higher than the country-level median.	Datastream
IO_FOR_INDEP	Independent foreign institutional ownership (e.g., mutual funds and advisors).	FactSet Ownership(LionShares)
IO_FOR_GRAY	Gray foreign institutional ownership (e.g., bank trusts and insurance companies).	FactSet Ownership(LionShares)
IO_FOR_US	U.S.-based foreign institutional ownership.	FactSet Ownership(LionShares)
IO_FOR_NUS	Non-U.S.-based foreign institutional ownership.	FactSet Ownership(LionShares)
$Assets$	Log of total assets	Worldscope
LEV	Ratio of total debt to total assets	Worldscope
$N\_Analysts$	Log of number of analysts covering a firm as reported by I/B/E/S	I/B/E/S
$Tightness$	Cultural tightness index.	Gelfand et al. (2011)
$Individualism$	Cultural individualism index.	Hofstede, (2001)
EPU	U.S. economic policy uncertainty index.	Baker et al. (2014)
$R^2_{(FR,MR)}$	The goodness of fit of the regression of stock returns on market returns.	Datastream
$ACCT$	Accounting standard index based on annual reports of inclusion or omission of 90 items.	La Porta *et al.* (1998)
EMS	Earning management index, calculated as the average of four earnings management variables.	Leuz et al. (2003)
$Discl$	Financial disclosures, calculated based on ratings of detailed disclosure data from the Center for Financial Analysis and Research.	Bushman et al. (2004)
AD	Revised anti-director rights index.	Djankov et al. (2008)
LAW	Dummy variable for French legal origin countries or German legal origin countries.	La Porta *et al.* (1998)
Q	Tobin's Q.	Worldscope

$Forecast\_accuracy$	The absolute value of the forecast error multiplied by -1 and scaled by the stock price, where the forecast error is the I/B/E/S analysts' mean monthly earnings forecast minus the actual earnings as reported by I/B/E/S.	I/B/E/S

Highlights

- There is a negative and robust association between foreign institutional ownership and global stock liquidity commonality in 39 countries from 2000 to 2014.
- The enhancement of corporate transparency is a key mechanism through which foreign institutional investors can reduce stock liquidity commonality.
- Independent and U.S.-based foreign institutional investors have a greater effect on reducing stock liquidity commonality.
- There is a U-shaped relation between foreign institutional ownership and stock liquidity commonality.
- Foreign institutional investors mitigate the effects of local culture, exaggerate the impacts of economic policy uncertainty, and substitute the role of a country's corporate governance level.
- Stock liquidity commonality mediates the relation between foreign institutional ownership and firm valuation. Foreign institutional investors can enhance firm valuation through stock liquidity commonality and stock illiquidity.