Journal of Economic Analysis

Homepage: https://www.anserpress.org/journal/jea

The role of business environment optimization on entrepreneurship enhancement

Nannan Wang [a, *], Dengfeng Cui [a], Chuanzhen Geng [b], Zefan Xia [c]

[a] *School of Economics and Management, Shihezi University, Shihezi, China*

[b] *Rotman Business School, University of Toronto, Mississauga, Canada*

[c] *LSK business school, The Hong Kong university of Science and Technology, Hong Kong, China*

ABSTRACT

Entrepreneurs are important actors in economic activities and creators of social wealth. Excellent entrepreneurs contribute their wisdom to the accumulation of social wealth and the promotion of high-quality economic and social development. The business environment is the main manifestation of the soft power of cities and regional economic development, and a better business environment can effectively attract enterprises and promote their sustainable growth. Using data from Chinese A-share listed companies from 2009-2019 as a research sample, the following research conclusions were drawn: (1) A better business environment helps enhance entrepreneurship. (2) A better business environment promotes entrepreneurship by reducing rent-seeking expenses and corporate credit costs. (3) Compared to traditional enterprises, high-tech enterprises are better able to enjoy the benefits brought by business environment optimization and further enhance entrepreneurship. When competition is low, entrepreneurs face lower rent-seeking expenses, which is conducive to stimulating entrepreneurship. The business environment can promote fairness and bring more equal financing opportunities for enterprises, which has a higher impact on entrepreneurship for the group facing higher financing constraints. This study meticulously analyzes the impact of the business environment on entrepreneurship, providing references for the next steps of optimizing the business environment and enhancing entrepreneurship.

*Corresponding author: Nannan Wang
E-mail address: wangnn@stu.shzu.edu.cn

1. Introduction

In the new era of socialism with Chinese characteristics, economic development requires a shift towards high quality. Entrepreneurs are the main actors in market economic activities, and entrepreneurship with production attributes is a crucial source of economic development. Entrepreneurship is also a vital source of core competitiveness for enterprises, and the formation of an entrepreneurial group with an entrepreneurial spirit is of great significance for Chinese enterprises to continuously adapt to changes in the market environment and build internationally competitive enterprises (Lim et al., 2010). The business environment is the most direct external factor affecting business operations and runs through every stage of business development, thus deeply affecting the growth of enterprises and entrepreneurs.

The development of entrepreneurship is closely linked to the business environment in which they operate (Baumol, 1993), and optimizing the business environment and cultivating high-quality entrepreneurship is of practical significance. Scholars have focused on how to cultivate higher entrepreneurship, mainly through the following aspects: First, according to the "institutional critical hypothesis," the external institutional environment affects entrepreneurship. Studies have shown that the institutional environment (Lucas et al., 2022; Chowdhury et al., 2019), property rights protection system (Bu & Liao, 2022), legal environment (Yang et al., 2022), the degree of local corruption (Liu & Li, 2022), and government control (Akhmetshin & Shafigullina, 2015) directly or indirectly impact entrepreneurship. Second, based on the theory of information asymmetry, studies have explored financing constraints (Jensen et al., 2022) and the level of financial development (Jiang & Fan, 2021) as significant factors affecting the level of entrepreneurial innovation and input. Third, the continuous marketization process (Zhao & Wang, 2020), the development of internet technology (Paunov & Rollo, 2016), and the improvement of the social security system (Song et al., 2020) provide sufficient conditions for entrepreneurship to thrive.

The previous literature shows that although some studies have explored entrepreneurship from the institutional environment, relatively few studies have examined entrepreneurship at the level of the business environment. As an important external environment facing business development, how the business environment affects entrepreneurship needs to be further explored. Currently, entrepreneurship is mainly measured from innovation and entrepreneurship at the city level. The core meaning of entrepreneurship is analyzed, and it is the ability of entrepreneurs to effectively use the existing resources of the enterprise to create output, leading the company to obtain larger returns with smaller inputs. This, to some extent, is expressed as the efficiency of resource utilization and can more deeply reflect the role of external macro conditions on entrepreneurship. Therefore, this study further explores the following: (1) at the micro level, how to measure entrepreneurship using the efficiency of entrepreneurs in using resources; (2) Does the business environment have an impact on entrepreneurship, and if so, what are the intrinsic path mechanisms? (3) Are there any differences in the impact of the business environment on entrepreneurship for different industry classifications, competitive environments, and financing constraints? Based on this, the contributions of this study are mainly in the following aspects: first, there is no consistent conclusion on the measurement of entrepreneurship, and this study measures it at both macro and micro levels, using innovation, entrepreneurship, and resource utilization efficiency as a comprehensive measure. Second, two mediating paths, rent-seeking expenses and credit cost, are explored to enrich the mechanism of the impact of the business environment on entrepreneurship. Third, a heterogeneous analysis of industry type, degree of market competition, and financing constraints broadens the boundary conditions of the business environment on entrepreneurship.

2. Background, Literature Review and Research Hypothesis

2.1. Institutional Background

Since the 18th Party Congress, China has attached great importance to optimizing the business environment. The relevant institutional system has been improved, market access has been significantly relaxed, fair regulation has been accelerated, and government services have been continuously optimized. The Doing Business 2020 report released by the World Bank shows that China is ranked thirty-first, an improvement of 47 places in two years, making it the major economy with the most significant improvement in the business environment. According to statistics, the average annual net growth of market entities in China since 2012 has been more than 10 million, and the overall activity rate is stable at about 70%. The business start-up time has been compressed from an average of 22.9 days to within four working days, in which the continuous optimization of the business environment plays an important role. The optimization of the business environment cultivates new momentum for economic development, promotes the construction of a unified national market, and injects new momentum into the dual domestic and international cycle. Although China's economic growth has slowed down due to COVID-19, the optimization of the business environment has boosted the confidence of market players. The overall situation of foreign investment and foreign trade is stable, and the long-term positive fundamentals of the economy remain unchanged. Optimization of the business environment promotes reform and innovation, and related institutional mechanisms continue to improve. Governments at all levels attach great importance to the optimization of the business environment, establishing and improving institutional rules, perfecting institutional settings, and building digital platforms around the business environment, accelerating the shift from single-player advancement in various fields to overall systemic synergy. China's reform initiatives to optimize the business environment have provided a reference for other economies around the world and have strongly promoted the overall improvement of the global business environment.

2.2. Literature Review

2.2.1. Rent-seeking expenses

Buchanan (1980) argues that rent-seeking is an activity in which economic agents seek to transfer wealth through government protection. Rent-seeking is actually a transfer of wealth rather than a creation, so rent-seeking behavior is contrary to the market-based competition mechanism and is an unproductive activity. In order to obtain more government subsidies, tax incentives, and access to certain industries, business managers participate in rent-seeking activities. This not only costs entrepreneurs' time and energy but also reduces their production and operation activities. This is not conducive to the entrepreneurial spirit. Financing is difficult and expensive for enterprises, and the financing problem largely raises the operating cost of enterprises. The business environment can also reduce the information asymmetry between banks and enterprises, enhance mutual understanding between enterprises and government, financial institutions, and external investors, and improve information transparency to provide funding sources for enterprise innovation and entrepreneurship from multiple channels. This can help reduce the willingness to seek rent (Dutta et al., 2020).

2.2.2. Credit Cost

The cost of corporate credit refers to the cost of debt financing that a firm obtains from banks and is a component of the cost of corporate financing. The financing behavior of a firm is present throughout its business operations, and changes in the cost of financing have an impact on the risk of the capital structure of its operations. Therefore, the cost of credit is an important factor affecting the development of business operations (Shamshur & Weill, 2019). Information asymmetry is the main reason for the difficulty that firms face in obtaining financing (Stiglitz & Weiss, 1981), and it is an important problem faced by banks in making credit decisions. Optimizing the business environment can improve the level of information disclosure and thus reduce the risk of credit mismatch

faced by banks and other financial institutions, increasing the availability of loans for firms (Diamond & Verrecchia, 1991; Dhaliwal et al., 2011). Existing studies on the cost of credit have mainly been conducted from the perspectives of its governance characteristics (Bertomeu & Marinovic, 2016), information disclosure (Fields et al., 2012), and borrowers' reputation (Dorfleitner et al., 2016). Further exploration is needed regarding the impact of the business environment as an external factor on the cost of credit for firms.

2.3. Research Hypothesis

2.3.1. Business Environment and Entrepreneurship

The business environment refers to the institutional factors and conditions involved in the market economic activities of enterprises and other market players. It can be divided into four dimensions: a fair and competitive market environment, an efficient and clean government environment, a fair and transparent legal and policy environment, and an open and inclusive human environment. Entrepreneurship is the result of a combination of factors, and according to the "Institutions are crucial" hypothesis, the business environment as an external system profoundly affects entrepreneurship (Wu & Lin, 2022). This study aims to analyze entrepreneurship according to the four dimensions of the business environment.

Firstly, a good business environment means an efficient and fair market environment that reduces business start-up costs and improves operational efficiency, thus stimulating the entrepreneurial spirit of innovation and entrepreneurship (Lim et al., 2010). The marketization process has not only provided sufficient grounds to stimulate entrepreneurship (Zhao & Wang, 2020) but has also helped to clarify the boundary between the government and the market, guaranteeing entrepreneurs' business autonomy and improving the efficiency of resource allocation, thus stimulating greater entrepreneurship (Hardar et al., 2012). An efficient and clean governmental environment can reduce corrupt practices, provide efficient and convenient government services for enterprises, and reduce the time entrepreneurs spend on non-productive external public relations hospitality, allowing them to devote their time to more useful business activities such as enterprise production and new product development. This enables them to respond quickly to market demand (Liu & Li, 2022; Dongle et al., 2016; Sendra-Pons et al., 2022). A fair and transparent legal policy environment implies improving the property rights protection system at the legal level and creating an external economic system with clear property rights and separation of authority and responsibility. This not only reduces the potential risks of entrepreneurs in the entrepreneurial process and increases the expected returns of entrepreneurial activities but also motivates entrepreneurs to invest more resources in productive activities, improving innovation and entrepreneurship (Yang et al., 2022; Slesman et al., 2020). An open and inclusive humanistic environment provides a better atmosphere for the cultivation of entrepreneurship, as innovation and entrepreneurship engaged in by entrepreneurs are high-risk and high-stress activities. The establishment of a sound incentive mechanism and fault tolerance mechanism provides an open and inclusive social atmosphere for entrepreneurs' innovation and entrepreneurship (Hackler & Mayer, 2008; Aghion et al., 2005).

In summary, as the business environment improves, a fairer market environment, a cleaner and more efficient government environment, a fairer and more transparent legal environment, and a more open and inclusive humanistic environment provide better internal and external conditions for the breeding of entrepreneurship. Therefore, the hypothesis of this study is proposed:

H1: A better business environment is conducive to fostering entrepreneurship.

2.3.2. Business environment, rent-seeking expenses and entrepreneurship

According to the transaction cost theory, rent-seeking expenses, as a non-productive expenditure, consume

business operating costs. But a good business environment provides strong supervision and restraint on the government's power, so that the government gives more power to the market in resource allocation, which reduces the rent-seeking activities of enterprises and significantly compresses the rent-seeking space of enterprises, weakening the incentive of enterprises to seek rent. Enterprises will fully allocate resources to innovation, which helps to enhance entrepreneurial innovation opportunities further (Malik & Froese, 2022; Bracke et al., 2018).

Three main aspects are analyzed. First, a good business environment implies a fair, competitive market, and both monopolism and unfair competition decline. A more transparent market leads to greater confidence among entrepreneurs, which further enhances entrepreneurial risk-taking (Xie et al., 2021). Second, with the promotion of a legalized business environment, enterprises' production and operation can be based on the law, and government law enforcement must punish offenders, which reduces the risk of enterprises' operation and their rent-seeking motives (Yu & Xu, 2020). In addition, the better the business environment, the higher the efficiency of resource allocation in the region, which can save private enterprises' information costs and reduce their rent-seeking motives (Río, 2021). Third, a better business environment also reduces rent-seeking activities by reducing the uncertainty of the external business environment. When the uncertainty of the external business environment increases, non-productive and tax expenditures of enterprises also increase. Therefore, the better the business environment and the higher the transparency of the market, the fewer rent-seeking activities and the smaller the rent-seeking expenses (Bucher, 2020; Buchanan, 1980; Dutta et al., 2020). Xu and Yano (2017) also found that a good business environment reduces unproductive business expenses, not only increases firms' net cash and makes up for the shortage of innovation funds but also reduces the marginal cost and risks of firm innovation, increases the benefits of firm innovation, and enhances entrepreneurs' willingness to innovate.

In summary, the business environment not only reduces uncertainty in business development, alleviates information asymmetry, and stimulates entrepreneurial innovation, but it also helps reduce non-productive expenditures of enterprises, optimizes the efficiency of enterprise resource allocation, and provides sufficient funds for entrepreneurial innovation activities. The optimization of the business environment creates an efficient and clean government, increases the cost of rent-seeking, reduces the rent-seeking motive, and reduces the rent-seeking expenses of entrepreneurs and managers. Entrepreneurs can use the limited time and money for business development, which helps to enhance the entrepreneurial spirit. Therefore, the hypothesis of this study is proposed as follows:

H2: A better business environment promotes entrepreneurship by reducing rent-seeking expenses.

2.3.3. Business environment, credit cost and entrepreneurship

Credit costs are mainly due to the crisis of trust between the two parties caused by information asymmetry. Optimization of the business environment can improve the transparency of enterprise information and reduce information asymmetry between the two parties, thus providing institutional guarantees for enterprises to reduce credit costs (Brychko et al., 2022). A better business environment can help enterprises obtain more bank loans, financial subsidies, and other policy resources through the "resource effect" and "information effect", ensuring that enterprises have sufficient liquidity and necessary financial flexibility in an uncertain environment. This will promote further entrepreneurship (Baker et al., 2016; Qin & Kong, 2021).

The impact of the business environment on the cost of credit is mainly based on the fact that an increasingly optimized business environment can promote the development of multi-level capital markets, which widens access to financing and increases financing opportunities for enterprises. A better business environment can help alleviate the information asymmetry and reduce the cost of screening and monitoring enterprises by banks, which in turn helps to reduce the cost of credit for enterprises (Dhali & Judd, 2016; Behr et al., 2011). The optimization of the business environment brings about an increase in the marketization of interest rates, thus reducing the cost of

credit for enterprises (Kook & Shin, 2004; Pittman & Fortin, 2004). In summary, the business environment reduces the cost of credit by reducing information asymmetry between the two sides of the transaction, promoting a fairer competitive financial market, and widening access to finance. This helps entrepreneurs with the necessary sources of capital for their innovative and entrepreneurial activities. Therefore, the hypothesis of this study is proposed as follows:

H3: A better business environment promotes entrepreneurship by reducing credit costs.

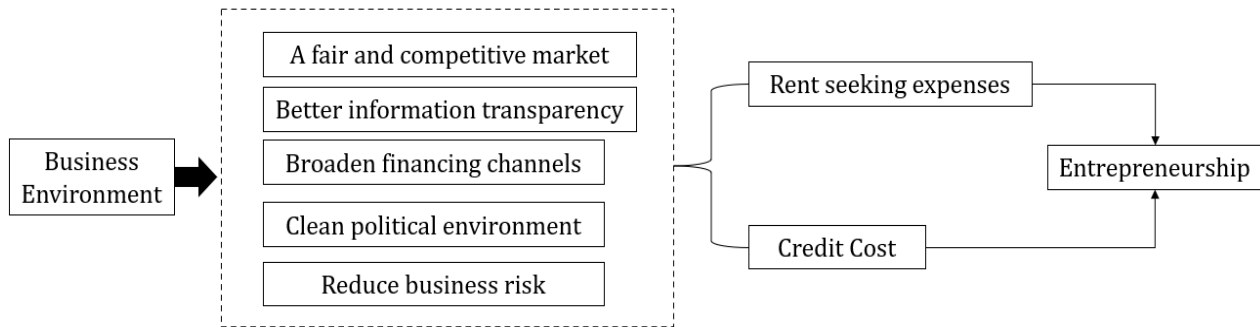In summary, the conceptual model proposed for this study is shown in Figure 1.

Figure 1. Research logical framework diagram.

3. Methodology and data

3.1. Data sources

Starting from the above analysis, this study selects the data of Chinese A-share listed companies from 2009 to 2019 as the initial research sample, and further filters the sample by applying the following criteria: (1) removing companies with asset-liability ratios greater than 1; (2) removing companies in the financial category, ST category, and companies with serious missing data. Finally, a total of 12,612 observations for 2,697 companies were obtained. The data sources for the study include the "China Sub-Provincial Enterprise Business Environment Index Report" by Wang (2019) for the business environment indicators, CSMAR and WIND for financial indicators, the EPS database for city-level data, and China Research Data Service Platform for enterprise patent data.

3.2. Model Setting

First, in order to verify the impact of the business environment on entrepreneurship, the following research model is set with reference to Wu and Lin (2022).

$$Entrep_{it} = \alpha_0 + \alpha_1 * Market_{it} + \alpha_2 * Controls_{it} + \Sigma Industry + \Sigma Year + \varepsilon \tag{1}$$

In model (1), the subscript i denotes company code, t denotes the year, $Entrep_{it}$ denotes the entrepreneurship of company i in year t; $Market_{it}$ denotes the business environment of company i in year t. Controls are the control variables shown in Table 1. In addition, the model controls for the industry effect Industry and the year effect Year. ε is a random disturbance term.

Second, in order to verify the mechanism of the effect of the business environment on entrepreneurship, the specific model is set up as follows, using mediator tests such as Wen (2004).

$$rent_{it} = \theta_0 + \theta_1 * Market_{it} + \theta_2 * Controls_{it} + \Sigma Industry + \Sigma Year + \varepsilon \tag{2}$$

$$cost_{it} = \delta_0 + \delta_1 * Market_{it} + \delta_2 * Controls_{it} + \Sigma Industry + \Sigma Year + \varepsilon \tag{3}$$

$$Entrep_{it} = \gamma_0 + \gamma_1 * Market_{it} + \gamma_2 * rent_{it} + \gamma_3 * Controls_{it} + \Sigma Industry + \Sigma Year + \varepsilon \qquad (4)$$

$$Entrep_{it} = \beta_0 + \beta_1 * Market_{it} + \beta_2 * cost_{it} + \beta_3 * Controls_{it} + \Sigma Industry + \Sigma Year + \varepsilon \qquad (5)$$

In models (2), (3), (4) and (5), the subscript i denotes firm code, t denotes the year, $rent_{it}$ denotes the rent-seeking expenses of firm i in year t. $cost_{it}$ denotes credit cost firm i in year t.

3.3. Variable description and measurement

3.3.1. Dependent variable: Entrepreneurship

There is no unified method for measuring entrepreneurship. This paper measures entrepreneurship at the macro and micro levels, respectively. The macro measurement mainly draws on Hébert and Link's (1989) approach, which further measures entrepreneurship using the number of innovations and start-up businesses at the city level. The number of innovations is derived from the natural logarithm of the number of patents granted to the city (E1), and start-up businesses use the share of private businesses and self-employment in the employed population (E2).

Micro-level entrepreneurship is the ability of entrepreneurs to effectively use the firm's available resources to create output, leading the firm to obtain larger returns with smaller inputs, which is expressed, to some extent, as resource efficiency. Therefore, this paper further uses resource utilization efficiency to measure micro-level entrepreneurship. Drawing on the data envelopment analysis (DEA) model proposed by Demerjian et al. (2011), the resource efficiency of firms is estimated as a measure of entrepreneurship by comparing the revenues of different firms at a given level of expenditure. The main calculation steps are as follows.

The DEA model is applied to solve the optimal problem of equation (6) and to determine the value of E, which is taken to be in the range of 0 to 1. On this basis, the efficiency of resource utilization due to entrepreneurship is estimated by controlling for the efficiency brought about by the inherent characteristics of the firm, and the Tobit regression is applied to calculate entrepreneurship by industry. That is, the resource use efficiency of entrepreneurs was calculated according to the model (7).

$$MaxE = \frac{Sales}{\omega_1 * Pe + \omega_2 * Rd + 3 * Gw + \omega_4 * Int + \omega_5 * Cog + \omega_6 * Sga} \qquad (6)$$

$$Tobit(E) = \rho_0 + \rho_1 * Size + \rho_2 * Ms + \rho_3 * Cf + \rho_4 * Age + \rho_5 * HHI + \rho_6 * Fc + Industry + Year + \varepsilon \qquad (7)$$

In model (6), "Sales" represents operating income, "Pe" represents net fixed assets, "Rd" represents net R&D expenses, "Gw" represents company goodwill, "Int" represents intangible assets, "Cog" represents the cost of main business, and "Sga" represents the sum of administrative expenses and selling expenses.

In model (7), "Size" represents the value of log (1+total assets); "Ms" represents the firm's market share; "Cf" represents the presence or absence of positive free cash flow; "Age" represents the value of log (number of years the firm has been listed + 1); "HHI" represents the Herfindahl index, which represents the degree of diversification; "Fc" indicates the presence or absence of overseas subsidiaries, and takes the value of 1 if it exists, and 0 otherwise.

3.3.2. Independent variable: Business environment

Drawing on the research of previous scholars, the "marketization index" is used to measure the business environment. The marketization index is a synthesized measure of the business environment of market players, which is determined by weighing five indicators: government-market relationship, development of non-state economy, development of product market, development of factor market, and development of market intermediary organizations and legal system environment. This has many similarities with the World Bank's evaluation system and its focus on the business environment. Therefore, the marketization index can be used to reflect the business

environment. The data are obtained from Wang et al.'s China Marketization Report by Province 2019, which contains data from 2008 to 2016. As the data interval of this study is 2009-2019, the data are extrapolated to 2019 according to the average annual growth rate following existing studies.

3.3.3. Mechanism Variables

(1) Rent-seeking expenses: Drawing on Anderson (2006), the ratio of non-productive expenses to operating income is chosen as a measure of rent-seeking expenses. Non-productive expenses are defined as operating overhead minus executive compensation, amortization of intangible assets, and provisions for bad debts and inventory decline in the current year.

(2) Credit cost: Drawing on Pittman and Fortin's (2004) study, the ratio of finance costs to bank borrowings is used as a measure of corporate credit cost.

3.3.4. Control variables

Since this paper uses the DEA model to calculate the efficiency of entrepreneurs' resource utilization, it controls for firm age, size, and cash flow from operating activities to avoid the covariance problem, according to the setting of models (6) and (7). In combination with Chowdhury et al.'s (2019) study, the paper selects the growth rate of the main business, the level of financial leverage, firm age and size, net interest rate, cash flow from operating activities, and the nature of property rights as control variables.

Table 1. Variable definitions.

Variable Type	Variable Name	Code	Calculation method
Dependent variable	Entrepreneurship	E1	Log (1+number of city patents granted)
		E2	Self-employment as a share of employment
		E3	Model (6) and model (7) calculate
Independent variable	Business environment	Market	Drawing on the China sub-provincial marketization published by Wang et al. (2019) Report
Mechanism Variables	Rent-seeking	rent	Unproductive expenses/main operating income
	Credit cost	cost	Finance cost/bank borrowings
Control variables	Cash flow Ratio	CF	Cash flow / total assets
	Company Size	Size	Log (1+ total assets)
	Growth	Growth	The growth rate of main business revenue
	Profitability	Roa	Net Profit/total assets
	Age	Age	Log (1+ duration of establishment)
	Financial leverage	Level	Total liabilities / total assets
	Ownership	Soe	State-owned enterprises are assigned a value of 1, otherwise 0

3.4. Descriptive statistics of variables

To make the data more informative, continuous variables with extreme values were subjected to upper and lower 1% Winsorization, and descriptive statistical analysis was performed using Stata 16. Table 2 presents the results of the descriptive statistical analysis of the main research variables in this paper. From Table 2, we can see that: (1) the mean value of the business environment is 8.395, with a minimum value of -1.420 and a maximum value of 11.40, reflecting great differences in the business environment among different Chinese listed companies. (2) The mean value of entrepreneurship at the micro level is 0.004, with a minimum value of -0.289 and a maximum value of 0.469, indicating large differences in entrepreneurship among listed companies. (3) The mean value of entrepreneurial innovation at the macro level was 10.96, with minimum and maximum values of 3.871 and 12.74, respectively; the mean value of entrepreneurship was 0.323, with minimum and maximum values of 0.034 and

0.598, respectively, showing greater differences in entrepreneurship at the city level compared to innovation. (4) Individual differences were also observed in the sample for the main control variables, and the distribution of the control variable values was within a reasonable range. Overall, the sample was well differentiated.

Table 2. Descriptive statistics.

variable	N	mean	sd	p50	min	max
E1	12612	10.96	1.226	11.15	3.871	12.74
E2	12612	0.323	0.117	0.309	0.034	0.598
E3	12612	0.004	0.120	-0.014	-0.289	0.469
Market	12612	8.395	1.900	8.790	-1.420	11.40
Cost	12612	-0.068	0.706	0.047	-5.808	0.734
Rent	12612	0.075	0.054	0.061	0.003	0.315
Growth	12612	0.178	0.346	0.119	-0.421	2.037
Lev	12612	0.450	0.183	0.444	0.096	0.866
Age	12612	3.073	0.238	3.091	2.485	3.584
Size	12612	22.34	1.266	22.15	20.17	26.29
Roa	12612	0.036	0.053	0.035	-0.224	0.174
Cf	12612	0.044	0.063	0.043	-0.134	0.215
Soe	12612	0.590	0.492	1	0	1

4. Analysis of the empirical results

4.1. Baseline regression results

Table 3 reports the results of the impact of the business environment on entrepreneurship. Firstly, as shown in columns (1), (2), and (3) of Table 3, a better business environment in a region leads to more patents being granted in the region ($\alpha 1=0.560$, p<0.01) and a higher percentage of employees in private and individual enterprises ($\alpha 1=0.016$, p<0.01). Furthermore, analyzing the enterprise level, a good business environment fosters higher entrepreneurship ($\alpha 1=0.008$, p<0.01). The combined macro and micro-level regression results show that for each unit increase in the business environment, the level of innovation and the share of entrepreneurship at the city level increase by 0.56 and 0.016, respectively, and entrepreneurship at the micro-level increases by 0.008. There is a positive effect of the business environment on entrepreneurship, both at the macro and micro levels. Therefore, hypothesis 1, that a better business environment promotes entrepreneurship is verified.

Table 3. Benchmark regression.

	City Level				Corporate level		
	E1		E2		E3		Inpat
	(1)	(4)	(2)	(5)	(3)	(6)	(7)
Market	0.560***		0.016***		0.008***		0.025***
	(158.08)		(31.29)		(14.48)		(3.37)
CM		0.742***		0.007***		0.016***	
		(53.06)		(5.61)		(8.72)	
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ind & Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes
City	Yes	Yes	Yes	Yes	No	No	No
_cons	6.426***	12.331***	0.073***	0.230***	-0.133***	0.052	-2.502***
	(52.65)	(28.86)	(3.08)	(6.15)	(-5.71)	(1.06)	(-6.37)
N	12612	5793	12612	5793	12612	5793	12612
R2_adj	0.792	0.068	0.072	0.038	0.287	0.248	0.056
F	3469.917	27.237	134.296	9.292	344.355	68.341	53.396

*Note: ***, ** and * denote significance levels at 1%, 5% and 10%, respectively.*

4.2. Robustness test

4.2.1. Replace the measurement indicators of business environment

As China continues to deepen its reforms, it becomes more meaningful to study the business environment after the 19th National Congress. Therefore, the study's findings are tested for robustness by remeasuring the business environment using data from the Doing Business in China's Provinces 2017-2020 report published by Zhang and Zhang (2022). This report evaluates the business environment of Chinese provinces in terms of the market environment, governmental environment, legal policy environment, and human environment according to the evaluation principles of international comparability, comparison with the World Bank, and Chinese characteristics, which fits the theme of this research paper. As shown in columns (4), (5), and (6) of Table 3, the business environment has a significant positive effect on the macro-level innovation spirit (α_1=0.742, p<0.01), entrepreneurship (α_1=0.007, p<0.01), and the micro-level comprehensive evaluation of entrepreneurship (α_1=0.016, p<0.01), indicating a significant positive effect. These results validate hypothesis 1 and make the findings more robust and reliable.

4.2.2. Replacing the measurement index of entrepreneurship

Entrepreneurship is more often expressed as innovation and entrepreneurship, and is measured by the intensity of R&D investment. This is mainly because entrepreneurs take risks when making decisions about innovation, and the intensity of R&D investment reflects, to a certain extent, the entrepreneurial spirit of risk-taking and breakthrough. In this study, we further extend this definition by considering the number of company patent licenses as a response to the ability of entrepreneurs to use resources for innovation. Therefore, the number of company patent licenses (Inpat) is used to measure entrepreneurship. As shown in column (7) of Table 3, the effect of the business environment on entrepreneurship is still significant (α_1=0.025, p<0.01) even with alternative measures of entrepreneurship.

4.2.3. Exploration of endogeneity issues

The business environment, as an external macro factor in this paper, is an exogenous variable. However, this paper may also face endogeneity problems due to omitted variables and measurement errors. In order to address the endogenous problem in this paper, the history of opening ports and trading in each city is used as the instrumental variable, and the study is re-estimated using two-stage least squares and instrumental variables. To safeguard the validity of the instrumental variable and avoid the interference of city-level characteristics in the results, only micro-level entrepreneurial resource utilization efficiency is used to measure entrepreneurship (E3). Table 4 shows the estimation results of the two-stage least squares method. Column (1) is the baseline regression, and from column (2), it is clear that the instrumental variables are correlated with the endogenous explanatory variables. After replacing the business environment with instrumental variables in column (3), the business environment still has a positive effect on entrepreneurship (α_1=0.0099, p<0.01). The p-value of the unidentifiable test is 0.000, strongly rejecting the original hypothesis of unidentifiability. The F-value of the weak instrumental variable test is greater than 10, and the original hypothesis of the existence of weak instrumental variables is rejected at the 1% level. Therefore, the selected instrumental variables are reasonable and valid, and the endogenous interference is solved to some extent, and the positive influence of the business environment on entrepreneurship is verified.

5. Further analysis

5.1. Analysis of internal mechanisms

Table 4. Endogeneity test results.

	Stage 1		Stage 2
	E3	market	E3
	(1)	(2)	(3)
market	0.008***		0.0099***
	(14.48)		(4.07)
history		0.007***	
		(13.12)	
Ind	Yes	Yes	Yes
Year	Yes	Yes	Yes
Controls	Yes	Yes	Yes
N	12612	5535	5535
F-statistic with instrumental variables			
Unrecognizable test[P]		172.12***	167.22***
			(0.000)
Weak instrumental variable test[F]			172.12***
			(0.000)

*Note: ***, ** and * denote significance levels at 1%, 5% and 10%, respectively.*

In studying the path mechanism, the mediating variables selected for this study are intra-term operating variables, so the entrepreneurship calculated by principal component analysis is chosen to be more relevant to the issue studied in this paper. Column (1) of Table 5 is the baseline regression of business environment on entrepreneurship. Next, the mediating effects of credit cost and rent-seeking expenses are tested sequentially according to the three-step approach. According to model (2), the impact of the business environment on rent-seeking expenses is tested, and it is shown in column (2) of Table 5 that the business environment can mitigate rent-seeking expenses (θ 1=-0.0003, p<0.01). According to model (3) to test the effect of the business environment on the cost of credit, it can be seen from column (4) of Table 5 that the business environment can reduce the cost of credit faced by enterprises (δ 1=-0.006, p<0.05). The significance of the above results verifies the existence of the path of influence of the business environment on the mediating variables. Next, according to model (4) and (5), the mediating variables are added in turn for testing. Column (3) of Table 5 indicates that the effect of rent-seeking expenses on entrepreneurship is negative (γ 2=-1.019, p<0.01). Column (5) of Table 5 shows that the effect of credit cost on entrepreneurship is negative (β 2=-0.007, p<0.01). In addition, the influence of the business environment on entrepreneurship is still significant after the inclusion of mediating variables, indicating the existence of a mediating effect.

The above results show that the stepwise tests for the mediating variables rent-seeking expenses and credit cost are significant and satisfy the step of sequentially testing the mediating effects. Thus, hypothesis 2 can be tested: the business environment improves entrepreneurship by reducing the rent-seeking expenses, and also hypothesis 3: along with the improvement of the business environment, information asymmetry decreases, and the credit cost of enterprises decreases, thus improving entrepreneurship.

5.2. Group regression results

In this paper, industry-level, market-level, and firm-level characteristic factors are selected for robustness testing. To avoid bias in the results caused by city-level factors, the measure of micro-level entrepreneurial resource utilization efficiency (E3) is used in this group test to measure entrepreneurship.

5.2.1. Based on high-tech industry grouping test

Table 5. Analysis of the mechanism of business environment affecting entrepreneurship.

	Regression	Rent seeking expenses		Credit cost	
	(1)	(2)	(3)	(4)	(5)
	E3	Rent	E3	Cost	E3
Market	0.008***	-0.0003***	0.008***	-0.006**	0.008***
	(14.48)	(-3.84)	(14.61)	(-2.04)	(14.40)
Rent			-1.019***		
			(-2.79)		
Cost					-0.007***
					(-4.70)
Controls	Yes	Yes	Yes	Yes	Yes
Ind &Year	Yes	Yes	Yes	Yes	Yes
_cons	-0.133***	0.230***	-1.126**	-0.011	-0.133***
	(-5.71)	(13.81)	(-2.03)	(-0.09)	(-5.72)
N	12612	12612	12612	12612	12612
R2_adj	0.287	0.164	0.052	0.053	0.288
F	344.355	68.515	25.567	43.519	312.839

*Note: ***, ** and * denote significance levels at 1%, 5% and 10%, respectively.*

Compared to traditional industries, high-tech enterprises, as the main force of innovation, face both pressure and motivation to innovate and engage in R&D. The high-tech industry also faces greater risks and expenses related to innovation, making the business environment more significant for this industry. This study uses the "Management Measures for the Recognition of High-tech Enterprises" released in 2008 to classify whether a company is a high-tech enterprise or not. The specific analysis results are shown in columns (1)-(2) of Table 6, and the coefficient difference between the two types of enterprises is -0.019, which is significant at the 1% level. This indicates that the coefficient difference between the two groups is significant, demonstrating that the business environment, as an external variable, has a positive influence on the cultivation of entrepreneurship. Furthermore, high-tech enterprises, due to the necessity and urgency of innovation and research development, have significant coefficients compared to traditional enterprises.

5.2.2. Grouping based on the degree of market competition

According to the previous analysis, the degree of market competition intensifies the risk of enterprise operation, which will lead to an increase in uncertainty factors. For the sustainability of enterprise operation, the willingness of entrepreneurs to innovate and start businesses will decline. The results are shown in columns (3)-(4) of Table 6. Low competition in the market reduces the risk of business operation and uncertainty, thus increasing the opportunity for innovation and entrepreneurship, which in turn improves entrepreneurship.

5.2.3. Grouping based on financing constraints

It has been found that financing constraints are crucial to enterprise innovation and entrepreneurship. Therefore, this paper expects that when the financing constraints of enterprises are high, the external environmental changes brought about by the business environment will be more obvious in stimulating entrepreneurship. Specifically, the paper uses the SA index to measure the financing constraints faced by enterprises and divides the sample into two groups based on the median SA by industry, with high and low financing constraints, to test the effect of the business environment on entrepreneurship. The results are shown in columns (5)-(6) of Table 6. This indicates that the business environment promotes the development of the capital market, broadens the financing channels, and increases the financing opportunities of enterprises. Therefore, it brings more

significant spillover effects to firms with high financing constraints.

Table 6. Regression results for subgroups.

	Business Type		Competition degree		Financing constraints	
	None high-tech	High-tech	Low	High	High	Low
	(1)	(2)	(3)	(4)	(5)	(6)
market	0.004***	0.014***	0.016***	0.008***	0.013***	0.010***
	(4.61)	(13.37)	(13.64)	(7.59)	(12.08)	(10.33)
Ind	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
_cons	-0.409***	-0.094**	-0.077	-0.271***	-0.331***	-0.082
	(-9.52)	(-2.08)	(-1.47)	(-5.71)	(-6.30)	(-1.47)
N	5539	7073	5482	6190	6292	6292
Intergroup test	b=-0.019, p<0.001		b=0.012, p<0.001		b=0.007, p<0.05	

Note: ***, ** and * denote significance levels at 1%, 5% and 10%, respectively.

6. Research Conclusion and Future Prospect

6.1. Research Conclusion

Based on the A-share data of listed companies from 2009-2019, this study verifies the role of the business environment in influencing entrepreneurship. Based on this analysis, the following research conclusions are drawn:

(1) A better business environment can cultivate entrepreneurship. The business environment is an important soft power of a region or even a country. A better business environment creates an external environment that is conducive to entrepreneurial innovation and entrepreneurship, thus enhancing entrepreneurship.

(2) A better business environment means that policies and laws are coherent, which can reduce the institutional risks faced by enterprises externally and lower rent-seeking costs to provide a more favorable external environment for entrepreneurs. A good business environment reduces credit costs, providing sufficient conditions for the cultivation of entrepreneurship.

(3) Further heterogeneity analysis reveals that, along with the continuous optimization of the business environment, high-tech enterprises can better benefit from the optimization of the business environment and further enhance entrepreneurship compared to traditional enterprises. When the degree of competition is low, entrepreneurs face lower business risks, which is conducive to stimulating entrepreneurship. The business environment can promote equity and bring about more equal financing opportunities for firms, which has a higher spillover effect on entrepreneurship in the high financing constraint group.

6.2. Management Implications

This study also has certain practical implications for guidance. First, the government should continue to optimize China's business environment to stimulate the vitality of market players. A better business environment not only stimulates entrepreneurship but also helps to hedge the impact of policy uncertainty on entrepreneurship. The government should play a bridging role by establishing credit channels between financial institutions and enterprises, reducing the cost of credit for enterprises, and providing the necessary financial resources for entrepreneurship. Second, the government should continue to create an efficient and clean governance environment, further promote a fair and competitive market environment, reduce incentives for enterprises to seek rent, and provide guarantees for entrepreneurs to devote more energy to productive activities. Third, the government should gradually improve the salary system, improve the social security system, strengthen the social

innovation atmosphere, as well as the construction of a fault-tolerant mechanism, form an open and inclusive humanistic environment, provide fertile ground for the growth of entrepreneurs, and reduce concerns for entrepreneurs' innovation and entrepreneurship.

6.3. Limitations and Prospects

Limited by the research topic and data, this paper has the following three shortcomings, which indicate the directions for future research to be expanded.

First, this study's measurement of the business environment draws on Wang's (2019) and Zhang's (2022) evaluations of China's business environment by province, and although the data are relatively scientific, there are differences in the level of economic development and business environment among cities in the same province. Future research can therefore further refine the business environment evaluation index system.

Second, this study only explores the influence of the business environment on entrepreneurship through reducing rent-seeking expenses and credit costs, which is a relatively narrow research path. Future research should continue to explore other influencing factors and influence paths to further deepen the research on entrepreneurship.

Third, the formation of entrepreneurship is a complex and systematic project. This study uses traditional regression analysis to explore the net effect relationship at the variable level, and future research can use Qualitative Comparative Analysis (QCA) to study the simultaneous mechanism of multiple factors on the formation of entrepreneurship.

Funding Statement

Acknowledgment

Conflict of interest

The authors claim that the manuscript is completely original. The authors also declare no conflict of interest.

References

Aghion, P., Bloom, N., Blundell, R.W., Griffith, R., & Howitt, P. (2005). Competition and innovation: an inverted-U relationship. *The Quarterly Journal of Economics*, 120 (2): 701-728. https://doi.org/10.3386/w9269

Akhmetshin, R.M., & Shafigullina, A.V. (2015). Government Regulation of Small and Medium Entrepreneurship under the Influence of Value-Time Benchmarks. *Mediterranean Journal of Social Sciences*. https://doi.org/10.5901/mjss.2015.v6n1s3p151

Anderson, M.R., Banker, R., & Janakiraman, S. (2006). "Cost Behavior and Fundamental Analysis of SG & A Cost". *Working Paper*. https://doi.org/10.1177/0148558x0702200103

Baker, S.R., Bloom N., & Davis S. J. (2016). Measuring economic policy uncertainty. *Quarterly Journal of Economics*, 131(4): 1593-1636. https://doi.org/10.3386/w21633

Baumol, W. J. (1993). Entrepreneurship, Management and the Structure of Payoffs, *Cambridge, MA: MIT-Pres*. https://doi.org/10.2307/2554878

Behr, P., Entzian, A., & Giittler, A. (2011). How do lending relationships affect access to credit and loan conditions in microlending? *Journal of Banking & Finance*. (8): 2169-2178. https://doi.org/10.1016/j.jbankfin.2011.01.005

Bertomeu, J., & Marinovic, I. (2016). A Theory of Hard and Soft Information. *The Accounting Review*, 91: 1 -20. https://doi.org/10.2308/accr-51102

Brackea, P., Hilberb, C. A. L., & Silvab, O. (2018). Mortgage debt and entrepreneurship. *Journal of Urban Economics*, 103: 52-66. https://doi.org/10.1016/j.jue.2017.10.003

Brychko, M., Bilan, Y., Lyeonov, S., & Streimikiene, D. (2022). Do changes in the business environment and sustainable development really matter for enhancing enterprise development? *Sustainable Development*, 1–13. https://doi.org/10.1002/sd.2410

Bu, D., Liao, Y. (2022). Land property rights and rural enterprise growth: Evidence from land titling reform in China. *Journal of Development Economics*, 157, 102853. https://doi.org/10.1016/j.jdeveco.2022.102853

Buchanan, J.R., & Tollision, G. (1980). Toward a theory of Rent-seeking Society. *College Park: Texas A&M University Press*, 359-367. https://doi.org/10.2307/1058683

Chowdhury, F., Audretsch, D.B., & Belitski, M. (2019). Institutions and Entrepreneurship Quality. *Entrepreneurship Theory and Practice*, 43. https://doi.org/10.1177/1042258718780431

Demerjian, P., Lev, B.; & McVay, S. (2012). Quantifying Managerial Ability: A New Measure and Validation Tests. *Managerial Science*, 58 (7) : 1229－1248. https://doi.org/10.2139/ssrn.1266974

Dhaliwal, D. S., Li, O. Z., Tsang, A., & Yang, Y. G. (2011). Voluntary Nonfinancial Disclosure and the Cost of Equity Capital: The Initiation of Corporate Social Responsibility Reporting. *The Accounting Review*, 86: 59-100. https://doi.org/10.2308/accr.00000005

Dhaliwal, D., Judd, J. S., Serfling, M., & Shaikh, S. (2016). Customer concentration risk and the cost of equity capital. *Journal of Accounting and Economics*, 61 (1): 23-48. https://doi.org/10.1016/j.jacceco.2015.03.005

Diamond, D.W., & Verrecchia, R.E. (1991). Disclosure, Liquidity, and the Cost of Capital. *The Journal of Finance*, 46: 1325-1359. https://doi.org/10.1111/j.1540-6261.1991.tb04620.x

Dong, Z., Wei, X., & Zhang, Y. (2016). The allocation of entrepreneurial efforts in a rent-seeking society: evidence from China". *Journal of Comparative Economics*, 44 (2): 353-371. https://doi.org/10.1016/j.jce.2015.02.004

Dorfleitner, G., Priberny, C., Schuster, S., Stoiber, J., Weber, M., De Castro, I., Kammler, J. (2016). Description -text Related Soft Information in Peer-to-peer Lending-Evidence from Two Leading European Platforms. *Journal of Banking & Finance*, 64, 169-187. https://doi.org/10.1016/j.jbankfin.2015.11.009

Dutta, S., Folta, T. B., & Rodrigues, J. (2020). Does government fund the best entrepreneurial ventures? the case of the small business innovation research program. *Academy of Management Discoveries*,8(1): 103-138. https://doi.org/10.5465/amd.2019.0078

Fields, L.P., Fraser, D.R., & Subrahmanyam, A. (2012). Board Quality and the Cost of Debt Capital: The Case of Bank Loans. *Journal of Banking & Finance*, 36: 1536-1547. https://doi.org/10.2139/ssrn.1590298

Hackler, D., & Mayer, H. (2008). Diversity, entrepreneurship, and the urban environment. *Routledge*. 3. https://doi.org/10.1111/j.1467-9906.2008.00396.x

Haidar, J. (2012). The Impact of Business Regulatory reforms on Economic Growth. *Journal of the Japanese and International Economies*, 26 (3): 285-307. https://doi.org/10.1016/j.jjie.2012.05.004

Hébert R F, & Link A N. (1989). In Search of the Meaning of Entrepreneurship. *Small Business Economics*, 1 (1). https://doi.org/10.1007/bf00389915

Jensen, T.L., Leth-Petersen, S.N. Ramana. (2022). Financing constraints, home equity and selection into entrepreneurship. *Journal of Financial Economics*, 145 (2):318-337. https://doi.org/10.1016/j.jfineco.2021.10.012

Jiang, R., & Fan,W. (2021). Inclusive finance and employment: Can financial development improve peasant's entrepreneurship? *Managerial and Decision Economics*, (4). https://doi.org/10.1002/mde.3407

Kooky, J., & Shin, S., (2004). Financial liberalization and corporate investments: evidence from Korean firm data. *Asian Economic Journal*, (3): 277-292. https://doi.org/10.1111/j.1467-8381.2004.00193.x

Lim, D.S.K., Morse, E.A., & Mitchell, R. K. (2010). Institutional environment and entrepreneurial cognitions: A comparative business systems perspective. *Entrepreneurship Theory & Practice*, 34 (3) : 491-516．https://doi.org/10.1111/j.1540-6520.2010.00384.x

Liu, X., & Li, S. (2022). The impact of criminal law regulation-based business environment optimization on entrepreneurial spirit and enterprise development. *Frontiers in Psychology*, 13. https://doi.org/10.3389/fpsyg.2022.944146

Lucas, P.D.M., Gustavo, H., & Bruno, B.F. (2022). The impact of the institutional environment on entrepreneurial activity: an analysis of developing and developed countries. *Journal of Entrepreneurship and Public Policy*, 11 (1):1-22. https://doi.org/10.1108/jepp-09-2021-0113

Malik, A., & Froese, F.J. (2022). Corruption as a perverse Innovation: The dark side of digitalization and corruption in international business. *Journal of Business Research*, 145: 682-693. https://doi.org/10.1016/j.jbusres.2022.03.032

Paunov, C, & Rollo, V. (2016). Has the internet fostered inclusive innovation in the developing world?. *World Development*, (78): 587－609. https://doi.org/10.1016/j.worlddev.2015.10.029

Pittman J A, & Fortin S, (2004). "Auditor Choice and the Cost of Debt Capital for Newly Public Firms", *Journal of Accounting and Economics*, (1), 113-136. https://doi.org/10.1016/j.jacceco.2003.06.005

Qin, N., & Kong, D. (2021). Access to Credit and Entrepreneurship: Evidence from China. *Economic Development and Cultural Change*. https://doi.org/10.1086/714440

Río, F.D. (2021). The impact of rent seeking on social infrastructure and productivity. *Review of Development Economics*, 25, 1741-1760. https://doi.org/10.1111/rode.12772

Sendra-Pons, P., Comeig, I., & Mas-Tur, A. (2022). Institutional factors affecting entrepreneurship: A QCA analysis. *European Research on Management and Business Economics*, 28 (3): 100187. https://doi.org/10.1016/j.iedeen.2021.100187

Shamshur, A., & Weill L. (2019). Does bank efficiency influence the cost of credit? *Journal of Banking & Finance*, 105 (AUG.): 62-73. https://doi.org/10.1016/j.jbankfin.2019.05.002

Slesman, L., Abubakar, Y. A., & Mitra, J. (2020). *International Business Review*, 30 (3): 101774. https://doi.org/10.1016/j.ibusrev.2020.101774

Song, C, Park, K.M., & Kim Y. (2020). Socio-cultural factors explaining technology-based entrepreneurial activity: Direct and indirect role of social security. *Technology in Society*, 61 (4): 101246. https://doi.org/10.1016/j.techsoc.2020.101246

Stiglitz, J. E., &Weiss, A. (1981). Credit Rationing in Markets with Imperfect Information. *SSRN Electronic Journal*. 71: 393-410. https://doi.org/10.2139/ssrn.1010965

Wang, X., Fan, G., &Yu, J. (2018). Marketization Index Report of China by Provinces (2018). *Beijing: Social Science Literature Press*.

Wen, Z., Zhang, L., & Hou, J. (2006). Mediated moderating variables and moderated mediating variables. *Journal of Psychology*, (03): 448-452.

Wu, C., & Lin, J. (2022). The Relationship Between Business Environment and Single Champion Enterprise Entrepreneurship. *Frontiers in Psychology*, 12. https://doi.org/10.3389/fpsyg.2021.788053

Xie, Z., Wang, J., & Miao, L. (2021). Big data and emerging market firms' innovation in an open economy: The diversification strategy perspective. *Technological Forecasting and Social Change*, 173, 121091. https://doi.org/10.1016/j.techfore.2021.121091

Xu, G., & Yano, G. (2017). How does anticorruption affect corporate innovation? Evidence from recent anticorruption efforts in China. *Journal of Comparative Economics*, 45 (3): 498-519. https://doi.org/10.1016/j.jce.2016.10.001

Yang, X., Huang, Y., & Gao, M. (2022). Can digital financial inclusion promote female entrepreneurship? Evidence and mechanisms. *North American Journal of Economics and Finance*, 63. https://doi.org/10.1016/j.najef.2022.101800

Yu, Y., & Xu, J.Q. (2020). The Dynamic Rent-Seeking Games with Policymaker Cost and Competition Intensity. *Discrete Dynamics in Nature and Society*, 1-11. https://doi.org/10.1155/2020/8081370

Zhang, S. and Z. Zhang (2022). Evaluation of Doing Business in Chinese Provinces 2022, *Peking University Open Research Data Platform*.

Zhao, J., & Wang, J. (2020). Regional Differences and Firms' Innovation Self-Choice Behavior: Insights from China. *Sustainability*, 12(9),3866. https://doi.org/10.3390/su12093866