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ORIGINAL RESEARCH

Does ownership matter for corporate social responsibility disclosure in banks? evidence from China

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Abstract
Existing literature on the relationship between ownership and Corporate Social Responsibility (CSR) has been mainly focused on non-financial firms. While a few studies have explored how ownership influences banks' CSR, most of them are based on Western or Islamic finance contexts. Our study contributes to the literature by examining the effects of different ownership types in CSR engagement among 110 large Chinese banks from 2009 to 2020, including state ownership and foreign ownership. Our findings reveal a significant positive correlation between CSR engagement and foreign ownership, whereas state ownership does not show a similar association with the CSR index. This suggests that different owners impact CSR involvement due to their distinct economic roles in society. Our research underscores the importance of considering the diverse effects of ownership structure on CSR engagement within the Chinese banking sector, highlighting the need to account for shareholder background in discussions of shareholder activism. Additionally, it emphasises the necessity of addressing the multidimensional nature of banks' CSR, providing new insights into the dynamics of shareholder influence on corporate social responsibility.

Keywords Banks' CSR · Ownership · Investor Activism

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1 Introduction

Banks' corporate social responsibility (CSR) activities have faced increasing public scrutiny (Gill 2008; Jizi et al. 2014) after the financial crisis of 2007–2008. However, the banking sector has long been excluded from CSR research due to its specific regulatory requirements and characteristics (Chakroun et al. 2017; Matuszak et al. 2019). Jizi et al. (2014) explore how board directors affect commercial banks' CSR disclosure in the US. Following Jizi et al.'s work, subsequent studies have investigated the impacts of banks' corporate governance on their CSR activities/disclosure in different countries. [1] Yet, evidence on how different ownership structures affect banks' CSR remains scarce. Our study aims to fill this gap by exploring the relationship between ownership types and CSR practices in the Chinese banking sector. To the best of our knowledge, it is the first study to investigate this issue in this context.

The CSR initiatives in the Chinese banking sector are deeply intertwined with government policies and national development objectives. Since the first report on social responsibility in the banking sector published in 2006, China has enacted several directives to ensure that banks adhere to CSR practices.[2] Given that the Chinese government continuously prioritizes sustainable development, it is timely important to understand the determinants of CSR initiatives and adoption in China, especially in the banking sector (Jiang and Kim 2020, 2024). The complexity is mainly reflected in the different types of ownership structure (Jiang and Kim 2020, 2024). The majority of banks in China are transformed state-owned enterprises (SOEs), with the central or local government often remaining as the largest shareholder. State-owned banks in China are likely to engage in CSR as a response to government directives that aim at maintaining political, social, and economic stabilities (Li and Zhang 2010). However, due to government backing, state-owned banks sometimes might not prioritize additional CSR investments (Shah 2011).

Following ownership reforms, foreign ownership has become a significant aspect in bank governance. Foreign investors bring not only capital and operational expertise but also improvements in corporate governance (Cheng et al. 2020), leading them to uphold stronger social responsibilities in overseas investments. However, foreign investors may have the motivation to seek immediate financial returns at the expense of CSR investments (Barnea and Rubin 2010). This diverse landscape of ownership in Chinese banks presents a complex and varied picture of CSR engagement, making it an ideal context to explore the relationship between banks' ownership and their CSR engagement.

[1] The existing studies of the determinants of banks' CSR focus mainly on the Western contexts (e.g., US, Germany, Poland, Brazil) and the Gulf Cooperation Council (GCC), and very few attentions have been paid to the banking sector in Asia. These investigations predominantly focus on the attributes of the boards on Banks' CSR (e.g., Buallay and AI-Ajmj, 2020; Matuszak et al. 2019; Rouf and Hossan 2021; Schröder 2021).

[2] These include, for example, the "Opinions on Strengthening the Social Responsibilities of Banking Financial Institutions" issued by the China Banking Regulatory Commission (CBRC) in 2007 and the issue of "Guidelines on Corporate Social Responsibility of Chinese Banking Financial Institutions" in 2009 (China Banking Association, 2009).

We analyse a sample of major Chinese banks over the period of 2009–2020 by manually collecting their CSR and annual reports and employing content analysis to assess the quality of CSR information disclosed in those reports. In line with established CSR disclosure methodologies (e.g., Jizi et al. 2014; Platonova et al. 2018), we develop a CSR index based on the social responsibility guidelines issued by the China Banking Association. This index encompasses four core dimensions, namely, general responsibility, economic responsibility, social responsibility, and environmental responsibility. Each dimension is then scored based on its content richness and whether it discloses specific values in sub-dimensions.

Our regression results show that foreign ownership has a positive impact on the overall and all three dimensions of CSR disclosure. This relationship is robust using different measurements of foreign ownership. We use a variety of methods to address endogeneity issues, including controlling for bank and year fixed effects, using leaded dependent variables, propensity score matching (PSM), Entropy Balancing, Generalized Method of Moments (GMM), Heckman two-stage method, as well as constructing an instrumental variable using two-stage least squares (2SLS) to further enrich the identified causal effect of foreign ownership and CSR disclosure. Our results remain unchanged. However, we do not find any significant relationship between CSR engagement and state-owned shares in Chinese banks.

We further document that the positive impact of foreign ownership on banks' CSR is conditional on its interaction with the dominant blockholders (i.e. state ownership), and varies with bank listing status, external conditions and local policy environments. Specifically, our findings indicate that the effect is stronger for banks headquartered in the Pearl River Delta and Yangtze River Delta economic zones, where early foreign investment yielded greater CSR gains (Cheng et al. 2024), and in provinces with higher government transparency. Moreover, the relationship is statistically significant for unlisted and non–overseas-listed banks, but not for listed banks.

Our study makes three interrelated contributions to the literature on corporate governance and CSR disclosure. First, we contribute to the CSR and corporate governance literature by addressing a key unresolved question regarding the role of ownership structure in shaping banks' CSR engagement. While prior studies on CSR determinants have largely focused on general enterprises or manufacturing sectors (e.g., Chemmanur et al. 2025; Harjoto et al. 2017; Li and Zhang 2010; McGuinness et al. 2017; Nguyen et al. 2025), research on the role of corporate governance in shaping CSR in the banking industry remains limited. Although a growing body of research examines governance–CSR linkages in the banking sector following Jizi et al. (2014), existing evidence remains fragmented and inconclusive, particularly with respect to ownership effects. Much of the prior literature either focuses on board characteristics, treats ownership structure in an aggregated manner, or yields mixed findings across institutional settings (e.g., Buallay and Al-Ajmi 2020; Chakroun et al. 2017; Matuszak et al. 2019; Rouf and Hossan 2021; Schröder 2021).[3] As a result, it remains unclear which types of owners matter for CSR, and through what mechanisms, especially in regulated industries such as banking. We directly address this gap by disentangling the effects of different ownership types, specifically state and foreign ownership, on banks' CSR performance. In doing so, our study responds to recent calls for more fine-grained analyses

[3] For example, Matuszak et al. (2019) find a positive impact of foreign ownership on banks' CSR disclosure in Poland, while de Oliveria et al.'s (2022) study shows that foreign ownership affects negatively Brazilian banks' CSR disclose and Chakroun et al. (2017) do not find any significant relationship between foreign ownership and banks' CSR disclosure in Tunis.

of ownership heterogeneity in governance research (Gillan et al. 2021) and provides novel evidence from a setting where ownership structures are both highly concentrated and institutionally distinctive.

Second, we extend the literature on corporate governance and CSR in emerging economies by offering systematic evidence from the Chinese banking sector, a context that has been largely overlooked in prior studies. Most existing research on bank CSR determinants focuses on Western contexts (e.g., US, Germany, Poland, Brazil) or the Gulf Cooperation Council (GCC), where institutional environments, regulatory regimes, and ownership arrangements differ markedly from those in China. The banking sector plays a critical role in the country's economy, and its CSR practices have significant implications for social, environmental, and financial outcomes, yet the role of ownership types in shaping CSR within its banks remains insufficiently examined (Jiang and Kim 2020, 2024).

By focusing on Chinese banks, our study addresses this ambiguity and demonstrates how ownership reforms and foreign participation shape CSR engagement in a transitional institutional setting. Our study shows that ownership reforms have heightened CSR awareness and that foreign investment can bring improved governance practices while enhancing CSR participation. These findings have important implications for policymakers and banking practitioners. For regulators, the positive association between foreign ownership and CSR engagement suggests that encouraging foreign investment in the banking sector may indirectly promote higher CSR standards, particularly in banks that are less exposed to public scrutiny or international norms. Policymakers could consider designing incentives or guidelines that leverage foreign shareholder involvement to strengthen CSR practices across the industry. Banks with significant foreign ownership may be more responsive to global CSR expectations and best practices, while those dominated by state ownership may require additional internal or regulatory encouragement to enhance CSR initiatives.

Third, we contribute to the CSR measurement literature by addressing a methodological limitation in existing empirical studies, namely the widespread use of generic CSR indices that insufficiently reflect sectoral and institutional specificities. Prior empirical research often applies generic CSR metrics across sectors, implicitly assuming comparability despite substantial differences in regulatory obligations and disclosure practices (Jizi et al. 2014). This approach may obscure meaningful variation in CSR performance, particularly in heavily regulated sectors such as banking.

To overcome this limitation, we develop a new CSR disclosure index tailored specifically to the Chinese banking sector, grounded in the CSR guidelines issued by the China Banking Association. This context-specific measure more accurately captures the regulatory expectations, operational characteristics, and disclosure constraints faced by Chinese banks. By aligning CSR measurement with industry and country level institutions, our study enhances the precision of empirical CSR analysis and offers a framework that can be adapted to other regulated sectors and emerging markets.

The remainder of the paper is organized as follows. Section 2 reviews relevant literature and develops our testable hypotheses. Section 3 presents the data and methodology. Section 4outlines the processes of our analysis and discusses the results. The conclusion is given in the final section.

2 Literature review and hypothesis development

2.1 Ownership structure and CSR initiatives

CSR addresses corporate impacts on society, environment, and people, aiming to contribute to sustainable development while enhancing corporate growth (Starks 2009). However, theoretical perspectives on its impacts remain divided. Some argue that CSR can be overused by managers responding to external pressures or seeking personal gains (Cronqvist and Yu 2017; Dyck et al. 2019), while others view it as a strategy for long-term shareholder value and improved stakeholder relations (Ferrés and Marcet 2021; Gill 2008; Kavadis and Thomsen 2023; Kolk and Pinkse 2010; Mackenzie 2007; Matten 2006; Salama et al. 2011). This more optimistic stance is reinforced by growing investor interest in companies with strong CSR performance (Chen et al. 2020; Dyck et al. 2019), which in turn has attracted increasing academic attention on the influential factors of CSR initiatives.

Among the various firm characteristics influencing CSR initiatives, ownership structure is one of the most important determinants of CSR disclosure (Christensen et al. 2021; Gillan et al. 2021; Nguyen et al. 2025). However, research on CSR and different types of firms' ownership yields mixed results (e.g., Harjoto et al. 2017; Jia and Zhang 2013; Soliman et al. 2013). In a recent review of ESG/CSR research in corporate finance, Gillan et al. (2021) identify that while researchers have employed different definitions of ESG/CSR and focused on different types or structures of ownership (e.g., institutional investors, family ownership and state ownership), disparities still exist in their results. Different ownership types, shaped by regulatory and societal changes, can affect investment decisions, positioning CSR as a strategic mechanism for mitigating stakeholder conflicts and enhancing corporate legitimacy (Brammer and Millington, 2008; Harjoto and Jo 2011; Liu et al. 2021; Tosun and Moon 2025). This underscores the complexity of CSR's role in corporate strategy and highlights the need for deeper investigation into how different ownership structures shape CSR initiatives (Gillan et al. 2021).

Moreover, the existing studies of ownership structure and ESG/CSR have been focused on enterprises, with limited attention paid to the banking sector. Although some studies attempt to explore how different corporate governance factors impact banks' CSR and include ownership in their consideration, such as Chakroun et al.'s (2017) study in Tunis, de Oliveira et al.'s (2022) study in Brazil, and Matuszak et al.'s (2019) study in Poland, empirical evidence appears to be inconclusive. These studies often overlook the specific impacts of different ownership types, and their theoretical frameworks and methodologies requires further refinement to more effectively isolate the effects of ownership.

Our study addresses this gap by examining how different types of ownership in the Chinese banking sector are associated with CSR initiatives. This focus is motivated by Jiang and Kim's (2020) call for more nuanced analyses of the role of bank ownership structures in shaping CSR in China. They argue that the determinants and effects of CSR in China may diverge markedly from those in Western economies, as the dominant agency problem in China arises from conflicts between controlling and minority shareholders, a consequence of its highly concentrated ownership structures.

2.2 Related studies about CSR and state ownership

While state ownership continues to be a prominent characteristic of emerging economies such as China, theoretical and empirical evidence on its impact on CSR activities and disclosure remains inconclusive.

When the government is the largest shareholder of a company, its objectives extend beyond profit maximization to include the alignment of corporate activities with public interests and social and environmental responsibilities (e.g., Wang 2015). As a result, CEOs of SOEs are often incentivized or pressured by government authorities to implement social responsibility initiatives (Chemmanur et al. 2025; Kim and Jo 2022). In recent years, the Chinese government has adopted an increasingly positive stance toward CSR. For example, the China Banking Regulatory Commission issued t*he Opinions on Strengthening the Social Responsibility of Banking Financial Institutions* in 2007, emphasizing that fulfilling social responsibility is both an inevitable requirement for building a harmonious society and a crucial means of enhancing the competitiveness of banking institutions (China Banking Regulatory Commission, 2007). In this context, top managers often align their attitudes with government priorities to secure favourable performance assessments, preserve their positions, or gain promotions (Firth et al. 2006; Zhou 2019). Dam and Scholtens (2012) argue that SOEs are often used as instruments to implement government policies, aiming to achieve social and environmental objectives.

On the other hand, state ownership can also be associated with lower participation in CSR initiatives. Literature shows that agency problems are often more prevalent in SOEs. Managers of SOEs often lack the motivation to manage the business effectively and profitably (Dharwadkar et al. 2000), and may even frequently engage in unethical practices that prioritize personal gain over the interests of the state institutions they represent (Agbiboa 2012). In the Chinese context, where banks operate within a relatively weak institutional framework and investor protection is limited, societal resources are more likely to be directed toward economic development rather than social or environmental initiatives (Musacchio et al. 2015). Moreover, because state-owned banks benefit from government support, they are less exposed to market pressures and may not view additional CSR investment as a priority for generating financial returns (Shah 2011). As Shah (2011) notes, SOEs benefit from government protection against market pressures, which can reduce their economic efficiency and weaken their incentive to issue CSR reports.

Based on the above arguments, we developed the following hypotheses:

H1a: State ownership is positively associated with banks' CSR.
H1b: State ownership is negatively associated with banks' CSR.

2.3 Related studies about CSR and foreign ownership

Similar to the mixed predictions regarding the effect of state ownership on CSR initiatives, the literature on foreign ownership's impact on local banks in developing countries also presents divergent findings. Scholars who hold a positive view of foreign ownership argue that the entry of foreign investors can lower the cost of financial services and promote economic growth by enabling a more efficient allocation of capital (Havrylchyk and Jurzyk 2011). Foreign participation has also been linked to improved bank profitability and greater

capacity for risk-taking in local markets (Berger et al. 2009; Jiang et al. 2013). Several recent studies have confirmed the positive effect of foreign ownership on firms' CSR (Dyck et al. 2019; Kavadis and Thomsen 2023; Zhou 2019).

Recent empirical study by Kim et al. (2025) documents that foreign ownership improves the ESG performance of Korean manufacturing firms. Several factors may motivate foreign investors to enhance the social responsibility performance of banks. First, compared to domestic investors, foreign investors may have a higher norm of social preference and are more attuned to the expectations of a broader range of stakeholders, which aligns well with CSR activities (Cheng et al. 2024). Previous research indicates that investors often choose to invest based on social preferences, and they are willing to sacrifice some financial returns to support socially responsible companies (Chen et al. 2020; Riedl and Smeets 2017). Second, foreign investors are frequently influenced by regulatory requirements and market pressures in their home countries, particularly those from developed nations, where maintaining a global reputation is a key concern. Such pressures encourage stronger social responsibility in foreign investments, mitigating risks related to poor governance or unethical behavior (Cheng et al. 2024; McGuinness et al. 2017). Third, foreign investors can directly influence CSR by shaping banks' strategic decisions, participating in management, and strengthening corporate governance (Cheng et al. 2020), which positively affects CSR performance (Chan et al. 2014; Ntim and Soobaroyen 2013). Forth, foreign ownership can promote CSR through collaboration with domestic banks on human resources development (Cheng et al. 2020).[4]

However, the influence of foreign ownership is not uniformly positive. Banks with foreign ownership may charge higher net interest margins, potentially resulting in lower profitability, inefficiency, and reduced competitiveness (Lee and Hsieh 2014). Moreover, foreign investors—often regarded as delegated regulators—may prioritize financial returns, closely monitoring management and potentially curbing CSR expenditures to enhance revenue and firm value (Barnea and Rubin 2010).

It is also important to recognize that not all foreign investors are alike. The literature differentiates institutional ownership between independent or grey investors (Ferreira and Matos 2008), quasi-indexers, transient or dedicated investors (Bushee 2001) or long-term versus short-term investors (Drobetz et al. 2021). These investor types differ significantly in their monitoring activity, implying potentially different influences on CSR disclosure. However, compared to the US and other developed countries, ownership is highly concentrated in China (Jiang and Kim 2020, 2024), and as a result, the corporate governance role of foreign ownership in the Chinese banking sector may also differ significantly.

Since China's accession to the WTO, the government has gradually opened its banking sector to foreign investors, but under strict regulatory constraints.[5] Significant regulatory changes emerged in 2003 with the establishment of the China Banking Regulatory Commission (CBRC), which encouraged foreign investments and increased the allowable share-

[4] For example, in 2006, the Big Four banks, in partnership with foreign investors, undertook 305 joint initiatives across 53 sectors, facilitating over 10,000 training events through 75 specialised training programmes (Cheng et al. 2020).

[5] Historically, a single foreign investor could hold no more than 20% of a domestic bank's equity, and the combined stake of all foreign investors was capped at 25%. These ownership limits, along with stringent approval processes and close oversight by regulators such as the China Banking Regulatory Commission - CBRC (now China Banking and Insurance Regulatory Commission - CBIRC), were designed to safeguard financial stability while leveraging foreign capital and expertise (Berger et al. 2009; Jiang et al. 2013).

holding limits for foreign investors. Despite regulatory reforms in recent years, including the 2018 relaxation of some financial sector ownership rules, foreign ownership in Chinese banks remains limited in practice. Large state-owned banks are still tightly controlled by the government, with strategic decision-making firmly in domestic hands. Foreign investors have found more space in joint-stock commercial banks (JSCBs) and city commercial banks, yet their influence is generally constrained. Empirical evidence (e.g., Berger et al. 2009; Jia 2009; Jiang et al. 2013) shows that minority foreign ownership is associated with more long-term gains in efficiency and governance, and prudential behaviour in lending. Overall, while foreign capital has helped modernize China's banking sector, it continues to play a supplementary rather than controlling role and function more as a long-term investor.

Therefore, the following hypotheses are developed based on the above arguments:

H2a: Foreign ownership is positively associated with banks' CSR.
H2b: Foreign ownership is negatively associated with banks' CSR.

3 Methodology

3.1 Data and sample construction

This paper examines how Chinese banks with different ownership types affect corporate social responsibility. According to the "List of legal persons of banking financial institutions" issued by the China Banking and Insurance Regulatory Commission in 2021, there were 4044 banks in 2020, including 54 listed banks and 3990 unlisted ones. To obtain a large sample of Chinese banks, we initially selected the top 300 banks from two ranking sources: *Brand Finance Banking 500* and *S&P Global Worldwide Bank Ranking*.[6] These top 300 banks cover more than 95% of the total assets of Chinese banks. Then, we excluded the central bank of China, policy banks and credit unions, as they have different disclosure and regulatory requirements compared to commercial banks. [7] Additionally, banks with total assets of less than $1 billion were excluded from the sample.

The selection of large banks for this study is well justified given their ownership characteristics and CSR disclosure practices. Large banks, particularly state-owned banks, hold the majority of banking assets in China, making them central to the stability and performance of the financial system (Lin and Zhang 2009). These banks have undergone extensive reforms, including recapitalisation, privatisation, and the entry of foreign strategic investors, resulting in diverse ownership structures (Jiang et al. 2013). Focusing on large banks is essential for understanding the effects of ownership structure and regulatory changes.

Our sample period begins in 2009 when most CSR data for Chinese banks became available, following the issuance of the first guidelines on CSR report disclosure by the China Banking Association in 2009 (China Banking Association, 2009). To ensure data accuracy and comprehensiveness, we manually collected social responsibility data from the CSR

[6] Brand Finance Banking 500 is the 500 most valuable and strongest banking brands in the world. S&P Global Worldwide Bank Ranking is sorted by bank total assets and can be filtered by country.

[7] Policy banks refer to non-commercial professional financial institutions founded by the government to implement the government's economic policies and conduct financial business in a specific field. Such as Exim Bank of China, Agriculture Development Bank of China etc.

reports and annual reports of Chinese banks for the years 2009–2020. In applying panel data techniques, we excluded bank_year observations with missing values. This resulted in an unbalanced panel of 110 Chinese banks from 2009 to 2020, including all 6 state-owned commercial banks, 11 joint-stock commercial banks, 24 rural commercial banks and 69 urban commercial banks. The total assets of these 110 Chinese banks account for more than 90% of the total assets of Chinese commercial banks. Appendix A provides a summary of the sample selection procedure. Data on bank ownership is collected from banks' annual reports and the CSMAR database, and financial data is obtained from the CSMAR and BankFocus databases.

3.2 Variables

3.2.1 Dependent variable: CSR disclosure

A review of the literature identified three main types of social responsibility disclosure measurement. The first type is to measure the disclosure content, such as the number of words (e.g., Deegan and Gordon 1996), sentences (e.g., Tsang 1998) and pages (e.g., Patten 1991) in the CSR or annual reports. However, measuring by the number of words or pages may be problematic, because a single word may not have any meaning if no context is provided (Milne and Adler 1999). One argument against measuring CSR disclosures based on the number of sentences and pages is that any unit of measurement that fails to consider graphs, charts or photographs will ignore the valid information contained in them (Beattie and Jones 1997). The second type is to use CSR ratings provided by social rating agencies (e.g., Chen et al. 2020; Cornett et al. 2016; McGuinness et al. 2017). Social ratings provided by Kinder, Lydenberg, Domini & Co. (KLD) have been commonly used in CSR research. In addition to the KLD, recent academic surveys have highlighted the prominent role of the China Rankins (RKS) in guiding investors through the quality and content of the overall social reporting activities of listed companies (McGuinness et al. 2017). However, this type of measurement has its inherent limitations as rating agencies focus primarily on the disclosure status of listed companies and the ratings are easily influenced by the information disclosed by the companies (Jizi et al. 2014).

The third type is the construction of CSR index based on content analysis. Content analysis was defined by Abbott and Monsen (1979, p. 504) as "a technique for gathering data that consists of codifying qualitative information in anecdotal and literary form, into categories in order to derive quantitative scales of varying levels of complexity." Content analysis has been widely utilized in CSR research to evaluate the quality of CSR disclosures. For example, Jizi et al. (2014) apply content analysis to examine the quality and comprehensiveness of CSR disclosures in the annual reports of major U.S. commercial banks. Based on the definition and framework of CSR in Western countries, they divided CSR disclosure into four main areas: community involvement, environment, employees, and product and customer service quality. Platonova et al. (2018) use content analysis to investigate CSR disclosures, with a particular emphasis on the ethical aspects of CSR within Islamic banks. They develop the CSR index based on standards set by the Accounting and Auditing Organization for Islamic Financial Institutions.

In this paper, we analyze the content of banks' social responsibility reports and generate a CSR disclosure index to measure the CSR performance of China's banking indus-

try. The CSR index was developed based on the disclosure policies and characteristics of China's banking industry (text information), aiming to provide a more comprehensive perspective on CSR disclosure, encompassing both the qualitative and quantitative aspects of CSR.

The CSR initiatives in the Chinese banking sector are deeply intertwined with government policies and national development objectives since the introduction of relevant regulation by Shanghai Stock Exchange in 2008 (Shanghai Stock Exchange, 2008) and the issue of "Guidelines on Corporate Social Responsibility of Chinese Banking Financial Institutions" in 2009 (China Banking Association, 2009). The guidelines stipulate that the CSR of banks and other financial institutions shall at least include three aspects: (1) economic responsibility, (2) social responsibility, and (3) environmental responsibility.

First, Chinese banks are responsible for creating economic value for the country, shareholders, employees, customers, and the public in compliance with legal conditions, with the focus of inclusive finance. Second, in the aspect of social responsibility, financial precision poverty alleviation is the precise connection between financial policies and poverty alleviation goals, supplemented by relatively reasonable financial products and financial norms, aiming to improve the effectiveness and efficiency of poverty alleviation work. Third, Chinese banks are expected to support national environmental protection policies and sustainable development through green finance, which aims to prompt enterprises to save resources and requires banks to integrate ecological and environmental factors into their accounting and decision-making (See Appendix B for a detailed background overview of CSR in the Chinese banking sector).

According to the relevant policies of the Chinese banking industry and the CSR literature (e.g., Gray et al. 1995; Gray et al. 2001), we construct an index that comprises four dimensions: general responsibility, economic responsibility, social responsibility, and environmental responsibility. Each dimension is divided into several sub-dimensions according to the guidelines issued by the China Banking Association (See Appendix C for more detailed information about the index). We also extend the analysis by evaluating the disclosure of financial and numerical information, such as green credit loans, poverty alleviation loans and rural loans. We then score the content in these four CSR dimensions according to the existence and comprehensiveness of the information disclosed in each dimension. The total score of four CSR dimensions is 36 points, and the level of CSR for each bank is derived from the following Eq. (1).

$$CSR = \sum (points\ of\ general,\ economic,\ social\ and\ environmental\ dimentions)/36 \quad (1)$$

CSR (General) = Disclose CSR report (2), disclose CSR in the annual report (1), not disclosed (0)

CSR (Economic responsibility) = Scores for six sub-dimensions (0~12)

CSR (Social responsibility) = Scores for six sub-dimensions (0~12)

CSR (Environmental responsibility) = Scores for five sub-dimensions (0~10)

To ensure comparability and objectivity, we adopted a structured content analysis approach grounded in the procedures developed by Platonova et al. (2018), with adjustments tailored to the Chinese banking context. We created a coding framework comprising precisely defined CSR dimensions (economic, environmental, and social), and associated

sub-dimensions. Each indicator was linked to explicit decision rules, allowing coders to apply the same scoring logic consistently across bank-year observations.

To further assess the reliability and validity of our scoring method, we conducted a larger validation exercise using a random 10% subsample of our full dataset, comprising 89 CSR reports stratified by bank type. Each report in this validation set was independently scored twice by the two lead authors with a one-month interval between sessions to evaluate inter-coder reliability over time. In addition, two trained research assistants (PhD students familiar with CSR reporting) independently coded the same set of reports while blind to the original scores and to each other's evaluations. After coding, we compared the independently produced scores and assessed inter-coder agreement using both raw percentage agreement and Krippendorff's alpha, following the standards set by Jizi et al. (2014). The initial agreement rate was approximately 82% across indicators, demonstrating an acceptable level of reliability for content analysis of this type. Based on the comparison results and coder feedback, we made further refinements to the scoring criteria, which were then fixed for application to the full sample.

To minimise subjective scoring bias throughout the process, we implemented several safeguards. First, all coders, including the authors and research assistants, underwent formal training before any coding taking place. The training process ensured consistent understanding of the scoring rules and interpretation of CSR content. Second, all coders worked independently, and blind to each other's scores, using the same detailed definitions and structured scoring sheets. Third, during the full-scale coding phase, we randomly selected 15% of the reports for re-coding by a second coder, allowing us to monitor consistency and detect potential drift in scoring over time. Any discrepancies were reviewed collaboratively and, if necessary, resolved through discussion and adjustment of scoring definitions. This ongoing quality control helped ensure that subjective judgment did not systematically influence the results.

3.2.2 Independent variables: ownership

There are two main ways to measure ownership. The first way is to calculate the percentage held by shareholders of different natures (Berger et al. 2010; McGuinness et al. 2017). The second way is to use the dummy variables (Berger et al. 2009; Boateng et al. 2015; Cheng et al. 2020). In China, ownership is highly concentrated and dominated by one or two blockholders compared to developed economies, which can significantly influence the firm's decision-making process (Jiang and Kim 2020). Dummy variables are particularly useful in this context, as they capture the presence or absence of specific types of shareholders (such as state-owned shareholders or foreign shareholders) rather than relying solely on the exact ownership percentage. Furthermore, since the relationship between ownership percentage and management decisions is not always linear or straightforward, and in line with international accounting reporting standards, even a small change in ownership stakes (e.g., from 49% to 51% or from 19% to 21%) can effectively grant the shareholder majority control (Jiang et al. 2019). Therefore, we use dummy variables rather than their actual shares to measure different types of ownership across most analyses in this paper.

Based on the nature of the holding owner commonly used in the academic literature (e.g., Berger et al. 2010; Boateng et al. 2015), we classify the types of ownership into state ownership, foreign ownership and other ownerships. Following empirical studies of Chinese

listed companies by Jiang et al. (2019), a bank is assumed to be controlled when at least one shareholder owns more than 5% of the total outstanding shares. We define State ownership as a dummy variable that equals 1 if the largest shareholder is state and greater than 5% of total outstanding shares; and 0 otherwise. Foreign ownership is defined as a dummy variable that equals 1 if the largest shareholder is a foreign investor and greater than 5% of total outstanding shares; and 0 otherwise. Following Jiang et al.'s (2019) study, we further classify state ownership into central government, local government and state enterprise. Central government is a dummy variable that equals 1 if the largest state shareholder is the central government and 0 otherwise. Local government is a dummy variable that equals 1 if the largest state shareholder is the local government and 0 otherwise. State enterprise is a dummy variable that equals 1 if the largest state shareholder is a state-owned enterprise and 0 otherwise.

3.2.3 Control variables

We include a set of control variables that have been used in prior studies in our analysis, including bank characteristics (e.g., Cheng et al. 2022; Jizi et al. 2014; Kim and Jo 2022), corporate board characteristics (e.g., Lu and Boateng 2018; Oh et al. 2017) and core bank regulatory indicators (e.g., Wu and Shen 2013).

Bank size captures public visibility and resource availability, as larger banks are under greater stakeholder pressure and have more capacity to invest in CSR (Goss and Roberts 2011). Profitability (ROA) reflects the availability of slack resources that can facilitate CSR investment (Clark and Hebb 2005). Leverage may drive firms to adopt CSR as a form of risk mitigation (Chakroun et al. 2017). Bank age serves as a proxy for institutional maturity, with older banks having more established stakeholder relations and CSR reporting traditions. Board independence strengthens monitoring and enhances legitimacy, thereby contributing to stronger CSR performance (Oh et al. 2017). Finally, non-performing loans (NPLs), liquidity, and capital adequacy ratio (CAR) are core regulatory indicators of financial soundness and risk exposure, all of which may influence CSR engagement (Wu and Shen 2013). Variable definitions are detailed in Appendix 9.

3.3 Regression model

Based on the work of Cheng et al. (2022) and Jizi et al. (2014), the following panel regression model is employed to test our two hypotheses. We use a one-year lag to address the potential reverse causality problems.

$$\begin{gathered} CSR_{i,t} = \beta_0 + \beta_1 State\ ownership_{i,t-1} + \\ \beta_2 Foreign\ ownership_{i,t-1} + \beta_3 Bank\ age_{i,t-1} + \\ \beta_4 Bank\ size_{i,t-1} + \beta_5 Independent\ director_{i,t-1} + \\ \beta_6 CAR_{i,t-1} + \beta_7 ROA_{i,t-1} + \beta_8 NPL_{i,t-1} + \\ \beta_9 Leverage_{i,t-1} + \beta_{10} Liquid_{i,t-1} + Bank\ Fixed\ Effects + Year\ Fixed\ Effects + \epsilon_{i,t-1} \end{gathered} \tag{2}$$

Where $CSR_{i,t}$ is the CSR score of bank *i* in year *t*, measured as the ratio of the number of disclosure points to the highest score the bank can achieve; $State\ ownership_{i,t-1}$ is a dummy variable that equals 1 if a bank's largest shareholder is state and holds greater than 5% of outstanding shares, and 0 otherwise for bank *i* in year *t-1*; $Foreign\ ownership_{i,t-1}$

is a dummy variable that equals 1 if a bank's largest shareholder is foreign ownership and holds greater than 5% of outstanding shares, and 0 otherwise for bank *i* in year *t-1*; $Central\ government_{i,t-1}$ is a dummy variable that equals 1 for central government owned banks and 0 otherwise for bank *i* in year *t-1*; $Local\ government_{i,t-1}$ is a dummy variable that equals 1 for local government owned banks and 0 otherwise for bank *i* in year *t-1*; $State\ enterprise_{i,t-1}$ is a dummy variable that equals 1 for state enterprise owned banks and 0 otherwise for bank *i* in year *t-1*. All independent variables are at time $t-1$ indicating that they are lagged with respect to the dependent variable.

4 Empirical results

4.1 Descriptive statistics

Table 1 presents descriptive statistics for the variables used in our empirical analyses. All continuous variables are winsorized at the 1 st and 99th percentiles to mitigate the effects of outliers. The minimum value of the corporate social responsibility score is 0 and the maximum value is 0.972, indicating that the CSR scores of various banks are quite different. The mean of the state ownership of the banks in the sample is 0.602, suggesting that most of the banks in this study are state owned. This is in line with the study of Jiang et al. (2019) who find that approximately 54% of the banks are state-controlled based on 487 observations of 73 banks from 2006 to 2015. The mean of the foreign ownership of banks in the sample is 0.153. Compared with Cheng et al.'s (2020) study in which 25% of Chinese banks have introduced foreign strategic investors between 2001 and 2016, it is not surprising that our sample contains a smaller percentage of foreign invested banks as we are looking at foreign

Table 1 Summary Statistics

Variable	N	Mean	*Sd*	*Min*	*Max*
CSR	889	0.504	0.348	0	0.972
-Economic	889	0.522	0.340	0	1
-Social	889	0.535	0.341	0	1
-Environmental	889	0.517	0.379	0	1
State ownership	889	0.602	0.490	0	1
-Central government	889	0.069	0.253	0	1
-Local government	889	0.121	0.327	0	1
-State enterprise	889	0.412	0.492	0	1
Foreign ownership	889	0.153	0.360	0	1
Bank age	889	17.20	10.11	2	60
Bank size	889	12.83	1.547	10.44	16.76
Independent director	889	0.301	0.085	0.083	0.444
CAR	889	13.01	1.684	10.14	17.59
ROA	889	0.962	0.336	0.154	1.821
NPL	889	1.417	0.660	0.230	3.730
Leverage	889	6.966	1.399	4.157	10.47
Liquid	889	21.14	11.03	5.258	51.58

This table reports the summary statistics of key variables in this research. See Appendix D for detailed variable definitions.

ownership holdings greater than 5% of total outstanding shares of banks and not all foreign investors play a dominant role in the Chinese banks.[8] We also present descriptive statistics for the sub-CSR. The standard deviations for the economic, social, and environmental dimensions are 0.340, 0.341, and 0.379, respectively. The slightly higher standard deviation in the environmental dimension suggests that there is greater variability in banks' performance related to environmental responsibility compared to the other dimensions.

4.2 Baseline empirical results: overall CSR performance

Table 2 presents the main evidence on the relation between banks' ownership and CSR. In Column 1, the coefficient on state ownership is statistically insignificant at the conventional significance level, indicating no correlation between state ownership and CSR, thereby rejecting H1. One possible explanation is that state-owned banks enjoy substantial government protection and therefore have little incentive to adjust CSR investments to enhance financial returns or address social issues (Shah 2011). By contrast, the coefficient on foreign ownership is positive and significant at the 5% level, supporting H2a and suggesting that foreign owners are more likely to engage in CSR. This finding aligns with previous studies on the relationship between foreign ownership and firms' CSR (Cheng et al. 2024; McGuinness et al. 2017), which suggest that the entry of foreign investors encourages local banks to adjust their strategic planning, governance structures, and non-interest activities.

Regarding the control variables, the results show that bank size and independent directors are positively associated with CSR, while capital adequacy ratio, non-performing loan and liquidity are negatively associated with CSR.

In Column 2, we further divided state ownership into central government, local government ownership and state enterprise. Consistent with the overall results of state ownership, the coefficients on these categories are not statistically significant.

In Eq. (2), a bank is assumed to be controlled when at least one shareholder owns more than 5% of the total outstanding shares. We also use two alternative measures of ownership to test the hypotheses. First, we assume that banks are controlled only if at least one shareholder owns more than 10% of the total outstanding shares (Jiang et al. 2019). The results are presented in Column 3 of Table 2, showing that the positive effect of foreign ownership on CSR remains unchanged, while the effects of state ownership on CSR is insignificant. These results are consistent with our main findings. Second, to better reflect the continuity of ownership, we constructed two continuous variables: *State ownership total* referring to the proportion of state-owned shares held by the top 10 largest shareholders, and *Foreign ownership total* measured by the proportion of foreign-owned shares held by the top 10 largest shareholders. We re-estimate the baseline model using these two variables instead of ownership dummies, and results (presented in Column 4 of Table 2) are consistent with our main findings.

4.3 Baseline empirical results: three components of CSR

Our previous findings show that foreign investors have a positive impact on banks' overall CSR disclosure. To further explore how foreign investors influence CSR, we divide the CSR

[8] This is also confirmed by Cheng et al. (2020) that only 18.5% of foreign strategic investors appointed directors or senior managers to domestic banks.

Table 2 Bank ownership and CSR disclosure

Dependent variable	CSR			
			Alternative measures of bank ownership	
	(1)	(2)	Ownership measured as a 10% dummy(3)	Ownership measured as a percentage(4)
Foreign ownership	0.078**	0.084***	0.086***	0.003**
	(0.031)	(0.031)	(0.030)	(0.001)
State ownership	−0.009		−0.001	0.001
	(0.024)		(0.026)	(0.001)
-Central government		0.061		
		(0.063)		
-Local government		−0.001		
		(0.051)		
-State enterprise		−0.014		
		(0.025)		
Bank age	0.013	0.013	0.013	−0.004
	(0.015)	(0.015)	(0.015)	(0.018)
Bank size	0.103***	0.104***	0.107***	0.115***
	(0.038)	(0.038)	(0.038)	(0.041)
Independent director	0.281***	0.284***	0.273***	0.190*
	(0.103)	(0.104)	(0.104)	(0.103)
CAR	−0.011**	−0.011**	−0.012**	−0.017***
	(0.005)	(0.005)	(0.005)	(0.005)
ROA	0.012	0.014	0.011	0.028
	(0.028)	(0.028)	(0.028)	(0.030)
NPL	−0.025**	−0.025**	−0.025**	−0.018
	(0.012)	(0.012)	(0.012)	(0.014)
Leverage	0.007	0.007	0.007	−0.001
	(0.008)	(0.008)	(0.008)	(0.008)
Liquid	−0.002**	−0.002**	−0.002**	−0.002***
	(0.001)	(0.001)	(0.001)	(0.001)
Constant	−0.919**	−0.945**	−0.966**	−0.803
	(0.462)	(0.469)	(0.462)	(0.535)
N	889	889	889	784
R-square	0.342	0.344	0.342	0.331
Bank Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes

This table reports the baseline results of the impact of bank ownership on CSR disclosure in the sample period of 2009-2020. Columns (1) and (2) are our baseline evidence, ownership variables are defined as at least one type of shareholder owns more than 5% of the total outstanding shares. Columns (3) and (4) use alternative measures of ownership. In Columns (3), ownership variables are defined as at least one type of shareholder owns more than 10% of the total outstanding shares. In Columns (4), ownership variables are defined as the proportion of state-owned/foreign-owned shares held by the top 10 largest shareholders. See Appendix D for detailed variable definitions. All continuous independent variables are winsorized at the 1% and 99% levels. Standard errors are in parentheses. *, **, and *** denote the 10%, 5%, and 1% significance levels, respectively

index into three subcategories: economic, social and environmental responsibilities. Table 3 reports CSR subgroup regression results.

In Table 3, the coefficients of foreign ownership are positive and significant in columns 1 through 3. These results suggest that foreign ownership impacts positively all three dimensions of CSR. This is not a surprising finding as the entry of foreign investors not only improves banks' capital and governance structure but also promotes cooperation in employee training and internal education as suggested by the existing literature (e.g., Cheng et al. 2020).

Table 3 Bank ownership and CSR disclosure: Components of CSR

Dependent variable	Economic	Social	Environmental	Economic	Social	Environmental
	(1)	(2)	(3)	(4)	(5)	(6)
Foreign ownership	0.078**	0.085***	0.082**	0.080***	0.092***	0.090**
	(0.031)	(0.032)	(0.035)	(0.031)	(0.032)	(0.035)
State ownership	0.013	0.006	−0.026			
	(0.024)	(0.025)	(0.027)			
-Central government				0.041	0.091	0.074
				(0.063)	(0.065)	(0.071)
-Local government				0.029	0.009	−0.035
				(0.051)	(0.053)	(0.057)
-State enterprise				0.009	0.001	−0.030
				(0.025)	(0.026)	(0.028)
Bank age	0.005	0.012	0.022	0.005	0.012	0.022
	(0.015)	(0.016)	(0.017)	(0.016)	(0.016)	(0.017)
Bank size	0.119***	0.132***	0.096**	0.122***	0.133***	0.095**
	(0.038)	(0.039)	(0.043)	(0.038)	(0.040)	(0.043)
Independent director	0.289***	0.287***	0.290**	0.288***	0.292***	0.297**
	(0.104)	(0.107)	(0.117)	(0.104)	(0.108)	(0.117)
CAR	−0.012**	−0.011**	−0.010*	−0.012**	−0.011**	−0.009*
	(0.005)	(0.005)	(0.006)	(0.005)	(0.005)	(0.006)
ROA	0.003	0.012	0.011	0.004	0.014	0.013
	(0.028)	(0.029)	(0.031)	(0.028)	(0.029)	(0.031)
NPL	−0.028**	−0.028**	−0.019	−0.028**	−0.028**	−0.019
	(0.012)	(0.013)	(0.014)	(0.012)	(0.013)	(0.014)
Leverage	0.009	0.006	0.006	0.009	0.006	0.006
	(0.008)	(0.008)	(0.009)	(0.008)	(0.008)	(0.009)
Liquid	−0.002**	−0.001*	−0.002**	−0.002**	−0.001**	−0.002**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Constant	−1.011**	−1.225**	−0.931*	−1.046**	−1.246**	−0.932*
	(0.463)	(0.479)	(0.522)	(0.470)	(0.486)	(0.530)
N	889	889	889	889	889	889
R-square	0.334	0.339	0.301	0.334	0.341	0.303
Bank Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

This table reports the impact of bank ownership on the three components of CSR disclosure. The dependent variables in Columns (1)-(3) are Economic, Social, and Environment, respectively. See Appendix D for detailed variable definitions. All continuous independent variables are winsorized at the 1% and 99% levels Standard errors are in parentheses. *, **, and *** denote the 10%, 5%, and 1% significance levels, respectively

4.4 Additional analysis

We further conduct a subgroup analysis based on the proportion of state ownership[9]. Specifically, we classify banks according to whether state ownership exceeds thresholds of 25% and 30%, respectively. We hypothesise that when state ownership surpasses 25%, governance is likely dominated by state shareholders, thereby limiting the influence of foreign investors. Table 4 demonstrates that foreign ownership is significantly and positively associated with CSR disclosure only when state ownership is relatively low (less than 25% or 30%), suggesting that the effectiveness of foreign ownership in enhancing CSR is conditional on its interaction with the dominant blockholders (i.e. state ownership).

These findings are consistent with McGuinness et al. (2017), who find that in SOEs where strong political networks already exist, foreign institutional investors are less incentivised to promote CSR, thereby diminishing their marginal effect. By contrast, foreign investors are more influential in non-SOEs, where their engagement in CSR may serve as a strategic tool to build new networks and competitive advantages. This view is further supported by Jiang and Kim (2024), who highlight the institutional complexity of China's corporate governance, noting that SOEs and non-SOEs differ fundamentally in their objectives.

4.5 Identifications

A major concern in the baseline regression is endogeneity (Ebbes et al. 2022; Roberts and Whited 2013). Our main results show that foreign ownership has a positive effect on banks' CSR disclosure. Although we employ a fixed effect model (bank and year fixed effects), and use lagged values of independent variables and control variables to mitigate the potential endogeneity concern, establishing a causal relationship between foreign ownership and CSR disclosure remains challenging. It is also possible that omitted variables affect both foreign ownership and CSR disclosure. Furthermore, banks' ownership and disclosure of CSR may be non-random, this may cause a self-selection bias.

In the following sections, we use six approaches to further address the endogeneity issues[10]: (1) Leaded dependent variable, (2) Generalized Method of Moments (GMM), (3) Instrumental Variable (IV) with two-stage Least Squares (2SLS), (4) Propensity Score Matching (PSM), (5) Entropy balancing, and (6) Heckman two-stage method.

[9] For foreign ownership, the institutional context of our sample justifies a preference for a dummy variable approach. We note that foreign investment in Chinese commercial banks was subject to regulatory restrictions for much of our sample period (2009–2020). Specifically, before the restrictions were lifted in 2018, a single foreign investor was limited to a 20% stake in a Chinese commercial bank, and the combined stake of multiple foreign investors was limited to 25% (China Banking Regulatory Commission, 2003). As shown in Appendix 10, approximately 64% of banks in our sample had no foreign shareholders among their top 10 shareholders, and the mean number of foreign shareholders was below one. The average foreign ownership proportion was only 6.95%, with a median of 0%. This distribution suggests that foreign ownership was both limited and highly skewed.

[10] To evaluate omitted variable bias, we also use the Impact Threshold for a Confounding Variable (ITCV), as proposed by Frank (2000) and applied in recent studies (e.g., Croci and Petmezas 2015; Fu et al. 2012). This method estimates how strongly an unobserved variable would need to be correlated with both foreign ownership and CSR disclosure in order to make the effect of foreign ownership statistically insignificant. Appendix 11reports the results of the ITCV analysis, assessing the robustness of the estimated effect of foreign ownership on CSR disclosure.

Table 4 Foreign ownership and CSR disclosure under different levels of state ownership

Dependent variable	CSR			
	State ownership is more than 25%	State ownership is less than 25%	State ownership is more than 30%	State ownership is less than 30%
	(1)	(2)	(3)	(4)
Foreign ownership	0.061	0.123**	0.058	0.109***
	(0.045)	(0.052)	(0.051)	(0.041)
Bank age	0.000	0.002	0.001	0.001
	(0.016)	(0.017)	(0.016)	(0.015)
Bank size	0.112*	0.110	0.105*	0.135*
	(0.058)	(0.095)	(0.058)	(0.081)
Independent director	0.243	0.227	0.223	0.218
	(0.158)	(0.181)	(0.160)	(0.167)
CAR	−0.022***	0.003	−0.019**	−0.001
	(0.007)	(0.009)	(0.008)	(0.009)
ROA	0.057	−0.056	−0.023	0.002
	(0.052)	(0.057)	(0.056)	(0.052)
NPL	0.014	−0.034	0.011	−0.021
	(0.023)	(0.026)	(0.023)	(0.025)
Leverage	0.014	−0.016	0.013	−0.019
	(0.012)	(0.015)	(0.012)	(0.014)
Liquid	−0.002**	−0.003**	−0.003***	−0.002*
	(0.001)	(0.001)	(0.001)	(0.001)
Constant	−0.846	−0.744	−0.706	−1.038
	(0.759)	(0.986)	(0.770)	(0.828)
N	414	256	371	299
R-square	0.281	0.369	0.306	0.376
Bank Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes

This table reports the regression results using subsamples split by state ownership. We split the sample by the proportion of state ownership (large than 25%/30% or not) in the top 10 largest shareholders. See Appendix D for detailed variable definitions. All continuous independent variables are winsorized at the 1% and 99% levels. Standard errors are in parentheses. *, **, and *** denote the 10%, 5%, and 1% significance levels, respectively

4.5.1 Leaded dependent variable

To further address the concern of reverse causality – whether banks with stronger CSR performance may attract foreign investors rather than the other way around – we conduct lead-dependent variable tests. Following a similar approach to Ali et al. (2022) and Katsiampa et al. (2024), we examine the effect of bank ownership on CSR disclosure by regressing one-year, two-year and three-year lead CSR disclosure (CSR_{t+1}, CSR_{t+2}, CSR_{t+3}), respectively, on current independent and control variables. The results are presented in Columns 1–3 of Table 5, consistently showing that foreign ownership remains significantly and positively associated with CSR disclosure.

Table 5 Foreign ownership and CSR disclosure: Leaded Dependent Variable (LDV), GMM, IV-2SLS

Dependent variable	CSRt+1	CSRt+2	CSRt+3	CSR	Foreign ownership	CSR	Foreign ownership	CSR
	LDV	LDV	LDV	GMM	2SLS: First stage	2SLS:Second stage	2SLS: First stage	2SLS:Second stage
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Foreign ownership	0.092**	0.095**	0.100**	0.123**				
	(0.037)	(0.039)	(0.045)	(0.059)				
L.CSR				0.542***				
				(0.121)				
Foreign ownership (fitted value)						0.369**		0.509**
						(0.185)		(2.112)
Foreign owner mean					0.310***			
					(0.068)			
Lagged foreign owner mean							0.332***	
							(3.768)	
Constant	−0.694	−0.433	−0.535	−0.477*	−0.948	−0.302	-0.993	−0.229
	(0.577)	(0.649)	(0.684)	(0.251)	(0.672)	(0.604)	(-1.241)	(−0.297)
N	670	555	460	760	780	780	653	653
R-square	0.303	0.254	0.258		0.091	0.241	0.102	0.092
F-statistics					21.890			
AR1				−3.568				
(p-value)				(0.000)				
AR2				0.103				
(p-value)				(0.918)				
Sargan				119.925				
(p-value)				(0.659)				
Hansen				66.443				1.136
(p-value)				(1.000)				(0.287)

Table 5 (continued)

Dependent variable	CSRt+1	CSRt+2	CSRt+3	CSR	Foreign ownership	CSR	Foreign ownership	CSR
Kleibergen-Paap LM								0.807
(p-value)								0.668
Control variable included	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

This table addresses potential reverse causality. Columns (1) to (3) presents regressions of foreign ownership on banks' CSR disclosure in the following 1, 2, and 3 years (CSRt+1, CSRt+2, CSRt+3); Columns (4) report GMM estimates; Columns (5) to (8) report IV-2SLS results. Foreign ownership is the first stage dependent variable. Foreign owner mean and Lagged foreign owner mean serve as instruments. The second stage uses the fitted values from the first stage. See Appendix D for detailed variable definitions. All continuous independent variables are winsorized at the 1% and 99% levels. Standard errors are in parentheses. *, **, and *** denote the 10%, 5%, and 1% significance levels, respectively

4.5.2 Generalized Method of moments *(GMM)*

We further employ the GMM dynamic panel estimation approach proposed by Blundell and Bond (1998), which is robust to endogeneity and measurement error in panel settings. The results of GMM estimates are reported in Column 4 of Table 5, supporting the positive effect of foreign ownership on CSR disclosure.

The Hansen test assesses the validity of the instrumental variables used in GMM estimation. The statistically insignificant results of the Hansen test (Hansen J-statistic = 66.443, p-value = 1.000) indicate that the instruments are valid and do not over-identify the model, thus supporting the reliability of the GMM estimation. As expected, the residuals in the first order difference show serial correlation (AR1) and the residuals in the second difference do not show serial correlation (AR2), suggesting that the model is correct in capturing the dynamics without introducing autocorrelation problem at this order.

4.5.3 Instrumental variable (IV) and two-stage least squares (2SLS) regression

To better identify the causal relationship between foreign ownership and CSR disclosure, we employ an instrumental variable (IV) within a two-stage least squares (2SLS) regression framework. The key to the IV-2SLS method is the selection of an appropriate instrumental variable (e.g., Hung et al. 2017; Jia et al. 2019) that satisfies two main conditions: it must be strongly correlated with the endogenous independent variable (i.e. foreign ownership) but must not have a direct effect on the dependent variable (i.e. CSR disclosure). To meet these criteria, we construct an instrumental variable by calculating the average annual number of foreign owners at the provincial level for each bank. This variable captures exogenous variation in foreign ownership arising from provincial-level dynamics, under the assumption that such variation affects the foreign ownership status of individual banks, while not directly affect their CSR disclosure.

Following prior studies (e.g., Hung et al. 2017), in the first stage of the IV-2SLS approach, we use foreign ownership as the dependent variable, while the IV and all control variables in Eq. (2) as independent variables. After completing the first-stage regression, we have the fitted value for foreign ownership. This step generates the fitted values of foreign ownership, which represent the variation in foreign ownership explained by the instrumental variable, effectively isolating the exogenous component of foreign ownership. In the second stage, the fitted value is used to replace the original endogenous.

The results of IV-2SLS are reported in Columns 5–6 of Table 5. In Column 5, the instrument variable is strongly correlated with foreign ownership. In Column 6, we replace foreign ownership with the fitted value derived from the first-stage regression, the regression result shows that foreign ownership still has a significantly positive effect on CSR disclosure, consistent with the results observed in the baseline regression. In addition, the F-statistic for the first-stage regression is 21.89, further demonstrating the robustness of the instrumental variables. This value exceeds the cutoff point of 10 suggested by Staiger and Stock (1997), highlighting the validity and strength of the instrumental variables. These results suggest that the instrument effectively addresses potential endogeneity issues and ensures a reliable estimation of the causal impact of foreign ownership on CSR disclosure.

To strengthen the validity of our instrumental variables, we follow the work of Arellano and Bond (1991) and Blundell and Bond (1998) and use the one-year lag of the provincial average foreign owners as an alternative instrument. As reported in Columns 7–8 of Table 5, the lagged instrument remains strongly significant in the first stage and continues to produce a significant and positive effect on CSR in the second stage. The Hansen J overidentification test yields a p-value of 0.2866, suggesting that the instruments are valid and uncorrelated with the error term.

While the use of industry or region averages has been widely adopted in the literature (Ali et al. 2022; Ginglinger and Moreau 2023), we acknowledge the limitations inherent in any instrumental variable strategy. The selection of instrumental variables is inherently subjective and the perfect exclusion restriction is rarely met in practice (Coles et al. 2012; Wolfolds and Siegel 2019). Although no IV approach can completely rule out endogeneity between ownership and CSR disclosure, our IV results, together with the other endogeneity tests we conducted, provide strong suggestive evidence that the observed relationship between bank ownership and CSR disclosure is likely causal (Schopohl et al. 2021).

4.5.4 Propensity score matching (PSM)

This section utilizes the propensity score matching technique introduced by Rosenbaum and Rubin (1983) to analyse the impact of foreign ownership on CSR. PSM is particularly useful in observational studies where random assignment is not feasible, as it allows for the creation of a quasi-experimental design by matching treated and control units based on their propensity scores, thereby reducing selection bias. The first step in implementing PSM involves estimating the propensity scores for each bank-year observation. We calculate the propensity scores via a probit model, selecting foreign ownership as the dependent variable, while all control variables specified in Eq. (2) serve as the explanatory variables. This approach ensures that the propensity scores capture the likelihood of foreign ownership given the bank's observed characteristics.

We then match each foreign ownership bank (i.e. treated group) with the non-foreign ownership bank (i.e. control group) with the closest score. The nearest-neighbour matching is conducted with replacement, ensuring that each foreign-owned bank is paired with the most similar non-foreign-owned bank in terms of their propensity score. This process results in a matched sample with 247 bank-year observations. The outcomes presented in Appendix 12 from the PSM analysis indicates a positive effect of foreign ownership on CSR.

To validate the quality of the matching process, we conduct a balancing test (presented in Appendix 12, which confirms that the application of PSM significantly reduces the standardised biases across all covariates. Specifically, Column 4 of Panel B in Appendix 12 shows that the standardised biases for all variables are reduced, with each falling below the 10% threshold in Column 3 of Panel B, indicating that the matched sample is well-balanced and comparable. Additionally, the t-test indicates no significant differences between the control and the treated group regarding the variables in Column 5 of Panel B.

We rerun the regression of Eq. (2) using the matched sample and the results are presented in Column 1 of Table 6. It shows that the coefficient of foreign ownership is positive and statistically significant at the 5% level, consistent with our baseline results presented in Table 2.

4.5.5 Entropy balancing

To further address potential sample selection bias, we apply an entropy balancing (EB) approach, which has been increasingly used in governance and finance research (e.g., Ali et al. 2022; Katsiampa et al. 2024). We use EB to reweight the control group (i.e. banks without dominant foreign shareholders) so that they closely match the treatment group (i.e. banks whose largest shareholder is foreign and holds more than 5% of total shares) in terms of observable characteristics. This allows us to better isolate the effect of foreign ownership on CSR disclosure. Table 6 Column 2 shows that, after balancing (see Appendix 13 for the detailed progress), the effect of foreign ownership on CSR disclosure remains significant, which supports the robustness of our findings even under strict covariate balancing conditions.

Although both PSM and EB aim to balance the distribution of the covariates across treatment and control groups, so to compare the CSR of banks which are similar across all other related dimensions (apart from the foreign ownership), the two approaches distinct in how the weights are assigned to the control group (Katsiampa et al. 2024). Following McMullin and Schonberger (2020), we prioritize the EB approach. Specifically, PSM estimates a first-stage treatment model and then matches bank-year observations from the treatment group to the bank-year observations from the control group according to the propensity score, putting a weight of either zero (excluded) or one (matched) to each control observation. While EB identifies continuous weights for all bank-year observations from the control

Table 6 Foreign ownership and CSR disclosure: PSM, Entropy balancing, Heckman two-stage

Dependent variable	CSR	CSR	Foreign ownership	CSR
	PSM	Entropy balancing	Heckman Stage 1: Probit regression	Heckman Stage 2: OLS regression
	(1)	(2)	(3)	(4)
Foreign ownership	0.106**	0.089***		0.075**
	(0.042)	(0.023)		(0.031)
Foreign owner mean			0.254**	
			(0.112)	
IMR				−0.323
				(0.254)
Constant	2.174*	3.668	−1.714*	0.053
	(1.226)	(4.059)	(0.940)	(0.757)
N	247	802	780	780
R-square	0.351	0.879	0.079	0.334
Control variables included	Yes	Yes	Yes	Yes
Bank Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes

This table reports the regression results using PSM, Entropy balancing, and Heckman two-stage. For PSM, see Appendix E for the detailed process. For Entropy balancing, see Appendix H for the detailed process. For Heckman two-stage selection model, the first stage uses Foreign ownership as the dependent variable. Foreign owner mean is an exogenous variable, which is the mean of foreign owners at provincial level in our sample. In the second stage, we use Inverse Mills Ratio (IMR) from the first stage to run the fixed effect regression. See Appendix D for detailed variable definitions. All continuous independent variables are winsorized at the 1% and 99% levels. Standard errors are in parentheses. *, **, and *** denote the 10%, 5%, and 1% significance levels, respectively

group to equalize the distribution moments (e.g., means, variances and skewness) for all covariates in the treatment and control groups. EB is superior to PSM because it requires fewer assumptions and eliminates any bias caused by researchers' discretion (McMullin and Schonberger 2020).

4.5.6 Heckman two-stage method

Banks with good CSR disclosure may be more willing to accept foreign investors, therefore foreign ownership may be non-random and potentially introduce self-selection bias into analyses. To address this concern, we use the Heckman (1976, 1979) two-stage method. Following prior studies (e.g., McGuinness et al., 2017), in the first stage, we construct a probit model with foreign ownership dummy and all control variables in our baseline regression. Heckman's estimator requires an exogenous variable that is correlated with foreign ownership and are uncorrelated with CSR. We use the mean value of foreign owners at the provincial level to satisfy this requirement. It reflects the general tendency of foreign investment in the region, which influences whether a particular bank is foreign-owned, but it is unlikely to be directly related to the CSR activities of individual banks. Results of the first-stage regression are reported in Column 3 of Table 6. The coefficient on foreign owner mean is significant and positive, suggesting that banks with more foreign owners are more likely be a foreign bank.

Following the first-stage estimation, we compute the Inverse Mills Ratio (IMR), which captures the likelihood of selection into foreign ownership based on the bank's observed characteristics. The IMR is then included as an additional explanatory variable in the second-stage to control for the potential sample selection bias. The second-stage regression results are reported in Column 4 of Table 6. Our findings are in line with baseline results, indicating that the observed effects and conclusions drawn from our study are robust.

4.6 Further tests

In the baseline regression, we find a positive relationship between foreign ownership and CSR disclosure. However, the disclosure of banks' social responsibility may vary depending on the bank characteristics, external environment and local policies. In this section, we perform the subgroup analyses based on bank listing status, economic zone and government transparency respectively.

4.6.1 Bank listing status

The role of foreign ownership in shaping CSR outcomes may vary depending on bank characteristics. Smaller or unlisted banks, with less international experience, particularly benefit from the governance and knowledge provided by foreign shareholders (Khan et al. 2013). In these banks, a foreign stakeholder may hold a meaningful ownership share and actively promote modern CSR practices. In contrast, larger or listed banks (many of which are state-owned or operate nationwide) typically already have diverse stakeholders, including government entities and domestic institutional investors, who dominate decision-making (Dam and Scholtens 2012). Foreign owners in these large banks tend to hold relatively

small stakes, limiting their ability to influence CSR outcomes (Li et al. 2021; McGuinness et al. 2017).

We examined whether a bank's listing status moderate the effect of foreign ownership on CSR (see Table 7 Panel A). We find that foreign ownership has a significant positive

Table 7 Bank ownership and CSR disclosure: Subsample analysis

Panel A: Subsample analysis by bank listing status				
Dependent variable	CSR			
	Listed bank	Non-listed bank	Overseas listing	Non overseas listing
	(1)	(2)	(3)	(4)
Foreign ownership	0.024	0.086*	0.118	0.071**
	(0.033)	(0.047)	(0.087)	(0.036)
State ownership	−0.039	0.003	0.006	−0.005
	(0.031)	(0.028)	(0.080)	(0.025)
Constant	−0.854	1.083	−4.136***	0.813
	(0.651)	(0.756)	(1.124)	(0.806)
N	269	533	130	672
R-square	0.273	0.304	0.552	0.328
Control variables included	Yes	Yes	Yes	Yes
Bank Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
Panel B: Subsample analysis by economic zone and government transparency				
Dependent variable	CSR			
	In the economic zone	Outside economic zone	High government transparency	Low government transparency
	(1)	(2)	(3)	(4)
Foreign ownership	0.107**	0.056	0.077**	0.059
	(0.044)	(0.045)	(0.037)	(0.061)
State ownership	−0.038	0.030	0.029	−0.113**
	(0.035)	(0.035)	(0.030)	(0.047)
Constant	−0.455	−0.874	−0.857	−1.999**
	(1.691)	(0.555)	(0.640)	(0.992)
N	337	552	541	348
R-square	0.462	0.328	336	0.423
Control variables included	Yes	Yes	Yes	Yes
Bank Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes

This table reports the regression results using subsample analysis. Panel A presents subsamples split by bank listing status. Listed bank is defined as a bank has exchange listings in A (onshore) and H (offshore) forms. Overseas listing is defined as a bank has exchange listing in H (offshore) forms. Panel B presents subsamples split by economic zone and government transparency index. In Columns (1) and (2), economic zone is defined as whether the bank is in the Pearl River Delta Economic Zone and the Yangtze River Delta Economic Zone. In Columns (3) and (4), we split the sample by the bank's head office in a province being above or below the sample median value of the government transparency for a given year (the higher this ranking, the higher of the government transparency). See Appendix D for detailed variable definitions. All continuous independent variables are winsorized at the 1% and 99% levels. Standard errors are in parentheses. *, **, and *** denote the 10%, 5%, and 1% significance levels, respectively

effect on CSR in unlisted banks, but not in listed banks. Similarly, foreign ownership shows a positive and significant relationship with CSR in the non-overseas-listed group. Unlisted banks do not face the same regulatory pressures or public responsibilities as listed companies (Chen et al. 2006). By contrast, listed banks, especially those with overseas listings, generally already meet higher transparency and CSR standards due to stock exchange rules, institutional investor expectations, and reputational concerns (Li and Zhang 2010). For example, many large Chinese banks listed in Hong Kong publish ESG reports and maintain formal CSR committees as part of listing requirements. Consequently, foreign investors in these listed banks may have limited scope to further enhance CSR practices (McGuinness et al. 2017).

4.6.2 Pearl river delta economic zone and Yangtze river delta economic zone

Banks' CSR practice in China is profoundly influenced by the country's regional economic and market development, which varies considerably across its vast landscape. In regions with advanced economies and more mature markets, the pressure is higher on banks to adopt comprehensive CSR strategies. These areas typically boast stronger regulatory frameworks and greater public awareness about social and environmental issues, prompting banks to weave CSR into their core business functions to stay competitive and responsive to stakeholder demands. On the other hand, in less economically developed regions where economic growth is a priority, banks' CSR efforts are often closely aligned with local developmental objectives, such as expanding access to financial services, supporting small and medium-sized enterprises (SMEs), and initiating community development programs that address the most pressing regional needs (Liu et al. 2020). This alignment ensures that CSR initiatives are not only socially responsible but also relevant and impactful within the specific socioeconomic context of the region.

We group banks according to economic zones in which they operate, and grouping method is related to China's policy of opening up to the West (Chen et al. 2019). China established the Pearl River Delta and Yangtze River Delta economic zones from 1979 onwards under the auspices of the Open Door policy, as a way to introduce foreign investment and accelerate the modernisation process (Jia 2014), while the restrictions on foreign investment in Chinese banks were gradually relaxed following China's accession to the WTO in 2001. As a result, banks operating in the Pearl River Delta and Yangtze River Delta economic zones have earlier access to foreign capital than banks in other economic zones. Moreover, foreign banks are more likely to be supported by local governments and policies that influence their governance structure, strategies and noninterest activities in many ways (Cheng et al. 2020).

We employ an economic zone dummy variable to measure a bank's location, which equals one if the bank location is in the Pearl River Delta Economic Zone and the Yangtze River Delta Economic Zone, and zero otherwise. The results are shown in Columns 1–2 of Panel B of Table 7. It can be seen that the coefficient on foreign ownership in Column 1 is 0.107 (significant at the 1% level), while in Column 2 is 0.056 (insignificant), indicating that banks with foreign ownership in the two economic zones are more willing to engage in CSR.

As mentioned above, the two economic zones are characterized by high levels of economic development, innovation and international trade. These economic zones attract

significant foreign investment and often have more progressive policies, including environmental regulations and social welfare measures (Chen et al. 2019). Banks operating in these areas face higher expectations from local governments and communities to make a positive contribution to the sustainable development of the region. Furthermore, banks in economic zones benefit from being at the centre of China's economic growth and innovation. This proximity to cutting-edge industries can encourage banks to adopt forward-looking CSR strategies that support sustainable development, innovation in financial products and services, and community engagement. For banks that effectively integrate CSR into their core businesses, a dynamic economic environment can provide them with a competitive advantage (Liu et al. 2020).

4.6.3 Government transparency

Increased government transparency could fundamentally reshape the relationship between CSR and banks by imposing more explicit and stringent regulatory expectations. Transparent governance would provide political ties, clearer guidelines and policies regarding CSR, enabling banks to better align their initiatives with national standards and priorities (Lester et al. 2008). This transparency can ensure consistency in how CSR is implemented across the banking sector, leading to more effective and accountable practices. It also creates a more equitable environment where all financial institutions operate under the same set of expectations, fostering fair competition and driving overall improvements in CSR. Furthermore, a transparent government framework bolsters public trust, as stakeholders can more easily access and assess information regarding banks' CSR engagements and their adherence to regulations (Jiang et al. 2019). This increased trust can incentivize banks to elevate their CSR efforts to satisfy stakeholder scrutiny and enhance their reputational capital. With heightened accountability, banks may adopt a more proactive stance on CSR, not only complying with current mandates but also anticipating future regulatory trends and societal expectations. This forward-thinking approach could manifest in more innovative and impactful CSR strategies, as banks strive to meet both the demands of a more informed public and the evolving landscape of government policy.

Institutional theory suggests that the behaviour and practices of organizations are largely influenced by the norms, values and culture that exist in the institutional environment around them (North 1990). Banks located in regions with high government transparency are subject to institutional pressures that favour ethical behaviour and social responsibility. These pressures drive banks' social responsibility practices to align with these expectations in order to gain legitimacy, resources, and competitive advantage (Zattoni and Cuomo 2008). Moreover, from the perspective of stakeholder theory, which emphasizes the importance of meeting the needs and expectations of all stakeholders, including customers, employees, investors, and the community (Roberts 1992). Where government transparency is high, civil society tends to be more active and the public more engaged, which puts pressure on banks to adopt and implement strong CSR practices. Particularly, banks with foreign ownership are likely to respond more aggressively to these pressures as they seek to safeguard their local and global reputations (Barnea and Rubin 2010). Therefore, we can reasonably assume

that in provinces with a high level of government transparency, foreign owned banks can achieve their legitimacy through CSR. In contrast, banks located in regions with low government transparency have less incentives for CSR involvement due to lower public oversight, regulatory requirements and limited political ties (Hung et al. 2017; Jia et al. 2019). In such a setting, banks may see less strategic benefit in engaging in CSR to gain political capital or legitimacy. This aligns with findings from Hung et al. (2017), who highlight that politically connected banks can more easily obtain resources and policy support. Therefore, in less transparent environments, banks may achieve their objectives through political channels rather than CSR.

We obtain the government transparency data from China Government Transparency Index Report (2020),[11] and add a government dummy variable in our baseline regression model to measure government transparency. Government dummy equals to 1 if the bank's local government ranks in the top 15 in terms of transparency, 0 otherwise. Results are presented in Columns 3–4 of Panel B of Table 7. The coefficients on foreign ownership are positive and significant in Column 3, but insignificant in Column 4, indicating that in places with higher government transparency, foreign banks are more inclined to engage in CSR. However, the coefficients on state ownership are negative and significant at the 5% level in Column 4, showing that in places where government transparency is lower, state-owned banks will be less involved in CSR. The lack of institutional and public pressure allows state-owned banks to operate with less emphasis on CSR, as they rely on their political connections rather than CSR practices to secure political and economic benefits (Jia et al. 2019; Wang 2015). This finding is also in line with the research by Kim and Jo (2022), countries or regions without administrative capacity and with a weak sense of national interest can have a negative impact on CSR.

5 Conclusions

This study examines the relationship between ownership structure and CSR disclosure in Chinese banks, with particular attention to state and foreign ownership. The core finding is that foreign ownership is consistently and positively associated with banks' CSR disclosure, indicating that foreign shareholders play a meaningful governance role in promoting socially responsible practices. This relationship remains robust across alternative model specifications. The additional heterogeneity analyses clarify the conditions under which foreign investors' governance role is most salient. Specifically, the stronger effects observed among unlisted banks and in regions with more developed institutional environments indicate that foreign owners are particularly effective in promoting CSR where external market discipline is weaker or where institutional transparency enhances moni-

[11] China Government Transparency Index Report (2020) is available from here: https://www.pishu.com.cn/skwx_ps/initDatabaseDetail? siteId=14&contentId=12467755&contentType=literature . The report provides a third-party assessment of the performance of 31 provincial governments in conducting their public affairs work. In addition, the report points out that the higher the level of government transparency, the more it helps to regulate government management, which can effectively optimise the local business environment and thus promote the sustainable development of the local economy.

toring incentives. In contrast, state ownership shows no significant association with CSR disclosure across baseline and robustness analyses. This suggests that state ownership, despite its prevalence in China's banking sector, does not generate comparable incentives for CSR engagement, potentially due to weaker market discipline and political appointment processes.

While our findings highlight the role of foreign ownership in enhancing CSR engagement, they should be interpreted in light of several limitations. First, although prior research emphasizes that foreign investors are heterogeneous in terms of investment horizon, monitoring capacity, and CSR preferences, our empirical analysis necessarily treats foreign ownership as a single category. This represents a conceptual limitation, as different types of foreign investors (e.g., long-term strategic investors versus short-term portfolio investors) may exert distinct governance pressures and exhibit varying commitments to CSR. However, due to data constraints, particularly the inclusion of unlisted banks and the limited disclosure of investor identities in China, it is not possible to construct a more granular classification of foreign owners. Our results therefore capture the average effect of foreign participation rather than the behavior of specific investor types.

Second, although we employ a range of econometric approaches to mitigate endogeneity concerns, data limitations restrict our ability to establish strong causal inference. As such, the findings should be viewed as robust associations rather than definitive causal effects. Future research could explore ownership dynamics using transaction level investment data or natural experiments such as regulatory shocks.

Appendix A

Table 8 Sample Selection

Description	Banks
Total number of Chinese banks	4044
Less: banks that are not on the Brand Finance Banking 500 and S&P Bank Ranking	3744
Less: central bank of China, policy banks, credit unions and banks with total assets of less than $1 billion.	101
Less: banks that did not disclose corporate social responsibility and that disclosed social responsibility for less than three years	89
Final sample	110

Appendix B

CSR in the Chinese banking sector

The CSR initiatives in the Chinese banking sector are deeply intertwined with government policies and national development objectives. The first report on social responsibility in the banking sector was published in 2006 by Shanghai Pudong Development Bank, which laid

the foundation for the subsequent introduction of relevant regulation by Shanghai Stock Exchange (SSE) in 2008 and the issue of "Guidelines on Corporate Social Responsibility of Chinese Banking Financial Institutions" in 2009 (China Banking Association, 2009). The guidelines stipulate that the CSR of banks and other financial institutions shall at least include three aspects: economic responsibility, social responsibility, and environmental responsibility. Although the guidelines are not mandatory and the three responsibilities are not defined very clearly, they worked as a signal and encouraged commercial banks to issue CSR reports gradually. With the continuous development and improvement of social responsibility in the Chinese banking sector, each part of the responsibility has its own specific goals and representative features.

1) Economic responsibility-Inclusive finance

Chinese banks are responsible for creating economic value for the country, shareholders, employees, customers, and the public in compliance with legal conditions, with the focus of inclusive finance. Inclusive finance refers to providing necessary financing at a certain level of costs for vulnerable groups with very limited production capacities and funds, such as farmers and small enterprises (State Council of the People's Republic of China, 2015). The concept of inclusive finance was first proposed by the United Nations in 2005. In 2017, the Chinese Government Work Report Conference proposed that the government should support domestic commercial banks in building inclusive financial institutions and develop inclusive financial services. In October 2018, the China Banking and Insurance Regulatory Commission (CBIRC) issued the "Report on China's Inclusive Financial Development". The report shows that as of the end of 2017, the balance of loans for small and micro enterprises in the banking industry was 30.74 trillion yuan, and loan services were provided to 15.21 million small and micro-enterprises (China Banking and Insurance Regulatory Commission, 2018).

1) Social responsibility-Financial poverty alleviation

Financial precision poverty alleviation is the precise connection between financial policies and poverty alleviation goals, supplemented by relatively reasonable financial products and financial norms, largely improves the effectiveness and efficiency of poverty alleviation work. The important idea of "precision poverty alleviation" was first proposed by President Xi Jinping in 2013. In March 2016, it was clearly instructed at the Twelfth Chinese People's Congress. In 2017, the People's Bank of China (PBC), the CBRC, the China Securities Regulatory Commission, and the China Insurance Regulatory Commission jointly issued the "Opinions on Financial Support for Poverty Alleviation in Deep Poverty Areas", requiring financial sectors to prioritise financial services and funds for those in deep-poverty areas. By the end of March 2018, China's poverty alleviation loan balance reached 635.3 billion yuan, and 8.35 million poor people received credit support (People's Bank of China, 2018).

1) Environmental responsibility-Green finance

Chinese banks are expected to support national environmental protection policies and sustainable development. Green finance aims to prompt enterprises to save resources and

requires banks to integrate ecological and environmental factors into their accounting and decision-making. Since the CBRC issued the Green Credit Guidelines that normalized the credit structure of commercial Banks and made suggestions for the adjustment of the credit structure of commercial banks in 2012 (China Banking Regulatory Commission, 2012), there have been a number of government policies and regulations related to green credit (the following table shows the relevant major policies issued by China since 2007). The supervision requirements of the PBC, the CBRC and the State Environmental Protection Administration have effectively prevented bank loans from being lent to enterprises that do not meet environmental requirements and projects that may cause environmental pollution. The green financing balance had reached nearly 9 trillion yuan at the end of 2017 (People's Bank of China, 2017).

Table 9 Relevant Policies and Legal Provisions of Green Credit in China

Release date	Host Department	Relevant policies, documents or legal requirements
2007	The People's Bank of China (PBC), the China Banking Regulatory Commission (CBRC) and the State Environmental Protection Administration	"Opinions on Implementing Environmental Policies and Regulations to Prevent Credit Risks" has become the main guide for China's green credit policies
2008	PBC, the Municipal Development and Reform Commission, the Municipal Environmental Protection Bureau and the CBRC	Opinions on Strengthening the Construction of "Green Credit" to Support Capital Energy Conservation and Emission Reduction
2009	China Banking Association	Guidelines on Corporate Social Responsibility of Chinese Banking Financial Institutions
2012	CBRC and Environmental Protection Administration	The "Green Credit Guidelines" were issued to integrate bank supervision and environmental protection supervision, and require banks to use financial leverage to promote energy conservation, emission reduction, and environmental protection.
2013	CBRC	Issuing the "Green Credit Statistics System" to strengthen the quality management of green credit statistics
2014	CBRC	"Notice on Submitting Green Credit Statistics Table" to strictly monitor the implementation status of my country's green credit business
2015	PBC and The National Development and Reform Commission	Regulate the issuance of green financial bonds
2016	The National People's Congress and the Chinese Political Consultative Conference (NPC&CPPCC)	The 13th Five-Year Plan outlines the establishment of a green financial system.
2017	The State Council	"Guidelines on Green Bond Evaluation and Certification" improve the quality of green bonds and promote the healthy development of the green bond market.
2018	China Banking Association	Printed and issued the "China Banking Green Bank Evaluation Implementation Plan (Trial)"

Appendix C

Table 10 CSR index

CSR dimension	CSR sub-dimension	Content	Score
General (2)	CSR report	Disclose separate CSR reports.[1]	0,1,2
Economic responsibility (12)	Financial stability	Preventing financial risks and safeguarding financial assets.[2]	0,1,2
	Business Ethics	Oppose commercial bribery and unfair competition.	0,1,2
	Corporate governance	Corporate structure, information disclosure and board.	0,1,2
	Stakeholder management	Protecting employee and customer rights and creating value for employees and customers.	0,1,2
	Inclusive finance	Inclusive finance policy and loans to SMEs and rural finance.	0,1,2
	Overall		0.1.2
Social responsibility (12)	Customer management	The responsibility of consumer education to guide and nurture the financial awareness of the public.	0,1,2
	Community management	Community economic development and facilitating financial services for the community.	0,1,2
	Employee management	Focus on employee health and safety and enhance employee training.	0,1,2
	Charity and donation	Charitable donations, volunteer activities and commitment to social welfare activities.	0,1,2
	Poverty alleviation	Poverty alleviation loans.	0,1,2
	Overall	Disclosure of quantitative content in this section	0,1,2
Environmental responsibility (10)	Environmental policy	Develop environmental policies to support social, economic and environmental sustainability.	0,1,2
	Environmental disclosure	Disclosure of energy consumption information and promotion of environmentally friendly office.	0,1,2
	Environmental management	Customers conduct environmental training, strengthen staff awareness of environmental protection and participate in practical and promotional activities for environmental protection.	0,1,2
	Green finance	Green finance policy and green credit loans.	0,1,2
	Overall	Disclosure of quantitative content in this section	0,1,2

Note: 1. For general CSR disclosure assessments, the following scale is used: 0 indicates no disclosure, 1 denotes CSR information included in the annual report, and 2 represents a separate, dedicated CSR report 2. For specific CSR dimensions—Economic, Social, and Environmental Responsibility: 0 indicates no disclosure; 1 signifies disclosure of text content only; 2 represents further disclosure including non-textual content such as images, tables, and figures

Appendix D

Table 11 Variable definition

Variable	Description	Source
Dependent variable		
CSR	Follow Jizi et al. (2014) and Platonova et al. (2018), we use content analysis to examine the quality and comprehensiveness of CSR disclosures in the CSR reports and annual reports. We construct a CSR disclosure index (including four dimensions: general responsibility, economic responsibility, social responsibility, and environmental responsibility) according to the relevant policies of the Chinese banking industry and the corporate social responsibility literature (Gray et al. 1995, 2001). CSR disclosure score measured as the ratio of disclosure content points to the maximum score the bank can achieve.	CSR report and annual report
Independent variable		
State ownership	A dummy variable that equals 1 if the largest shareholder is state and greater than 5% of total outstanding shares, and 0 otherwise (Jiang et al. 2019).	CSMAR and annual report
Foreign ownership	A dummy variable that equals 1 if the largest shareholder is a foreign investor and greater than 5% of total outstanding shares, and 0 otherwise (Jiang et al. 2019).	CSMAR and annual report
Central government	A dummy variable that equals 1 if the largest state shareholder is the central government, and 0 otherwise (Jiang et al. 2019).	CSMAR and annual report
Local government	A dummy variable that equals 1 if the largest state shareholder is the local government, and 0 otherwise (Jiang et al. 2019).	CSMAR and annual report
State enterprise	A dummy variable that equals 1 if the largest state shareholder is the state-owned enterprise, and 0 otherwise (Jiang et al. 2019).	CSMAR and annual report
Control variable		
Bank age	Natural logarithm of the number of years since the establishment of bank (Kim and Jo 2022).	CSMAR
Bank size	Natural logarithm of total assets (Kim and Jo 2022).	BankFocus
Independent	The percentage of independent directors on board (Oh et al. 2017).	CSMAR
ROA	Ratio of net income to total assets (Lu and Boateng 2018 ; Wu and Shen 2013).	BankFocus
Liquid	Ratio of current assets to current liabilities (Wu and Shen 2013).	BankFocus
Leverage	Ratio of total debts to total assets (Cheng et al. 2022).	BankFocus
NPL	Non-performing loans to total loans (Wu and Shen 2013).	BankFocus
CAR	Capital adequacy ratio: net capital to risk weighted assets (Platonova et al. 2018).	BankFocus

Appendix E

Table 12 Number of foreign shareholders in the top 10 shareholders

This table reports the frequency of foreign shareholders in the top 10 shareholders. Foreign shareholder is the number of foreign shareholders in the top 10 largest shareholders

Foreign shareholder	Freq.	Percent	Cum.
0	517	64.46	64.46
1	146	18.20	82.67
2	96	11.97	94.64
3	35	4.36	99
4	5	0.62	99.63
5	2	0.25	99.88
7	1	0.12	100
Total	802	100	

Table 13 Summary statistics of foreign shareholders and total foreign ownership

Variable	*N*	Mean	SD	Min	p25	p50	p75	Max
Foreign shareholder	802	0.599	0.959	0	0	0	1	7
Total foreign ownership	802	6.945	10.88	0	0	0	16.59	50.44

This table reports the summary statistics of foreign related variables. Foreign shareholder is the number of foreign shareholders in the top 10 largest shareholders. Total foreign ownership is the proportion of foreign ownership in the top 10 largest shareholders

Appendix F

Table 14 Impact of unobserved confounding variables

	ITCV	Impact	$\text{Impact}_{\text{raw}}$
Foreign ownership	0.048		
State ownership		0.0071	−0.0260
Bank age		0.0075	0.0298
Bank size		0.1134	0.1451
CAR		0.0004	0.0075
Independent director		0.0046	0.0695
ROA		0.0000	0.0010
NPL		−0.0041	0.0011
Leverage		−0.0141	0.0098
Liquid		0.0030	0.0158

This table present the analysis for the impact of unobserved confounding variables. For the main control variable (Foreign ownership) an impact statistic is calculated (ITCV) indicating the minimum impact of a confounding variable that would be needed to render the coefficient statistically insignificant. The ITCV is defined as the product of the correlation between the x-variable (i.e., foreign ownership) and the confounding variable and the correlation between the y-variable (i.e., CSR disclosure) and the confounding variable. To assess the likelihood that such a variable exists, column (3) shows the impact of each independent variable on the coefficient of foreign ownership. The impact is defined as the product of the partial correlation between the x-variable (i.e., foreign ownership) and the control variable and the correlation between the y-variable (CSR disclosure) and the control variable (partialling out the effect of the other control variables). Column (4) shows a more conservative measure of impact, which is the product of the simple correlation between the x-variable and the control variable and the simple correlation between the y-variable and the control variable. See Appendix D for detailed variable definitions

Appendix G

Table 15 The process of PSM

Panel A The Propensity Score Matching (PSM) results						
Variable		Mean				
	Sample	Treatment	Control	Difference	S.E.	T-statistic
CSR	*Unmatched*	0.677	0.473	0.204	0.032	6.420***
	ATT	0.677	0.587	0.090	0.044	2.050**

This table reports the PSM results. Unmatched indicates unmatched sample. ATT indicates average treatment effects on treatment group. See Appendix D for detailed variable definitions. *, **, and *** denote the 10%, 5%, and 1% significance levels, respectively

Table 16 Panel B The balancing property tests

Variable		Mean				
	Sample	Treatment	Control	Bias(%)	Reduct|bias|(%)	T-statistic
		(1)	(2)	(3)	(4)	(5)
Bank age	*Unmatched*	19.853	17.339	21.000		2.080**
	Matched	19.853	19.449	3.400	83.900	0.270
Bank size	*Unmatched*	13.540	12.702	57.800		5.870***
	Matched	13.540	13.533	0.500	99.200	0.040
Independent director	*Unmatched*	0.331	0.295	45.100		4.470***
	Matched	0.331	0.330	1.300	97.200	0.120
CAR	*Unmatched*	12.776	13.101	−16.700		−1.830*
	Matched	12.776	12.876	−5.200	69.000	−0.450
ROA	*Unmatched*	0.974	0.963	3.500		0.340
	Matched	0.874	0.946	8.700	−152.700	0.800
NPL	*Unmatched*	1.348	1.441	−13.600		−1.410
	Matched	1.348	1.318	4.300	68.300	0.390
Leverage	*Unmatched*	6.656	7.041	−27.900		−2.780***
	Matched	6.656	6.704	−3.500	87.500	−0.310
Liquid	*Unmatched*	19.630	21.565	−18.600		−1.810*
	Matched	19.630	19.036	5.700	69.300	0.530

This table reports the validity test of the balancing property of PSM results. Unmatched indicates unmatched sample. Matched indicates matched sample. See Appendix D for detailed variable definitions. *, **, and *** denote the 10%, 5%, and 1% significance levels, respectively

Appendix H

The process of entropy balancing

Table 17 Entropy balancing approach

Panel A After entropy balancing-appendix						
	Treatment group			Control group		
	Foreign dominant banks			Non foreign dominant banks		
	Mean	*Variance*	*Skewness*	*Mean*	*Variance*	*Skewness*
Bank age	20.02	121.1	1.894	20.02	121.1	3.377
Bank size	13.59	1.872	0.2963	13.59	1.872	0.3191
CAR	12.77	3.561	0.9421	12.77	3.561	1.371
Independent director	0.3311	0.004776	−1.035	0.3311	0.004776	−0.9274
ROA	0.9704	0.06903	−0.5724	0.9704	0.06903	−0.1307
NPL	1.367	0.4252	1.907	1.367	0.4252	1.782
Leverage	6.659	1.319	0.3647	6.659	1.319	0.4356
Liquid	19.23	74.71	0.3388	19.23	74.72	0.9123
Panel B Entropy balancing regression results						
	CSR					
Foreign ownership	0.089***					
	(0.023)					
Constant	3.668					
	(4.059)					
Control variables included	Yes					
N	802					
R-square	0.879					
Bank Fixed Effect	Yes					
Year Fixed Effect	Yes					

This table presents the results of entropy balancing approach. Panels A reports the mean, variance and skewness for the covariates for the treatment group (banks whose largest shareholder is foreign and holding more than 5% of total shares) and control groups (banks without dominant foreign ownership) after balancing, respectively. Panel B presents the regression based on entropy balancing method. See Appendix D for detailed variable definitions. *, **, and *** denote the 10%, 5%, and 1% significance levels, respectively

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Declarations

Conflicts of interest/Competing interests Not applicable.

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