

# Microfinance and Consumption Inequality: Evidence from the People's Republic of China

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# **MICROFINANCE AND CONSUMPTION INEQUALITY: EVIDENCE FROM THE PEOPLE’S REPUBLIC OF CHINA**

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## **Abstract**

This paper examines whether microfinance reduces consumption inequality of entrepreneurs of micro, small, and medium-sized enterprises (MSMEs). We obtain data on 160,000 individually owned MSMEs’ usage of microcredit as well as the consumption data of MSME entrepreneurs from the Ant Group, the fintech giant of the People’s Republic of China. Based on the consumption data, we calculate MSME entrepreneur Engel curve for food, and find that its sensitivity is significantly reduced when microloans are taken. The take-up of microloans is associated with a 0.8% reduction in food’s share in total consumption for sample MSME entrepreneurs on average, the magnitude of which is about 5% of the unconditional sample average of the Engel curve for food. The evidence confirms that microfinance helps to reduce MSME entrepreneur consumption inequality. Moreover, we find that the effect is especially evident for active business, for female MSME entrepreneurs, in large and medium-sized cities, and for active business in cities with greater financial inclusion.

## **Keywords**

microfinance, consumption inequality, engel curve, financial inclusion

## I. INTRODUCTION

Microfinance, a policy instrument for governments, is becoming increasingly important nowadays, especially in emerging markets where most employment is in micro-, small, and medium-sized enterprises (MSMEs). Microfinance programs have successfully found a business model that allows for offering credit to MSMEs, which are largely unserved by traditional banking industry because of their lack of credit. Microfinance overcomes the credit constraints of MSMEs by utilizing innovative ways to tokenize credit data for businesses, e.g., based on transaction data, yet the empirical evidence on the impact of microfinance remains inconclusive. There are studies arguing that microfinance is effective in raising household income and consumption (e.g., Pitt and Khandker 1996, 1998; Dunn and Arbuckle 2001; Khandker 2005; Berhane and Gardebroek 2011; Kaboski and Townsend 2012; Dupas and Robinson 2013; Khandker and Koolwal 2016; and Cai, Park, and Wang 2020), in enhancing educational attainment (Pitt and Khandker 1996, 1998), and in improving health status (Pitt, Khandker, Foster, and Menon 1999). Some other studies, however, claim that microfinance benefits only the “middle and upper poor” (e.g., Kondo, Orbeta, Dingcong, and Infantado 2008; and Banerjee, Duflo, Glennerster, and Kinnan 2015), is unsuccessful in reaching those gravely needing assistance (Adjei, Arun, and Hossain 2009; and Kondo, Orbeta, Dingcong, and Infantado 2008), or has no effect on poverty or inequality reduction (e.g., Roodman and Morduch 2014; and Banerjee, Karlan, and Zinman 2015).

We contribute to this line of research by examining whether microfinance helps to reduce poverty and inequality for MSME entrepreneurs. In performing the investigation, we choose to focus on consumption inequality. We expect microfinance to reduce MSME entrepreneurs’ consumption inequality as it enables MSMEs to overcome their financial constraints and realize their growth opportunities, which in turn is expected to be followed by enhanced income and improvements in life quality of owners of MSMEs.

Consumption inequality is an important dimension for the investigation of inequality. Attanasio and Pistaferri (2016) contend that, while much of the debate over the rising levels of inequality is phrased in terms of income, a basic utility function of individuals typically refers to consumption, rather than income. And they posit that consumption might reveal different insights than income when the effects of inequality are examined for the poorest segments of the society, as the dynamics in the relative prices of goods consumed by rich and poor households are likely to be different. Further, Aguiar and Bils (2015) argue that consumption inequality tracked income inequality much more closely than estimated by direct responses on expenditures. Meyer and Sullivan (2011, 2012) suggest that consumption-based measures are even better than income-based measures in capturing the well-being of the poor.

In measuring consumption inequality, we follow Almas (2012) and Aguiar and Bils (2015) to use the Engel curve for food: the ratio of spending on food to that of total expenditures. The aforementioned two studies argue that the ratio of expenditure is robust to individual-specific multiplicative measurement error, since the ratio of expenditures will be unaffected, making inaccuracy in total consumption data less a concern.

We obtain monthly data on the take-up of microloans by a group of randomly selected, individually owned MSMEs as well as MSME entrepreneur consumption data from the Ant Group, the fintech giant in the People's Republic of China (PRC). The Ant Group, an affiliate of Alibaba, is one of the biggest technology firms in the world and the biggest online payments platform in the PRC. It has established its presence in every aspect of financial life in the PRC, from investment accounts and micro savings products to insurance, credit scores, and micro loans, and has helped establish the PRC as the world leader in digital transactions, given entrepreneurs and consumers far greater access to loans, and changed the way that people manage their money. The Ant Group operates its

microloan business to MSMEs under the brand Jiebei, which is registered in the southern municipality of Chongqing. About 98% credit issued through the Ant Group and its affiliates were funded by its finance partners like banks or securitized as of June 2020. The Ant Group also runs the Alipay mobile payments app, used by more than 700 million monthly active users in the PRC in making their digital payments. Alipay has helped make Chinese society virtually cashless, at least in big cities, with consumers and merchants alike relying on digital payments using their phones. We obtain MSME microloan data from Jiebei, and their consumption data from Alipay.

The unique data we have obtained from the Ant Group enable us to investigate the effect of microfinance on consumption inequality to an extent that was impossible in previous studies. We are able to link the operation data (including the take-up of microloans) of MSMEs with the consumption behavior of MSME entrepreneurs. We trace the actual consumption of individuals based on their Alipay transactions, rather than measuring consumption based on survey data, as most existing studies have done. Moreover, surveys, e.g., the Consumer Expenditure Survey or those carried out by the World Bank or local governments, usually cover thousands of households (Almas 2012; and Aguiar and Bils 2015). In our study, however, we perform the investigation based on a much larger and, thus, more representative database. We randomly select 160,000 individually owned MSMEs in the PRC from the Ant Group database and collect data on these business as well as their respective entrepreneurs' monthly consumption over a 2-year period from August 2017 to July 2019, which enable us to perform the investigation in depth.

Our empirical investigation reveals that the take-up of microloans by a MSME is followed by a significant reduction in the share of food in total consumption for its entrepreneurs over the next month. The significantly negative relation is robust when business activeness, the personal characteristics of entrepreneurs, as well as time-, city-, and industry-fixed

effects are all controlled. The evidence confirms that microfinance benefits MSMEs by reducing the consumption inequality of MSME entrepreneurs, who constitute a large proportion of the poor segment of the society in the PRC.

Further, we conduct cross-sectional variation tests to examine the impact of microfinance conditional on (i) business activeness, (ii) gender of MSME entrepreneurs, (iii) city, and (iv) the development of local financial inclusion systems. We find that microfinance's effect in reducing MSME entrepreneurs' consumption inequality is especially evident for MSMEs that are more active in operation, for female MSME entrepreneurs, in large cities, and for active MSMEs in cities with more developed financial inclusion systems.

The rest of the paper is organized as follows. Section II reviews related literature on the effectiveness assessment of microfinance programs as well as literature on the measurement of poverty and inequality. Section III introduces data and research design. Section IV presents results of our empirical investigation. Section V concludes.

## **II. LITERATURE REVIEW**

In this section, we first review studies on the mission of microfinance as well as its effectiveness, with a focus on poverty and/or inequality reduction. We then review some related studies on the measurement of poverty and inequality, which motivate us to examine the effect of microfinance based on the consumption inequality, or consumption structure, rather than total income or total consumption of individuals.

### **A. The Effectiveness of Microfinance in Reducing Poverty and Inequality**

Microfinance has long been a laboratory for social investment, and provides a chance to understand the possibilities, limits, and conundrums of social business and social investment (Morduch and Ogden 2019). It strikes to create financial services for

individuals or communities that, otherwise, would lack efficient, reliable channels to borrow, save, and insure.

In early days, the microfinance movements were largely driven by enthusiasm about the possibilities to contribute to improving living quality, especially for those in great need. In recent decades, however, more hard questions about microfinance have been put forward, with some being answered and others being insufficiently addressed. One such question is about the social impacts that microfinance is able to bring to participants as well as the community. Proponents argue that microfinance mitigates market failures, stimulates MSME growth, and improves participants' well-being. Opponents contend that there is no solid evidence that microfinance programs have achieved these goals successfully, and that the programs may even bring negative impacts, such as business stealing from borrowers to non-borrowers. In this section, we go over related literature on the impact of microfinance, with a focus on its poverty- and inequality-reduction ability.

Pitt and Khandker (1998) is one of the most influential studies in this line of research. They evaluate the effect of three group-based credit programs in Bangladesh, based on a special survey carried out in 87 rural Bangladeshi villages over 1991–1992, on household labor supply, schooling, household expenditure, and assets. They find that credit is an important determinant for many of these behaviors, especially for women. Many follow-up studies find consistent and supporting evidence. Khandker (2005) examines the effects of microfinance on poverty reduction at both the individual and aggregate levels, using data from Bangladesh, and confirms that the access to microfinance helps to reduce poverty, especially for women. Moreover, Khandker (2005) shows that the access to microfinance reduces poverty at the village level, suggesting that it helps not only poor individuals but also local economy. Utilizing data on 351 farm households in northern Ethiopia, Berhane and Gardebroke (2011) find that the access to microfinance causally increased

consumption and housing improvements. Kaboski and Townsend (2012) evaluate the impact of Thailand's "Million Baht Village Fund" program, which is one of the largest government microfinance intervention programs globally, and document that it increased total short-term credit, consumption, agricultural investment, and income growth. Khandker and Koolwal (2016) examine the effect of rural credit expansion on outcomes of agriculture households, and find that microcredits benefited households with lower landownings, and raised agricultural income from activities that require less land, especially for landless or near-landless households. A couple of studies also document a positive impact of microfinance on education attainment (e.g., Littlefield, Morduch, and Hashemi 2003; and Holvoet 2004).

However, some other studies present mixed evidence on the effect of microcredit programs. Karlan and Zinman (2011) employ an innovative experimental design that randomly assigned individual liability microloans to 1,601 individuals in the Philippines, and find that business activeness and individual well-beings slightly decline for treatment group relative to controls, and document no evidence that microloans have more positive impacts for women. However, they do find evidence showing that microloans increase individuals' ability to deal with risk and their access to informal credit. Roodman and Morduch (2014) revisit Pitt and Khandker (1998) and find that that their original results on microcredit's effect in reducing poverty disappear after outliers are dropped or when a robust linear estimator is employed, casting doubt on whether microfinance indeed helped to lift families out of poverty. Banerjee, Duflo, Glennerster, and Kinnan (2015) perform randomized evaluation of a group-lending microcredit program in Hyderabad, India. They find that the take-up of microcredit is associated with increased small business investments and profits of preexisting businesses. However, the effect concentrates among firms in the upper tail, but diminishes for the vast of firms that were originally small and weak. Further, they find



no evidence that microcredit programs help to increase consumption or improve health, education, or women's empowerment.

Banerjee, Karlan, and Zinman (2015) summarize findings of six separately conducted randomized control trials, which employ varying designs and data for the same purpose of identifying the causal effects of access to microcredits on borrowers and/or communities.<sup>1</sup> Their conclusion is that there is a lack of evidence of transformative effects on the average borrower of microcredit program borrowers. None of the six studies show significant impact on borrowers' household income. In terms of consumption (the commonly used measure for poverty), only one program documents some positive impact on borrowers' consumption, and others find no such evidence or even opposing evidence. However, these studies found some potentially important impacts of access to microcredit in terms of "occupational choice, business scale, consumption choice, female decision power, and improved risk management". (Banerjee, Karlan, and Zinman, 2015, p. 14).

Although the aforementioned studies have provided inconclusive evidence on the effect of microfinance, a recent study by Cai, Park, and Wang (2020) document exciting evidence in the PRC. They evaluate the impact of a randomized control trial in the PRC which introduced externally funded village credit funds in poor rural villages. They find that the Chinese program significantly increases household income and, at the same time, reduces poverty. More specifically, they show that the access to the microcredit program is followed by increased consumption, particularly for durable goods and housing services, and subjective well-being revealed by self-assessment. They contend that the effect of microfinance is substantial in the PRC possibly because of less-frequent repayment

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<sup>1</sup> These six randomized control trials are Banerjee, Duflo, Glennerster, and Kinnan (2015) conducted in India; Tarozzi, Desai, and Johnson (2015) conducted in Ethiopia; Attanasio, Augsburg, De Haas, Fitzsimons, and Harmgart (2015) conducted in Mongolia; Crépon, Devoto, Duflo, and Parienté (2015) conducted in Morocco; and Angelucci, Karlan, and Zinman (2015) and Augsburg, De Haas, Harmgart, and Meghir (2015) conducted in Bosnia and Herzegovina.

schedule, lower interest rate, and less access to formal credit prior to the intervention, and greater potential returns from off-farm employment opportunities.

Collectively, while some studies suggest that microfinance programs contribute to poverty and inequality reduction, others find weak or no such evidence. In this study, we specifically examine the poverty- and inequality-reduction effect of microfinance in the PRC, where the features of markets make microfinance programs more likely to succeed as suggested by Cai, Park, and Wang (2020). In conducting the investigation, we focus on microfinance's impact on the consumption inequality of participants. In section II.B., we go over studies which suggest that consumption inequality is a preferred measure over income- or total consumption-based measures, which are commonly examined in the aforementioned studies on microfinance effectiveness, in capturing poverty and inequality.

## **B. Measuring Poverty and Inequality: Income versus Consumption**

Reducing poverty and inequality is central to the sustainable development goals of governments globally, and microfinance is developed and promoted to achieve this goal. In investigating poverty or inequality, existing studies largely focus on income or components of income (e.g., wages or earnings). However, there are wide concerns about income under-reporting (e.g., Coder and Scoon-Rogers 1996; Roemer 2000; and Meyer and Sullivan 2009). Meyer and Sullivan (2011) evaluate the relative merits of income- and consumption-based measures of well-being. They argue that consumption-based measure better captures well-being for those with few resources than income-based measure as (i) under-reporting of income is common, and it is high and rising for government transfers; (ii) fewer observations are required for a consumption data set than for an income data set to obtain the same level of estimation precision; and (iii) very low consumption may cause more concerns than very low income, as the former is more likely to be associated with other bad outcomes. Meyer and Sullivan (2012) contend that a consumption-based measure

is preferred to the official or supplementary poverty measure, and question whether a flawed measure of income, even when modified to be conceptually closer to consumption, can reliably be used to measure poverty.

The conjecture that consumption-based measure is more suitable than income-based measure in capturing individual poverty and inequality is also supported by Attanasio and Pistaferri (2016), who contend that a basic utility function of individuals typically refers to consumption and leisure, rather than income. Moreover, consumption can be quite different from income if individuals borrow, save, or receive transfers from government or other family members because of some income shocks. Attanasio and Pistaferri (2016) further assert that looking at inequality of consumption across specific components of consumption can be informative. Specifically, disparities in consumption necessities, such as food, is a stronger signal of inequality than disparities in the consumption of luxuries, such as vacations.

When consumption-based measures are concerned, some studies further suggest that consumption inequality measure is preferred over total consumption measure. For instance, Aguiar and Bils (2015) exploit households' relative expenditure on luxuries versus necessities to capture inequality. In measuring necessities expenditure, they focus on food at home and implement the Engel curve approach. They find that consumption inequality tracked income inequality much more closely than total consumption. Further, they contend that the consumption inequality measure is superior to total consumption measure in that the mismeasurement will not be or will be less biased than the ratio-based measures of consumption inequality. Almas (2012) shares similar view with Aguiar and Bils (2015) by conjecturing that consumption inequality does not require household overall expenditures be well measured, and thus is less affected by consumption data inaccuracies.

Therefore, Almas (2012) employs a similar approach as Aguiar and Bils (2015) in evaluating income inequality using the Engel curve for food.

The aforementioned studies have suggested that consumption inequality, e.g., the proportion of necessities (food) in an individual's total consumption, is a preferred measure for poverty and inequality over income or total consumption. However, in examining whether microfinance helps to reduce poverty and inequality, existing studies have focused on its effect on total income or consumption (e.g., Pitt and Khandker 1998; Berhane and Gardebreek 2011; Kaboski and Townsend 2012; Banerjee, Duflo, Glennerster, and Kinnan 2015; Banerjee, Karlan, and Zinman 2015; and Cai, Park, and Wang 2020) and few have examined its impact on participants consumption inequality. We attempt to fill this void by investigating whether and how the access to microfinance programs is associated with changes in participants' consumption inequality, which is measured by the proportion of food in total consumption. And we perform the investigation in the PRC. Although microfinance is developing rapidly in recent decades in the PRC, its effectiveness has been underexplored. As Cai, Park, and Wang (2020) suggest, the markets of the PRC are different from those in other countries, which might make microfinance programs more successful in the PRC. Thus, we expect the access to microfinance programs in the PRC to be followed by a significant reduction in consumption inequality, if such programs indeed help to reduce poverty and inequality.

### **III. DATA**

#### **A. Sample and Variables**

Our sample includes 160,000 individually owned MSMEs that are randomly chosen from the database of the Ant Group over the period from August 2017 to July 2019. These enterprises conduct their business through digital business platforms and operate either through the online system of Alibaba or using the quick response (QR) codes provided by

it. For each sample enterprise, we obtain monthly data on whether it has used microloans and its sales in the month. We also identify the sector to which the enterprise belongs, the city where it operates in, and the way that its business is conducted (through online system or QR codes). Then, for each sample enterprise, we obtain monthly consumption data of its entrepreneur as well as personal characteristic data. Note that, for consumption transactions, we only consider those made on *ecommerce platforms* through *Alipay system*, as only such transactions can be recorded and, at the same time, have been classified into different categories by the Ant Group. Consumption made by cash, on non-ecommerce platforms, or through other transaction tools are not considered in our investigation because of data unavailability. However, as long as individuals' transaction behavior does not change systematically over the sample period (2 years), we can still use the relation between the take-up of microloans and the *change* in the proportion of food consumption on total consumption, both of which are made on the ecommerce platforms through Alipay system, to examine the impact of microfinance on consumption inequality.

In examining consumption inequality, we focus on the Engel curve for food, which is defined as the proportion of an individual's expenditure for food over his/her total consumption in each month and is denoted as  $EC_{i,t}^{Food}$ . We exclude some observations without food consumption to maintain  $EC_{i,t}^{Food} > 0$ . A higher  $EC_{i,t}^{Food}$  suggests greater consumption inequality and vice versa.

We use a dummy variable  $Microloan_{i,t}$  to indicate MSMEs' take-up of microfinance, and it is our main measure of interest. The variable  $Microloan_{i,t}$  equals one if enterprise  $i$  has taken microloans in month  $t$  and zero otherwise. We also control for a set of entrepreneur as well as enterprise characteristics, which are potential determinants of MSME entrepreneurs' consumption inequality, in the empirical investigation, including age

( $Age_{i,t}$ ), and dummies indicating whether the entrepreneur is female (equals one) or male (equals zero) ( $Gender_{i,t}$ ), whether he/she has kid(s) ( $Kid_{i,t}$ ), whether he/she is married ( $Marriage_{i,t}$ ), and whether he/she holds an advanced bank account ( $AdvancedAcc_{i,t}$ ). We do not have data on entrepreneurs' total wealth, thus we use the advanced bank account dummy to capture the wealth effect. In the PRC, commercial banks usually grant customers with no less than CNY50,000 (about US\$7,500) or sometimes CNY100,000 (about US\$15,000) with the banks advanced bank accounts. We expect entrepreneurs with such accounts to be relatively richer than their counterparts. We also include dummies indicating whether the MSME operates through the online system of Alibaba ( $TaobaoSeller_{i,t}$ ) or the QR codes ( $QRSeller_{i,t}$ ) provided by it.

When examining the cross-sectional variation in the effect of microfinance, we focus on the activeness of MSMEs as well as local development of the financial inclusion system. We use a dummy variable  $Active_{i,t}$  to capture the business activeness of MSMEs, which equals to one for MSMEs with monthly sales above their respective industry average sales, and zero otherwise. And we measure the development of the financial inclusion system using the Digital Financial Inclusion Index of the PRC published by the Institute of Digital Finance research center of Peking University. The index is constructed based on the breadth of digital financial inclusion coverage (e.g., the number of Alipay accounts per 10,000 individuals, the proportion of Alipay users with bank cards tied to their Alipay accounts, and the average number of bank accounts tied to each Alipay account), the depth of usage (the activeness of digital finance usage, the availability of microloans for individuals and for micro and small businesses, and the popularity of online insurance or investments), and the level of digitization (e.g., the pervasiveness of mobile payments, the

affordability of microloans, and the continence of the usage of digital finance). More detailed index information can be found in the Institute of Digital Finance website.<sup>2</sup>

## **B. Summary Statistics and Distribution of Variables of Main Interests**

Table 1 reports the summary statistics of variables used in our empirical investigation. Our sample contains 142,098 unique MSMEs entrepreneurs and 1,119,367 observations in total. The average of our independent variable, the Engel curve for food, is 0.148, and its median value is 0.069. The statistics are lower than expected as it is likely that only part of the food consumption is made *on ecommerce platforms* through the *Alipay system* of the Ant Group, and thus is recorded and classified in the database of the Ant Group. As introduced in section III.A, the Ant Group can only record transactions made through the Alipay system, and can only identify the categories of the consumption if it is made on ecommerce platforms. However, as long as individuals' transaction behavior (e.g., the proportion of food expenditures made on ecommerce platforms though Alipay) does not change systematically over the 2-year sample period, we contend that we can still use the food consumption over total consumption, both of which are made on ecommerce platforms through Alipay to capture consumption inequality.

As for some personal characteristics, the average (75th percentile) age of MSME entrepreneurs is 34 (39), which suggests that the MSME entrepreneurs tend to be relatively young. This is not surprising as the MSMEs examined in this study are those conducting business through digital business platforms, which are more likely to be operated by young people. Further, more than half of our sample MSME entrepreneurs are female (56.2%), implying that MSMEs operated on digital business platforms help to create much working opportunities for female. The percentage of sample MSME entrepreneurs who have kid(s) or are married are 32.3% and 66.8%, respectively. The average monthly total consumption

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<sup>2</sup> <https://en.idf.pku.edu.cn/achievements/seriesofdigitalfinanceindexes/490847.htm>.

of sample MSME entrepreneurs is CNY4,126.28 (about US\$616), and the average monthly sales of sample MSMEs is CNY23,447.72 (about US\$3,500).

Table 2 displays the Ant Group microloan coverage ratios across industries. There are 25 MSME industries in our sample, including book and magazine, internet service, transport, sports and entertainment, cosmetics, health care, furniture, electrical appliance, residential service, construction and decoration, education, office supplies, cultural and entertainment service, daily necessities, clothing, car, living service, food, travel, drugs, communication equipment, communication, gold and silver jewelry, catering service, and others. For each industry, we calculate its time-series average of monthly percentage of MSMEs that have access to Ant Group microloans. Industries with the top three highest Ant Group microloan coverage ratios are sports and entertainment (21.43%), communication service (16.67%), and construction and decoration (14.45%). The industry with the lowest Ant Group microloan coverage ratio is drug (3.18%).

Although the focus of this study is the Engel curve for food, we present some additional information about the consumption pattern of our sample MSME entrepreneurs in Table 3, which could help to shed light on the consumption behavior of this particular group of individuals. Specifically, we present sample MSME entrepreneurs' Engel curve for different consumption categories. There are 21 major consumption categories in total in our sample data, including book and magazine, cosmetics, furniture, education, office supplies, cultural and entertainment service, daily necessities, living service, food, travel, gold and silver jewelry, catering service, drugs, sports and entertainment, health care, electrical appliance, construction and decoration, clothing, car, communication equipment, and retailing. Among all the categories, the spending as a percentage of total monthly consumption is the greatest for clothing in general (29.03%), and is high for travel (21.40%) and retailing (21.59%) as well. The Engel curve for food has a mean (median) of 14.83%



(6.91%), which is ranked 11th across all the 21 consumption categories. Note that, as we discussed before, these data only capture the consumption made on ecommerce platforms through the Alipay system (so that they can be classified into different categories), and it is likely that individuals also make purchases using cash, through other payment apps, or on non-e-commerce platforms. But, as long as individuals' transaction behavior do not change systematically (e.g., the proportion of transaction in each category that they make on ecommerce platforms through Alipay), these data can still help us to understand the consumption behavior of sample individuals.

### C. Research Design

To examine the effect of microfinance on MSME entrepreneurs' consumption inequality, we regress monthly  $EC_{i,t}^{Food}$  on a dummy variable  $Credit_{i,t}$ , which equals one if enterprise  $i$  has taken microloans in month  $t$  and zero otherwise, as shown in equation (1):

$$EC_{i,t}^{Food} = a + b \times Microloan_{it} + Controls + \varepsilon_{i,t}, \quad (1)$$

where  $EC_{i,t}^{Food}$  is the entrepreneur  $i$ 's consumption of food as a percentage of his/her total consumption in month  $t$ , and coefficient  $b$  captures the effect of microfinance on MSME entrepreneurs' consumption inequality. A significantly negative  $b$  suggests that enterprise  $i$ 's usage of microfinance helps to reduce entrepreneurs' consumption inequality, and vice versa. A set of entrepreneur as well as enterprise characteristics are included as control variables, including  $Age_{i,t}$ ,  $Gender_{i,t}$ ,  $Kid_{i,t}$ ,  $Marriage_{i,t}$ ,  $AdvancedAcc_{i,t}$ ,  $TaobaoSeller_{i,t}$ , and  $QRSeller_{i,t}$ , which are described in detail in section II.A. We also control for time-, city-, and industry-fixed effects in the regressions.

## IV. EMPIRICAL RESULTS

### A. Baseline Tests

To investigate the influence of microfinance over MSMEs' consumption inequality, we first regress the individual Engel curve for food, measured by  $EC_{i,t}^{Food}$  on the dummy variable indicating the usage of microloans by MSMEs, or  $Microloan_{i,t}$ , as specified in equation (1). A set of control variables are included in the regressions, as discussed in section II.C. To account for time-series and cross-sectional dependence, we cluster the standard errors at the individual- and time-dimension levels in all the regressions. Results of our baseline tests are reported in Table 4.

In column (1), the coefficients on  $Microloan_{i,t}$  is significantly negative at the 1% level, with a  $t$ -value of -3.20. The evidence suggests that the usage of microloans helps to significantly reduce MSME entrepreneurs' consumption of food as a percentage of their total consumption. Given that the Engel curve for food is an inverse indicator of life quality and consumption inequality, such a piece of evidence is consistent with our argument that microfinance, in the form of microloans to be specific, helps to significantly reduce MSME entrepreneurs' consumption inequality and increase their life quality. In columns (2)–(4), we control for fixed effects in regressions. The results are qualitatively similar. The coefficient on  $Microloan_{i,t}$  remains significantly negative at the 1% level. When we control for time-, city-, and industry-fixed effects simultaneously in column (4), the coefficient on  $Microloan_{i,t}$  is -0.008 ( $t=-4.81$ ). It suggests that, by taking microloans, MSME entrepreneurs' consumption of food as a percentage of their total consumption is reduced by 0.8% on average. Given that the sample average of this percentage is about 15%, such a reduction is significant not only statistically but also economically (about 5% of unconditional sample average).

When the control variables are examined, we find that some personal as well as MSME characteristics also exhibit influence over MSME entrepreneurs' consumption inequality. For example, the coefficients are significantly negative on  $Age_{i,t}$ ,  $Gender_{i,t}$ , and  $AdvancedAcc_{i,t}$ , suggesting that, for elder or female MSME entrepreneurs as well as those with advanced bank accounts (relatively wealthy), their Engel curve for food is significantly lower than their counterparts. For those with kids and those who are married, however, their Engel curve for food is significantly higher than others. In terms of MSME characteristics, we find that entrepreneurs' Engel curve for food is significantly lower as the entrepreneurs operate on the online system of Alibaba, which is not surprising as the scale of business generally is large for Alibaba online platform sellers than for QR code sellers.

Overall, results of the baseline tests support the argument that microfinance helps to improve the life quality of MSME entrepreneurs, in terms of reducing their consumption of food as a percentage of total consumption, which is indicative of greater life quality.

## **B. Cross-Sectional Variation**

Although we have documented evidence that microloans help to reduce the consumption inequality of MSME entrepreneurs, we do not expect such effect to be constant across MSMEs or individuals. Therefore, we take one step further in this section to examine the cross-sectional variation in such an effect. Specifically, we examine the relation between the usage of microloans and MSME entrepreneurs' consumption inequality conditional on (i) business activeness, (ii) gender of MSME entrepreneurs, (iii) cities where MSMEs are located, and (iv) the development of local financial inclusion system. Such an investigation will not only help us to understand the cross-sectional effect of microfinance, but also shed

light over the debate over whether microfinance helps those gravely needing assistance or benefits only the “middle and upper poor”.

## 1. Business Activeness

We expect microfinance to be more influential on the Engel curve for food when MSMEs are more active in their business operation. In active MSMEs, the microloans can provide necessary support for business operation, and the enhanced business performance is likely to lead to better quality of MSME entrepreneurs, which may be reflected in a lower  $EC_{i,t}^{Food}$ .

To examine the impact of business activeness on the relationship between microloan usage and MSME entrepreneurs’ consumption inequality, we include  $Active_{i,t}$ , which is a dummy variable that indicates whether business sales of enterprise  $i$  is above its industry average sales, into equation. (1) as well as its interaction term with  $Microloan_{i,t}$ :

$$EC_{i,t}^{Food} = a + b_1 Microloan_{it} + b_2 Active_{i,t} + b_3 Microloan_{it} \times Active_{i,t} + Controls_{i,t} + \varepsilon_{i,t}, \quad (2)$$

where control variables are the same as in equation (1), and a significantly negative  $b_3$  would suggest greater impact of microloans in reducing MSME entrepreneurs’ consumption inequality in active MSMEs, and vice versa. The results are reported in Table 5.

In column (1), where we only add  $Active_{it}$  into the baseline regression equation (1), the coefficients on both  $Microloan_{it}$  and  $Active_{it}$  are significantly negative with t-values equal to -2.47 and -13.72, respectively. The evidence suggests that, for MSMEs that have taken microloans and for MSMEs with more active business operation, their entrepreneurs’

consumption inequality is relatively lower than counterparts. We further control for time-, industry-, and city-fixed effects in column (2), and the results are qualitatively similar.

In columns (3) and (4), we additionally include an interaction term  $Microloan_{it} \times Active_{i,t}$  into the regressions. The coefficients on the interaction term, or  $b_3$  is significantly negative in both columns. In column (3),  $b_3$  is -0.007 ( $t=-2.67$ ) and is significantly different from zero at the 1% level, which suggests that business activeness can moderate the effect of microfinance on the Engel curve for food. The negative relation between  $Microloan_{it}$  and  $EC_{i,t}^{Food}$  is especially strong among MSMEs with more active business operation. The results hold when we control for various fixed effects in column (4). The magnitude of the coefficient on the interaction term suggests that, compared with an MSME that does not take microloans and at the same time is inactive in its business operation, the Engel curve for food of an active MSME with microloans is lower by 2.7%.

## 2. Gender

Next, we examine the effect of microloans conditional on the gender of MSME entrepreneurs. We partition our sample into two, based on whether MSME entrepreneur is male or female. The female group contains 629,978 observations, and the male group consists of 489,389 observations. Given that our results in 3.2.1 suggest that the effect of microloans is greatly affected by business activeness, we examine both equation (1) and equation (2) conditional on MSME entrepreneur gender in Table 6.

Columns (1) and (2) report the regression results for equations (1) and (2) for the male group, while columns (3) and (4) report the regression results of the two models for the female group.

When equation (1) is examined in columns (1) and (3), the coefficients on *Microloan<sub>it</sub>* is significantly negative in both columns, and microfinance has a stronger effect on the Engel curve for food in female MSME entrepreneurs ( $t=-5.14$ ). Comparing the results in column (2) and column (4), we find that the interaction term in male subsample is not statistically significant anymore ( $t=-1.15$ ). However, the interaction term in female subsample is still significantly negative ( $t=-3.10$ ) at 1% level. What is more, the coefficients on *Credit* ( $t=-3.15$ ) and *Active* ( $t=-12.09$ ) are also more significant than their male counterparts. From the above results, we can infer that the effect of microfinance on consumption inequality is more pronounced among female MSME entrepreneurs, and the moderating effect of business activeness only exists in female samples.

### 3. City

Except for the gender effect, we also want to investigate the cross-sectional variation effect across cities. We divide the full sample into three subsamples according to their city level. Both model (1) and model (2) are estimated in our three subsamples.

In Table 7, columns (1) and (2) report the results of the first/second tier cities. Columns (3) and (4) are the results of the third/forth tier cities, and columns (5) and (6) show the results of the fifth/sixth tier cities. For big cities (first/second frontier), the effect of microfinance on the Engel curve for food is the strongest, and the influence will be more significant if the entrepreneur participates in the microbusiness actively. In median cities (third/forth frontier), the coefficients on *Credit* and *Active* are still statistically significant. However, the interaction term is not significant anymore. For small cities (fifth/sixth frontier), the coefficient on *Active* still remains significantly negative, although the  $t$  statistic ( $-4.73$ ) is smaller. However, the coefficients on *Credit* and interaction term are not significant anymore. Thus, we can conclude that microfinance plays a more important role on improving life standard in larger and more developed areas, but participating in active

business can still help to reduce the consumption for food and enhance the living quality in all cities.

#### **4. Development of Local Financial Inclusion System**

Nowadays, digital finance offers financial services to a wider population at a lower cost, and has presented great potential for enhancing financial inclusion. However, the financial inclusion level exhibits spatial heterogeneity. To explore the cross-section variation effect of regional financial inclusion, we split our full sample into two subgroups based on the Peking University Digital Financial Inclusion Index of the PRC. This index covers about 2,800 counties, 337 cities, and 31 provinces over the period 2011–2018. Our MSME sample period is 2017–2019, we thus match the 2017 city-level aggregate financial inclusion index with our full sample. If a city's index number is larger than the mean value, then we consider this city as a high financial inclusion region. The low financial inclusion sample is constructed in a similar way when financial inclusion index is lower than the average. Similar to the previous empirical tests, we regress model (1) and model (2) in both subgroups. The results are exhibited in Table 8.

Columns (1) and (2) show the results in low financial inclusion cities, the coefficients on Credit are significantly negative ( $t=-3.06$ ,  $t=-2.07$ ) in both specifications, but the interaction term of Credit\* Active ( $t=-0.70$ ) is not statistically significant anymore. Compared with low financial inclusion cities, microbusiness and microfinance have stronger effect on high financial inclusion regions. In column (3), the t-statistic of Credit is -4.28, which is more significant compared with -3.06. What is more, in column (4), the interaction term of Credit\* Active is significantly negative at 5% level. These results document that the effect of microloans and active business is more pronounced in high financial inclusion cities, which means digital financial inclusion can promote the function of microfinance, and help to reduce the consumption inequality.

## V. CONCLUSION

Microfinance is an important policy instrument in emerging markets, which innovatively provides MSMEs an access to microcredit. Our research explores the impact of microfinance in reducing consumption inequality, and documents that microloans can help MSMEs overcome their financial constraints and realize their growth opportunities, which leads to life quality improvement.

The reason to choose consumption dimension is that a basic utility function of individuals typically refers to consumption rather than income. Thus, consumption-based measures are better than income-based measure in capturing living quality in emerging markets. Our proprietary database provides possibility for further investigation compared with previous studies. We link the operation data of MSMEs with the consumption behavior of MSME entrepreneurs based on their Alipay transactions, which is a much larger and more representative sample. And we choose the Engel curve for food to reflect consumption inequality and people's well-being. We shed lights on the microfinance benefits on MSMEs living quality in depth. In addition, cross-section variation tests are also conducted to examine the impact of microfinance, conditional on business activeness, gender, city level, and the development of local financial inclusion.

Overall, we can conclude that microfinance helps to reduce significantly the consumption inequality of MSME entrepreneurs, and the results are robust when characteristics of enterprises and entrepreneurs are both controlled. Moreover, the effect is evident, especially for active business, for female entrepreneurs, in first/second tier cities, and in cities with greater financial inclusion. These results reveal the direction of further development of microfinance, and offer some practical experience for governments and microfinance platforms.



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## APPENDIX

**Table A1: Variable Definitions**

$EC_{i,t}^{Food}$	The proportion of an individual's expenditure for food over his/her total consumption in each month
$Microloan_{i,t}$	A dummy variable that equals one if enterprise $i$ has taken microloans in month $t$ , and zero otherwise
$Active_{it}$	A dummy variable indicating whether business sales of enterprise $i$ is above its industry average sales
$Age_{i,t}$	The age of MSMEs' entrepreneurs
$Gender_{i,t}$	A dummy variable indicating whether the entrepreneur is female (equals one) or male (equals zero)
$Kid_{i,t}$	The possibility of he/she having kids
$Marriage_{i,t}$	The possibility of he/she getting married
$AdvancedAcc_{i,t}$	A dummy variable indicating whether he/she holds an advanced bank account
$TaobaoSeller_{i,t}$	An indicator that equals one if the MSMEs operate through the online system of Alibaba, and zero otherwise
$QRSeller_{i,t}$	An indicator that equals one if the MSMEs operate through its QR codes, and zero otherwise

MSME = micro, small, and medium-sized enterprises.

**Table 1: Summary Statistics**

<b>Variables</b>	<b>No. Obs.</b>	<b>Mean</b>	<b>Median</b>	<b>Std Dev</b>	<b>25%</b>	<b>75%</b>
$EC_{i,t}^{Food}$	1,124,072	0.148	0.069	0.195	0.025	0.186
$Microloan_{i,t}$	1,124,072	0.0702	0	0.256	0	0
$Active_{i,t}$	1,124,072	0.183	0	0.387	0	0
$Totalcomsump_{i,t}$	1,124,072	4,126.28	1,525.90	23,733.03	678.30	3,570.81
$Sales_{i,t}$	1,124,072	23,447.72	3,252.60	188,787.69	700.18	12,090.00
$Age_{i,t}$	1,124,072	34	32	8.25	28	39
$Kid_{i,t}$	1,119,367	0.323	0.191	0.095	0.061	0.564
$Marriage_{i,t}$	1,119,367	0.668	0.739	0.241	0.518	0.861
$Gender_{i,t}$	1,124,072	0.562	1	0.496	0	1
$AdvancedAcc_{i,t}$	1,124,072	0.304	0	0.460	0	1
$Taobao\ Seller_{i,t}$	1,124,072	0.193	0	0.395	0	0
$QRcode\ Seller_{i,t}$	1,124,072	0.941	1	0.236	1	1

Note: Table 1 reports summary statistics of our sample.

Source: Authors' calculations.

**Table 2: Access to Microfinance Across Sectors**

Book and magazine	14.24%	Internet Service	9.89%	Transport	3.58%	Sports and entertainment	21.43%	Cosmetics	10.06%
Health care	7.37%	Furniture	7.44%	Electrical appliance	7.45%	Residential service	4.09%	Construction and decoration	14.45%
Education	8.12%	Office supplies	10.20%	Cultural and entertainment service	5.72%	Daily necessities	10.07%	Clothing	8.59%
Car	6.91%	Living Service	7.79%	Food	5.34%	Travel	4.73%	Drugs	3.18%
Communication equipment	8.37%	Communication Service	16.67%	Gold and silver jewelry	13.19%	Catering service	6.17%	Others	8.91%

Note: Table 2 exhibits the access to microfinance across business sectors. The percentage shown here is a time-series average of monthly ratios, which is also calculated as the weight of the number of micro, small, and medium-sized enterprises entrepreneurs who receives microloans in each business sectors every month.

Source: Authors' calculations.

**Table 3: Consumption Inequality: Engel Curve for Major Categories of Consumption**

	<b>Mean</b>	<b>Std</b>	<b>25%</b>	<b>50%</b>	<b>75%</b>
Book and magazine	7.75%	13.75%	1.09%	2.93%	7.85%
Cosmetics	12.33%	16.62%	2.07%	5.87%	15.37%
Furniture	17.48%	20.78%	3.09%	9.06%	23.76%
Education	11.49%	21.11%	0.47%	2.02%	10.25%
Office supplies	13.51%	20.69%	1.32%	4.43%	15.43%
Cultural and entertainment service	1.39%	7.23%	0.05%	0.19%	0.63%
Daily necessities	16.55%	19.73%	3.42%	9.18%	21.67%
Living service	9.21%	16.63%	0.82%	2.69%	8.93%
Food	14.83%	19.53%	2.46%	6.91%	18.59%
Travel	21.40%	24.42%	3.19%	11.27%	31.28%
Gold and silver jewelry	8.02%	15.50%	0.79%	2.23%	6.99%
Catering service	8.73%	15.46%	0.80%	2.90%	9.13%
Drugs	9.43%	15.00%	1.26%	3.72%	10.45%
Sports and entertainment	14.86%	20.92%	2.11%	6.24%	17.72%
Health care	11.61%	16.71%	1.82%	5.06%	13.67%
Electrical appliance	16.14%	22.06%	2.05%	6.51%	20.26%
Construction and decoration	14.91%	21.17%	1.65%	5.63%	18.35%
Clothing	29.03%	25.41%	8.00%	21.57%	44.34%
Car	15.30%	21.94%	1.67%	5.56%	18.63%
Communication equipment	19.37%	26.15%	2.22%	7.50%	24.44%
Retailing	21.59%	16.88%	8.03%	17.50%	31.96%

Note: Table 3 reports consumption inequality in our sample through the distribution of Engel curve for major consumption categories.

Source: Authors' calculations.



**Table 4: Engel Curve for Food and Microfinance**

	(1)	(2)	(3)	(4)
<i>Microloan<sub>i,t</sub></i>	-0.006*** (-3.20)	-0.006*** (-3.41)	-0.008*** (-4.36)	-0.008*** (-4.81)
<i>Age<sub>i,t</sub></i>	-0.001*** (-6.27)	-0.001*** (-6.72)	-0.001*** (-5.11)	-0.001*** (-5.56)
<i>Gender<sub>i,t</sub></i>	-0.040*** (-29.79)	-0.041*** (-32.21)	-0.039*** (-29.82)	-0.039*** (-32.17)
<i>Kid<sub>i,t</sub></i>	0.104*** (18.98)	0.104*** (19.37)	0.102*** (18.79)	0.103*** (19.14)
<i>Marriage<sub>i,t</sub></i>	0.014*** (4.44)	0.014*** (4.30)	0.018*** (6.08)	0.018*** (5.94)
<i>AdvancedAcc<sub>i,t</sub></i>	-0.017*** (-13.96)	-0.017*** (-13.87)	-0.014*** (-12.78)	-0.014*** (-11.99)
<i>Taobao Seller<sub>i,t</sub></i>	-0.049*** (-25.74)	-0.048*** (-27.43)	-0.037*** (-22.90)	-0.037*** (-24.74)
<i>QRcode Seller<sub>i,t</sub></i>	0.001 (0.64)	0.001 (0.68)	-0.003 (-1.57)	-0.003 (-1.57)
<i>Constant</i>	0.172 (28.07)	0.173 (34.17)	0.167 (28.56)	0.169 (35.42)
Observations	1119367	1119367	1119367	1119367
R-squared	0.039	0.039	0.033	0.034
Month FE	NO	YES	NO	YES
City, Industry FE	NO	NO	YES	YES

FE = fixed effects.

Note: Table 4 examines the relation between microfinance and Engel curve for food. Standard errors are clustered by individual and month. Month-, city-, and industry-fixed effects are controlled in some regressions. \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Source: Authors' estimates.

**Table 5: Cross-Sectional Variation: The Effect of Business Activeness**

	(1)	(2)	(3)	(4)
<i>Microloan<sub>i,t</sub></i>	-0.004** (-2.47)	-0.006*** (-4.02)	-0.003 (-1.36)	-0.005*** (-2.89)
<i>Active<sub>i,t</sub></i>	-0.018*** (-13.72)	-0.017*** (-14.79)	-0.017*** (-12.65)	-0.016*** (-13.97)
<i>Microloan<sub>i,t</sub>*Active<sub>i,t</sub></i>			-0.007*** (-2.67)	-0.006** (-2.45)
<i>Age<sub>i,t</sub></i>	-0.001*** (-6.57)	-0.001*** (-5.82)	-0.001*** (-6.57)	-0.001*** (-5.82)
<i>Gender<sub>i,t</sub></i>	-0.040*** (-29.55)	-0.039*** (-32.14)	-0.040*** (-29.54)	-0.039*** (-32.13)
<i>Kid<sub>i,t</sub></i>	0.106*** (19.48)	0.105*** (19.52)	0.105*** (19.48)	0.105*** (19.53)
<i>Marriage<sub>i,t</sub></i>	0.015*** (4.62)	0.018*** (6.02)	0.015*** (4.61)	0.018*** (6.02)
<i>AdvancedAcc<sub>i,t</sub></i>	-0.016*** (-13.12)	-0.013*** (-11.12)	-0.016*** (-13.12)	-0.013*** (-11.12)
<i>Taobao Seller<sub>i,t</sub></i>	-0.046*** (-25.98)	-0.036*** (-25.28)	-0.046*** (-25.99)	-0.036*** (-25.29)
<i>QRcode Seller<sub>i,t</sub></i>	0.009*** (4.27)	0.001 (0.49)	0.009*** (4.26)	0.001 (0.49)
<i>Constant</i>	0.166 (26.80)	0.166 (34.99)	0.166 (26.80)	0.166 (34.99)
Observations	1104557	1104557	1104557	1104557
R-squared	0.040	0.035	0.040	0.035
City, Industry, Month FE	NO	YES	NO	YES

FE = fixed effects.

Note Table 5 examines the moderating effect of business activeness. Standard errors are clustered by individual and month. Month-, city-, and industry-fixed effects are controlled in some regressions. \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Source: Authors' estimates.

**Table 6: Cross-Sectional Variation: The Effect of Gender**

	Male		Female	
	(1)	(2)	(3)	(4)
<i>Microloan<sub>i,t</sub></i>	-0.006*** (-3.01)	-0.004* (-1.70)	-0.009*** (-5.14)	-0.006*** (-3.15)
<i>Active<sub>i,t</sub></i>		-0.017*** (-9.55)		-0.016*** (-12.09)
<i>Microloan<sub>i,t</sub>*Active<sub>i,t</sub></i>		-0.004 (-1.15)		-0.009*** (-3.10)
<i>Age<sub>i,t</sub></i>	-0.001*** (-7.84)	-0.002*** (-7.95)	0.000 (0.51)	0.000 (0.29)
<i>Kid<sub>i,t</sub></i>	0.122*** (17.32)	0.123*** (17.31)	0.085*** (16.23)	0.088*** (16.89)
<i>Marriage<sub>i,t</sub></i>	0.011*** (2.69)	0.010** (2.55)	0.023*** (7.13)	0.025*** (7.50)
<i>AdvancedAcc<sub>i,t</sub></i>	-0.015*** (-8.24)	-0.014*** (-7.58)	-0.012*** (-9.25)	-0.011*** (-8.60)
<i>Taobao Seller<sub>i,t</sub></i>	-0.051*** (-25.53)	-0.050*** (-25.68)	-0.024*** (-13.99)	-0.023*** (-13.71)
<i>QRcode Seller<sub>i,t</sub></i>	-0.001 (-0.31)	0.003 (0.77)	-0.001 (-0.53)	0.004* (1.82)
<i>Constant</i>	0.184 (28.08)	0.182 (28.08)	0.109 (20.21)	0.104 (19.27)
Observations	489389	483625	629978	620932
R-squared	0.025	0.026	0.024	0.025
City, Industry, Month FE	YES	YES	YES	YES

FE = fixed effects.

Note: Table 6 presents a subsample test to examine the moderating effect of entrepreneur gender. Standard errors are clustered by individual and month. Month-, city-, and industry-fixed effects are controlled in all regressions. \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Source: Authors' estimates.

**Table 7: Cross-Sectional Variation: The Effect Across Cities**

	First/Second tier cites		Third/Fourth tier cites		Fifth and Sixth tier cites	
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Microloan<sub>i,t</sub></i>	-0.008*** (-3.68)	-0.004* (-1.91)	-0.009*** (-4.64)	-0.007*** (-3.40)	0.000 (0.10)	0.002 (0.49)
<i>Active<sub>i,t</sub></i>		-0.015*** (-10.89)		-0.017*** (-9.42)		-0.015*** (-4.73)
<i>Microloan<sub>i,t</sub>*Active<sub>i,t</sub></i>		-0.007* (-1.82)		-0.004 (-1.10)		-0.005 (-0.60)
<i>Age<sub>i,t</sub></i>	-0.000 (-0.98)	-0.000 (-0.93)	-0.001*** (-5.73)	-0.001*** (-6.09)	-0.002*** (-6.35)	-0.002*** (-6.58)
<i>Gender<sub>i,t</sub></i>	-0.040*** (-24.79)	-0.040*** (-24.52)	-0.038*** (-24.20)	-0.038*** (-24.40)	-0.045*** (-15.02)	-0.045*** (-15.10)
<i>Kid<sub>i,t</sub></i>	0.090*** (16.49)	0.092*** (16.71)	0.112*** (17.86)	0.115*** (18.27)	0.123*** (12.04)	0.125*** (12.18)
<i>Marriage<sub>i,t</sub></i>	0.012*** (3.59)	0.013*** (3.66)	0.025*** (6.67)	0.025*** (6.67)	0.015** (2.16)	0.016** (2.28)
<i>AdvancedAcc<sub>i,t</sub></i>	-0.013*** (-8.67)	-0.012*** (-7.92)	-0.015*** (-9.09)	-0.014*** (-8.41)	-0.010*** (-3.08)	-0.010** (2.28)
<i>Taobao Seller<sub>i,t</sub></i>	-0.036*** (-20.84)	-0.035*** (-20.41)	-0.038*** (-18.13)	-0.037*** (-18.56)	-0.035*** (-8.06)	-0.036*** (-8.11)
<i>QRcode Seller<sub>i,t</sub></i>	-0.003 (-0.90)	0.004 (1.40)	-0.002 (-0.68)	0.000 (0.03)	-0.019** (-2.27)	-0.02** (-2.21)
<i>Constant</i>	0.156 (27.32)	0.150 (26.36)	0.168 (26.54)	0.168 (26.72)	0.227 (16.27)	0.233 (15.38)
Observations	485117	477570	507661	501670	126037	124765
R-squared	0.037	0.038	0.033	0.034	0.029	0.029
City, Industry, Month fixed effects	YES	YES	YES	YES	YES	YES

Note: Table 7 presents a subsample test to examine the moderating effect of city level. Standard errors are clustered by individual and month. Month-, city-, and industry-fixed effects are controlled in all regressions. \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% level, respectively. Source: Authors' estimates.

**Table 8: Cross-Sectional Variation: The Effect of Regional Financial Inclusion**

	Low financial inclusion cities		High financial inclusion cities	
	(1)	(2)	(3)	(4)
<i>Microloan<sub>i,t</sub></i>	-0.008*** (-3.06)	-0.006** (-2.07)	-0.007*** (-4.28)	-0.005** (-2.52)
<i>Active<sub>i,t</sub></i>		-0.023*** (-8.54)		-0.015*** (-12.38)
<i>Microloan<sub>i,t</sub>*Active<sub>i,t</sub></i>		-0.004 (-0.70)		-0.006** (-2.23)
<i>Age<sub>i,t</sub></i>	-0.002*** (-6.49)	-0.002*** (-6.89)	-0.001*** (-3.71)	-0.001*** (-3.84)
<i>Gender<sub>i,t</sub></i>	-0.037*** (-16.78)	-0.038*** (-17.14)	-0.040*** (-30.56)	-0.040*** (-30.30)
<i>Kid<sub>i,t</sub></i>	0.129*** (15.00)	0.132*** (15.38)	0.097*** (18.78)	0.099*** (19.08)
<i>Marriage<sub>i,t</sub></i>	0.029*** (5.51)	0.029*** (5.46)	0.015*** (5.12)	0.016*** (5.20)
<i>AdvancedAcc<sub>i,t</sub></i>	-0.015*** (-6.45)	-0.013*** (-5.62)	-0.013*** (-10.81)	-0.012*** (-10.11)
<i>Taobao Seller<sub>i,t</sub></i>	-0.035*** (-11.80)	-0.034*** (-11.30)	-0.037*** (-24.02)	-0.036*** (-24.48)
<i>QRcode Seller<sub>i,t</sub></i>	0.003 (0.48)	0.006 (0.96)	-0.004 (-1.95)	0.000 (0.06)
<i>Constant</i>	0.178 (19.34)	0.179 (18.49)	0.165 (33.22)	0.162 (33.05)
Observations	234990	232986	884071	871265
R-squared	0.030	0.032	0.035	0.036
City, Industry, Month fixed effects	YES	YES	YES	YES

Note: Table 8 presents a subsample test to examine the moderating effect of financial inclusion. Standard errors are clustered by individual and month. Month-, city-, and industry-fixed effects are controlled in all regressions. \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Source: Authors' estimates.