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Empirical Evidence for Commercial Bank Efficiency and Corporate Directorship in China

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Abstract

This study examines the links between bank efficiency and the profile of corporate directorships of listed banks in China. We focused on the composition of independent, foreign and women directors, human and social capital of the directors, and their diligence for board meetings. We collected the individual director profiles of a panel of 28 commercial banks data from 2010 to 2018. GMM estimation is employed to address the endogeneity issues. In general, we found that independent and foreign directors have a positive impact on bank efficiency, as well as educational level, professional qualification, political connection, and their board meeting attendance. These findings suggest that a certain profile of corporate directorship can significantly drive listed bank efficiency.

Keywords: *bank efficiency, director profile, DEA, China*

1. Introduction

Over the last decade China's commercial banks have an overwhelmingly dominant position in the Chinese financial system, and they have become an extremely important and unreplaceable engine of Chinese economic growth. Chinese listed commercial banks have achieved tremendous progress even under the scenario of the world economic downturn in recent years, as can be observed in Table 1 which summarizes global bank rankings reported by a famous British magazine – *The Banker*. Since 2012 to 2018 China always have four commercial banks in this top-10 list, which is at par with the USA. In the latest 2018 ranking, the four Chinese banks even ranked among the top four positions. In addition, according to the statistical data released from the China Banking Regulatory Commission (CBRC), China's commercial bank's domestic total assets is approximately RMB261.4 trillion at the end of 2018, which is more than three times the value of 2010.

Table 1 Headquarter Location of Top 10 Gobal Banks from *The Banker* (ranking of 2010-2018)

	2010	2011	2012	2013	2014	2015	2016	2017	2018
USA	4	4	4	4	4	4	4	4	4
Europe	4	1	1	1	1	1	1	1	1
China	1	3	4	4	4	4	4	4	4
Japan	0	1	1	1	1	1	1	1	1

Source: Collected from <https://www.thebanker.com>.

Among a range of different governance mechanisms, the Chinese supervisory authority has underscored corporate board as an essential part of the commercial bank governance reform. As early as in 2005, CBRC has published "Guidelines for Board of Directors Code of Conduct of Joint Stock Commercial Banks", aiming to standardize board structure and establish the boards of China's commercial banks to be as strong and functional as those in developed countries. In 2010, the last state-owned commercial bank of China completed the board system reform and was listed; at the same time the board of directors was established.

This paper explores the role of corporate boards in the Chinese banking sector. Our study aims to provide and renew some useful information about banks' board director's characteristics in the context of Chinese banking reforms, and more importantly we investigate the influence of diversity in corporate directorship towards Chinese commercial banks efficiency, especially when China's economy has moved into the post crisis recovery period.

This study contributes to the literature in twofold. First, many of the earlier bank efficiency studies concentrated on developed countries and documented a significant role of corporate governance in bank operations, but past research on China's commercial banks efficiency (An and Zhou, 2006; Han and Su, 2016; Ke and Feng, 2008; Xi and Zeng, 2003) do not pay much attention on corporate governance aspect, especially the function of corporate board which charts the strategic direction of firms. Although corporate governance reforms in China borrow advanced concepts and successful practices from developed countries, the mechanism and effectiveness of commercial bank governance in China are quite different relative to other developing countries. Our paper intends to fill this gap. Empirical evidence and perspective on commercial bank governance in this biggest emerging economy in the world can provide more robust evidences against the potential data-snooping bias in the past literature. Second, we extend the bank governance literature in China by dealing with the various dimensions of corporate directorship. We refer to a stream of existing research

that documents the various governance mechanisms in China's banking sector and finally we focus on board members and their background towards bank efficiency. We explored how the different dimension of corporate directorship affects bank efficiency so one can gauge what type of directors should be hire to improve bank efficiency.

The rest of this paper is organised as follows: the next section establishes the hypotheses to be tested based on the wisdom of the literature. The following section discusses the methodology and data which include the modelling used. Section 4 gives the results and findings and the final section concludes.

2. Literature Review

Berle and Means (1932) were the first to highlight that agency issue is the core concern of modern corporate governance. Another seminal paper in this regard is Jensen and Meckling (1976). Later, Fama and Jensen (1983) put forward that the core of corporate governance is the structure of the board of directors. The board of directors is positioned in between shareholders and managers and they are playing a pivotal role to closely monitor and supervise every strategic decision made by the managers in a corporate. The board is important to ensure that decisions made by managers can bring positive benefits to the corporate and reduce agency cost. Jensen (1993) believed that a well-structured and orderly board of directors must be a high-quality board, which will inevitably bring a catalytic role in corporate efficiency. Yu and Chi (2004) also pointed out that an excellent board of directors absolutely has its own distinctive common characteristics, through the analysis and search for this feature will greatly accelerate the reform process of enterprises.

The concept for the corporate governance of banks is based on this similar corporate governance theory (Li and Yang, 2008). However, corporate directorship of commercial banks needs to take greater responsibility than ordinary companies. The reason is that the maintenance of shareholders' benefits is no longer the sole target of the corporate governance of a commercial bank, it needs to reduce the bank's market risks to maintain a stable financial system (Ciancanelli and Reyes-Gonzalez, 2000). In order to accomplish these goals, the board of commercial banks should be at highest degree of quality and diversity; the board should have a large number of independent and foreign directors, with diverse background and education, and high diligence to assume the corresponding responsibilities. This is even critical for China, a centrally planned command economy. In this study, we examine three aspects of corporate board directorships in the case of the listed commercial banks in China: directors' profile, directors' human and social capital, and their diligence in meetings.

2.1 Director Profile

Generally, the higher the proportion of independent directors, the stronger the independence, professionalism and objectivity of board's decision-making, as well as the supervisory capacity of the managers (Fama, 1980). Independent directors need to maintain their good reputation and so they have stronger incentive to effectively supervise the managers. Independent directors also represent the interests of other stakeholders and minority shareholders in the board, so their existence can effectively coordinate the conflict of interest between major shareholders and managers, and ultimately maximize the firm's profits (Fama and Jensen, 1983). Mishra and Nieisen (2000) also supported the above point of view. They found that increasing the number of independent directors, especially those not controlled by senior bank managers, played a crucial role in improving the performance of commercial banks in the US. Zhong et al. (2005) even found that a positive relationship between increasing the number of independent directors and the degree of voluntarily disclosure on business information of the firm.

However, Hermalin and Weisbach (1991) and Bhagat and Black (2001) pointed out that improving the number of independent directors cannot significantly help promote bank performance. The main reason is that the appointment of independent directors in commercial banks are mainly nominated by the chairman of the board or other directors, thus leading to the lack of independence of independent directors. In addition, the independent directors mainly obtain information from internal bank documents for bank decision-making process. Therefore, the internal limitations on information sources lead to their failure to make fair judgments.

Most literature from China, like Li (2013), Sun (2008), Wang (2007) and Xie (2008) have already documented the negative relationship between independent directors and bank performance. They explained the result is due to the traditional culture of the Chinese which prefer to pursue harmony in communication. When independent directors have different opinions, they will always try to hide their opinions to agree with the other directors or chairman. Some independent directors are often absent from board meetings, and entrust other internal directors to vote instead. When there are more independent directors on the board, the commitment and responsibility of an individual independent director become even diluted, and the tendency of agreement with the majority becomes stronger. Therefore, based on the above perspective, we deduce the following hypothesis:

Hypothesis 1: the number of independent directors is negatively related to the efficiency of China's listed commercial banks.

With the accession of China into the WTO, market entry barriers have been removed. Thus since 2006, the competition for market share between

foreign and local Chinese commercial banks has been intensified. In order to improve the internationalization level to respond to this unprecedented market competition, China's commercial banks began to gradually introduce overseas strategic investors as important shareholders (Li and Wang, 2018).

Among others, foreign directors have been identified as a significant part of corporate governance (Choi et al., 2007). The presence of foreign directors has been proven to improve firm's performance through monitoring function, they also improve board independency by reducing expropriation and restrict the power of existing board members (Oxelheim and Randoy, 2003). Foreign directors bring different ideas and views, professional experiences, and heterogeneity (Ararat et al., 2010). In addition, learning from foreign governance practices is as important as learning from connected domestic firms (Lliev and Roth, 2018). The board could converge to the outstanding governance characteristics and practices of international standard through their foreign directors.

On the other hand, however, the appointment of foreign directors may also weaken the effectiveness of board monitoring. This is due to the long geographical distance of the foreign director and their unfamiliarity with local working business environment (Masulis et al., 2012). In contrast, Oxelheim and Randoy (2003) after studying Swedish companies indicated that foreign shareholders who can keep at least one foreign representative in the boardroom, is a signal of greater commitment towards corporate governance and transparency, and this signal may help the firm to gain a better reputation in the financial market and results in higher market value in the end. As we do not have any empirical evidence on how foreign directors perform in Chinese listed bank efficiency, therefore, based on the above literature perspective, we propose the following hypothesis:

Hypothesis 2: the number of foreign directors is positively related to the efficiency of China's listed commercial banks.

Powell and Mainiero (1999) points out that if the gender proportion of the board of directors can be better representative of the gender ratio of all employees of the company, the staff in general will think they can get equal promotion opportunities and possibilities; this in turn will increase the incentive role of employees, thereby enhancing firm performance. Past studies on gender postulate that a positive relationship between woman on board and firm's performance also supported the above point of view (Adams and Ferreira, 2009; Catalyst, 2007; Erhardt et al., 2003). Previous studies also showed that the presence of women directors would enhance the independence of the board (Fondas and Sassalos, 2000), because they play a role in contributing to enhance quality of governance in boardroom by providing different opinions in board meeting and make a board more

interactive (Ruigrok et al., 2007). Women directors concentrated more on their role by avoiding political behaviour thus leading to enhance the efficiency of board (Sing et al., 2008), and reduce the chances of financial crimes on the board (Zhang, 2014).

However, Adams and Ferreira (2009), Farrell and Hersch (2005) and Liu et al. (2014) found insignificant or negative relationship between women directors and firm's performance. These empirical studies found that board diversity incur extra cost to foster mutual trust among directors, and the heterogeneity of members creates more differences and internal conflicts, which increases decision-making costs. In addition, women directors are more inclined to avoid risks and prefer conservative operations, and this tendency will sometimes lead to the firm losing profit opportunities in the market. Again, as there is no literature on female directors on Chinese listed bank efficiency, therefore, based on the above literature having negative perspective on feminism, we propose the following hypothesis to be tested:

Hypothesis 3: the number of women directors is negatively related to the efficiency of China's listed commercial banks.

2.2 Human Capital and Social Capital of the Directors

Recent corporate governance research started to do in-depth investigation on the social and human capital of the board of directors, for example see Carpenter and Westphal (2001), Kim and Lim (2010) and Wincent et al. (2010). Human capital generally refers to the skills, abilities and knowledge to generate a given set of benefits (Becker, 1983; Hitt et al. 2001). Studies such as Gradstein and Justman (2000) and Souitaris (2002) document the advantage of adopting greater diversity in board's human capital by arguing that the formal education, working experience and other skills of the board could provide excellent solutions and alternatives to the firms. Westphal (1999) also indicated that board comprising members with different fields of expertise, such as public affairs and marketing specialists, lawyers, government officials and community leaders, can facilitate the role of counsel to the managers.

For commercial banks, the directors' human capital is essential as the banking industry is a service sector which requires complex business strategies and is highly regulated by a central bank. Due to the difference of the commercial banking industry from other industries like agriculture and manufacturing, which do not need too much changes of strategy and operation, banking in contrast requires frequent or even immediate response to business challenges to meet the rapidly changing market environment (Gropper, 1991). As the core decision-making body of the bank, the education level of its corporate directors has a crucial impact on the effectiveness of its

strategies. Jiang and He (2015), Wu (2013) and Zhang and An (2005) through their investigations showed that the education level of board members in the financial industry has a more significant positive impact on firm performance than other industries. Kim and Lim (2010) also showed significant positive effect of board's education diversity on Tobin Q, as well as Wincent et al. (2010) on the positive effect of expertise diversity of directors on corporate innovation performance and network entrepreneurial orientation. In short, these studies indicate that greater diversity in board's human capital provides opportunities for networking corporates to be proactive in developing new innovation which could indirectly improve the firm's performance. Therefore, we propose the following hypotheses:

Hypothesis 4: the level of education of directors is positively related to the efficiency of China's listed commercial banks.

Hypothesis 5: the number of directors with overseas education is positively related to the efficiency of China's listed commercial banks.

Hypothesis 6: the number of directors with professional qualification is positively related to the efficiency of China's listed commercial banks.

Another equally important aspect is the social capital. Social capital is defined as the sum of the potential and actual resources available to an individual's and a social unit's network of relationships (Nahapiet and Ghoshal, 1998). In the context of China's economic transformation, the political relations remain the most important social capital for corporate directorship in this central planning capitalism. Faccio (2006) indicated that the phenomenon of corporate political connections is widespread in all countries (Claessens et al., 2008; Khwaja and Mian, 2005; Leuz and Felix, 2006; Wijantini, 2007). Li et al. (2011) pointed out that under current China's political and economic system, Chinese companies have stronger incentives to establish a good relationship with the government as compared to foreign companies. This relationship can be used as corporate competitive strategy, and the reason behind this strong motivation is due to China as a country that implements one-party dictatorship and there never was an alternate government existing since its independency in 1949. Therefore, all listed companies must maintain long-term and good relationships with the government if they want to seek competitive advantages. Once this relationship is destroyed, the company's losses can be fatal and is difficult to repair permanently. In fact, the government also hopes that through this kind of benign interaction and reciprocal cooperation, enterprises can help the government to complete national construction goals and social responsibilities, thus helping the government to win more public trust and good reputation. Yu and Pan (2008) found that the private enterprise managers who have membership in the Chinese

Communist Party will bring a range of significant positive impact on their business efficiency, especially in areas where the market is ineffective and the institutional environment is poor (Luo and Liu, 2009; Luo and Tang, 2009). On top of that, they can also assist to obtain more bank loans, government support and relatively easily expand business with easier access to the government regulation industry. Therefore, we propose the following hypothesis:

Hypothesis 7: the number of political linked directors is positively related to the efficiency of China's listed commercial banks.

2.3 Board Diligence

Johl et al. (2015) pointed out that board diligence is a key corporate governance mechanism that helps in guiding and advising the management towards the pursuit of shareholder interest amidst other control functions. The diligence of board members is usually measured by their board meeting attendance rate (Ghosh, 2007; Ilaboya and Obaretin, 2015; Johl et al., 2015). Ntim and Osei (2011) also concluded that the board that meets more generated a higher level of performance than those who do not. Ghosh (2007) also found a statistically significant relationship indeed exists between board diligence and firm performance.

The contribution of a non-executive corporate director is only through board meetings. For board members to effectively perform their duties, meetings need to be held frequently (Vafeas, 1999). Francis et al. (2012) revealed that boards with a low frequency of meeting performed poorly as compared to a board with high frequency meeting. However, Jensen (1993) thinks that board meeting is only formalism. The frequent meeting leads to a waste in managerial time, increase financial burden in terms of travelling expenses and sitting allowance given to board members. Others found that bank performance did not increase as the number of board meeting increased (Ntim and Osei, 2011; Oyerinde, 2014; Taghizadeh and Saremi, 2013). Based on the above literature perspectives, we propose a test on both board meeting frequency and attendance with the following hypotheses:

Hypothesis 8: The frequency of board meeting is positively related to the efficiency of China's listed commercial banks.

Hypothesis 9: The attendance rate of board meetings is positively related to the efficiency of China's listed commercial banks.

3. Methodology and Data

According to the 2018 statistics report of the Chinese Banking Regulatory Commission, until the end of 2018, there are 28 Chinese commercial banks

listed in the A-shares market on the Chinese mainland. Among them, the type of bank's property rights from 1 to 4 are state-owned, 5 to 13 are large nationwide joint-stock and 14 to 28 are small city joint-stock. All sample data are collected from their annual reports shown by the respective bank's official website, the "Almanac of China's Finance and Banking" published by the People's Bank of China from 2010 to 2018 and also from the China Banking Regulatory Commission official website released data. The list of our sample banks is reported in Table 2 below.

Table 2 Sample of China's Listed Commercial Banks Until 2018

No.	Commercial Bank Name	Year Established	Year Listed	Registered City
1	Industrial and Commercial Bank of China	1984	2006	Beijing
2	China Construction Bank	1954	2007	Beijing
3	Bank of China	1912	2006	Beijing
4	Agricultural Bank of China	1951	2010	Beijing
5	Bank of Communications	1908	2007	Shanghai
6	China Merchants Bank	1987	2002	Shenzhen
7	China Citic Bank	1987	2007	Beijing
8	China Everbright Bank	1992	2010	Beijing
9	Shanghai Pudong Development Bank	1992	1999	Shanghai
10	Industrial Bank	1988	2007	Fuzhou
11	China Minsheng Bank	1996	2000	Beijing
12	Ping An Bank	1987	1991	Shenzhen
13	Hua Xia Bank	1992	2003	Beijing
14	Bank of Beijing	1996	2007	Beijing
15	Bank of Nanjing	1996	2007	Nanjing
16	Bank of Ningbo	1997	2007	Ningbo
17	Bank of Shanghai	1995	2016	Shanghai
18	Bank of Chengdu	1996	2018	Chengdu
19	Bank of Guiyang	1997	2016	Guiyang
20	Bank of Hangzhou	1996	2016	Hangzhou
21	Bank of Jiangsu	2007	2016	Nanjing
22	Bank of Changsha	1997	2018	Changsha
23	Bank of Zhengzhou	2000	2018	Zhengzhou
24	Jiangyin Rural Commercial Bank	2001	2016	Jiangyin
25	Changshu Rural Commercial Bank	2001	2016	Changshu
26	Suzhou Rural Commercial Bank	2004	2016	Suzhou
27	Wuxi Rural Commercial Bank	2005	2016	Wuxi
28	Rural Commercial Bank of Zhangjiagang	2001	2017	Zhangjiagang

This study covered two step analyses. In step 1, we used data envelopment analysis (DEA) to measure relative bank technical efficiency scores cross time. DEA is a non-parametric method of linear programming. In DEA, the term "decision making unit" (DMU) refers to a bank that uses input resources to produce output. We can calculate the result of bank efficiency performance with a score between 0 and 1. The firm with the highest efficiency of 1 is considered to be the most efficient reference bank in comparison with other banks. Selecting inputs and outputs is important in the DEA method. In this study, we consider the primary function of commercial banks as finance intermediation agencies in the financial market, so we use the intermediation approach (Benston et al. 1982). After referring to the part of previous literature from China, we selected fixed assets, operating expenses, total deposit and number of employees as inputs, total loans, net profit, and net interest income as outputs. Step 1 produces a panel series of $Efficiency_{it}$ that measures i as number of efficiency scores across time t. We obtained a series of bank efficiency scores that lie between 0 and 1 for China's listed commercial banks annually from 2010 to 2018; a higher value indicates higher efficiency relative to the sample, and a lower value means a lower efficiency relative to the other sample banks.

To test the effect of corporate board profile on China's commercial bank efficiency, in step 2, Model 1 is constructed to examine the relationship between the bank efficiency score obtained from the DEA method and the various director profiles.

$$\begin{aligned} Efficiency_{it} = {} & \beta_0 + \beta_1 Bank\ Size_{it} + \beta_2 Leverage_{it} + \beta_3 Profitability_{it} + \\ & \beta_4 StateOwnership_{it} + \beta_5 ForeignOwnership_{it} + \\ & \beta_6 CEORemuneration_{it} + \beta_7 BoardSize_{it} + \\ & \beta_8 Independent_{it} + \beta_9 Foreign_{it} + \beta_{10} Women_{it} + \varepsilon_{it} \end{aligned} \quad (1)$$

where $Efficiency_{it}$ is the dependent variable, which is estimated from the DEA technical efficiency score of China's listed commercial banks annually. The control variables are bank fundamentals which can generate sustained competitive advantages and influence bank efficiency. $BankSize_{it}$ is represented by the natural logarithm of total assets. $Leverage_{it}$ is represented by percentage of long-term debts to total assets. $Profitability_{it}$ is represented by percentage of return of assets. These variables are widely used as control variables in the research area of corporate governance focussing on bank performance. The board governance variables include the following: $StateOwnership_{it}$ is represented by percentage of state-owned controlled shareholding in the top ten shareholders, $ForeignOwnership_{it}$ is represented by percentage of foreign controlled shareholding in the top ten shareholders, $CEORemuneration_{it}$ is represented by the CEO remuneration in each board, and $BoardSize_{it}$ represents total number of directors sitting on the board.

The variables for directors' profile include $Independent_{it}$ representing percentage of independent directors to total board size, $Foreign_{it}$ representing percentage of foreign directors to total board size, $Women_{it}$ representing percentage of women directors to total board size.

Model 2 is designed to examine the relationship between bank efficiency and directors' social and human capital.

$$\begin{aligned} Efficiency_{it} = {} & \beta_0 + \beta_1 Bank\ Size_{it} + \beta_2 Leverage_{it} + \beta_3 Profitability_{it} + \\ & \beta_4 StateOwnership_{it} + \beta_5 ForeignOwnership_{it} + \\ & \beta_6 CEORemuneration_{it} + \beta_7 BoardSize_{it} + \beta_8 BoardEdu_{it} + \\ & \beta_9 OverseaEdu_{it} + \beta_{10} Professional_{it} + \beta_{11} Political_{it} + \varepsilon_{it} \end{aligned} \quad (2)$$

where $BoardEdu_{it}$ represents the whole board of directors' average education value (note: Diploma = 1, Bachelor = 2, Master = 3, Doctor = 4). $Overseas\ Edu_{it}$ represents percentage of directors who have overseas education degree. $Professional_{it}$ represents percentage of directors who have professional qualifications. While $Political_{it}$ represents percentage of politically-linked directors to total board size.

Model 3 examines the relationship between bank efficiency and frequency of board meeting and the attendance rate.

$$\begin{aligned} Efficiency_{it} = {} & \beta_0 + \beta_1 Bank\ Size_{it} + \beta_2 Leverage_{it} + \beta_3 Profitability_{it} + \\ & \beta_4 StateOwnership_{it} + \beta_5 ForeignOwnership_{it} + \\ & \beta_6 CEORemuneration_{it} + \beta_7 BoardSize_{it} + \\ & \beta_8 BoardMeeting_{it} + \beta_9 Attendance_{it} + \varepsilon_{it} \end{aligned} \quad (3)$$

where $BoardMeeting_{it}$ represents the number of board meetings, and $Attendance_{it}$ represents percentage of board members' meeting attendance rate.

The complete model that examine the various aspect of board influence on bank efficiency is comprehended in the following generalized Model (4).

$$\begin{aligned} Efficiency_{it} = {} & \beta_0 + \beta_1 Bank\ Size_{it} + \beta_2 Leverage_{it} + \beta_3 Profitability_{it} + \\ & \beta_4 StateOwnership_{it} + \beta_5 ForeignOwnership_{it} + \\ & \beta_6 CEORemuneration_{it} + \beta_7 BoardSize_{it} + \beta_8 Independent_{it} + \\ & \beta_9 Foreign_{it} + \beta_{10} Women_{it} + \beta_{11} BoardEdu_{it} + \\ & \beta_{12} OverseaEdu_{it} + \beta_{13} Professional_{it} + \beta_{14} Political_{it} + \\ & \beta_{15} BoardMeeting_{it} + \beta_{16} Attendance_{it} + \varepsilon_{it} \end{aligned} \quad (4)$$

4. Results and Discussion

Table 3 presents the descriptive statistics for all variables used in this study. The average bank technical efficiency is 97.49 per cent. The high score suggests that China's listed commercial banks are performing well in the post crisis recovery era. In terms of board size, there are 15 board members on average in a bank with a median of 35.29 per cent for independent directors.

Table 3 Descriptive Statistics for all Variables (Obs. = 252, 2010-2018)

Variable Name	Mean	Median	Std. Dev.	Min	Max
Efficiency (%)	97.4978	98.0000	2.3135	86.3600	100.0000
Bank Size (millions)	6.0390	6.1183	0.7953	4.6593	7.4424
Leverage (%)	5.5669	5.3300	0.9109	4.0000	8.8300
Profitability (%)	1.0924	1.0850	0.2374	0.5900	1.8259
State Ownership (%)	35.6619	35.7000	22.7877	0.0000	85.2400
Foreign Ownership (%)	12.2819	11.8700	12.1525	0.0000	40.5600
CEO Remuneration (millions)	1.7505	1.2500	1.5243	0.2322	8.6900
Board Size	14.6587	15.0000	2.2016	9.0000	19.0000
Independent (%)	35.3221	35.2941	5.8892	7.1428	50.0000
Foreign (%)	13.8755	16.6667	11.5484	0.0000	46.1538
Women (%)	12.9536	12.1323	8.8386	0.0000	40.0000
Board Edu	3.0992	3.1000	0.1845	2.0000	3.3800
Oversea Edu (%)	20.0738	20.0000	6.3411	6.6013	25.0000
Professional (%)	72.0261	73.3334	4.6891	55.2567	78.9473
Political (%)	65.0326	66.6667	5.8614	44.3681	73.6842
Board Meeting	9.4603	9.0000	3.4987	3.0000	26.0000
Attendance (%)	92.0259	92.5474	4.7628	76.4705	100.0000

This implies that a majority of the banks only fulfil the minimal requirement of the China Banking Regulatory Commission which requires the firms to adopt one-third of the outside board in order to minimize agency problems. In terms of education level, the average value of 3.09 reflects that on average all directors in China's listed commercial banks have a Master degree, which is considered quite high in education level. About 20 per cent of these directors have an overseas education and about 72 per cent of them holds a professional qualification while about 65 per cent of them are considered politically connected. This high percentage of politically related directors implies that the board is more likely to be affected by politics. The frequency of board meetings on average is 9 times a year, with 92.02 per cent attendance rate on average. The correlations between the continuous variables used in this study are displayed in Table 4. Each of the variables show low variation inflation factor implying no multicollinearity issue.

Hermalin and Weisbach (1998) and Weisbach (1998) pointed out that a key concern for any corporate board analysis is the endogeneity of board and performance. Therefore, we estimate the GMM two-step system estimator with sample size adjusted standard error for potential heteroscedasticity as proposed by Arellano and Bond (1998). We use lagged board diversity at different levels as instruments. In order to test the validity of model

Table 4 Correlation Data

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	VIF
1 Bank size	1.0000																3.22
2. Leverage	0.1276	1.0000															2.02
3. Profitability	-0.1149	-0.3394	1.0000														1.42
4. State Ownership	0.6379	0.0134	0.0470	1.0000													3.02
5. Foreign Ownership	0.6237	0.1196	0.0161	0.4179	1.0000												2.92
6. CEO Remuneration	0.0693	-0.3228	0.0347	-0.3809	-0.0512	1.0000											2.27
7. Board Size	0.1984	-0.1406	0.1625	-0.1537	0.1131	0.3039	1.0000										2.17
8. Independent	0.3746	0.2039	-0.2405	0.1345	0.2692	0.0446	-0.1167	1.0000									1.54
9. Foreign	0.6840	0.0099	-0.0681	0.4801	0.7256	0.1043	0.0538	0.2961	1.0000								2.94
10. Women	0.1327	0.1468	-0.0592	0.1061	0.2261	0.0297	-0.0923	0.1664	0.1425	1.0000							1.19
11. Political	0.1690	-0.1247	0.2093	-0.1472	0.0576	0.2604	0.0578	-0.1584	0.0126	-0.1113	1.0000						1.55
12. Board Edu	0.4133	-0.1072	-0.0383	0.4077	0.3542	0.0579	0.1143	0.1232	0.3408	0.0532	0.1052	1.0000					1.44
13. Oversea Degree	0.7274	-0.2377	0.0142	0.6002	0.5435	0.2022	0.2361	0.1395	0.6450	0.1086	0.1906	0.4425	1.0000				1.82
14. Professional	0.1690	-0.1247	0.2093	-0.1472	0.0576	0.2604	0.0978	-0.1584	0.0126	-0.1113	0.1023	0.1052	0.1906	1.0000			1.36
15. Board Meeting	0.4626	-0.0190	-0.0297	0.3163	0.2611	0.1364	0.1508	0.1649	0.3302	0.1710	0.1443	0.2927	0.4282	0.1443	1.0000		1.42
16. Attendance	0.3158	0.0267	-0.0350	0.0820	0.1863	0.2817	0.0971	0.0473	0.2519	-0.0779	0.0952	0.2230	0.2646	0.0952	0.3113	1.0000	1.35

specification, we refer to the Hansen and Sargen tests on over identification. The Hansen tests show no rejection of the null hypothesis and confirm the validity of the choices of instrument variables.

The estimated coefficients are reported in Table 5 until Table 7. With GMM estimators the results show that five control variables are statistically significant. Bank size, leverage, profitability, state ownership and board size all show a positive and significant relationship with bank efficiency. The other control variables like foreign ownership and CEO remuneration do not affect bank efficiency statistically.

For director's profile, both independent, foreign and political directors all have significant positive impacts on bank efficiency, consistent with previous banking studies such as Andres and Vallelado (2008) and Cornett et al. (2009). The result implies that more and more Chinese banks already realize the role of independent directors on board. Although previous Chinese literature like Li (2013), Sun (2008), Wang (2007) and Xie (2008) pointed out that independent directors were ineffective on board due to the traditional culture of the Chinese which prefer to pursue harmony, however, with China's commercial bank business scope continuing to expand in recent years, challenges in laws, financial security and political complexity from domestic and international market is also increasing, thus appointing more capable independent directors becomes important. These banks have been proactive and regularly disclose the background, responsibility and work and replacement records of their independent directors to maintain corporate image and improve credibility to society. In addition, banks also actively hunt for independent directors from different industries, experience and nationality, especially those from the host country of their foreign businesses as this helps them to hedge against potential foreign business and political risks.

The estimates for foreign directors are positively and statistically significant at 10 per cent, supporting hypothesis 2 and consistent with literature such as Ararat et al. (2010), Choi et al. (2007), Lliev and Roth (2018) and Oxelheim and Randov (2003). Finally, the estimate for women directors is not statistically significant and hence we fail to find statistical support for hypothesis 3. As highlighted by Wang and Clift (2009), such outcome may be due to very few women directors in the test sample.

For directors' human and social capital, Table 6 shows both the board's education level, the directors who have professional qualification and the politically linked directors have significant positive effect on bank efficiency. These results are consistent with Gropper (1991), Ooi et al. (2015), Wincent et al. (2010) and Wincent et al. (2014) which all found that human capital diversity on board could enhance the performance or innovation of firms. The overall effect also indicates the human capital construction level and positive role of China's listed commercial banks has made great progress during this

Table 5 GMM Results on Board Diversity for Director Profile

	(1)	(2)	(3)
Constant	95.4940***	93.7724***	94.1076***
	(0.0000)	(0.0000)	(0.0000)
Bank size	1.6986***	1.3758***	1.3805***
	(0.0001)	(0.0001)	(0.0001)
Leverage	0.5730***	0.6080***	0.5365***
	(0.0040)	(0.0020)	(0.0070)
Profitability	3.5080***	3.1458***	3.2038***
	(0.0001)	(0.0001)	(0.0001)
State Ownership	0.0299***	0.0263***	0.0235**
	(0.0020)	(0.0060)	(0.0130)
Foreign Ownership	0.0207	-0.0291*	-0.0160
	(0.1190)	(0.0680)	(0.2360)
CEO Remuneration	-0.0361	-0.0563	0.0054
	(0.7340)	(0.6110)	(0.9600)
Board Size	0.1839**	0.2364***	0.2116***
	(0.0100)	(0.0001)	(0.0010)
Independent	0.1719***		
	(0.0020)		
Foreign		0.0123*	
		(0.0848)	
Women			-0.0414
			(0.1130)
R^2	0.3061	0.2947	0.3191
Year Dummies	Yes	Yes	Yes
AR (1) test	0.1543***	0.0097*	-0.0085*
	(0.0010)	(0.0674)	(0.0976)
AR (2) test	0.3310	0.2650	0.0612
	(0.1878)	(0.2143)	(0.2580)
Hansen Test	1.3485	0.8743	0.5250
	(0.6867)	(0.8980)	(0.7624)

Note: Standard errors are in parentheses. ***significant at the 1% level, **significant at the 5% level, *significant at the 10% level.

Table 6 GMM Results on Board Diversity for Board's Background Capital Aspect

	(1)	(2)	(3)	(4)
Constant	99.2435***	93.9402***	85.8901***	89.8940***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Bank size	1.3766***	1.4075***	1.5133**	1.4075***
	(0.0001)	(0.0001)	(0.0100)	(0.0001)
Leverage	0.7033***	0.6300***	0.2621**	0.6300***
	(0.0010)	(0.0020)	(0.0257)	(0.0020)
Profitability	3.2478***	3.5054***	3.4280***	3.5054***
	(0.0001)	(0.0000)	(0.0000)	(0.0001)
State Ownership	0.0189*	0.0257***	0.0310***	0.0257***
	(0.0570)	(0.0070)	(0.0010)	(0.0070)
Foreign Ownership	-0.0161	-0.0176	-0.0315	-0.0176
	(0.2420)	(0.2090)	(0.2100)	(0.2090)
CEO Remuneration	-0.0012	0.0186	-0.0881	-0.0186
	(0.9910)	(0.8640)	(0.4150)	(0.8640)
Board Size	0.2518***	0.1914*	0.2166***	0.1914*
	(0.0001)	(0.0522)	(0.0010)	(0.0522)
Board Edu	1.7464***			
	(0.0062)			
Oversea Degree		0.2001		
		(0.1500)		
Professional			0.8886***	
			(0.0050)	
Political				0.1287*
				(0.0746)
R^2	0.3053	0.2952	0.2936	0.2952
Year Dummies	Yes	Yes	Yes	Yes
AR (1) test	1.1420**	0.1072*	0.6340***	0.0833*
	(0.0232)	(0.0898)	(0.0010)	(0.0669)
AR (2) test	1.8422	0.3390	0.5144	0.2280
	(0.6520)	(0.5249)	(0.3208)	(0.4360)
Hansen Test	2.0340	0.7622	1.5473	0.6600
	(0.8410)	(1.3020)	(0.9630)	(0.8762)

Note: Standard errors are in parentheses. ***significant at the 1% level, **significant at the 5% level, *significant at the 10% level.

Table 7 GMM Results on Board Diversity for Board Meeting and Attendance Rate Aspect

	(1)	(2)
Constant	93.6923***	86.4136***
	(0.0000)	(0.0000)
Bank size	1.3963***	1.3148***
	(0.0000)	(0.0000)
Leverage	0.6016***	0.6214***
	(0.0030)	(0.0020)
Profitability	3.2368***	3.3115***
	(0.0001)	(0.0001)
State Ownership	0.0263***	0.0261***
	(0.0060)	(0.0050)
Foreign Ownership	-0.0233	-0.0253
	(0.8400)	(0.5700)
CEO Remuneration	-0.0509	-0.1292
	(0.6420)	(0.2390)
Board size	0.2263***	0.2344***
	(0.0010)	(0.0001)
Board Meeting	0.0272	
	(0.4950)	
Attendance		0.0896***
		(0.0010)
R^2	0.2906	0.3210
Year Dummies	Yes	Yes
AR(1) test	0.0084*	0.0802***
	(0.0442)	(0.0001)
AR(2) test	0.0447	1.0325
	(0.8720)	(0.7700)
Hansen Test	0.1025	0.2450
	(0.9980)	(0.9930)

Note: Standard errors are in parentheses. ***significant at the 1% level, **significant at the 5% level, *significant at the 10% level.

period, it has been effectively providing a variety of options to meet market needs and improve bank efficiency. Column (2) shows a positive relationship with bank efficiency but not significant. This result can be explained due to two reasons, first the knowledge or practical experience from other countries may not be suitable for China's financial market, second with the deepening of globalization, whatever the standards or regulatory requirements of China's financial industry have all gradually begun to integrate with the world. Therefore, the refined knowledge about the financial industry studied by Chinese students whether domestic or overseas is also converging. Finally, on politically linked directors, the estimate is statistically significant at 10 per cent, consistent with previous studies on China, including Chen et al. (2013), He et al. (2019) and Zhu and Xu (2015).

For board diligence, only the meeting attendance is statistically significant at 1 per cent, consistent with Ntim and Osei (2011), Oyerinde (2014) and Taghizadeh and Saremi (2013). This implies that if China's listed commercial banks pay more attention to directors' attendance rate instead of meeting frequency, it could effectively improve bank efficiency. Finally, Table 8 reports the estimations for the comprehensive model, and these estimates are rather consistent with all the other tables.

Table 8 Comprehensive GMM Results on Various Aspects of Board Influence on Bank Efficiency

	(1)
Constant	90.7192***
	(0.0000)
Bank Size	0.08226**
	(0.0320)
Leverage	0.3191*
	(0.0740)
Profitability	3.9798***
	(0.0000)
State Ownership	0.0260***
	(0.0080)
Foreign Ownership	-0.0118
	(0.4660)
CEO Remuneration	-0.0655
	(0.5610)
Board Size	0.2384**
	(0.0414)

Table 8 Continued

	(1)
Independent	0.0353**
	(0.0145)
Foreign	0.0005*
	(0.0997)
Women	-0.0372
	(0.1080)
Political	0.1364*
	(0.0827)
Board Edu	1.4132***
	(0.0094)
Oversea Edu	0.0016
	(0.1750)
Professional	0.0826**
	(0.0140)
Board Meeting	0.0278
	(0.4740)
Attendance	0.0758**
	(0.0470)
R^2	0.3683
Year Dummies	Yes
AR (1) test	1.0536**
	(0.0327)
AR (2) test	2.0622
	(1.0452)
Hansen test	3.8900
	(1.3270)

Note: Standard errors are in parentheses. ***significant at the 1% level, **significant at the 5% level, *significant at the 10% level.

5. Conclusion

In the context of the ongoing bank reform in China after the 2008 financial crisis, this paper examines the effect of corporate directorship and operating efficiency of China's listed commercial banks. We dealt with the three

dimensions of corporate directorship which include director profile, their social and human capital as well as their diligence. We collected data of 28 main listed commercial banks of China from 2010 to 2018. We use GMM estimators to address the concern of endogeneity. On director's profile, we found strong evidences that independent directors and foreign directors have significant positive relationship with bank efficiency, while for social and human capital, we found that directors that have higher education, professional qualifications and politically linked have positive significant impacts on bank efficiency. Finally, on diligence, we also found a positive significant relationship between board meeting attendance and bank efficiency.

Although corporate directorship may play an important role in bank governance, we show that only certain characteristics of directorship are influential for bank efficiency. While a sound corporate governance system is critical for China's banking industry to transform itself into a modern market-oriented financial group, among a series of reforms in the post crisis recovery years, some measures should be given priority. There is a need for the regulators to focus on improving a fair board environment to make sure that independent and foreign directors are highly qualified and have more voice in the meetings as well as joining the meeting. In short, this study shed light on the likely direction and effects of future board reforms. Although this study focused solely on the listed commercial banks in China, we believe our finding is also beneficial to other small commercial banks and listed firms in other sectors.

Notes

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