



Corporate social responsibility and bank financial performance in China: The moderating role of green credit



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ABSTRACT

Most of the existing studies have ignored the moderating role of green credit in the relationship between corporate social responsibility (CSR) and bank financial performance. Using the data of listed banks in China from 2008 to 2018, this paper investigates the impact of CSR on bank financial performance. Moreover, we document the mediating effect of green credit on their relationship. The results show that CSR would make a negative impact on bank financial performance in the short term. However, this relationship turns out to be positive in the long run. Besides that, green credit does play an important role in this relationship. Furthermore, we do a series of heterogeneity tests. Our conclusion would be useful both to the following researchers and the establishment of environmental policies.

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1. Introduction

In recent years, corporate social responsibility (CSR) has garnered much interests from both enterprises and the academia. The financial performance is a crucial factor when managers decide whether or not to undertake social responsibilities (Zhu et al., 2016). Many researchers have explored the link between CSR and firm financial performance. And they formed two completely opposing views on this issue which support both the positive and negative influence of CSR (Edmans 2011; Krüger 2015; Flammer 2015; Saeidi et al. 2015). However, most of the aforementioned studies have focused on non-financial enterprises, and there is relatively little work on banks. Since banks industry has been playing an important role in country's economic development (Shen and Lee, 2006), it is necessary to further investigate the impact of CSR on bank financial performance.

Some new features have emerged in banking industry in the past decade, and more and more emphases have been put on the environmental responsibility of banks. This phenomenon is more prominent in China. For example, the Chinese government has been pushing green credit policy from 2012 to fight against the environmental

pollution. This policy requires banks to provide a green channel when lending to eco-friendly enterprises. By doing this, the lenders can transmit the idea of sustainable development to the debtors and force the later to take more eco-friendly actions (Jeucken 2002). With the rapid development of green credit, its influence has become increasingly apparent. Actually, some researchers have studied the impact of green loans on bank financial performance, e.g. Scholtens and Dam (2007), Cilliers (2012), Richardson (2014). However, they give little attention to the moderating role of green loans in the relationship of CSR and bank financial performance. Therefore, a further exploring for this question is valuable, and it is the main question addressed in this paper.

This paper differs from previous studies in several aspects. First, we reveal the moderating role of green loans. This paper regards the environment as a potential stake holder of banks basing on the stakeholder theory. Accordingly, we further investigate the moderating mechanism of green credit on CSR and bank financial performance. Second, we measure the CSR of banks more objectively. This study constructs the CSR index of banks by using the method of principal component analysis. This method can overcome the shortcomings of subjectivity which exists in the previous studies. It will measure the CSR of banks more objectively. Third, we measure the CSR of banks more comprehensively. Compared with the existing studies which measures the CSR with a single financial indicator, this paper covers 10 different indicators when constructing the CSR index. For example, it includes the indicators of bank growth ability, profit quality, risk control, and so on. Thus, the index we construct in this paper is more comprehensive.

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The remainder of this paper is structured as follows. Section 2 is the literature review. Section 3 presents the data, main variable and empirical model. Section 4 provides and analyses the empirical results. Finally, Section 5 concludes this paper.

2. Literature review

There are two strands of existing literature which are related to our study. The first one mainly refers to the research on the impact of CSR on firm financial performance, and the second one concerns the relationship between green credit and firm financial performance.

2.1. CSR and bank financial performance

Although there are many researchers who have been conducting the studies on the relationship between social responsibility and financial performance since the 1970s, no consensus has been reached yet.

Some studies argue that there is a positive correlation between social responsibility and financial performance (Barnett and Salomon 2006; Van Dijken, 2007; Galema et al. 2008; Ahamed et al. 2014). Based on the perspective of CSR, the existing research has studied the mediating effect of CSR on the relationship between CSR governance and financial performance. Wang and Sarkis (2017) find that whether the top 500 green enterprises in the United States successfully implement CSR governance to produce good CSR performance has an important impact on their financial performance. The disclosure of CSR has a significant positive correlation with the financial performance of Islamic banks in GCC member countries. Furthermore, there is a positive correlation between the disclosure of CSR and the future financial performance of Islamic banks in GCC. It indicates that the current CSR activities of Islamic banks in GCC may have a long-term impact on their financial performance (Platonova et al., 2018). Studies have found that when the competition among companies is intense, CSR activities will improve the company's financial performance (Kim et al. 2018). Using the data of 28 listed banks in India on the Bombay Stock Exchange for 10 years, Maqbool and Zameer (2018) empirically analyze the impact of CSR on the financial performance of Indian banks.

On the contrary, some scholars believe that there is a negative correlation between social responsibility and financial performance (Brammer et al. 2006). Esteban-Sanchez et al. (2017) adopt the data from 154 financial institutions in 22 countries from 2005 to 2010 to investigate the impact of CSR on enterprise financial performance. Specially, their study pays more attention to the period of the 2008 global financial crisis. The results show that the financial crisis plays a negative role in the relationship of them, and makes the relationship to transform from positive to negative. In addition, empirical analysis finds that irresponsible enterprises have longer durability than socially responsible enterprises, and companies that rarely engaging in CSR activities have better financial performance than those engaging in high-level CSR activities (Price and Sun, 2017).

Besides that, some scholars believe that there is a U-shaped relationship between CSR and financial performance. Specifically, corporates with low-level environmental performance are negatively correlated with financial performance, on the meanwhile, corporates with high-level environmental performance are positively correlated with financial performance (Brammer and Millington 2008; Barnett and Salomon, 2012). For example, Trumpp and Guenther (2017) study the relationship between corporate environmental performance and corporate financial performance basing on the international sample of 2361 companies from 2008 to 2012. The empirical results show that there is a U-shaped relationship between carbon performance and profitability, as well as between waste intensity and profitability.

However, some scholars also believe that social responsibility has no influence on firm financial performance (McWilliams and Siegel, 2000; Newell and Lee, 2012; Kim and Choi 2013). Research results show that different CSR have different influences on corporate strategy and hence

on corporate financial performance, but CSR has no significant influence on corporate financial performance in general (Theodoulidis et al. 2017). Empirical results show that there is no direct correlation between CSR and financial performance, which is completely dominated by customer satisfaction, and a good institutional environment can significantly enhance the impact of CSR on customer satisfaction (Xie et al. 2017). Based on the analysis of Sustainability Reports of 100 American Companies which possess the best performance, Hussain et al. (2018) study the relationship among sustainable development performance, sustainable information disclosure and financial performance. The results show that different secondary indicators of sustainable development performance have different impacts on financial performance, but the overall impact of sustainable development performance on financial performance is nonsignificant.

To sum up, the relationship between social responsibility and financial performance is still controversial. The main reason lies in the fact that existing studies ignore the difference between long-term and short-term impact. Specifically, banks have limited resources in the short term, so they have to pay a certain financial cost to undertake social responsibility, and if banks invest too much in social responsibility, it may directly have a certain negative impact on their normal operation (Hillman and Keim 2001), thus may have a negative impact on its short-term financial performance. However, in the long run, the banks' responsibility to the government is conducive to the establishment of a good relationship between the bank and the government, thereby obtaining government support (Waddock and Graves, 1997); Banks' responsibility to its employees' can enhance the cohesion and work enthusiasm of employees, thereby enhancing its competitive advantage (Becker and Gerhart 1996); Banks' responsibility to shareholders is conducive to increasing shareholders' trust in banks, improving shareholders' interests and attracting new shareholders, which is conducive to the long-term development of banks (Ferrell et al., 2016); Banks actively undertake the social responsibility to depositors and lenders is conducive to improve the loyalty and satisfaction of depositors and lenders, and increasing the integrity of banks, so as to maintain a good relationship with lenders and depositors, which is conducive to the long-term development of the bank; Banks' social responsibility in public welfare undertakings is conducive to the establishment of a good image in the society, and can convey to the outside world the signal of the bank's good operation, which is conducive to attracting more investors, lenders and depositors, and ultimately leading to the improvement of its long-term financial performance.

2.2. The mediating effect of green credit

There are abundant studies on the impact of green credit on the financial performance of commercial banks. Most of these studies argue that green credit could improve the financial performance of banks (Rochlin et al. 2005; Cilliers 2012; Richardson 2014). Specially, some researchers explore this question by adopting evidences from China. For example, through an empirical test, Zhang (2018) shows that green credit has a positive impact on bank financial performance. Based on the perspective of credit risk, Cui et al. (2018) discuss the impact of China's green credit policy. Their results show that the green credit policy would reduce the non-performing loan ratio of banks by improve the ration of green loans in the total loans. Through the research on the relationship among eco-friendly actions, green performance and corporate financial performance, Chen et al. (2018) find that eco-friendly actions could make a positive impact on green performance, and then on its financial performance. Besides that, by adopting the data of CSR scores and various financial indicators from 119 Chinese listed companies from 2010 to 2016, He et al. (2019) show that green credit could enhance social responsibility of the debtors, and eventually increase its profitability.

These studies aforementioned fully recognize the importance of green credit to financial performance of enterprises. Unfortunately,

they ignore the possible mediating effect of green credit to CSR and financial performance. It is need to point out that we adopt the definition of CSR from Aguinis (2011) throughout this paper. Aguinis (2011) views CSR as an expectation from stakeholders of the enterprises which accounts for the triple bottom line of economics, society and environment. Rupp (2011) and other researchers also use this definition. According to this definition, green credit should be view as a part of CSR. Specifically, since green credit originates from the protection of environment, it is closely related to the government, the depositors, the borrowers, and other stakeholders. For this reason, it should make a difference to the relationship of CSR and bank financial performance. The reasons are as follows. Compared with other green actions, green credit can be quantified more easily. The existing literatures pay more attention to the manufactural enterprises (e.g. He et al., 2019). When evaluating a non-financial enterprise's environmental responsibility, we mainly estimate whether its production modes are eco-friendly or not. This process is more subjective and difficult to measure. Thus, the stakeholders cannot make a precise judgement. It is quite different when we refer to the banks. Since the green loan is a precise number, a bank which lending more green loans will win much more reputation, trust, and support from the stakeholders, especially from the government. This phenomenon is more prominent in China. Because the Chinese government would tend to give more implicit guarantee to banks which undertake more CSR. Green loans could help the government identify these banks more precisely. Therefore, it makes sense that green credit might make a positive impact on the relationship between CSR and bank financial performance. That might be true at least in China.

There might big differences in the impact of bank social responsibility on its financial performance among different properties and periods. In China, the five biggest commercial banks are state owned. It is a commonsense that the five-big banks have been vital to the economic development of China. On the meanwhile, the joint-stock commercial banks have been playing a secondary role. The business operations of state-owned banks are relatively stable and can get more policy support. On the contrary, the start up times of joint-stock commercial banks are much later than the stated-owned and get less support from the government. All these factors let to different stages of development, external resources, and management philosophy, and the impact the relationship between CSR and its financial performance. Apart from that, the green credit policy of China makes a big difference to the relationship. This policy was implemented in 2012 which required banks to lend more green loans. It refuses to grant credit to companies or projects that do not comply with environmental performance. At the same time, green credit policy clarifies the supervision responsibilities of the China Securities Regulatory Commission and banking regulatory agencies, which indicating that green credit has entered a standardized and institutionalized process. It has Also conveyed to the public the determination of government departments to govern the environment. Therefore, there are differences in social awareness, government supervision, and the level of banks' attention on social responsibility before and after the implementation of the China's green credit policy. Thus, the relationship between social responsibility, green credit and bank financial performance may be different. It is crucial to point out that though this policy was announced in 2012, it did be pushed in 2013. Based on the above analysis, it is necessary to further consider the heterogeneity before 2013 and after 2013. It could be helpful to better understand the research issue of our study.

According to the theoretical analysis above, we propose three hypotheses as follows.

Hypothesis 1. CSR makes a negative effect on bank financial performance at least in the short term.

Hypothesis 2. Green credit plays a moderating role in the relationship between CSR and bank financial performance.

Hypothesis 3. Green credit has different influences on the relationship between CSR and bank financial performance according to different properties and periods.

3. Research design

3.1. Data source and description

In this paper, 5 big state-owned banks and 7 joint-stock banks are selected as samples. These state-owned commercial banks have covered all the big state-owned commercial banks in China. As the most important bank in China, state-owned banks undertake the largest part of social responsibility. At the same time, CSR also has a more obvious impact on its business modes. Therefore, it is more representative to select state-owned commercial banks as the research samples. In this paper, the seven selected joint-stock commercial banks are also regional important banks, their business is generally concentrated in a region. They have an important social responsibility to the region, so it is a supplement to state-owned banks to select them as research samples. At the same time, it can also explain the differences between joint-stock banks and state-owned banks in the construction of CSR.

The sample interval of this paper is from 2008 to 2018, a total of 11 years data. The social responsibility data of banks comes from the annual reports and corporate social responsibility reports of banks. The financial performance indicators and control variable data are derived from the annual financial statements of banks. The green credit data are from the annual corporate social reports.

3.2. Construction of bank social responsibility indicators

3.2.1. Selection of bank social responsibility indicators

According to the stakeholder theory, this paper divides the stakeholders into six categories. It contains shareholders, employees, depositors, lenders, government and society. For different stakeholders, this paper adopts different indicators to measure them, as shown in Table 1.

3.2.2. Determination of the weight of bank social responsibility

Most of the previous studies use AHP, reputation index and Carroll model to build CSR indicators. However, these three commonly used methods have been more or less subjective, which are easily affected by subjective factors and are not objective enough. In order to overcome these shortcomings, principal component analysis method is applied in this paper. Principal component analysis is a statistical dimensionality reduction method which is based entirely on real data. Therefore, principal component analysis is more objective. In this paper, each indicator's weight is determined according to the information it contains. This purpose can be accomplished by using the method of principal component analysis.

(1) Adopt principal component analysis to determine the weight of each index

Firstly, the primary weight model (namely the principal component model) is determined:

$$\begin{cases} F_1 = f_{11}x_1 + f_{12}x_2 + \dots + f_{1n}x_n \\ F_2 = f_{21}x_1 + f_{22}x_2 + \dots + f_{2n}x_n \\ \dots \\ F_m = f_{m1}x_1 + f_{m2}x_2 + \dots + f_{mn}x_n \end{cases} \quad (1)$$

In this formula, F_1, F_2, \dots, F_m is the m principal components obtained by using principal component analysis; f_{ij} is the initial factor load; x_i is the i th index (after standardization).

Table 1
Influence factors of bank social responsibility.

| Stakeholder | Variable | Symbol | Calculation |
|-------------|---------------------------------------|--------|--|
| Shareholder | Dividend payment rate | DPR | Dividend per share/EPS |
| Staff | Staff expense rate | WR | Management expenses/operating income |
| Depositor | Interest payment rate | IER | Interest expense/operating income |
| Lender | Top 10 customer loan ratio | LIO | Total loans/loans from top ten customers |
| Government | Tax proportion | TR | Income tax/business income |
| Society | Proportion of public welfare donation | DR | Public donation/business income |

Secondly, the initial factor load is converted into the decision matrix coefficient:

$$u_{ij} = \frac{f_{ij}}{\sqrt{\lambda_j}} \quad (2)$$

In this formula, u_{ij} is the decision matrix coefficient; f_{ij} is the initial factor load; λ_j is the characteristic root of the j th principal component equation.

$$F_z = \sum_{j=1}^m (\lambda_j/\kappa) F_j = a_1x_1 + a_2x_2 + \dots + a_nx_n \quad (3)$$

$$\kappa = \lambda_1 + \lambda_2 + \dots + \lambda_m \quad (4)$$

Finally, the weight of each index can be obtained as follows:

$$w_i = a_i / \sum_{i=1}^m a_i \quad (5)$$

(2) The weighted results of principal component analysis

Since this paper selects six indicators that can represent the interests of stakeholders, the principal component analysis method will obtain at most six principal components, the results are shown in Table 2 below.

According to the above weighting method, the eigenvalues of the six principal components are calculated. Then the weights of the six social responsibility indexes are calculated. Based on the calculation results, the distribution weights among shareholders, employees, depositors, lenders, government and society are 43.73%, 20.26%, 12.06%, 11.66%, 6.89% and 5.40% respectively. It can be seen from these weights that the proportion of shareholders in commercial banks is the largest, which indicates that as long as banks maximize their own goals, they will realize nearly half.

of their social responsibilities. Secondly, the employees of commercial banks are the most important. Since banks are financial services and light asset industries, their biggest asset is the employee. Thus, it is very important to bear the responsibility to the employee. Moreover, the depositors and the lenders of banks have more weights. Compared with the lenders, the depositors have even more weights. This is because the most fundamental way of banks to make profits is to absorb deposits and make loans. Deposits account for more than 90% of the bank liabilities. There is a rigid demand of banks for deposits. Therefore, the interests of depositors should be considered first. Finally, government and society are the two stakeholders with the least weight. Due

Table 2
Results of principal component analysis of bank social responsibility.

| | Comp.1 | Comp.2 | Comp.3 | Comp.4 | Comp.5 | Comp.6 |
|-----|--------|--------|--------|--------|--------|--------|
| DPR | 0.399 | 0.371 | 0.495 | 0.231 | 0.593 | 0.230 |
| IER | -0.135 | -0.695 | -0.112 | -0.226 | 0.612 | 0.245 |
| LIO | -0.509 | 0.366 | 0.073 | -0.356 | 0.407 | -0.556 |
| WR | -0.594 | 0.280 | 0.128 | -0.109 | -0.121 | 0.726 |
| TR | 0.215 | 0.405 | -0.827 | -0.081 | 0.248 | 0.194 |
| DR | -0.405 | -0.057 | -0.192 | 0.866 | 0.177 | -0.116 |

to the income tax of corporate is mandatory, government plays a more important role in CSR than society. Its weight is naturally bigger. It can be seen that the above weights of CSR among different stakeholders are practical and persuasive. According to these weights, this paper constructs the corporate social responsibility index of Chinese commercial banks and denotes it as CSR.

3.3. Construction of bank financial performance indicators

3.3.1. Selection of bank financial performance indicators

For the selection of bank financial performance indicators, most studies use a single indicator, e.g. ROA (return on assets), ROE (return on equity), or Tobin-Q, to measure bank financial performance. While a single indicator could be easily applied, it cannot describe the financial performance comprehensively. Therefore, taking into account growth ability, profitability, profit quality and risk control, this paper uses 10 financial indicators to measure the overall financial status of banks. These indicators have been shown in Table 3.

3.3.2. Principal component analysis of bank financial performance indicators

Although we have selected ten representative indicators of bank financial performance, they are highly related. For example, there is a strong positive correlation between return on total assets and return on equity. Also, there is a strong negative correlation between return on total assets and non-performing asset ratio of banks. If these indicators are directly taken as independent variables, multicollinearity will inevitably occur which will result in a large deviation in the last estimated results. Therefore, this paper adopts principal component analysis to reduce the dimensions of these variables, and constructs variables that have no correlation with each other. The results of principal component analysis are shown in Table 4.

It can be seen from the results of principal component analysis that the cumulative interpretation degree of the first four principal components reaches 75.5%. Therefore, the first four principal components are selected as the analysis objects in this paper. The first principal component f1 is highly correlated with the growth rate of total assets, net assets, operating income and operating profit. Therefore, this paper defines the first principal component f1 as the growth capacity factor of banks. The second principal component f2 is highly correlated with the return on total assets and return on net assets, so it is defined as the profitability factor of banks in our study. The third principal component f3 has the greatest correlation with earnings per share, so it is defined as the earnings quality factor of banks. The fourth principal component f4 is highly correlated with the liquidity ratio, non-performing asset ratio and core asset adequacy ratio of commercial banks, so it is defined as the risk control factor of banks.

3.4. Selection of regression variables

The selection of financial performance indicators comes from the use of principal component analysis to extract the information of 10 variables, which are used as explained variables. In this paper, two variables

Table 3
Financial performance indicators of commercial banks.

| Variable | Financial performance | Code | Calculation |
|---------------------|----------------------------------|----------|--|
| Growth ability | Growth rate of total assets | TAGROWTH | Total assets at the end of this year/total assets at the end of last year-1 |
| | Growth rate of net assets | NAGROWTH | Net assets at the end of this year/net assets at the end of last year-1 |
| | Growth rate of operating revenue | OIGROWTH | Current year's operating revenue/previous year's operating revenue-1 |
| Profitability | Operating profit growth rate | OPGROWTH | Operating profit of this year/operating profit of last year-1 |
| | Return on total assets | ROA | Net profit/total assets |
| | Return on equity | ROE | Net profit/net assets |
| Quality of Earnings | Earnings per share (diluted) | EPS | Net profit/total equity |
| Risk Management | Liquidity ratio | LR | Current assets/liabilities |
| | Nonperforming asset ratio | NPL | Total non-performing assets at the end of the year/total assets at the end of the year |
| | Core capital adequacy ratio | CCAR | Total core capital/weighted risk assets |

closely related to the research object, social responsibility index and green credit rate, are selected as explanatory variables. When selecting control variables, this paper selects bank size. Since bank size has a significant impact on financial performance, large state-owned banks are better than small and medium sized banks in terms of profitability, profit quality and risk control. Second, asset-liability ratio is selected. Small and medium sized banks are more aggressive due to higher cost of obtaining deposits, lower profitability and more fragile risk control ability than large state-owned banks. Finally, an index at the macro-level is selected as the control variable. The reason we choose the growth of M2 instead of GDP is that bank costs and earnings are more easily affected by monetary policy. Accordingly, all these variables in our study are shown in Table 5.

3.5. Empirical models

Firstly, we set up the following empirical model to investigate the impact of CSR on bank financial performance.

$$Performance_{i,t} = \alpha_0 + \beta_1 Performance_{i,t-1} + \beta_2 CSR_{i,t} + \beta_3 \ln(Size_{i,t}) + \beta_4 Lev_{i,t} + \beta_5 M2_{i,t} + \varepsilon_{i,t} \tag{6}$$

In this formula, the explained variable $Performance_{i,t}$ ($i = 1,2,3,4$) respectively represents the growth ability f1, profitability f2, profit quality f3 and risk control f4 of banks. $Performance_{i,t-1}$ is a lag period variable of bank financial performance. $CSR_{i,t}$ represents the social responsibility value of the i th commercial bank in year t .

Secondly, a model of moderating the relationship between green credit and CSR and financial performance of commercial banks is constructed. The moderating effect of green credit on the relationship between bank social responsibility and financial performance is shown in the following aspects. If banks could actively expand green credit business which means banks increase investment in environmental protection and bears more social responsibilities. If social responsibility had a positive impact on the performance of banks, the positive impact of green credit would be more

Table 5
Regression variables.

| Type | Variable | Variable definition | Variable symbols |
|----------------------|-----------------------|-------------------------------------|------------------|
| Explained variable | Financial performance | Growth ability | f1 |
| | | Profitability | f2 |
| | | Quality of Earnings | f3 |
| | | Risk Management | f4 |
| Explanatory variable | Social responsibility | Social responsibility indicators | CSR |
| Regulatory variable | Green credit | Green credit rate | GC |
| Control variable | Bank size | Size of bank assets | Size |
| | Asset liability ratio | Ratio of bank assets to liabilities | Lev |
| | M2 growth rate | M2 growth rate | M2 |

significant. If social responsibility had a negative impact on the performance of banks, the negative impact of social responsibility would be also more significant. Therefore, green credit tends to act as a meditating variable rather than an intermediary variable of bank social responsibility. The panel data model of the mediating effect of green credit on the relationship between social responsibility and bank financial performance is set up as follows.

$$Performance_{i,t} = \alpha_0 + \beta_1 Performance_{i,t-1} + \beta_2 CSR_{i,t} + \beta_3 GC_{i,t} + \beta_4 CSR_{i,t} * GC_{i,t} + \beta_5 Size_{i,t} + \beta_6 Lev_{i,t} + \beta_7 M2_{i,t} + \varepsilon_{i,t} \tag{7}$$

In this formula, $GC_{i,t}$ is the proportion of green credit in the total loans of the i th commercial bank in year t ; $CSR_{i,t} * GC_{i,t}$ is the cross production of CSR and green credit. In this paper, we mainly pay attention to the significance of the coefficient β_3 . If it was significant, it would mean that green credit plays a moderating role in the relationship between CSR and bank financial performance.

Table 4
Results of Principal component analysis of bank financial indicators.

| Variable | f1 | f2 | f3 | f4 | f5 | f6 | f7 | f8 | f9 | f10 |
|------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| ROA | 0.192 | 0.618 | -0.072 | 0.186 | 0.381 | 0.134 | -0.076 | -0.008 | -0.061 | -0.607 |
| ROE | 0.436 | 0.141 | 0.030 | 0.049 | 0.404 | 0.224 | -0.320 | -0.163 | 0.263 | 0.612 |
| EPS | 0.089 | 0.068 | 0.859 | -0.124 | 0.177 | -0.337 | 0.047 | 0.292 | 0.039 | -0.019 |
| TAGROWTH | 0.365 | -0.271 | -0.037 | -0.009 | 0.210 | 0.443 | 0.598 | 0.378 | -0.227 | 0.014 |
| NAGROWTH | 0.231 | -0.427 | -0.057 | 0.474 | 0.287 | -0.470 | 0.210 | -0.379 | 0.134 | -0.168 |
| OIGROWTH | 0.407 | 0.018 | 0.003 | 0.359 | -0.342 | -0.173 | -0.338 | 0.172 | -0.635 | 0.108 |
| OPGROWTH | 0.420 | 0.036 | -0.107 | 0.085 | -0.474 | -0.051 | -0.007 | 0.345 | 0.655 | -0.171 |
| LR | -0.247 | -0.018 | 0.425 | 0.621 | -0.237 | 0.519 | 0.034 | -0.182 | 0.113 | -0.003 |
| NPL | -0.322 | -0.342 | -0.147 | 0.252 | 0.366 | 0.033 | -0.447 | 0.585 | 0.102 | -0.081 |
| CCAR | -0.268 | 0.468 | -0.197 | 0.371 | 0.041 | -0.313 | 0.416 | 0.278 | 0.041 | 0.425 |
| Cumulative | 0.374 | 0.550 | 0.663 | 0.755 | 0.835 | 0.892 | 0.937 | 0.973 | 0.995 | 1.000 |

Table 6
Summary statistics.

| Variables | Mean | Median | Standard deviation | Min | Max |
|---------------------------------------|------------|------------|--------------------|----------|-------------|
| Return on total assets | 1.087 | 1.116 | 0.204 | 0.464 | 1.475 |
| Return on equity | 18.060 | 18.105 | 4.322 | 10.645 | 35.772 |
| Earnings per share | 1.131 | 0.840 | 0.767 | 0.198 | 3.194 |
| Growth rate of total assets | 15.959 | 14.435 | 9.487 | -4.272 | 44.096 |
| Growth rate of net assets | 22.013 | 16.933 | 19.365 | -13.652 | 139.918 |
| Growth rate of operating revenue | 15.450 | 13.036 | 13.035 | -10.893 | 50.394 |
| Operating profit growth rate | 15.486 | 11.182 | 17.797 | -32.766 | 66.855 |
| Liquidity ratio | 43.993 | 43.550 | 8.398 | 27.600 | 67.280 |
| Nonperforming asset ratio | 1.316 | 1.315 | 0.550 | 0.380 | 4.320 |
| Core capital adequacy ratio | 9.474 | 9.280 | 1.499 | 5.030 | 12.890 |
| Dividend payment rate | 0.241 | 0.267 | 0.091 | 0.024 | 0.439 |
| Staff expense rate | 0.686 | 0.668 | 0.198 | 0.384 | 1.187 |
| Interest payment rate | 0.188 | 0.165 | 0.074 | 0.100 | 0.482 |
| Top 10 customer loan ratio | 0.317 | 0.312 | 0.051 | 0.213 | 0.449 |
| Tax proportion | 0.100 | 0.105 | 0.025 | 0.004 | 0.140 |
| Proportion of public welfare donation | 0.001 | 0.000 | 0.001 | 0.000 | 0.008 |
| Green credit ratio | 3.777 | 3.502 | 2.214 | 0.278 | 9.079 |
| Total assets | 77,317.150 | 53,869.290 | 67,345.060 | 7316.370 | 276,995.400 |
| Asset liability ratio | 92.463 | 93.600 | 4.834 | 67.527 | 96.815 |
| M2 | 14.727 | 13.533 | 4.948 | 8.275 | 26.498 |

4. Empirical results

The section includes descriptive statistics, benchmark regression, endogeneity test, robustness test and heterogeneity test.

4.1. Summary statistics

Table 6 reports the summary statistics for the whole sample.

As shown in Table 6, during the sample period, the average return on total assets and return on equity of China's listed banks are relatively high which indicates they have high profitability. Average earnings per share is greater than 1 which indicates a higher quality of earnings. The growth rate of average total assets is above 15%, the growth rate of net assets above 20%, the growth rate of operating income and operating profit both above 15%. All these indicate that listed banks have high growth potential. The liquidity ratio and core capital adequacy ratio are both high, on the while, the non-performing capital ratio is low. It indicates that the listed banks have a strong risk control ability.

Table 7
Influence of CSR on bank financial performance.

| | (1) | (2) | (3) | (4) |
|-----------------|----------------------|---------------------|---------------------|----------------------|
| | Growth f1 | Profitability f2 | Profit quality f3 | Risk control f4 |
| CSR | -0.061*** (0.022) | -0.029** (0.014) | 0.025** (0.010) | -0.047*** (0.018) |
| Lf1 | 0.641*** (0.061) | | | |
| Lf2 | | 0.597*** (0.050) | | |
| Lf3 | | | 0.390*** (0.082) | |
| Lf4 | | | | 0.088 (0.079) |
| Size | -0.302** (0.138) | 0.203** (0.086) | 0.387* (0.215) | 0.162 (0.104) |
| Lev | 0.000 (0.021) | -0.005 (0.013) | 0.000 (0.019) | -0.016 (0.017) |
| M2 | 0.089*** (0.020) | 0.003 (0.013) | -0.024 (0.015) | -0.039** (0.016) |
| Constant | 3.667 (3.067) | -0.728 (1.936) | -4.637 (2.851) | 1.660 (2.453) |
| Observations | 120 | 120 | 120 | 120 |
| Number of banks | 12 | 12 | 12 | 12 |

Standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

4.2. Benchmark regression

In the benchmark empirical model, this paper examines the impact of bank social responsibility on its financial performance. The results are presented in Table 7. The moderating effect of green credit on CSR and bank financial performance are reported in Table 8.

As shown in Table 7, the influence of corporate social responsibility on the growth ability and risk control ability of commercial banks is significant at the 1% significance level. It indicates that corporate social responsibility has a significant negative impact on them. The influence of corporate social responsibility on the profitability of commercial banks is significant at the level of 5% which indicates that corporate social responsibility has a significant negative influence on the profitability of banks. The influence of corporate social responsibility on the profit quality of banks is significant at 5% significance level which indicates that

Table 8
Mediating effect of the green credit.

| | (1) | (2) | (3) | (4) |
|-----------------|----------------------|---------------------|----------------------|----------------------|
| | Growth f1 | Profitability f2 | Profit quality f3 | Risk control f4 |
| CSR | -0.130*** (0.042) | -0.054** (0.026) | 0.003 (0.017) | -0.107*** (0.032) |
| Lf1 | 0.630*** (0.061) | | | |
| Lf2 | | 0.600*** (0.051) | | |
| Lf3 | | | 0.816*** (0.049) | |
| Lf4 | | | | -0.129* (0.073) |
| GreenCredit | -0.675** (0.339) | -0.241 (0.214) | -0.058 (0.136) | -0.823*** (0.258) |
| CSR*GreenCredit | 0.022** (0.011) | 0.008 (0.007) | 0.002 (0.004) | 0.024*** (0.008) |
| Size | -0.287* (0.160) | 0.207** (0.096) | -0.105 (0.076) | -0.496 (0.394) |
| Lev | 0.002 (0.021) | -0.005 (0.013) | 0.004 (0.009) | 0.014 (0.036) |
| M2 | 0.087*** (0.020) | 0.002 (0.013) | -0.036*** (0.009) | -0.100*** (0.029) |
| Constant | 5.448 (3.387) | -0.068 (2.116) | 1.230 (1.505) | 9.119* (5.361) |
| Observations | 120 | 120 | 120 | 120 |
| Number of banks | 12 | 12 | 12 | 12 |

Standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

corporate social responsibility has a significant positive influence on the profit quality of commercial banks.

It can be seen from Table 8 that from the perspective of the growth ability of commercial banks, the interaction between corporate social responsibility and green credit of commercial banks is significant at a 5% significance level, which indicates that green credit has a significant positive adjustment effect on bank social responsibility and its growth ability. Specifically, green credit can alleviate the negative impact of commercial banks on their own growth ability due to bearing social responsibility. From the perspective of profitability, the interaction term between bank corporate social responsibility and green credit is positive which indicates that green credit can alleviate the negative impact of bank social responsibility on its profitability to some extent. However, that effect is not statistically significant. Besides that, while the coefficient of the interaction term is positive from the perspective of profit quality, it is also not statistically significant. Furthermore, from the perspective of risk control, the interaction between bank corporate social responsibility and green credit is significantly positive, indicating that green credit can significantly alleviate the negative impact of bank social responsibility on its risk control. In other words, green credit has a significant moderating effect.

4.3. Endogeneity test

In order to tackle with the possible endogeneity problem, we adopt the lag term of bank social responsibility into the model as a proxy variable of CSR. The test results of the benchmark regression are shown in Table 9, and the test results of the model of mediating effect are reported in Table 10.

As can be seen from Table 9, the influence of the lag term of bank social responsibility on bank growth ability is significant at the 5% significance level. It indicates that the positive influence of corporate social responsibility on the growth ability of banks is delayed and only appears in the second period. The negative impact of corporate social responsibility on the profitability of commercial banks is not significant at the level of 10% which indicates that the negative impact of corporate social responsibility on the profitability of commercial banks might become insignificant after the first period. The influence of the lag period of CSR on the profit quality of commercial banks is not significant at the level of 10% indicating that the positive influence of CSR on the profit quality of commercial banks might become insignificant in the second

Table 9
Endogenous test of the main regression.

| | (1) | (2) | (3) | (4) |
|-----------------|----------------------|----------------------|---------------------|----------------------|
| | Growth f1 | Profitability f2 | Profit quality f3 | Risk control f4 |
| LCSR | 0.060** (0.026) | -0.004 (0.014) | 0.009 (0.010) | -0.015 (0.022) |
| Lf1 | 0.296*** (0.072) | | | |
| Lf2 | | 0.409*** (0.047) | | |
| Lf3 | | | 0.415*** (0.083) | |
| Lf4 | | | | -0.128 (0.078) |
| Size | -5.502*** (0.685) | -2.060*** (0.303) | 0.385 (0.239) | -0.827* (0.445) |
| Lev | 0.090* (0.047) | 0.014 (0.026) | 0.006 (0.019) | 0.006 (0.038) |
| M2 | -0.232*** (0.046) | -0.167*** (0.024) | -0.027 (0.017) | -0.100*** (0.035) |
| Constant | 53.275*** (8.394) | 23.952*** (4.010) | -4.581 (3.038) | 10.319* (5.872) |
| Observations | 120 | 120 | 120 | 120 |
| Number of banks | 12 | 12 | 12 | 12 |

Standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 10
Endogeneity test of the mediating model.

| | (1) | (2) | (3) | (4) |
|--------------------|----------------------|---------------------|----------------------|----------------------|
| | Growth f1 | Profitability f2 | Profit quality f3 | Risk control f4 |
| CSR | -0.124*** (0.040) | -0.049* (0.025) | 0.004 (0.016) | -0.108*** (0.031) |
| Lf1 | 0.630*** (0.061) | | | |
| Lf2 | | 0.599*** (0.050) | | |
| Lf3 | | | 0.817*** (0.049) | |
| Lf4 | | | | -0.105 (0.074) |
| L.GreenCredit | -0.653** (0.333) | -0.190 (0.210) | -0.043 (0.133) | -0.782*** (0.262) |
| CSR *L.GreenCredit | 0.021* (0.011) | 0.006 (0.007) | 0.002 (0.004) | 0.023*** (0.008) |
| Size | -0.259 (0.161) | 0.210** (0.100) | -0.116 (0.078) | -0.480 (0.430) |
| Lev | 0.004 (0.021) | -0.005 (0.013) | 0.004 (0.009) | 0.014 (0.037) |
| M2 | 0.086*** (0.020) | 0.002 (0.013) | -0.035*** (0.009) | -0.098*** (0.030) |
| Constant | 4.894 (3.360) | -0.284 (2.116) | 1.324 (1.489) | 8.891 (5.588) |
| Observations | 120 | 120 | 120 | 120 |
| Number of banks | 12 | 12 | 12 | 12 |

Standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

period. The effect of the lag period of CSR on risk control of commercial banks is nonsignificant at the level of 10%, which indicates that the negative effect of CSR on risk control of commercial banks might be not significant after the first period.

Combining both Table 7 and Table 9, we can infer that CSR has a significant negative impact on the growth capacity of commercial banks in the first period. However, this effect will not last long. It will turn around and become positive in the next period. This shows that in the short term, CSR has a negative impact on the growth rate of banks, but this effect is temporary. In the long run, this negative effect will be eliminated and turned into a positive effect on the bank financial performance. Although corporate social responsibility has a significant negative impact on the profitability and risk control of commercial banks in the short term, in the long term, this negative impact will gradually disappear.

The results of the second endogeneity test are reported in Table 10. We could see that the interaction term of the lag of green credit and the lag of bank social responsibility is significant at 10% statistical level when it refers to the bank growth ability. It illustrates that the lag term of green credit has a mediating effect on the relationship between corporate social responsibility and bank growth ability. On the same time, we could also find that from the perspective of risk control of commercial banks the coefficient of the interaction term is 0.0232 greater than zero. And more important, it is significant at 1% level. That indicates the green credit of last period could have a significant positive effect on the relationship between CSR and the risk control ability of banks. However, both from the perspective of profitability and the perspective of profit quality, the interaction is nonsignificant. We could infer that the green credit of next period has no significant influence on the relationship between CSR and profitability. That is also true when it refers to its profit quality.

4.4. Robustness test

In order to test the robustness of the above benchmark regression results, four aspects of banks performance, namely growth ability, profitability, profit quality and risk control, are included in the alternative explained variable. In this section, we use a new explained variable called comprehensive financial performance. Specifically, we

Table 11
The robustness test.

| | (1) Benchmark model | (2) Mediating effect |
|-----------------|------------------------|-------------------------|
| CSR | -0.036*** (0.013) | -0.080*** (0.023) |
| Lf | 0.678*** (0.057) | 0.667*** (0.058) |
| GreenCredit | | -0.413** (0.191) |
| CSR*GreenCredit | | 0.014** (0.006) |
| Size | -0.123* (0.075) | -0.122 (0.088) |
| Lev | -0.001 (0.012) | -0.001 (0.012) |
| M2 | 0.034*** (0.011) | 0.034*** (0.011) |
| Constant | 2.008 (1.730) | 3.243* (1.911) |
| Observations | 120 | 120 |
| Number of banks | 12 | 12 |

Standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

construct the comprehensive financial performance of banks by using the ration of each part's variance to the total variance as the weigh. The formula is as follows:

$$\text{Comprehensive Performance} = \frac{0.3738}{0.755} * f1 + \frac{0.1766}{0.755} * f2 + \frac{0.1122}{0.755} * f3 + \frac{0.025}{0.755} * f4 \quad (8)$$

The results of robustness test are presented in Table 11. As we can see, the core explanatory variable is significant at 1% level in the baseline model. On the meanwhile, the interaction term of CSR and green credit keeps significantly positive at the 5% level. The results are consistent with those in Table 7 and Table 8. According the consistent outcomes of different models, we argue that the results above is robust.

4.5. Heterogeneity test

The influences of corporate social responsibility on financial performance might be different in different nature and different stages of commercial banks. This paper first divides the sample banks into two types according to the actual controller to do heterogeneity test. They are state-owned commercial banks and joint-stock commercial banks respectively. While the green credit policy in China was implemented in 2012, its rapid development of green credit came after 2013. Accordingly, this paper takes 2013 as the boundary and tests the data before and after 2013 respectively. The heterogeneity test results of the influence of bank social responsibility in different properties and periods on its financial performance are shown in Table 12 and Table 13.

As can be seen from Table 12, the negative impact of bank social responsibility on the growth ability of state-owned banks is not significant, but the negative impact of bank social responsibility on the growth ability of joint-stock banks is significantly negative. The relationship between bank social responsibility and its profitability is nonsignificant in the group of stat-owned banks. However, bank social responsibility is significantly negative with its profitability in the group of joint-stock banks. Based on the perspective of the profit quality of banks, the CSR of the state-owned banks has a positive but nonsignificant impact on the profit quality of banks. However, the CSR of joint-stock banks has a significantly positive impact on the profit quality of banks. From the perspective of risk control of banks, the negative impact CSR of state-owned banks is not significant. But the negative impact of bank social responsibility is significant in the group of joint-stock banks.

There are several reasons that the negative impact of bank social responsibility will gradually turn into positive. The most important ones might be that they set up earlier than the joint-stock banks, and they are bigger and would get more policy support. Given the almost same reasons, due to lack of government support, smaller scale, the impact of CSR would tend to be negative. Because bearing more social responsibilities turn out to be more financial burdens. However, this influence is just temporary. In the long run, undertaking social responsibility will bring a good reputation to the banks themselves and enable them to acquire potential customers and even the government support. Therefore,

Table 12
Heterogeneity test of different properties.

| | (1) f1 State | (2) f1Joint | (3) f2 State | (4) f2Joint | (5) f3State | (6) f3Joint | (7) f4 State | (8) f4Joint |
|-----------------|-----------------------|----------------------|----------------------|---------------------|---------------------|---------------------|----------------------|----------------------|
| CSR | -0.047 (0.032) | -0.083*** (0.029) | 0.034 (0.022) | -0.030* (0.017) | 0.005 (0.014) | 0.024* (0.013) | -0.049 (0.034) | -0.032 (0.021) |
| Lf1 | 0.254* (0.128) | 0.537*** (0.085) | | | | | | |
| Lf2 | | | 0.371*** (0.057) | 0.611*** (0.073) | | | | |
| Lf3 | | | | | 0.726*** (0.088) | 0.395*** (0.104) | | |
| Lf4 | | | | | | | 0.050 (0.113) | -0.012 (0.100) |
| Size | -5.639*** (1.314) | -0.670* (0.376) | -2.899*** (0.423) | -0.418* (0.251) | -0.370 (0.245) | 0.341 (0.297) | -2.428*** (0.622) | -0.154 (0.286) |
| Lev | 0.031 (0.026) | 0.466* (0.250) | -0.007 (0.016) | 0.017 (0.133) | -0.001 (0.006) | 0.023 (0.091) | 0.007 (0.014) | -0.340** (0.171) |
| M2 | -0.148** (0.061) | 0.003 (0.040) | -0.166*** (0.027) | -0.059** (0.024) | -0.033** (0.016) | -0.038 (0.023) | -0.146*** (0.036) | -0.029 (0.031) |
| Constant | 67.757*** (16.368) | -34.271 (24.806) | 37.322*** (5.354) | 4.538 (13.591) | 4.681 (2.913) | -5.613 (9.289) | 32.251*** (7.483) | 34.712** (17.416) |
| Observations | 40 | 80 | 40 | 80 | 40 | 80 | 40 | 80 |
| Number of banks | 4 | 8 | 4 | 8 | 4 | 8 | 4 | 8 |

Standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 13
Heterogeneity test of different periods.

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|-----------------|----------------------|-----------------------|----------------------|----------------------|----------------------|---------------------|---------------------|----------------------|
| | f1 Before | f1 After | f2 Before | f2 After | f3 Before | f3 After | f4 Before | f4 After |
| CSR | -0.124*** (0.043) | 0.020 (0.026) | -0.021 (0.016) | 0.009 (0.015) | 0.004 (0.013) | 0.027** (0.012) | -0.062** (0.029) | 0.007 (0.017) |
| Lf1 | -0.259* (0.148) | 0.046 (0.112) | | | | | | |
| Lf2 | | | 0.431*** (0.054) | 0.018 (0.101) | | | | |
| Lf3 | | | | | 0.774*** (0.077) | 0.971*** (0.052) | | |
| Lf4 | | | | | | | -0.199* (0.107) | 0.701*** (0.092) |
| Size | 0.619 (1.792) | -4.233*** (0.918) | 0.426*** (0.104) | -4.559*** (0.529) | -0.042 (0.092) | 0.002 (0.074) | 0.329* (0.186) | 0.023 (0.095) |
| Lev | 0.096 (0.073) | 0.009 (0.040) | 0.005 (0.019) | -0.016 (0.023) | 0.003 (0.015) | 0.004 (0.009) | -0.013 (0.034) | -0.008 (0.013) |
| M2 | -0.088 (0.082) | 0.100 (0.070) | -0.085*** (0.016) | -0.184*** (0.038) | -0.044*** (0.013) | -0.030 (0.020) | -0.063** (0.026) | -0.081*** (0.028) |
| Constant | -8.174 (19.008) | 43.697*** (10.957) | -2.577 (2.532) | 54.667*** (6.530) | 0.858 (2.129) | -0.746 (1.527) | 0.625 (4.587) | 1.233 (2.086) |
| Observations | 48 | 72 | 48 | 72 | 48 | 72 | 48 | 72 |
| Number of banks | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 |

Standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

bearing social responsibility will eventually improve the profit quality of joint-stock banks.

Table 13 presents the results of heterogeneity test in different periods. As the Table 13 has shown, bank social responsibility has a significant negative impact on its growth ability before 2013. However, this significant influence disappears after that. On the meanwhile, the impact of bank social responsibility on bank profitability keeps nonsignificant no matter before or after 2013. When referring to the profit quality, bank social responsibility has no significant influence on it before 2013. The case is different after that. Bearing more social responsibilities would get a higher profit quality after 2013. As for the ability of bank risk control, before 2013, there is a negative impact on it at the 5% significance level. However, this effect turns out to be disappeared after 2013.

Table 14 presents the heterogeneity test of the moderating role of green credit. As we can see, in terms of growth ability, the coefficient of the interaction term is significantly positive at 5% level in the group of joint-stock banks. But the coefficient in the state-owned banks is nonsignificant. As for the bank profitability, the interaction of CSR and green credit has no significant influence on it in both groups. On the contrary of growth, there is a significantly negative impact of green credit in the group of state-owned banks, and there is not in the group of joint-stock banks.

Finally, as shown in columns 7 and 8, both the interaction coefficients are nonsignificant. This shows that the green credit has no significant influence on the relationship between CSR and bank ability of risk management.

Table 14
Heterogeneity test of the mediating effect.

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|-----------------|---------------------|----------------------|---------------------|----------------------|---------------------|----------------------|----------------------|----------------------|
| | f1 State | f1 Joint | f2 State | f2 Joint | f3 State | f3 Joint | f4 State | f4 Joint |
| CSR | -0.037 (0.082) | -0.185*** (0.052) | 0.035 (0.067) | -0.054* (0.031) | 0.066** (0.032) | -0.006 (0.020) | -0.021 (0.075) | -0.056 (0.040) |
| Lf1 | 0.686*** (0.097) | 0.518*** (0.084) | | | | | | |
| Lf2 | | | 0.669*** (0.064) | 0.577*** (0.072) | | | | |
| Lf3 | | | | | 0.640*** (0.095) | 0.707*** (0.069) | | |
| Lf4 | | | | | | | 0.035 (0.122) | -0.043 (0.099) |
| GreenCredit | 0.076 (0.556) | -1.084** (0.441) | 0.304 (0.434) | -0.332 (0.280) | 0.424** (0.210) | 0.058 (0.173) | 0.208 (0.500) | -0.171 (0.352) |
| CSR*GreenCredit | -0.002 (0.019) | 0.033** (0.014) | -0.012 (0.015) | 0.011 (0.009) | -0.015** (0.007) | 0.001 (0.005) | -0.007 (0.018) | 0.007 (0.011) |
| Size | -0.785 (0.884) | -0.572 (0.382) | -0.843 (0.637) | -0.765** (0.299) | -0.318 (0.284) | 0.149 (0.149) | -2.410*** (0.736) | -0.298 (0.323) |
| Lev | 0.007 (0.017) | 0.567** (0.250) | 0.014 (0.013) | 0.021 (0.136) | 0.002 (0.006) | 0.185** (0.089) | 0.009 (0.015) | -0.354** (0.176) |
| M2 | 0.074* (0.043) | -0.008 (0.040) | -0.029 (0.034) | -0.087*** (0.027) | -0.035** (0.016) | -0.051*** (0.016) | -0.144*** (0.037) | -0.033 (0.032) |
| Constant | 8.460 (11.237) | -41.290* (24.808) | 8.859 (8.193) | 8.930 (13.888) | 2.136 (3.581) | -18.115** (9.042) | 31.124*** (9.341) | 38.092** (17.915) |
| Observations | 40 | 80 | 40 | 80 | 40 | 80 | 40 | 80 |
| Number of banks | 4 | 8 | 4 | 8 | 4 | 8 | 4 | 8 |

Standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

5. Conclusion

Different from existing literature, this paper studies the relationship between CSR and bank financial performance from the perspective of green credit. On the basis of stakeholder theory, environment is regarded as a potential stakeholder of banks. Besides that, we go to a step further to study the moderating role of green credit in relationship of CSR and bank financial performance. The moderating role played by green credit is ignored by previous studies.

In addition, this paper makes an improvement in the construction of CSR index. Specifically, when constructing the CSR index of commercial banks, we attempt to use the method of principal component analysis to decide the weights of different stakeholders. By doing this, this paper overcome the subjectivity of constructing CSR index which occurs in the previous studies. Moreover, we use the same method in formulating the financial performance index of banks. We comprehensively include 10 indicators of banks covering growth ability, profitability, profit quality and risk control by using principal component analysis. It overcomes the shortcoming of adopting a single indicator in the existing literature. Based on the work above, we set up empirical models to investigate the relationship among CSR, bank financial performance and green credit. Also, we get ample conclusions as follows.

First, CSR would increase bank financial burden in short term, and make a negative impact on bank financial performance. However, in the long run, or more precisely the next year, CSR would tend to generate more incentives for stakeholders of banks. For example, it would improve information transparency, reduce bank environmental risks. All this would improve bank financial performance. As a moderating variable, green credit could enhance the effect of CSR on bank financial performance. Second, bank social responsibility has a significant negative impact on their growth ability, profitability and risk control. The results show that green credit could significantly alleviate the negative relationship between bank social responsibility and growth ability and risk control. Finally, this paper further conducts a series of heterogeneity tests including the heterogeneity of property and period. And we get different conclusions based on these tests.

Declaration of Competing Interest

We declare that we do not have any commercial or associative interest that represents a conflict of interest in connection with the work submitted.

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Appendix A. Supplementary data

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