How Effective is Microlending Program to Improve Responsible and Sustainable Financial Inclusion of Micro, Small, and Medium Enterprises? Evidence from Indonesia

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Research on government micro-lending program and micro, small, and medium enterprises (MSMEs) from different perspectives are widely scrutinized, yet there is lack evidence of its impact on MSME's financial inclusion level. This paper uses principal components analysis to measure financial inclusion index of MSME with government microlending program and MSME without, then employ difference in differencetechniques to evaluate the effect of the program to MSMEs. Our study uses survey data from 6,341 MSMEs from 7 provinces in Indonesia. We find that the financial inclusion of MSMEs with the program are better than MSMEs without, and digital finance channel can accelerate the financial inclusion among MSMEs. However, strong evidence also reveals that the program mostly serve the underbanked people while the target is the unbanked.

Keywords : micro lending, Micro, small, and medium enterprises, financial inclusion, entrepreneurship

1. Introduction

Financial inclusion, defined as fair access and usage of affordable formal financial services that potentially bring welfare for everyone (Chakravarty dan Pal, 2013; Allen et al., 2016; World Bank, 2018; Kabakova dan Plaksenkov, 2018). Empirical evidence shows that access and usage of formal financial services by individuals who are financially excluded unlocked opportunities for a better education and entrepreneurships, contribute to poverty reduction, and eventually lead to the sustainable development of the economy (Loayza and Ranciere, 2006; Beck, Demirguc-Kunt and Levine, 2007; Bruhn and Love, 2014; Fungáčová and Weill, 2015; Magnani, 2014; Pomeroy et al., 2020).

While many countries have embraced financial inclusions in their economic development strategy, there is no single recipe for developing an inclusive financial system. Various methods have adopted to bridge the gap between formal financial institutions and the needs of financially excluded individuals. Some countries applied specific policies towards financial inclusions, which mostly focus on increasing access to financial services.

For example, social banking policies in India mandated banks to open branches in four unbanked areas to get permit to open one branch in already banked areas (Chakravarty dan Pal, 2013). Africa uses technology such as mobile banking and mobile money account to increase access to financial services (Demirguc-Kunt et al., 2018; Mbiti dan Weil, 2011; Zins dan Weill, 2016). Meanwhile, social banking policies in Indonesia granted relaxation in branches permit rule for banks with minimum 20% of its loan portfolio distribute to micro, small, and medium enterprises (MSMEs) or 10% of its loan portfolio distribute to micro and small enterprises. Generally, support from government and private money is necessary to open wide access to finance and reduce poverty (E. Costa et al., 2016; Moro et al., 2020; Yoshino N et al., 2018).

Access to financing is critical to small and medium enterprises (SMEs) that depend on external finance rather than internal finance for its survival and growth (De la Torre et al., 2010). Particularly during the crisis period, business become more dependent on external finance while banks tend to be more prudent in lending money (Zubair et al., 2020). As a result, loan to SMEs have higher interest rate, shorter maturity time, and riskier due to macroeconomic instability compared to large firms (De la Torre et al., 2010).

Although many studies concluded the importance of access to financing for unbanked people or SMEs to foster economic growth, employment creation, and alleviate poverty (Ayyagari et al., 2007; Quartey et al., 2017; Kersten et al., 2017), financial constraint is the major problem of MSMEs development in developing countries (Carbó-Valverde et al., 2009; Holton and McCann, 2017; Ma et al., 2018). Consistent with those findings, in Indonesia context, a 2018 Survey of Entrepreneurs and MSMEs in Indonesia by Asia Pacific Foundation of Canada discover that 70 percent of respondent answer lack access to financing as barrier to expanding their business.

Generally, informal financing (owner's savings, money lenders/loan sharks, and family and friends) and government schemes/intervention (De la Torre et al., 2010; Kersten et al., 2017; Hajilee et.al., 2017) become main source of finance for SMEs (Kent Baker et al., 2017).

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Microlending commonly use as intervention tool by government to bridge SME opaqueness by combining subsidize interest rate and willingness to lend to the unbanked and make the loan price and transaction cost more affordable and reasonable for SMEs (Banerjee, 2013; Yoshino N et al., 2018).

Research on microlending and government intervention widely scrutinized, yet the debate on its effectiveness from different perspectives is an interesting subject for many scholars. Some empirical evidence show that microcredit open the access to finance for more than 100 million people per year (Cull et al., 2007). On the other hand, Banerjee (2013) concluded that in the long run, the increased in consumption or income gains because of business creation resulting from microcredit, did not sustain. Moreover, other studies find microcredit failure to reach the poorest of the poor (Amin et al., 2003; Navajas et al., 2000). SMEs opaqueness leading to high acquisition cost per borrower, information asymmetry that leads to credit rationing, and higher risk is the main natural factors of its financing (Stiglitz and Weiss, 1981; Bhatt and Tang, 1998; Navajas et al., 2000; Henock, 2018; Wang et al., 2019). This opaqueness make microcredit mostly serve individuals that near the poverty line.

In Indonesia over the past 10 years microlending program namely People Business Credit (PBC), uses as institutional mechanism to improve financing access to the micro, small and medium enterprises (MSMEs)[3] . This government program main purpose is to improve the inclusiveness of financial system by improving formal financial services' outreach for the unbanked. Inclusive financial systems may become solution to reduce the unbanked and poverty. However, financial inclusion is more than just an access to the formal financial services, it is also about integration of inclusive financial services to the people daily activities, particularly the unbanked, that will bring welfare. Moreover, all the effort has been made is to reach a responsible and sustainable financial inclusion, which allow the unbanked to actively use formal savings and eventually will lead to other and more complex financial services— bank loan, non bank financing, insurance, pension fund, investment, and many more. The more attachment people to the financial systems will encourage entrepreneurships, better education and health access, risk management, buffer to financial shock, improve welfare and sustainable economic development (Cull at al., 2007; Santana Felix and Belo, 2019).

In this paper we focus on government microlending program in Indonesia as a case study. Indonesia is an emerging economy where government microlending program has been globally acknowledged (Banerjee, 2013) and MSMEs play important role as backbone of the economy. This study therefore dedicated to examine the net impact of government PBC program from financial inclusion perspectives by empirically measuring the improvement in responsible and sustainable financial inclusion level of MSMEs after joining the PBC program. To the best our knowledge, this is the first study that specifically the impact of government microlending program by measuring the increase in financial inclusion index of user's program.

We will use two stage Principal Component Analysis (PCA) measure the responsible and sustainable financial inclusion index of two different groups: MSMEs with PBC program and MSMEs without PBC program. Then we apply difference in differencetechniques to empirically evaluate the impact of government microlending program on the responsible and sustainable financial inclusion of both groups.

We find evidence that financial inclusion of MSMEs with PBC program is higher than of MSMEs without PBC program. Our deeper analysis reveals that digital finance channel accelerate the financial inclusion and MSMEs with PBC program become more attach to the financial systems by actively using not only savings, but also loan, financing, insurance, and investments. However, we also find there is migration from high interest rate loan customer to low interest rate loan (PBC program). This indicate that PBC program mostly reach the underbanked people, not the targeted unbanked people.

The rest of this paper is structured as follows. Section 2 introduces the microlending program and provides theoretical background, followed by data, variables, and methodology in Section 3. We present the empirical results and robustness checks in Section 4. Section 5 concludes our presentation with some implications to policy makers.

2. Theoretical Background

This section begins by introducing the government microlending program in Indonesia. Then, some studies financial inclusion and all other control variabels are presented to provide support for our theoretical framework as well as our hypothesis about the impact of government microlending program on responsible and sustainable financial inclusion.

2.1 Government microlending program

In order to MSMEs empowerment, job creation, and poverty reduction, Indonesia government launched a set of policies in 2007 focusing on improvement of the access to finance, entrepreneurships, MSMEs product markets, and reformation of MSME regulation. In responding to this new policies, a government microlending program namely People Business Credit (PBC) initiated with main objectives to open wide access to finance. PBC program is a business loan facilities (working capital or investment loan) with maximum limit to IDR500 million (approx. USD35,000) to productive but unbanked individual/firms because of no sufficient collateral. The PBC credit term is maximum 3 years for working capital loan and 5 years for investment loan. However, source of funds for business loan facilities with PBC program is the third-party funds of the participated financial institutions, while government funds allocate to the subsidy scheme cost.

Since its launching, PBC program design has been evolving from a guarantee service fee scheme in 2007 to interest rate subsidy scheme in 2015. With low interest rate, microlending is expected to be more affordable for the unbanked. Over the years, the interest rate set for PBC program is continuously decreasing from 12% in 2015 to 6% in 2020. Furthermore, more financial institutions engaged in PBC program from 7 banks and 2 loan guarantees companies to 41 financial institutions and 11 loan guarantees companies. The program's credit limit for

micro business is also continuously increasing from IDR 5 million (approx. USD 360) to IDR 50 million in (approx. USD3,500) in 2020.

2.2 Financial inclusion

Issues related to financial inclusion has gained considerable attention from academics and policymakers in recent years. Previous studied have shown that financial inclusion is an effective tools against the poverty alleviation, welfare improvement, and eventually sustainable economic development. However, only a few focused on how to measure the index of financial inclusion (Demirguc-kunt and Klapper, 2013; Cámara and Tuesta, 2014; Turvey and Xiong, 2017; Datta and Singh, 2019).

Measuring financial inclusion index can be draw from supply-side and demand-side datasets. Sarma (2008) and Chakravarty and Pal (2013) demonstrated measuring financial inclusion indexs from supply-side datasets. However, supply-side indicators, usually numbers of savings or loan accounts, may result in overestimation of financial inclusion index because one person may have more than one accounts (Cámara and Tuesta, 2014). Thus, Camara and Tuesta (2014) provides construction of multidimensional index of financial inclusion by employing two-stage Principal Component Analysis (PCA) on all the indicators that represent three dimensions of financial inclusion: supply-side country level indicators for access and demand-side individual indicators for usage and barriers. The authors argued that using PCA avoid the problem of weight assignment on financial inclusion dimensions that will be lead to inaccurate readings of the index.

Demirguc-kunt and Klapper (2013) measures global financial index from demand-side individual datasets focuses on two dimensions: usage and barriers. This study provides the largest database from survey data from more than 150,000 random adults (age more than 15 years old) in 148 countries.

Datta and Singh (2019) applies PCA method on three dimensions: availability, access, and usage. The study uses G20 financial inclusions indicators for availability and the global financial inclusion database 2011 and 2014 for access and usage.

Most studies focus on measuring the index agree that financial inclusion is not only about access to financial services. It have multidimensional aspects to considered, thus how to measure the index of financial inclusion is not straightforward. Cámara and Tuesta (2014), Demirguc-Kunt and Klapper (2013), and Datta and Singh (2019) commonly use dimensions access and usage in their index. For the barriers, we conclude that it is the same dimensions as access, as people have lack of access due to some barriers. Therefore, in ths study, we integrate some barriers face by people in access dimensions.

Furthermore, for more comprehensive measurements of financial inclusion index, we add more dimensions of financial inclusion adopted from Alliance for Financial Inclusion policy paper (2010). The policy paper introduced four dimensions of financial inclusion that subtracted from commonly used lenses on how people define the financial inclusion:

1. Access as the ability to use available formal financial products and services
2. Quality as a measure of the available formal financial products and services match to the

needs of consumers. Quality dimensions use to capture the nature and the depth relationships between financial institutions and its consumers with assumptions that the consumers know what product options are available and the implications of their choices.

3. Usage as the consumers habit towards formal financial products and services: the regularity, frequency, and duration of use over time.

4. Impact on users that bring by formal financial products and services to the consumers life, including changes in consumption, welfare, and business activity.

We follow the two-stage PCA techniques applied by Cámara and Tuesta (2014) on those four dimensions of financial inclusions.

2.3 Control Variables

2.3.1 Structural and institutional context of financial system

Structural and institutional context of financial system may create substitutions or complements to the formal financial products and services and play as enhancers or inhibitors to the formal financial systems (Fu, 2020). Previous studies identify bank and MSME opaqueness may encourage some parties to take advantage to target uninformed customers to demand higher price and purchase costly insurance (Behr and Sonnekalb, 2012; Bauchet, et al., 2018). This information asymmetry and security issues will be reduced when longer relationships between institution and customers that will lead to lower interest rate and less collateral (Behr et al., 2011). Thus, microlending needs intervention from the government to bridge this opaqueness and security issue by providing incentives such as subsidies (De la Torre et al., 2010; Kersten et al., 2017; Hajilee et.al., 2017).

On the other hand, structural and institutional context of financial system cause inflexibility of financial institutions in responding to customer needs (Field et al.,, 2011). Most formal financial institutions have little flexibility in loan structures such as credit term, payment frequency, collateral, and processing speed. Meanwhile many MSMEs particularly micro business needs the loan to be processed in one day, payment term in days, and with no collateral but only with gentlement's agreement. This inflexibility cause an advantage for more flexible non formal institutions like moneylenders, to take over this opportunity by offering substitute or complementary products.

2.3.2 Financial Literacy

Financial literacy is concerned as a significant variable affecting financial inclusion. A study conduct by Sahrawat R (2010) found that financial inclusion of MSMEs is affected by financial literacy, lack of collateral, inadequate credit history, low and cyclical income, absence of formal and verifiable identity, understanding bureaucracy, and the credit that mainly used for personal consumption. The entrepreneur is encouraged to make financial decisions (e.g., savings, investment, financing) to be able to run their business properly. Therefore, financial literacy becomes pivotal in firms' financing decisions and their business performance (Miller et al., 2009). In addition, Adomako and Danso (2104) argue that financial literacy plays a crucial role in determining business performance and should be considered as an integral part

of firm activities.

On the other hand, Scott and Pam (1991) point out a "small business finance gap" as the problems experienced by MSMEs in operating their finance. This gap consists of their limited knowledge of the availability of funds and the higher costs of financing. Hence, these two factors become the biggest constrain for MSMEs in accessing finance. The knowledge gap emerges as a direct consequence of their limited awareness of the suitable source of finance and the relevant advantages and disadvantages of various financial products and services. Kumar and Rao (2015) identified a knowledge gap as a lack of awareness regarding accessibility towards potential financial resources.

The knowledge gap experienced by MSMEs, therefore, lead to MSMEs' opaqueness in financial information. The MSMEs opaque financial information is the natural barrier to financing (Stiglitz and Weiss, 1981). This opaqueness comes from both sides: the financial institution and the consumers themselves. From financial institutions perspective, lack of information about the business lead to inaccurate assessments of loan risk and result in a higher loan rate that unaffordable for MSMEs. From the consumer perspective, a low level of financial understanding can contribute to a bad financial decision (Grohmann et al., 2018) and discourage a business owner from using formal financial services (Cole et al., 2011).

SMEs opaqueness leading to high acquisition cost per borrower, information asymmetry that leads to credit rationing, and higher risk are the main natural factors of its financing (Stiglitz and Weiss, 1981; Bhatt and Tang, 1998; Navajas et al., 2000; Henock, 2018; Wang et al., 2019). This opaqueness makes microcredit mostly serve individuals near the poverty line. Hong and Gu (2004) argue that asymmetry information can severely impact MSME in accessing external financial resources, especially from the formal financial industry.

Concerning the relationship to financial inclusion, some studies found the positive relationships between financial literacy and financial inclusion, from increase demand in bank saving accounts (Cole et al., 2011), the likelihood of holding bank loans (Xu et al., 2019), and robust in any income levels and several subgroups across countries (Grohmann et al., 2018).

2.3.3   Entrepreneurship Level

The relationship between entrepreneurial orientation and financing can be described by behavioral finance theory, which explains the influence of an individual's psychology in making financial decisions (Baker and Ricciardi, 2015). According to Van Der Wijst (2012), a high entrepreneurial spirit tends to have behavioral bias related to cognition, emotions, and social psychology. Regarding MSMEs' access to finance, an entrepreneur with entrepreneurial orientation will have a higher intention to increase their access to finance, especially in the financing, by builds a connection with the fund supplier, as results causing improvement to their business' performance (Sidek et al., 2016). The entrepreneurial orientation is expressed by the risk-taking behavior, innovative and proactive in developing the firm (Miller, 2011). Therefore, an entrepreneur who is not afraid to take the risk; being innovative and proactive will motivate them to access additional financing to increase the firm's growth (Lumpkin and Dess, 2001).

Moreover, empirical works of literature also suggest that technology adoption promotes financial inclusion through entrepreneurship. This is because access to external finance significantly affects firm innovation (Hajivassiliou and Savignac, 2008). Information communication and technology are seen as the gap-bridging between the previously unbanked individual and financial services providers (Diniz et al., 2012). Hence, information communication and technology lead to higher financial inclusion (Wellalage et al., 2020), a primary driver of communication and technology's network in the financial services sector (Lapukeni, 2015), especially facilitating access to credit. Furthermore, Mushtaq and Bruneau (2019) find that financial inclusion is positively affected by diffusion in information and technology but negatively influences poverty and inequality.
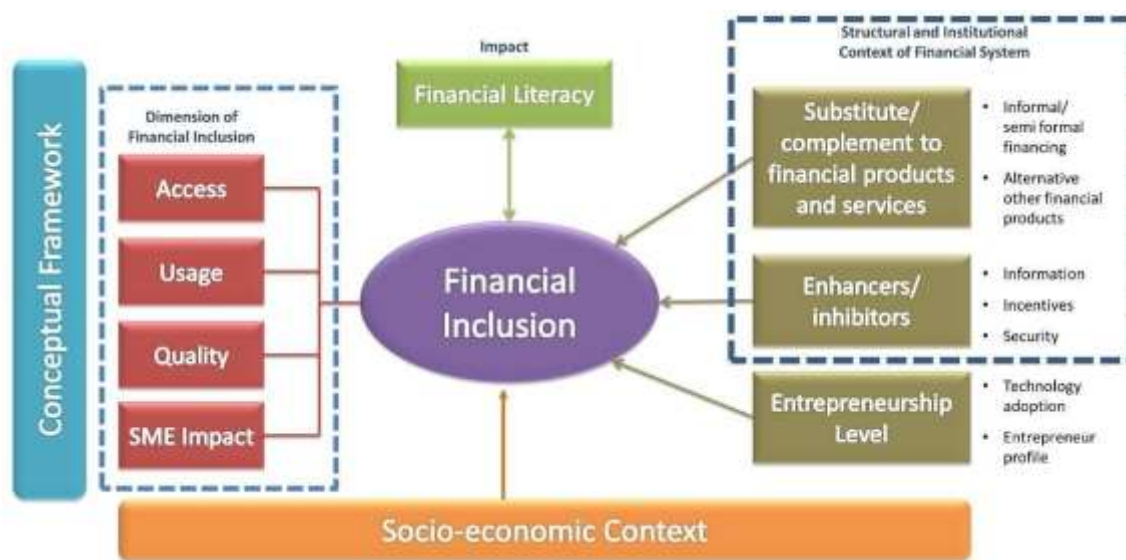
Figure 1 Conceptual Framework of Responsible and Sustainable Financial Inclusion - MSME

3. Method

3.1 Data

We conduct a survey to obtain a nationally representative dataset to examine the impact of people's business credit (PBC) on MSMEs financial inclusion. The data was collected through an MSMEs survey, which was personally conducted between July 2020 and October 2020 in 7 provinces in Indonesia (presented in Table 8). The MSMEs respondents in this study are those engaged in the agriculture, fisheries, and tourism sector.

The year in which the Indonesian government began to implement the people's business credit (PBC) program with interest subsidy is 2015. Therefore, we use 2014 as the pre- program and choose 2016 as the post-program period. Notably, we use a two-year (2014/2016) panel data in the difference in difference(DiD) model for financial inclusion impact analysis, with financial inclusion dimensions and the financial inclusion index to measure the inclusive finance among MSMEs. The interaction between post-program and the

MSMEs' involvement in people's business credit (PBC) is the primary independent variable of interest in this study.

The sampling framework consists of two groups of MSMEs: a group who have and still borrowed from people's business credit (PBC) program, referred to as the PBC group; and a group of MSMEs who have never borrowed from people's business credit (PBC) program or the application has been rejected, referred as a non-PBC group. To obtain the sample, we draw a multistage stratified random sampling method. Overall, there are 6.341 MSMEs included in this study, with 2.646 of them are the PBC group, and 3.695 remaining are the non-PBC group.

3.2 Type of Data

We input the collected data into the table to classify them as variables recognized in the framework. There are four categories for data tabulation; they are 1) table of basic coding, 2) table of multistage coding, 3) table of data processing, and 4) table of data processing results displayed in the discussion section. To analyze the data, we use Stata 14 software.

The analysis of our free-text survey questions was established by the inductive approach of grounded theory (Strauss, 1987). That study utilizes open coding related to grounded theory to derive categories from the free-text answers that tend to be qualitative by reading them carefully and aggregating categories. Following that method, we divide the respondents' statements into categories regarding our variables used in this study (see Table 1). Each response was assigned one or multiple categories to quickly outline the relevant topics (Reuter and Spielhofer, 2016). We use the previously collected literature review to increase the theoretical sensitivity in the coding process.

3.3 Operationalization of Construct and Measurements

To avoid information bias and errors in drawing the research conclusions, we develop an operational definition of the variables to acquire accurate measurement results.

Table 1 Operationalization of Construct and The Measurements

Component	Definition	Variable	Measurement Description	Indicator	Data Scale
Financial Inclusion	The process ensures the ease of access, availability, and usage of the formal financial system for all members of the economy (Sarma, 2008).	Access	Saving access to formal or semiformal financial institutions.	access 1	
			Saving access to informal financial institutions.	access 2	
			Financing access to formal or semiformal financial institutions.	access 3	
			Financing access to informal financial institutions.	access 4	
			Access to digital finance channel.	access 5	
		Usage	Credit ownership except for people's business credit (PBC).	usage 1	
			Ownership of formal or semiformal financial products.	usage 2	
			Frequency of digital finance usage.	usage 3	Ratio
			Insurance ownership.	usage 4	
		Quality	Ownership of various financial products.	quality 1	
			Saving habit to formal or semiformal financial products.	quality 2	
			Saving habit to nonformal financial products.	quality 3	
			Financing habit to formal or semiformal financial products.	quality 4	
			Financing habit to nonformal financial products.	quality 5	
			Ownership of digital financial products.	quality 6	

Component	Definition	Variable	Measurement Description	Indicator	Data Scale
			Frequency of digital finance usage.	quality 7	
		Impact	Additional non-PBC loan ownership related to business.	impact 1	
			Ownership of financial products related to business.	impact 2	
			Ownership of loan products relevant to welfare.	impact 3	
			Ownership of financial products related to welfare.	impact 4	
			Nonformal financial products' usage.	impact 5	
Entrepreneurship Level	Entrepreneurial behavior is influenced by the factors of needs, values, desires, habits, and beliefs (Lee and Wong, 2004)	Technology Adoption	Use of technology in financial records, payments with suppliers and consumers, interactions with suppliers and consumers, internet usage in business, and online store ownership.	techadpt	Ordinal
		Ambition	Intention to develop the business and have an online store.	entambi	
Financial System	Factors that accelerate the penetration of financial products and services due to the higher prevalence of information resources, the availability of additional financial service options, and various forms of semiformal and informal finance (Fu, 2020).	Institutional	The availability of products and services from informal and semiformal financial institutions at a lower cost, easier access, speed, and adaptability to individual needs.	finsysin	Ratio
		Structural	Availability of free information resources regarding financial products and services, the incentives, and the financial services system's security.	finsysstrk	

Component	Definition	Variable	Measurement Description	Indicator	Data Scale
Financial Literacy	The process by which financial consumers/investors improve their understanding of financial products and concepts, and through information, instruction, or objective advice (Lusardi and Mitchell, 2007)	Knowledge	General knowledge of finance, the security of financial products, and insurance products	litknow	Ratio
		Self-awareness	Financial attitudes towards digital payments	litself	Ratio

3.4 Methodology for Indexing Financial Inclusion

An inclusive financial system contains specific dimensions and cannot be directly measured quantitatively. Nonetheless, this variable is determined by the interaction of a set of variables that caused each other. Behind those set of correlated variables, we can identify the underlying latent structure as the context of financial inclusion. In estimating the latent variables, it is essential to consider these crucial issues: the choice of relevant causal variables and the weighting or estimating the parameters. In selecting the relevant variables, reducing information criterion in a standard way is not possible to perform. Also, since financial inclusion is unobserved, it is impossible to estimate the parameters using standard regression techniques (Camara and Tuesta, 2014). To overcome the issues stated above, we use two-stage principal components analysis as our indexing strategy.

The dataset consisted of indicators correlated with each other, which summarize our respondents' financial inclusion degree. Each correlated variable refers to different dimensions of financial inclusion. We divide those indicators into four sub-indices, namely Access, Usage, Quality, and Impact to MSME. Because the sub-indices consist of highly correlated indicators within the dimension, it is necessary to estimate the sub-indices rather than estimating the complete index using all the indicators. Mishra (2007) argues that this strategy can prevent weight biases among indicators that show the highest correlation. We follow Camara and Tuesta (2014) in applying the two-stage PCA to construct a multidimensional index of financial inclusion. The first stage estimates the four sub-indices: access, usage, quality, and impact, as the dimensions of financial inclusion. The next stage is to estimate each dimension's weights and construct the overall financial inclusion index by putting the dimensions as explanatory variables.

Financial inclusion is considered to be linearly determined and formulated as follows:

$$FI_i = w_1 A^u_i + w_2 U^c_i + w_3 Q^b_i + w_4 I^a_i + e_i \qquad (1)$$

where the subscript i denotes the respondent, and $(A^u_i, U^c_i, Q^b_i, I^a_i)$ represents the access, usage, quality, and impact to MSME's dimension, respectively. Therefore, the total variation in financial inclusion is explained by two orthogonal factors: causal variables variation and the error term (e_i) variation.

Table 1 exhibits our variables with different scales. Some of our variables also contain large variance while other variables have small variance (see Appendix 2, tables A6). Therefore, we have to standardize the selected indicators to normalize the variables and generate normal distribution. The standardization is necessary before estimating the sub-indices because the result of PCA is sensitive to the initial variables' variance. Specifically, if the ranges of initial variables have considerable differences, they will dominate those with small ranges. In this research, we employ z-score as transformation techniques, where we base the scaling on deviation from the mean. The result of our normalized variables for financial inclusion indicators is shown in Table 2.

We calculate standardization using z-score normalization as follows.

$$Z = \frac{X_i - \bar{X}}{\sigma}$$ (2)

where,

$\bar{X}$=group average
σ=standard deviation

In the next stage, we processed the normalized data to construct sub-indices using PCA, a standard technique to simplify a dataset by extracting data for hidden features and relationships, and removing the data containing excessive information. Therefore it reduces the data's dimension for the analysis (Le et al., 2019).

Table 2 Descriptive Statistics of Variables

Variable	Obs	Mean	Std. Dev.	Min	Max
techadpt	12682	8.609	2.417	5	19
entambi	12682	55.602	7.044	20	75
finsysin	12682	1.055	5.067	0	41
finsysstrk	12682	7.51	2.084	0	20
litknow	12682	2.791	2.526	0	10
litself	12682	2.058	4.412	0	58
access	12682	0	1.293	-8.595	1.691
usage	12682	0	1.353	-.875	12.264
quality	12682	0	1.435	-1.675	9.698
impact	12682	0	1.292	-.654	12.555
fiindex	12682	0	1.415	-1.487	12.99

This table shows the summary statistics for all data samples of the DiD analysis's key variables. The normalized variables are access, quality, impact, and FI_index.

Many researchers have used the PCA technique in explanatory data analysis. Jollife and Cadima (2016) mentioned that PCA discloses the data structure and explains the variation in the projections. Although PCA is not often used to quantify financial inclusion, some studies have employed PCA as the analysis tool in examining financial variables (see Le et al., 2019; Camara and Tuesta, 2014; Le et al., 2016; Adu et al., 2013; Hye, 2011; Ang and McKibbin, 2007). In particular, Le et al., (2019) constructs financial inclusion in Asia using PCA to examine its impact on financial efficiency and sustainability. Ang and McKibbin (2007) also performing PCA to formulate the financial depth index and financial repression index in Malaysia.

To determine the outcome variable, PCA assigns weight to each input variable in the index construction. The first principal component represents selected input variables best; therefore, it determines the newly established index. The weights implied the degree of correlation between a given input variable and the outcome index (Radovanović et al., 2018). Thus, we can discover the essential variables in explaining the index. The standardization

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resulting in all the principal components have zero mean value. Every component's standard deviation is the eigenvalue's square root (Radovanović et al., 2018).

Before we begin the estimation using PCA, Bartlett's test of sphericity and Kaiser- Meyer-Olkin (KMO) test were performed to examine the data suitability for factor analysis. The purpose of Bartlett's test of sphericity is to analyze whether the correlation matrix in the PCA is an identity matrix. Therefore, to be suitable for factor analysis, the value should be significant with $p < 0.05$ (Hair et al., 2006; Tabachnick et al., 2007). Then, we conduct the Kaiser- Meyer-Olkin (KMO) test to examine the sampling adequacy. Yoshina and Taghizadeh-Hesary (2015) explain that the KMO test's value indicates the proportion of common variance that is potentially caused by underlying factors. The index range is between 0 and 1, and the factor is suitable if it has an index greater than 0.5 (Hair et al., 2006; Tabachnick et al., 2007). Table 3 shows the results of Bartlett's test of sphericity and the Kaiser-Meyer-Olkin (KMO) test. The KMO value is higher than 0.5, and Bartlett's test of sphericity results p-value lower than the significance level alpha = 0.01. It indicates that we reject the null hypothesis, which means that the variables we used in PCA are correlated. Thus, the PCA method is appropriate in this study.

Table 3 Results of Bartlett's test of sphericity and the Kaiser-Meyer-Olkin Measure of Sampling Adequacy

	Bartlett's test of sphericity			Kaiser-Meyer-Olkin Measure of Sampling Adequacy
	Chi-square	Degree of freedom	p-value	
Financial Inclusion				
z-score normalization	95573.187***	190	0.000	0.69

Note: Bartlett test of sphericity: H0: variables are not intercorrelated. *** indicates statistical significance at 1% level.

Later, we perform the first stage of PCA that estimates the dimensions, which is the four unobserved endogenous variables (A_i^u, U_i^c, Q_i^b, I_i^a) and formulated as follow:

$$A_i^u = \beta_1 access1 + \beta_2 access2 + \beta_3 access3 + \beta_4 access4 + \beta_5 access5 \qquad (3)$$

$$U_i^c = \theta_1 usage1 + \theta_2 usage2 + \theta_3 usage3 + \theta_4 usage4 \qquad (4)$$

$$Q_i^b = \gamma_1 quality\,1 + \gamma_2 quality\,2 + \gamma_3 quality\,3 + \gamma_4 quality\,4 + \gamma_5 quality5 + \gamma_6 quality6 + \gamma_7 quality7 \qquad (5)$$

$$I_i^a = \delta_1 impact\,1 + \delta_2 impact\,2 + \delta_3 impact\,3 + \delta_4 impact\,4 \qquad (6)$$

The variables used in each dimension are described in table 1. Remember that the endogenous variables are unobserved, so they are estimated jointly with the unknown parameters: β, θ, γ, and δ. Usually, the principal component is used to decide the number of components contains in the estimation. In general practice, people tend to use the first few

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principal components to replace all causal variables because it captures a significant proportion of all the samples' total variation. In this research, we acknowledge the whole components as the explanatory variables. Because we avoid eliminating the relevant information that might affect the estimation; thus, we did not reduce the data dimension to estimate financial inclusion accurately.

Next, the second stage of principal component analysis calculates the overall financial inclusion index by replacing $A^u{}_i$, $U^c{}_i$, $Q^b{}_i$ and $I^a{}_i$ in Eq.(1) and employ the exact process with the first stage to measure the vectors of parameters λ.

The formula of financial inclusion index is expressed as follows:

$$FI_i = \frac{\sum_{j=1}^{4} \lambda_j(\varphi_{j1}A^u_i + \varphi_{j2}U^c_i + \varphi_{j3}Q^b_i + \varphi_{j4}I^a_i)}{4 \sum_{j=1} \lambda_j} \qquad (7)$$

The highest weight λ_1 is belongs to the first principal components due to its largest proportion of the total variation in all causal variables. Accordingly, λ_2 represents the second-highest weight of the principal component and so on.

3.5 Methodology for Measuring The Impact of People's Business Credit Program (PBC) on the Financial Inclusion

To consistently compare the impact of people's business credit (PBC) on financial inclusion, we establish two different groups consisting of treatment and control groups. The treatment group is MSMEs, which receives people's business credit (PBC). The control group is MSMEs that do not apply for people's business credit, or they have applied. However, for several reasons, the application was rejected.

We estimate the model by applying difference in difference(DiD) method with the following equation:

$$\begin{aligned}
Y_{i,t} = {} & \alpha + \beta_1 PBC_i + \beta_2 Post_t + \beta_3 Post_t * PBC_i + \beta_4 TechnologyAdoption_i + \\
& \beta_5 EntrepreneurAmbition_i + \beta_6 FinancialSystemInstitutional_i + \\
& \beta_7 FinancialSystemStructural_i + \beta_8 FinancialKnowledge_i + \\
& \beta_9 FinancialSelfAwareness_i + \beta_{10} SocioEconomy_i + \varepsilon_{i,t} \qquad (8)
\end{aligned}$$

where $Y_{i,t}$ is our dependent variables consist of the dimensions of the financial inclusion index (which are access, usage, quality, and impact) and the financial inclusion index as a whole. PBC_i is a dummy variable that equals one for respondents or MSMEs that receive people's business credit (PBC) and zero otherwise. $Post_t$ is a dummy variable that consists of one for the time after the MSMEs implemented people's business credit (PBC) with interest subsidy scheme.

$Post_t * PBC_i$ as the variable of interest, which specifies the direct impact of people's business credit (PBC) program on the dependent variables. Our sets of the control variables that might affect the dependent variables consist of $TechnologyAdoption_i$,

EntrepreneurAmbition$_i$, FinancialSystemInstitutional$_i$, FinancialSystemStructural$_i$, FinancialKnowledge$_i$, FinancialSelfAwareness$_i$, and SocioEconomy$_i$.

4. Results

4.1 Financial Inclusion Dimensions

This section presents our estimation of financial inclusion indices for 6.341 MSMEs, both those who receive the people's business credit (PBC) and those who did not. We apply two-stage PCA for periods before and after Indonesia's governments implement people's business credit (PBC) with interest subsidy. Table 6 presents the correlation matrix of the causal variables that we use to measure financial inclusion.

The first stage of PCA measures the weight for each sub-index's causal variables and compute the latent variables: access, usage, quality, and the impact that serve as the dimensions of the financial inclusion index.

Table 4 Cumulative Variance Explained by Component

	Eigenvalue	Difference	Proportion	Cumulative
Access				
PC 1	1.672422	0.3751933	0.3345	0.3345
PC 2	1.297229	0.3061119	0.2594	0.5939
PC 3	0.9911166	0.1840787	0.1982	0.7922
PC 4	0.807038	0.5748429	0.1614	0.9536
PC 5	0.232195	.	0.0464	1
Usage				
PC 1	1.831089	0.8434538	0.4578	0.4578
PC 2	0.9876355	0.101253	0.2469	0.7047
PC 3	0.8863825	0.5914897	0.2216	0.9263
PC 4	0.2948928	.	0.0737	1
Quality				
PC 1	1.838677	0.6919131	0.2627	0.2627
PC 2	1.146764	0.1454603	0.1638	0.4265
PC 3	1.001303	0.0021122	0.143	0.5695
PC 4	0.9991911	0.0823559	0.1427	0.7123
PC 5	0.9168352	0.0777649	0.131	0.8433
PC 6	0.8390702	0.5809105	0.1199	0.9631
PC 7	0.2581598	.	0.0369	1
Impact				
PC 1	1.66898	0.66817	0.3338	0.3338
PC 2	1.00082	0.08385	0.2002	0.534

	Eigenvalue	Difference	Proportion	Cumulative
PC 3	0.91697	0.05093	0.1834	0.7174
PC 4	0.86603	0.31883	0.1732	0.8906
PC 5	0.5472	.	0.1094	1

Table 5 Principal Components Estimates

	PC 1	PC 2	PC 3	Unexplained
Access				
Access 1	-0.1864449	0.7037276	-0.3317294	0
Access 2	0.5817417	-0.1471882	0.4876662	0
Access 3	-0.4878153	0.0417678	0.5880426	0
Access 4	0.6209346	0.4321639	-0.0435372	0
Access 5	-0.0573704	0.5427641	0.5517678	0
Usage				
Usage 1	0.2021453	0.865695	-0.4563362	0
Usage 2	0.3263731	0.3812342	0.8632609	0
Usage 3	0.6501156	-0.2218499	-0.1917073	0
Usage 4	0.6557191	-0.2366756	-0.098925	0
Quality				
Quality 1	0.3088687	-0.2275265	0.0593583	0
Quality 2	0.0146195	0.0251472	0.7598109	0
Quality 3	0.0180986	-0.0150218	-0.6466637	0
Quality 4	0.1496019	-0.6685271	0.0092291	0
Quality 5	-0.0110316	0.6813973	-0.0082746	0
Quality 6	0.6564962	0.1451107	0.0003058	0
Quality 7	0.6712445	0.1228245	-0.028918	0
Impact				
Impact 1	0.3769914	0.0592137	0.6561085	0
Impact 2	0.5277668	-0.1558878	-0.5160793	0
Impact 3	0.4543215	0.0651031	0.4468414	0
Impact 4	0.6077236	-0.0470956	-0.2766503	0
Impact 5	0.0600301	0.9827188	-0.1642594	0

We present the estimated factors and each financial inclusion dimension's eigenvalues in Table 4. Because our purpose is to estimate the financial inclusion accurately, therefore we consider all components as the explanatory variables. The estimated principal components for access, usage, quality, and impact are presented in Table 5. Note that because of the standardization, therefore, all the principal components have zero mean. Also, the correlation between the principal components is zero.

To explain the principal components, we need to recognize the variables with a strong correlation with each component. In this case, the large numbers of magnitude or the farthest from zero in both directions indicate that variables are strongly correlated with each component. Following Le (2019), we consider a correlation of 0.5 and above as a threshold for essential variables.

For the component access, we find that the first principal component is strongly and positively correlated with access 2 and access 4. This component can be viewed as savings to nonformal financial institutions and financing to nonformal financial institutions. The second principal component increases with access 1 and access 5. This component can be viewed as a measure of savings to formal or nonformal financial institutions and digital channel finance. The third principal component increases with an increase in access 3 and access 5. Therefore this component can be viewed as financing to formal or nonformal financial institutions and digital channel finance.

For the component usage, we find that the first principal component is strongly and positively correlated with usage 3 and usage 4. These two variables measure the frequency of using digital finance and insurance ownership. The positive correlation indicates that they vary together. For example, if digital finance usage is increasing, insurance ownership will likely to rise. The second principal component increases with usage 1, which measures credit ownership other than people's business credit (PBC). On the other hand, the third principal component increases with an increase in usage 2, explaining formal or semiformal financial product ownership.

For the component quality, the first principal component is strongly and positively correlated with quality 6 and quality 7. This component can be viewed as ownership of digital financial products and the frequency of using digital finance. The second principal component is strongly and positively correlated with quality 5 while significantly and negatively correlated with quality 4. This finding suggests that these variables move together in a reversed direction. For instance, if quality 5 (financing habit from informal financial institutions) increases, quality 4 (financing habit from formal or informal financial institutions) will likely fall. Moreover, the third principal component increases with quality 2 (saving habit to formal or semiformal financial institutions) and decreases with quality 3 (saving habit to informal financial institutions).

For the component impact, we find that the first principal component is strongly and positively correlated with impact 2 and impact 4. Those variables represent the ownership of financial products related to business (e.g., leasing, fire insurance, and property insurance) and the ownership of financial products related to their welfare (e.g., vehicle ownership credit, homeownership credit, and credit card). The second principal component increases with impact 5, a measure of nonformal financial products' usage. Meanwhile, the third principal component increases with the increase in impact 1, which assesses the additional non-PBC loan ownership related to business.

Table 6 Correlation Matrix

Variables	(1) access1	(2) access2	(3) access3	(4) access4	(5) access5	(6) usage1	(7) usage2	(8) usage3	(9) usage4	(10) quality1	(11) quality2
access1	1										
access2	-0.299***	1									
access3	0.145***	-0.0865***	1								
access4	0.204***	0.467***	-0.392***	1							
access5	0.131***	-0.0584***	0.123***	0.129***	1						
usage1	0.0494***	-0.0257**	0.157***	-0.0645***	0.128***	1					
usage2	0.162***	-0.0564***	-0.0959***	0.240***	0.211***	0.0970***	1				
usage3	0.0472***	-0.0378***	0.128***	0.0769***	0.815***	0.121***	0.169***	1			
usage4	0.0174*	0.00161	-0.0371***	0.193***	0.587***	0.0884***	0.216***	0.702***	1		
quality1	0.129***	-0.0664***	0.238***	-0.0459***	0.222***	0.188***	0.167***	0.202***	0.121***	1	
quality2	0.0251**	0.0112	-0.00446	0.00696	0.0170	0.0331***	0.0178*	0.00462	0.00615	0.00649	1
quality3	0.0127	-0.00625	0.00945	0.00385	0.0126	0.00345	0.00801	0.00940	0.00879	-0.000313	-0.000678
quality4	0.0861***	-0.0254**	0.339***	-0.0118	0.0633***	0.249***	0.0894***	0.0645***	0.0634***	0.101***	-0.00231
quality5	-0.0165	0.0232**	-0.0972***	0.122***	0.0168	-0.0573***	0.0181*	0.0234**	0.0168	-0.0215*	0.00160
quality6	0.122***	-0.0682***	0.0882***	0.0883***	0.823***	0.111***	0.130***	0.681***	0.482***	0.152***	0.0231**
quality7	0.0700***	-0.0508***	0.109***	0.162***	0.873***	0.120***	0.243***	0.866***	0.659***	0.215***	-0.00672
impact1	-0.00803	-0.0267**	-0.0866***	0.235***	0.174***	0.290***	0.196***	0.149***	0.176***	0.0907***	0.0164
impact2	0.0464***	-0.0573***	0.0446***	0.0142	0.196***	0.175***	0.342***	0.167***	0.181***	0.599***	0.0113
impact3	0.0474***	-0.0181*	0.142***	-0.0380***	0.116***	0.833***	0.0919***	0.117***	0.0861***	0.169***	0.0319***
impact4	0.0907***	-0.0815***	0.0797***	0.0413***	0.207***	0.259***	0.402***	0.185***	0.161***	0.538***	-0.00337
impact5	0.0543***	-0.0315***	0.116***	-0.0736***	-0.0103	0.0347***	0.00634	-0.00581	0.0161	0.00476	-0.000343
N	12682										

Table 6 Correlation Matrix (Cont.)

Variables	(12) quality3	(13) quality4	(14) quality5	(15) quality6	(16) quality7	(17) impact1	(18) impact2	(19) impact3	(20) impact4	(21) impact5
access1										
access2										
access3										
access4										
access5										
usage1										
usage2										
usage3										
usage4										
quality1										
quality2										
quality3	1									
quality4	0.00452	1								
quality5	-0.00312	-0.137***	1							
quality6	0.00878	0.0553***	0.00252	1						
quality7	0.0131	0.0842***	0.0243**	0.737***	1					
impact1	0.00844	0.121***	0.0106	0.109***	0.224***	1				
impact2	-0.0121	0.0916***	-0.0138	0.0595***	0.165***	0.158***	1			
impact3	0.00236	0.213***	-0.0419***	0.106***	0.120***	0.163***	0.112***	1		
impact4	-0.00273	0.140***	-0.0227*	0.181***	0.218***	0.154***	0.399***	0.299***	1	
impact5	0.000678	0.142***	-0.262***	-0.000890	-0.00467	0.0216*	0.00206	0.0223*	0.0342***	1
N	12682									

4.2 The Impact of People's Business Credit Program (PBC) on the Financial Inclusion

4.2.1 Treatment and Control Groups

To examine the impact of people's business program (PBC) on MSMEs' financial inclusion, we employ DiD method, which requires a treatment group and a control group. The treatment group is the MSMEs that receive a loan from people's business credit (PBC), while the control group consists of MSMEs that did not join the PBC program. The treatment effect is the year when the Indonesian government started to implement interest subsidies for the loan.

4.2.2 Empirical Results

Table 7 presents the characteristic of respondents. Nearly half of the surveys were conducted in Central Java Province (47.44%), with the majority of respondents belong to the MSMEs' owner with male gender (72.48%), married (86.52%), on average, 40 – 54 years old. Regarding the business sector, 79.64% of MSMEs are engaged in the agriculture sector. Concerning the financial characteristics, 39.35% have an average monthly income slightly above the regional minimum wage (Rp 1.700.000 - Rp 3.800.000). Regarding the education degree, 40.58% have completed senior high school. A significant portion reported having been running their business for more than ten years (67.64%). Also, it was found that 49.57% of respondents stated that their distance to the nearest financial institution is less than 5 Km. Regarding engagement to the internet, half of the respondents (50.95%) have at least a cellular phone, email, or internet access. Besides, only 6.37% of respondents have an online store, and the majority of them (73.32%) are documenting their business finances.

We examine the impact of people's business credit program (PBC) on Indonesia's financial inclusion using the DiD method. Table 9 shows the results of our baseline regression. The variable of interest is the interaction between the treatment respondents' dummy variable and the treatment effect dummy variable (post*PBC), which presents the consecutive impact of people's business credit program (PBC) on the dependent variables. We employ access, usage, quality, credit impact on MSME, and the financial inclusion index as our dependent variables.

From table 8, we find several findings. Firstly, the impact of people's business credit program (PBC) on the financial access dimension, namely access, usage, quality, and impact, is positive and significant. The financial inclusion index, as a whole, also implies a positive and significant effect. Furthermore, the coefficients of the interaction variable on the dependent variables also present similar results. These findings imply that respondents who tie with people's business credit program (PBC) have better financial inclusion than those who do not.

Table 7 Characteristics of Respondents

Characteristic	Full Sample		PBC Group		Non-PBC Group	
	Freq.	Percent	Freq.	Percent	Freq.	Percent
Province						
DI. Yogyakarta	281	4.43	109	4.12	172	4.65
Central Java	3008	47.44	972	36.73	2036	55.10
Lampung	940	14.82	283	10.70	657	17.78
West Nusa Tenggara	455	7.18	306	11.56	149	4.03
East Nusa Tenggara	176	2.78	138	5.22	38	1.03
South Sulawesi	788	12.43	478	18.07	310	8.39
West Sumatera	693	10.93	360	13.61	333	9.01
Gender						
Male	4596	72.48	1722	65.08	2874	77.78
Female	1745	27.52	924	34.92	821	22.22
Age						
Under 24	221	3.49	52	1.97	169	4.57
24-39 years old	2088	32.93	1241	46.90	847	22.92
40-54 years old	2685	42.34	1083	40.93	1602	43.36
55-65 years old	1050	16.56	249	9.41	801	21.68
Over 65 years old	297	4.68	21	0.79	276	7.47
Education						
Not attend formal school	242	3.82	43	1.63	199	5.39
Elementary	1462	23.06	380	14.36	1082	29.28
Middle school	1110	17.51	406	15.34	704	19.05
High school	2573	40.58	1289	48.72	1284	34.75
Diploma	247	3.90	146	5.52	101	2.73
Bachelors	669	10.55	366	13.83	303	8.20
Master degree	38	0.60	16	0.60	22	0.60
Marital Status						
Not married	579	9.13	234	8.84	345	9.34
Divorced	276	4.35	103	3.89	173	4.68
Married	5486	86.52	2309	87.26	3177	85.98
Monthly Income						
Less than Rp 1.700.000	2315	36.51	458	17.31	1857	50.26
Rp 1.700.000 - Rp 3.800.000	2495	39.35	1021	38.59	1474	39.89
Rp 3.800.001 - Rp 7.000.000	1002	15.80	732	27.66	270	7.31
Rp 7.000.001 - Rp 10.000.000	300	4.73	249	9.41	51	1.38
Rp 10.000.001 - Rp 17.500.000	150	2.37	125	4.72	25	0.68
More than Rp 17.500.000	79	1.25	61	2.31	18	0.49

Characteristic	Full Sample		PBC Group		Non-PBC Group	
	Freq.	Percent	Freq.	Percent	Freq.	Percent
Business Age						
Less than 1 years	92	1.45	20	0.76	72	1.95
1-5 years	1960	30.91	1066	40.29	894	24.19
More than 10 years	4289	67.64	1560	58.96	2729	73.86
Sector						
Tourism	592	9.34	447	16.89	145	3.92
Agriculture	5050	79.64	1715	64.81	3335	90.26
Fisheries	699	11.02	484	18.29	215	5.82
Engagement to Internet						
Very low	3110	49.05	1570	59.33	1661	44.95
(Do not have a cellphone, email address, and internet access)						
Medium	3231	50.95	1076	40.67	2034	55.05
(Have a cellphone and email address, and or internet access)						
Having an Online Store						
Yes	404	6.37	217	8.20	187	5.06
No	5937	93.63	2429	91.80	3508	94.94
Having a Business Financial Record						
Yes	1692	26.68	879	33.22	813	22
No	4649	73.32	1767	66.78	2882	78
Distance to Finance Institution	3142	49.55	1315	49.70	1827	49.45
Less than 5 Km	2435	38.40	918	34.69	1517	41.06
5 Km - 10 Km	587	9.26	288	10.88	299	8.09
10 Km - 20 Km	177	2.79	125	4.72	52	1.41
More than 20 Km						
Total	6341	100	2646	100.00	3695	100

Then we look more profound at the indicator of the financial inclusion dimension presented in table 9. People's business credit program (PBC) enables the respondents to have greater access to formal and semiformal finance institutions for savings (access 1). They also experienced better access to digital finance (access 5). Also, the interaction variables (PBC*post) exhibit a positive and significant impact on access saving to nonformal financial institutions (access 2) and financing access to informal financial institutions (access 4). These results indicate that the PBC program succeeded in migrating PBC respondents from nonformal financial access to the use of formal or semiformal financial access. In contrast, the PBC program with subsidized interest resulted in a migration from users of expensive financing products to low-cost financing products. This result is supported by the negative and significant impact on financing access to formal or semiformal financial institutions (access 3).

Next, for the usage dimension, respondents who join the people's business credit program (PBC) own more financial products (usage 2) but use digital finance channels (usage 3) less frequently than non-PBC users for usage dimension. The relationship of PBC with loan ownership other than PBC (usage 1) and insurance ownership (usage 4) demonstrates a negative and significant direction. But the interation variables (PBC*post) exhibit a positive and significant relationship with the nonbasic financial product and services such as insurance (usage 4) and digital finance (usage 3). In conclusion, MSMEs who join PBC are less active in exploring non-subsidized financing than non-PBC MSMEs.

The examination in quality dimension finds that interaction variable (PBC*post) positive and significant affecting ownership of various financial products (quality 1), financing habit to nonformal financial institutions (quality 5), and frequency of using digital finance channel (quality 7). Oppositely, the effects on financing habits to formal or semiformal financial institutions (quality 4) and digital finance ownership (quality 6) are negative significant. These findings indicate that after the government applied an interest subsidy policy, MSMEs who participate in PBC have a higher understanding of choosing financial products and services according to their needs, compared to non-PBC MSMEs. In terms of the wideness of financial products and services usage such as savings, financing, insurance, investment, and digital finance (quality 1), the PBC MSMEs group has a much more varied range of financial products and financial services, compared to the non-PBC MSMEs.

Additionally, the finding also indicates that PBC MSMEs are faster to leave nonformal financing products (in this case, it refers to loan sharks) than non-PBC MSMEs. The MSMEs who join PBC also much more selective in choosing digital financial products according to their needs. We can see the evidence of the decrease in ownership of various digital financial products (quality 7) and the increase in digital financial products' usage frequency (quality 6). On the other hand, consistent with the access and usage dimension results, after the implication on interest subsidy, the PBC MSMEs tend to be less active in exploring financing products and services other than PBC compared to non-PBC MSMEs.

Regarding to the relationship on impact dimensions, the coefficients of people's business credit (PBC) are positive and significant with business performance (impact 1), personal welfare (impact 4), and the usage of nonformal financial products (impact 5). Also, the

interaction variable (PBC*post) shows positive and significant results on impact 2. However, the interaction variable coefficients (PBC*post) become negative significant with business performance (impact 1) and nonformal financial products usage (impact 5). From this finding, it indicates that the PBC program has successfully accelerated the development of PBC MSMEs. The result demonstrates that PBC MSMEs have become more active in using financial products and services related to their business's progress (such as working capital credit, leasing, and micro or fire insurance) than the non-PBC MSMEs. However, further analysis is consistent with the other three dimensions. It shows that PBC MSMEs tend to be less active in using non-subsidized financing products than non-PBC MSMEs (impact1). Furthermore, the PBC program impacts accelerating MSMEs to leave nonformal financial products and services (such as loan sharks), as shown in impact 5.

Later, we examine the control variables' impact on financial inclusion. As shown in table 8, technology adoption positively and significantly impacts the quality and financial inclusion index. The results imply that MSMEs who adopt technology in their daily transaction (such as computerized bookkeeping systems, online shops, and electronic transactions), both with suppliers or consumers, have a higher financial inclusion level. Similarly, entrepreneur ambition has a positive and significant impact on access. It implies that MSMEs with a higher entrepreneurship level have the intention to develop their business. Hence these MSMEs will need access and active use of formal financial products and services to get a capital injection.

The financial system institutional impact is positive and significant for the usage, quality, impact, and financial inclusion index. However, the coefficient is negative significant for the access dimension. It indicates that better institutional quality will increase people's trust in the financial system, hence reinforcing financial inclusion (Rojas-Suarez, 2010; Honohan, 2008). In contrast, the control variable of a financial system in structural have a negative and significant impact on the access, usage, quality, and financial inclusion. The result implies that the structure of the financial system cannot support the availability of free information resources regarding financial products and services, the incentives, and the financial services system's security. Therefore this situation leads to the failure in boosting financial inclusion.

Table 8 also shows that respondents' financial knowledge and financial self-awareness are positively correlated with financial product usage and quality. Moreover, the higher financial literacy is, the higher its impact on business performance. As a result, the overall financial inclusion index will also positively affected. In addition, education and income have a positive and significant effect on the financial inclusion index. However, we find that marital status does not affect the financial inclusion index.

4.3 Robustness Checks

Instead of directly regressing all variables in the empirical model, we employ an incremental regression to provide consistent results. Concerning our variables of interest, the result is persistent with the baseline regression (see Appendix 1, tables A1-A5).

Table 8 Baseline Regression Results

VARIABLES	(1) access	(2) usage	(3) quality	(4) impact	(5) FI_index	(6) Access	(7) usage	(8) quality	(9) impact	(10) FI_index
post	-0.0432**	0.570***	0.400***	0.366***	0.581***					
	(0.0211)	(0.0172)	(0.0178)	(0.0212)	(0.0182)					
PBC	1.032***	0.260***	0.207***	0.293***	0.255***					
	(0.0248)	(0.0210)	(0.0222)	(0.0278)	(0.0229)					
PBC*post						0.622***	0.790***	0.404***	0.537***	0.704***
						(0.0243)	(0.0304)	(0.0263)	(0.0318)	(0.0286)
techadpt	-0.0493***	0.00773	0.0584***	0.00380	0.0348***	-0.0544***	0.00867*	0.0583***	0.00363	0.0355***
	(0.00552)	(0.00500)	(0.00547)	(0.00591)	(0.00530)	(0.00578)	(0.00501)	(0.00556)	(0.00592)	(0.00538)
entambi	0.00434***	-0.000369	0.000740	0.00252	0.000806	0.00947***	-0.00133	0.000778	0.00270	0.000115
	(0.00157)	(0.00144)	(0.00141)	(0.00170)	(0.00149)	(0.00164)	(0.00142)	(0.00141)	(0.00168)	(0.00149)
finsysin	-0.0395***	0.0111***	0.0162***	0.0187***	0.0218***	-0.0401***	0.0112***	0.0162***	0.0186***	0.0219***
	(0.00347)	(0.00221)	(0.00207)	(0.00283)	(0.00230)	(0.00329)	(0.00220)	(0.00208)	(0.00286)	(0.00233)
finsysstrk	-0.0353***	-0.0968***	-0.0753***	0.0161**	-0.0710***	-0.0317***	-0.0974***	-0.0753***	0.0162**	-0.0715***
	(0.00637)	(0.00664)	(0.00650)	(0.00673)	(0.00651)	(0.00664)	(0.00668)	(0.00656)	(0.00677)	(0.00662)
litknow	-0.0263***	0.148***	0.0757***	0.0556***	0.125***	0.0187***	0.140***	0.0761***	0.0571***	0.119***
	(0.00547)	(0.00495)	(0.00521)	(0.00618)	(0.00526)	(0.00556)	(0.00502)	(0.00523)	(0.00600)	(0.00524)
litself	-0.0182***	0.136***	0.131***	0.0441***	0.140***	-0.0144***	0.135***	0.131***	0.0442***	0.139***
	(0.00304)	(0.00646)	(0.00611)	(0.00493)	(0.00626)	(0.00322)	(0.00641)	(0.00615)	(0.00493)	(0.00627)
educ	-0.0415***	0.00375	0.0926***	0.0306***	0.0578***	-0.0378***	0.00305	0.0926***	0.0307***	0.0573***
	(0.00897)	(0.00754)	(0.00792)	(0.00946)	(0.00810)	(0.00945)	(0.00757)	(0.00800)	(0.00948)	(0.00820)
marital	-0.0384	0.00234	-0.0688**	0.0257	-0.0187	-0.0272	-0.00106	-0.0694**	0.0253	-0.0214
	(0.0320)	(0.0265)	(0.0288)	(0.0315)	(0.0280)	(0.0330)	(0.0265)	(0.0294)	(0.0314)	(0.0285)
income	-0.0341***	0.0584***	0.0668***	0.106***	0.0982***	0.0557***	0.0416***	0.0675***	0.109***	0.0862***
	(0.0108)	(0.0118)	(0.0113)	(0.0144)	(0.0122)	(0.0112)	(0.0113)	(0.0110)	(0.0138)	(0.0118)
Constant	0.440***	-0.550***	-1.164***	-1.208***	-1.252***	0.115	-0.207**	-0.965***	-1.035***	-0.920***
	(0.106)	(0.0968)	(0.0941)	(0.118)	(0.101)	(0.110)	(0.0954)	(0.0937)	(0.117)	(0.101)
Observations	12,682	12,682	12,682	12,682	12,682	12,682	12,682	12,682	12,682	12,682
R-squared	0.159	0.488	0.455	0.149	0.493	0.083	0.488	0.442	0.146	0.482

This table presents the baseline regression results employing the difference-in-difference method for panel data of 3.095 treated MSMEs and 3.704 control group MSMEs.

We estimate the following equation using regression with robust standard:

$$Y_{i,t} = \alpha + \beta_1 PBC_i + \beta_2 Post_t + \beta_3 Post_t * PBC_i + \beta_4 TechnologyAdoption_i + \beta_5 EntrepreneurAmbition_i + \beta_6 FinancialSystemInstitutional_i + \beta_7 FinancialSystemStructural_i + \beta_8 FinancialKnowledge_i + \beta_9 FinancialSelfAwareness_i + \beta_{10} SocioEconomy_i + \varepsilon_{i,t}$$

Standard errors are shown in parentheses. *, **, *** indicate significance at the 10%, 5%, and 1% level, respectively.

Table 9 Regression with Each Financial Inclusion Indicators

VARIABLES	(1) access 1	(2) access 2	(3) access 3	(4) access 4	(5) access 5	(6) usage 1	(7) usage 2	(8) usage 3	(9) usage 4	(10) quality 1	(11) quality 2
Post	0.0387***	-0.0170	0.0906***	-0.0190	0.344***	0.186***	0.0503***	0.288***	0.138***	0.284***	0.00113
	(0.0105)	(0.0201)	(0.0216)	(0.0226)	(0.0138)	(0.0212)	(0.0145)	(0.0133)	(0.0121)	(0.0254)	(0.00120)
PBC	0.888***	-0.162***	-0.925***	1.263***	0.0538**	-0.169***	0.504***	-0.162***	-0.0770***	-0.239***	-0.0232
	(0.0318)	(0.0284)	(0.0242)	(0.0193)	(0.0226)	(0.0256)	(0.0264)	(0.0214)	(0.0223)	(0.0226)	(0.0233)
PBC*post	0.0687*	0.110***	-0.122***	0.0442*	0.336***	-0.0945***	0.291***	0.275***	0.481***	0.0936***	0.0414
	(0.0367)	(0.0374)	(0.0309)	(0.0243)	(0.0298)	(0.0359)	(0.0355)	(0.0290)	(0.0314)	(0.0322)	(0.0425)
techadpt	0.00836**	-0.0242***	0.0404***	-0.0186***	0.0432***	0.000709	-0.00327	0.0223***	-0.00891**	0.0210***	-0.000860
	(0.00418)	(0.00448)	(0.00414)	(0.00348)	(0.00405)	(0.00508)	(0.00424)	(0.00400)	(0.00403)	(0.00424)	(0.000738)
entambi	-0.00593***	0.00277**	-0.00114	0.00166	-0.000660	0.00269*	0.000923	0.000997	-0.00284**	-0.000279	0.00202
	(0.00120)	(0.00138)	(0.00116)	(0.00101)	(0.00113)	(0.00156)	(0.00135)	(0.00105)	(0.00115)	(0.00114)	(0.00203)
finsysin	0.00672***	-0.00957***	0.0319***	-0.0271***	0.00423***	0.0163***	0.000421	0.00328**	0.00845***	0.00956***	-0.000339
	(0.00178)	(0.00182)	(0.00353)	(0.00218)	(0.00148)	(0.00270)	(0.00123)	(0.00157)	(0.00185)	(0.00229)	(0.000327)
finsysstrk	0.0339***	-0.0265***	0.0117**	-0.0190***	-0.0688***	0.0321***	0.00292	-0.0763***	-0.0833***	0.000669	-0.00324
	(0.00499)	(0.00528)	(0.00542)	(0.00369)	(0.00485)	(0.00564)	(0.00487)	(0.00507)	(0.00539)	(0.00469)	(0.00318)
litknow	-0.0178***	-0.00183	0.0579***	0.00462	0.0564***	0.0164***	0.0173***	0.0632***	0.150***	0.0558***	0.00871
	(0.00450)	(0.00430)	(0.00420)	(0.00359)	(0.00387)	(0.00486)	(0.00485)	(0.00391)	(0.00423)	(0.00470)	(0.00868)
litself	0.00389*	-0.00863***	0.00751***	-0.00692***	0.0785***	0.0308***	0.0342***	0.107***	0.0743***	0.0124***	-0.00462
	(0.00228)	(0.00280)	(0.00251)	(0.00157)	(0.00420)	(0.00516)	(0.00362)	(0.00507)	(0.00475)	(0.00219)	(0.00461)
Constant	-0.378***	0.297***	-0.708***	-0.255***	-0.611***	-0.788***	-0.586***	-0.353***	0.227***	-0.747***	-0.158
	(0.0795)	(0.0894)	(0.0814)	(0.0676)	(0.0729)	(0.103)	(0.0916)	(0.0699)	(0.0773)	(0.0782)	(0.152)
Observations	12,682	12,682	12,682	12,682	12,682	12,682	12,682	12,682	12,682	12,682	12,682
R-squared	0.199	0.018	0.228	0.407	0.409	0.055	0.196	0.444	0.377	0.090	0.001

This table presents the baseline regression results employing the difference-in-difference method for panel data of 3.095 treated MSMEs and 3.704 control group MSMEs.

We estimate the following equation using regression with robust standard:

$$Y_{i,t} = \alpha + \beta_1 PBC_i + \beta_2 Post_t + \beta_3 Post_t * PBC_i + \beta_4 TechnologyAdoption_i + \beta_5 EntrepreneurAmbition_i + \beta_6 FinancialSystemInstitutional_i + \beta_7 FinancialSystemStructural_i$$
$$+ \beta_8 FinancialKnowledge_i + \beta_9 FinancialSelfAwareness_i + \beta_{10} SocioEconomy_i + \varepsilon_{i,t}$$

Standard errors are shown in parentheses. *, **, *** indicate significance at the 10%, 5%, and 1% level, respectively.

Table 9 Regression with Each Financial Inclusion Indicators (Cont.)

VARIABLES	(12) quality 3	(13) quality 4	(14) quality 5	(15) quality 6	(16) quality 7	(17) impact 1	(18) impact 2	(19) impact 3	(20) impact 4	(21) impact 5
Post	0.00941	0.0459**	-0.0213	0.133***	0.325***	0.119***	0.164***	0.122***	0.117***	0.00592
	(0.0305)	(0.0183)	(0.0176)	(0.0135)	(0.0131)	(0.0119)	(0.0208)	(0.0215)	(0.0185)	(0.00562)
PBC	0.0562	0.0670**	-0.0262	0.194***	0.213***	0.749***	-0.220***	-0.157***	0.101***	0.131***
	(0.0380)	(0.0287)	(0.0213)	(0.0256)	(0.0203)	(0.0266)	(0.0201)	(0.0265)	(0.0263)	(0.0382)
PBC*post	-0.00943	-0.0981***	0.1000***	-0.104***	0.0805***	-0.101***	0.577***	-0.0427	0.0289	-0.122***
	(0.0305)	(0.0361)	(0.0261)	(0.0332)	(0.0270)	(0.0364)	(0.0350)	(0.0359)	(0.0367)	(0.0414)
techadpt	0.000646	0.0115**	-0.00369	0.0388***	0.0367***	0.00174	-8.02e-06	0.00257	0.00355	-0.00285
	(0.00206)	(0.00455)	(0.00335)	(0.00471)	(0.00377)	(0.00418)	(0.00437)	(0.00530)	(0.00468)	(0.00372)
entambi	-0.00244	0.00416***	0.00237*	-8.36e-05	0.000446	0.00322***	0.000155	0.00296**	-9.71e-05	-0.000966
	(0.00155)	(0.00152)	(0.00131)	(0.00127)	(0.000973)	(0.00120)	(0.00126)	(0.00131)	(0.00139)	(0.00228)
finsysin	0.000756*	0.0440***	-0.134***	0.00551***	0.00227	0.00218	0.01000***	0.0120***	0.00819***	0.0358***
	(0.000457)	(0.00350)	(0.00544)	(0.00170)	(0.00139)	(0.00172)	(0.00210)	(0.00252)	(0.00191)	(0.00863)
finsysstrk	-0.00424	0.0733***	-0.00144	-0.0558***	-0.0741***	0.00623	0.0112**	0.0203***	-0.00145	-0.00870
	(0.00508)	(0.00674)	(0.00579)	(0.00545)	(0.00466)	(0.00519)	(0.00499)	(0.00563)	(0.00526)	(0.00725)
litknow	0.00569	0.00383	0.00582*	0.0307***	0.0560***	0.0269***	0.0437***	0.0157***	0.0238***	0.0126
	(0.00521)	(0.00487)	(0.00346)	(0.00423)	(0.00368)	(0.00392)	(0.00475)	(0.00504)	(0.00477)	(0.00935)
litself	0.00183**	0.0204***	0.00111	0.0854***	0.102***	0.00511*	0.0122***	0.0291***	0.0371***	-0.000490
	(0.000924)	(0.00350)	(0.00165)	(0.00495)	(0.00443)	(0.00303)	(0.00297)	(0.00488)	(0.00370)	(0.00152)
Constant	0.00569	0.00334	-0.00287	0.0584***	0.0499***	-0.00969	-0.00552	0.0361***	0.0348***	-0.00582
	(0.00437)	(0.00744)	(0.00569)	(0.00677)	(0.00559)	(0.00721)	(0.00683)	(0.00858)	(0.00758)	(0.00421)
Observations	12,682	12,682	12,682	12,682	12,682	12,682	12,682	12,682	12,682	12,682
R-squared	0.002	0.107	0.463	0.296	0.508	0.196	0.096	0.045	0.080	0.036

This table presents the baseline regression results employing the difference-in-difference method for panel data of 3.095 treated MSMEs and 3.704 control group MSMEs.

We estimate the following equation using regression with robust standard:

$$Y_{i,t} = \alpha + \beta_1 PBC_i + \beta_2 Post_t + \beta_3 Post_t * PBC_i + \beta_4 TechnologyAdoption_i + \beta_5 EntrepreneurAmbition_i +$$
$$\beta_6 FinancialSystemInstitutional_i$$
$$+ \beta_7 FinancialSystemStructural_i + \beta_8 FinancialKnowledge_i + \beta_9 FinancialSelfAwareness_i + \beta_{10} SocioEconomy_i + \varepsilon_{i,t}$$

Standard errors are shown in parentheses. *, **, *** indicate significance at the 10%, 5%, and 1% level, respectively.

5.   Conclusion and Policy Recommendation

This research empirically investigates the impact of the PBC program on responsible and sustainable financial inclusion level of MSMEs. We collect 6,341 respondents consist of 2,646 MSMEs with PBC program as treatment group and 3,695 MSMEs without PBC Program as control group. Our results reveal that financial inclusion index of MSMEs with PBC program is higher than of its control group. MSMEs with PBC program is more active in using the access to formal or semiformal financial products and services, higher migrate level from nonformal financial products and services, and higher frequency of transactions through formal financial products and services than MSMEs without.

We also find that MSMEs with PBC program gain a higher understanding level of their needs for financial products and services. Thus, MSMEs with PBC program have capabilities to take advantage of any formal financial products and services offered including benefit of financial diversification, not only around savings and financing products but also in investment products, insurance, pension funds, and other additional products. Consequently, this higher level of inclusiveness in the financial system impact positively to their business development and encourage them to use more diverse financial products and services related to the business compare to MSMEs without PBC program.

On the other hand, our findings indicate PBC program cause a migration from high interest loan users to low interest loan users. This is a drawback for MSMEs business development since PBC program loan credit plafond is up to amounted of IDR500 million (approx. USD 4,500). Our results shows that reduce in diversity of financing products and services range (access3, usage2, and impact1) owned by MSMEs with PBC program compare to those owned by its control group.

Our deeper analysis also reveals that the application of digital technology, which is measured by access, the use, and frequency of digital finance usage, can accelerate financial inclusion in MSME sector. The impact of PBC program is significantly positive to access5 (access to digital finance), usage3 (frequency of use in digital channel), and quality7 (frequency of use digital finance). This findings is consistent with PCA estimation results used for measuring index of financial inclusion, which reveals that the largest weight of Principal Component for Access, Usage, and Quality is from access, ownerships, and frequency of digital channel usage.

This research proves that the positive impact of PBC program on financial inclusion is not only access to formal finance but also utilization of those access by MSMEs which will bring welfare. The level of responsible and sustainable financial inclusion is reflected in the frequency and diversity of financial product and services usage—not only savings, but also loan, financing, insurance, pension funds, investments, and other products—by MSMEs. Eventually, those will encourage business development and ultimately increase the quality of life and sustainable economic development.

These findings carry substantial contributions to policy implication for PBC program and financial inclusion. We find strong evidence that PBC program cause migration of high-cost or commercial financing to subsidized financing (PBC program loan) indicate that the PBC program is mostly enjoyed by the underbanked, not its target: the unbanked communities. Therefore, to expand PBC program outreach for unbanked communities, it is necessary to add source of funds from central government and municipal. Currently, source of funds for the PBC program loan is banks'third-party funds thus it limit the outreach of the program. Central government and municipal funds placement in bank will expand the program outreach. This action may encourage banking industry to prioritize MSMEs sector particularly in finding the unbanked in their business strategy and target achievement. Thus, the program will successfully achieve its target, the unbanked. Furthermore, expansion of outreach and availability of PBC program may create more opportunities for the unbanked to enjoy affordable loan. This will, eventually, drive banks to decrease the commercial interest rate.

Furthermore, we find strong evidence that digital technology have a substantial impact on encouraging entrepreneurship and accelerating financial inclusion. Hence, it is necessary to consider the digitization of MSMEs from downstream to upstream, starting from value chain, the distribution process from suppliers (raw materials) to consumers, daily operational, and capital needs (digitalized financial transaction processes). In short, MSMEs needs to be ready for digitally onboarding, thus technical assistance is important to scale up MSMEs' capabilities and compatibility. Moreover, integration of PBC program and digital technology may improve loan features to be matched to MSMEs' needs.

Authorship contribution statement

Rosnita Wirdiyanti: Conceptualization, Formal Analysis, Writing

Saut Simanjuntak: Conceptualization, Supervision, Formal Analysis

Milan Malinda: Methodology, Formal Analysis, Software, Writing

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Appendix 1. Robustness Check Tables

Table A.1

VARIABLES	(1) access	(2) access	(3) access	(4) access	(5) access	(6) access	(7) access	(8) access	(9) access	(10) access
PBC*post	0.621***	0.666***	0.651***	0.643***	0.650***	0.633***	0.639***	0.642***	0.642***	0.622***
	(0.0235)	(0.0241)	(0.0242)	(0.0233)	(0.0233)	(0.0240)	(0.0241)	(0.0242)	(0.0242)	(0.0243)
techadpt		-0.0561***	-0.0614***	-0.0611***	-0.0606***	-0.0650***	-0.0562***	-0.0517***	-0.0518***	-0.0544***
		(0.00489)	(0.00499)	(0.00491)	(0.00491)	(0.00523)	(0.00556)	(0.00574)	(0.00574)	(0.00578)
entambi			0.00771***	0.00903***	0.00930***	0.00867***	0.00920***	0.00983***	0.00982***	0.00947***
			(0.00163)	(0.00160)	(0.00160)	(0.00162)	(0.00162)	(0.00164)	(0.00164)	(0.00164)
finsysin				-0.0422***	-0.0413***	-0.0410***	-0.0406***	-0.0408***	-0.0408***	-0.0401***
				(0.00325)	(0.00327)	(0.00327)	(0.00326)	(0.00326)	(0.00327)	(0.00329)
finsysstrk					-0.0158***	-0.0217***	-0.0310***	-0.0317***	-0.0316***	-0.0317***
					(0.00587)	(0.00638)	(0.00666)	(0.00666)	(0.00665)	(0.00664)
litknow						0.0144***	0.0209***	0.0232***	0.0233***	0.0187***
						(0.00534)	(0.00551)	(0.00553)	(0.00553)	(0.00556)
litself							-0.0142***	-0.0128***	-0.0128***	-0.0144***
							(0.00319)	(0.00321)	(0.00321)	(0.00322)
educ								-0.0313***	-0.0314***	-0.0378***
								(0.00935)	(0.00935)	(0.00945)
marital									-0.0221	-0.0272
									(0.0329)	(0.0330)
income										0.0557***
										(0.0112)
Constant	-0.130***	0.344***	-0.0357	-0.0658	0.0317	0.112	0.0857	0.117	0.137	0.115
	(0.0133)	(0.0413)	(0.0912)	(0.0899)	(0.0984)	(0.105)	(0.104)	(0.104)	(0.110)	(0.110)
Observations	12,682	12,682	12,682	12,682	12,682	12,682	12,682	12,682	12,682	12,682
R-squared	0.038	0.049	0.051	0.078	0.078	0.079	0.081	0.081	0.081	0.083

Standard errors are shown in parentheses. *, **, *** indicate significance at the 10%, 5%, and 1% level, respectively.

Table A.2

VARIABLES	(1) usage	(2) usage	(3) usage	(4) usage	(5) usage	(6) usage	(7) usage	(8) usage	(9) usage	(10) usage
PBC*post	1.215***	1.083***	1.060***	1.061***	1.106***	0.867***	0.806***	0.805***	0.805***	0.790***
	(0.0406)	(0.0377)	(0.0379)	(0.0379)	(0.0379)	(0.0353)	(0.0302)	(0.0301)	(0.0302)	(0.0304)
techadpt		0.165***	0.157***	0.157***	0.160***	0.0965***	0.0118**	0.0106**	0.0106**	0.00867*
		(0.00533)	(0.00552)	(0.00552)	(0.00547)	(0.00523)	(0.00494)	(0.00504)	(0.00503)	(0.00501)
entambi			0.0116***	0.0115***	0.0132***	0.00421***	-0.000913	-0.00107	-0.00107	-0.00133
			(0.00178)	(0.00178)	(0.00174)	(0.00162)	(0.00141)	(0.00142)	(0.00142)	(0.00142)
finsysin				0.00421*	0.00982***	0.0144***	0.0107***	0.0107***	0.0107***	0.0112***
				(0.00236)	(0.00238)	(0.00222)	(0.00220)	(0.00220)	(0.00220)	(0.00220)
finsysstrk					-0.101***	-0.187***	-0.0975***	-0.0974***	-0.0974***	-0.0974***
					(0.00688)	(0.00786)	(0.00669)	(0.00669)	(0.00669)	(0.00668)
litknow						0.207***	0.144***	0.143***	0.143***	0.140***
						(0.00543)	(0.00497)	(0.00497)	(0.00497)	(0.00502)
litself							0.137***	0.136***	0.136***	0.135***
							(0.00631)	(0.00638)	(0.00638)	(0.00641)
educ								0.00783	0.00784	0.00305
								(0.00750)	(0.00751)	(0.00757)
marital									0.00279	-0.00106
									(0.0265)	(0.0265)
income										0.0416***
										(0.0113)
Constant	-0.254***	-1.648***	-2.222***	-2.219***	-1.594***	-0.436***	-0.180**	-0.188**	-0.190**	-0.207**
	(0.00956)	(0.0429)	(0.0957)	(0.0957)	(0.101)	(0.105)	(0.0914)	(0.0915)	(0.0952)	(0.0954)
Observations	12,682	12,682	12,682	12,682	12,682	12,682	12,682	12,682	12,682	12,682
R-squared	0.133	0.219	0.222	0.222	0.246	0.348	0.487	0.487	0.487	0.488

Standard errors are shown in parentheses. *, **, *** indicate significance at the 10%, 5%, and 1% level, respectively.

Table A.3

VARIABLES	(1) quality	(2) quality	(3) quality	(4) quality	(5) quality	(6) quality	(7) quality	(8) quality	(9) quality	(10) quality
PBC*post	0.825***	0.653***	0.626***	0.628***	0.674***	0.498***	0.437***	0.428***	0.429***	0.404***
	(0.0350)	(0.0320)	(0.0322)	(0.0321)	(0.0317)	(0.0307)	(0.0262)	(0.0260)	(0.0260)	(0.0263)
techadpt		0.215***	0.206***	0.206***	0.209***	0.162***	0.0766***	0.0618***	0.0615***	0.0583***
		(0.00561)	(0.00576)	(0.00566)	(0.00572)	(0.00572)	(0.00548)	(0.00556)	(0.00555)	(0.00556)
entambi			0.0136***	0.0133***	0.0151***	0.00841***	0.00324**	0.00123	0.00121	0.000778
			(0.00170)	(0.00170)	(0.00167)	(0.00160)	(0.00141)	(0.00141)	(0.00141)	(0.00141)
finsysin				0.00936***	0.0152***	0.0186***	0.0148***	0.0153***	0.0153***	0.0162***
				(0.00225)	(0.00229)	(0.00224)	(0.00210)	(0.00208)	(0.00208)	(0.00208)
finsysstrk					-0.105***	-0.168***	-0.0776***	-0.0754***	-0.0752***	-0.0753***
					(0.00670)	(0.00785)	(0.00663)	(0.00657)	(0.00657)	(0.00656)
litknow						0.152***	0.0887***	0.0814***	0.0816***	0.0761***
						(0.00595)	(0.00519)	(0.00517)	(0.00517)	(0.00523)
litself							0.138***	0.134***	0.133***	0.131***
							(0.00616)	(0.00613)	(0.00613)	(0.00615)
educ								0.101***	0.100***	0.0926***
								(0.00791)	(0.00791)	(0.00800)
marital									-0.0632**	-0.0694**
									(0.0294)	(0.0294)
income										0.0675***
										(0.0110)
Constant	-0.172***	-1.989***	-2.658***	-2.651***	-2.006***	-1.153***	-0.895***	-0.996***	-0.938***	-0.965***
	(0.0119)	(0.0438)	(0.0927)	(0.0927)	(0.0973)	(0.105)	(0.0914)	(0.0903)	(0.0937)	(0.0937)
Observations	12,682	12,682	12,682	12,682	12,682	12,682	12,682	12,682	12,682	12,682
R-squared	0.061	0.206	0.210	0.211	0.236	0.291	0.433	0.440	0.440	0.442

Standard errors are shown in parentheses. *, **, *** indicate significance at the 10%, 5%, and 1% level, respectively.

Table A.4

VARIABLES	(1) impact	(2) impact	(3) impact	(4) impact	(5) impact	(6) impact	(7) impact	(8) impact	(9) impact	(10) impact
PBC*post	0.802***	0.737***	0.715***	0.719***	0.709***	0.603***	0.581***	0.577***	0.577***	0.537***
	(0.0316)	(0.0312)	(0.0314)	(0.0313)	(0.0316)	(0.0318)	(0.0314)	(0.0314)	(0.0314)	(0.0318)
techadpt		0.0820***	0.0744***	0.0743***	0.0737***	0.0454***	0.0150***	0.00863	0.00880	0.00363
		(0.00502)	(0.00508)	(0.00507)	(0.00509)	(0.00529)	(0.00568)	(0.00592)	(0.00592)	(0.00592)
entambi			0.0110***	0.0105***	0.0101***	0.00609***	0.00425**	0.00338**	0.00340**	0.00270
			(0.00173)	(0.00173)	(0.00172)	(0.00171)	(0.00168)	(0.00169)	(0.00169)	(0.00168)
finsysin				0.0176***	0.0165***	0.0185***	0.0172***	0.0174***	0.0173***	0.0186***
				(0.00290)	(0.00288)	(0.00289)	(0.00287)	(0.00287)	(0.00287)	(0.00286)
finsysstrk					0.0214***	-0.0166**	0.0155**	0.0164**	0.0163**	0.0162**
					(0.00588)	(0.00672)	(0.00683)	(0.00681)	(0.00680)	(0.00677)
litknow						0.0920***	0.0693***	0.0662***	0.0660***	0.0571***
						(0.00613)	(0.00603)	(0.00600)	(0.00600)	(0.00600)
litself							0.0491***	0.0472***	0.0473***	0.0442***
							(0.00497)	(0.00497)	(0.00497)	(0.00493)
educ								0.0432***	0.0433***	0.0307***
								(0.00935)	(0.00935)	(0.00948)
marital									0.0355	0.0253
									(0.0316)	(0.0314)
income										0.109***
										(0.0138)
Constant	-0.167***	-0.860***	-1.403***	-1.390***	-1.522***	-1.007***	-0.915***	-0.958***	-0.991***	-1.035***
	(0.0117)	(0.0412)	(0.0963)	(0.0961)	(0.105)	(0.112)	(0.111)	(0.110)	(0.117)	(0.117)
Observations	12,682	12,682	12,682	12,682	12,682	12,682	12,682	12,682	12,682	12,682
R-squared	0.064	0.087	0.090	0.095	0.096	0.118	0.138	0.139	0.139	0.146

Standard errors are shown in parentheses. *, **, *** indicate significance at the 10%, 5%, and 1% level, respectively.

Table A.5

VARIABLES	(1) FI_index	(2) FI_index	(3) FI_index	(4) FI_index	(5) FI_index	(6) FI_index	(7) FI_index	(8) FI_index	(9) FI_index	(10) FI_index
PBC*post	1.189***	1.022***	0.993***	0.996***	1.034***	0.805***	0.741***	0.735***	0.735***	0.704***
	(0.0389)	(0.0355)	(0.0358)	(0.0357)	(0.0357)	(0.0336)	(0.0286)	(0.0285)	(0.0285)	(0.0286)
techadpt		0.208***	0.198***	0.197***	0.200***	0.139***	0.0495***	0.0396***	0.0396***	0.0355***
		(0.00556)	(0.00573)	(0.00572)	(0.00569)	(0.00555)	(0.00531)	(0.00542)	(0.00541)	(0.00538)
entambi			0.0151***	0.0146***	0.0161***	0.00744***	0.00202	0.000666	0.000661	0.000115
			(0.00185)	(0.00185)	(0.00182)	(0.00170)	(0.00148)	(0.00149)	(0.00149)	(0.00149)
finsysin				0.0153***	0.0201***	0.0245***	0.0205***	0.0208***	0.0208***	0.0219***
				(0.00248)	(0.00255)	(0.00245)	(0.00234)	(0.00234)	(0.00234)	(0.00233)
finsysstrk					-0.0859***	-0.167***	-0.0729***	-0.0714***	-0.0714***	-0.0715***
					(0.00687)	(0.00795)	(0.00667)	(0.00664)	(0.00663)	(0.00662)
litknow						0.198***	0.131***	0.126***	0.126***	0.119***
						(0.00600)	(0.00526)	(0.00522)	(0.00522)	(0.00524)
litself							0.145***	0.142***	0.142***	0.139***
							(0.00625)	(0.00626)	(0.00627)	(0.00627)
educ								0.0673***	0.0673***	0.0573***
								(0.00812)	(0.00812)	(0.00820)
marital									-0.0134	-0.0214
									(0.0285)	(0.0285)
income										0.0862***
										(0.0118)
Constant	-0.248***	-2.004***	-2.747***	-2.736***	-2.206***	-1.100***	-0.830***	-0.897***	-0.885***	-0.920***
	(0.0116)	(0.0444)	(0.0997)	(0.0996)	(0.106)	(0.111)	(0.0970)	(0.0963)	(0.101)	(0.101)
Observations	12,682	12,682	12,682	12,682	12,682	12,682	12,682	12,682	12,682	12,682
R-squared	0.113	0.233	0.238	0.241	0.256	0.338	0.476	0.479	0.479	0.482

Standard errors are shown in parentheses. *, **, *** indicate significance at the 10%, 5%, and 1% level, respectively.

Appendix 2. Descriptive Statistics of Financial Inclusion Indicators

Table A.6

	Full Sample					Treatment Group = PBC MSMEs					Control Group = Non PBC MSMEs				
	Obs	Mean	Std. Dev.	min	max	Obs	Mean	Std. Dev.	min	max	Obs	Mean	Std. Dev.	min	max
access 1	12682	20.708	28.236	0	100	5292	34.705	36.991	0	100	7390	10.685	12.15	0	100
access 2	12682	-30.2	24.32	-100	0	5292	-32.343	27.954	-100	0	7390	-28.666	21.211	-100	0
access 3	12682	7.362	12.124	0	100	5292	2.695	10.306	0	100	7390	10.704	12.224	0	100
access 4	12682	-17.299	21.741	-100	0	5292	-1.427	8.494	-100	0	7390	-28.666	21.211	-100	0
access 5	12682	11.771	16.219	0	100	5292	17.147	18.505	0	100	7390	7.922	13.066	0	100
usage 1	12682	1.263	5.692	0	100	5292	1.205	6.117	0	100	7390	1.305	5.367	0	100
usage 2	12682	3.559	8.101	0	100	5292	7.309	9.932	0	100	7390	.873	4.97	0	100
usage 3	12682	7.287	13.23	0	100	5292	10.15	15.487	0	100	7390	5.237	10.888	0	100
usage 4	12682	6.031	12.022	0	100	5292	10.083	15.869	0	100	7390	3.13	6.894	0	85.714
quality 1	12682	13.745	16.636	0	100	5292	15.918	17.363	0	100	7390	12.189	15.916	0	100
quality 2	12682	30.016	34.091	0	100	5292	38.99	35.7	0	100	7390	23.589	31.352	0	100
quality 3	12682	-33.454	39.216	-100	0	5292	-43.361	36.931	-100	0	7390	-26.36	39.269	-100	0
quality 4	12682	5.438	21.627	0	100	5292	7.87	25.796	0	100	7390	3.697	17.86	0	100
quality 5	12682	-2.366	13.602	-100	0	5292	-1.838	11.207	-100	0	7390	-2.744	15.075	-100	0
quality 6	12682	10.099	18.665	0	100	5292	14.636	22.36	0	100	7390	6.85	14.648	0	100
quality 7	12682	11.896	15.715	0	100	5292	17.961	17.873	0	100	7390	7.553	12.244	0	100
impact 1	12682	6.746	14.633	0	100	5292	14.04	18.502	0	100	7390	1.523	7.547	0	100
impact 2	12682	3.487	10.72	0	100	5292	4.913	11.809	0	100	7390	2.465	9.74	0	100
impact 3	12682	1.714	8.843	0	100	5292	1.801	9.442	0	100	7390	1.651	8.388	0	100
impact 4	12682	5.672	15.766	0	100	5292	8.56	18.738	0	100	7390	3.604	12.841	0	100
impact 5	12682	.067	1.813	0	100	5292	.15	2.777	0	100	7390	.008	.329	0	20
techadpt	12682	8.609	2.417	5	19	5292	9.243	2.341	5	18	7390	8.156	2.368	6	19
entambi	12682	55.602	7.044	20	75	5292	57.579	7.005	20	75	7390	54.186	6.724	25	74

	Obs	Mean	Std. Dev.	min	max	Obs	Mean	Std. Dev.	min	max	Obs	Mean	Std. Dev.	min	max
finsysin	12682	1.055	5.067	0	41	5292	.971	4.904	0	40	7390	1.115	5.179	0	41
finsysstrk	12682	7.51	2.084	0	20	5292	7.907	2.293	0	19	7390	7.227	1.87	0	20

	Full Sample					Treatment Group = PBC MSMEs					Control Group = Non PBC MSMEs				
	Obs	Mean	Std. Dev.	min	max	Obs	Mean	Std. Dev.	min	max	Obs	Mean	Std. Dev.	min	max
litknow	12682	2.791	2.526	0	10	5292	4.153	1.898	0	10	7390	1.816	2.469	0	10
litself	12682	2.058	4.412	0	58	5292	3.243	5.545	0	58	7390	1.209	3.109	0	43

Appendix 3. Correlation Matrix Pre Treatment

Tabel A.7

Variables	(1) access1	(2) access2	(3) access3	(4) access4	(5) access5	(6) usage1	(7) usage2	(8) usage3	(9) usage4	(10) quality1	(11) quality2
access1	1										
access2	-0.289***	1									
access3	0.182***	-0.0948***	1								
access4	0.186***	0.463***	-0.367***	1							
access5	0.0703***	-0.0665***	0.112***	0.118***	1						
usage1	0.0492***	-0.0338**	0.145***	-0.0487***	0.0355**	1					
usage2	0.162***	-0.106***	-0.0489***	0.200***	0.0270*	0.154***	1				
usage3	0.0139	-0.0456***	0.108***	0.0697***	0.779***	0.0412**	0.0169	1			
usage4	-0.0365**	-0.00994	-0.0562***	0.157***	0.500***	0.00537	0.0361**	0.657***	1		
quality1	0.203***	-0.119***	0.337***	-0.0417***	0.174***	0.245***	0.255***	0.165***	0.00688	1	
quality2	0.335***	0.113***	0.399***	0.179***	0.141***	0.0714***	0.137***	0.139***	0.0287*	0.342***	1
quality3	-0.0337**	0.285***	0.180***	-0.0807***	-0.0531***	0.0141	-0.0575***	-0.0309*	-0.0932***	0.0765***	0.251***
quality4	0.101***	-0.0362**	0.348***	0.00699	0.0332**	0.222***	0.141***	0.0432***	0.0230	0.155***	0.146***
quality5	-0.0339**	0.0349**	-0.0961***	0.123***	-0.00625	-0.0353**	-0.00268	0.00241	0.00467	-0.0258*	-0.0226
quality6	0.0448***	-0.0662***	0.0395**	0.168***	0.855***	0.0162	0.0619***	0.650***	0.525***	0.137***	0.112***
quality7	0.0253*	-0.0651***	0.0830***	0.205***	0.817***	0.0546***	0.149***	0.809***	0.554***	0.230***	0.237***

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impact1	-0.0401**	-0.0230	-0.108***	0.271***	0.147***	0.198***	0.200***	0.123***	0.147***	0.108***	0.0632***
impact2	0.0656***	-0.0624***	0.0682***	-0.0738***	-0.00990	0.134***	0.193***	-0.000912	-0.0281*	0.308***	0.0191
impact3	0.0415***	-0.0260*	0.141***	-0.0324**	0.0292*	0.836***	0.129***	0.0418***	-0.00170	0.229***	0.0774***
impact4	0.0929***	-0.123***	0.0690***	0.0411**	0.0607***	0.231***	0.503***	0.0586***	0.0304*	0.427***	0.0885***
impact5	0.0773***	-0.0419***	0.116***	-0.0766***	-0.00527	0.0562***	0.0116	0.00137	0.0402**	0.0253*	0.0254*
N	6341										

Tabel A.7 (Cont.)

Variables	(12) quality3	(13) quality4	(14) quality5	(15) quality6	(16) quality7	(17) impact1	(18) impact2	(19) impact3	(20) impact4	(21) impact5
access1										
access2										
access3										
access4										
access5										
usage1										
usage2										
usage3										
usage4										
quality1										
quality2										
quality3	1									
quality4	0.0110	1								
quality5	-0.00662	-0.0916***	1							
quality6	-0.0841***	0.0516***	-0.0181	1						
quality7	-0.0696***	0.0854***	0.00461	0.709***	1					

impact1	-0.125***	0.0938***	0.0202	0.181***	0.262***	1				
impact2	0.0336**	0.0629***	-0.0234	-0.0246	-0.0255*	0.00820	1			
impact3	0.00503	0.208***	-0.0314*	0.0177	0.0583***	0.122***	0.0750***	1		
impact4	-0.0268*	0.140***	-0.0206	0.0609***	0.127***	0.138***	0.452***	0.279***	1	
impact5	-0.0127	0.0558***	-0.196***	0.00316	0.00215	0.0275*	0.0105	0.0360**	0.0574***	1
N	6341									

Appendix 4. Correlation Matrix Post Treatment

Tabel A.8

Variables	(1) access1	(2) access2	(3) access3	(4) access4	(5) access5	(6) usage1	(7) usage2	(8) usage3	(9) usage4	(10) quality1	(11) quality2
access1	1										
access2	-0.310***	1									
access3	0.107***	-0.0788***	1								
access4	0.222***	0.471***	-0.418***	1							
access5	0.170***	-0.0636***	0.133***	0.146***	1						
usage1	0.0470***	-0.0227	0.167***	-0.0771***	0.152***	1					
usage2	0.159***	-0.0163	-0.142***	0.277***	0.303***	0.0542***	1				
usage3	0.0608***	-0.0407**	0.144***	0.0871***	0.820***	0.138***	0.235***	1			
usage4	0.0442***	0.00490	-0.0328**	0.228***	0.604***	0.110***	0.303***	0.707***	1		
quality1	0.175***	-0.0805***	0.269***	-0.0104	0.351***	0.268***	0.227***	0.305***	0.226***	1	
quality2	0.303***	0.140***	0.273***	0.256***	0.310***	0.0445***	0.153***	0.251***	0.174***	0.284***	1
quality3	-0.0735***	0.325***	0.158***	-0.0276*	-0.00231	0.0386**	-0.0622***	0.00852	-0.0509***	0.0438***	0.196***
quality4	0.0620***	-0.00395	0.321***	-0.0110	0.0930***	0.259***	0.0545***	0.0895***	0.0996***	0.141***	0.0705***
quality5	0.0112	0.00306	-0.0745***	0.113***	0.0290*	-0.0598***	0.0348**	0.0352**	0.0224	-0.0110	0.0251*
quality6	0.177***	-0.0719***	0.169***	0.0136	0.670***	0.117***	0.107***	0.581***	0.298***	0.283***	0.206***

quality7	0.0955***	-0.0467***	0.130***	0.139***	0.888***	0.128***	0.285***	0.877***	0.678***	0.331***	0.292***
impact1	0.0194	-0.0311*	-0.0685***	0.203***	0.187***	0.349***	0.188***	0.161***	0.191***	0.185***	0.153***
impact2	0.0272*	-0.0639***	0.0275*	0.0671***	0.224***	0.177***	0.415***	0.181***	0.221***	0.318***	0.114***
impact3	0.0498***	-0.0138	0.143***	-0.0428***	0.148***	0.831***	0.0608***	0.141***	0.118***	0.232***	0.0524***
impact4	0.0859***	-0.0501***	0.0872***	0.0420***	0.279***	0.271***	0.322***	0.240***	0.221***	0.446***	0.109***
impact5	0.00816	-0.0159	0.232***	-0.134***	-0.0113	0.0280*	0.00522	-0.0108	-0.00569	0.00709	0.0122
N	6341										

Tabel A.8 (Cont.)

Variables	(12) quality3	(13) quality4	(14) quality5	(15) quality6	(16) quality7	(17) impact1	(18) impact2	(19) impact3	(20) impact4	(21) impact5
access1										
access2										
access3										
access4										
access5										
usage1										
usage2										
usage3										
usage4										
quality1										
quality2										
quality3	1									
quality4	0.00757	1								
quality5	-0.0194	-0.0704***	1							
quality6	0.0194	0.0651***	0.0140	1						

quality7	0.00586	0.0965***	0.0351**	0.608***	1				
impact1	-0.0566***	0.145***	0.00835	0.0546***	0.200***	1			
impact2	-0.0131	0.110***	-0.0122	0.0463***	0.198***	0.238***	1		
impact3	0.0221	0.207***	-0.0415***	0.117***	0.137***	0.191***	0.118***	1	
impact4	-0.00161	0.124***	-0.00443	0.191***	0.252***	0.162***	0.374***	0.308***	1
impact5	-0.0119	0.122***	-0.124***	0.00427	-0.0101	0.0270*	0.00792	0.0131	-0.00111	1
N	6341								