Journal of Business Research xxx (xxxx) xxx–xxx

Contents lists available at ScienceDirect

Journal of Business Research

journal homepage: www.elsevier.com/locate/jbusres

Financial support for micro and small enterprises: Economic benefit or social responsibility?

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ARTICLE INFO

Keywords:
Financial support
Micro and small enterprises (MSEs)
Conditional density
Reallocation scheme
Economic benefit
Social responsibility

ABSTRACT

Regarding the financial support provided to micro and small enterprises (MSEs), deciding whether to prioritize economic benefit or social responsibility is a crucial policy choice, especially in developing countries. This paper establishes a new research framework for density of enterprise output value and wages conditional on loans to balance economic benefit (sales revenue) and social responsibility (employee payroll). Using data on 9125 Chinese enterprises from January 2015 to December 2017, this paper shows that loans have a range effect on sales revenue and employee payroll, which ascends gradually to a plateau and eventually descends. Based on this finding, this paper proposes a reallocation scheme. With total loans unchanged, fixed sales revenue can increase employee payroll by 3.8%. Similarly, fixed employee payroll can increase sales revenue by 5.2%. This study not only provides empirical evidence for financially supporting MSEs, but also provides alternative decision support for policy design.

1. Introduction

With the acceleration of economic and financial globalization, financial resources have become the core of economic development. Enterprises are the fundamental building blocks of the social and economic system, and the largest group of enterprises are micro and small enterprises (MSEs). At all stages of their life cycles, MSEs need access to appropriate financing to survive, function, and grow (Luo, Zhang, & Zhou, 2018). Arena, Bengo, Calderini, and Chiodo (2018) analyzed how startups obtain financing, the financing barriers experienced by these organizations, and the financial instruments most suitable to meet their financial needs. In the current advanced technological world, it is usually assumed that there is sufficient external financial assistance available to promote businesses and MSEs because of the modernization of banking structures and modern ways of financing (see, for example, van der Schans, 2015). Similarly, Ma, Wu, and Gan (2019) documented how credit constraints significantly decrease the number of newly created household businesses. Huang, Liao, and Li (2019) found that only an appropriate loan scale can perform the role of loans in the sustainable innovation of enterprises.

Firms that make a profit or break even perceive it as easier to obtain bank financing than firms incurring a loss (Erdogan, 2019). However, MSEs' excessive financial allocation may delay the exit of poor enterprises from the market and hinder the wider productivity of and investment in MSEs (Nam, 2016). Furthermore, Xia, Liu, and Liu (2017) reported that the correct loan evaluation method and an optimized portfolio allocation model play a strong role in enterprises' profitability. In addition, Shen, Firth, and Poon (2016) proposed that effective loan segmentation by banks has an impact on the capital structure and investment decisions of enterprises. In particular, in facilitating the prosperity and development of MSEs, the allocation of loan resources has an impact on the macroeconomy of MSEs. Matinaro, Liu, and Poesche (2019) stated that a sustainable business development model and the allocation of financial resources must be optimized to improve the economic development ability of MSEs. Unlike commercial enterprises, social enterprises have a dual mission to improve social as well as economic performance (Bhattarai, Kwong, & Tasavori, 2019). The social performance of an enterprise refers to creating social value or achieving social missions, goals, and objectives, whereas economic performance refers to the performance of enterprises in obtaining economic value from their activities.

The main contribution of this paper is to present empirical research on how to balance economic benefit and social responsibility. This balancing act is vital to ensure economic growth as well as social wellbeing. This paper explores changes in financial resource allocation for MSEs in China. This paper uses MSEs in Taizhou (a city in Eastern

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https://doi.org/10.1016/j.jbusres.2020.01.071
Received 20 November 2019; Received in revised form 30 January 2020; Accepted 31 January 2020

China) for the study sample and examines the impact of these enterprises' financial resource allocation on economic benefit and social responsibility. MSEs in Eastern China are usually more dependent on bank financing than those in Central and Western China. Taizhou is a state-level experimental zone for MSE financial service innovation. It also represents a national model of social credit system construction in the Zhejiang province of China. It has a Credit Information Sharing Platform for financial services. This platform can effectively solve the information asymmetry problem. It sets up the first credit guarantee fund for MSEs in mainland China, after the fund originated in Taiwan. Its aim is to strengthen the financial position of MSEs and help them to avoid difficulties with financing.

On this issue, this paper attempts to answer two specific questions. First, which enterprises have been most affected by the used loan amount? Second, from the perspective of the maximization of social responsibility or economic benefit, has the loan amount allocated to these enterprises reached local optimal allocation and, if not, how should financial resources be reallocated?

The contents of this paper are arranged as follows. Section 2 describes the theoretical framework. Section 3 details the method. Section 4 presents and discusses the empirical results. The paper concludes with a discussion of the findings, implications, and final remarks.

2. Theoretical framework

Some of the most notable early contributions to corporate social responsibility (CSR) theory can be attributed to Carroll (1979), who postulated a CSR pyramid that includes a hierarchical classification of the CSR concept, involving economic, legal, ethical, and philanthropic responsibilities. The definitions of the concept of CSR and the differing perspectives regarding this issue are too numerous to list here, ranging from defining comprehensive structural measures to multiple theoretical approaches (Donaldson & Fafaliou, 2003; Graafland, Van de Ven, & Stoffele, 2003). However, focusing on the commonalities of these definitions reveals that CSR involves corporates engaging in voluntary initiatives to fulfill the social, economic, and environmental expectations of society and incorporating the interests and trust of their stakeholders in their campaigns to achieve sustainability and long-term presence in the market (Sharma, 2019). Servera-Francés and Piqueras-Tomás (2019) empirically demonstrated that investment in CSR policies increases consumer value, satisfaction, and loyalty to the company. However, it was noted that, despite the wealth of studies of the impact of social responsibility on the economic performance of large enterprises, very few studies have focused on small, medium-sized, and micro enterprises (Sánchez-Infante Hernández, Yañez-Araque, & Moreno-García, 2019).

The study purpose, context, and data sources are critical factors that may influence researchers' decisions in relation to the CSR dimensions that should be measured in a survey (Latif & Sajjad, 2018). Formal CSR strategies seem to characterize large firms, whereas informal CSR strategies prevail in micro, small, and medium-sized enterprises (Russo & Tencati, 2009). Environmental issues are typically associated with large industrial ventures. Thus, given their nature, small businesses are unlikely to concern themselves with such activities (Yao Dzansi & Pretorius, 2009). In addition, the CSR actions associated with the core business of conventional banks differ from those associated with the philanthropy-oriented CSR that prevails in Islamic banks (Aracil, 2019). Financial statement comparability serves an integral mechanism to facilitate a firm's pre-existing information environment (Kim, Kim, & Kim, 2020). What MSEs really care about is their survival. It is generally believed that the time limit for formulating a strategy is five years, so it is hard to talk about the strategy of MSEs. For MSEs, social responsibility should first solve the problem of employment and of paying wages to employees to ensure employees' social welfare. Also, economic benefit should primarily relate to output value. Thus, in this paper, social responsibility and economic benefit are based on the wages of employees and the output value of MSEs, respectively.

3. Data and method

The data in this study were drawn from the Credit Information Sharing Platform for financial services in Taizhou. The platform has collected comprehensive information on output, taxation, and lending for more than 600,000 MSEs across all industries in Taizhou. This information fully reflects growth, operating conditions, and the financial services environment of MSEs in the city of Taizhou over time. The selected enterprises had financial support and an output value for the year 2015 of between 1 million and 100 million RMB. Data on 9125 companies for the period January 2015 to December 2017 were extracted and integrated through the Oracle database. Here, the data on enterprise output value, wages, and loans were primarily used. Because the data on output value were unavailable, the sales revenue of each enterprise was taken as a proxy. The social responsibility and economic benefit were based solely on the wages of employees and the output value of MSEs, respectively.

Microfinance has moderate social and economic impacts, but even the meager benefit of microfinance may yield an impressive cost–benefit ratio (Cull, Demirgüç-Kunt, & Morduch, 2018). The study of Agier and Szafarz (2013) documented that essentially subjective bias has led to the failure of financial resources to achieve optimal allocation, which leads to the failure to optimally allocate financial resources. They stressed a need to adopt other methods to curb this subjectivity in the allocation of credit to microentrepreneurs. Nonparametric density estimation is of great importance when econometricians seek to model the probabilistic or stochastic structure of a data set (Zambom & Dias, 2013). The conditional kernel density (CKD) estimator produces an estimate of the conditional density $f(y|x)$ of a variable y conditional on the variable$x$. The essential idea is that, for a given value of x, the density function at the value y is constructed by applying kernel density estimation to the set of observations$Y = (Y_1, \cdots, Y_n)$, with each Y_t value weighted in accordance with the closeness of the corresponding X_t to the conditioning value x. In contrast to the classical linear regression approach, which focuses on modeling the conditional expectation E(Y|X) in a parametric framework, CKD allows nonlinear and nonparametric modeling of the whole density.

Hyndman and Grunwald (1996) used the CKD estimator to model daily temperature by conditioning current temperature on lagged temperature observations and a seasonal variable. Jeon and Taylor (2012) used the CKD estimator to predict the density of wind power conditional on wind velocity densities. Wen and Wu (2017) provided an application to adult body mass index (BMI) densities conditional on age. To identify the initial allocation efficiency of governmental public expenditure (PE) and foreign direct investment (FDI) in different regions of China, the conditional kernel density approach of the underlying structure of gross domestic product (GDP) per capita is used with a path-converged design (Xu, Zeng, & Watada, 2014). Raudys and Pabarškaitė (2018) proposed an optimized custom moving average that is the most suitable for stock time series smoothing. Suitability criteria are defined by smoothness and accuracy. Previous research has focused on only one of the two criteria in isolation. Based on these studies, by combining the optimizing model of Raudys and Pabarškaitė (2018) and the conditional density method, this paper constructs an analytical framework of financial resource allocation that is used to balance economic benefit and social responsibility.

3.1. Identification of financial resource allocation

First, this paper describes the enterprise output value of different periods by nonparametric density estimation. Let$f_n(x)$ be the output value density at period t, and assume the observed output value data are $X = (X_1, \cdots, X_n)$. Then:

$$f_n(x) = \frac{1}{n}\sum_{i=1}^{n} h^{-1}K\left(\frac{x - X_i}{h}\right) \tag{1}$$

where $K(.)$ stands for kernel function and h is the bandwidth:

$$K(u) = \frac{1}{\sqrt{2\pi}} exp\left(-\frac{u^2}{2}\right) \tag{2}$$

Throughout the whole paper, the Gaussian kernel is used to estimate the density, and the bandwidth selection is mainly determined by cross-validation. This approach is commonly used in classical density estimation and conditional density estimation. Second, the conditional density distribution of enterprise output value is given by:

$$f_n(x, w) = f_n(x|loan) = \sum_{j=1}^{n} w_j h^{-1}K\left(\frac{x - X_j}{h}\right) \tag{3}$$

Here:

$$w_j = \frac{K\left(\frac{loan - LOAN_j}{h_1}\right)}{\sum_{i=1}^{n} K\left(\frac{loan - LOAN_i}{h_1}\right)} \tag{4}$$

Assuming that the observed loan data are $LOAN = (LOAN_1, \cdots, LOAN_n)$, the sum of w_j must always be 1, and $w_j > 0$. Technically, the identification of the allocation efficiency of loans is difficult because the density $f_n(x, w)$ varies with different x. The allocation efficiency of loans can be identified by the difference as follows:

$$f_n(x, w) - f_n(x)$$

3.2. Optimization of financial resource allocation

The CKD estimation of the output value is given by:

$$f_n(x, w) = f_n(x|loan) = \sum_{j=1}^{n} w_j h^{-1}K\left(\frac{x - X_j}{h}\right) \tag{5}$$

Assume that the observed output value data are $X = (X_1, \cdots, X_n)$. The CKD estimation of wages is given by:

$$f_n(y, w) = f_n(y|loan) = \sum_{j=1}^{n} w_j h^{-1}K\left(\frac{y - Y_j}{h}\right) \tag{6}$$

Assume that the observed wage data are $Y = (Y_1, \cdots, Y_n)$. Under different loan conditions, the expected sales revenue with economic benefit is given as:

$$EX = \sum_{i=1}^{n} x_i f(x_i, w) \tag{7}$$

And the expected wages of employees with social responsibility is given as:

$$EY = \sum_{i=1}^{n} y_i f(y_i, w) \tag{8}$$

In other words, EX represents the economic benefit, and larger values are better. Similarly, EY represents social responsibility, and larger values are again better. A custom density function is proposed, where weights w are optimized to achieve the best social responsibility at a given economic benefit level.

Objective 1: Maximize social responsibility at each of these economic benefit levels by fixing it as follows:

$$w = argmax\{EY(w), EX(w) < EX^x \tag{9}$$

Here, w is a weight vector fixed to the specific economic benefit level.

Objective 2: Maximize economic benefit at each of these social responsibility levels by fixing it as follows:

$$w = argmax\{EX(w), EY(w) < EY^x\} \tag{10}$$

Here, w is a weight vector fixed to the specific social responsibility level.

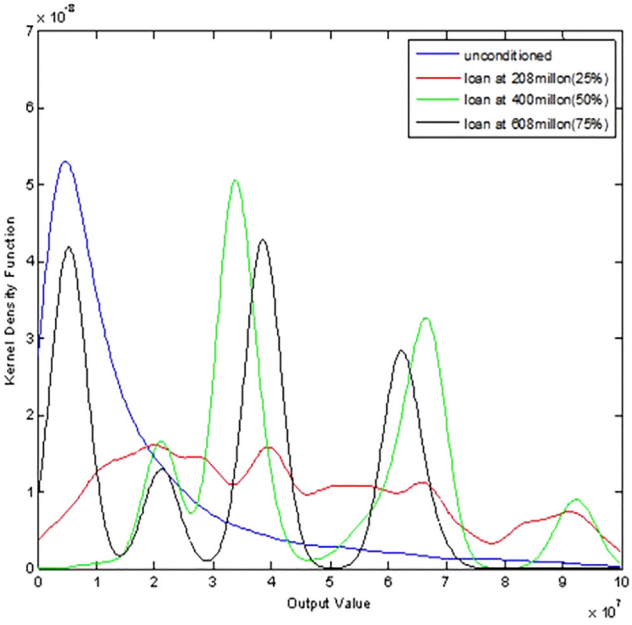

Fig. 1. Kernel density of output value under different loan conditions.

4. Results

This section seeks to answer the following questions:

1. Which enterprises have been most affected by the loan amount?
2. From the perspective of the maximization of social responsibility or economic benefit, did the loan amount allocated to these enterprises reach local optimal allocation and, if not, how should it be re-allocated?

4.1. The most affected enterprises under different loan conditions

Taking enterprise-level data for the year 2017 as an example, the dynamic changes of the enterprise output value distribution and the enterprise total wage distribution curves under different loan conditions were studied. The loan amount increased from 0 to 800 million RMB, each time increasing by 16 million RMB. Fig. 1 shows four output value distribution curves. Three are conditional on 25%, 50%, and 75% of the max loan amount, and the fourth is unconditioned. As the loan amount increases, the kernel density of the output value first moves to the right, then gradually moves to the left, and the most affected enterprises change accordingly (see Fig. 1).

Similarly, Fig. 2 shows four wage distribution curves. Again, three are conditional on 25%, 50%, and 75% of the max loan amount, and the fourth is unconditioned. Different loan conditions affect enterprises distributed in different output value and wage ranges. Table 1 provides the numerical output of the results.

4.2. Economic benefit and social responsibility under different loan conditions

Using Eqs. (7) and (8), the expected value for each loan condition was calculated. The result is shown in Fig. 3. Loans are helpful at first, but the effect diminishes as the loan amount reaches a certain point.

More specifically, as the loan amount increases, both economic benefit and social responsibility increase. The loan amount at 208 million RMB is a point of inflection for both economic benefit and social responsibility growth. When the loan amount increases to 336 million RMB, the sum of both economic benefit and social responsibility reach the maximum value. Later, the economic benefit remains stable, while the social benefit gradually increases. When the loan value increases to

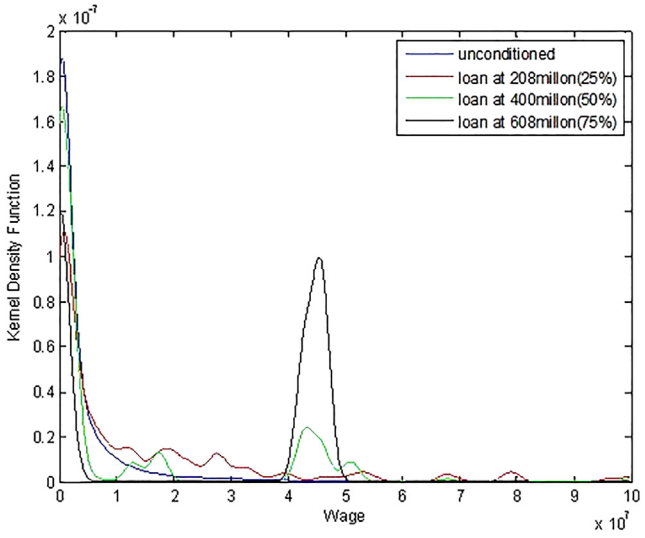

Fig. 2. Kernel density of wages under different loan conditions.

Table 1
The most affected enterprises.

Loan (million RMB)	Output value range of most affected enterprises (million RMB)	Wage range of most affected enterprises (million RMB)
0–208	0–10	0–10
208–400	10–70	10–30
400–608	30–40, 60–70	40–50
608–800	0–10, 30–40	0–5

576 million RMB, the social responsibility reaches a maximum value, and both the economic benefit and social benefit begin to decrease with the increase of the loan. Table 2 shows the numerical output of the above results.

4.3. Optimization of financial resource allocation

Under the condition that the total loan remains unchanged, social responsibility (total wages of employees) was maximized by fixing economic benefit (sales revenue), and economic benefit was maximized by fixing social responsibility. A sub-maximum value of economic benefit was found. After that point, the growth rate of economic benefit began to decrease. The loan amount of 208 million RMB was identified. The economic benefit was 37.4 million RMB, and the social responsibility was 11.06 million RMB (see Table 2).

1. Maximization of social responsibility

Table 2
Important loan conditions.

Loan (million RMB)	Economic benefit (million RMB)	Social responsibility (million RMB)
208	37.40	11.06
336	60.91	20.24
576	47.06	22.80

Step 1. A total of 490 enterprises with the wage distribution of 9.7 and 23 million RMB were selected. The expected sales revenue of enterprises in this wage area was 37.4 million RMB.

Step 2. In the selected sample of 490 enterprises, eight were identified as needing to increase lending and 482 to decrease lending. It was judged whether it is necessary for enterprises to increase or decrease loans by comparing the weight of loan conditions. If the total loan amount remains unchanged, assuming that the proportion of enterprises that need to increase their loans grows by 20%, the proportion of enterprises that need to reduce their loans will decrease by 1.92%.

Step 3. The social responsibility after loan redistribution was calculated. The adjusted enterprise loan amount was obtained according to the loan adjustment ratio. Under the condition of the loan value at 208 million RMB, the social responsibility calculated after loan redistribution was 15.55 million RMB, which is greater than the original social responsibility of 14.98 million RMB, with a growth rate of 3.8%.

2. Maximization of economic benefit

Step 1. A total of 571 enterprises with an output value between 40 and 67 million RMB were selected. The expected employee payroll of enterprises in this output value region was 11.06 million RMB.

Step 2. In the selected sample of 571 enterprises, 17 were identified as needing to increase lending and 554 to decrease lending. It was judged whether it is necessary for enterprises to increase or decrease loans by comparing the weight of adjacent loan conditions. If the total loan amount remains unchanged, assuming that the proportion of enterprises that need to increase their loans grows by 20%, the proportion of enterprises that need to reduce their loans will decrease by 3.13%.

Step 3. The economic benefit after loan redistribution was calculated. The adjusted enterprise loan amount was obtained according to the loan adjustment ratio. Under the condition of the loan amount at 208 million RMB, the economic benefit calculated after loan redistribution was 52.7 million RMB, which is greater than the original economic benefit of 50.1 million RMB, with a growth rate of 5.19%. Table 3 presents the numerical output of the above results.

5. Conclusions and discussion

The findings of this paper suggest that when loans are very large,

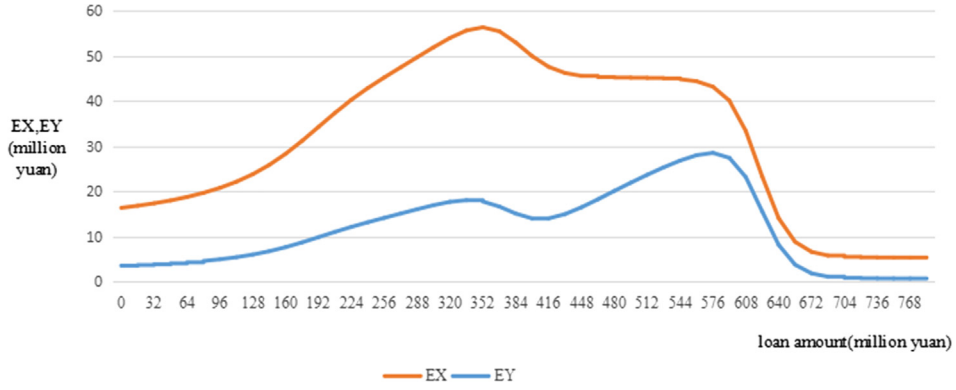

Fig. 3. Expected value of output value and total wages under different loan conditions.

Table 3
Loans at 208 million RMB: Economic benefit and social responsibility.

	Before redistribution	After redistribution	Growth rate (%)
Economic benefit	50.10	52.70	5.19
Social responsibility	14.98	15.55	3.81

the density curves of the enterprise output value and total wages move to the left compared to the density curves with no conditions; however, this does not imply that increasing the loan is a failure or that all enterprises should eschew microfinance. It does, however, underscore the need for sustainable financial resource management. The evidence of this paper shows that loans are helpful at first and that increasing loans affects enterprises in different output value and wage ranges but that the effect diminishes as the loan amount reaches a certain point.

This paper constructs an analytical framework of financial resource allocation, which is used to balance economic benefit and social responsibility and to maximize social responsibility when economic benefit remains unchanged. This paper shows that loans at 336 million RMB have the largest impact on economic benefit, whereas loans at 576 million RMB have the largest impact on social responsibility. Lending at 208 million RMB is a point of inflection for both economic benefit and social responsibility growth.

This paper therefore has several policy implications. First, there is a need to select the most affected enterprises at a fixed economic benefit, with the sum of the loan amount unchanged. Second, after comparing the weight of loan conditions, it is important to judge whether it is necessary for enterprises to increase or decrease the loan amount. Ultimately, the social benefit can increase by 3.81% through the reallocation of loans among these enterprises. The amount of increased lending to enterprises is found to be nonsignificant in influencing their decisions to apply for financing, which is consistent with the findings of Wasiuzzaman and Nurdin (2019).

Omri (2020) used good governance as a conditional variable that enhances financial development to influence both formal and informal entrepreneurship. It must be noted, however, that this paper focused on the direct dyadic relationship between lenders and borrowers, while neglecting supply chain effects (Song, Yu, & Lu, 2018). Factors such as type of industry, knowledge intensity, and international scope could play a crucial role in understanding crises in companies (Vojtko, Rolínek, & Plevný, 2019). Future work should therefore extend the existing model by analyzing multiple sectors and regions and by considering more factors that affect economic benefit and social responsibility, with the aim of better understanding financial loan allocation of MSEs. However, this study not only provides empirical evidence for financial support to MSEs, but also more importantly provides alternative decision support for policy design.

Acknowledgments

This paper was sponsored by the project “Research on the innovation of Macroeconomy control Theory—Chinese National Funding of Social Sciences” (No. 16AJL004).

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