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Citation for published version:

Xiang, X, Chen, CR, Liu, Y, Mughal, A & Tao, Q 2023, 'Are directors with foreign experience better monitors? Evidence from investment efficiency', *Review of Quantitative Finance and Accounting*.
<https://doi.org/10.1007/s11156-023-01221-9>

Digital Object Identifier (DOI):

[10.1007/s11156-023-01221-9](https://doi.org/10.1007/s11156-023-01221-9)

Link:

[Link to publication record in Edinburgh Research Explorer](#)

Document Version:

Peer reviewed version

Published In:

Review of Quantitative Finance and Accounting

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Are directors with foreign experience better monitors? Evidence from investment efficiency

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Abstract

Using Chinese listed firms from 2008 to 2018, we find that directors with foreign experience alleviate both overinvestment and underinvestment, hence improve firms' investment efficiency. The source of efficiency lies in better governance, which arises from the transfer of values and cognition, and advanced management practices across countries as well as greater independence as these directors with foreign experience have fewer local ties. Better governance helps mitigate agency problems and information asymmetry and relax firms' financial constraints. Supporting this argument, we find that directors with foreign experience are associated with lower controlling shareholders' tunneling transactions and lower investment—cash flow sensitivity. We further find that the impact of directors' foreign experience on investment efficiency is more pronounced at firms with weaker corporate governance, less transparent information environment, higher financial constraints, and when foreign experience is gained in countries with better investor protection, superior management practices, better rule of law, and less corruption. Our finding is robust to alternative variable measurements and tests for endogeneity. Overall, this paper highlights the important monitoring role of directors with foreign experience, which promotes firm investment efficiency through various governance channels.

Keywords Board directors · Foreign experience · Investment efficiency · Governance channel

JEL Classification G31 · G34 · O16

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1 Introduction

What decides firms' capital allocation is one of the most important questions that determine the firm value and shareholders' wealth. In a perfect world (as in Modigliani and Miller 1958), a firm's investment depends only on its investment opportunities as measured by Tobin's Q (Baker et al. 2003; Modigliani and Miller 1958; Tobin 1969). In reality, however, capital market frictions cause a firm's investment to deviate from the optimal level. Information asymmetry and agency problems are the two main frictions examined in the investment literature (Baker et al. 2003; Chen et al. 2007; Jiang et al. 2011; McLean et al. 2012). Better monitoring, which mitigates information asymmetry and agency problems, improves investment efficiency (Chen et al. 2017b; Alvarez et al. 2018; Jiang et al. 2018).

Corporate boards play crucial roles in strategy and investment-related firm decisions, monitoring and advising managers (Fama and Jensen 1983; Hermalin and Weisbach 1991, 1998, 2003). The extent to which boards fulfill these duties depends largely on the composition and characteristics of board directors (Adams et al. 2010), such as board gender (Adams and Ferreira 2009) and board directors' experience (Feng and Johansson 2018). Zhang et al. (2018) suggest that directors' experience can affect corporate investment decisions through their monitoring and advisory roles. We focus on one particular characteristic of board directors, i.e., board directors' foreign experience.

In this paper, we investigate whether directors with foreign experience are better monitors in improving investment efficiency in an emerging market such as China. Because corporate governance and disclosure are poor in China (Gul et al. 2010), boards of directors play an important role in monitoring, and foreign experience may be valuable. Studies suggest a "brain gain" phenomenon (Giannetti et al. 2015; Kerr 2008) that transfers knowledge and skills from host to home countries through managerial foreign experience. The knowledge transfer effect may be manifested in governance practices (Iliev and Roth 2018; Tao et al. 2022), especially for emerging markets such as China where the economy is hampered by weak legal institutions, frail investor protection, and underdeveloped labor markets. Therefore, we propose that directors who study/work abroad, immerse themselves in foreign culture and rule of law, are more likely to apply good governance practices to their current firms, which helps them practice better monitoring and improves investment efficiency through mitigating agency problems and information asymmetry. Poor corporate governance and a large number of overseas talents in China make the Chinese dataset particularly suitable to explore the impact of directors with foreign experience on firm investment efficiency.

The imprinting theory suggests that an individual's experience and environmental factors in a critical period will have an influence on his/her cognition and values (Marquis and Tilcsik 2013). Foreign directors experience cultural environment, institutional environment, and living environment that are quite distinct from those in China, and thus may affect their values and cognition. Upper echelons theory indicates that company decision-makers' cognition and values will further affect firm decisions (Hambrick 2007). Directors who obtain foreign experience do so primarily in the U.S., Hong Kong, the U.K., Japan and Canada (Yuan and Wen 2018) and tend to acquire advanced governance knowledge, global views, and advanced management practices. Therefore, directors with foreign experience can then transfer this knowledge to the companies they work for after returning to China. Good corporate governance learned abroad helps directors better act the monitoring function. Besides, they may also have greater independence and provide better monitoring because they have fewer local political and business ties (Giannetti et al. 2015).

Applying 22,498 firm-year observations on 3291 Chinese listed companies from 2008 to 2018, we show that a higher proportion of directors with foreign experience positively correlates with firm investment efficiency by promoting the sensitivity of investment to

investment opportunities measured by Tobin's Q. Economically, increasing the proportion of directors with foreign experience by one standard deviation improves investment efficiency by 50%. Moreover, we demonstrate that directors with foreign experience improve investment efficiency by mitigating a firm's tendency of overinvestment or underinvestment. Specifically, the empirical result shows that a higher proportion of directors with foreign experience is associated with higher investment if the firm is more likely to underinvest and lower investment if the firm is more likely to overinvest.

More importantly, we explore the channels through which directors with foreign experience improve investment efficiency. We propose that foreign experience helps directors conduct stronger monitoring and better governance, which reduce controlling shareholders' tunneling and curb overinvestment. Furthermore, improved corporate governance and a more transparent information environment brought by these directors helps alleviate financial constraints and lower cost of capital, which reduce underinvestment. The empirical results support the governance channel by showing that directors with foreign experience are associated with less controlling shareholders' tunneling transactions and lower investment-cash flow sensitivity.

To provide additional evidence on the governance channel, we further perform cross-sectional analyses conditional on corporate governance quality, the information environment, and financial constraints. The results show that the positive impact of directors with foreign experience on a firm's investment efficiency is more prominent at firms with weaker corporate governance, a less transparent information environment, and higher financial constraints. Moreover, reinforcing earlier evidence, we find a stronger positive association when directors' foreign experience is gained in countries with better investor protection, advanced management practices, finer rule of law, and greater control of corruption. We finally conduct robustness tests, including endogeneity analysis. Our results remain robust to alternative measures of investment and investment opportunities, controlling for CEOs with foreign experience, controlling for the firm- and year-fixed effects, and the use of Heckman two-stage approach to mitigate potential self-selection bias.

Our paper contributes to three strands of the literature. The first relates to the literature on the determinants of firm investment efficiency. Empirical evidence on investment efficiency related to agency problems has explored the impact of the analyst forecasts quality, the existence of multiple large shareholders and institutional blockholders. Our study examines the effects of one of the most important internal monitoring mechanisms, the board of directors. Our study shows the significant impact of governance performed by board directors with foreign experience on investment efficiency.

Second, we explore the potential channels through which directors' foreign experience impact investment efficiency. We show that the reduction in overinvestment is driven by better corporate governance, and the reduction in underinvestment is driven by the alleviation of financial constraints through information transparency, both are attributed to directors with foreign experience. To the best of our knowledge, our paper is the first to directly explore the channels through which directors with foreign experience improve firms' investment efficiency. We provide both direct and indirect evidence supporting the governance channel.

Third, our paper is related to the strand of literature linking board characteristics with corporate governance. How well a board monitors the management and impacts corporate governance is affected by its composition and director characteristics (Adams et al. 2010). Previous studies suggest that corporate governance is influenced by multiple board characteristics, including board size (Jensen 1993), board independence (Setia-Atmaja et al. 2011), board gender diversity (Adams and Ferreira 2009; Gul et al. 2011; Chen et al. 2017a, b, c; Griffin et al. 2021), board directors' early-life experience (Feng and Johansson 2018), board overall diversity (An et al. 2021), among others. Our paper complements theirs

by showing evidence on the role of enhancing corporate governance by directors with foreign experience.

Given the increasing corporate globalization and internationalization of boards of directors, our finding on China can be applied to other emerging countries that suffer from weak governance. These countries may face similar “brain drain” and subsequent “brain gain.” Because we focus on an emerging market, China, where directors can learn sound corporate governance, management practices, and rule of law during their study or work abroad and bring them back home, our findings have corporate policy implications for other emerging countries with weak governance.

The rest of this paper is organized as follows. Section 2 introduces the related literature. Section 3 describes the data and variables. Section 4 reports and discusses the baseline regression results. Section 5 analyzes potential influencing channels. Section 6 conducts robustness tests and endogeneity analysis, and Sect. 7 concludes the paper.

2 Literature review

2.1 Determinants of capital investment efficiency

Investment is a crucial pillar for corporate finance. In a perfect world without frictions (information asymmetry, transaction costs, taxes), a firm’s investment depends only on its investment opportunities and invest until the marginal cost equals the marginal revenue (Baker et al. 2003; Modigliani and Miller 1958; Tobin 1969). However, more and more studies find that in reality a firm’s investment would deviate from the optimal level (either over-invest or under-invest) due to capital market frictions such as information asymmetry and agency problems (Baker et al. 2003; Chen et al. 2007; Jiang et al. 2011; McLean et al. 2012), causing investment inefficiency. The determinants of investment inefficiency attract much attention from the researchers.

Information asymmetry models suggest that adverse selection and moral hazard due to information asymmetry between firms and external capital providers may lead to higher external capital costs, resulting in financial constraints and underinvestment (Myers 1984). Under adverse selection, managers are more likely to issue capital when their firms are overvalued because they are better informed than outside investors as to the true value of the firm’s assets and growth opportunities. However, rational investors might anticipate this outcome and require a premium, which increases capital costs and leads to underinvestment. Under moral hazard, managers have incentives to maximize their welfare and overinvest (Jensen 1986). However, outside investors might anticipate this problem and raise the cost of capital, which leads to financial constraints and underinvestment (Stiglitz and Weiss 1981).

Agency models suggest that managers might make investment decisions that maximize their benefits, rather than the interests of shareholders (Jensen and Meckling 1976), leading to investment inefficiency. Prior research illustrates a positive association between investment expenditure and cash flow (Cleary 1999; Cummins et al. 2006; Fazzari et al. 1988; Hubbard 1998); Richardson 2006). The positive association can be explained by two types of agency problems: those between controlling shareholders and minority shareholders and those between managers and shareholders (Jensen 1986; Stulz 1990). Liu and Lu (2007) and Jiang et al. (2010) find that the first type of agency problem is prevalent in China, where controlling shareholders are found to expropriate resources from minority investors (tunneling). Jensen (1986) and Stulz (1990) suggest that monitoring difficulty creates the potential for management to spend internally generated cash flow on projects that are beneficial from a management perspective but costly to shareholders.

These two types of agency problems lead to overinvestment. For example, Jensen (1986) argues that empire-building motives lead managers with free cash flow to overinvest. Opler et al. (1999) suggest that firms with excess cash engage in more capital expenditures and acquisitions, even when the investment opportunities appear to be poor. Harford (1999) also indicates that cash-rich firms are more prone to making acquisitions, which results in abnormal declines in operating performance. Taken together, these capital market imperfections lower firm investment efficiency. Information asymmetry leads to underinvestment, while agency problems lead to overinvestment.

Empirical evidence on investment efficiency concerning agency problems have investigated multiple monitoring mechanisms. For example, Chen et al. (2017a) argue that foreign institutions improve corporate governance and financial transparency, which mitigate agency problems and information asymmetry and consequently improve firm investment efficiency. Chay et al. (2023) find that the 2003 dividend tax cut in the U.S. improved the investment efficiency of U.S. listed firms by mitigating agency problems associated with the excess free cash flows of overinvesting firms. Others show that high-quality analyst forecasts (Chen et al. 2017b), the existence of multiple large shareholders (Jiang et al. 2018), or information disclosure ratings (Chen et al. 2023) increase external monitoring, which in turn improves investment efficiency. In our study, we examine whether foreign experience enhances these directors' monitoring capacity, which improves corporate governance, reduces agency problems, and contributes to firms' investment efficiency.

2.2 Foreign experience

Studies on imprint theory show that individuals' experience and environmental factors in a critical period will affect their cognition, values and decision-making process (e.g., Barkan et al. 1998; Hertwig et al. 2004; Hertwig and Erev 2009). Managers' experience influences their interpretation of situations and affects their choices (Hambrick 2007). There is a growing body of literature focusing on managerial foreign experience in recent years. These studies suggest that international experience affects personal values and provides rare and valuable resources (e.g., Carpenter et al. 2001; Quan et al. 2023; Slater and Dixon-Fowler 2009; Suutari and Mäkelä, 2007). Foreign directors experience cultural environment, institutional environment, and living environment that are quite distinct from those in China and thus may affect their values and cognition.

Managerial foreign experience facilitates knowledge spillover around the world (e.g., Giannetti et al. 2015; Miletkov et al. 2017). Returnees transfer knowledge and skills learned abroad to their home countries (Bhagwati and Hamada 1974), a process called the "brain gain" phenomenon (Giannetti et al. 2015; Kerr 2008). Iliev and Roth (2018) argue that this transfer-of-knowledge effect is even more important when the knowledge transferred is about governance practices. They find that directors' foreign experience is an important source of cross-country governance transfers, and the transfer effect is stronger in countries with weak investor protection.

Directors with foreign experience also learn how foreign organizations work, which teaches them about advanced management practice. Furthermore, as upper echelons theory indicates, company decision-makers' cognition and values will further affect firm decisions (Hambrick 2007). Therefore, directors with foreign experience can apply superior management practices at their current firms, enhancing firm performance and productivity (Bloom et al. 2007). Giannetti et al. (2015) find that hiring directors with foreign experience promotes firm performance in China. They argue that directors with foreign experience have weaker local ties, hence stronger incentives for pursuing profitability, rather than pleasing

politicians and other local constituencies. Their empirical results support this view, showing that directors with foreign experience decrease firms' likelihood of earnings management. Other studies associate directors' foreign experience with CSR engagement, corporate investments, cost of debt, stock price informativeness, and dividend payout (Zhang et al. 2018; Dai et al. 2018; Xie et al. 2019; Cao et al. 2019; Tao et al. 2022).

3 Data and variables

3.1 Sample selection

Our sample covers all listed A-share companies in the China Securities Market and Accounting Research (CSMAR) database from 2008 to 2018.¹ We exclude financial firms, "Foreign-owned Enterprise," and "Other" firms.² We also omit firms labeled as ST or *ST and firms with missing observations.³ Directors' foreign experience and firms' financial data are obtained from the CSMAR database. Firms' basic information, acquisition expenditure, research and development (R&D) expenditure, related party transaction, and shares held by major shareholders are collected from China Research Data Services Platform (CNRDS). Shares held by institutional shareholders and information about firms' product lines are collected from the WIND database. All continuous variables are winsorized at the 1st and 99th percentiles. Our sample period is from 2008 to 2018 because CSMAR started covering directors' foreign experience data in 2008. The final sample consists of 22,498 firm-year observations, representing 3291 listed companies.

Table 1 describes the distribution of sample firms by year. It presents the number of firm-year observations, the number (N) and the percentage ($Ratio$) of firm-years in which at least one director has foreign experience. We also report the mean ($Mean$) of the proportion of directors with foreign experience for all observations in each year. Table 1 suggests that the number of firm-years with directors who have foreign experience increases steadily from 2008 to 2017 and drops in 2018. The ratio also gradually increases from 40.0% in 2008 to 59.4% in 2016 and declines to 51.1% in 2018. The mean proportion of directors with foreign experience ($Mean$) grows in general from 6.7% in 2008 to 13.5% in 2017. This value falls to 10.6% in 2018, implying that in 2018 about one out of ten directors has foreign experience.

¹ Currently, most Chinese companies listed and traded on the Shanghai Stock Exchange (SHSE) and Shenzhen Stock Exchange (SZSE) issue two classes of shares: A and B shares. A shares are domestic shares quoted in Chinese currency (RMB) and are restricted to domestic investors and qualified foreign institutional investors (QFIIs). B shares are foreign shares quoted in foreign currencies (U.S. dollars for Shanghai B shares and Hong Kong dollars for Shenzhen B shares). Until February 2001, B shares were available only to foreign investors. B-share companies might be more likely to employ directors with foreign experience and have different investment policies. To avoid the influence of B shares on our research question, our sample covers only A shares.

² CSMAR divides all listed firm into four categories based on their equity nature, including, state-owned enterprises, private enterprises, foreign-owned enterprises and other. Foreign-owned enterprises are those established in China with capital invested by foreign investors, including joint ventures, cooperative enterprises and wholly foreign-owned enterprises, excluding the branches of foreign enterprises or other economic organizations in China. We exclude firms labelled as "Foreign-owned Enterprise" and "Other". Our sample contains only state-owned firms and private firms.

³ ST (special treatment) stocks are stocks with abnormal financial conditions. *ST stocks fail to comply with certain rules imposed by the exchange during the period of being labeled as ST. These stocks are typically in financial difficulty.

Table 1 Summary statistics for directors' foreign experience by year

<i>Year</i>	<i>Observations</i>	<i>N</i>	<i>Ratio</i>	<i>Mean</i>
2008	1186	474	0.400	0.067
2009	1297	554	0.427	0.082
2010	1608	750	0.466	0.100
2011	1906	953	0.500	0.106
2012	2093	1055	0.504	0.098
2013	2106	1101	0.523	0.102
2014	2142	1168	0.545	0.117
2015	2180	1266	0.581	0.129
2016	2370	1408	0.594	0.134
2017	2732	1590	0.582	0.135
2018	2878	1470	0.511	0.106

This table describes the distribution of firm-year observations with board directors with foreign experience by year. Each panel presents the number (*N*) and percentage (*Ratio*) of observations that have at least one director with foreign experience. The table also reports the mean (*Mean*) of the proportion of directors with foreign experience for all observations in each year. The final sample consists of 22,498 firm-year observations for 3291 firms from 2008 to 2018

3.2 Variables

3.2.1 Dependent variable: investment

Following previous studies (e.g., Biddle et al. 2009; Chen et al. 2017b; Cheng et al. 2013; Richardson 2006), we measure investment expenditure (*Invest*) in a given firm-year as cash payments for fixed assets, intangible assets, and other long-term assets from the cashflow statement, minus cash receipts from selling these assets, plus R&D expenditure and acquisition expenditure, scaled by beginning-of-the-year total assets. It is one of the most popularly used measurements of investment in prior studies. An advantage of this measure is that it considers several types of investment. Some investment literature also measures investment expenditure as cash payments for fixed assets, intangible assets, and other long-term assets from the cash-flow statement minus cash receipts from selling these assets, scaled by beginning-of-the-year total assets (e.g., Chen et al. 2011).⁴ We use this alternative measurement (*Invest2*) as a robustness check.

3.2.2 Test variables: directors with foreign experience and investment opportunities

Following Giannetti et al. (2015), a director is considered as having foreign experiences if he or she has studied or worked outside mainland China. We follow related studies and measure directors with foreign experience by the proportion of board members with foreign experience (*DirectorsFE*). We also use other measures as robustness checks, including the number of directors with foreign experience (*NumberFE*), and a dummy variable that equals one if a firm has at least one director with foreign experience, and zero

⁴ This measurement is equivalent to capital expenditure (COMPUSTAT Item 128#) used by U.S.-based studies.

otherwise (*DummyFE*).

Investment opportunities are captured by Tobin's Q (TQ), which is the sum of the market value of tradable shares, the book value of non-tradable shares and liabilities, divided by the book value of total assets. We use the book value of non-tradable shares to compute TQ because of their illiquidity. Such shares are normally traded at a price close to the book value of equity in the over-the-counter market. Some studies apply growth rate in sales (*SalesGrowth*) to measure investment opportunities (e.g., Biddle et al. 2009; Cull et al. 2015; Firth et al. 2008; Guariglia and Yang 2016; Hu and Liu 2015; Whited and Wu 2006), we therefore also use *SalesGrowth* to proxy for investment opportunities as robustness checks.⁵ Because the coefficient of investment opportunities (TQ) measures the sensitivity of investment expenditures to investment opportunities, the coefficient of the interaction term (*Directors FE* \times TQ) thus measures the impact of directors with foreign experience on the sensitivity of investment expenditures to investment opportunities.

3.2.3 Control variables

Following previous studies (e.g., Biddle et al. 2009; Chen et al. 2017b; Cheng et al. 2013), we include control variables that were shown to impact firm investment, including firm size measured by the natural logarithm of total assets (*Size*), firm age measured by the natural logarithm of one plus the number of years since the firm was listed (*Age*), firm leverage calculated as the ratio of debt to the market value of the firm (*Leverage*), the ratio of cash to beginning-of-the-year total assets (*Cash*), the ratio of tangible assets to total assets (*Tangibility*), and a dividend indicator (*Dividend*) which equals one if a firm pays dividend in a given year and zero otherwise. *Loss* is an indicator variable that takes the value of one if a firm's net income before extraordinary items is negative, and zero otherwise. *SOE* equals one if the firm is state owned, and zero otherwise.

We also control for a group of corporate governance indicators following prior studies (Chen et al. 2017a, b; Jiang et al. 2018; To et al. 2018). They are CEO-chair duality (*Duality*), a dummy variable that equals one if the board chair also serves as CEO, and zero otherwise; the proportion of independent directors (*Independent Directors*); shares held by the largest shareholder (*Largest Share*); shares held by institutional shareholders (*Institution Share*); shares held by foreign investors (*Foreign Share*); and the natural logarithm of one plus the number of analyst following a firm (*Analyst Coverage*). Year-fixed effects (α_t) and firm-fixed effects (α_i) are included to capture unobservable factors that might influence firm investments.

3.3 Summary statistics

Table 2 provides descriptive statistics of the variables used in our main analysis. We winsorize all continuous variables at the 1st and 99th percentiles to mitigate the impact of outliers. Appendix 1 provides detailed definitions of all variables. As shown in Table 2, the average annual investment expenditure for all firms is 7.7%, with a median of 6.0%. These values are consistent with Chen et al. (2011) and Jiang et al. (2018). The average proportion of directors with foreign experience is 11.1%, meaning around one in ten board members has

⁵ This test is motivated by the fact that in the Chinese context, Tobin's Q may be an imperfect measure of investment opportunities.

Table 2 Descriptive statistics

Variable	<i>N</i>	<i>Mean</i>	<i>Std</i>	<i>Min</i>	<i>Median</i>	<i>Max</i>
<i>Invest</i>	22,498	0.077	0.071	-0.046	0.060	0.408
<i>Directors FE</i>	22,498	0.111	0.143	0	0.091	0.667
<i>Directors FE U.S</i>	22,485	0.040	0.086	0	0	0.444
<i>Directors FE H.K</i>	22,485	0.015	0.049	0	0	0.286
<i>Directors FE U.K</i>	22,485	0.013	0.042	0	0	0.222
<i>Directors FE 1</i>	22,485	0.064	0.115	0	0	0.583
<i>Directors FE 2</i>	22,485	0.057	0.106	0	0	0.556
<i>Directors FE 3</i>	22,485	0.079	0.133	0	0	0.714
<i>Directors FE 4</i>	22,485	0.076	0.129	0	0	0.667
<i>Directors FE Work</i>	22,498	0.037	0.078	0	0	0.400
<i>Directors FE Study</i>	22,498	0.051	0.086	0	0	0.400
<i>Loss</i>	22,498	0.073	0.260	0	0	1
<i>SOE</i>	22,498	0.415	0.493	0	0	1
<i>Duality</i>	22,498	0.256	0.436	0	0	1
<i>Independent Directors</i>	22,498	0.372	0.052	0.308	0.333	0.571
<i>Largest Share</i>	22,498	0.354	0.149	0.087	0.337	0.750
<i>Institution Share</i>	22,498	0.369	0.238	0	0.369	0.866
<i>Foreign Share</i>	22,498	0.007	0.039	0	0	0.276
<i>Analyst Coverage</i>	22,498	1.610	1.140	0	1.610	3.640

This table presents the descriptive statistics of the variables in our main analysis, including observations (*N*), mean (*Mean*), standard deviation (*Std*), minimum value (*Min*), median value (*Median*), and maximum value (*Max*). The sample includes 22,498 firm-year observations for 3291 firms from 2008 to 2018 for all variables. Detailed definitions of all variables are described in Appendix 1

foreign experience. 52.4% of the sample firms have at least one director with foreign experience. The correlation matrix of the main variables is presented in Appendix 2.

4 Foreign experience and investment efficiency

Based on the discussions in Sect. 2, we expect directors with foreign experience to be associated with improved investment efficiency because they are more capable of monitoring and implementing strong corporate governance, which helps reduce information asymmetry and agency problems and improves investment efficiency. We test this argument using the baseline regression (Eq. (1) following the investment literature and measure investment efficiency as the sensitivity of investment expenditure to investment opportunities (e.g., Baker et al. 2003; Chen et al. 2011, 2017a; Fazzari et al. 1988; Whited 1992).

$$Invest_{i,t} = \alpha_t + \alpha_i + \beta_1 Directors\ FE_{i,t-1} \times Investment\ Opportunities_{i,t-1} + \beta_2 Directors\ FE_{i,t-1} + \beta_3 Investment\ Opportunities_{i,t-1} + Controls_{i,t-1} + \varepsilon_{i,t} \quad (1)$$

where the dependent variable $Invest_{i,t}$ is firm i 's investment expenditure in year t . $Directors\ FE$ measures directors with foreign experience, while $Investment\ Opportunities$ captures

a firm's investment opportunities. We also include control variables that were previously found to be associated with firm investment. Year fixed effects (α_t) and firm fixed effects (α_i) are incorporated in this model, and ε is an error term. Following Petersen (2009), we compute the t -statistics of the estimated coefficients from the heteroscedasticity-consistent standard errors at the firm level.

We use lagged independent variables and lagged control variables because investment decisions are typically made at the beginning of the year based on the previous year's investment opportunities (Jiang et al. 2018). The coefficient of *Investment Opportunities*, β_3 , measures the sensitivity of investment expenditures to investment opportunities. Modigliani and Miller (1958) suggest a positive relationship between investment opportunities and investment expenditures. Our primary hypothesis can be examined by the interaction term, i.e., *Directors FE* \times *Investment Opportunities*. We predict a positive β_1 .

4.1 Baseline regression results

Table 3 presents the baseline regression results of Eq. (1), which tests whether directors with foreign experience improve the sensitivity of firm investment expenditures to investment opportunities. The dependent variable in Table 3 is investment expenditure (*Invest*). A firm's investment opportunity is measured by Tobin's Q (*TQ*). Directors' foreign experience is measured by *Directors FE*, *Number FE*, and *Dummy FE*, and the results are shown in column (1)–(3) respectively. We include year- and firm-fixed effects in all regressions.⁶

The empirical results in Table 3 show that the coefficients of the interaction between directors with foreign experience and investment opportunities (*Directors FE* \times *TQ*, *Number FE* \times *TQ*, *Dummy FE* \times *TQ*) in columns (1)–(3) are all positive and statistically significant regardless of the measurement for directors with foreign experience. This evidence suggests that, compared to firms that have no director with foreign experience, those with at least one director with foreign experience have higher investment efficiency as it enhances the sensitivity of investment expenditures to investment opportunities. The same conclusion holds when a director's foreign experience is measured by the number or proportion of such directors.

The results are also economically significant. For example, based on column (1), investment-*TQ* sensitivity evaluated at the mean level of *Directors FE* is 0.003 ($0.002 + 0.010 \times 0.111 = 0.003$). Holding all other variables constant, increasing the proportion of directors with foreign experience by one standard deviation (i.e., 0.143) improves investment-*TQ* sensitivity by 50% from 0.003 to 0.0045 ($0.002 + 0.010 \times (0.111 + 0.143) = 0.0045$).

The signs of the coefficients on control variables are generally consistent with the findings of previous researchers (e.g., Jiang et al. 2018). Consistent with Modigliani and Miller's (1958) paradigm, investment opportunities (*TQ*) are significantly and positively correlated with investment. Firm size (*Size*) and listed years (*Age*) both have significant and negative signs because smaller and younger firms are more likely in the expansion stage. Firm leverage (*Leverage*) has a negative impact because firms with higher leverage are less likely to obtain additional debt financing, which limits investment. Dividend payers and firms with a higher proportion of tangible assets (*Tangibility*) have a higher

⁶ We also use the industry-fixed effect, and our main conclusion does not change. The results are available upon request.

Table 3 Directors with foreign experience and investment efficiency

Variables	(1) <i>Invest</i>	(2) <i>Invest</i>	(3) <i>Invest</i>
<i>Directors FE × TQ</i>	0.010** (2.54)		
<i>Number FE × TQ</i>		0.001** (2.47)	
<i>Dummy FE × TQ</i>			0.002** (2.05)
<i>Directors FE</i>	− 0.028*** (− 3.10)		
<i>Number FE</i>		− 0.003*** (− 2.96)	
<i>Dummy FE</i>			− 0.006*** (− 2.72)
<i>TQ</i>	0.002*** (2.70)	0.002*** (2.74)	0.002** (2.55)
<i>Size</i>	− 0.005** (− 2.35)	− 0.005** (− 2.35)	− 0.005** (− 2.32)
<i>Age</i>	− 0.018*** (− 7.35)	− 0.018*** (− 7.35)	− 0.017*** (− 7.29)
<i>Leverage</i>	− 0.070*** (− 9.29)	− 0.070*** (− 9.25)	− 0.070*** (− 9.29)
<i>Cash</i>	0.002 (0.64)	0.002 (0.63)	0.002 (0.49)
<i>Tangibility</i>	0.027** (2.53)	0.027** (2.52)	0.027** (2.57)
<i>Dividend</i>	0.006*** (4.28)	0.006*** (4.27)	0.006*** (4.28)
<i>Loss</i>	− 0.012*** (− 6.92)	− 0.012*** (− 6.94)	− 0.012*** (− 6.92)
<i>SOE</i>	− 0.017*** (− 3.06)	− 0.016*** (− 3.05)	− 0.016*** (− 3.03)
<i>Duality</i>	0.004** (2.21)	0.004** (2.23)	0.004** (2.24)
<i>Independent Directors</i>	− 0.021 (− 1.45)	− 0.022 (− 1.51)	− 0.022 (− 1.52)
<i>Largest Share</i>	0.039*** (3.87)	0.039*** (3.85)	0.039*** (3.90)
<i>Institution Share</i>	0.002 (0.52)	0.002 (0.50)	0.002 (0.54)
<i>Foreign Share</i>	0.044** (2.38)	0.044** (2.39)	0.043** (2.31)
<i>Analyst Coverage</i>	0.007*** (9.45)	0.007*** (9.45)	0.007*** (9.48)
<i>Constant</i>	0.187*** (4.24)	0.187*** (4.25)	0.186*** (4.21)
<i>Observations</i>	22,498	22,498	22,498

Table 3
(continued)

Variables	(1) <i>Invest</i>	(2) <i>Invest</i>	(3) <i>Invest</i>
<i>Adjusted R-squared</i>	0.133	0.133	0.133
<i>Year FE</i>	Yes	Yes	Yes
<i>Firm FE</i>	Yes	Yes	Yes

This table presents the regression results of Eq. (1). The dependent variable is cash payments for fixed assets, intangible assets, and other long-term assets from the cash-flow statement, minus cash receipts from selling these assets, plus research and development expenditure, plus acquisition expenditure, scaled by beginning-of-year total assets (*Invest*). The major explanatory variable of interest is the interaction between directors with foreign experience and the firm's investment opportunity measured by Tobin's Q (*TQ*). We use three measurements for directors with foreign experience. The first is the proportion of directors with foreign experience (*Directors FE*). The second is the number of directors with foreign experience (*Number*). The third one is *Dummy FE*, which is a dummy variable that equals one if a firm has at least one director with foreign experience in year t , and zero otherwise. The results are shown in columns (1)–(3) respectively. All independent variables are lagged by 1 year. Year- and firm-fixed effects are included in all regressions. All the variables are defined in Appendix

1. All continuous variables are winsorized at 1% in both tails. The t -values clustered as firm level are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively

investment level. In contrast, firms that suffer losses (*Loss*) in the previous year have a lower investment level. In addition, private firms have a higher investment level than state-owned firms (*SOE*). For corporate governance variables, dual positions (*Duality*), largest shareholder ownership (*Largest Share*), foreign ownership (*Foreign Share*), and analyst coverage (*Analyst Coverage*) are positively correlated with investment.

4.2 Overinvestment or underinvestment

Improving investment efficiency can be achieved by mitigating overinvestment and/or underinvestment. In this section, we use firm-specific characteristics (identified in the prior literature) to distinguish firms based on their higher likelihood of under- or overinvesting and then follow Biddle et al. (2009), Cheng et al. (2013), and Chen et al. (2017b) in employing Eq. (2) to examine whether a higher proportion of directors with foreign experience is correlated with a lower likelihood of under- or over-investment.

$$\begin{aligned}
 Invest_{i,t} = & \alpha_t + \alpha_i + \beta_1 Directors FE_{i,t-1} + \beta_2 Directors FE_{i,t-1} \\
 & \times Over Firm_{i,t-1} + \beta_3 Over Firm + Controls_{i,t-1} + \varepsilon_{i,t}
 \end{aligned} \tag{2}$$

where *Over Firm* is a proxy used to capture a firm's likelihood to under- or overinvest. Following Biddle et al. (2009), Cheng et al. (2013), and Chen et al. (2017b), we construct *Over Firm* based on two variables, cash and leverage, that reflect firm liquidity. Prior literature suggests that, on average, firms with high cash balances are more likely to experience agency problems and inefficient use of excess cash, such as empire building, perquisite consumption, and overinvestment (Blanchard et al. 1994; Jensen 1986; Opler et al. 1999). By contrast, firms with high leverage (lack of cash) may suffer from debt

overhang (financial constraints) that forces them to underinvest (Aivazian et al. 2005; Myers 1977). Therefore, a firm's likelihood to overinvest (underinvest) is associated with higher cash and lower leverage (lower cash and higher leverage). We use both variables because combining these two variables reduces measurement error in the individual variables (Biddle et al. 2009).

To construct *Over Firm*, each year and industry, we rank firms in deciles based on each of the two firm-specific variables: cash balance and leverage. We multiply leverage by -1 before ranking so that it increases with the likelihood of overinvestment. We then rescale the ranked numbers to a range between zero and one. In such a ranking setting, firms that are most likely to overinvest have the highest rank, while those that are most likely to underinvest rank lower. Next, we construct a composite score measure, *Over Firm*, calculated as the average of the two rescaled ranks. A higher score for *Over Firm* indicates that a firm is more likely to overinvest, and a low score indicates that a firm is likely to underinvest. The mean and standard deviation of *Over Firm* are 0.478 and 0.262, respectively (shown in Table 2). These values are very similar to those in Chen et al. (2017b).

Because *Over Firm* increases (decreases) in the likelihood of overinvestment (underinvestment), the estimated coefficient β_1 in Eq. (2) reflects the impact of directors' foreign experience on the firms' investment level when firms are more likely to underinvest. Therefore, $\beta_1 > 0$ implies that a higher proportion of directors with foreign experience is positively associated with investment when firms are more likely to underinvest. However, because β_2 measures the incremental relation between directors' foreign experience and investment as firms are more likely to overinvest, $(\beta_1 + \beta_2)$ measures the relationship between directors with foreign experience and investment when overinvestment is more likely. We, therefore, use the joint effect of these coefficients $(\beta_1 + \beta_2 < 0)$ to test the notion that a higher proportion of directors with foreign experience is negatively associated with investment when firms are more likely to overinvest. We also test whether the coefficient on the interaction term between directors' foreign experience and overinvestment is less than zero (i.e., $\beta_2 < 0$).⁷

Table 4 reports the results of regressions specified in Eq. (2). The coefficient on *Directors FE* is positive and statistically significant. This evidence suggests a positive relationship between the proportion of directors with foreign experience and investment among firms that are more likely to underinvest (*Over Firm* = 0). Economically, for firms that underinvest, increasing *Directors FE* by 1% raises *Invest* by 0.019%. Given that the mean of *Invest* in the full sample is 0.077, the impact of a 1% increase in *Directors FE* corresponds to an increase of 24.7% ($0.019/0.077$) in the mean of *Invest*. This evidence supports our argument that the proportion of directors with foreign experience is negatively associated with firm underinvestment.

The coefficient for *Directors FE* *Over Firm* is negative and significant at 1% level, whereas the overall effect of *Directors FE* on investment among firms that are more prone to overinvest (as measured by $\beta_1 + \beta_2$ in Eq. (2)) is significant and negative. The joint significance test rejects the null hypothesis that the sum of the coefficients is zero. Economically, for firms that have a higher likelihood to overinvest, every one-percentage-point increase in *Directors FE* decreases *Invest* by 0.027%, which corresponds to about 35.1% ($0.027/0.077$) of mean *Invest*. This finding provides support for the notion that directors with foreign experience are negatively associated with firm overinvestment.

⁷ Because *Leverage* and *Cash* are used to construct *Over Firm*, they are omitted from Eq. (2).

Table 4 Overinvestment or underinvestment

Variables	<i>Invest</i>
<i>Directors FE</i>	0.019* (1.80)
<i>Directors FE</i> × <i>Over Firm</i>	- 0.046*** (- 2.85)
<i>Joint significance</i>	- 0.027** (<i>p</i> value = 0.03)
<i>Over Firm</i>	0.052*** (12.51)
<i>TQ</i>	0.005*** (6.42)
<i>Size</i>	- 0.010*** (- 5.92)
<i>Age</i>	- 0.011*** (- 5.14)
<i>Tangibility</i>	0.021** (1.99)
<i>Dividend</i>	0.005*** (3.83)
<i>Loss</i>	- 0.011*** (- 6.36)
<i>SOE</i>	- 0.016*** (- 3.07)
<i>Duality</i>	0.004** (2.24)
<i>Independent Directors</i>	- 0.025* (- 1.71)
<i>Largest Share</i>	0.035*** (3.41)
<i>Institution Share</i>	0.005 (1.51)
<i>Foreign Share</i>	0.036* (1.93)
<i>Analyst Coverage</i>	0.007*** (10.27)
<i>Constant</i>	0.241*** (5.90)
<i>Observations</i>	22,498
<i>Adjusted R-squared</i>	0.138
<i>Year FE</i>	Yes
<i>Firm FE</i>	Yes

This table presents the regression results specified in Eq. (2) and the dependent variable is *Invest*. *Over Firm* is a ranked variable based on the average of a ranked (deciles) measure of cash and leverage. Leverage is multiplied by -1 before ranking so that both variables have an increasing likelihood of overinvestment. A higher score for *Over Firm* indicates that a firm is more likely to overinvest and a lower score indicates that a firm is likely to underinvest. All independent variables are lagged by 1 year. Year- and firm-fixed effects are included in both regressions. All the variables are defined in Appendix 1. All continuous variables are winsorized at 1% in both tails. The *t*-values clustered as firm level are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively

Taken together, empirical results in Table 4 provide consistent support for the argument that directors with foreign experience promote firm investment efficiency by decreasing investment expenditures at firms that are prone to overinvestment and increasing investment expenditures at firms that are prone to underinvestment.

5 The mechanism: influencing channel analysis

In this section, we explore potential channels through which directors with foreign experience impact firm investment efficiency. According to the discussions in Sect. 2, agency problems and information asymmetry are the two main frictions leading to investment inefficiency. We argue that directors with foreign experience conduct stronger monitoring and better corporate governance, which help mitigate agency conflicts and information asymmetry problems, therefore improve investment efficiency. We explicitly test this governance channel from the perspective of overinvestment and underinvestment respectively. To further provide evidence for the governance channel, we examine the impact of directors with foreign experience on investment efficiency conditional on corporate governance quality, information environment, financial constraints, and experience gained in different countries.

5.1 Impact on controlling shareholders' related-party transaction

Asset acquisition by controlling shareholders is the most common type of tunneling transaction that leads to overinvestment and harms firm value (Jiang et al. 2010; Wang et al. 2020). Controlling shareholders' expropriation problem is especially severe in China (Jiang et al. 2010). Tunneling through related-party transactions is more likely to occur when controlling shareholders have excess control rights. If our argument on the governance channel exists, we expect that directors with foreign experience would curb controlling shareholders' tunneling through related-party transactions. To test this conjecture, each year we partition the sample into subgroups using the median value of *Directors FE*, and run Eq. (3) for each subgroup:

$$Related\ Transaction_{i,t} = \alpha_i + \alpha_i + \beta_1 Excess_{i,t-1} + Controls_{i,t-1} + \varepsilon_{i,t} \quad (3)$$

Following Cheung et al. (2006), controlling shareholders' expropriation activities are measured by related-party transactions (*Related Transaction*). We follow Jiang et al. (2010) and measure controlling shareholders' expropriation motivations by their excess control rights (*Excess*), calculated as the differences between controlling shareholders' control rights and cash-flow rights. Controlling shareholders with higher excess control rights have higher incentives to tunnel. We apply the same control variables as those in Eq. (1) and include year- and firm-fixed effects.

Results in column (1) of Table 5 show that for the subgroup with lower proportion of directors with foreign experience, the estimated coefficient on *Excess* is significantly positive, suggesting that excess control rights of controlling shareholders are positively correlated with related-party transactions. In comparison, the estimated coefficient on *Excess* in column (2) is insignificant, indicating that for the subgroup with higher proportion of directors with foreign experience, there is no significant correlation between the excess control rights of controlling shareholders and firms' related-party transactions. Overall,

Table 5 Impact of directors with foreign experience on related-party transactions

Variables	(1) <i>Directors FE=Low</i>	(2) <i>Directors FE=High</i>
<i>Excess</i>	0.033** (2.02)	- 0.011 (- 0.63)
<i>TQ</i>	0.001 (1.26)	0.001** (2.30)
<i>Size</i>	- 0.005*** (- 2.85)	- 0.002 (- 1.38)
<i>Age</i>	0.006*** (3.46)	0.002 (1.41)
<i>Leverage</i>	0.013** (1.96)	0.003 (0.42)
<i>Cash</i>	0.003 (1.43)	0.001 (0.92)
<i>Tangibility</i>	- 0.007 (- 0.88)	- 0.007 (- 1.08)
<i>Dividend</i>	- 0.001 (- 0.97)	0.001 (0.48)
<i>Loss</i>	0.002 (0.90)	0.001 (0.53)
<i>SOE</i>	0.007 (1.47)	0.013 (1.63)
<i>Duality</i>	- 0.000 (- 0.00)	0.001 (1.08)
<i>Independent Directors</i>	0.006 (0.36)	- 0.005 (- 1.00)
<i>Largest Share</i>	0.010 (1.33)	- 0.006 (- 0.55)
<i>Institution Share</i>	0.005 (1.54)	- 0.003 (- 1.26)
<i>Foreign Share</i>	- 0.011 (- 0.76)	- 0.008 (- 0.67)
<i>Analyst Coverage</i>	0.000 (0.60)	0.000 (0.27)
<i>Constant</i>	0.093** (2.38)	0.045 (1.32)
<i>Observations</i>	10,830	8,252
<i>Adjusted R-squared</i>	0.027	0.017
<i>Year FE</i>	Yes	Yes
<i>Firm FE</i>	Yes	Yes

This table examines the effects of the information environment on the relationship between directors with foreign experience and investment efficiency. We divide our sample into two subgroups in each year based on the median of *Directors FE* and then estimate the regression specified in Eq. (3) for each subgroup. The dependent variable is related-party transactions (*Related Transaction*) in both columns. *Excess* measures controlling shareholders' expropriation motivation, which is calculated as the differences between controlling shareholders' control rights and cash-flow rights. All independent variables are lagged by 1 year. Year- and firm-fixed effects are included in both regressions. All the variables are defined in Appendix 1. All continuous variables are winsorized at 1% in both tails. The *t*-values clustered as firm level are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively

results in Table 5 suggest that directors with foreign experience help to curb the related-party transactions of controlling shareholders, which provides direct evidence for the governance channel.

5.2 Impact on investment—cash flow sensitivity

Almeida and Campello (2007) suggest that financing frictions affect firm investment decisions. Financial constraints hamper investment in valuable projects, which leads to inefficient investment (Campello et al. 2010; Myers 1984). Financing constraints are the main frictions that lead to underinvestment in Chinese listed firms (Guariglia and Yang 2016). McLean et al. (2012) provide evidence that investor protection reduces financial constraints and encourages efficient investment. Cheng et al. (2013) show that a transparent information environment reduces financial constraints and improves investment efficiency.

As discussed in Sect. 2.1, information asymmetry may raise the cost of capital and leads to financial constraints. Based on the previous discussion, we propose that better monitoring practices by directors with foreign experience can mitigate agency problems and information asymmetry, which helps relax financial constraints and improve investment efficiency. Therefore, we expect that the investment of firms with a higher proportion of directors with foreign experience would be less affected by financial constraints, hence lower investment-cash flow sensitivity. To test this hypothesis, we follow Javakhadze et al. (2016) and apply Eq. (4) to examine the impact of directors with foreign experience on investment-cash flow sensitivity.

$$Invest_{i,t} = \alpha_t + \alpha_i + \beta_1 Directors FE_{i,t-1} \times CFO_{i,t-1} + \beta_2 Directors FE_{i,t-1} + \beta_3 CFO_{i,t-1} + Controls_{i,t-1} + \varepsilon_{i,t} \quad (4)$$

where cash flow (*CFO*) is measured by operating cash flow scaled by beginning-of-year total assets. We include the same control variables as those in Eq. (1) and include year- and firm-fixed effects. The results are shown in Table 6. Consistent with our argument, we find that the coefficient on *Directors FE* \times *CFO* is significantly negative (Coeff = -0.68, *t*-value = -1.98), suggesting that directors with foreign experience reduce investment-cash flow sensitivity.

5.3 Conditions under which monitoring is more effective

Various governance mechanisms are used for monitoring managers (Agrawal and Knoeber 1996; Rediker and Seth 1995), and directors with foreign experience supplement them. If our arguments that directors with foreign experience improve investment efficiency through enhanced monitoring and better governance practices, we would expect the effect to be more pronounced at firms with weaker corporate governance, weaker information environment, or higher financial constraints. In addition, experience per se does not necessarily lead to brain gain for the home country, the learning environment matters. We thus also examine the differences in experience gained in countries with disparities in corporate governance, management practices, rule of law, and control of corruption. In this section, we test this conjecture by partitioning the sample into sub-groups based on variables that proxy for each of the attributes above and conduct tests based on sample partitioning.

Table 6 Impact of directors with foreign experience on investment-cash flow sensitivity

Variables	<i>Invest</i>
<i>Directors FE</i> × <i>CFO</i>	− 0.068** (− 1.98)
<i>Directors FE</i>	− 0.004 (− 0.78)
<i>CFO</i>	0.037*** (5.44)
<i>TQ</i>	0.003*** (4.36)
<i>Size</i>	− 0.004** (− 2.21)
<i>Age</i>	− 0.018*** (− 7.66)
<i>Leverage</i>	− 0.069*** (− 9.16)
<i>Cash</i>	− 0.001 (− 0.23)
<i>Tangibility</i>	0.030*** (2.83)
<i>Dividend</i>	0.006*** (4.09)
<i>Loss</i>	− 0.012*** (− 6.62)
<i>SOE</i>	− 0.017*** (− 3.05)
<i>Duality</i>	0.004** (2.22)
<i>Independent Directors</i>	− 0.020 (− 1.42)
<i>Largest Share</i>	0.039*** (3.87)
<i>Institution Share</i>	0.002 (0.54)
<i>Foreign Share</i>	0.043** (2.32)
<i>Analyst Coverage</i>	0.007*** (9.43)
<i>Constant</i>	0.175*** (4.00)
<i>Observations</i>	22,498
<i>Adjusted R-squared</i>	0.134
<i>Year FE</i>	Yes
<i>Firm FE</i>	Yes

This table presents the regression results specified in Eq. (4). The dependent variable is *Invest*. *CFO* means a firm's cash flow, which is measured by operating cash flow scaled by beginning-of-year total assets. All independent variables are lagged by 1 year. Year- and firm-fixed effects are included in both regressions. All the variables are defined in Appendix 1. All continuous variables are winsorized at 1% in both tails. The *t*-values clustered as firm level are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively

5.3.1 The effect of corporate governance quality

In this subsection, we test if the impact of directors with foreign experience is more pronounced in firms with inferior corporate governance. We choose two variables to measure corporate governance.

The first is a firm's monitoring intensity, measured as shares held by the second to fifth largest shareholders (*Main Shares*) (Wang et al. 2020). These shareholders have both the incentive and ability to monitor controlling shareholders' tunneling activities. Each year we partition the sample into subgroups using the median value of *Main Shares*. Firms with higher *Main Shares* (*Main Shares = High*) have better corporate governance. If the governance channel in our paper exists, we expect the influence of directors with foreign experience on investment efficiency to be more pronounced for firms with lower monitoring intensity (*Main Shares = Low*).

The second measure of corporate governance is *Separation*, a dummy variable that equals one if a firm's controlling shareholder enjoys higher control rights than cash-flow rights and zero if a firm's controlling shareholder has no divergence between control rights and cashflow rights. Prior studies suggest that firms have less severe agency problems when there is no divergence between control rights and cash-flow rights for the largest controlling shareholders (e.g., Claessens et al. 2002; Faccio and Lang 2002; Jiang et al. 2011). Therefore, corporate governance is better for the subgroup with *Separation* = 0 than the subgroup with *Separation* = 1. All the variables are defined in detail in Appendix 1.

We then rerun Eq. (1) for each of the four subgroups respectively, *Main Shares = Low*, *Main Shares = High*, *Separation = 1*, *Separation = 0*. Table 7 presents the results, which shows that the positive impact of directors with foreign experience on firm's investment efficiency (coefficient of *Directors FE × TQ*) is more pronounced at firms with lower monitoring intensity (*Main Shares = Low*) and firms whose controlling shareholders enjoy higher control rights than cash-flow rights (*Separation = 1*), both represent weaker corporate governance. This evidence is thus consistent with the monitoring hypothesis, reinforcing the argument that the effect of directors with foreign experience on a firm's investment efficiency is more pronounced at firms with weaker corporate governance.

5.3.2 The effect of information environment

We conjecture that the monitoring effect of directors with foreign experience is stronger at less transparent firms. To test this hypothesis, we follow Jiang et al. (2018) and assess a firm's information environment with two measurements. The first is a firm's stock return volatility (*Risk*), measured by the standard deviation of daily stock returns over the past twelve months (Kang et al. 2018). A higher value of *Risk* suggests a more opaque information environment. The second is the diversification of a firm's product lines, measured by the Herfindahl index of a firm's product market categories (*HHI*). It is calculated as the sum of squared market shares for product categories in a firm, and a higher value suggests lower information asymmetry (Best et al. 2004).

We then partition the sample into subgroups using the median value of *Risk* and *HHI* in each year respectively. The subgroup with higher *Risk* or lower *HHI* is more opaque. We repeat Eq. (1) for each subgroup. The results are shown in Table 8. The coefficients of *Directors FE × TQ* are significantly positive in columns (1) and (3), but the same statistics are not significant in columns (2) and (4), suggesting that the positive impact of directors' foreign experience on a firm's investment efficiency is more pronounced at less

Table 7 Effect of corporate governance

	<i>Main Shares = Low</i>	<i>Main Shares = High</i>	<i>Separation = 1</i>	<i>Separation = 0</i>
<i>Directors FE × TQ</i>	0.011** (2.34)	0.004 (0.79)	0.013** (2.19)	0.005 (1.01)
<i>Directors FE</i>	- 0.035* (- 1.95)	- 0.015 (- 0.85)	- 0.032** (- 2.26)	- 0.022* (- 1.74)
<i>TQ</i>	0.002 (1.34)	0.002** (1.96)	0.001 (0.40)	0.005*** (3.96)
<i>Size</i>	- 0.004 (- 1.37)	- 0.013*** (- 4.03)	- 0.008** (- 2.44)	- 0.009*** (- 2.73)
<i>Age</i>	- 0.014*** (- 3.76)	- 0.013*** (- 3.83)	- 0.017*** (- 4.10)	- 0.016*** (- 4.86)
<i>Leverage</i>	- 0.072*** (- 7.03)	- 0.068*** (- 5.79)	- 0.079*** (- 6.47)	- 0.055*** (- 5.07)
<i>Cash</i>	0.012** (2.17)	- 0.002 (- 0.38)	0.004 (0.73)	0.000 (0.01)
<i>Tangibility</i>	0.031* (1.71)	0.023 (1.52)	0.021 (1.27)	0.038** (2.01)
<i>Dividend</i>	0.005*** (2.93)	0.005** (2.13)	0.006*** (2.67)	0.004* (1.84)
<i>Loss</i>	- 0.011*** (- 5.49)	- 0.014*** (- 4.48)	- 0.011*** (- 3.78)	- 0.017*** (- 6.57)
<i>SOE</i>	- 0.010 (- 1.18)	- 0.016** (- 2.02)	- 0.008 (- 0.74)	- 0.037* (- 1.82)
<i>Duality</i>	0.003* (1.65)	0.004 (1.37)	- 0.000 (- 0.12)	0.002 (0.79)
<i>Independent Director</i>	0.004 (0.25)	0.007 (0.36)	- 0.039 (- 1.60)	- 0.026 (- 1.29)
<i>Largest Share</i>	0.036** (2.57)	0.060*** (3.26)	0.037** (2.42)	0.057*** (3.72)
<i>Institution Share</i>	0.008 (1.57)	- 0.007 (- 1.42)	0.001 (0.24)	0.004 (0.79)
<i>Foreign Share</i>	0.064 (1.15)	0.023 (1.17)	0.070*** (2.95)	0.009 (0.22)
<i>Analyst Coverage</i>	0.007*** (7.01)	0.006*** (5.39)	0.006*** (4.92)	0.007*** (6.38)
<i>Constant</i>	0.154** (2.44)	0.369*** (4.80)	0.296*** (3.67)	0.262*** (3.73)
<i>Observations</i>	11,893	10,600	9,111	10,928
<i>Adjusted R-squared</i>	0.107	0.137	0.122	0.131
<i>Year FE</i>	Yes	Yes	Yes	Yes
<i>Firm FE</i>	Yes	Yes	Yes	Yes

This table examines the effects of corporate governance on the relationship between directors with foreign experience and investment efficiency. We proxy a firm's governance by monitoring intensity (*Main Shares*) and *Separation*. *Main Shares* equals shares held by the second to fifth largest shareholders. We divide our sample into two subgroups in each year based on the median of *Main Shares*. *Separation* is a dummy variable that equals one if the firm's controlling shareholder enjoys higher control rights than cash-flow rights and equals zero if a firm has a controlling shareholder with no divergence between control rights and cash-flow rights. The governance environment is weaker at firms with *Main Shares = Low* or *Separation = 1*. We then repeat the regression in Eq. (1) for each subgroup. All independent variables are lagged by 1 year. Year- and firm-fixed effects are included in all regressions. All the variables are defined in Appendix 1. All continuous variables are winsorized at 1% in both tails. The *t*-values clustered as firm level are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

transparent firms with higher risk ($Risk = High$) and more diversified product market lines ($HHI = Low$).

5.3.3 The effect of financial constraints

In this subsection, we test the notion that the relationship between directors with foreign experience and investment efficiency is stronger for more financially constrained firms. We firstly examine whether directors with foreign experience help lower cost of capital. Financial constraints arising from information asymmetry and agency cost would cause external funds to be more costly than internal funds, implying increased cost of capital and resulting in forgone valuable investments (Campbell et al. 2012). We measure the cost of equity using the modified price-earnings growth (MPEG) model (Easton 2004) and measure the cost of debt as the ratio of interest expense to debt. As shown in Panel A of Table 9, we observe significantly negative relationships between *Directors FE* with both cost of equity and cost of debt. The results show that directors with foreign experience significantly lower the cost of capital.

Based on this, we further examine the heterogenous effect of directors with foreign experience on investment efficiency across firms with different levels of financial constraints. We apply both the KZ index (Kaplan and Zingales 1997) and the SA index (Hadlock and Pierce 2010) to proxy for financial constraints. We follow Lamont et al. (2001) in estimating the KZ index. Specifically, the KZ index consists of five variables—*Cash Flow/K*, Tobin's Q (*TQ*), leverage ratio (*Leverage*), *Dividends/K*, and *Cash/K*, where *K* denotes total assets at the beginning of the year. All the variables are defined in Appendix 1. We first divide the firms into discrete categories of financial constraints based on each of the variables. Then we use an ordered logit regression to relate their classifications to accounting variables and use the regression coefficients to construct the KZ index.⁸ Firms that are more constrained have a higher KZ index.

The SA index is a reasonable measure of financial constraints used in various contexts (Hadlock and Pierce 2010). It is based on firm characteristics, such as size and age, and is calculated as $(-0.737 \times Size) + (0.043 \times Size^2) - (0.040 \times List\ Year)$, where *Size* is the log of total assets in 10 million RMB. *List Year* is the number of years since the firm was listed. A higher SA indicates a more financially constrained firm (Hadlock and Pierce 2010).

We divide our sample into two subgroups based on the median value of the KZ and SA indexes in each year respectively and then repeat the regression in Eq. (1). The results in Panel B of Table 9 show that *Directors FE* \times *TQ* is significant and positive in the high KZ

⁸ In this paper, the KZ index is calculated as: $-9.352 \times (Cash\ Flow/K) + (0.483 \times TQ) + 4.634 \times Leverage - 29.912 \times (Dividends/K) - 3.079 \times (Cash/K)$.

Table 8 Effect of environment information

	<i>Risk=High</i>	<i>Risk=Low</i>	<i>HHI=Low</i>	<i>HHI=High</i>
<i>Directors FE × TQ</i>	0.009* (1.83)	0.006 (1.04)	0.010* (1.74)	0.009 (1.53)
<i>Directors FE</i>	- 0.013 (- 0.86)	- 0.009 (- 0.65)	- 0.018 (- 1.33)	- 0.022 (- 1.56)
<i>TQ</i>	0.003** (2.20)	0.003** (2.20)	0.003*** (2.73)	0.001 (1.12)
<i>Size</i>	- 0.005* (- 1.77)	- 0.001 (- 0.51)	- 0.006** (- 2.01)	- 0.008** (- 2.35)
<i>Age</i>	- 0.029*** (- 5.89)	- 0.023*** (- 5.44)	- 0.017*** (- 4.37)	- 0.016*** (- 4.54)
<i>Leverage</i>	- 0.053*** (- 4.60)	- 0.072*** (- 7.11)	- 0.067*** (- 6.00)	- 0.076*** (- 6.19)
<i>Cash</i>	0.022*** (3.45)	0.032*** (4.14)	0.007 (1.48)	- 0.002 (- 0.41)
<i>Tangibility</i>	0.033** (2.45)	0.016 (0.84)	0.022* (1.65)	0.033* (1.69)
<i>Dividend</i>	0.004* (1.80)	0.006*** (3.13)	0.004** (2.18)	0.006*** (2.76)
<i>Loss</i>	- 0.013*** (- 5.13)	- 0.007*** (- 2.79)	- 0.012*** (- 5.16)	- 0.013*** (- 4.54)
<i>SOE</i>	- 0.024*** (- 2.83)	- 0.005 (- 0.80)	- 0.016** (- 2.49)	- 0.012 (- 1.51)
<i>Duality</i>	0.007** (2.46)	0.002 (0.97)	0.003 (1.27)	0.006** (2.22)
<i>Independent Director</i>	- 0.006 (- 0.25)	- 0.038** (- 2.28)	- 0.035* (- 1.83)	- 0.026 (- 0.99)
<i>Largest Share</i>	0.036** (2.30)	0.029** (2.23)	0.034** (2.50)	0.026 (1.50)
<i>Institution Share</i>	- 0.002 (- 0.39)	0.000 (0.01)	0.001 (0.21)	- 0.002 (- 0.43)
<i>Foreign Share</i>	0.079** (2.41)	0.006 (0.26)	0.048 (1.28)	0.041* (1.71)
<i>Analyst Coverage</i>	0.006*** (5.29)	0.005*** (5.34)	0.006*** (5.44)	0.007*** (6.44)
<i>Constant</i>	0.197*** (3.15)	0.150** (2.29)	0.227*** (3.44)	0.281*** (3.31)
<i>Observations</i>	9,481	11,194	10,362	10,162
<i>Adjusted R-squared</i>	0.119	0.124	0.121	0.136
<i>Year FE</i>	Yes	Yes	Yes	Yes
<i>Firm FE</i>	Yes	Yes	Yes	Yes

This table examines the effects of the information environment on the relationship between directors with foreign experience and investment efficiency. We measure a firm's information environment by *Risk* and *HHI*. *Risk* is proxied by a firm's daily stock return over the previous 12-month period. *HHI* reflects the diversification of a firm's product market, calculated as the sum of squared market shares for the product categories within a firm. We divide our sample into two subgroups in each year based on the median of *Risk* and *HHI*, respectively. The information environment is less transparent at firms with *Risk = High* and

Table 8 (continued)

firms with $HHI = Low$. We then repeat the regression in Eq. (1) for each subgroup. All independent variables are lagged by 1 year. Year- and firm-fixed effects are included in all regressions. All the variables are defined in Appendix 1. All continuous variables are winsorized at 1% in both tails. The t -values clustered as firm level are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively

index group, as shown in column (1) (high constraints, coeff. = 0.013, $t = 2.47$) and the high SA index group (high constraints, coeff. = 0.010, $t = 2.02$) as shown in column (3) but not significant in the low KZ index group or low SA index group, as shown in columns (2) and (4). This result suggests that the positive impact of directors with foreign experience on investment efficiency is more noticeable at firms with higher financial constraints.

5.3.4 Where the experience is gained matters

In this subsection, we examine whether all experience is equal and whether foreign experience gained in certain countries has a stronger effect. Following Giannetti et al. (2015), we measure a country's investor protection and corporate governance by the anti-director rights index that comes from La Porta et al. (1998). Countries with higher anti-director rights indexes have better investor protection. Following Giannetti et al. (2015), we measure a country's management practices quality by the country's monitoring production index reported in Bloom et al. (2012). Countries with higher monitoring management scores in Bloom et al. (2012) have better management practices.

Moreover, directors who study/work abroad, immerse themselves in certain foreign cultures and rule of law, are more likely to enhance good governance practices. To this end, we also apply indicators of rule of law and control of corruption obtained from the Worldwide Governance Indicators (WGI) in the analysis. "Rule of Law" reflects perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. "Control of Corruption" reflects perceptions of the extent to which public power is exercised for private gain, as well as "capture" of the state by elites and private interests.

For the purpose of this test, we construct eight variables: (I) *Directors FE1* equals the proportion of directors who obtained foreign experience in countries with the highest La Porta et al. (1998) anti-director rights index; (II) *Directors FE2* equals the proportion of directors who obtained foreign experience in other countries; (III) *Directors FE3* equals the proportion of directors who obtained foreign experience in top three management practice countries according to Bloom et al. (2012); (IV) *Directors FE4* equals the proportion of directors who obtained foreign experience in other countries; (V) *Directors FE5* equals the proportion of directors who obtained foreign experience in countries that rank ahead of China in terms of "Rule of Law"; (VI) *Directors FE6* equals the proportion of directors who obtained foreign experience in countries that rank behind of China in terms of "Rule of Law"; (VII) *Directors FE7* equals the proportion of directors who obtained

Table 9 Effect of financial constraints

Panel A	(1)	(2)		
	<i>Cost of equity</i>	<i>Cost of debt</i>		
<i>Directors FE</i>	- 0.005*	- 0.003***		
	(- 1.74)	(- 4.16)		
<i>Size</i>	0.007***	0.003***		
	(16.72)	(20.75)		
<i>Age</i>	- 0.002***	0.002***		
	(- 3.18)	(10.89)		
<i>Tangibility</i>	0.015***	- 0.011***		
	(3.90)	(- 9.73)		
<i>Dividend</i>	0.003***	- 0.004***		
	(3.49)	(- 14.07)		
<i>Loss</i>	0.001	0.005***		
	(0.65)	(13.11)		
<i>SOE</i>	- 0.011***	- 0.004***		
	(- 12.30)	(- 14.69)		
<i>Duality</i>	0.001	0.000		
	(0.61)	(0.50)		
<i>Independent Director</i>	0.007	- 0.001		
	(1.06)	(- 0.54)		
<i>Largest Share</i>	- 0.012***	- 0.008***		
	(- 4.59)	(- 10.39)		
<i>Institution Share</i>	0.004*	- 0.001		
	(1.90)	(- 1.48)		
<i>Foreign Share</i>	0.010	- 0.009***		
	(1.05)	(- 3.44)		
<i>Analyst Coverage</i>	0.002***	- 0.002***		
	(5.96)	(- 17.95)		
<i>TQ</i>	- 0.003***	- 0.001***		
	(- 8.96)	(- 11.47)		
<i>Constant</i>	- 0.063***	- 0.008***		
	(- 6.30)	(- 2.70)		
<i>Observations</i>	12,813	20,619		
<i>Adjusted R-squared</i>	0.263	0.198		
<i>Year FE</i>	Yes	Yes		
<i>Industry FE</i>	Yes	Yes		
Panel B	<i>KZ index = High</i>	<i>KZ index = Low</i>	<i>SA index = High</i>	<i>SA index = Low</i>
<i>Directors FE × TQ</i>	0.013**	0.008	0.010**	0.009
	(2.47)	(1.34)	(2.02)	(1.35)
<i>Directors FE</i>	- 0.030**	- 0.020	- 0.025**	- 0.027*
	(- 2.27)	(- 1.26)	(- 2.08)	(- 1.92)
<i>TQ</i>	- 0.002	0.006***	0.002	0.004***
	(- 1.43)	(4.13)	(1.48)	(2.77)
<i>Size</i>	- 0.002	- 0.013***	- 0.023***	- 0.009***
	(- 0.77)	(- 2.79)	(- 5.35)	(- 3.42)
<i>Age</i>	- 0.019***	- 0.014***	- 0.007*	- 0.024***

Table 9 (continued)

Panel B	<i>KZ index=High</i>	<i>KZ index=Low</i>	<i>SA index=High</i>	<i>SA index=Low</i>
	(- 4.68)	(- 3.46)	(- 1.68)	(- 3.98)
<i>Leverage</i>	- 0.087***	- 0.078***	- 0.057***	- 0.064***
	(- 8.11)	(- 5.25)	(- 4.05)	(- 6.54)
<i>Cash</i>	0.037***	- 0.004	- 0.004	0.032***
	(5.74)	(- 0.94)	(- 1.09)	(5.04)
<i>Tangibility</i>	0.020	0.020	0.003	0.036*
	(1.24)	(1.00)	(0.21)	(1.79)
<i>Dividend</i>	0.008***	- 0.001	0.010***	0.003*
	(4.78)	(- 0.18)	(4.11)	(1.71)
<i>Loss</i>	- 0.011***	- 0.009*	- 0.012***	- 0.012***
	(- 5.22)	(- 1.67)	(- 4.20)	(- 5.43)
<i>SOE</i>	- 0.016**	- 0.005	- 0.027*	- 0.011*
	(- 2.31)	(- 0.62)	(- 1.89)	(- 1.78)
<i>Duality</i>	0.003	0.003	0.004	0.004*
	(1.16)	(1.10)	(1.45)	(1.75)
<i>Independent Director</i>	- 0.025	- 0.027	- 0.013	- 0.021
	(- 1.22)	(- 1.14)	(- 0.48)	(- 1.31)
<i>Largest Share</i>	0.020	0.070***	0.056***	0.011
	(1.54)	(3.25)	(2.79)	(0.95)
<i>Institution Share</i>	0.002	- 0.004	- 0.006	0.009*
	(0.47)	(- 0.71)	(- 1.24)	(1.75)
<i>Foreign Share</i>	0.090**	0.026	0.050**	0.033
	(2.37)	(1.04)	(2.43)	(0.89)
<i>Analyst Coverage</i>	0.007***	0.005***	0.007***	0.005***
	(6.70)	(3.84)	(6.44)	(5.48)
<i>Constant</i>	0.156***	0.372***	0.565***	0.318***
	(2.62)	(3.18)	(5.88)	(4.84)
<i>Observations</i>	10,015	9,116	10,567	11,931
<i>Adjusted R-squared</i>	0.147	0.115	0.164	0.132
<i>Year FE</i>	Yes	Yes	Yes	Yes
<i>Firm FE</i>	Yes	Yes	Yes	Yes

Panel A examines the impact of directors with foreign experience on financial constraints and financial costs. The dependent variable in Column 1 and 2 are the cost of equity and cost of debt, respectively. The cost of equity is calculated using the modified price-earnings growth (MPEG) model (Easton 2004). The consensus FY1 and FY2 earnings forecasts by analysts are used as forecast earnings for year $t+1$ and year $t+2$. The cost of debt is defined as the ratio of interest expense to debt. Year- and industry-fixed effects are included in both regressions. Panel B examines the effects of financial constraints on the relationship between directors with foreign experience and investment efficiency. We apply the KZ and SA indexes to proxy for financial constraints. The KZ index is made up of five variables, *Cash Flow*/*K*, Tobin's Q (*TQ*), leverage ratio (*Leverage*), and *Dividends*/*K*, *Cash*/*K*, where *K* denotes beginning-of-the-year total assets.

The SA index is calculated as $(-0.737 \times Size) + 0.043 \times Size^2 - (0.040 \times List\ Year)$, where *Size* is the log of total assets in 10 million RMB. *List Year* is the number of years since the firm was listed. We divide our sample into two subgroups based on the median KZ and SA indexes, respectively, and the subgroups with higher KZ and higher SA values have higher financial constraints. We then repeat the regression in Eq. (1) for each subgroup. All independent variables are lagged by 1 year. Year- and firm-fixed effects are included in all regressions. All the variables are defined in Appendix 1. All continuous variables are winsorized at 1% in both tails. The *t*-values clustered as firm level are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively

foreign experience in countries that rank ahead of China in terms of “Control of Corruption”; (VIII) *Directors FE8* equals the proportion of directors who obtained foreign experience in countries that rank behind of China in terms of “Control of Corruption”. All the variables are defined in Appendix 1.

The regression results are reported in Table 10, which shows that the estimated coefficients on *Directors FE1*, *Directors FE3*, *Directors FE5*, and *Directors FE7* are significantly positive, while the estimated coefficients on *Directors FE2*, *Directors FE4*, *Directors FE6*, and *Directors FE8* are insignificant. This result supports the findings in McLean et al. (2012), who demonstrate that investor protection encourages efficient investment. Overall, our empirical results in Table 10 suggest that the positive impact of directors’ foreign experience on firms’ investment efficiency is more pronounced when foreign experience is gained in countries with better investor protection, management practices, rule of law, and control of corruption. Where the experience is gained matters because all experience is not created equal.

6 Robustness tests and endogeneity analysis

6.1 Alternative measurement for firm investment and growth opportunities

Some literature also measures investment expenditure as cash payments for fixed assets, intangible assets, and other long-term assets from the cash-flow statement minus cash receipts from selling these assets, scaled by total assets at the beginning of the year (e.g., Chen et al. 2011).⁹ We use this alternative measurement (*Invest2*) as a robustness check. We apply *Invest2* as a dependent variable and repeat the regression in Eq. (1). Results show a significant and positive relation between directors with foreign experience and firms’ investment efficiency, which is consistent with the results in Table 3. These results are not tabulated for brevity, but are available upon request.

Moreover, we follow prior studies (e.g., Biddle et al. 2009) and use growth in sales revenue (*Sales Growth*) to proxy for investment opportunities as a robustness check. Results show that the interaction between directors with foreign experience and sales growth (*Directors FE* × *Sales Growth*) is significant and positive. In terms of economic significance, based on the coefficients of *Sales Growth*, *Directors FE* × *Sales Growth*, and the mean value of *Directors FE*, we obtain the investment-*Sales Growth* sensitivity evaluated at the mean level of *Directors FE* as 0.0131. Increasing the proportion of directors with foreign experience by one standard deviation (i.e., 0.143) promotes investment-*Sales Growth* sensitivity by 20.6%, holding all other variables constant. These statistics are not tabulated for brevity, but are available upon request.

6.2 The effect of CEOs with foreign experience

Could the improvement in investment efficiency be attributed to the CEOs with foreign experience? To reinforce our argument that the improving monitoring function rendered by the board of directors is the main contributor to the investment efficiency, we run additional tests by controlling for the influence of CEOs with foreign experience. In our sample, among all directors with foreign experience, 1,818 observations are related to CEOs.

⁹ This measurement is equivalent to capital expenditure (COMPUSTAT Item 128#) used in U.S.-based studies.

Table 10 Where the foreign experience is gained matters

	(1) Anti-director rights index	(2) Management practice	(3) Rule of Law	(4) Control of corruption
<i>Directors FE1 × TQ</i>	0.012** (2.24)			
<i>Directors FE2 × TQ</i>	0.004 (0.57)			
<i>Directors FE3 × TQ</i>		0.011** (2.09)		
<i>Directors FE4 × TQ</i>		0.010 (1.38)		
<i>Directors FE5 × TQ</i>			0.013*** (2.75)	
<i>Directors FE6 × TQ</i>			- 0.002 (- 0.10)	
<i>Directors FE7 × TQ</i>				0.012*** (2.64)
<i>Directors FE8 × TQ</i>				0.013 (0.68)
<i>Directors FE1</i>	- 0.033*** (- 2.58)			
<i>Directors FE2</i>	- 0.008 (- 0.51)			
<i>Directors FE3</i>		- 0.028** (- 2.21)		
<i>Directors FE4</i>		- 0.024 (- 1.56)		
<i>Directors FE5</i>			- 0.030*** (- 2.74)	
<i>Directors FE6</i>			- 0.035 (- 0.86)	
<i>Directors FE7</i>				- 0.031*** (- 2.83)
<i>Directors FE8</i>				- 0.041 (- 1.02)
<i>TQ</i>	0.003*** (3.34)	0.003*** (3.21)	0.003*** (3.14)	0.003*** (3.14)
<i>Size</i>	- 0.004** (- 2.28)	- 0.004** (- 2.31)	- 0.004** (- 2.30)	- 0.004** (- 2.30)
<i>Age</i>	- 0.018*** (- 7.35)	- 0.018*** (- 7.40)	- 0.018*** (- 7.37)	- 0.018*** (- 7.38)
<i>Leverage</i>	- 0.070*** (- 9.28)	- 0.070*** (- 9.26)	- 0.070*** (- 9.29)	- 0.070*** (- 9.27)
<i>Cash</i>	0.002 (0.64)	0.002 (0.65)	0.002 (0.63)	0.002 (0.63)
<i>Tangibility</i>	0.027**	0.026**	0.026**	0.027**

Table 10 (continued)

	(1) Anti-director rights index	(2) Management practice	(3) Rule of Law	(4) Control of corruption
	(2.51)	(2.48)	(2.49)	(2.50)
<i>Dividend</i>	0.006***	0.006***	0.006***	0.006***
	(4.31)	(4.32)	(4.30)	(4.32)
<i>Loss</i>	- 0.012***	- 0.012***	- 0.012***	- 0.012***
	(- 6.88)	(- 6.87)	(- 6.89)	(- 6.88)
<i>SOE</i>	- 0.016***	- 0.016***	- 0.016***	- 0.016***
	(- 3.07)	(- 3.07)	(- 3.05)	(- 3.06)
<i>Duality</i>	0.004**	0.004**	0.004**	0.004**
	(2.18)	(2.21)	(2.21)	(2.20)
<i>Independent Directors</i>	- 0.021	- 0.021	- 0.021	- 0.021
	(- 1.48)	(- 1.48)	(- 1.48)	(- 1.49)
<i>Largest Share</i>	0.039***	0.039***	0.039***	0.039***
	(3.90)	(3.90)	(3.90)	(3.91)
<i>Institution Share</i>	0.002	0.002	0.002	0.002
	(0.53)	(0.55)	(0.53)	(0.54)
<i>Foreign Share</i>	0.045**	0.045**	0.044**	0.045**
	(2.39)	(2.42)	(2.37)	(2.40)
<i>Analyst Coverage</i>	0.007***	0.007***	0.007***	0.007***
	(9.50)	(9.51)	(9.53)	(9.53)
<i>Constant</i>	0.184***	0.185***	0.185***	0.185***
	(4.16)	(4.22)	(4.20)	(4.20)
<i>Observations</i>	22,485	22,485	22,485	22,485
<i>Adjusted R-squared</i>	0.133	0.133	0.133	0.133
<i>Year FE</i>	Yes	Yes	Yes	Yes
<i>Firm FE</i>	Yes	Yes	Yes	Yes

This table examines whether foreign experience in countries with better investor protection and corporate governance has a stronger effect. *Directors FE1* equals the proportion of directors who obtained foreign experience in countries with the highest La Porta et al. (1998) anti-director rights index. *Directors FE2* equals the proportion of directors who obtained foreign experience in other countries. *Directors FE3* equals the proportion of directors who obtained foreign experience in the top three management practice countries according to Bloom et al. (2012). *Directors FE4* equals the proportion of directors who obtained foreign experience in other countries. *Directors FE5* equals the proportion of directors who obtained foreign experience in countries that rank ahead of China in terms of “Rule of Law”. *Directors FE6* equals the proportion of directors who obtained foreign experience in countries that rank behind China in terms of “Rule of Law”. *Directors FE7* equals the proportion of directors who obtained foreign experience in countries that rank ahead of China in terms of “Control of Corruption”. *Directors FE8* equals the proportion of directors who obtained foreign experience in countries that rank behind China in terms of “Control of Corruption”. All independent variables are lagged by 1 year. Year- and firm-fixed effects are included in all regressions. All the variables are defined in Appendix 1. All continuous variables are winsorized at 1% in both tails. The *t*-values clustered as firm level are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively

To control for this potential confounding effect, we add additional control variables, (1) *CEO FE*, a dummy variable that equals one if a firm’s CEO has foreign experience, and zero otherwise, and (2) the interaction term *CEO FE* × *TQ*. As shown in Table 11, the

Table 11 Control for the CEO effect

Variables	(1)	(2)	(3)
	<i>Invest</i>	<i>Invest</i>	<i>Invest</i>
<i>Directors FE × TQ</i>	0.010** (2.28)		
<i>Number FE × TQ</i>		0.001** (2.20)	
<i>Dummy FE × TQ</i>			0.002* (1.83)
<i>CEO FE × TQ</i>	0.001 (0.29)	0.001 (0.33)	0.001 (0.88)
<i>Directors FE</i>	- 0.028*** (- 2.83)		
<i>Number FE</i>		- 0.003*** (- 2.67)	
<i>Dummy FE</i>			- 0.006** (- 2.48)
<i>CEO FE</i>	- 0.001 (- 0.22)	- 0.001 (- 0.29)	- 0.004 (- 0.80)
<i>TQ</i>	0.002*** (2.68)	0.002*** (2.72)	0.002** (2.49)
<i>Size</i>	- 0.005** (- 2.40)	- 0.005** (- 2.40)	- 0.005** (- 2.38)
<i>Age</i>	- 0.017*** (- 7.32)	- 0.018*** (- 7.32)	- 0.017*** (- 7.26)
<i>Leverage</i>	- 0.070*** (- 9.29)	- 0.070*** (- 9.25)	- 0.070*** (- 9.30)
<i>Cash</i>	0.002 (0.63)	0.002 (0.62)	0.002 (0.49)
<i>Tangibility</i>	0.027** (2.50)	0.027** (2.49)	0.027** (2.53)
<i>Dividend</i>	0.006*** (4.30)	0.006*** (4.29)	0.006*** (4.30)
<i>Loss</i>	- 0.012*** (- 6.87)	- 0.012*** (- 6.89)	- 0.012*** (- 6.87)
<i>SOE</i>	- 0.017*** (- 3.06)	- 0.016*** (- 3.05)	- 0.016*** (- 3.04)
<i>Duality</i>	0.004** (2.17)	0.004** (2.19)	0.004** (2.20)
<i>Independent Directors</i>	- 0.019 (- 1.34)	- 0.020 (- 1.40)	- 0.020 (- 1.41)
<i>Largest Share</i>	0.039*** (3.91)	0.039*** (3.89)	0.040*** (3.94)
<i>Institution Share</i>	0.002 (0.52)	0.002 (0.50)	0.002 (0.53)
<i>Foreign Share</i>	0.046** (2.40)	0.046** (2.41)	0.045** (2.34)
<i>Analyst Coverage</i>	0.007***	0.007***	0.007***

Table 11 (continued)

Variables	(1)	(2)	(3)
	<i>Invest</i>	<i>Invest</i>	<i>Invest</i>
	(9.52)	(9.52)	(9.56)
<i>Constant</i>	0.189*** (4.29)	0.189*** (4.30)	0.188*** (4.26)
<i>Observations</i>	22,486	22,486	22,486
<i>Adjusted R-squared</i>	0.133	0.133	0.133
<i>Year FE</i>	Yes	Yes	Yes
<i>Firm FE</i>	Yes	Yes	Yes

This table presents the regression results of Eq. (1). We add $CEO\ FE \times TQ$ and $CEO\ FE$ as control variables. $CEO\ FE$ is a dummy variable that equals one if a firm's CEO has foreign experience, and zero otherwise. The dependent variable is *Invest*. The major explanatory variable of interest is the interaction between directors with foreign experience and firm's investment opportunity measured by Tobin's Q (TQ). We use three measurements for directors with foreign experience. The first is the proportion of directors with foreign experience (*Directors FE*). The second is the number of directors with foreign experience (*Number FE*). The third one is *Dummy FE*, which is a dummy variable that equals one if a firm has at least one director with foreign experience in year t , and zero otherwise. The results are shown in columns (1)-(3) respectively. All independent variables are lagged by 1 year. Year- and firm-fixed effects are included in all regressions. All the variables are defined in Appendix 1. All continuous variables are winsorized at 1% in both tails. The t -values clustered as firm level are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively

results are virtually unchanged from Table 3. In fact, the coefficients for $CEO\ FE$ and $CEO\ FE \times TQ$ are not significant in all three models.

6.3 Heckman self-selection model

So far, our evidence indicates a positive relationship between directors with foreign experience and firm investment efficiency. However, one potential concern is that the positive association may be driven by endogeneity bias. For example, there might be a reverse-causality concern that firms with higher investment efficiency attract directors with foreign experience. As such, firms' appointment of directors may not be random, and this might cause a self-selection bias.

The firm-fixed effect model applied in Eq. (1) mitigates the omitted variable problem. The use of lagged values of directors with foreign experience in all regressions also alleviates some of the reverse-causality concerns. Nevertheless, we further employ Heckman (1979) two-step approach to address potential problems caused by self-selection bias following prior studies (Chen et al. 2017a, 2011; Hu and Liu 2015; Jiang et al. 2018).

In the first step, we use a probit model presented in Eq. (5) to estimate the probability of a firm's hiring directors with foreign experience.

$$Prob(Dummy\ FE_{i,t}) = \alpha_t + \alpha_j + \beta_1 Industry\ FE_{t-1} + Controls_{t-1} + \varepsilon_{it} \quad (5)$$

where *Dummy FE* is a variable that equals one if a firm has at least one director with foreign experience and zero if a firm has no directors with foreign experience. *Industry FE*

is the average proportion of directors with foreign experience appointed by firms in the same industry in the same year, excluding the firm in question. Specifically, we regress *Dummy FE* in year t on *Industry FE* in year $t - 1$, along with other variables that might determine *Dummy FE* and year- and industry-fixed effects (α_j) to estimate the inverse Mills ratio (*IMR*). Studies employing the industry average as a reasonable instrument include Chen et al. (2011), Laeven and Levine (2009), Paligorova and Xu (2012), and Yuan and Wen (2018). Heckman's estimator requires instrumental variables to be correlated with a firm's propensity to appoint directors with foreign experience but not with the firm's investment. We expect that *Industry FE* is likely to be associated with a firm's propensity to appoint directors with foreign experience but is less likely to be correlated with a firm's investment efficiency.

Like prior studies (Giannetti et al. 2015; Yuan and Wen 2018), we add some determinants of appointing directors with foreign experience in Eq. (5). *Foreign Share*, *Size*, *Age*, *Leverage*, *TQ*, *Sales Growth*, *SOE*, *Independent Directors*, and *Largest Share* are defined as in Eq. (1). *ROA* is return on assets, *Board Size* is the number of directors on a firm's board.

The probit regression results are presented in Panel A of Table 12, which shows that *Industry FE*, *Foreign Share*, *Size*, *TQ*, *Sales Growth*, and *Board Size* have significant and positive impacts on a firm's decision to appoint directors with foreign experience. In contrast, *Age*, *Leverage*, and *SOE* have negative impacts.

In the second step, we include *IMR* estimated from the first-step regression as an additional independent variable in the baseline regression (Eq. (1)). The result reported in Panel B of Table 12 is consistent with the baseline regression result in Table 3. To be sure, after correcting for selection bias, the coefficients on the interaction term remain significant and positive, reconfirming our conclusion that directors with foreign experience promote firms' investment efficiency. The coefficient for $IMR \times TQ$ is significant, suggesting that selection bias exists in our baseline model. The negative coefficients of $IMR \times TQ$ imply that unobserved factors that motivate firms to appoint directors with foreign experience are negatively correlated with firm investment.¹⁰

¹⁰ Thanks for the reviewer's suggestion of identifying individual firms with changes in board members with foreign experience and use evidence from change analyses to provide stronger evidence. However, to employ this identification approach, we need firstly to identify individual firms with changes in board members with foreign experience and then compare the difference in investment efficiency of treated firm pre- and post-event. As shown in Eq. (1) in the main text, we measure firm's investment efficiency as the sensitivity of investment expenditure to investment opportunities, which is the coefficient estimate obtained by regressing firm investment expenditure on investment opportunities. Therefore, to measure the investment efficiency of a firm that experiences a change event, we need sufficient number of observations for this specific firm both before and after the changes to make the regression analysis in Eq. (1) meaningful. That is, all firms must have sufficient number of observations during the pre- and post-event periods. However, constrained by our panel data set with data availability fixed to the period of 2008-2018, and some changes occur in the earlier years of the sample period, while others occur in the latter years, estimating investment efficiency for all firms with unequal number of observations (before and after the event) is statistically not feasible. Therefore, we are unable to conduct the change analyses as the reviewer suggested in our empirical framework.

Table 12 Heckman two-stage analysis

Panel A: First stage regression	
Variables	<i>Dummy FE</i>
<i>Industry FE</i>	1.568*** (2.79)
<i>Foreign Share</i>	2.479*** (5.71)
<i>Size</i>	0.249*** (10.41)
<i>Age</i>	- 0.181*** (- 6.21)
<i>Leverage</i>	- 0.569*** (- 3.89)
<i>ROA</i>	- 0.073 (- 0.24)
<i>TQ</i>	0.076*** (5.10)
<i>Sales Growth</i>	0.036* (1.88)
<i>SOE</i>	- 0.239*** (- 4.76)
<i>Board Size</i>	0.074*** (5.68)
<i>Independent Directors</i>	0.584 (1.56)
<i>Largest Share</i>	- 0.147 (- 1.06)
<i>Constant</i>	- 6.517*** (- 11.96)
<i>Observations</i>	19,170
<i>Year FE</i>	Yes
<i>Industry FE</i>	Yes
<i>Pseudo R-squared</i>	0.061
Panel B: Second stage regression	
Variables	<i>Invest</i>
<i>Directors FE</i> × <i>TQ</i>	0.008* (1.74)
<i>IMR</i> × <i>TQ</i>	- 0.007** (- 2.42)
<i>Directors FE</i>	- 0.013 (- 0.88)
<i>IMR</i>	- 0.013 (- 1.17)
<i>TQ</i>	0.006*** (2.70)
<i>Size</i>	- 0.010***

Table 12 (continued)

Panel B: Second stage regression

Variables	<i>Invest</i>
	(- 3.21)
<i>Age</i>	- 0.018***
	(- 5.09)
<i>Leverage</i>	- 0.068***
	(- 7.16)
<i>Cash</i>	0.017***
	(3.65)
<i>Tangibility</i>	0.030**
	(2.55)
<i>Dividend</i>	0.006***
	(3.74)
<i>Loss</i>	- 0.012***
	(- 6.01)
<i>SOE</i>	- 0.012**
	(- 1.99)
<i>Duality</i>	0.004*
	(1.96)
<i>Independent Directors</i>	- 0.018
	(- 1.22)
<i>Largest Share</i>	0.043***
	(3.90)
<i>Institution Share</i>	- 0.000
	(- 0.11)
<i>Foreign Share</i>	0.012
	(0.42)
<i>Analyst Coverage</i>	0.007***
	(8.12)
<i>Constant</i>	0.310***
	(4.22)
<i>Observations</i>	18,209
<i>Adjusted R-squared</i>	0.127
<i>Year FE</i>	Yes
<i>Firm FE</i>	Yes

This table presents the regression results of Heckman model specified in Eq. (5). Panel A reports the results for the first-step Probit regression in which the dependent variable is *Dummy FE*, an indicator variable that equals one if a firm has at least one director with foreign experience in year t , and zero otherwise. Panel B reports the results of the second-step regression in which the dependent variable is *Invest* and investment opportunity is proxied by Tobin's Q (TQ). *IMR* denotes the inverse Mills ratio, which is generated from the first step and included in the second step of this model. All independent variables are lagged by 1 year. Year- and firm-fixed effects are included in the regression in Panel B. All the variables are defined in Appendix 1. All continuous variables are winsorized at 1% in both tails. The z -values or t -values clustered at firm level are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively

7 Conclusion

This paper uses data on 3291 listed Chinese firms and 22,498 firm-year observations from 2008 to 2018 to examine the impact of directors with foreign experience on firm investment efficiency. The findings show that directors with foreign experience have a significant and positive impact on firm investment efficiency by enhancing the sensitivity of investment to investment opportunities, proxied by Tobin's Q or sales growth. Economically, increasing the proportion of directors with foreign experience by one standard deviation improves the investment—Tobin's Q sensitivity by 50%, holding all other variables constant.

We then demonstrate the two sources of investment inefficiency, overinvestment and underinvestment, by testing the relation between directors with foreign experience and investment levels, conditional on a given firm's likelihood of overinvesting or underinvesting. The empirical results show that directors with foreign experience promote firm investment efficiency by alleviating both overinvestment and underinvestment.

We also investigate the potential influencing channel through which directors with foreign experience affect investment efficiency. The findings show that directors with foreign experience reduce controlling shareholdings tunneling transactions, which reduces overinvestment. Moreover, directors with foreign experience ease firms' financial constraints proxied by investment—cash flow sensitivity, which reduces underinvestment. These findings provide direct evidence supporting the governance channel through which these directors affect investment efficiency.

We further explore the effect of governance, the information environment, and financial constraints on the positive impact of directors with foreign experience. The results show that the positive impact of directors with foreign experience on investment efficiency is more pronounced at firms with weaker corporate governance, less transparent information environment, and higher financial constraints. These results are corroborated by the finding that the relationship is more pronounced when foreign experience is obtained in countries with strong investor protection, superior management practices, robust rule of law, and effective control of corruption. These tests provide further support for the governance channel.

Additional tests show that the positive effect of directors with foreign experience on firms' investment efficiency is robust to alternative measures of firm investment or investment opportunities, and controlling for CEO effect. The conclusion remains when Heckman's two-stage approach is used to mitigate potential endogeneity issues.

Appendix 1

See Table 13.

Table 13 Definition of variables

Variable	Definition	Source
<i>Invest</i>	Cash payments for fixed assets, intangible assets, and other long-term assets from the cash-flow statement, minus cash receipts from selling these assets, plus research and development (R&D) expenditure and acquisition expenditure, scaled by beginning-of-the-year total assets	CSMAR
<i>Invest2</i>	Cash payments for fixed assets, intangible assets, and other long-term assets from the cash-flow statement, minus cash receipts from selling these assets, scaled by beginning-of-the-year total assets	CSMAR
<i>Directors FE</i>	Total number of directors with foreign experience divided by total number of board members	CSMAR
<i>Directors FE U.S</i>	Total number of directors with foreign experience from U.S. divided by total number of board members	CSMAR
<i>Directors FE H.K</i>	Total number of directors with foreign experience from H.K. divided by total number of board members	CSMAR
<i>Directors FE U.K</i>	Total number of directors with foreign experience from U.K. divided by total number of board members	CSAMR
<i>Directors FE Work</i>	Total number of directors with foreign work experience divided by total number of board members	CSMAR
<i>Directors FE Education</i>	Total number of directors with foreign education experience divided by total number of board members	CSMAR
<i>Age</i>	The natural logarithm of one plus the number of years since the firm was listed	CNRDS
<i>Leverage</i>	Total debt divided by market value of firm	CSMAR
<i>Cash</i>	Cash and cash equivalents divided by total assets	CSMAR
<i>Tangibility</i>	Tangible assets divided by Total assets	CSMAR
<i>Dividend</i>	Dummy variable that equals one if a firm pays dividend in a given year, and equals zero otherwise	CSMAR
<i>Loss</i>	Indicator variable that takes a value of one if earnings before interest and tax are negative, and zero otherwise	CSMAR
<i>SOE</i>	Dummy variable that equals one if the firm is state-owned, and zero otherwise	CSMAR
<i>Duality</i>	Dummy variable that equals one if the director also acts as CEO, and zero otherwise	CSMAR
<i>Independent Directors</i>	Proportion of independent directors on the board	CSMAR
<i>Largest Share</i>	Percentage of firm shares held by the largest shareholder	
<i>Institution Share</i>	Percentage of firm shares held by institutional investors	WIND
<i>Foreign Share</i>	Percentage of firm shares held by foreign investors	CSMAR
<i>Analyst Coverage</i>	The natural logarithm of one plus the number of analysts following a firm	CSMAR
<i>Over Firm</i>	A ranked variable based on the average of a ranked (decile) measure of cash and leverage. Leverage is multiplied by -1 before ranking so that both variables have an increasing likelihood of overinvestment	CSMAR
<i>Related Transaction</i>	Related-party transactions divided by total assets	CNRDS

Table 13 (continued)

Variable	Definition	Source
<i>Excess</i>	Excess control rights of controlling shareholders, calculated as the divergence between controlling shareholders' control rights and cash-flow rights	CSMAR
<i>CFO</i>	Operating cash flow divided by total assets	CSMAR
<i>Main Shares Separation</i>	Total percentage of shares held by the second to fifth largest shareholders Dummy variable that equals one if firm's controlling shareholders enjoy higher control rights than cash-flow rights, and zero otherwise	CNRDS CSMAR
<i>Risk</i>	The standard deviation of daily stock returns over the previous 12-month period	CSMAR
<i>HHI</i>	The sum of squared market shares for the product categories within a firm	WIND
<i>Cash Flow/K</i>	Operating cash flow divided by beginning-of-the-year total assets	CSMAR
<i>Dividends/K</i>	Total annual dividend payments divided by beginning-of-the-year total assets	CSMAR
<i>Cash/K</i>	Cash and cash equivalents, divided by beginning-of-the-year total assets	CSMAR
<i>KZ index</i>	Calculated as: $-10.046 \times (Cash\ Flow/K) + (0.512 \times TQ) + 4.522 \times Leverage - 39.374 \times (Dividends/K) - 5.332 \times (Cash/K)$. A higher KZ index value indicates more financial constraints at the firm	CSMAR
<i>SA index</i>	Calculated as $(-0.737 \times Size) + 0.043 \times Size^2 - (0.040 \times ListYear)$, where <i>Size</i> is the log of total assets in 10 million RMB. <i>List Year</i> is the number of years since the firm was listed. A higher SA indicates more financial constraints at the firm	CSMAR
<i>List Year</i>	The number of years since the firm was listed	CNRDS
<i>Directors FE1</i>	Total number of directors who obtained foreign experience in countries with the highest La Porta et al. (1998) anti-director rights index ("High CG Ranking"), divided by the total number of board members	CSMAR
<i>Directors FE2</i>	Total number of directors with foreign experience in countries beyond "High CG Ranking" countries, divided by the total number of board members	CSMAR
<i>Directors FE3</i>	Total number of directors with foreign experience in top three management practice countries (High MP Ranking) according to Bloom et al. (2012), divided by the total number of board members	CSMAR
<i>Directors FE4</i>	Total number of directors with foreign experience in countries beyond "High MP Ranking" countries, divided by the total number of board members	CSMAR
<i>Directors FE5</i>	Total number of directors who obtained foreign experience in countries that rank ahead of China in terms of "Rule of Law", divided by the total number of board members	CSMAR

Table 13 (continued)

Variable	Definition	Source
<i>Directors FE6</i>	Total number of directors who obtained foreign experience in countries that rank behind China in terms of “Rule of Law”, divided by the total number of board members	CSMAR
<i>Directors FE7</i>	Total number of directors who obtained foreign experience in countries that rank ahead of China in terms of “Control of Corruption”, divided by the total number of board members	CSMAR
<i>Directors FE8</i>	Total number of directors who obtained foreign experience in countries that rank behind China in terms of “Control of Corruption”, divided by the total number of board members	CSMAR
<i>Industry FE</i>	Average proportion of directors with foreign experience appointed by firms in the same industry in the same year, excluding the firm concerned	CSMAR
<i>ROA</i>	Return on assets, calculated as earnings before amortization items divided by total assets	CSMAR
<i>Board Size</i>	Number of directors on the board	CSMAR
<i>IMR</i>	Inverse Mills ratio	
<i>CEO FE</i>	A dummy variable that equals one if a firm’s CEO has foreign experience, and zero otherwise	CSMAR

Appendix 2

See Table 14.

Table 14 Correlation matrix

	1	2	3	4	5	6	7	8
<i>Directors FE</i>	1							
<i>TQ</i>	0.031	1						
<i>Size</i>	0.068	-0.387	1					
<i>Age</i>	-0.174	0.048	0.386	1				
<i>Leverage</i>	-0.062	-0.551	0.653	0.321	1			
<i>Cash</i>	0.158	0.061	-0.251	-0.452	-0.328	1		
<i>Tangibility</i>	-0.041	-0.052	-0.024	-0.045	0.107	0.090	1	
<i>Dividend</i>	0.089	-0.098	0.118	-0.255	-0.104	0.164	0.010#	1
	9	10	11	12	13	14	15	16
<i>Loss</i>	1							
<i>SOE</i>	0.039	1						
<i>Duality</i>	-0.016	-0.307	1					
<i>Independent Direct ors</i>	0.012#	-0.065	0.104	1				
<i>Largest Share</i>	-0.073	0.222	-0.049	0.046	1			
<i>Institution Share</i>	-0.041	0.372	-0.186	-0.037	0.293	1		
<i>Foreign Share</i>	-0.028	-0.098	0.054	-0.010#	-0.002#	-0.071	1	
<i>Analyst Cover- age</i>	-0.196	-0.037	0.025	0.000	0.091	0.246	0.066	1

This table reports the correlation coefficients for the main independent and control variables defined in Appendix 1. All correlations are significant at the 5% level or better except for those marked #

References

- Adams RB, Ferreira D (2009) Women in the boardroom and their impact on governance and performance. *J Financ Econ* 94(2):291–309
- Adams RB, Hermalin BE, Weisbach MS (2010) The role of boards of directors in corporate governance: a conceptual framework and survey. *J Econ Lit* 48(1):58–107
- Agrawal A, Knoeber CR (1996) Firm performance and mechanisms to control agency problems between managers and shareholders. *J Financ Quant Anal* 31(3):377–397
- Aivazian VA, Ge Y, Qiu J (2005) The impact of leverage on firm investment: Canadian evidence. *J Corp Financ* 11(1):277–291
- Almeida H, Campello M (2007) Financial constraints, asset tangibility, and corporate investment. *Rev Financ Stud* 20(5):1429–1460

- Alvarez R, Jara M, Pombo C (2018) Do institutional blockholders influence corporate investment? Evidence from emerging markets. *J Corp Financ* 53:38–64
- An H, Chen CR, Wu Q, Zhang T (2021) Corporate innovation: Do diverse boards help? *J Financ Quant Anal* 56(1):155–182
- Baker M, Stein JC, Wurgler J (2003) When does the market matter? Stock prices and the investment of equity-dependent firms. *Q J Econ* 118(3):969–1005
- Barkan R, Zohar D, Erev I (1998) Accidents and decision making under uncertainty: a comparison of four models. *Organ Behav Hum Decis Process* 74(2):118–144
- Best RW, Hodges CW, Lin B-X (2004) Does information asymmetry explain the diversification discount? *J Financ Res* 27(2):235–249
- Bhagwati J, Hamada K (1974) The brain drain, international integration of markets for professionals and unemployment: a theoretical analysis. *J Dev Econ* 1(1):19–42
- Biddle GC, Hilary G, Verdi RS (2009) How does financial reporting quality relate to investment efficiency? *J Account Econ* 48(2):112–131
- Blanchard OJ, Lopez-de-Silanes F, Shleifer A (1994) What do firms do with cash windfalls? *J Financ Econ* 36(3):337–360
- Bloom N, Bloom D, Reenen J (2007) Measuring and explaining management practices across firms and countries. *Q J Econ* 122(4):1351–1408
- Bloom N, Genakos C, Sadun R, Van Reenen J (2012) Management practices across firms and countries. *Acad Manag Perspect* 26(1):12–33
- Campbell JL, Dhaliwal DS, Schwartz WC Jr (2012) Financing constraints and the cost of capital: evidence from the funding of corporate pension plans. *Rev Financ Stud* 25(3):868–912
- Campello M, Graham JR, Harvey CR (2010) The real effects of financial constraints: evidence from a financial crisis. *J Financ Econ* 97(3):470–487
- Cao F, Sun J, Yuan R (2019) Board directors with foreign experience and stock price crash risk: evidence from China. *J Bus Financ Acc* 46(9–10):1144–1170
- Carpenter MA, Sanders WG, Gregersen HB (2001) Bundling human capital with organizational context: the impact of international assignment experience on multinational firm performance and CEO pay. *Acad Manag J* 44(3):493–511
- Chay JB, Chong BU, Im HJ (2023) Dividend taxes and investment efficiency: evidence from the 2003 U.S. personal taxation reform. *J Account Econ* 75(1):101514
- Chen Q, Goldstein I, Jiang W (2007) Price informativeness and investment sensitivity to stock price. *Rev Financ Stud* 20(3):619–650
- Chen S, Sun Z, Tang S, Wu D (2011) Government intervention and investment efficiency: evidence from China. *J Corp Financ* 17(2):259–271
- Chen J, Leung WS, Goergen M (2017a) The impact of board gender composition on dividend payouts. *J Corp Finan* 43:86–105
- Chen R, El Ghoul S, Guedhami O, Wang H (2017b) Do state and foreign ownership affect investment efficiency? Evidence from privatizations. *J Corp Financ* 42:408–421
- Chen T, Xie L, Zhang Y (2017c) How does analysts' forecast quality relate to corporate investment efficiency? *J Corp Finan* 43:217–240
- Chen CC, Ho KC, Li HM, Yu MT (2023) Impact of information disclosure ratings on investment efficiency: evidence from China. *Rev Quant Financ Account* 60(2):471–500
- Cheng M, Dhaliwal D, Zhang Y (2013) Does investment efficiency improve after the disclosure of material weaknesses in internal control over financial reporting? *J Account Econ* 56(1):1–18
- Cheung Y-L, Rau PR, Stouraitis A (2006) Tunneling, propping, and expropriation: evidence from connected party transactions in Hong Kong. *J Financ Econ* 82(2):343–386
- Claessens S, Djankov S, Fan JPH, Lang LHP (2002) Disentangling the incentive and entrenchment effects of large shareholdings. *J Financ* 57(6):2741–2771
- Cleary S (1999) The relationship between firm investment and financial status. *J Financ* 54(2):673–692
- Cull R, Li W, Sun B, Xu LC (2015) Government connections and financial constraints: Evidence from a large representative sample of Chinese firms. *J Corp Finan* 32:271–294
- Cummins J, Hassett K, Oliner S (2006) Investment behavior, observable expectations, and internal funds. *Am Econ Rev* 96(3):796–810
- Dai Y, Kong D, Liu S (2018) Returnee talent and corporate investment: evidence from China. *Eur Account Rev* 27(2):313–337
- Easton PD (2004) PE ratios, PEG ratios, and estimating the implied expected rate of return on equity capital. *Account Rev* 79(1):73–95
- Faccio M, Lang LHP (2002) The ultimate ownership of western European corporations. *J Financ Econ* 65(3):365–395

- Fama EF, Jensen MC (1983) Agency problems and residual claims. *J Law Econ* 26(2):327–349
- Fazzari SM, Hubbard RG, Petersen BC (1988) Finance constraints and corporate investment. *Brook Pap Econ Act* 19(1):141–206
- Feng X, Johansson AC (2018) Living through the Great Chinese Famine: early-life experiences and managerial decisions. *J Corp Financ* 48:638–657
- Firth M, Lin C, Wong SML (2008) Leverage and investment under a state-owned bank lending environment: EVIDENCE from China. *J Corp Financ* 14(5):642–653
- Giannetti M, Liao G, Yu X (2015) The Brain gain of corporate boards: evidence from China. *J Financ* 70(4):1629–1682
- Griffin D, Li K, Xu T (2021) Board gender diversity and corporate innovation: International evidence. *J Financ Quant Anal* 56(1):123–154
- Guariglia A, Yang J (2016) A balancing act: managing financial constraints and agency costs to minimize investment inefficiency in the Chinese market. *J Corp Financ* 36:111–130
- Gul FA, Kim J-B, Qiu AA (2010) Ownership concentration, foreign shareholding, audit quality, and stock price synchronicity: evidence from China. *J Financ Econ* 95(3):425–442
- Gul FA, Srinidhi B, Ng AC (2011) Does board gender diversity improve the informativeness of stock prices? *J Account Econ* 51:314–338
- Hadlock C, Pierce J (2010) New evidence on measuring financial constraints: moving beyond the KZ index. *Rev Financ Stud* 23(5):1909–1940
- Hambrick D (2007) Upper echelons theory: an update. *Acad Manag Rev* 32(2):334–343
- Harford J (1999) Corporate cash reserves and acquisitions. *J Financ* 54(6):1969–1997
- Heckman JJ (1979) Sample selection bias as a specification error. *Econometrica* 47(1):153–161
- Hermalin BE, Weisbach MS (1991) The effects of board composition and direct incentives on firm performance. *Financ Manag* 20(4):101–112
- Hermalin BE, Weisbach MS (1998) Endogenously chosen boards of directors and their monitoring of the CEO. *Econ Policy Rev Fed Reserve Bank N Y* 9(1):7–26
- Hermalin BE, Weisbach MS (2003) Boards of directors as an endogenously determined institution: a survey of the economic literature. *Econ Policy Rev Fed Reserve Bank N Y* 9(4):7–26
- Hertwig R, Erev I (2009) The description–experience gap in risky choice. *Trends Cogn Sci* 13(12):517–523
- Hertwig R, Barron G, Weber E, Erev I (2004) Decisions from experience and the effect of rare events in risky choice. *Psychol Sci* 15(8):534–539
- Hu C, Liu Y-J (2015) Valuing diversity: CEOs’ career experiences and corporate investment. *J Corp Financ* 30:11–31
- Hubbard RG (1998) Capital-market imperfections and investment. *J Econ Lit* 36(1):193–225
- Iliev P, Roth L (2018) Learning from directors’ foreign board experiences. *J Corp Financ* 51:1–19
- Javakhadze D, Ferris SP, French DW (2016) Social capital, investments, and external financing. *J Corp Financ* 37:38–55
- Jensen MC (1986) Agency costs of free cash flow, corporate finance, and takeovers. *Am Econ Rev* 76(2):323–329
- Jensen MC (1993) The modern industrial revolution, exit, and the failure of internal control systems. *J Financ* 48(3):831–880
- Jensen MC, Meckling WH (1976) Theory of the firm: managerial behavior, agency costs and ownership structure. *J Financ Econ* 3(4):305–360
- Jiang G, Lee CMC, Yue H (2010) Tunneling through intercorporate loans: the China experience. *J Financ Econ* 98(1):1–20
- Jiang L, Kim J-B, Pang L (2011) Control-ownership wedge and investment sensitivity to stock price. *J Bank Finance* 35(11):2856–2867
- Jiang F, Cai W, Wang X, Zhu B (2018) Multiple large shareholders and corporate investment: evidence from China. *J Corp Financ* 50:66–83
- Kang S, Kim EH, Lu Y (2018) Does independent directors’ CEO experience matter? *Rev Finance* 22(3):905–949
- Kaplan SN, Zingales L (1997) Do financing constraints explain why investment is correlated with cash flow? *Q J Econ* 112:168–216
- Kerr W (2008) Ethnic scientific communities and international technology diffusion. *Rev Econ Stat* 90(3):518–537
- La Porta R, Lopez-de-Silanes F, Shleifer A, Vishny RW (1998) Law and finance. *J Polit Econ* 106(6):1113–1155
- Laeven L, Levine R (2009) Bank governance, regulation and risk taking. *J Financ Econ* 93(2):259–275

- Lamont O, Polk C, Saa-Requejo J (2001) Financial constraints and stock returns. *Rev Financ Stud* 14(2):529–554
- Liu Q, Lu Z (2007) Corporate governance and earnings management in the Chinese listed companies: a tunneling perspective. *J Corp Financ* 13(5):881–906
- Marquis C, Tilcsik A (2013) Imprinting: toward a multilevel theory. *Acad Manag Ann* 7(1):195–245
- McLean RD, Zhang T, Zhao M (2012) Why does the law matter? Investor protection and its effects on investment, finance, and growth. *J Financ* 67(1):313–350
- Miletkov M, Poulsen A, Wintoki MB (2017) Foreign independent directors and the quality of legal institutions. *J Int Bus Stud* 48(2):267–292
- Modigliani F, Miller MH (1958) The cost of capital, corporation finance and the theory of investment. *Am Econ Rev* 48(3):261–297
- Myers SC (1977) Determinants of corporate borrowing. *J Financ Econ* 5(2):147–175
- Myers SC (1984) The capital structure puzzle. *J Financ* 39(3):574–592
- Opler T, Pinkowitz L, Stulz R, Williamson R (1999) The determinants and implications of corporate cash holdings. *J Financ Econ* 52(1):3–46
- Paligorova T, Xu Z (2012) Complex ownership and capital structure. *J Corp Finan* 18(4):701–716
- Petersen MA (2009) Estimating standard errors in finance panel data sets: comparing approaches. *Rev Financ Stud* 22(1):435–480
- Quan X, Ke Y, Qian Y, Zhang Y (2023) CEO foreign experience and green innovation: evidence from China. *J Bus Ethics* 182(2):535–557
- Rediker KJ, Seth A (1995) Boards of directors and substitution effects of alternative governance mechanisms. *Strateg Manag J* 16(2):85–99
- Richardson S (2006) Over-investment of free cash flow. *Rev Acc Stud* 11(2–3):159–189
- Setia-Atmaja L, Haman J, Tanewski G (2011) The role of board independence in mitigating agency problem II in Australian family firms. *Br Account Rev* 43(3):230–246
- Slater DJ, Dixon-Fowler HR (2009) CEO international assignment experience and corporate social performance. *J Bus Ethics* 89(3):473–489
- Stiglitz JE, Weiss A (1981) Credit rationing in markets with imperfect information. *Am Econ Rev* 71(3):393–410
- Stulz R (1990) Managerial discretion and optimal financing policies. *J Financ Econ* 26(1):3–27
- Suutari V, Mäkelä K (2007) The career capital of managers with global careers. *J Manag Psychol* 22(7):628–648
- Tao Q, Wei KCJ, Xiang X, Yi B (2022) Board directors' foreign experience and firm dividend payouts. *J Corp Financ* 75:102237
- To TY, Navone M, Wu E (2018) Analyst coverage and the quality of corporate investment decisions. *J Corp Financ* 51:164–181
- Tobin J (1969) A general equilibrium approach to monetary theory. *J Money Credit Bank* 1(1):15–29
- Wang H, Luo T, Tian GG, Yan H (2020) How does bank ownership affect firm investment? Evidence from China. *J Bank Finance* 113:105741
- Whited TM (1992) Debt, liquidity constraints, and corporate investment: evidence from panel data. *J Financ* 47(4):1425–1460
- Whited TM, Wu G (2006) Financial constraints risk. *Rev Financ Stud* 19(2):531–559
- Xie H, Ding L, Liao K (2019) Overseas background directors and debt costs—evidence from the mediating effect of the advisory and supervisory functions. *Bus Rev* 31(11):202–211 **(in Chinese)**
- Yuan R, Wen W (2018) Managerial foreign experience and corporate innovation. *J Corp Financ* 48:752–770
- Zhang J, Kong D, Wu J (2018) Doing good business by hiring directors with foreign experience. *J Bus Ethics* 153(3):859–876