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# Loan guarantee, management earnings forecasts and cost of debt: evidence from Chinese manufacturing firms

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## ABSTRACT

One of the most pressing issues facing developing economies is how to provide expansion capital for existing businesses. However, this issue is more pressing in China, where private enterprises suffer significant financial constraints from capital market limitations. Therefore, the significance of obtaining third-party loan guarantees rises among private firms in the secondary loan market. This study investigates the relationship between loan guarantees and the firm's cost of debt and the moderating effect of management earnings forecasts. We find that loan guarantees have a significant negative relationship with the firm's cost of debt. However, a positive relationship between information asymmetry measures and loan guarantees is more pronounced, suggesting that loan guarantees reduce the significance of information asymmetry issues, which impair borrowing firms' re-payment ability and increase the credit risk of guarantors and banks. In contrast, frequent and quality management earnings forecasts help firms to build their reputation in the market by reducing the concerns of information asymmetry, information risk, agency problems, and loan repayment with banks, which, in turn, benefit firms in reducing their cost of debt. Our study results are robust to the use of two-stage least square analysis, and Heckman two-stage treatment effect model. This work offers the latest contribution to the recent understanding of the effects of loan guarantees in reducing the cost of debt and the vital role of management earnings forecasts in firms' growth.

## IMPACT STATEMENT

A firm's loan guarantee is often recognized as a useful instrument for mitigating the risks involved with borrowing to firms that lack a solid credit history and auditing procedures. However, loan guarantees are frequently associated with riskier or lower-quality borrowing enterprises, which leads to serious information asymmetry problems. This, in turn, has a negative effect on the company's reputation and exposes it to threats of bank and guarantor non-payment. Our empirical study looks at how loan guarantees might reduce debt costs by neglecting information asymmetry in the bank lending process. Furthermore, our findings provide empirical evidence of the substitution effect of management earnings forecasts over loan guarantees in lowering the firm's cost of debt. The findings imply that both loan guarantee and management earnings forecasts have a negative impact on firms' cost of debt in China. First, on the one hand, the loan guarantee lowers the cost of debt by ignoring information asymmetry, which results in adverse selection and ethical uncertainty concerns, both of which raise the default and litigation risks faced by financial institutions and clients. Second, management earnings forecasts have a substitution effect on funding injection into China's bank loans. It may help firms improve their reputations, reducing informational asymmetries concerns such as unfavorable shortlisting and ethical inconsistency, and lowering their cost of debt in banks' credit lending programs. The present study contributes to the most contemporary understanding of the impacts of loan guarantees on debt cost reductions and the critical role of management earnings forecasts in company expansion.

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## 1. Introduction

Although China's external capital market expanded extensively after the establishment of both stock markets (i.e. Shanghai and Shenzhen) in early 1990, however, many firms' especially Non-State-Owned Enterprises (NSOE), are still facing rigorous financial difficulties due to the country's initial public offerings (IPOs) restrictions. For example, to access the equity market under the IPO system, the firms must maintain a high-level listing standard and wait for a lengthy, uncertain period of time for approval from Chinese Security Regulatory Commission (CSRC) authorities (Chu & Xu, 2022). A prior application and clearance from CSRC are required even during seasoned stock offerings by State-Owned Enterprises (SOE) to get access to equity market funds. As a result, the IPO stock market system presents challenges for new and struggling businesses in meeting their capital requirements. Besides, China's corporate bond market is also quite limited and typically facilitates large-scale firms and SOEs.

Furthermore, lately, the trend of a shadow bank system has emerged in the country with peer-to-peer financing. Still, firms consider that the interest rate offered in this system is more remarkable than conventional banking loans. Therefore, various Chinese firms strongly rely on bank lending for additional capital needs (Rizwan, 2021). Considering such a scenario, banks have substantial negotiating rights and usually need an outside party (called a guarantor) to make a lawful enterprise owe the principal lender's loan in the event of a repayment default. Based on the guarantee provider's strong credit history, banks tend to consider listed firms ideal applicants for guarantors. As a secured party, the primary lender benefits from such credit guarantees by relieving the lending restrictions by supplying the borrower with insurance (F. Wang et al., 2020). However, Loan Guarantees (LG) are widely acknowledged worldwide in bank lending due to secured loans and fewer borrowers' default risk. For instance, Beyhaghi (2022) reports that United States banks provided over one-third of personal or corporate guarantees to separate legal entities for corporate loans. Similarly, Dagdeviren and Karwowski (2022) document that guarantees relaxed credit restrictions for firms by fostering access to loan funding in the United Kingdom. In comparison, Storm (2019) finds that LG lowered lending costs by 16–20% and raised total debt's median value to 9.6% in Italian firms. In context to China, Gu et al. (2022) report that more than 50% of Chinese firms are engaged in LG to obtain secured loans. Moreover, during COVID times, studies such as Core and De Marco (2021); Gonzalez-Urbe and Wang (2020), Jiménez et al. (2022); Balyuk et al. (2020); Bartik et al. (2020); Cole (2020); Duchin et al. (2022); Hubbard and Strain (2020) in Europe and the United States examine the banking and other lenders' role as public liquidity conduits through state-guaranteed loans to the Small Medium Enterprises (SME). However, guarantors are often more willing to sustain losses and face greater exposure to risk. In general, to determine the net risk effect, commercial banks may consider the extent of the guarantee provided by the guarantor. For instance, if the borrower default is high, the guarantee's protection becomes more valuable in reducing the bank's net risk. Similarly, if the bank has to pay a fee or premium, this cost must be factored into the net risk calculation. Overall, the net risk effect would be the difference between the gross risk increase and the risk reduction the guarantee provides. If the guarantee effectively covers the potential losses and the cost of the guarantee is reasonable, the net risk effect may be positive (i.e. the bank's overall risk is reduced). Nevertheless, if the guarantee is insufficient or costly, the net risk effect may still increase risk. Overall, the LG commitment aggravates the operating and financial uncertainties experienced by guarantors based on mutual and various obligation arrangement provisions in the case of failure, such as the Monkey King delisting and Leng Guang asset restructuring events (F. Wang et al., 2020).

Similarly, listed firms in the Chinese credit market passively engage in LG relationships due to social capital's motive. Considering this, many listed firms provide bank LG to other peer firms to obtain future guaranteed loans. However, these credit resource exchanges between peer firms may raise the over-guarantee occurrence rate and cause the hardest financial distress for the guarantor. The LG agreements resemble the put-option, as they contain an inherent asymmetry in the distribution of risk and reward for the guarantor. Hence, the guarantor must take downside risks without attaining upside rewards, increasing the debtor's moral hazard. In general, such over-guarantee behavior's listed firms are likely to have a greater risk of default. Thus, the value and viability of listed firms may be significantly harmed by over-guaranteed behavior (Johnson et al., 2000; Jian & Xu, 2012). If managers intend to decline the adverse influence of over-guarantees, they might initially trace the motivation behind the over-

guarantee behavior to evade undue contingent liabilities and possible financial risk (Xu & Wu, 2022). Besides this phenomenon, some studies have shown that LG adversely affects the related parties, such as expropriation of minority shareholders and increase guarantor's debt costs and own audit fee (F. Wang et al., 2020).

Although several previous empirical studies examine the usefulness of LG, but little empirical work has been done on its prospective effect on the system. The significant cause of LG cost is moral hazard and adverse selection, i.e. information asymmetry problem. Since LG provides banks with insurance against default losses, they are encouraged to ask potentially risky borrowing firms to apply for LG. As the guarantors do not differentiate low-risk borrowing firms from risky firms, LG draws many high-risk borrowing firms, leading to inappropriate capital distribution. This potential information asymmetry problem is severely grim in China, where the ratio of LG is more than 50% (Cohen et al., 2019). For example, in the past several decades, the State-Owned Banks (SOB) of China were used as a policy tool by the state administration. The SOBs have not maintained necessary lending records to facilitate future loan allocation, especially for private firms. As a result, this situation forms a more significant information gap between banks' and private firms' relationship. Similarly, this information problem increased when these banks issued loans on LG basis. Because during LG-based loans, the banks act as the critical dominant party in the relationship among the related parties' firms (Vagliasindi et al., 2022). The LG guarantor played a quiet role during the lending and remained unaware of the borrowing firm's activities due to a lack of cooperation, less qualified professionals, and limited access to information dominance, which increased the possibility of guarantors' default risk.<sup>1</sup> For instance, On the one hand, Banks have access to valuable information about borrowers, which can allow them to assess creditworthiness more accurately than entities with less information. This informational advantage can enable banks to make more informed lending decisions and sometimes provide loans to borrowers who might otherwise be considered too risky. As a result, banks can charge a modest interest rate premium for extending credit, taking advantage of their superior information. However, whether this modest interest rate differential is enough to compensate for assuming more risk depends on several factors, such as the bank's risk tolerance, risk assessment accuracy, market conditions, competition, and regulatory factors (N. Chen et al., 2016; Lee et al., 2022; Yan et al., 2017). On the other hand, if banks want to diminish secured loan repayment risk due to the risky nature of borrowing firms, they might adjust their slack behavior and reinforce the monitoring and screening function for a guarantor. In contrast, banks often overlook borrowing firms' monitoring and screening processes that benefit borrowing firms. Thus, this practice harms the critical importance of information asymmetry between borrower firms and banks; as a result, it increases guarantors' default risk and banks' bad debts. Overall, the LG provided to riskier firms rigorously affects the related parties more than other loan technologies. Although the effects of information asymmetry in LG have been noted earlier, however, no empirical study of such a possible problem has been conducted according to the authors' knowledge (Beltrame et al., 2018).

Our research has two goals. First, we want to see whether and how LG might lower COD by ignoring information asymmetry in the bank lending process. Next, our research offers empirical proof of the substitution impact of MEF over LG in reducing the firm's COD. Despite this, common wisdom in the banking industry is that LG is safer since it guarantees loan repayment. However, LG is often linked with low-quality or riskier borrowing enterprises, which creates severe information asymmetry issues, which in turn has disastrous effects on the firm's credibility and exposes it to the guarantor and bank non-payment threats. In addition, the information asymmetry issue could not be disregarded since it is a significant component in determining the success of enterprises' various financing arrangements (Stanula et al., 2020). It also has implications for the structure of bank loan contracts (F. Wang et al., 2020).

In this study, we only address the adverse effects of LG on the firms' repayment and default risks. China's banks see LG as a valuable tool for reducing the risks associated with lending to businesses that lack an established credit history and auditing procedure. This raises an interesting issue about bank lending: if LG is the most crucial approach for Chinese companies to acquire long-term loans without vulnerability, then why has it not been addressed yet? The subject is important because, on the one hand, SOE has direct access to SOB throughout the decision-making process for loans. On the other hand, the state offers an implicit guarantee and verifies that SOE will not fail on their repayments. However, many NSOE have obtained LG via well-known guarantors, institutional guarantee services, and

guarantee circles since they see it as a valuable instrument for mitigating risk and fostering successful partnerships with financial institutions<sup>2</sup>.

Second, we provide data that supports the hypothesis that MEF contributes to COD. The cost of equity in the capital market may be lowered, and information asymmetry can be mitigated with the use of MEF (Bangmek et al., 2020; Ramos Meza et al., 2021; B. Y. Wang et al., 2022). Guan et al. (2020) document that MEF is a proper voluntary disclosure mechanism that assists firms in achieving market earnings expectations and influences their reputation for transparent, precise, and quality reporting. However, little has been undertaken to analyze how MEF affects the decision-making processes of creditors, except for the research work of Hsieh et al. (2019) and Fan et al. (2021). Hsieh et al. (2019) find that firms prefer to provide MEF to announce better news before bank loan initiation, attain benefits from more positive contracts, and draw additional creditors' attention. They find that MEF reduce the associated debt spread by 14.06 basis points over 9 months after the payment quarters activating the loan. In contrast, firms with greater MEF are subject to tighter contracting requirements and draw fewer lenders. Their research also showed that firms systematically issue MEF before they enter into loan contracts and that the information contained in MEF should be integrated into bank loan contracts. In addition, Fan et al. (2021) emphasize the influence of MEF in credit default swaps and found that credit spreads are substantially increasing (decreased) about the good (bad) news of MEF, and the responses are much more significant to the real earnings announcements. Our study intends to extend the literature by examining how MEF affects the firm's COD. In particular, we investigate the following two relevant research questions. (1) whether firms with frequent and precise MEF can reduce the COD of a firm, and (2) whether MEF can be an effective tool or technology to substitute LG in mitigating the information asymmetry problem in the bank lending process.

Our study's baseline regression analysis demonstrates that the LG decreased by 0.048% firm's COD using data from a sample of 800 manufacturing businesses (i.e. 7200 firm-year observations) obtained from China Securities Markets and Accounting Research (CSMAR) between 2010 and 2018. N-Analyst, a proxy for information asymmetry, was found to have a negative and statistically significant effect, suggesting that banks relied on greater analyst coverage when deciding how much to restrict loans to guaranteed firms and how likely they were to require collateral and performance-pricing provisions. As a result of the risk-sharing arrangement, guarantors now bear the brunt of credit risk, even if banks have been lazy<sup>2</sup> in monitoring and screening borrowers. The risk of failure by the guarantor's company and banks is heightened because the LG covenant tends to downplay the significance of information asymmetry, which in turn causes adverse selection and moral hazard concerns. Since the LG assumes the credit risk and shields the borrower from liability, the relevance of information asymmetry between the company and the lender is mitigated when LG is present.

In addition, we find that the MEF coefficient is 0.0128%, negatively and statistically significantly correlated with the firm's COD, demonstrating the importance of MEF in how banks provide loans. Lechler et al. (2019) and Villena et al. (2021) argue that information asymmetry may be quickly mitigated by companies that are prepared to share more information efficiently. As a result, businesses with lower COD may profit from MEF that are both high quality and exact by increasing their access to credit loans. In addition, we discovered a positive and statistically significant coefficient of 0.0382% for the interaction term among LG and MEF, indicating that MEF has a moderation impact on LG and addresses the issue of information asymmetry between banks and firms. Our research offers strong evidence that NSOE has a tremendous potential to receive credit loans on an informal basis, allowing them to minimize their COD even if prior studies have highlighted the critical importance of SOE in China. Overall, our research indicates that LG and MEF technologies have a considerable effect on the lending practices of financial institutions. Endogenous LG provides a possible endogeneity and self-selection bias problem, which is a cause for worry in our research. For this reason, we used Heckman's (1979) two-stage approach, which allowed us to consider that distinct potential determinants may have differential effects on each LG stage. A large proportion of businesses often choose not to use LG, but by using these techniques, we can mitigate the risks of endogeneity and self-selection bias. Despite the possibility of self-selection bias, Heckman's (1979) two-step analysis demonstrates a negative correlation between LG, MEF, and COD. For instance, a 1% increase in LG for the typical business in the sample was associated with a 7.78% drop in



COD. MEF increases of 1% were associated with a 0.90% drop in COD at the median businesses in the study. The rest of our study's conclusions are equally economically meaningful but different.

Our research confirms this hypothesis, and our findings are consistent even after using the various analysis methods; these data demonstrate that LG decreases the COD but at the expense of the parties' ability to communicate effectively on crucial informational matters. Our research adds to the scholarly canon in two ways. First, LG is negatively associated with COD, implying that firms receiving LG reduce their COD in China. Further, to bridge the literature gap in the bank-firm lending relationship in Chinese firms, our study examines how LG affects China's bank lending process at the cost of information problems. The series of tests show negative results of information asymmetry variable, i.e. N-Analyst, which specifies that the presence of higher analyst followings of guarantor firms, banks require less intense monitoring and due-diligence because credit risk of the borrower is bear by the guarantor. Therefore, lending banks avoid screening and monitoring the activity of borrowing firms, which reduces the importance of the information asymmetry problem. In general, this negligent behavior by banks can affect funds allocation to support safe borrowers with lower riskiness and increase banks' default risk. Prior studies about LG in China discuss the motivation of LG, determinants of LG, and economic consequences of LG (Gurmessa & Ndinda, 2014; Q. Huang & Lu, 2017; Kim & Rhee, 2009; Ramos Meza et al., 2021; Shi et al., 2019; B. Y. Wang et al., 2022).

Our study, however, is up-to-date since it highlights how corporations increasingly use LG to raise the default risk of guarantors and banks. Second, this research adds to the literature on bank credit loans by providing evidence that MEF are an essential part of the bank credit loan procedure that helps businesses reduce their COD. Previous research has largely ignored the essential function of MEF in the credit lending process. As a result, we want to provide more clarity on how MEF might dramatically impact information asymmetry in the credit lending process between bank enterprises and firms that profit from reduced COD. Our research differs from others in its focus on wages and incorporation of a new earnings element that expands the body of information. As MEF has a replacement impact on LG, it boosts the firm's reputation and reduces information asymmetry between banks and borrowing businesses, and we expect that more MEF in the future will play a significant role in getting smooth bank credit loans.

As for the rest of the paper, it is organized as follows: The literature reviews and hypothesis formulation are discussed in [Section 2](#). The research procedures are described in [Section 3](#). The empirical research is presented in [Section 4](#). The last section is 5.

## 2. Literature review and hypothesis development

The bank's existence is vital as it effectively monitors and screens borrowers, which differentiates them from other stakeholders (Allen & Santomero, 1997; Bhattacharya & Thakor, 1993; Fama, 1985; Goodhart, 1989). Banks' specialization lies in the collection of private information of borrowers and their discreet handling (Freixas & Rochet, 1997). In general, banks gather firms' strategic information about the revenue, expenditure, and growth strategies through managing finances and deposit accounts (Diamond & Rajan, 2001; Ruhle, 1997). Despite the excessive information, interactions between banks and firms are rarely perfect, resulting in occasional credit approval or rejection mistakes. Therefore, banks face information asymmetry problems (Freixas & Rochet, 1999) in a manner that the credit market cannot be cleared by the changes in prices (interest rates). Consequently, this leads to an equilibrium of non-Walrasians, where some agents remain unsatisfied (Bonnet et al., 2016). Empirical studies on seminal theory postulated that it is difficult for firms to access long-term loans without a credit rating (Diamond, 1991; Jaffee & Modigliani, 1969; Stiglitz & Weiss, 1981). For example, Stiglitz and Weiss (1981) provide a substantial justification for policy action by formalizing the condition where credit rationing might arise in the information asymmetry regime. The collateral channel has been the primary mechanism used by these schemes to address the perceived credit rationing. However, the lender may opt for credit rationing due to information imperfection and associated high risk (Chan & Thakor, 1987; Jaffee & Modigliani, 1969; Stiglitz & Weiss, 1981). Overall, prior studies on credit rationing indicate that in the real world, the significance of this phenomenon remains uncertain due to its mixed results (Berger & Udell, 1992; Fazzari et al., 1988; Hall, 1992). Similarly, the literature on credit rationing has also extensively explored the

significance of collateral in this context. For example, Besanko and Thakor (1987) and Bester (1985) contended that collateral may function as a tool for sorting because borrowers provide collateral for loans against higher quality projects with low risk of default. Therefore, collateral acts as a sorting tool for banks to categorize high-risk and low-risk borrowers. This approach allows banks to reduce information-related issues. In addition, the ex-post theory argues that collateral is desirable by banks from riskier borrowers (Fang et al., 2020) to mitigate higher credit risk associated with borrowers (Jiménez & Saurina, 2004; Berger et al., 2017). Despite having high-quality projects, not all enterprises have access to collateral. This issue indicates a key reason to justify public sector involvement in capital markets through implementing loan guarantee schemes (Levitsky and Prasad (1987); Cowling (2010) and Cowling et al. (2023)). Our objectives of this study is to present the arguments of how the LG mechanism modifies the significance of information asymmetry in lowering bank loan rates and favoring enterprises with lower COD. We then describe how MEF helps firms with lower COD by solving the information asymmetry issue between banks and firms.

### **2.1. Loan guarantee and cost of debt**

Our study suggests two inclusive arguments on how LG may affect the cost of debt. The first argument is focused on the importance of information asymmetry. Olivares-Caminal and Mustapha (2020) provide evidence that firms that confront more significant uncertainties are likely to give imprecise information. Although guaranteed loans may successfully enhance credit availability, Ramos Meza et al. (2021) discovered that enterprises involved in loan guarantees are more likely to fail than firms borrowing without a loan guarantee due to the information asymmetry issue.

Given the greater likelihood of information asymmetry problems triggered between the borrowing firms and banks in LG activities, banks are less likely to increase the choice of compliance and substantive monitoring, decrease scrutiny procedures, reduce the monitoring period, and use less experienced monitoring teams. For instance, banks may examine whether the guarantor has a sound financial position and debt repayment ability. Therefore, banks will charge lower interest rates for compensation for information asymmetry issues. Armstrong et al. (2015) emphasized the importance of information intermediaries, particularly financial analysts, in lowering the information asymmetry issue in bank lending. According to their research, financial institutions are more likely to provide credit to companies with extensive analyst coverage, have reduced collateral requirements, and use performance pricing clauses. The study also revealed that banks are more data-conscious when extending credit to companies with extensive analyst coverage and less likely to create active syndicates when dealing with debtors of poor credit grades. Since the LG provider, in other words, the guarantor is often a significant organization with greater information disclosures and more assurance to the bank in repayment risk, LG is essential for low-quality borrowers to access bank credit.

Although the LG's influence in lowering COD and further distorting the significance of information asymmetry has not been studied in previous research, it has been the subject of several investigations on the effects of bank lending in China. For example, Ge et al. (2020) discovered that SOEs had a COD than NSOE's owing to state dominance and associated information asymmetry issues. According to the results of their research, banks often provide guarantor businesses a 'conditioned debt' at a higher cost interest rate to compensate for the increased risk of the loan caused by the guarantee. For this reason, Chinese guarantor firms should avoid pursuing guaranteed loans. Compared to collateralized loans and credit loans, secured loans have a higher default risk, according to research by D'Hauwers et al. (2020). The study concluded that guarantors do not have access to more confidential information about businesses than banks do. Therefore, guarantors face several information asymmetry difficulties, including adverse selection and moral hazard, which may raise the default rate of the guarantee business.

Several recent incidents in China have raised concerns that linked parties' interests would be harmed by the issuing of LG (El-Helaly, 2018). Therefore, guarantors often levy a more significant premium cost since they have restricted access to participate in companies' price differential generated from the company's risk. In this case, the increased premium may lead to higher business loan costs, further exacerbating the adverse selection issue that forces low-risk companies out of the credit market. The moral



hazard is also made worse since corporations may be tempted to participate in more risky plans due to the increased financing costs (Knight, 2020).

In light of the preceding, we postulate that riskier firms may obtain bank loans at a minimum value i.e. risk-free interest rate, to the benefit of firms with lower COD, even though LG can act as a signaling tool for banks to differentiate the ex-ante riskiness of firms (Liu et al., 2016). Dong and Yang (2023) argued that the role of LG is to transfer default risk to insurers; thus, the bank loan decreases to the minimum value, i.e. the risk-free rate. On the other hand, we suggest that LG lessen the impact of information asymmetry across banks and companies, which raises the default risk for banks and guarantors. Due to information asymmetry, LG borrowers are more likely to default than non-borrowers (Ramos Meza et al., 2021); thus, LG has a higher default risk than other lending technologies (D'Hauwers et al., 2020). The first hypothesis follows what has been said thus far. The information asymmetry is the basis for the second argument.

H<sub>1</sub>: Loan guarantees have a negative impact on the cost of debt in a Chinese context.

## **2.2. Management earnings forecasts, loan guarantee, and cost of debt**

The information asymmetry problem in China highlights the country's poor institutional conditions (Zhang et al., 2019). In a bank-firm interaction, asymmetric information difficulties are common in China, as Jing et al. (2022) noted, since banks have been used as an essential policy instrument by the government for decades. Banks cannot base credit loan distribution choices on the credit histories of NSOE, which is a significant problem. Lending to NSOE becomes problematic in this situation due to information asymmetry. According to Abou Saleh and Al Tuwaijri (2022), during the early stages of a bank's engagement with a company, the bank lacks the time to collect sufficient qualitative information about the company to make informed lending decisions. Since NSOE in China still have informal accounting procedures, internal management control weaknesses, and corporate governance concerns, Chinese banks need to recognize signals and evaluate the quality of possible borrowing enterprises, as Lin et al. (2020) noted.

Given the difficulty in obtaining such loans, the existing literature revealed that China had paid little attention to the credit loan lending industry. For example, Tian et al. (2022) documented that Chinese firms having a closer relationship with banks are more likely to apply for credit loans only because these loans are presumed to a relationship-based loan in China. Y. Huang et al. (2020) and Jin et al. (2022), using data from personal and SME loans in China, confirmed the lower risk of credit loans compared to secured loans by LG, as established in the original research by Orgler (1970). In addition, as recently documented by Kamal and Abu-Hijleh (2022), businesses should concentrate on qualitative information in order to mitigate the information asymmetry problem and secure credit loans; this demonstrates the firm's credibility and economic organization, both of which are necessary for the successful repayment of the loans. According to several pieces of literature, Chinese businesses need a tool to provide vital information about the enterprises' reputation, economic strength, and payback capabilities to banks throughout the screening process. Corporate governance, financial performance, and political ties have all been shown to have promise as reliable indicators in corporations' lending (Bandiyono, 2020; Braun, 2022; C. C. Chen et al., 2020). This research, however, tries to supplement the literature by proposing an alternative to an LG in the form of a MEF, which can help businesses present their financial standing and creditworthiness to banks in the form of soft information so that the banks will be more willing to extend credit and the firms will have a lower cost of borrowing.

According to Anderson et al. (2020), to establish a company's financial health and capacity to repay a loan from future commitments, banks need both past data and projections for the future, i.e. MEF. For this reason, MEF as prospective data may be relied upon as a helpful resource for businesses and financial institutions throughout the loan procedure. Moreover, Diaz-Becerra et al. (2021) argued that MEF is a crucial voluntary disclosure tool that may affect a company's image by delivering a precise and transparent assessment of the firm's trustworthiness. By providing consistent, accurate, and up-to-date information over time, MEF aids in developing a company's standing, which is seldom subject to rapid change. While doing so, the gap in knowledge between the company and its stakeholders is narrowed,

making the desired outcome more likely to materialize. Firms are making more frequent and timely information disclosures, mainly MEF may accomplish a wide range of market goals, including a reduced cost of capital/debt, as evidenced by Ramos Meza et al. (2021).

Both MEF and the COD are grounded in theory; for example, Luo et al. (2019) research was the first to show a negative correlation between disclosure quality and COD. We agree with Ibrahim et al. (2021) contention that MEF precision in an earlier time period indicates a company's ability to provide reliable forecasts of its future credibility and debt repayment capacity. Based on this signal, financial institutions may formulate an accurate prediction of the future value distribution of a company in the context of loan contract conditions since MEF is an efficient means of spreading good tidings in advance of the disbursement of bank loans (Hsieh et al., 2019). Consequently, MEF gives quantitative information that is readily apparent and accessible at minimal cost for banks to map interest rates and future data. As a result, we believe that MEF is a crucial tool that might replace LG to get credit loans in China as it can give accurate information more than any other accounting source, which in turn helps to alleviate issues related to information asymmetry and provides a net advantage to businesses in the form of reduced COD (Gambetta et al., 2019). Our second hypothesis follows naturally from the first.

H<sub>2</sub>: There is a substitution impact between management's earnings forecasts and loan guarantees in reducing the cost of debt.

### 3. Research methodology

#### 3.1. Data and sample

From the China Securities Markets and Accounting Research (CSMAR) Database, we gathered data on the LG, MEF, COD, and control factors for the 2010 to 2018 period. We zeroed primarily on A-share listed companies because they make up the backbone of China's listed companies and because a shift in their COD may have far-reaching effects on the country's financial markets. Furthermore, the financial information landscape of these companies is distinct from that of B and H share companies. The manufacturing industry is the most important in China and has a total market value of 14.5 trillion RMBs, which is why we focus on it. We exclude 1292 observations from the 10,835 firm-years of non-financial manufacturing from the sample period due to missing values on LG, 245 observations due to missing values on the COD, and 2098 observations due to insufficient data on other variables. This gives us a total sample size of 800 businesses and 7,200 firm-year data to evaluate our assumptions. Additionally, we winsorized the chosen continuous variables at the 1 and 99% levels to lessen the effect of outliers or misreported data in the dataset.

#### 3.2. Variable descriptions and regression models

Using COD as the dependent variable, this work follows a previous empirical study by Liu et al. (2016). For the purpose of calculating COD, we multiplied the company's interest costs by its total annual short- and long-term debt. In descriptive statistics, Pittman and Fortin (2004) argue that the COD variable is a noisy proxy for the firm's interest rate, necessitating the trimming of data to adequately explain outlying occurrences. Since Henry and Sansing (2018) note that deleting observations is often employed to control the noise impact generated by accounting ratios carrying extremely small denominators, our investigation excludes and removes businesses with extreme observations.

Our study's choice of quantitative methodologies demonstrates a deliberate approach to address the complex challenges inherent in empirical analysis. Furthermore, adopting Two-Stage Least Square (2SLS) models is appropriate for addressing potential endogeneity concerns that may arise from bidirectional relationships between LGs, the cost of debt, and other variables. By instrumenting endogenous variables, this approach ensures unbiased estimates, enhancing the credibility of the study's findings. Additionally, the inclusion of the Heckman Two-Stage Treatment Effect Model demonstrates the researchers' diligence in mitigating selection bias or sample selection issues, which are crucial when analyzing firms with and

without LGs. In summary, the careful selection of these methodologies elevates the research's empirical contributions and reinforces the dependability of the examined relationships.

The proportion of companies that have received LG is the main independent variable we are interested in. We determine LG using the amount of the outstanding guarantee as of the end of the year divided by the total assets as of the end of the year (as per Liu et al., 2016). With a COD, we anticipate a negative coefficient of LG (Saito & Tsuruta, 2018). The second factor we're interested in is the MEF adjustment variable. When an organization issued MEF in the given year, we assigned it a value of one and considered it worthless. H2 argues in this research that MEF may stand in for LG and help lessen the impact of the information asymmetry issue and COD. H. Wang et al. (2021) state that a negative relationship exists between MEF and COD. Companies with lower COD gain from the MEF because the signals it sends about a firm's creditworthiness and economic strength in repaying its loan commitments assist in reducing the information gap between banks and firms. Due to MEF's improved data quality, banks may worry less about predicting default risk. Our study incorporates a variety of controls variables in regression models, such as the number of financial analysts releasing earnings forecast (N-Analyst) as a proxy for information asymmetry, based on prior research on COD (Badertscher et al., 2019; Putri & Rahyuda, 2020). It may be quantified by counting the times in a given year that financial experts provide earnings predictions for the companies in question. N-Analyst is a negative indicator of information asymmetry, as stated by Lang and Lundholm (1993). Financial institutions often use n-Analyst as a proxy for gauging the level of information asymmetry between themselves and borrowers. According to the research of Chiou and Shu (2017), the lower N-Analyst involves a greater degree of information asymmetry between the bank and the company. Firm size (FS) is determined by taking the natural logarithm of a company's total assets as of the last day of the fiscal year. According to research by Putri and Rahyuda (2020), FS is inversely related to a company's cost of debt. A negative coefficient of FS indicates that large firms are less likely to take risks due to their greater assets and more promising growth prospects.

The SOE are evaluated as having a value of 1 at the start of the year if they are possessed or managed by a state agency and a score of 0 elsewhere (a negative coefficient is predicted owing to implied LG by the government) (Subedi & Farazmand, 2020). If the company is inspected by one of the Big 4 auditors in a given year, then the Big 4 audit quality (B4AQ) is 1; alternatively, it is 0. It regulates the size-related impacts on the auditory system. In developing nations, where auditing and financial reporting frameworks are weak, businesses audited by multinational companies enjoy higher reliability and faster service than their domestic counterparts (Rykaczewski et al., 2022). When looking at COD, audit quality seems to be inversely related (Stefano & Tatiana, 2018). Following what has been found in previous research on COD (Cheng et al., 2020). We manage the company's leverage (LEV), a measure of its exposure to failure derived from the ratio of its entire commitments to its total assets. However, COD and default risk rise over a threshold when leverage exceeds that threshold. It is thus an analytical issue what effect leverage has on the COD. In addition, there is a correlation between the age of a company and its default rate, with younger companies being riskier (Coluccia et al., 2020). As a result, the cost of doing business is greater for newer companies. Firms that generate more cash flow from operations (CFO) are in a better position to make their debt payments; thus, they may choose a lower cost of debt (COD). However, as argued by Ding et al. (2022), a greater CFO may result in a lower COD if the creditor determines that the company has excess free funds that are expected to be invested with minimal returns or even value destruction.

Generally speaking, debt is employed by more established companies when they are in need of external finance, which is a factor that is governed by the firm's maturity (Aziz & Abbas, 2019). As previous research by Putri and Rahyuda (2020) shows, the importance of borrowed funds increases with a company's revenue (Grow). It is advocated that a negative coefficient be used since it is believed that growing businesses have a lower probability of defaulting on their borrowing. We managed ROE as an indicator of access to internal financing; a high ROE indicates looser credit restrictions. Higher returns on equity may indicate more growth prospects, which in turn may impose more significant limitations. Higher-profitability businesses, showing easier availability to intrinsic financing and less likelihood of being credit-constrained, are indicated by a negative and statistically significant ROE (Ferri & Murro, 2015). Tobin's Q, which is calculated as the current worth of stock plus the accounting value of debt multiplied by the company's net capital, was also within our control. Lastly, our research replicates

Mueller and Stegmaier (2017) use of a ‘controls industry dummy’ and ‘year fixed effects’ to eliminate noise in the data.

### 3.3. Model specification

Firstly, we design a framework to investigate the function of LG in reducing the company's COD, drawing inspiration from previous research (Borisova et al., 2015). As LG produces data imbalance between the guarantee, the financial institution, and the enterprises receiving loans, we also analyze LG's effect on minimizing the significance of asymmetric information in bank lending (as the primary debtor). For our first model, we will use the following structure.

$$COD_{it} : \beta_0 + \beta_1 LG_{it} + \beta_2 N - Analyst_{it} + \beta_3 LEV_{it} + \beta_4 ROE_{it} + \beta_5 FS_{it} + \beta_6 SOE_{it} + \beta_7 B4AQ_{it} + \beta_8 FA_{it} + \beta_9 CFO_{it} + \beta_{10} Grow_{it} + \beta_{10} T.Q_{it} + Ind.FE + Yr.FE + \varepsilon_{it} \quad (1)$$

Also, we want to see whether MEF has a replacement impact on an LG in terms of reducing the knowledge gap between enterprises that rely on bank financing and those that depend on COD subsidies. By increasing the reliability of their information, businesses may mitigate the effects of the asymmetric information issue and qualify for reduced interest borrowing costs, as stated by Rahman et al. (2017). As a result, more bank financing options may be created due to MEF's efforts to enhance data quality. The MEF x LG moderating effect is also of particular importance in model 2. Using the interaction term, we can research how significantly the MEF influences the LG variable on the loan choices made by banks. The sign and significance level of the coefficient that was determined on the model's interaction term rarely communicates the degree to which a moderator variable impacts the relationship between the explanatory and dependent variables in this model (Ai & Norton, 2003). Based on our findings, we anticipate a positive coefficient for this relationship, which would highlight the critical role that MEF plays in reducing businesses' COD and substitution impact on LG. Here's the breakdown of the second model:

$$COD_{it} : \beta_0 + \beta_1 LG_{it} + \beta_2 MEF_{it} + \beta_3 LG \times MEF_{it} + \beta_4 N - Analyst_{it} + \beta_5 LEV_{it} + \beta_6 ROE_{it} + \beta_7 FS_{it} + \beta_8 SOE_{it} + \beta_9 B4AQ_{it} + \beta_{10} FA_{it} + \beta_{11} CFO_{it} + \beta_{12} Grow_{it} + \beta_{13} T.Q_{it} + Ind.FE + Yr.FE + \varepsilon_{it} \quad (2)$$

In Appendix A, we have listed every model variable and explained their significance.

## 4. Empirical results

### 4.1. Descriptive statistics

The descriptive data reported in Table 1 indicated that COD and LG mean values were 0.096 and 0.052, respectively. The overall mean of the latter shows that LG is prevalent among Chinese listed businesses, and 52% of sampled firms-year records obtained an LG. Regarding this, the average score of MEF (0.582)

**Table 1.** Descriptive table.

Variable	Observations	Mean	Std. dev	Min	Max
COD	7,200	0.0960	0.1390	0.0160	1.5510
LG	7,200	0.0520	0.0870	0.0000	1.3440
MEF	7,200	0.5820	0.4930	0.0000	1.0000
N-analyst	7,200	5.6750	7.9760	0.0000	39.0000
Lev	7,200	0.4320	0.2100	0.0070	3.2620
ROE	7,200	0.0810	0.0710	0.0000	0.4000
SOE	7,200	0.6540	0.4760	0.0000	1.0000
B4AQ	7,200	0.0430	0.2030	0.0000	1.0000
Tobin's Q	7,200	1.9240	1.6330	0.0000	13.5970
FA	7,200	9.2410	6.4530	0.0000	29.0000
CFO	7,200	0.0490	0.0760	-1.6860	0.4080
Grow	7,200	0.0720	0.2310	-2.5790	0.9930
FS	7,200	22.0240	1.1140	18.7600	27.1040

suggests that severe government involvement causes many enterprises to restrict disclosing periodic earnings prediction. Besides this, the overall 65% of Chinese industrial enterprises are SOE. However, on average, 04% of Chinese industrial companies are inspected by big4 auditors. The ROE, Grow, and CFO mean readings were 0.081, 0.072, and 0.049, respectively. Yet, some businesses have a terrible fiscal situation, as evidenced by a negative lower limit of ROE. The remainder of the control variables comprising FS and FA and T.Q had average scores of 22.024, 9.241, and 1.924, respectively.

## 4.2. Correlation results

Table 2 displays the stated outcome of the covariance matrix. The major independent factors have a statistically significant inverse relationship with COD. Businesses that get LG have a lower COD ( $p0.001$ ), lending credence to the initial hypothesis H1. Consistent with our second hypothesis, H2, we find a negative correlation ( $p0.10$ ) between MEF and COD, suggesting that MEF has a curative effect on COD. Inversely linked N-analysts ( $p0.001$ ). COD was also significantly correlated negatively with LEV, SOE, FA ( $p0.001$ ), and FS ( $p0.10$ ). The association between COD and T.Q. was also favorable and statistically significant. In contrast, no noticeable link exists among COD and B4AQ, Grow.

## 4.3. Baseline regression analysis

Based on the data, we estimate Equations 1 and 2 for 800 firms over the longest possible period. LG for each analyzed firm-year observation is the main independent variable. Methods for analyzing panels of data, such as pooled ordinary least squares (OLS), fixed effects, and random effects, have all been implemented here. The F-test findings point to fixed effect estimates as preferable to pooled OLS. And apart from that, the Hausman test findings endorse the fixed effect estimation approach over random effects.

All of the significant regression findings are shown in Table 3. Our null hypothesis H1 is supported by the sizeable negative coefficient of LG (0.048%) on COD in column 1. In addition, a negative and statistically significant N-Analyst coefficient suggests that when making loans, banks are more likely to rely on more excellent analyst coverage, resulting in lower interest rates, lower collateral requirements, and lower performance pricing provisions for loans made to guaranteed firms. Since the banks were no longer responsible for credit risk under the risk-sharing arrangement, they became lax in their screening and monitoring duties and failed to catch on to the fact that the guarantors were now bearing the brunt of the risk. Additionally, the LG covenant reduces the significance of information asymmetry, which causes adverse selection and moral hazard problems and raises default and lawsuit risks for banks and guarantor companies.

Consequently, with LG present, the value of information asymmetry between the borrowing business and the bank is diminished. These findings are in line with the theoretical prediction that in the presence of information opacity, LG is a valuable device to mitigate the impact of information asymmetry between banks and firms, ultimately benefiting LG firms through lower COD (Crawford et al., 2018; Park et al., 2017). Additionally, a negative coefficient of SOE on COD indicates that the state has greater control over a greater number of firms in China, giving them preferential access to loans from state-owned

**Table 2.** Correlation analysis.

Vari	1. COD	2. LG	3. MEF	4. N-Analyst	5. LEV	6. ROE	7. SOE	8.B4AQ	9. T.Q	10. FA	11. CFO	12. Grow	13. FS
1	1												
2	-0.0631***	1											
3	-0.0259*	0.1231***	1										
4	-0.0461***	0.0132	0.0680***	1									
5	-0.4592***	0.0297*	-0.0667***	-0.1251***	1								
6	0.2496***	-0.0887***	-0.1489***	0.0358**	-0.1604***	1							
7	-0.0720***	-0.0109	-0.1000***	-0.0394**	0.1419***	-0.0217	1						
8	0.0067	-0.0448***	-0.0557*	-0.0194	0.0616***	0.1036***	0.0533***	1					
9	0.2968***	0.0823***	0.0305**	0.1074***	-0.4296***	0.2501***	-0.0958***	-0.0686***	1				
10	-0.1597***	0.0236	-0.2243***	-0.0785***	0.3442***	-0.0392*	0.0656***	0.0944***	-0.0591***	1			
11	0.2050***	-0.0291*	-0.0500***	0.0079	-0.1525***	0.3899***	-0.0231	0.0713***	0.1482***	0.0673***	1		
12	-0.0047	-0.0468***	-0.0374**	0.0238	-0.1120***	0.3077***	-0.0389**	0.0019	0.0846***	-0.1520***	0.0558***	1	
13	-0.1762*	-0.1143***	-0.1391***	-0.0295*	0.3857***	0.0826***	0.1589***	0.3471***	-0.3883***	0.3045***	0.0924***	-0.001	1

\*, \*\*, \*\*\* presents level of significance at 10%, 5% and 1%, respectively.

**Table 3.** Results of baseline regression analysis.

Variables	Model-1 COD	Model-2 COD
LG	−0.04800** (0.02007)	−0.07979*** (0.02552)
MEF	−	−0.01284** (0.00513)
LG*MEF	−	0.02823** (0.01099)
N-Analyst	−0.00380*** (0.0012)	−0.00212*** (0.00058)
Lev	−0.22260*** (0.01476)	−0.09619*** (0.01425)
ROE	0.16161*** (0.03352)	0.14783*** (0.03844)
SOE	−0.03893** (0.01673)	−0.03378** (0.01609)
B4AQ	0.04436** (0.01887)	0.05019** (0.01956)
T.Q	−0.00225 (0.00156)	−0.00427** (0.00174)
FA	−0.00784 (0.00483)	−0.00529 (0.00641)
CFO	0.04581* (0.02491)	0.04265 (0.02605)
Grow	−0.02414*** (0.00751)	−0.01779** (0.00767)
FS	−0.02937*** (0.00552)	−0.04499*** (0.00610)
Constant	0.84888*** (0.12515)	1.15487*** (0.13982)
Industry FE	Yes	Yes
Year FE	Yes	Yes
R-squared	0.108	0.076
Hausman Chi <sup>2</sup>	166.050	187.920
Observations	7,200	7,200

*Notes:* The cost of debt (COD) is the dependent variable. The loan guarantee (LG) is the independent variable. Management's Earnings Forecast (MEF) is the only variable used for adjustment. \*, \*\*, \*\*\*present degree of significance at 10%, 5%, and 1%, respectively, for the t-statistics values presented, which are reported as (White, 1980) robust standard errors. [Table 1](#) provides definitions of the variables.

banks at a lower interest rate and minimizing the impact of information asymmetry at the time the loan originated. Economically, the remainder of the data in (Column 1) is noteworthy since decreasing COD is correlated with falling from the top percentile of LG to the lowest decile of LG.

The impact of MEF on the company's COD when LG is included is seen in [Table 3](#) (model 2). On the other hand, the negative coefficient of LG suggests that the 0.079% lower COD subsample may be found among enterprises that get LG. The negative coefficient of MEF is small (0.0128), but its size shows that it significantly reduces COD. Our second hypothesis, H2, was supported, and the findings of previous investigations were confirmed by the data (Liu et al., 2016; Xiong et al., 2021). In addition, as predicted by our alternative hypothesis H2, the critical factor of relevance in model 2 was the LG and MEF association term with a positive coefficient, i.e. 0.0382. These findings give empirical support for the hypothesis that an LG's exposure to high-quality information gained via MEF reduced the informational asymmetries issue between the bank and the company, which in turn benefited the business by reducing COD. In addition, SOE in China plays a prominent role in securing more borrowed funds on a light data foundation. Still, our research shows that NSOE has a better chance of obtaining credit financing on information grounds, allowing them to lower their COD. Our research indicates that MEF had a significant effect on bank financing.

#### 4.4. Additional analysis

In [Table 4](#), we compare the SOE and NSOE enterprises and analyze the average differences in their features. Test data for the standard deviation in company attributes between the SOE (treated group) and NSOE are shown in the table below (control group). We discover that the anticipated inclination ratings



**Table 4.** Result of mean difference test.

	SOE firms = 1		NSOE firms = 0		Mean difference (= Treated – Control)	t-Statistics
	N	Treated	N	Control		
COD	4680	0.089	2520	0.110	−0.021	4.676***
LG	4680	0.031	2520	0.029	−0.002	0.708*
MEF	4680	0.546	2520	0.650	−0.104	6.510***
LG*MEF	4680	0.021	2520	0.027	−0.006	2.253**
N-Analyst	4680	5.447	2520	6.107	−0.661	2.554**
Lev	4680	0.454	2520	0.391	0.062	−9.283***
ROE	4680	0.080	2520	0.083	−0.003	1.405***
B4AQ	4680	0.024	2520	0.028	−0.004	−3.457***
T.Q	4680	1.810	2520	2.139	−0.329	6.235***
FA	4680	9.549	2520	8.658	0.890	−4.260***
CFO	4680	0.048	2520	0.051	−0.004	1.495
Grow	4680	0.066	2520	0.084	−0.019	2.522**
FS	4680	22.152	2520	21.780	0.372	−10.421***

Notes: the cost of debt (COD) is the dependent variable. The loan guarantee (LG) is the independent variable. Management's Earnings Forecast (MEF) is the control variable, while the other variables serve as the adjustment. \*, \*\*, \*\*\*present degree of significance at 10%, 5%, and 1%, respectively, for the t-statistics values presented, which are reported as (White, 1980) robust standard errors. Table 1 provides definitions of the variables.

of these two categories are not drastically different from one another. They are comparable in terms of total company size, annual revenue growth, debt, and cash flow from operational activities. It is worth noting that the 30% significance level was used in previous research as a matching benchmark. For every listed SOE, L. Huang and Pontell (2022) determine which unregistered SOE is most like it by using a deviance of 30%. The results of these tests indicate that, overall, our comparison is rather precise.

#### 4.5. Heckman's two-stage analysis

While the primary regression findings are substantial and support hypotheses 1 and 2, our research remains conscious of the possibility of self-selection biases. We concentrate on how enterprises' receipt of LG affects their cost of goods produced because if the choice to receive LG is endogenous, it might lead to biased estimates and conclusions. In line with the research of Pandey and Sahu (2019), we employed Heckman's (1979) two-phase selection framework to account for any potential sampling error in LG. We initially apply a probit regression model to see whether there is a correlation between a company's characteristics and LG (LD) (where 1 indicates that the company has an LG at the end of the year and 0 suggests that it does not). Additionally, we use an additional variable, PEF (defined as the percentage of companies in the same sector that provides earnings predictions), in line with Jame et al. (2016). Secondly, we use the Inverse Mills Ratio (IMR) computed in the previous step as an extra endogenous variable in our COD modeling to regulate any potential confounding in LG. Applying the below formula, we compute IMR for two models;

$$\begin{aligned} \text{Probit}(LGD_{it}) : & \beta_0 + \beta_1 N - Analyst_{it} + \beta_2 LEV_{it} + \beta_3 ROE_{it} + \beta_4 SOE_{it} + \beta_5 B4AQ_{it} + \beta_6 T.Q_{it} + \beta_7 FA_{it} \\ & + \beta_8 CFO_{it} + \beta_9 Grow_{it} + \beta_{10} FS_{it} + \beta_{11} PEF_{it} + \Sigma Ind.FE + \Sigma Yr.FE + \varepsilon_{it} \end{aligned} \quad (3)$$

In the first step of probit regression, we have LGD, N-Analyst, LEV, ROE, B4AQ, T.Q, FA, CFO, Grow, and FS as our dependent variables. We included SOE because Ayyagari et al. (2010) research show that state-owned enterprises have easier access to bank financing. Table 5 displays the Probit regression model's initial phase findings, demonstrating that most factors are strongly connected to LG.

The findings of Heckman's second-stage regression analysis are shown in Table 5's columns (2 and 3). At the 1% significance level, the IMR coefficients for the two scenarios in the second phase were 0.776 and 0.847. Accordingly, the COD formula error factors linked with the businesses obtaining LG in (models 1 and 2) are compatible with the LG choice not being arbitrary. While model 2 does include the IMR variable to account for potential unobserved heterogeneity, the LG and MEF variables remain negative and statistically significant. The data shows that, on aggregate, a 1% rise in LG is associated with a 7.78 bps drop in COD for firms in the sample, whereas a 1% drop in MEF yields just a 0.90 bps drop in COD. These studies support the results suggesting that MEF has the prospective or/and replacement impact on LG in reducing COD. Our study's findings hold up well when we account for shortlisting bias.

**Table 5.** Results of Heckman's (1979) two-step selection bias method analysis results.

Variables	1st Step LGD	2nd Step	
		Model-1 COD	Model-2 COD
LG	–	–0.03984** (0.0197)	–0.07768*** (0.02269)
MEF	–	–	–0.0901** (0.0439)
LG*MEF	–	–	0.03883** (0.01946)
N-Analyst	0.00513** (0.00258)	–0.00237*** (0.00032)	–0.00261*** (0.0003)
Lev	1.23414*** (0.12456)	0.36392*** (0.05132)	0.42859*** (0.04784)
ROE	–2.50934*** (0.34817)	–1.19869*** (0.11883)	–1.22411*** (0.11122)
SOE	–0.07209* (0.04344)	–0.07449*** (0.01668)	–0.04860*** (0.00711)
B4AQ	–0.27480** (0.11111)	–0.11445*** (0.02281)	–0.13511*** (0.01806)
T.Q	0.05685*** (0.01547)	0.02687*** (0.00288)	0.02898*** (0.00258)
FA	0.02177*** (0.00354)	0.00449 (0.00485)	0.01169*** (0.00107)
CFO	–0.49461* (0.2972)	–0.22461*** (0.03335)	–0.22523*** (0.03181)
Grow	0.31655*** (0.09341)	0.15479*** (0.01673)	0.15670*** (0.01557)
FS	–0.00859 (0.02349)	–0.02285*** (0.00544)	–0.01627*** (0.00293)
Instrument variable			
PEF	0.0240*** (0.00517)	–	–
IMR	–	0.77668*** (0.0652)	0.84781*** (0.05995)
Constant	–0.80732*** (0.20535)	–0.41643** (0.16233)	–0.67128*** (0.10868)
LR chi2(10)	313.97		
Pseudo R2	0.057		
R-squared	–	0.14242	0.1418
Observations	7,200	7,200	7,200

\*, \*\*, \*\*\* presents degree of significance at 10%, 5%, and 1%, respectively. Appendix A describes the entire variables mentioned above.

## 4.6. Endogeneity test

### 4.6.1. 2-Stage least square (2SLS) analysis

One concern on our baseline analysis is that the LG and MEF are endogenous to COD. The firm having an LG may obtain more advantages due to risky behavior. For example, if the bank does not offer a lower interest rate through an LG, the firms acquire an unsecured loan simultaneously. Thus, additional, unmeasured outcomes could influence the COD during bank lending to an excluded variable bias. Our study is also concerned with MEF because it is a simple proxy for non-price expressions in the lending process. MEF may be associated with several other non-price terms in the lending activities, which may be linked with COD. If the reciprocal relation between price and non-price terms is not arranged correctly, there might be a possible endogeneity problem. According to Arifin et al. (2020), the COD and non-price terms are concurrently established; if these factors are present in the same regression equation, the possibility of endogeneity may increase.

In several classical research studies, endogeneity is a major drawback. Therefore, this study may have omitted variables that can be compared with MEF, LG, and COD, leading to a different relationship between the DV and IVs. Like the baseline modeling, this study intends to decrease the endogeneity issue by testing the impacts of LG and MEF on the COD by combining various controls with a fixed-effect approach for evaluating time-series thresholds. In this study, however, we used another method, i.e. the 2SLS technique, to manage endogeneity (presented in Table 6). Thus, following Al-Qudah et al. (2020), a 2SLS instrumental variable technique was performed. The key results materialized on the COD of a firm; we used a variable instrumental technique on the LG variable in this study. We used a 1st

**Table 6.** Results of 2-stage least square (2SLS) analysis.

Variables	Model-1 COD	Model-2 COD
LG	−0.0352** (0.01206)	−0.05699** (0.01751)
MEF	−	0.0996** (0.0388)
LG*MEF	−	0.06103** (0.02045)
N-Analyst	−0.00348*** (0.0011)	−0.00202*** (0.00057)
Lev	−0.2098*** (0.00675)	−0.07339*** (0.00624)
ROE	0.17441*** (0.02551)	0.17063*** (0.02943)
SOE	−0.02613** (0.00872)	−0.01098** (0.00808)
B4AQ	0.05716** (0.01086)	0.07299** (0.01155)
T.Q	0.01055 (0.00645)	0.01853 (0.00627)
FA	0.00496 (0.00318)	−0.00249 (0.0016)
CFO	0.05861* (0.0169)	0.06545 (0.01804)
Grow	−0.01134*** (0.0005)	0.00691** (0.00034)
FS	−0.01657*** (0.00249)	−0.02219*** (0.00191)
Constant	0.86168*** (0.11714)	1.17767*** (0.13181)
Wl-Test	32.145	30.426
Sargan stats	0.5908	0.6065
Obs.	7,200	7,200
R-sq.	0.192	0.994

\*, \*\*, \*\*\*presents degree of significance at 10%, 5%, and 1%, respectively. Appendix. A describes the entire variables mentioned above.

stage model to define the observed degree of COD with LG lags as an instrumental variable and all controls previously used as exogenous variables (Han et al., 2019). Then, the expected value substituted the LG variable in the 2nd stage model through the 1st stage. The 2nd stage findings showed identical results, showing that the LG decreased COD.

## 5. Conclusion

Our research explored the possible influence of LG and MEF in decreasing the firms' COD. Our curiosity in how LG and MEF affect a company's COD was piqued by the contradictory findings on the impact of asymmetries in data on these two types of firms. We utilized data from the Shanghai and Shenzhen stock exchanges to examine 7200 firm-years of Chinese manufacturing A-share businesses from 2010 to 2018. We discovered that LG and MEF are negatively associated with and considerably reduce the firm's COD. Firstly, we found that while LG helps businesses cut the interest rate on bank loans and reap the advantages of reduced COD, these gains are not substantial. Negative and statistically significant results for the N-Analyst informational asymmetries variable indicate that banking institutions rely on greater reporting quality when making loans to secured businesses with fewer restrictive covenants, a reduced probability of requiring collateral, and a reduced risk of performance-pricing clauses. Nonetheless, lenders transfer financial risks to guarantors underneath the risk-sharing scheme without thoroughly examining the borrowing enterprise's attributes. These LG agreements reduce the significance of asymmetric information, which in turn leads to adverse selection and ethical uncertainty issues, both of which increase the defaults and lawsuit risks faced by financial institutions and counterparties. Since the LG assumes the default risk and offers extra security to the bank, the existence of LG mitigates the significance of information asymmetry between the borrowing business and the bank. Secondly, we discovered a negative and statistically significant relationship between MEF and COD, suggesting that MEF plays a critical role in reducing organizations' COD. The positive and statistically significant direct

relationship between MEF and LG also means that MEF has a replacement impact on cash infusion in China's bank loans. Consequently, MEF may aid businesses in enhancing their reputations, which minimizes informational asymmetries issues like adverse shortlisting and moral uncertainty and lowers their COD in banks' money lending programs.

As a bonus, we discovered adverse outcomes of SOE with COD in both scenarios, suggesting that SOE-controlled enterprises have LG, reducing COD compared to NSOE without LG. It was in line with the idea that SOE benefits from preferential treatment from state-owned institutions in terms of loan strategic planning and cost of borrowing, which in turn helps businesses with a reduced cost of debt. Findings from SOE also indicated that, although LG may improve firm profitability by lowering the interest rates, it ultimately weakens the market prosperity of SOE. Our research adds to the growing body of literature in finance and economics that examines the interplay between the LG, MEF, and COD in developing economies like China. Therefore, the research indicated that MEF had an essential impact in reducing COD, suggesting that subsequent commercial bank issuing decisions may be influenced by improvements in MEF performance.

Theoretical implications arising from this study advance our comprehension of the complex interplay among third-party LG, the COD, and MEF. Notably, the research uncovers the pivotal role of LGs in alleviating capital constraints for private firms in developing economies, with a specific focus on China, as they significantly reduce COD. Furthermore, the positive correlation found between measures of information asymmetry and LGs underscores their function in mitigating challenges related to information and enhancing the creditworthiness of borrowing firms, contributing valuable insights into the underlying mechanisms of LGs in credit markets. Additionally, the study underscores the theoretical significance of MEFs in COD reduction, underscoring the essential role of transparent financial reporting in establishing trust and reputation for firms. On the practical front, these findings offer actionable guidance for various stakeholders, including private firms, financial institutions, and policymakers. Firms operating in developing economies can strategically employ LGs to effectively reduce borrowing costs, thereby freeing up capital for their growth initiatives. The emphasis on the importance of frequent and high-quality MEFs underscores the practical value of transparent financial reporting practices, assisting firms in cultivating trust among lenders and securing more favorable credit terms. Financial institutions may recognize the potential advantages of incorporating LGs into their business strategies, while policymakers may contemplate the implementation of policies that facilitate LG accessibility and foster financial transparency. This comprehensive approach contributes not only to healthier credit markets but also to reduced borrowing costs for firms, ultimately promoting economic growth in developing economies. In summary, this research encompasses both theoretical insights and practical strategies to navigate the challenges of capital constraints, credit terms, and financial transparency in developing economic contexts.

Despite its contributions, this research has certain limitations. Firstly, it primarily focuses on the Chinese context, potentially limiting the generalizability of its findings to other developing economies with distinct financial systems and regulatory landscapes. Moreover, the study assumes a causal relationship between LG and COD, potentially overlooking other factors influencing borrowing costs. There are several promising avenues for future research in this domain. Expanding the geographical scope to encompass other developing economies could offer a broader perspective on the role of LG and MEF in COD reduction. Furthermore, investigating how various types of LG (e.g. corporate guarantees and government guarantees) affect borrowing costs could be a compelling direction. Further research could also delve into the specific mechanisms through which MEFs influence credit risk and COD. Finally, qualitative research methods, such as interviews and case studies, could complement the quantitative findings by providing insights into the motivations and experiences of firms and financial institutions in employing LG and MEF.

## Notes

1. In China, courts have ruled that LG loan agreements are unlawful since a guarantor cannot collect interest if the borrower (LG recipient) defaults. When calculating the leverage ratio, the LG given by the guarantor's company is not included as debt. In addition, because the guarantee receives such a small percentage of the loan

amount when the contract is signed, the payment of the LG cannot serve as a trail. Entrusted loans are agreements in which a bank serves as a guarantor's agent to service the loan.

2. According to Manove et al. (2001), the word lazy used for banks that voluntarily select contract that includes a high level of posted collateral or/and guarantees without screening projects, thus the latter "lazy" would be efficient.

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## Appendix A:

### Variable description

Variable	Definition
COD	Interest expenditure as a percentage of total liabilities (including current and future) is the formula used to determine a company's cost of debt (COD).
LG	The end-of-year guarantee balance as a percentage of total assets
LGD	When a company has a loan guarantee at the end of the year, the value is 1; when it does not, it is 0.
MEF	If a company has issued a prognosis for year t, the MEF value is 1; otherwise, it is 0.
N-Analyst	N-Analyst is the metric of finance analysts, defined as the total number of people who make earnings predictions for companies in a given year.
LEV	Total liabilities divided by total assets is a company's leverage (LEV).
ROE	Return on equity (ROE) is calculated by dividing a company's net income by the market value of its shareholders' equity.
FS	The natural logarithm of the company's total resources at the completion of the firm-year t is known as firm size (FS).
SOE	State-owned enterprises (SOE) are computed with a t value of 1 if the company is initially possessed or managed immediately by the government and a t value of 0 alternatively.
B4AQ	If the company is inspected by one of the Big4 auditors in year t, then the Big4 audit quality (B4AQ) is 1; otherwise, it is 0.
FA	Firm age (FA) is the period since a particular company's initial public offering (IPO).
CFO	Cash Flow from Operations (CFO) is the end-of-year ratio of operating capital flow to cash holdings.
Grow	Revenue growth (Grow) is defined as the percentage increase in sales over a specific time period, and is found by dividing total sales by the difference between the previous sales period and the current one.
Tobin's Q	T.Q. is calculated by multiplying the stock market price by the book price of debt times the firm's net revenues.
Ind.FE	The industry dummy variable is used to adjust for the fixed impacts of the industry.
Yr. FE	The year dummy variable is used to adjust for seasonal and other year-specific factors.