

Article

# Financial Inclusion, Entry Barriers, and Entrepreneurship: Evidence from China

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Academic Editors: Hongbo Liu, Sizhong Sun and Iain Gordon

Received: 10 January 2017; Accepted: 25 January 2017; Published: 1 February 2017

**Abstract:** This paper aims at investigating the relationship between financial inclusion and the formation of entrepreneurs, both theoretically and empirically. We first construct a theoretical model to examine how the development of financial inclusion affects the formation of entrepreneurs. The model suggests that the development of financial inclusion can mitigate credit constraints on entrepreneurial activities by reducing information asymmetry in financial transactions, and in addition this effect is greater in industries with lower barriers to entry. Then, using data from 31 provinces and 19 industries in China during the period 2005–2014, we test the impact of financial inclusion on the formation of entrepreneurs. The estimation results confirm the positive effect of financial inclusion development on the formation of entrepreneurs, and indicate that this effect is heterogeneous across industries. Moreover, the development of financial inclusion is often beneficial to the formations of entrepreneurs in sectors with lower entry barriers.

**Keywords:** financial inclusion; entry barriers; entrepreneurship; China

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## 1. Introduction

Entrepreneurship has long been considered one of the most important factors in the process of economic development. Since Schumpeter [1] proposed the theory of innovation beyond the neoclassic framework, the role of entrepreneurship in economic development has captured widespread attention. Entrepreneurship is the willingness and ability of individuals to perceive and create new economic opportunities, and to introduce their ideas to the market [2]. It is suggested that entrepreneurial activities can not only lead to sustained economic growth and a persistent rise in living standards by carrying out innovations and enhancing rivalry, but also can reduce income inequality and even promote social fairness and justice [3–8], thus generating social sustainability. Especially with the rise and rapid development of the knowledge-based economy, mainly as a result of changes in the underlying technology, entrepreneurial activities have been increasingly viewed as a crucial engine of modern economic growth and inclusive development [9]. Therefore, a growing body of studies has paid close attention to the supply of entrepreneurial individuals across regions, and the question of how to facilitate the formation of entrepreneurs in a sustainable way has become a concern for policy makers worldwide.

Entrepreneurial activities usually involve a certain amount of irrecoverable start-up costs for obtaining essential skill training, operating innovations, building production facilities, and constructing distribution networks [10]. If entrepreneurs' personal wealth or internal resources are not sufficient to support their investments, they have to resort to external finance, especially through financial markets that are established to reduce transaction costs that limit direct pooling, and guide the allocation of funds via processing all available information about investments [11]. A well-functioning financial system can provide worthwhile investment opportunities to as many participants as possible,

and channel funds to their most productive uses. Therefore, financial development is crucial to the formation of entrepreneurs and their entrepreneurial activities.

However, previous research on financial development has focused mainly on the depth of formal financial systems but paid much less attention to the financial inclusiveness, which is typically defined as the extent to which individuals can directly access formal financial systems [12], mainly due to a lack of data on the individuals utilizing financial services. In the past decade, it has been increasingly observed that financial exclusion is severe worldwide, especially in developing countries. The data reveal that more than half of the world's adult population is currently excluded from access to formal financial systems, and 88% of the financially excluded live in developing regions, such as Latin America, Asia, and Africa [13]. Even in countries with robust financial systems, not everybody has access to financial services; for instance, 11% of the adults of 15 countries in the European Union are excluded from basic access to financial services, and this figure reaches 30% in Italy [14].

In the presence of financial exclusion, poor individuals and small enterprises that usually depend heavily on external finance often encounter financial constraints as a barrier to the entry and growth of firms, mainly due to the lack of collateral in the event of a default. They either cannot exploit investment opportunities or have to shut down their businesses when suffering from severe shocks at the very beginning, which leads to persistent exclusive development, as well as low economic growth or even poverty traps [10,15–20]. Empirical studies have also increasingly provided evidence for the impact of credit constraints on the entrepreneurial behaviors. One of the most consistent findings is that, regardless of the level of financial development, it seems to be much more difficult for small firms to utilize external finances than large firms [10,21–24], even if those small businesses are expected to offer a high rate of return [25].

The accessibility of external finance is affected not only by each individual's situation, but also by institutional environments. To mitigate financial exclusion and hence improve social and economic sustainability from an institutional perspective, the United Nations proposed establishing a financial inclusion system at the 2005 World Summit. This initiative aims at establishing an inclusive finance system offering a wide range of financial products and services at reasonable costs to all participants, supported by a corresponding policy, legal, and regulatory framework [26]. Since then, financial inclusion has been increasingly worldwide in practice. In September 2008, for example, some developing countries established the Alliance for Financial Inclusion (AFI) in Thailand. In September 2009, the G-20 set up the Financial Inclusion Experts Group (FIEG) in the United States, and later established the Global Partnership of Financial Inclusion (GPFI) in December 2010. At the country level, more than 50 countries have set formal goals for enhancing financial inclusion [27]. Compared with some early ways to cope with financial exclusion, the modern financial inclusion system emphasizes the sustainability of financial services rather than the charity via devoting more attention to the innovation of institution, products, and other aspects within the financial system, which reflects the transition of financial inclusion systems from welfarism to institutionalism.

The development of financial inclusion may favor entrepreneurial activities mainly through the following channels. First, financial inclusion can reduce start-up costs for individuals who are unable to obtain either self-financing or external financing [28]. Financial inclusion also enables established firms to make use of expansion opportunities [29]. Moreover, better financial inclusion allows firms to have a greater ability to make innovations [30,31]. However, no existing literature has specifically constructed theoretical models to examine the effects of financial inclusion development on entrepreneurial activities. On the empirical side, while the positive impact of financial inclusion is increasingly supported by some case studies with concrete loan information [32,33], there is also evidence that some particular inclusive financing measures, such as microfinance, have had little impact on microenterprise growth [34–37]. Therefore, there needs to be more evidence of the effect of financial inclusion on the formation of entrepreneurs and their entrepreneurial activities.

In recent years, the Chinese government has been constructing and promoting the financial inclusion system; for example, it issued the Plan of Promoting Financial Inclusion Development for

2016–2020. Meanwhile, it also has encouraged people, including college students, to start their own businesses, and more recently proposed a strategy named “Mass Entrepreneurship and Innovation”. Despite the policy importance, studies on the determinants of entrepreneurship in China are still limited [38,39]. Promoting financial inclusion and boosting entrepreneurial activities both require new sources of sustainable growth since China has attained middle-income status and tried to avoid middle-income traps. In this context, this paper attempts to construct a theoretical model to describe how the development of financial inclusion influences the formation of entrepreneurs and their entrepreneurial activities, and provide empirical evidence using China’s data on regions and sectors, thereby contributing to the research on both financial inclusion and the formation of entrepreneurs.

We extend the model developed by Aghion et al. [10] to theoretically explore the impact of financial inclusion on the formation of entrepreneurs. The original model analyzed credit constraints as a barrier to the entry and the expansion of firms. It assumes that the wealth endowment is different across individuals and there is a fixed sunk cost when entering the market. In the context of an imperfect financial market, entrepreneurs can only take the initial production capacity as collateral to borrow. This suggests that financial development will promote the entry of small firms and expansion of all entering firms. We extend this model from two perspectives. First, in the extended model, we assume that agents can use both initial and future wealth as collateral, but the proportion of future wealth that can be used as collateral relies on the degree of financial development. Because the core function of a financial inclusion system is to solve the problem of insufficient collateral mainly resulting from the information asymmetry, the level of financial development can be used to describe the situation of financial inclusion in our model. Furthermore, considering China’s reality, we introduce policy barriers to entry into the extended model, which enables us to explore the heterogeneous effect of financial inclusion on the formation of entrepreneurs across sectors with different levels of entry barriers. Then, using data on regions and industries in China, we test our predictions regarding the relationship between financial inclusion and the formation of entrepreneurs.

The remainder of this paper is organized as follows. Section 2 extends the model developed by Aghion et al. [10] to theoretically explore the impact of financial inclusion development on the formation of entrepreneurs. Section 3 measures the development of financial inclusion across Chinese regions. Section 4 uses empirical data to test the impact of financial inclusion on the number of entrepreneurs. Section 5 tests the robustness of estimation results. Section 6 concludes the paper.

## 2. Theoretical Model

Consider an economy with overlapping generations in which economic activity runs over infinite and discrete time. Two types of goods are produced in every period: good  $X$  is used as the production input and numeraire, and the other is consumption good  $Y$ . In every period a continuum of individuals is born. Individuals live for two periods; their consumption in the first period of life is an integral part of parental consumption. There also exist two types of individuals: investors and entrepreneurs. Entrepreneurs are heterogeneous not only in their initial wealth  $w$  (measured in units of the numeraire good  $X$ ) obtained from their parents at the end of the first period of life and but also in their potential production capacity  $q$  in the second period. Initial wealth  $w$  is uniformly distributed across individuals over the interval  $[0, \bar{w}]$ , whereas  $q$  is uniformly distributed across individuals over the interval  $[0, \bar{q}]$ . Moreover, initial wealth is assumed to be independent of potential capacity, which captures production uncertainty.

The consumption good needs to be renewed in every period due to shifts in the market demand or technological innovations. Entrepreneurs have to pay a fixed amount of sunk cost  $k$  (measured in units of the numeraire good  $X$ ) for product innovation before starting production. Moreover, entrepreneurs are also subject to an entry barrier, represented by a license fee  $b$  that needs to be paid up front before starting production. Taking their parental transfer and potential production capacity as collateral, entrepreneurs can borrow  $k$  and  $b$  from a large number of investors to finance their product renewing and license fee. It is assumed that lenders can identify individuals’ initial wealth  $w$ , but cannot perfectly

assess their potential capacity  $q$  in the second period. Therefore, the initial wealth  $w$  can be entirely used as collateral, but only a fraction of the potential capacity can be used as collateral due to credit market imperfections, implying that there is a potential moral hazard in debt repayment that limits borrowing against future income.

Expost, entrepreneurs can choose either to repay  $k + b$  or default on loans. If an entrepreneur chooses to default, s/he loses the collateral  $w + \tau pq$  but escapes the repayment obligation ( $p$  is the stationary equilibrium price for consumption goods, and  $\tau \in [0, 1]$  is the proportion of potential capacity that can be used as collateral). Since the core function of a financial inclusion system is to improve the assessment of individuals' potential so as to reduce financing constraints for the talented poor and the small enterprises,  $\tau$  can reasonably be used to capture the level of financial inclusion development; a higher value of  $\tau$  reflects a higher level of financial inclusion development.  $\tau = 0$  represents the case of complete financial exclusion, whereas  $\tau = 1$  indicates complete financial inclusion. Thus, ex post enforcement requires that:

$$k + b < w + \tau pq. \quad (1)$$

Otherwise, entrepreneurs cannot obtain sufficient capital to support their product innovation and market entry, and will not enter the consumption good market. Therefore, the cut-off level of entrepreneurs' initial wealth is

$$\hat{w} = k + b - \tau pq. \quad (2)$$

**Proposition 1.** *Financial inclusion development has a positive effect on the potential number of entrepreneurs by reducing financing constraints on individuals with low initial wealth.*

Equation (2) shows that, given the degree of financial inclusion  $\tau$  and the potential capacity  $q$ , entrepreneurs with initial wealth less than  $\hat{w}$  will be excluded from the consumption good market. The level of financial inclusion development  $\tau$  is negatively related to the initial wealth threshold  $\hat{w}$ , implying that the potential number of entrepreneurs entering the consumption good market is positively influenced by the level of financial inclusion development  $\tau$ .

Now consider entrepreneurs with initial wealth  $w \geq \hat{w}$ . Production costs are normalized at zero to simplify the analysis. If an entrepreneur enters the consumption good market by borrowing capital, his/her present value of net profit is

$$\pi = pq - k - b. \quad (3)$$

Obviously, an entrepreneur with initial wealth  $w \geq \hat{w}$  will enter the consumption good market whenever  $\pi \geq 0$  or equivalently:

$$q \geq (k + b) / p. \quad (4)$$

Specifically, the cut-off level of potential production capacity is:

$$\hat{q} = (k + b) / p. \quad (5)$$

**Proposition 2.** *The positive effect of financial inclusion development on the number of entrepreneurs is subject to the level of sectoral barriers to entry, and is greater in markets with fewer barriers to entry.*

Equation (5) demonstrates that the number of entrepreneurs with initial wealth  $w \geq \hat{w}$  who indeed enter the consumption good market is subject to the license fee  $b$ ; market liberalization can induce more firms to enter the consumption good market by increasing profit. Hence, combining the initial wealth threshold with the potential capacity threshold, it can be shown that the development of financial inclusion favors the entry of a higher number of firms. Moreover, this positive effect depends on the level of entry barriers, and is greater in markets with lower entry barriers.

As to the equilibrium price of the consumption good, it can be solved in a stationary equilibrium. The aggregate supply of consumption good obviously has a negative relationship with two thresholds,  $\hat{w}$  and  $\hat{q}$ ; therefore, according to Equations (2) and (5), it is an increasing function of  $p$  and  $\tau$ .  $S(p, \tau)$  and  $D(p)$  represent the aggregate supply and the aggregate demand, respectively; the latter is a decreasing function of price  $p$ . Then the equilibrium price of consumption good is determined by the stationary equilibrium condition:

$$S(p, \tau) = D(p). \quad (6)$$

In addition, the equilibrium price  $p$  of the consumption good is negatively influenced by the level of financial inclusion  $\tau$  due to the positive relationship between the development of financial inclusion and the aggregate supply. In other words, the development of financial inclusion can drive the price down by promoting entrepreneurial activities and hence enhancing the level of competition in the goods market, especially one with fewer barriers to entry.

### 3. Measurement of Financial Inclusion

Before testing the predictions of the model using data from provinces and industries in China, we first introduce our approach to measuring the level of financial inclusion. Since financial access is a multidimensional concept and thus cannot be adequately captured by any single indicator, existing studies often measure the level of financial inclusion by formulating a matching financial inclusion index along with the causes of the barriers to financial inclusion [40,41]. Sarma [40] suggested a set of criteria for constructing a good measure of financial inclusion as inclusive, practical, and comparable. Following these criteria, we adopt the following method to calculate the financial inclusion index:

(i) Designing dimensions and indicators of the financial inclusion index. Considering the availability and reliability of the data, and the comparability of index across regions, we measure the financial inclusion index from three dimensions: geographical penetration of financial branches (GP), availability of financial services (AS), and usage of financial system (UF). Each dimension is measured by two indicators. Since for firms and households in China external financing is largely from banks, all indicators are selected from the banking system. The geographical penetration of banking branches is measured by the number of financial branches per 10,000 square kilometers and the number of financial employees per 10,000 square kilometers. The availability of services is measured by the number of financial branches per 10,000 persons and the number of financial employees per 10,000 persons. The usage of the financial system is measured by the volume of deposits as a proportion of a province's GDP and the volume of credits as a proportion of a province's GDP. The data on six indicators are all collected from the Almanac of China's Finance and Banking [42–51] and the China's Regional Financial Performance Reports [52–61] issued by the People's Bank of China and the database of the National Bureau of Statistics of China.

(ii) Identifying the weight of each indicator. We use the variation coefficient method to assign a weight to each indicator while computing financial inclusion index. The coefficient of variation is the ratio of standard deviation to mean, namely  $V_i = \sigma_i / \bar{x}_i$ , where  $\sigma_i$  is the standard deviation of indicator  $I$  and  $\bar{x}_i$  is the mean of indicator  $i$ . The weight of indicator  $i$  is defined as the ratio of its variation coefficient  $V_i$  to the sum of the variation coefficients of all indicators  $\sum V_i$ , namely  $w_i = V_i / \sum V_i$ . The weight of each indicator is shown in Table 1.

(iii) Normalizing the value of each indicator. We normalize the value of each indicator with a linear efficacy coefficient method:

$$d_i = w_i \frac{A_i - m_i}{M_i - m_i} \quad (7)$$

where  $w_i$  is the weight for indicator  $i$ ,  $w_i \in [0, 1]$ ;  $A_i$  is the actual value of indicator  $i$ ; and  $m_i$  and  $M_i$  are the minimum and maximum values of indicator  $i$ , respectively.

$$d_i \in [0, w_i].$$

(iv) Calculating the financial inclusion index. A given province can be represented by a point  $X = (d_1, d_2, \dots, d_n)$  in Cartesian space with  $n$  dimensions. For example,  $O = (0, 0, \dots, 0)$  represents the province with the lowest level of financial inclusion (complete financial exclusion), whereas  $W = (w_1, w_2, \dots, w_n)$  is the province with the highest level of financial inclusion (complete financial inclusion). The closer a point is to point  $W$ , or the farther a point is away from point  $O$ , the higher the level of financial inclusion. If we define  $X_1$  as the standardized Euclidean distance between the point  $X$  and point  $O$ , and  $X_2$  as the standardized Euclidean distance between the point  $X$  and point  $W$ ,

$$X_1 = \left( \frac{d_1^2 + d_2^2 + \dots + d_n^2}{w_1^2 + w_2^2 + \dots + w_n^2} \right)^{1/2} \quad (8)$$

$$X_2 = 1 - \left( \frac{(w_1 - d_1)^2 + (w_2 - d_2)^2 + \dots + (w_n - d_n)^2}{w_1^2 + w_2^2 + \dots + w_n^2} \right)^{1/2}. \quad (9)$$

Finally, the financial inclusion index of each province can be measured by the arithmetic average of  $X_1$  and  $X_2$ :

$$IFI = (X_1 + X_2)/2. \quad (10)$$

Because the financial inclusion index is derived from a measure of the distance from the ideal, as Sarma [40] suggested, it has a few intuitive properties, i.e., normalization, symmetry, monotonicity, proximity, uniformity, and signaling.

**Table 1.** The weight of indicators.

Dimensions	Indicators	Weights
Geographical penetration	Number of financial branches per 10,000 km square	0.18
	Number of financial employees per 10,000 km square	0.14
Availability of services	Number of financial branches per 10,000 persons	0.12
	Number of financial employees per 10,000 persons	0.17
Use of financial system	Volume of deposits as a proportion of GDP	0.21
	Volume of credits as a proportion of GDP	0.17

#### 4. Empirical Analysis

In this section, using data from 31 regions (provinces, municipalities, and autonomous regions, hereafter referred to as provinces) and 19 industries over the period 2005–2014 in China, we test the theoretical predictions obtained from the model presented in the previous section regarding the relationship between financial inclusion development and the formation of entrepreneurs—that is, whether financial inclusion development favors the formation of entrepreneurs, and whether this effect is heterogeneous across sectors with different levels of entry barriers.

##### 4.1. Methodology

To accurately investigate the effect of financial inclusion development on the formation of entrepreneurs, based on the theoretical model formulated above and the existing relevant studies, we divide the implementation procedure into three basic steps.

First, we estimate the average impact of financial inclusion development on the number of entrepreneurs, distinguishing industries by their level of barriers to entry, in Model I as follows:

$$\begin{aligned}
Entrepre_{ijt} = & \zeta + \alpha(FinInc_{it} \times BF_{jt}) + \gamma PCGDP_{it} + \eta Edu_{it} + \lambda Urban_{it} + \delta Infra_{it} \\
& + \psi Open_{it} + \theta Gov_{it} + \varphi TE_{it} + \sum_i \varepsilon_i Province_i + \sum_j \beta_j Sector_j \\
& + \sum_{jt} \phi_{jt} Sector_{jt} + \sum_t \omega_t Year_t + \mu_{ijt}
\end{aligned} \quad , \quad (11)$$

where  $i$ ,  $j$ , and  $t$  denote the indexes of a given province, sector, and period, respectively.

The dependent variable  $Entrepre_{ijt}$  is the number of entrepreneurs in sector  $j$  as a proportion of the entire population in province  $i$  in period  $t$ . Throughout intellectual history, an entrepreneur evolved through multiple functions. There are at least three distinct facets emphasized by Schumpeter [1], Kirzner [62], and Knight [63], respectively: the innovator; the individual who perceives profit opportunities; and the person who tends to bear the risk related to uncertainty. Since every facet of entrepreneurs is important, it is not appropriate to define an entrepreneur solely as an individual who has all three characteristics mentioned above. Taking both the availability of data and the multiple facets of entrepreneurs into account, we measure the number of entrepreneurs by the number of registered firms.

$FinInc_{it}$  represents the level of financial inclusion of province  $i$  in period  $t$ , measured by the financial inclusion index IFI and its three dimensions GP, AS, and UF, presented in the previous section. According to the theoretical model built above, the development of financial inclusion improves the access to the formal financial system for all members. Therefore, it can be beneficial for alleviating credit constraints on poor individuals with high potential capability, and then promoting the entry of new firms.

$BF_{jt}$  is the business freedom index of sector  $j$  in period  $t$ ; a greater  $BF$  means a lower barrier to a firm's entry. Since the barriers to entry mainly aim to protect state-owned enterprises (SOEs) from competition in China, we use the SOEs' concentration ratio to measure the level of barriers to entry. The SOEs' concentration ratio is specifically measured by the number of SOEs employment as a proportion of total employment.  $BF$  is defined as 1 minus the SOEs' concentration ratio. As market liberalization promotes the birth of new establishments, business freedom is supposed to have a positive effect on the number of entrepreneurs.

$FinInc_{it} \times BF_{jt}$  is an interaction term between financial inclusion and business freedom. The parameter  $\alpha$  indicates the overall impact of financial inclusion on the number of entrepreneurs, given the level of business freedom or barriers to entry.

$PCGDP_{it}$  denotes the GDP per capita of province  $i$  in period  $t$ , taking the form of logarithm in estimation, which is used to measure the size of the local market. In general, the larger the market, the more demand it generates for specialized products and therefore the more attractive it is for start-ups [64–66].

$Edu_{it}$  is the number of college students as a proportion of total residents in province  $i$  in period  $t$ , a proxy for the level of education. Education is supposed to be beneficial for individuals' entrepreneurial intention and skill, and highly educated people tend to be self-employed [67]. Moreover, a large number of educated individuals may improve the rate of return on entrepreneurial activities by offering highly skilled workers, which is crucial for business operation [68]. Thus, education plays a favorable role in creating an entrepreneurial environment.

$Urban_{it}$  denotes the urbanization level of province  $i$  in period  $t$ , measured by the urban population as a proportion of the total local residents. There is a large development gap between rural and urban areas in China, mainly due to discrimination policies. Since, compared with rural residents, urban residents can usually start a business more conveniently and profitably in China, urbanization is expected to positively influence the number of entrepreneurs.

$Infra_{it}$  represents the infrastructure condition of province  $i$  in period  $t$ ; we use the highway area as a proportion of total residents to measure it. Access to well-established infrastructure can promote local businesses with low costs, and correspondingly help individuals to run businesses profitably.

$Open_{it}$  is the exports as a proportion of the GDP of province  $i$  in period  $t$ , employed to measure the degree of openness to the world market. Opening up to international markets can generate more firms through increasing competition. Moreover, it can bring capital, technology, and know-how, which are all beneficial for individuals looking to capture investment opportunities. Therefore, opening up to the world market is predicted to have a positive impact on the number of entrepreneurs.

$Gov_{it}$  denotes the proportion of local government spending in the GDP of province  $i$  in period  $t$ , measuring the extent to which local government directly supports businesses by using policy instruments. Government's fiscal spending can reduce entrepreneurs' financial constraints by providing direct subsidies and creating a prosperous business environment by stimulating aggregate demand. As a result, the local fiscal spending is expected to favor the formation of entrepreneurs.

$TE_{it}$  is the number of total registered firms as a proportion of the total residents  $i$  in period  $t$ , introduced to control the total entrepreneurs within a province.  $TE$  is supposed to have a positive impact on the number of entrepreneurs in each sector.

$Province_i$  and  $Year_t$  are dummy variables used to control for province-fixed effects and time-fixed effects, respectively.

$Sector_j$  and  $Sector_{jt}$  are dummy variables used to control for sectoral fixed and time-variant fixed effects, respectively.

$\zeta$  is a constant and  $\mu_{ijt} \sim (0, \sigma_u^2)$  is an i.i.d. (independent identically distributed) random error term.

The definitions and measurements of main variables in Model I are summarized in Table 2 as follow.

**Table 2.** Definitions and measurements of main variables.

Variables	Definition and Measurement
$Entrepre_{ijt}$	The number of entrepreneurs in sector $j$ as a proportion of entire population in province $i$ , measured by the number of registered firms in sector $j$ as a proportion of total residents in province $i$ .
$FinInc_{it}$	The level of financial inclusion development measured by the financial inclusion index IFI and its three dimensions GP, AS, and UF in the province.
$BF_{jt}$	The business freedom index measured by the 1 minus the number of SOEs employment in sector $j$ as a proportion of total employment in province $i$ .
$PCGDP_{it}$	The level of purchasing power of the local market, measured by the GDP per capita in province $i$ .
$Edu_{it}$	The development of education, measured by the number of college students as a proportion of total residents in province $i$ .
$Urban_{it}$	The development of urbanization, measured by the number of urban population as a proportion of total residents in province $i$ .
$Infra_{it}$	The situation of infrastructure, measured by the ratio of the highway area to the total residents in province $i$ .
$Open_{it}$	The degree of openness to the world market, measured by the value of exports as a proportion of GDP in province $i$ .
$Gov_{it}$	Government's policies for supporting business, measured by the ratio of government expenditure to GDP in province $i$ .
$TE_{jt}$	The total entrepreneurs, measured by the number of total registered firms as a proportion of total residents in province $i$ .

Secondly, we divide industries into different groups according to their level of entry barriers, and estimate the impact of financial inclusion development on the number of entrepreneurs for each of the groups. Each group has a single coefficient. Model II is constructed as follows:



$$\begin{aligned}
 \text{Entrepre}_{ijt} = & \zeta + \sum_g \alpha_g \text{FinInc}_{it} \times \text{Group}_g + \gamma \text{PCGDP}_{it} + \eta \text{Edu}_{it} + \lambda \text{Urban}_{it} + \delta \text{Infra}_{it} \\
 & + \psi \text{Open}_{it} + \theta \text{Gov}_{it} + \varphi \text{TE}_{it} + \sum_i \varepsilon_i \text{Province}_i + \sum_j \beta_j \text{Sector}_j \\
 & + \sum_g \kappa_g \text{Group}_g + \sum_{jt} \phi_{jt} \text{Sector}_{jt} + \sum_t \omega_t \text{Year}_t + \mu_{ijt}
 \end{aligned} \quad , \quad (12)$$

where  $\text{Group}_g$  is a dummy variable that categorizes 19 industries into five distinct groups.  $\alpha_g$  is a parameter that measures the effect of inclusive finance on the number of entrepreneurs in every group.

Finally, we estimate the effect of finance inclusion development on the number of entrepreneurs for each of the 19 industries. Model III is constructed as follows:

$$\begin{aligned}
 \text{Entrepre}_{ijt} = & \zeta + \sum_j \alpha_j \text{FinInc}_{it} \times \text{Sector}_j + \gamma \text{PCGDP}_{it} + \eta \text{Edu}_{it} + \lambda \text{Urban}_{it} + \delta \text{Infra}_{it} \\
 & + \psi \text{Open}_{it} + \theta \text{Gov}_{it} + \varphi \text{TE}_{it} + \sum_i \varepsilon_i \text{Province}_i + \sum_j \beta_j \text{Sector}_j + \sum_{jt} \phi_{jt} \text{Sector}_{jt} \\
 & + \sum_t \omega_t \text{Year}_t + \mu_{ijt}
 \end{aligned} \quad , \quad (13)$$

where  $\text{Sector}_j$  is a dummy variable that identifies each of 19 industries.  $\alpha_j$  is the parameter that indicates the effect of financial inclusion development on the number of entrepreneurs in each industry.

#### 4.2. Data

The dataset consists of 31 provinces of mainland China, and there are 19 industries in total in our sample, as shown in Table 3. Industries are listed in descending order by the level of barriers to entry; ‘public management and social organization’ and ‘manufacturing industry’, respectively, have the highest and lowest barriers to entry among the 19 industries. Industries are divided into five groups in ascending order of their level of business freedom; Groups 1 to 5 include six, three, three, six, and one industry/ies, respectively. The time horizon is selected as 2005 to 2014 mainly due to the availability of data on indicators for measuring the financial inclusion index. As mentioned above, the data used to measure the financial inclusion index are collected from the Almanac of China’s Finance and Banking [42–51] the China’s Regional Financial Performance Reports [52–61] issued by the People’s Bank of China and the database of the National Bureau of Statistics of China. The data on registered firms used to measure the number of entrepreneurs are available in the China Basic Statistical Units Yearbook [69–78]. The employment data used to measure the sectoral barriers to entry are compiled from the China Labor Statistical Yearbook [79–88]. The data for other control variables were all sourced from the database of National Bureau of Statistics of China.

The descriptive statistics are listed in Table 4, indicating a few crucial and intuitive characteristics. First, for the number of registered firms as a proportion of the entire population over the period 2005–2014, the maximum, 91.679, and minimum values, 0.0004 are widely separated, and the standard deviation (7.126) is high, implying that the number of entrepreneurs is quite diverse across provinces and industries. Second, the mean of financial inclusion index IFI (0.348) is significantly small considering the value range of this index, which suggests a low level of financial inclusion development in China over the period 2005–2014. Moreover, for the inclusive finance index, the maximum, 0.64, and minimum, 0.02 are significantly different, but the standard deviation (0.092) is not high, implying that the development of financial inclusion is not very different across China’s provinces. Last, there are not many missing observations, implying a nearly balanced panel.

**Table 3.** Sectoral classification and ranking of business freedom.

No.	Industry	BF	Group
1	public management and social organizations	0.0073	1
2	education	0.0459	1
3	agriculture, forestry, animal husbandry, and fishing	0.0525	1
4	health, social security, and social welfare	0.1140	1
5	water conservancy, environment, and public facilities management	0.1360	1
6	culture, sports, and entertainment	0.1437	1
7	scientific research, technical services, and geological prospecting	0.2493	2
8	transport, storage, and post	0.3489	2
9	production and supply of electricity, water, and gas	0.3543	2
10	resident services and other services	0.5496	3
11	leasing and business services	0.5509	3
12	mining	0.5969	3
13	finance	0.6156	4
14	information transmission, computer services, and software	0.6177	4
15	wholesale and retail trades	0.7052	4
16	accommodation and catering	0.7141	4
17	real estate	0.7541	4
18	construction	0.7715	4
19	manufacturing	0.8590	5

**Table 4.** The statistical description of variables.

	Mean	S.D.	Min	Max	Obs.
Entrepre	3.6890	7.1260	0.0004	91.6790	5269
IFI	0.3476	0.0918	0.0200	0.6397	5871
GP	0.4221	0.1527	0.0129	0.8979	5871
AS	0.3164	0.1179	0.0138	1.0000	5890
UF	0.3150	0.1457	0.0092	0.9223	5890
BF	0.4309	0.2782	0.0073	0.8590	5890
PCGDP	10.2060	0.6150	8.5280	11.5640	5890
Edu	0.0160	0.0060	0.0060	0.0360	5890
Urban	1.4280	1.6260	0.2610	8.6220	5890
Infra	12.7950	4.0130	4.0400	25.7700	5890
Open	0.1700	0.1950	0.0150	0.9050	5890
Gov	0.2320	0.1770	0.0800	1.2910	5890
TE	69.6759	46.3243	22.2766	307.0181	5301

#### 4.3. Estimation Results

On the basis of Models I, II, and III constructed in Section 4.1, we test the relationship between the development of financial inclusion and the formation of entrepreneurs using the data from 31 provinces and 19 industries in China during the period 2005–2014. The dependent variable is the number of registered firms in each of 19 industries, as a proportion of total population in each of 31 provinces. Financial inclusion development is primarily measured by the composite index *IFI* with three dimensions. Moreover, to particularly identify the respective impact of each dimension of financial inclusion on the formation of entrepreneurs, we also provide the estimation results for three financial dimensions separately. The results of the empirical estimations of three models are presented in Tables 5–7, respectively.

Table 5 shows the estimation results of Model I, presenting the overall effect of financial inclusion development on the number of entrepreneurs. Column (1) presents the estimation results by the composite index *IFI*. The estimated coefficient of the interaction between *IFI* and the *BF* is significantly positive at the 1% level, which supports the theoretical prediction. First, this indicates that financial inclusion has a strong and positive impact on the formation of entrepreneurs, and therefore provinces with a higher level of financial inclusion have more entrepreneurs in all covered industries.

Moreover, this shows that the positive effect of financial inclusion on the number of entrepreneurs is subject to sectoral business freedom. Specifically, it is greater in industries with lower barriers to entry. Columns (2)–(4) in Table 5 demonstrate the effects of three dimensions of financial inclusion development on the number of entrepreneurs. Excluding geographical penetration, the other two financial dimensions have a strong and positive impact on the number of entrepreneurs, and this effect is positively related to the degree of business freedom, further confirming the predictions of the theoretical model.

The estimation results of Model I present the average effect of financial inclusion on the number of entrepreneurs. However, the effect may be heterogeneous across industries identified by the level of business freedom, e.g., insignificant or even negative for some industries within this positive relationship due to the redistribution of financial resources. To examine if the impact of financial inclusion on the formation of entrepreneurs is heterogeneous, and thus whether the significance levels and even signs of the coefficients differ across industries, we now estimate Models II and III.

**Table 5.** The impact of financial inclusion on the formation of entrepreneurs.

Variable	(1)	(2)	(3)	(4)
IFI × BF	20.801 ***			
GP × BF		−14.433 ***		
AS × BF			25.815 ***	
UF × BF				23.935 ***
P CGDP	0.986	−1.491	0.480	0.755
Edu	−20.861	−3.233	−21.892	−20.394
Urban	−0.041	0.219	−0.030	0.104
Infra	0.025	−0.003	0.067	0.033
Open	0.795	−1.630	−0.975	0.564
Gov	−1.414	−0.188	−0.945	−3.028
TE	0.055 ***	0.051 ***	0.053 ***	0.054 ***
Observations	5250	5250	5269	5269
Adj R <sup>2</sup>	0.5525	0.5548	0.5616	0.5638
F	32.30 ***	32.60 ***	33.60 ***	33.90 ***
Province FE	Y	Y	Y	Y
Sector FE	Y	Y	Y	Y
Time FE	Y	Y	Y	Y
Sector–time FE	Y	Y	Y	Y

Notes: \*\*\* denotes the significance level of 1%. All fixed effects are not reported.

Table 6 reports the estimation results for Model II. The coefficients of the interaction term indicate the effect of financial inclusion on the number of entrepreneurs in each group and reveal if this relationship is different across industries. Moreover, those coefficients of the interaction term indicate how sectoral barriers to entry affect the relationship between the financial inclusion and the formation of entrepreneurs.

As shown in Table 6, since both the signs and significance of the interaction term differ across groups, the estimation results confirm the heterogeneous effect of the financial inclusion on the formation of entrepreneurs. Specifically, the estimates in Column (2) show that *IFI* has no significant impact on the number of entrepreneurs in some groups. For those groups in which *IFI* is statistically significant, the signs of coefficients are both negative and positive. This suggests that the formation of entrepreneurs in some industries benefits from the development of financial inclusion; thus, more entrepreneurs emerge in these industries in provinces with a higher level of financial inclusion. In contrast, other industries experience a decline in the number of entrepreneurs with the development of financial inclusion, suggesting that fewer entrepreneurs appear in these industries in provinces with a higher level of financial inclusion due to the redistribution of financial resources. The estimation

results for GP, AS, and UF also confirm the heterogeneous effects of financial inclusion development on the formation of entrepreneurs.

It is also demonstrated in Table 6 that the impact of financial inclusion on the number of entrepreneurs is subject to sectoral barriers to entry. As shown in Column (1), the groups with higher level of barriers to entry experience fewer entrepreneurs with the development of financial inclusion, which is illustrated by the significant and negative coefficient of *IFI* in Group 1. Meanwhile, groups with a higher level of business freedom experience an improvement in their entrepreneurs with the development financial inclusion, which is illustrated by the significant and positive coefficients of *IFI* in Groups 3–5. The coefficient of *IFI* in Group 2, however, is statistically insignificant, implying that there is a threshold effect of the sectoral barriers to entry, such that the formation of entrepreneurs can benefit from the improvement of financial inclusion only when the sectoral barrier to entry is below a certain threshold level. Furthermore, as shown in Columns (2)–(4) of Table 6, except for geographical penetration, the other two financial dimensions confirm the moderating effects of sectoral business freedom on the relationship between financial inclusion and the formation of entrepreneurs.

**Table 6.** The effect of financial inclusion on the formation of entrepreneurs by group of sectors.

Variable	(1)	(2)	(3)	(4)
	IFI	GP	AS	UF
Group 1	−9.353 ***	6.149 ***	−10.932 ***	−10.045 ***
Group 2	−4.229	1.886	−4.671 **	−3.679
Group 3	5.157 *	−0.961	2.561	5.464 **
Group 4	5.702 **	−3.747 ***	6.203 ***	6.442 ***
Group 5	19.524 ***	−17.038 ***	38.255 ***	14.907 ***
PCGDP	−0.033	−0.033	−0.040	−0.049
Edu	−7.251	−7.042	−7.463	−7.752
Urban	0.006	0.001	0.001	−0.007
Infra	−0.002	−0.001	−0.001	−0.003
Open	−0.005	−0.003	−0.028	−0.026
Gov	0.002	0.011	0.043	0.056
TE	0.054 ***	0.054 ***	0.054 ***	0.055 ***
Observations	5250	5250	5269	5269
Adj R <sup>2</sup>	0.5561	0.5594	0.5779	0.5690
F	32.16 ***	32.59 ***	35.19 ***	33.97 ***
Province FE	Y	Y	Y	Y
Sector FE	Y	Y	Y	Y
Time FE	Y	Y	Y	Y
Sector–time FE	Y	Y	Y	Y

Notes: \*\*\* denotes the significance level of 1%, \*\* denotes the significance level of 5%, and \* denotes the significance level of 10%. All fixed effects are not reported.

Finally, Table 7 presents the estimation results of Model III, incorporating an interaction term between financial inclusion and a sectoral binary variable that identifies every industry. The estimates indicate the impact of financial inclusion on the number of entrepreneurs in each industry. Moreover, they also offer a robustness test of the results listed in Table 6. As shown in each column of Table 7, the signs and significance of the interaction term in each industry confirm the estimation results shown in Table 6. Hence, the relationship between the financial inclusion and the formation of entrepreneurs is heterogeneous across sectors.

Regarding the prediction that the impact of financial inclusion on the formation of entrepreneurs is subject to barriers to entry, it can be validated by the results shown in Table 7. As shown in Column (1), among the 10 industries with business freedom equal to or below the median value (0.5496), nine have a negative or nonsignificant coefficient of interaction term. Moreover, in the nine industries with business freedom above the median value, three coefficients of the interaction term

are significant and positive, and the other six coefficients of the interaction term are nonsignificant or negative. These estimates are consistent with those shown in Table 6 and confirm that financial inclusion development is more likely to benefit the formations of entrepreneurs in sectors with lower barriers to entry. Similar to the results in Table 6, as shown in Columns (2)–(4) of Table 7, except for geographical penetration, the other two dimensions both confirm the moderating effects of the sectoral business freedom on the relationship between financial inclusion and the number of entrepreneurs.

**Table 7.** The effect of financial inclusion on the formation of entrepreneurs by sectors.

Variable	(1)	(2)	(3)	(4)
	IFI	GP	AS	UF
Industry 1	2.769	14.448 ***	−8.580 ***	−9.283 ***
Industry 2	−9.819 ***	4.861 **	−12.787 ***	−10.163 ***
Industry 3	−11.242 ***	4.446 **	−13.251 ***	−11.787 ***
Industry 4	−10.909 ***	6.080 ***	−13.300 ***	−12.149 ***
Industry 5	−10.548 ***	4.216 *	−12.067 ***	−10.844 ***
Industry 6	−4.573	3.058	−8.382 ***	−5.429 **
Industry 7	9.733 ***	−1.03	4.216 *	8.041 ***
Industry 8	−5.463	1.942	−6.069 **	−6.524 ***
Industry 9	−11.932 ***	4.859 **	−13.527 ***	−12.191 ***
Industry 10	−1.736	0.859	−4.201 *	−2.348
Industry 11	34.022 ***	−9.687 ***	24.779 ***	31.836 ***
Industry 12	−11.791 ***	6.057 ***	−14.263 ***	−12.731 ***
Industry 13	−10.25 ***	4.296 *	−13.528 ***	−10.959 ***
Industry 14	2.057	0.715	−2.435	1.222
Industry 15	65.851 ***	−28.892 ***	65.177 ***	61.624 ***
Industry 16	−4.339	2.267	−7.209 ***	−4.747 **
Industry 17	−6.797 *	0.198	−7.504 ***	−5.481 **
Industry 18	−4.058	−0.216	−4.001	−4.188 *
Industry 19	21.198 ***	−17.001 ***	37.798 ***	15.029 ***
PCGDP	0.155	−0.005	−0.027	−0.037
Edu	−4.972	−6.094	−2.882	−2.356
Urban	−0.078	0.004	−0.013	0.006
Infra	0.006	−0.001	−0.003	0.001
Open	0.002	0.002	−0.030	−0.053
Gov	−0.225	−0.036	−0.069	−0.001
TE	0.055 ***	0.054 ***	0.054 ***	0.053 ***
Observations	5252	5250	5269	5269
Adj R <sup>2</sup>	0.6059	0.5819	0.6520	0.6783
F	36.88 ***	33.47 ***	44.87 ***	50.37 ***
Province FE	Y	Y	Y	Y
Sector FE	Y	Y	Y	Y
Time FE	Y	Y	Y	Y
Sector–time FE	Y	Y	Y	Y

Notes: \*\*\* denotes the significance level of 1%, \*\* denotes the significance level of 5%, and \* denotes the significance level of 10%. All fixed effects are not reported.

## 5. Robustness

We implement a series of empirical tests to check the robustness of the estimation results shown above. First of all, we investigate the impact of outliers on the results by inspecting residuals and removing the extreme values of entrepreneurs [89]. Specifically, we removed (i) all observations whose residuals were greater than 2.5 standard deviation (SD); and (ii) the province with the highest and lowest number of entrepreneurs (the province with the highest number of entrepreneurs is Guizhou; the province with the lowest number of entrepreneurs is Beijing). As shown in Tables 8 and 9, the estimation results are in line with those listed in the previous section, that is, financial inclusion has

heterogeneous effects on the formation of entrepreneurs, and the effects are more likely to be positive for sectors with low entry barriers.

**Table 8.** Robustness: removing observations with residuals larger than 2.5 SD.

Variable	(1)	(2)	(3)	(4)
	IFI	GP	AS	UF
Industry 1	15.319 ***	11.703 ***	−2.858 **	−7.359 ***
Industry 2	−4.348 ***	2.163 **	−4.897 ***	−3.887 ***
Industry 3	−5.292 ***	1.640 *	−5.010 ***	−5.765 ***
Industry 4	−5.438 ***	3.382 ***	−5.410 ***	−5.874 ***
Industry 5	−5.076 ***	1.518	−4.177 ***	−4.568 ***
Industry 6	0.321	0.361	−0.492	0.847
Industry 7	10.023 ***	−3.112 ***	9.226 ***	10.589 ***
Industry 8	0.009	−0.756	1.821	−0.247
Industry 9	−6.460 ***	2.083 **	−5.637 ***	−5.914 ***
Industry 10	3.735 **	−1.838 *	3.689 ***	3.928 ***
Industry 11	15.369 ***	−6.262 ***	17.910 ***	34.180 ***
Industry 12	−6.320 ***	3.205 ***	−6.372 ***	−6.455 ***
Industry 13	−5.216 ***	1.668 *	−4.976 ***	−4.994 ***
Industry 14	7.529 ***	−1.983 **	5.455 ***	7.498 ***
Industry 15	21.441 ***	−24.795 ***	56.991 ***	62.752 ***
Industry 16	1.132	−0.431	0.681	1.529
Industry 17	−1.325	−2.499 ***	0.387	0.795
Industry 18	1.413	−2.914 ***	3.889 ***	2.088 *
Industry 19	7.731 ***	−19.280 ***	40.483 ***	10.887 ***
PCGDP	0.326	−0.543	0.288	0.405
Edu	2.780	34.837	−11.489	44.897
Urban	0.368	0.198	0.128	0.331
Infra	−0.035	0.006	0.002	−0.018
Open	1.553	0.995	0.464	0.662
Gov	−0.253	0.139	0.229	−0.732
TE	0.019 ***	0.026 ***	0.025 ***	0.017 ***
Observations	5096	5122	5123	5114
Adj R <sup>2</sup>	0.7486	0.7791	0.7879	0.8169
F	68.44 ***	81.26 ***	85.55 ***	102.41 ***
Province FE	Y	Y	Y	Y
Sector FE	Y	Y	Y	Y
Time FE	Y	Y	Y	Y
Sector–time FE	Y	Y	Y	Y

Notes: \*\*\* denotes the significance level of 1%, \*\* denotes the significance level of 5%, and \* denotes the significance level of 10%. All fixed effects are not reported.

Second, to examine whether there is indeed a heterogeneous effect of financial inclusion on the sectoral formation of entrepreneurs, the Wald test is conducted to inspect the results shown in Table 6. The results of the composite index *IFI* are demonstrated in Table 10. All the F-statistics imply that the coefficients are different for at least 5% of significance, except the relationship between Group 2 and Group 3, which confirms that the effect of financial inclusion on the formation of entrepreneurs is heterogeneous across sectors.

Finally, we need consider the endogeneity issue of the development of financial inclusion. In the previous empirical estimation, the development of financial inclusion was assumed to be exogenous, but the empirical results may be caused by the development of financial inclusion in response to demand from those sectors—that is, more entrepreneurs across sectors induce the development of financial inclusion, and financial inclusion development could be caused by the financial demand of sectors with lower barriers to entry. Therefore, we need to examine a possible reverse causality from the formation of entrepreneurs to financial inclusion development. The results from the previous

section help reduce the problem of reverse causality to some extent. In the first place, those dummy variables incorporated in the estimation can reduce the severity of reverse causality. Moreover, we use a composite index to measure financial inclusion, and this index is not correlated with omitted variables that promote the formation of entrepreneurs in sectors with lower barriers to entry. However, to examine the reverse causality more directly, following Rajan and Zingales [21] and Cezar [89], we divide all observers into two groups: sectors whose number of entrepreneurs is below the median for the province, and sectors whose number of entrepreneurs is above the median for the province. The results in Tables 11 and 12 show that the effects of financial inclusion do change in some sectors. Nonetheless, the estimates do not fundamentally change the predictions, and thus the main conclusions are sustained. The relationship between financial inclusion and the formation of entrepreneurs is still heterogeneous, and is more often significant and positive among the sectors with fewer barriers to entry.

**Table 9.** Robustness: removing the highest and lowest number of entrepreneurs.

Variable	(1)	(2)	(3)	(4)
	IFI	GP	AS	UF
Industry 1	11.689 ***	13.607 ***	−1.360	2.909
Industry 2	−8.316 **	3.356	−10.190 ***	−9.226 ***
Industry 3	−8.153 **	3.030	−9.833 ***	−8.706 ***
Industry 4	−7.676 **	4.522 **	−9.756 ***	−10.182 ***
Industry 5	−8.008 **	2.496	−8.711 ***	−8.960 ***
Industry 6	−7.251 **	2.409	−8.332 ***	−7.925 ***
Industry 7	−2.068	0.624	−2.030	−2.306
Industry 8	−3.555	0.649	−3.102	−3.822
Industry 9	−8.669 **	2.950	−9.683 ***	−9.773 ***
Industry 10	−4.003	0.691	−4.228 *	−3.689
Industry 11	8.782 ***	−4.448 **	8.973 ***	12.671 ***
Industry 12	−8.208 **	3.976 *	−10.024 ***	−10.243 ***
Industry 13	−7.864 **	2.492	−9.919 ***	−9.200 ***
Industry 14	−4.411	1.136	−5.235 **	−4.325
Industry 15	39.208 ***	−20.615 ***	46.964 ***	50.942 ***
Industry 16	−5.462	1.670	−6.540 ***	−5.316 *
Industry 17	−8.033 **	−0.729	−6.696 ***	−6.169 **
Industry 18	−3.070	−1.168	−1.971	−1.933
Industry 19	34.799 ***	−16.129 ***	45.275 ***	34.394 ***
P CGDP	−0.049	−0.044	−0.054	−0.043
Edu	−0.697	−0.888	0.746	−0.444
Urban	0.034	0.046	0.029	0.028
Infra	0.000	−0.001	−0.002	0.001
Open	−0.031	−0.030	−0.037	−0.054
Gov	−0.013	−0.013	−0.048	−0.003
TE	0.053 ***	0.053 ***	0.053 ***	0.053 ***
Observations	4930	4930	4930	4930
Adj R <sup>2</sup>	0.6069	0.6019	0.6524	0.6434
F	35.12 ***	34.41 ***	42.48 ***	40.88 ***
Province FE	Y	Y	Y	Y
Sector FE	Y	Y	Y	Y
Time FE	Y	Y	Y	Y
Sector–time FE	Y	Y	Y	Y

Notes: \*\*\* denotes the significance level of 1%, \*\* denotes the significance level of 5%, and \* denotes the significance level of 10%. All fixed effects are not reported.

**Table 10.** Robustness: wald test.

IFI		Group 1	Group 2	Group 3	Group 4	Group 5
Group 1	<i>F</i> -statistic Prob > F					
Group 2	<i>F</i> -statistic Prob > F	16.63 0.0000				
Group 3	<i>F</i> -statistic Prob > F	15.77 0.0001	0.06 0.8061			
Group 4	<i>F</i> -statistic Prob > F	43.09 0.0000	19.97 0.0000	13.46 0.0002		
Group 5	<i>F</i> -statistic Prob > F	72.73 0.0000	68.46 0.0000	42.80 0.0000	5.34 0.0209	

**Table 11.** Robustness: causality tests (below median).

Variable	(1)	(2)	(3)	(4)
	IFI	GP	AS	UF
Industry 1	(Omitted)			
Industry 2	−1.650	−3.284 **	2.647 ***	0.755 *
Industry 3	−8.742 ***	−2.654 ***	−1.230 **	−2.876 ***
Industry 4	−3.897 ***	0.787 **	−2.011 ***	−2.339 ***
Industry 5	−0.935	0.481	−0.701 **	−1.259 ***
Industry 6	0.590	0.178	0.144	0.307
Industry 7	−3.754 ***	−0.159	0.744	−0.583
Industry 8	1.278 **	−0.958 ***	2.372 ***	1.391 ***
Industry 9	−2.319 ***	1.125 ***	−2.161 ***	−2.606 ***
Industry 10	−0.444	−0.594 **	0.592	−0.039
Industry 11	(Omitted)			
Industry 12	−2.733 ***	1.696 ***	−2.950 ***	−3.113 ***
Industry 13	−1.329 **	0.559 **	−1.156 ***	−1.705 ***
Industry 14	3.243 ***	−0.998 ***	3.235 ***	3.913 ***
Industry 15	(Omitted)			
Industry 16	6.009 ***	−1.642 ***	6.151 ***	5.691 ***
Industry 17	2.688	2.021 *	−1.396 **	−1.491 *
Industry 18	3.233 ***	−5.243 ***	10.001 ***	5.690 ***
Industry 19	(Omitted)			
PCGDP	0.118	0.110	0.126	0.162
Edu	12.193	3.128	7.349	9.523
Urban	0.045	0.149	0.123	0.124
Infra	−0.012	−0.008	−0.006	−0.007
Open	0.056	0.180	0.079	0.047
Gov	−0.108	−0.533 *	−0.374	−0.293
TE	0.012 ***	0.009 ***	0.009 ***	0.009 ***
Observations	2748	2748	2758	2758
Adj <i>R</i> <sup>2</sup>	0.6573	0.6172	0.7107	0.7266
<i>F</i>	29.48 ***	24.95 ***	37.61 ***	57.66 ***
Province FE	Y	Y	Y	Y
Sector FE	Y	Y	Y	Y
Time FE	Y	Y	Y	Y
Sector–time FE	Y	Y	Y	Y

Notes: \*\*\* denotes the significance level of 1%, \*\* denotes the significance level of 5%, and \* denotes the significance level of 10%. All fixed effects are not reported.



**Table 12.** Robustness: causality tests (above median).

Variable	(1)	(2)	(3)	(4)
	IFI	GP	AS	UF
Industry 1	−7.735	20.865 ***	−24.321 ***	−22.795 ***
Industry 2	1.178	4.050	−12.971 ***	−6.844
Industry 3	7.903	1.920	−10.192 **	−1.609
Industry 4	−2.153	6.819	−8.181	−3.313
Industry 5	(Omitted)			
Industry 6	(Omitted)			
Industry 7	−3.845	7.749 *	−12.856 ***	−5.101
Industry 8	−32.461 **	−8.104	−8.803	−17.037 **
Industry 9	(Omitted)			
Industry 10	−18.702	33.078	0.279	−9.845
Industry 11	21.935 ***	−3.270	9.038 **	18.324 ***
Industry 12	50.983 **	5.301	−5.753	6.622
Industry 13	(Omitted)			
Industry 14	−7.538	38.834	−3.081	0.017
Industry 15	53.764 ***	−22.475 ***	49.436 ***	48.112 ***
Industry 16	−83.269 **	−2.830	−5.145	−4.681
Industry 17	−17.698 ***	6.848**	−26.224 ***	−19.808 ***
Industry 18	−16.804 **	2.240	−14.737 ***	−14.634 ***
Industry 19	9.112 *	−10.583 ***	22.058 ***	1.516
PCGDP	−0.211	−0.018	−0.231	−0.185
Edu	−45.989	−25.272	−38.221	−35.433
Urban	−0.426	0.048	0.018	−0.022
Infra	0.016	0.003	−0.008	−0.008
Open	0.157	−1.345	−0.993	−0.969
Gov	−1.480	1.138	0.696	0.365
TE	0.104 ***	0.105 ***	0.105 ***	0.104 ***
Observations	2504	2502	2511	2511
Adj R <sup>2</sup>	0.5979	0.5968	0.6430	0.6624
F	20.05 ***	20.09 ***	24.18 ***	26.26 ***
Province FE	Y	Y	Y	Y
Sector FE	Y	Y	Y	Y
Time FE	Y	Y	Y	Y
Sector–time FE	Y	Y	Y	Y

Notes: \*\*\* denotes the significance level of 1%, \*\* denotes the significance level of 5%, and \* denotes the significance level of 10%. All fixed effects are not reported.

## 6. Conclusions

The formation of entrepreneurs has been of increasing concern worldwide in the last two decades due to the crucial role of entrepreneurs in the sustainable growth of the modern economy. This paper aimed to investigate the effect of financial inclusion on the formation of entrepreneurs, hence contributing to the research on both financial inclusion development and the formation of entrepreneurs. By extending the study developed by Aghion et al. [10], we constructed a model to examine the theoretical relationship between the development of financial inclusion and the formation of entrepreneurs. The model predicted that in the context of an imperfect financial market, the development of financial inclusion can ease credit constraints on poor individuals through reducing information asymmetry and transaction costs between partners, and thus can potentially benefit the formation of entrepreneurs. In addition, this positive effect is subject to sectoral barriers to entry, and is greater in industries with lower barriers to entry.

Then, using data from 31 provinces and 19 industries in China over the period 2005–2014, we tested the main predictions of the theoretical model regarding the relationship between financial inclusion development and the formation of entrepreneurs. The overall estimation results showed

a significant and positive coefficient of the interaction between financial inclusion and barriers to entry, confirming the predictions of the theoretical model, such as that provinces with a higher level of financial inclusion have more entrepreneurs in all covered industries, especially in industries with lower barriers to entry. Moreover, by conducting group and sector estimations we found that the impacts of financial inclusion vary across sectors. Those impacts can be insignificant or even negative for some industries, but the development of financial inclusion is more likely to benefit the formation of entrepreneurs in sectors with lower barriers to entry. Finally, the results from a series of robust tests supported the reliability of our conclusions. As to policy implications, our study suggests that to obtain new sources of sustainable growth by boosting entrepreneurial activities, China needs to promote financial inclusion and remove barriers to entry in some regulated industries at the same time.

**Acknowledgments:** The authors acknowledge support from the National Social Sciences Fund of China (No. 13BRK013), and the Fundamental Research Funds for the Central Universities (No. 15jnlh007). The authors also want to thank Sizhong Sun, Hui Li, and Dongsong Zhang for their help with paper editing.

**Author Contributions:** Zhaobin Fan developed the theoretical model and wrote the paper. Ruohan Zhang collected data and conducted the empirical analysis. Both authors read and improved the final manuscript.

**Conflicts of Interest:** The authors declare no conflict of interest.

## References

- Schumpeter, J.A. *The Theory of Economic Development*; Harvard University Press: Cambridge, MA, USA, 1934.
- Wennekers, A.R.M.; Thurik, A.R. Linking Entrepreneurship and Economic Growth. *Small Bus. Econ.* **1999**, *13*, 27–55. [[CrossRef](#)]
- Audretsch, D.B.; Fritsch, M. Growth Regimes over Time and Space. *Reg. Stud.* **2002**, *36*, 113–124. [[CrossRef](#)]
- Dias, J.; McDermott, J. Institutions, Education, and Development: The Role of Entrepreneurs. *J. Dev. Econ.* **2006**, *80*, 299–328. [[CrossRef](#)]
- Baumol, W.J.; Strom, R.J. Entrepreneurship and Economic Growth. *Strat. Entrep. J.* **2007**, *1*, 233–237. [[CrossRef](#)]
- Agarwal, R.; Audretsch, D.; Sarkar, M.B. The Process of Creative Construction: Knowledge Spillovers, Entrepreneurship, and Economic Growth. *Strat. Entrep. J.* **2007**, *1*, 263–286. [[CrossRef](#)]
- Carree, M.A.; Thurik, A.R. The Impact of Entrepreneurship on Economic Growth. *Handb. Entrep. Res.* **2010**, *5*, 557–594.
- Samila, S. Venture Capital, Entrepreneurship, and Economic Growth. *Rev. Econ. Stat.* **2011**, *93*, 338–349. [[CrossRef](#)]
- Audretsch, D.B.; Thurik, A.R. Capitalism and Democracy in the 21st Century: From the Managed to the Entrepreneurial Economy. *J. Evol. Econ.* **2000**, *10*, 17–34. [[CrossRef](#)]
- Aghion, P.; Fally, T.; Scarpetta, S. Credit Constraints as a Barrier to the Entry and Post-Entry Growth of Firms. *Econ. Policy* **2007**, *22*, 731–779. [[CrossRef](#)]
- Levine, R. *Finance and Growth: Theory and Evidence*; Philippe, A., Durlauf, S., Eds.; Handbook of Economic Growth; North-Holland Elsevier Publishers: Amsterdam, The Netherlands, 2005.
- Beck, T.; Demirgüçkunt, A.; Honohan, P. Access to Financial Services: Measurement, Impact, and Policies. *World Bank Res. Observ.* **2009**, *24*, 119–145. [[CrossRef](#)]
- Chaia, A.; Dalal, A.; Goland, T.; Gonzalez, M.J.; Morduch, J.; Schiff, S. *Half the World is Unbanked*; Financial Access Initiative: New York, NY, USA, 2009.
- Peachy, S.; Roe, A. *Access to Finance: What Does It Mean and How Do Savings Banks Foster Access?* World Saving Bank Institute: Brussels, Belgium, 2004.
- Banerjee, A.; Newman, A. Occupational Choice and the Process of Development. *J. Political Econ.* **1993**, *101*, 274–298. [[CrossRef](#)]
- Aghion, P.; Bolton, P.A. Theory of Trickle-Down Growth and Development. *Rev. Econ. Stud.* **1997**, *64*, 151–172. [[CrossRef](#)]
- Lloyd-Ellis, H.; Bernhardt, D. Enterprise, Inequality, and Economic Development. *Rev. Econ. Stud.* **2000**, *67*, 147–168. [[CrossRef](#)]
- Albuquerque, R.; Hopenhayn, H.A. Optimal Lending Contracts and Firm Dynamics. *Rev. Econ. Stud.* **2004**, *71*, 285–315. [[CrossRef](#)]

19. Clementi, G.; Hopenhayn, H.A. Theory of Financing Constraints and Firm Dynamics. *Q. J. Econ.* **2006**, *121*, 229–265. [[CrossRef](#)]
20. Galor, O.; Michalopoulos, S. *Evolution and the Growth Process: Natural Selection of Entrepreneurial Traits*; NBER Working Paper, No. 17075; National Bureau of Economic Research: Cambridge, MA, USA, 2011.
21. Rajan, R.; Zingales, L. Financial Dependence and Growth. *Am. Econ. Rev.* **1998**, *88*, 559–586.
22. Beck, T.; Demirgüç-Kunt, A.; Maksimovic, V. Financial and Legal Constraints to Firm Growth: Does Size Matter? *J. Financ.* **2004**, *60*, 137–177. [[CrossRef](#)]
23. Levine, R. *Finance and Growth: Theory and Growth*; NBER Working Paper, No. 10766; National Bureau of Economic Research: Cambridge, MA, USA, 2004.
24. Alfaro, L.; Charlton, A. *International Financial Integration and Entrepreneurship*; Harvard Business School Working Paper, No. 7–12; Harvard Business School: Cambridge, MA, USA, 2006.
25. De Mel, S.; McKenzie, D.; Woodruff, C. One-Time Transfers of Cash or Capital Have Long-Lasting Effects on Microenterprises in Sri Lanka. *Science* **2012**, *335*, 962–966. [[CrossRef](#)] [[PubMed](#)]
26. UNCDF. *Building Financial Inclusive Financial Sectors for Development*; United Nations Capital Development Fund: New York, NY, USA, 2006.
27. World Bank. *Global Financial Development Report 2014: Financial Inclusion*; World Bank: Washington, DC, USA, 2014.
28. Klapper, L.; Laeven, L.; Rajan, R. Entry Regulation as a Barrier to Entrepreneurship. *J. Financ. Econ.* **2006**, *82*, 591–629. [[CrossRef](#)]
29. Beck, T.; Demirgüç-Kunt, A.; Maksimovic, V. The Influence of Financial and Legal Institutions on Firm Size. *J. Bank. Financ.* **2006**, *30*, 2995–3015. [[CrossRef](#)]
30. Claessens, S.; Laeven, L. Financial Development, Property Rights, and Growth. *J. Financ.* **2003**, *58*, 2401–2436. [[CrossRef](#)]
31. Ayyagari, M.; Demirgüç-Kunt, A.; Maksimovic, V. *Firm Innovation in Emerging Markets: Role of Governance and Finance*; Policy Research Working Paper No. 4157; World Bank: Washington, DC, USA, 2007.
32. Mckenzie, D.; Woodruff, C. Experimental Evidence on Returns to Capital and Access to Finance in Mexico. *World Bank Econ. Rev.* **2008**, *22*, 457–482. [[CrossRef](#)]
33. Banerjee, A.V.; Duflo, E. Do Firms Want to Borrow More? Testing Credit Constraints Using a Directed Lending Program. *Rev. Econ. Stud.* **2014**, *81*, 572–607. [[CrossRef](#)]
34. Banerjee, A.; Kinnan, C. The Miracle of Microfinance? Evidence from a Randomized Evaluation. *Ssrn Electron. J.* **2013**, *7*, 22–53. [[CrossRef](#)]
35. Karlan, D.; Zinman, J. Microcredit in Theory and Practice: Using Randomized Credit Scoring for Impact Evaluation. *Science* **2011**, *332*, 1278–1284. [[CrossRef](#)] [[PubMed](#)]
36. Kaboski, J.P.; Townsend, R.M. A Structural Evaluation of Large-Scale Quasi-Experimental Microfinance Initiative. *Econometrica* **2011**, *79*, 1357–1406. [[CrossRef](#)] [[PubMed](#)]
37. Field, E.; Pande, R.; Papp, J.; Rigol, N. Does the Classic Microfinance Model Discourage Entrepreneurship among the Poor? Experimental Evidence from India. *Am. Econ. Rev.* **2013**, *103*, 2196–2226. [[CrossRef](#)]
38. Anwar, S.; Sun, S. Foreign Direct Investment in R&D and Domestic Entrepreneurship in China's Manufacturing Industries. *Appl. Econ.* **2015**, *47*, 1633–1651.
39. Fan, Z.; Zhang, R.; Liu, X. Income Inequality, Entrepreneur Formation, and the Economic Development: Evidence from China. *J. Asia Pac. Econ.* **2016**, *21*, 444–464.
40. Sarma, M. *Index of Financial Inclusion*; Indian Council for Research on International Economic Relations, Working Paper, No. 215; Indian Council: New Delhi, India, 2008.
41. Amidžić, G.; Massara, A.; Mialou, A. *Assessing Countries' Financial Inclusion Standing: A New Composite Index*; IMF Working Papers, No.14; International Monetary Fund: Washington, DC, USA, 2014.
42. People's Bank of China. *Almanac of China's Finance and Banking*; Almanac of China's Finance and Banking Magazine Co.: Beijing, China, 2006. (In Chinese)
43. People's Bank of China. *Almanac of China's Finance and Banking*; Almanac of China's Finance and Banking Magazine Co.: Beijing, China, 2007. (In Chinese)
44. People's Bank of China. *Almanac of China's Finance and Banking*; Almanac of China's Finance and Banking Magazine Co.: Beijing, China, 2008. (In Chinese)
45. People's Bank of China. *Almanac of China's Finance and Banking*; Almanac of China's Finance and Banking Magazine Co.: Beijing, China, 2009. (In Chinese)

46. People's Bank of China. *Almanac of China's Finance and Banking*; Almanac of China's Finance and Banking Magazine Co.: Beijing, China, 2010. (In Chinese)
47. People's Bank of China. *Almanac of China's Finance and Banking*; Almanac of China's Finance and Banking Magazine Co.: Beijing, China, 2011. (In Chinese)
48. People's Bank of China. *Almanac of China's Finance and Banking*; Almanac of China's Finance and Banking Magazine Co.: Beijing, China, 2012. (In Chinese)
49. People's Bank of China. *Almanac of China's Finance and Banking*; Almanac of China's Finance and Banking Magazine Co.: Beijing, China, 2013. (In Chinese)
50. People's Bank of China. *Almanac of China's Finance and Banking*; Almanac of China's Finance and Banking Magazine Co.: Beijing, China, 2014. (In Chinese)
51. People's Bank of China. *Almanac of China's Finance and Banking*; Almanac of China's Finance and Banking Magazine Co.: Beijing, China, 2015. (In Chinese)
52. People's Bank of China. *China's Regional Financial Performance Reports*; China Financial Publishing House: Beijing, China, 2006. (In Chinese)
53. People's Bank of China. *China's Regional Financial Performance Reports*; China Financial Publishing House: Beijing, China, 2007. (In Chinese)
54. People's Bank of China. *China's Regional Financial Performance Reports*; China Financial Publishing House: Beijing, China, 2008. (In Chinese)
55. People's Bank of China. *China's Regional Financial Performance Reports*; China Financial Publishing House: Beijing, China, 2009. (In Chinese)
56. People's Bank of China. *China's Regional Financial Performance Reports*; China Financial Publishing House: Beijing, China, 2010. (In Chinese)
57. People's Bank of China. *China's Regional Financial Performance Reports*; China Financial Publishing House: Beijing, China, 2011. (In Chinese)
58. People's Bank of China. *China's Regional Financial Performance Reports*; China Financial Publishing House: Beijing, China, 2012. (In Chinese)
59. People's Bank of China. *China's Regional Financial Performance Reports*; China Financial Publishing House: Beijing, China, 2013. (In Chinese)
60. People's Bank of China. *China's Regional Financial Performance Reports*; China Financial Publishing House: Beijing, China, 2014. (In Chinese)
61. People's Bank of China. *China's Regional Financial Performance Reports*; China Financial Publishing House: Beijing, China, 2015. (In Chinese)
62. Kirzner, I.M. Entrepreneurial Discovery and the Competitive Market Process: An Austrian Approach. *J. Econ. Lit.* **1997**, *35*, 60–85.
63. Knight, F.H. *Risk, Uncertainty, and Profit*; Hart, Schaffner & Marx, Houghton Mifflin Co.: Boston, MA, USA, 1921.
64. Duranton, G.; Puga, D. Nursery Cities: Urban Diversity, Process Innovation, and the Life-cycle of Products. *Am. Econ. Rev.* **2001**, *91*, 1454–1477. [[CrossRef](#)]
65. Waldfogel, J. The Median Voter and the Median Consumer: Local Private Goods and Population Composition. *J. Urban Econ.* **2008**, *63*, 567–582. [[CrossRef](#)]
66. Duranton, G.; Jayet, H. Is the Division of Labour Limited by the Extent of the Market? Evidence from French Cities. *J. Urban Econ.* **2011**, *69*, 56–71. [[CrossRef](#)]
67. Doms, M.; Lewis, E.; Robb, A. Local Labor Market Endowments, New Business Characteristics, and Performance. *J. Urban Econ.* **2010**, *67*, 61–77. [[CrossRef](#)]
68. Glaeser, E.L.; Kerr, W.R.; Ponzetto, G.A.M. Clusters of Entrepreneurship. *J. Urban Econ.* **2010**, *67*, 150–168. [[CrossRef](#)]
69. National Bureau of Statistics of China. *China Basic Statistical Units Yearbook*; China Statistics Press: Beijing, China, 2006. (In Chinese)
70. National Bureau of Statistics of China. *China Basic Statistical Units Yearbook*; China Statistics Press: Beijing, China, 2007. (In Chinese)
71. National Bureau of Statistics of China. *China Basic Statistical Units Yearbook*; China Statistics Press: Beijing, China, 2008. (In Chinese)

72. National Bureau of Statistics of China. *China Basic Statistical Units Yearbook*; China Statistics Press: Beijing, China, 2009. (In Chinese)
73. National Bureau of Statistics of China. *China Basic Statistical Units Yearbook*; China Statistics Press: Beijing, China, 2010. (In Chinese)
74. National Bureau of Statistics of China. *China Basic Statistical Units Yearbook*; China Statistics Press: Beijing, China, 2011. (In Chinese)
75. National Bureau of Statistics of China. *China Basic Statistical Units Yearbook*; China Statistics Press: Beijing, China, 2012. (In Chinese)
76. P National Bureau of Statistics of China. *China Basic Statistical Units Yearbook*; China Statistics Press: Beijing, China, 2013. (In Chinese)
77. National Bureau of Statistics of China. *China Basic Statistical Units Yearbook*; China Statistics Press: Beijing, China, 2014. (In Chinese)
78. National Bureau of Statistics of China. *China Basic Statistical Units Yearbook*; China Statistics Press: Beijing, China, 2015. (In Chinese)
79. National Bureau of Statistics of China. *China Labor Statistical Yearbook*; China Statistics Press: Beijing, China, 2006. (In Chinese)
80. National Bureau of Statistics of China. *China Labor Statistical Yearbook*; China Statistics Press: Beijing, China, 2007. (In Chinese)
81. National Bureau of Statistics of China. *China Labor Statistical Yearbook*; China Statistics Press: Beijing, China, 2008. (In Chinese)
82. National Bureau of Statistics of China. *China Labor Statistical Yearbook*; China Statistics Press: Beijing, China, 2009. (In Chinese)
83. National Bureau of Statistics of China. *China Labor Statistical Yearbook*; China Statistics Press: Beijing, China, 2010. (In Chinese)
84. National Bureau of Statistics of China. *China Labor Statistical Yearbook*; China Statistics Press: Beijing, China, 2011. (In Chinese)
85. National Bureau of Statistics of China. *China Labor Statistical Yearbook*; China Statistics Press: Beijing, China, 2012. (In Chinese)
86. National Bureau of Statistics of China. *China Labor Statistical Yearbook*; China Statistics Press: Beijing, China, 2013. (In Chinese)
87. National Bureau of Statistics of China. *China Labor Statistical Yearbook*; China Statistics Press: Beijing, China, 2014. (In Chinese)
88. National Bureau of Statistics of China. *China Labor Statistical Yearbook*; China Statistics Press: Beijing, China, 2015. (In Chinese)
89. Cezar, R. The heterogeneous Effect of Finance on International Trade. *Appl. Econ.* **2014**, *46*, 2903–2919. [[CrossRef](#)]



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