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Microcredit Effectiveness and Micro-Small Business Development: Lesson from Indonesia

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Abstract

This paper aims to examine the effect of the government's microcredit program on micro-small enterprises (MSEs) development in terms of turnover, profit, and financial inclusion. Specifically, it focuses on analyzing the microcredit effectiveness in elevating the micro-small business performance. By using the Propensity Score Matching (PSM) method, it compared the microcredit borrowers and non-borrowers' performance and their financial inclusion level. It surveyed with questionnaire-based to 250 micro-small businesses as the sample. It found significant differences between the microcredit borrowers and non-ones in which the first group experienced an increasing turnover, and profit compared to the latter group. Surprisingly, both samples' performance did not affect financial inclusion. The microcredit program did not shape micro-small entrepreneurs' savings behavior as a part of financial inclusion aspects. The findings imply that government intervention through microcredit provision is essential to elevate micro-small business performance and, at the same time, providing technical assistance to improve their loan and savings management.

JEL Codes: G21, G5, I38, O17
Keywords: micro and small enterprises (MSEs), Propensity Score Matching, microfinance, microcredit, financial inclusion

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1. Introduction

Micro, small, and medium enterprises (MSMEs) are crucial for economic development in emerging economies and are one of the critical sources to provide employment opportunities and to reduce the poverty rate (Aditi & Pentana, 2018; Green, 2017). In Indonesia, MSMEs represented more than 99% of the total number of enterprises, provided 97% of employment, but only contributed by 57.08% of real GDP and responsible for 53.24% real investment (Ministry of Cooperatives and SMEs of the Republic of Indonesia, 2017). Most MSMEs are local and informal businesses that serve localized markets. Their local characteristics and low reliance on formal markets and credits made MSMEs play a key role in supporting the country's economic resilience during the 1997–1998 Asian financial crisis (Loh, 1998; Chakrabarti & Roll, 2002). MSMEs have high flexibility and respond quickly to sudden shocks (Berry et al., 2010).

However, their local and informal characteristics also barriers for MSMEs to get access to develop their businesses, including financial, business information, marketing, and human resource access (Coetzer et al., 2017; Sheng & Mendes-Da-Silva, 2014). The most binding obstacle for MSMEs is the lack of access to financing (Carbó-Valverde et al., 2009; Holton & McCann, 2017; Struwig et al., 2019). The fact is consistent with the result from the 2009 World Bank Enterprise Survey and 2018 Survey of Entrepreneurs and MSMEs in Indonesia conducted by the Asia Pacific Foundation of Canada, respectively, almost 50% and 70% of respondents cited lack of financial access as barriers to the business growth.

Thus, the Indonesian government launched a micro and small financing model named People's Business Credit or micro credit program (MCP) in 2007. Here MCP is defined as a government priority program designed to bridge MSMEs to financial institutions. The program aims to increase MSMEs' competitiveness and allow them to develop into a sustainable business with higher classes (Tham & Tambunan, 2018). Antecedent facts showed that microcredit programs had proved to be a useful tool in relieving people from poverty and had helped to enhance their participation in the economic and political processes of society (United Nations, 1995). When launching in 2007, the government set the micro-business credit limit was less than IDR 5 million (approx. USD 360). In 2013, bottom limit of MCP was upgraded to IDR 20 million (approx. USD 1400). Since its launching, the financing scheme of the MCP has evolved from a guaranteed service fee scheme in November 2007 to an interest subsidy scheme in August 2015 (Coordinating Ministry of Economic Affairs, 2019). The MCP also promotes financial inclusion in Indonesia. The Indonesia inclusion index has risen from 36.1 percent in 2014 to 48.9 percent in 2017 (Global Findex, 2017).

There are various methods to measure the success rate of the MCP (Green, 2003; Asdrubali et al., 2014; Stakhovich & Galishnikova, 2012), in which the common one is the Non-Performing Loan (NPL). Despite the fact of its low NPL rate (0.24 percent in 2018, Coordinating Ministry of Economic Affairs), the MCP carry inherent credit risk due to the following problems: (1) poor community literacy on MCP requirements; (2) poor customers' awareness to pay off the credits received; (3) the existing paradigm that the credit is a government grant; (4) highly

traditional business financial management; and (5) fluctuation of business revenue due to instability of demand and prices of the raw materials and finished goods.

Most of the prior studies on evaluations of the effectiveness of the micro-credit program focused on the performance of MSME's micro-credit recipient (Mahmud et al., 2007; Norma & Jarita, 2011; Rahman & Khan, 2013; Terano et al., 2015). On the other hand, comparative analysis of MSMEs' performance from financial literacy, job creation, and poverty alleviation perspective from micro-credit recipients and non-ones is still limited, specifically in the context of government micro-credit programs (Boocock & Shariff, 2005; Cowling & Mitchell, 2003). Therefore, the primary purpose of this study is to investigate the effectiveness of micro credit program (MCP) on MSMEs' performance in terms of turnover, and profit increases then compare it to the MSMEs' non-MCP recipients.

The paper is structured as follows. This section has introduced the background and purpose of the study. The second section discusses the literature review, hypothesis, and theoretical framework develop for this study. The third section describes the research method and data collection process. The subsequent section presents the study results, following the last section discusses the findings, conclusions, and implication of the study.

2. Literature Review

2.1 MSMEs in Indonesia

Regulation No.20/2008 on Micro, Small and Medium Enterprises (MSMEs) defines micro firms as enterprises with net assets up to IDR 50 million (approx. $3600) or annual sales revenues up to IDR 300 million (approx. $22,000). Small firms are enterprises with net assets over IDR 50 million (approx. $3600) but less than IDR 500 million (approx. $36,000) or annual sales revenues greater than IDR 300 million (approx. $22,000) but less than IDR 2.5 billion (approx. $179,000). Meanwhile, medium firms are those with net assets above IDR 500 million (approx. $36,000) but less than IDR 10 billion (approx. $716,000); or annual sales revenues over IDR 2.5 billion (approx. $179,000) but less than IDR 50 billion (approx. $3.6 million). There is no clear definition of how many employees for each firms' size in Indonesia, thus this study refers to the World Bank Enterprise Survey definition for the total headcount in each MSME class. The number of employees for each class is less than five firms are micro, from 5-19 is a small firm, and from 20-99 the firm is medium-sized.

2.2 Microcredit

There is numerous research discussing the effectiveness of microenterprise financing (Ayayi, 2012; Aitken, 2013; Gungen, 2018). Many research also show the scheme was an effective instrument of attacking poverty (Beck et al., 2008; Chibba, 2009) by providing entrepreneurship opportunities (Shastri (2009), which need government support and financially sustainable model to open access to the poor (Petersen & Rajan, 1994, Shetty, 2013), but some others are still pessimistic about the role of it (Armendáriz & Szafarz, 2011; Banerjee et al., 2015). Regardless pro and contra on the effect of microcredit, Arsyad (2008) confirmed that

excellent financial performance, business sustainability, dan credit outreach is necessary for microcredit to impact the welfare of poor positively.

Moreover, prior studies emphasized that microfinance performance and sustainability should be maintained (Chaves & Gonzales-Vega, 1996; Christen et al., 1995; Yaron et al., 1998). It relates to the theories of development stressing strong local institutional capacity prognosticate a strong association with sustainability (Snow, 1999). The facts show that the microcredit program provides sustainable development in society, especially among the recipients (Mohummed & Wencong, 2013; Rahman & Khan, 2013). Therefore, microfinance institutions should pay attention to their financial indicators such as profitability, repayment rate, self-sufficiency, outreach, and the mechanism of delivering credit to MSMEs (Dietsch & Petey, 2002). The findings also found that micro financing in Indonesia has culminated in the same way as Bangladesh did and that people in rural areas were still unaware of banking credit policies and systems (Adhikary et al., 2019).

Further, the direct impact of microcredit on its recipient is quite clear (Islam, 2012; Mohummed & Wencong, 2013), but the expected direct impact of financial development through the existence and sustainability of microcredit is inconclusive (Center for Financial Inclusion, 2008; Conroy, 2008; Stein, 2010).

Critics to the microcredit program for farmer and microenterprises, which having low repayment rate, mistarget, likely to be transitory, and lack of technical assistance made in the long run this program, in turn, increase their debt (Adam and von Pischke, 1992). Consequently, the programs were unsustainable because it was expensive, depended too heavily on outside funding, and many bad debt cause it suffered severe default problems. Even worse, a substantial portion of the subsidies passing through these programs, in the form of concessionary interest rates and lax loan recovery, were captured by people who were not poor (Christen et al., (2003).

Nasrin et al. (2017) shows that the provision of microcredit affects positively saving in the sector, supporting the institutional savings theory that posits that microcredit availability shapes the saving behavior of people. Alhought Lanzavecchia (2012) stated that the unfortunate people have little or no capacity to save, empirical evidence has shown that the poor ones have the ability and the desire to save (Rutherford, 1999; Wright, 2000; Armendariz and Morduch, 2005), willing to pay to gain savings facilities (Rutherford, 1999). They presume savings as the investment instrument for generating income, children's education fund, or improving their housing (Rutherford, 1999; Robinson, 2001; Armendariz and Morduch, 2005).

2.3 MSME and financial inclusion

Three key dimensions define financial inclusion: (i) financial products, (ii) features of financial products, and (iii) delivery channels (Snow, 2010). In MSMEs context, financial inclusion requires mechanism of delivering for MSMEs to a range of financial products beside microcredit like savings, microinsurance products, and payment facilities (remittances and money transfer). Moreover, it stresses the need for providing quality financial services at affordable prices in a convenient manner through a variety of delivery channels, including bank branches, non-bank institutions, and insurance companies (Adam, 2010).

Several studies show that access to financial services has a positive impact on economic growth (Beck et al., 2008), but findings on its positive distributional effects to the poors are inconclusive (Beck et al., 2005; Berger & Udell, 2006; Guerin, & Palier, 2004; Ghalib et al., 2012; Morduch & Haley, 2002). Beck & Demirguc-Kunt (2006) uses a cross-country analysis to show that financial access does have a positive impact on private credit (use domestic credit for private firms as % of GDP) and poverty alleviation (growth of income share of the poor). From this finding, they argue that financial development is especially beneficial to the poor. It means more significant financial development is associated with less poverty.

Moreover, Coleman (2006) indicates a different level on positive impact of the village bank program for some households (committee members and rank-and-file members) on several measures of household welfare (wealth, savings, income, productive expenses, and labor time). The study found that estimated impact in committee members is significantly larger that the impact on rank-and-file members due to different access between them (program was surveyed heavily distributed to committee members).

In contrast, Beck & De la Torre (2007) point out that the low use of financial services in MSME does not always indicate a problem of access but might indicate a problem of mismatch between demand and supply side of credit. On the demand side, potential users may have access to financial services but may decide not to use them. In this case, it would be improper to say that financial access is a problem. On the supply side, creditors may decide to reject loans to certain borrowers due to creditors' prudential policy like diversification matters, informational asymmetries mitigation, or less contract enforcement. It is debatable those situasions classified as a problem of access.

2.4 Propensity Score Matching (PSM)

The mixed results of microcredit's transformative impact on on the average borrower (Banerjee et al., 2015; Bruhn & Love, 2014) trigger a challenge to find the appropriate approaches and tools to evaluate the impact of microcredit on the individual level. There are some recent methods becoming the preferred method of evaluation among development scholars (Duflo et al., 2008). Randomized Control Trials (RCTs) is superior in evaluating microcredit effectiveness, but prohibit researchers to randomly assign the recipients to receive a microcredit loan for two main causes (Karlan & Zinman, 2010). First, the consequence of a selective take-up in which not everyone in a random treatment group would want to obtain a loan. Second, the assigned-financial institution shall ensure the microcredit-borrower's creditworthiness and thus cannot distribute loans randomly. Both of these reasons make it difficult for an RCT to evaluate the impact of microcredit on the individual level.

Hence, to overcome two issues above, recent studies on microcredit focus on specific geographic areas (villages, slums, towns), but not in others, where the outcomes are compared across areas (i.e., a treated area is compared with a nontreated one) (Attanasio et al., 2015; Augsburg et al., 2015; Banerjee et al., 2015b; Beaman et al., 2014; Angelucci et al., 2015; Crepon et al., 2015; Tarozzi et al., 2015). However, such studies can only produce the intention to treat estimates (ITT), which is the average impact of making microcredit available in an area (i.e., averaged over those who take it and whose who do not). Other studies apply the Local

Average Treatment Effect (LATE) when applying the Instrumental Variable (IV) estimator with random assignment as an instrument for taking-up.

Thus, the RCT cannot produce the estimate of the impact of microcredit on the individuals or households that actually take out the loans (i.e., the Average Treatment Effect on the Treated, or ATE). In the context of policy decision-making, a vast of possibilities of applying different parameters will be interesting for the policy makers when they are interested in evaluating the average impact of credit introduction on the area as a whole. In this case, the ITT is the appropriate estimate. On the other hand, if the policy-makers want to know the impact of credit on individual borrowers, the ATE is the appropriate estimate. In the latter estimates, the Propensity Score Matching (PSM) method which employ in this study, can serve it.

The PSM method creates a statistical comparison group of individuals without microcredit that has similar observable characteristics to the individuals with microcredit. While controlling on observables will reduce many of the significant differences between participants and nonparticipants, it cannot address the differences in intangible characteristics such as the entrepreneurial spirit or "spunk" of the borrower. It is likely that such latent factors will affect the selection of people to obtain an MFI loan and the outcomes of interest such as poverty status, which will bias the results.

Nevertheless, multiple studies that compared performance of PSM estimators relative to experimental results have argued that PSM can produce accurate estimates under certain conditions (see Heckman et al. 1997, 1998a, 1998b; Diaz & Handa, 2006). As we discuss in the next section, our data satisfies all of these conditions. Moreover, the same authors argued that the bias due to unobservables is small relative to the bias due to observables. In addition, the PSM method has been used successfully to evaluate impact of different programs in a wide variety of settings (see Ravallion, 2008 for a survey). Most importantly, we argue that the unique set-up of our study that uses two different comparison groups (i.e., comparing MFI borrowers to those without any other loans and to those with other types of loans) allows us to evaluate the magnitude of the bias due to unobservable entrepreneurial spirit. We believe that, in this setting, PSM is an appropriate method to apply in an effort to evaluate microcredit effectiveness and has an important advantage of allowing a direct comparison of borrowers to nonborrowers.

3. Research Methodology

This research examined the MSEs' MCP-recipients and non-MCP-ones in Medan City, North Sumatera. A sample of 250 MSEs, including 200 MCP recipients and 50 non-recipients, has been enrolled in this research. This research employed the Propensity Score Matching (PSM) method. Propensity Score is a conditional probability method of a given treatment that can minimize bias by adjusting the propensity score based on the same covariate between the treatment group and the control group (Rosenbaum & Rubin 1983). According to Caliendo and Kopeinig (2008), the primary PSM model would be comprised of treatment-outcomes and control-outcomes per individual. The individuals referred to in this research were MSEs. The result of the observation per individual i can be stated as follows.

$$Y_i = D_i\, Y_{1i}(1\text{-}D_i)\, Y_{0i} \quad (1)$$

In equation 1, $D_i \in \{0,1\}$ is a treatment indicator. D_i equals 1 if MSE actor i received MCP as treatment and 0 if otherwise. Y_i is the potential outcome of MSE actor i. Y_{1i} is the treatment outcome, that is, the potential outcome of MSE's MCP-recipient actor i or when $D_i = 1$. Y_{0i} is the control outcome, that is, the potential outcome of MSE's non-MCP-recipient actor i or when $D_i = 0$. The effect of the assignment of the treatment to an MSE actor is as follows:

$$\tau_i = Y_{1r} - Y_{0i} \quad (2)$$

A counterfactual problem led to improbability to observe each potential outcome on the two outcomes, treatment outcome (Y_{1i}), and control outcome (Y_{0i}), at the same time. Consequently, only one potential outcome was observable for each individual, thus disabling estimation of the effect of the treatment on an individual.

This research estimated the Average Treatment Effect on the Treated (ATET). The ATET estimated how much treatment impacted the treated on average. The ATET formula is as follow:

$$\tau ATET = [Y_{1i} - Y_{0i} |\, D_i = 1] \quad (3)$$

$$\tau ATET = E(\tau | D_i = 1) = E[Y_{1i} |\, D_i = 1] - E[Y_{0i} | D_i = 1] \quad (4)$$

$E[Y_{1i} |\, D_i = 1]$ is the outcome (turnover, profits, and savings values) observable in MSEs' MCP-recipients. $E[Y_{0i} | D_i = 1]$ is the potential outcome in the treated when it does not receive treatment, which was unobservable due to the presence of missing counterfactual.

It was deemed essential to calculate ATET to find a substitution to $E[Y_{0i} | D_i = 1]$. One possible thing to be performed was to use the potential outcome of a non-CBC-receiving individual ($E[Y_{0i} | D_i = 0]$) as the potential outcome of an individual who was supposed to receive CBC but not receiving CBC ($E[Y_{0i} | D_i = 1]$) was unobservable at the same time as when other MSEs received CBC. ATET was estimated as follows.

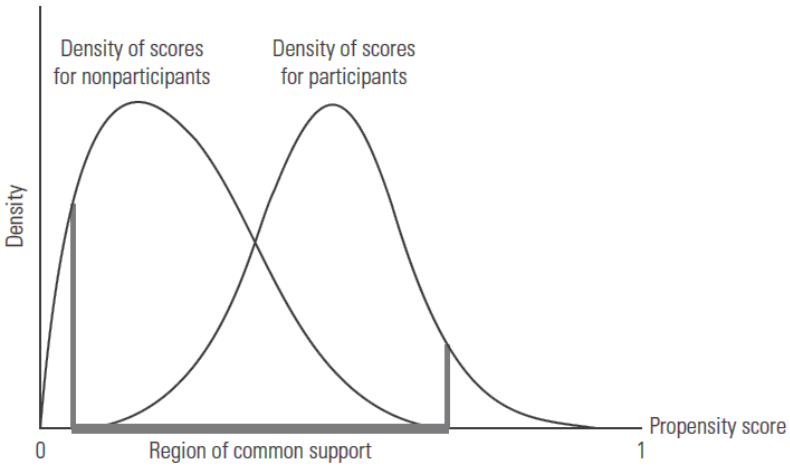
$$E[Y_{1i} |\, D_i = 1] - E[Y_{0i} | D_i = 0] = \tau ATET \quad (5)$$

Thus, ATET was estimated from the potential outcome of a CBC-receiving individual who was receiving treatment ($E[Y_{1i} | D_i = 1]$) minus the potential outcome of a non-CBC-receiving individual and who was not receiving treatment ($E[Y_{0i} | D_i = 0]$).

As stated by Caliendo and Kopeinig (2008), two assumptions must be met when conducting a test using the PSM to obtain a uniform control group. The two assumptions are the Conditional Independent Assumption (CIA) and Common Support. The model meets the CIA if the outcome to be generated by the treatment group is influenced by no other variable than the treatment variable. In other words, the outcome of the intervention is not the effect of factors external to the intervention. In this research, for example, the model would be said as meeting the CIA if the turnover, profits, and savings values of the CBC recipients were not influenced

by factors other than the CBC program itself.

The second assumption is the common support. It is a condition in which the density values of the treatment group and the control group are overlapping. Its area represents the characteristic similarity between the two groups based on the similarity of the propensity score distribution. It is as presented in Figure 2.



Source: Khandker et al. (2010)

Figure 1. The Common Support in Propensity Score Matching

The following five steps are estimate data by the PSM.

1. Estimate the Propensity Score

   According to Caliendo and Kopeinig (2008), two steps are to be followed when estimating the Propensity Score: select the model and select the variable to be incorporated into the model. This research employed the logit model. The selection of variables must refer to theories of economics and prior research.

2. Select the Matching Algorithm

   The matching algorithm consists of five elements: Nearest Neighbor (NN); Caliper and Radius; Stratification and Interval; Kernel and Local Linear; and Weighting. No method is more superior than the other. It is because of the trade-off between bias and variance that will affect the ATT value estimation (Caliendo and Kopeinig 2008, 34). This research used the Nearest Neighbor with replacement based on the data available, this research employed a small number of observations and a more significant number of participant members in comparison to the number of non-participant members, thus allowing repeated matching.

3. Check the Common Support

   The common support is one of the assumptions to be met in the PSM. Consequently, this step assumes much importance in estimation matching. It must be ensured whether overlap

occurs between the treatment group and the control group. In this way, the match between the group with intervention and one without intervention can be identified.

4. Judge the Quality of the Matching

   This step is not to be missed in the judgment of the matching quality. The tests to be conducted include the standardized bias test, the difference test before and after matching (t-test), and the test of variable combination quality within the matched sample (F-test/Hotelling's test). No difference is found (H_0 is accepted) implies that the sample used is of good matching quality. If the matching quality is poor, or if a difference is found, it is better to repeat the same step until satisfactory matching quality is achieved.

5. Estimate the Standard Error and Analyze the Sensitivity

   According to Rosenbaum and Rubin (1983) as well as Rosenbaum (2005), sensitivity analysis must be carried out in repetition to see the sensitivity of the finding against the hidden bias, that is, the bias that occurs as a result of the presence of variables outside the model that have yet to be incorporated but have influences on the variables inside the model. This research used Wilcoxon's signed-rank test to analyze sensitivity, which is developed by Rosenbaum (2005).

The variables investigated in this research included interest-variable (treatment), outcome variables, and control variables. The treatment variable (interest) used in this research was the dummy variable MCP, that is, the variable of the participation of MSEs in the MCP program, in which the MCP dummy would equal 1 if the MSEs received CBC and 0 if the MSEs did not receive MCP. The outcome variables in this research included turnover, profits, and savings values of the MSEs.

Meanwhile, the control variables in this research were represented by variables that could influence the CBC-receiving MSEs. The control variables used were as follows: age; sex (male = 1; otherwise = 0); marital status (married = 1; otherwise = 0); number of child/children; education level (graduate of senior high school/college = 1; otherwise = 0); length of time in business; business ownership status (self owned = 1; otherwise = 0); and availability of financial statements (available = 1; otherwise = 0). A collection of primary data was performed using a questionnaire.

4. Results and Discussion

4.1 Propensity Score Estimation

This research employed the logit model to estimate the propensity score by collecting the control variables as considerations for MSEs to be eligible for the MCP program. Out of the 14 variables initially found, only eight remained and formed a satisfactory model, meeting the Conditional Independence Assumption (CIA).

Table 1. MCP Program Logit Model

Dependent Variable: MCP	Parameter Estimation	
	Coefficient	**SE**
Age	-0.05631*	0.0320
Sex	-0.1381	0.4585
Marital status	1.4960*	0.8570
Number of child/children	-0.1796	0.1886
Education level	-0.8082	0.6642
Length of time in business	0.0304	0.0366
Business ownership status	0.4121	0.4683
Availability of financial statements	0.9287*	0.5524
Constant	2.9888	1.3302

Description: The dependent variable was the MCP program, equal 1 for the program beneficiary and otherwise. *significant at 10%, **significant at 5%, ***significant at 1%

Based on the results of the logit model estimation, as presented in Table 1, this research proved that the eligibility for the MCP program was influenced by age, marital status, and availability of business financial statements. Sex, number of child/children, education level, length of time in business, and business ownership status had yet to be proven as influencing MSEs' eligibility as MCP beneficiaries.

4.2 Selection of the Matching Algorithm

This research employed the Nearest Neighbor with replacement because the data available suggest that this research had a small number of observations and a greater number of participant members than the number of non-participant members, thus allowing repetition of matching. As shown in Figure 2, the distribution of propensity score pre-matching differed between the two groups.

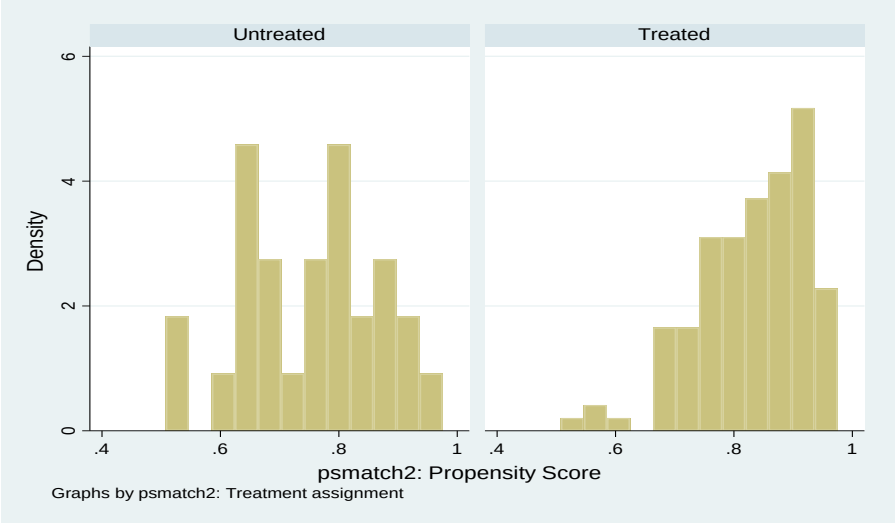


Figure 2. Comparison of Propensity Score Distribution before Matching

4.3 Common Support Check

As the second assumption to be met in the PSM estimation, a common support check assumes an indispensable role. Figure 3 shows that the model used in this research had met the common support assumption as marked by the overlap in the curve between the recipient group (treatment group) and the non-recipient group (control group). It is indicative that there was uniformity in the propensity value between the treatment group and the control group.

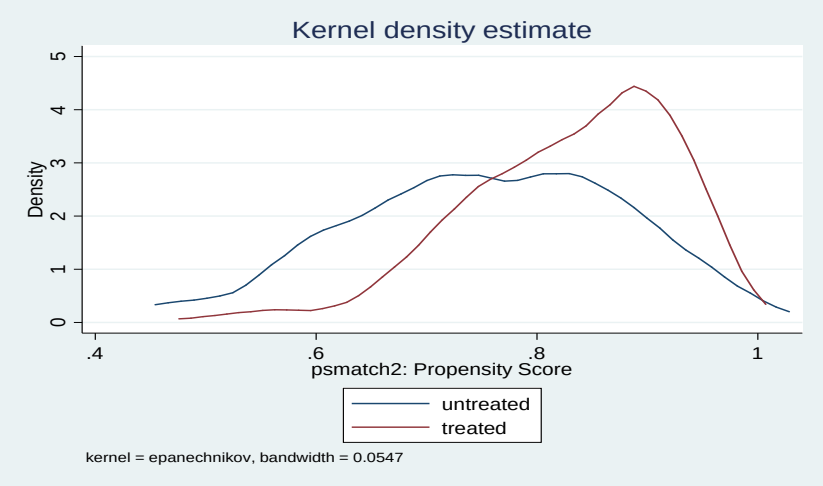


Figure 3. Distribution of Propensity Score and Common Support for Propensity Score Estimation

4.4 Matching Quality Test

a. Bias standard test, to look into bias minimization after matching

It can be seen in Table 2 that some variables scored smaller bias values after matching. However, no clear standard has been in place to determine the success of bias standard minimization in the matching method (Caliendo & Kopeinig, 2008).

Table 2. Results of Standardized Bias Test of NN with Replacement Matching

Covariate	Outcome: Turnover		Outcome: Profits, Savings	
	Before Matching	After Matching	Before Matching	After Matching
Turnover	36.3	40.3		
Profits			13.2	0.8
Savings			-31.6	-28.4
Age	-23.2	28.1	-23.2	15.9
Sex	-4	10.1	-4	7.3
Marital status	9.4	14.7	9.4	-31.8
Number of child/children	-20.9	7.8	-20.9	-9

Education level	-2.2	-2.3	-2.2	-10
Length of time in business	9.3	-20.9	9.3	3.4
Business ownership status	16.5	21.3	16.5	-21.3
Availability of financial statements	42.5	33.9	42.5	-32.5

b. T-test, to test the average quality before and after matching.

Table 3. Average Difference Test Before and After Matching (t-test)

Covariate	**Outcome: Turnover**		**Outcome: Profits, Savings**	
	Before Matching	**After Matching**	**Before Matching**	**After Matching**
Turnover	0.177	0.002		
Profits			0.623	0.056
Savings			0.046	0.293
Age	0.236	0.032	0.236	0.564
Sex	0.846	**0.420**	0.846	0.791
Marital status	0.639	**0.257**	0.639	0.322
Number of child/children	0.265	**0.499**	0.265	0.757
Education level	0.916	**0.859**	0.916	0.722
Length of time in business	0.642	**0.145**	0.642	0.889
Business ownership status	0.427	**0.095**	0.427	0.424
Availability of financial statements	0.058	0.010	0.058	0.087

Table 3 presents the p-value from the t-test for the equation before and after matching. After matching, some covariates had indistinct means between two groups. It shows that the model was of good matching quality.

c. Hotelling's Test (F-test), to figure out the average quality simultaneously in the matched sample.

Table 4. Hotelling's Test after Matching

Outcome	**Hotelling p-value**
Turnover	0.208
Profits	0.351
Savings	0.228

Simultaneous tests for all covariates were conducted with Hotelling's test. As presented in Table 4, the Hotelling's p-values were all greater than 5 percent. It shows that the means of the recipient group and the non-recipient group at the same time were not different, meaning that the combination of the control variables was satisfactory.

4.5 Sensitivity Analysis

Table 5 presents the results of the sensitivity analysis for the study of MCP effects on turnover, profits, and savings. It is shown that an increase of Γ=1.5 led to an increase in p-value to 0.0645 at the upper level (greater than 0.05). In this research, the hidden bias or selection bias at Γ=2.5 explains that two similar MSEs with the same covariates might have different opportunities in obtaining MCP by a factor of 2.5.

Table 5. Rosenbaum's Sensitivity Analysis

Outcome	Γ	p-value of Wilcoxon's Signed-rank Test		Hodges-Lehman Point Estimates	
		Upper bound	Lower bound	Upper bound	Lower bound
Turnover	2.5	0.065	0.000	42,250	343,000
Profits	1.1	0.070	0.028	52,100	68,525
Savings	1.0	0.116	0.116	-377,500	-377,500

The results of the sensitivity analysis for the study on the MCP effect on profits in Table 5 show that an increase of Γ=1.5 triggered an increase in p-value to 0.0696 at the upper level (greater than 0.05). The hidden bias or selection bias at Γ=1.1 explains that two similar MSEs with the same covariates might have different opportunities in obtaining CBC by a factor of 1.1. Meanwhile, the MCP effect on savings at Γ=1 explains that two similar MSEs with the same covariates might have different opportunities in obtaining MCP by a factor of 1. The values 2.5, 1.1, and 1.0 are categorized as small. Thus, it can be said that this research was sensitive to hidden bias.

4.6 Effect of MCP on MSEs' Performance

After satisfactory matching quality was achieved, the Average Treatment on the Treated (ATT) value was then estimated. The distribution of the data was able to demonstrate the effect of MCP on MSEs' performance by the NN with the replacement matching method.

The estimation results show that in general, there was a significant difference in turnover and profits between MCP recipients and MCP non-recipients. The ATT value of 187,578.08 shows that the MSEs participating in the MCP program had turnover of Rp 187.578.080 higher than the MSEs not participating in the program per year. It shows that the MCP-recipients have utilized the funds optimally to increase sales and finance its operating assets (Yoshino & Taghizadeh-Hesary, 2019). In this case, small business entrepreneurs are aware that received-credit is a fresh and relatively cheap capital to expand their business. They perceived it as an excellent opportunity to elevate their business level into a larger scale. This finding is line with the works of Twyeafur and Hafiz (2012). The study indicated that a vast majority of borrowers expressed positive attitudes towards the microcredit program indicating that beneficiaries could improve their socioeconomic status through prolonged involvement, amount of loan borrowed and training provided by the program.

Table 6 Effect of MCP on MSEs' Performance

Matching Method	Impact of MCP on:		
	Turnover	**Profit**	**Saving**
Nearest Neighbour with Replacement	567621.4***	1,726,872.77	-589,744.96
Nearest Neighbour without Replacement	1,103,346.4	94847.3*	-2,653,637.1
Radius Calliper	549662.3***	1,687,591.9	-1,704,714.9
Kernel	549610.6***	1,722,942.57	-1,956,175.31

Description: *significant at 10%, **significant at 5%, ***significant at 1%

From the estimation, it was also known that the ATT value of 94,847.32 in profits shows that the MSEs participating in the CBC program had profits of Rp 94,847,320 higher than the MSEs not participating in the program per year. However, the estimation results were still unable to prove that the MCP program could affect savings, as shown by the insignificant effects in all alpha levels with all matching methods. This finding is contrary to the prior studies, claiming that the availability of micro-credit shapes the saving behavior of people (Beverly & Sherraden, 1999; Curley et al., 2009; Dowla & Alamgir, 2003; Han & Sherraden, 2009; Nasrin et al., 2017). It shows that the MCP-recipients use the money to expand their business and not save into their accounts (Sherraden et al., 2003).

5. Conclusions

The Indonesian government has been running a microcredit program named Micro Credit Program (MCP) as an effort to improve people's welfare. The provision of MCP for micro and small enterprises (MSEs) is an intervention program to promote business performance, and, in turn, business development, welfare, and job creation. MCP has been positively influencing the performance of the MSEs in the North Sumatera Province as the third populated micro-small enterprises in Indonesia. The present study shows that there is a significant difference in turnover and profits between MSEs' MCP-recipients and non-MCP-ones, in which the first group has better business performance compared to the latter one. Thus, it means that the PBC program is a sustained-intervention program for MSEs development, in terms of upscaling business performance and promoting financial access.

The surprising finding is that the MCP does not encourage micro-small business owners to save more. It is different from prior empirical findings, which micro-credit shaped saving behavior. This finding becomes a trigger for further study, specifically to explore the behavioral aspect of the micro-small business owner's financial decision by using mixed methods (e.g., combined propensity score matching and structural equation model). Also, a more extensive data set (i.e., all Indonesian provinces and ASEAN member countries) and different types of samples (i.e., business sector) are the sources for a more in-depth study of microcredit effectiveness..

References

Adams, D.W., & Fitchett, D.A. (1992). *Informal finance in low-income countries*. Boulder, USA: Westview Press.

Adam, A.M. (2010). Financial openness induced growth and poverty reduction. *The International Journal of Applied Economics and Finance*, 5(1), 75-86. DOI: 10.3923/ijaef.2011.75.86

Adhikary, B. K., Kutsuna, K., & Stephannie, S. (2019). Does the government credit guarantee promote micro, small, and medium enterprises? Evidence from Indonesia. *Journal of Small Business & Entrepreneurship*, 1–26. DOI: 10.1080/08276331.2019.1666338

Aditi, B., & Pentana, S. (2018, December 7). Analysis of influence of micro small and medium enterprises (MSMEs) development as a competitive advantage to creative economic development. *Academic Journal of Economic Studies*, 4(3), 122-132. DOI: 10.31227/osf.io/8f4jb

Aitken, R. (2013). The financialization of micro-credit. *Development and Change*, 44(3), 473-499. DOI:10.1111/dech.12027

Angelucci, M., Karlan, D. & Zinman, J. (2015). Microcredit impacts: Evidence from a randomized microcredit program placement experiment by Compartamos Banco. *American Economic Journal: Applied Economics*, 7(1), 151–182.

Armendariz, B. & Morduch, J. (2005). *The economics of microfinance*, 1st ed. (paperback) Cambridge: The MIT Press.

Armendáriz, B., & Szafarz, A. (2011). On mission drift in microfinance institutions. In *The handbook of microfinance* (pp. 341-366). DOI: 10.1142/7645

Arsyad, L. (2008). *Lembaga keuangan mikro: institusi, kinerja, dan sustanabilita*s. Yogyakarta: Andi Offset.

Asdrubali, P., M. Brzozowski, A. Ferrari, P. Ga¸siorowski, and A. Gereben. (2014). *Credit guarantee schemes for SME lending in central, eastern and south-eastern Europe*, Working Paper. Vienna: European Investment Bank.

Attanasio, O., Augsburg, B., De Haas, R., Fitzsimons, E. & Harmgart, H. (2015). The impacts of microfinance: Evidence from joint-liability lending in Mongolia. *American Economic Journal: Applied Economics*, 7(1), 90–122.

Augsburg, B., De Haas, R., Harmgart, H. & Meghir, C. (2015). The impacts of microcredit: Evidence from Bosnia and Herzegovina. *American Economic Journal: Applied Economics*, 7(1), 183–203.

Ayayi, A.G. (2012), Micro-credit and micro-equity: The David and the Goliath of micro-enterprise financing. *Economic Papers: A journal of applied economics and policy*, 31(2): 244-254. DOI:10.1111/j.1759-3441.2011.00144.x

Banerjee, A., Karlan, D., & Zinman, J. (2015). Six randomized evaluations of microcredit: Introduction and further steps. *American Economic Journal: Applied Economics*, 7(1), 1-21. DOI: 10.1257/app.20140287

Banerjee, A., Duflo, E., Glennerster, R. & Kinnan, C. (2015b). The miracle of microfinance? Evidence from a randomized evaluation. *American Economic Journal: Applied Economics*, 7(1), 22–53.

Banerjee, A. & Duflo, E. (2011). *Poor economics: A radical rethinking of the way to fight global poverty*. New York, NY: Public Affairs.

Beaman, L., Karlan, D., Thuysbaert, B. & Udry, C. (2014). *Self-selection into credit markets: Evidence from agriculture in Mali*. Mimeo. Yale University.

Beck, T., & Demirguc-Kunt. A. (2006). Small and medium-size enterprises: Access to finance as a growth constraint. *Journal of Banking & Finance*, 30(11), 2931–2943.

Beck, T., & De La Torre, A. (2007). The Basic Analytics of Access to Financial Services. *Financial Markets, Institutions & Instruments*, 16(2), 79-117. DOI:10.1111/j.1468-0416.2007.00120.x

Beck, T., Demirguc-Kunt, A., & Maksimovic, V. (2005). Financial and legal constraints to firm growth: Does size matter? *The Journal of Finance*, 60(1), 137–177.

Beck, T., Demirguc-Kunt, A., & Maksimovic, V. (2008). Financing patterns around the world: Are small firms different? *Journal of Financial Economics*, 89(3), 467–487.

Berger, A., & Udell, G. (2006). A more complete conceptual framework for SME finance. *Journal of Banking & Finance*, 30(11), 2945–2966.

Beverly, S. G., & Sherraden, M. (1999). Institutional determinants of saving: Implications for low-income households and public policy. *The Journal of Socio-Economics*, 28(4), 457-473. DOI: 10.1016/S1053-5357(99)00046-3

Boocock, G., & Shariff, M.N. (2005). Measuring the effectiveness of credit guarantee schemes: Evidence from Malaysia. *International Small Business Journal: Researching Entrepreneurship*, 23(4), 427–454.

Bruhn, M. & Love, I. (2014). The real impact of improved access to finance: Evidence from Mexico. *The Journal of Finance*, 69(3), 1347–76.

Caliendo, M. & Kopeinig, S. (2008). Some Practical Guidance for the Implementation of Propensity Score Matching. *Journal of Economic Surveys*, 22(1), 31–72. DOI: 10.1111/j.1467-6419.2007.00527.x

Carbó-Valverde, S., Rodríguez-Fernández, F., & Udell, G. F. (2009). Bank market power and SME financing constraints. *Review of Finance*, 13(2), 309–340.

Center for Financial Inclusion (2008). *Financial inclusion: What's the vision?* ACCION International. Available at http://www.centerforfinancialinclusion.org/Document.Doc?id=778

Chakrabarti, R., & Roll, R. (2002). East Asia and Europe during the 1997 Asian collapse: a clinical study of a financial crisis. *Journal of Financial Markets*, 5(1), 1-30. DOI: 10.1016/S1386-4181(01)00022-2

Chaves, R.A., & Gonzales-Vega, C. (1996). The design of successful rural financial intermediaries: evidence from Indonesia. *World Development* 24 (1): 65-78.

Chibba, M. (2009). Financial inclusion, poverty reduction and the millennium development goals. *European Journal of Development Research*, 21(2), 213–30. DOI: 10.1057/ejdr.2008.17

Christen, R.B., Rhyne, E., & Vogel, R. (1995). *Maximizing the outreach of microenterprise finance: the emerging lessons of successful programs*. Focus Note 2. Washington, D.C.: CGAP.

Christen, R.P., Lyman, T.R., & Rosenberg, R. (2003). *Microfinance Consensus Guidelines; guiding principles on regulation and supervision of microfinance*. Microfinance Consensus Guidelines. Washington DC: World Bank. Available at http://documents.

worldbank.org/curated/en/270661468337464771/Microfinance-consensus-guidelines-guiding-principles-on-regulation-and-supervision-of-microfinance

Cintina, I. & Love, I. (2019). Re-evaluating Microfinance: Evidence from Propensity Score Matching, *The World Bank Economic Review*, 33(1), 95–115. DOI: 10.1093/wber/lhw069

Coetzer, A., Kock, H., & Wallo, A. (2017). Distinctive characteristics of small businesses as sites for informal learning. *Human Resource Development Review*, 16(2), 111-134. DOI: 10.1177/1534484317704291

Coleman, B.E. 2006. Microfinance in Northeast Thailand: Who benefits and how much? *World Development* 34, 1612-1638. DOI: 10.1016/j.worlddev.2006.01.006

Conroy, J. D. (2008). *Financial inclusion: A new microfinance initiative for APEC*, Brisbane: The Foundation for Development Cooperation. Available at http://www.apec.org.au/docs/08_MFAPEC_JC.pdf

Cowling, M., & Mitchell, P. (2003). Is the small firms' loan guarantee scheme hazardous for banks or helpful to small business? *Small Business Economics*, 21(1): 63–71.

Crepon, B., Devoto, F., Duflo, E. & Pariente, W. (2015). Estimating the impact of microcredit on those who take it up: Evidence from a randomized experiment in Morocco. *American Economic Journal: Applied Economics*, 7(1), 90–122.

Cull, R., Demirgüç-Kunt, A., & Morduch, J. (2009). Microfinance meets the market. *Journal of Economic Perspectives*, 23(1), 167-92.

Curley, J., Ssewamala, F., & Sherraden, M. (2009). Institutions and savings in low-income households. *Journal of Sociology & Social Welfare*, 36(3), 9-32.

Demirgüç-Kunt, A., Honohan, P., & Beck, T. (2008). *Finance for all? Policies and Pitfalls in Expanding Access*. Washington, DC.: World Bank.

Dietsch, M., & Petey, J. (2002). The credit risk in SME loans portfolios: Modeling issues, pricing, and capital requirements. *Journal of Banking & Finance*, 26(2–3), 303–322.

Dowla, A., & Alamgir, D. (2003). From microcredit to microfinance: evolution of savings products by MFIs in Bangladesh. *Journal of International Development*, 15(8), 969–988. DOI: 10.1002/jid.1032

Duflo, E., Glennerster R., & Kremer, M. (2008). Using Randomization in Development Economics Research: A Toolkit. *Handbook of Development Economics*, Elsevier.

Ghalib, A. K., Malki, I., & Imai, K. S. (2012). Microfinance and its role in household poverty reduction: findings from Pakistan. *BWPI Working Paper 173*. DOI: 10.2139/ssrn.2088196

Global Findex Database, The World Bank, 2017

Green, A. (2003). *Credit guarantee schemes for small enterprises: An effective instrument to promote export sector-led growth*. Vienna: UNIDO, Program Development and Technical Cooperation Division.

Green, A. (2017). Harnessing growth sectors for poverty reduction: what works to reduce poverty through sustainable employment with opportunities for progression. *Impact*, 31(9), 45-47. DOI: 10.21820/23987073.2017.9.45

Guerin, I., & Palier, J. (2004). *Microfinance challenges: Empowerment or disempowerment of the poor?* Pondicherry: French Institute of Pondicherry.

Güngen, A.R. (2018). Financial Inclusion and Policy-Making: Strategy, Campaigns and Microcredit *a la Turca*. *New Political Economy*, 23(3), 331-347. DOI: 10.1080/13563467.2017.1349091

Han, C. K., & Sherraden, M. (2009). Do institutions really matter for saving among low-income households? A comparative approach. *The Journal of Socio-Economics*, 38(3), 475-483.

Heckman, J., Ichimura, H. & Todd, P. (1997). Matching as an econometric evaluation estimator: Evidence from Evaluating a Job Training Program. *Review of Economic Studies*, 64(4), 605–54.

Holton S., & McCann F. (2017). The Small Firm Financing Premium in Europe: Where and When Do Small Firms Pay the Most?. In: Rossi S. (eds) *Access to Bank Credit and SME Financing*. Palgrave Macmillan Studies in Banking and Financial Institutions. Palgrave Macmillan, Cham. DOI: 10.1007/978-3-319-41363-1_5

Islam, T (2012). *Microcredit and poverty alleviation*. Aldershot, Hants, England: Ashgate.

Karlan, D., & Zinman, J. (2010). Expanding credit access: Using randomized supply decisions to estimate the impacts. *Review of Financial Studies*, 23(1), 433–64.

Lanzavecchia, A. (2012). Is microcredit targeted to poor people? Evidence from Cambodia microfinance institution. *China Business Review*, 11(2), 1537-1506. DOI: 10.17265/1537-1506/2012.02.001

Loh, S-U. (1998). The Impact of the Asian Crisis on International Financial Markets. *East Asian Economic Review*, 2(4), 49-73. DOI: 10.11644/KIEP.JEAI.1998.2.4.31

Mahmud, KT, Mohamed, ZA, Ismail, MM, Shamsudin, MN & Hilton, D (2007). Perception and Attitude of Microcredit Borrowers towards Effectiveness of Agricultural Diversification and Intensification Project in Bangladesh. *Asia-pacific Journal of Rural Development*, 17(2), 67–83.

Mohummed, S.U.M. & Wencong, L. (2013). Micro-credit and poverty reduction: a case of Bangladesh. *Prague Economic Papers*, 22(3), 403-417. DOI: https://doi.org/ 10.18267/ j.pep.459

Morduch, J., & Haley, B. (2002). Analysis of the effects of microfinance on poverty reduction. New York: NYU *Wagner Working Paper, 1014*.

Nasrin, S., Baskaran, A. & Rasiah, R. (2017). Microfinance and savings among the poor: evidence from Bangladesh microfinance sector. *Quality & Quantity*, 51(4), 1435–1448. DOI: 10.1007/s11135-016-0342-1

Norma, M.S., & Jarita, D. (2011). An Economic Impact Assessment of a Microcredit Program in Malaysia: The Case of Amanah Ikhtiar Malaysia (Aim). *International Journal of Business and Society*, 12(1), 1–19.

Petersen, M.A., & Rajan, R.G. (1994). The benefits of lending relationships: Evidence from small business data. *Journal of Finance*, 49(1), 3–37.

Rahman, M.T., & Khan, H.T. (2013). The effectiveness of the microcredit programme in Bangladesh. *Local Economy*, 28(1), 85-98.

Ravallion, M. (2003). Assessing the Poverty Impact of an Assigned Program. in Bourguignon, F. & Pereira da Silva, L. eds. *The impact of economic policies on poverty and income distribution*. New York: Oxford University Press.

Robinson, M.S (2001). *The Microfinance Revolution: Sustainable Finance for the Poor*, Washington, D.C: International Bank for Reconstruction and Development/The World Bank.

Rosenbaum, P.R. & Rubin, D. (1983). The central role of the propensity score in observational studies for causal effects. *Biometrica*, 70(1), 41-45.

Rosenbaum, P.R. (2005). Sensitivity analysis in observational studies. *Encyclopedia of Statistics in Behavioral Science*, 4, 1809-1814.

Rutherford, S. (1999). *The poor and their money*, IDPM, University of Manchester.

Shastri, R. K. (2009). Micro finance and poverty reduction in India (A comparative study with Asian Countries). *African Journal of Business Management*, 3(4), 136-140, ISSN: 1993-8233. http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.494.8080&rep=rep1&type=pdf

Sheng, H.H. & Mendes-Da-Silva, W. (2014). The big family: Informal financing of small- and medium-sized businesses by Guanxi. *Thunderbird International Business Review*, 56(2), 157-171. DOI:10.1002/tie.21609

Shetty, S. (2013). Microcredit, Poverty, and Empowerment: Exploring the Connections. In *Microcredit, poverty, and empowerment: Exploring the connections*. Leiden, The Netherlands: Brill. DOI: 10.1163/9789004252189_009

Sherraden, M., Schreiner, M., & Beverly, S. (2003). Income, institutions, and saving performance in individual development accounts. *Economic Development Quarterly*, 17(1), 95-112.

Snow, D. (1999). Microcredit: An institutional development opportunity. *International Journal of Economic Development*, 1(1), 65–79.

Stakhovich, L. V., & Galishnikova, E. V. (2012). Measuring access to financial services in Russia and the world. *Finansovyj žhurnal—Financial Journal*, 3(4), 115-122.

Stein, P. (2010). *Inclusive Finance.* A paper presented at the Korea-World Bank High Level Conference on Post-Crisis Growth and Development held 3-4 June 2010, Busan: Korea. Available at: http://siteresources.worldbank.org/DEC/Resources/84797-1275071905763/Inclusive_Finance-Stein.pdf

Struwig, F., Krüger, J., & Nuwagaba, G. (2019). The influence of the business environment on the growth of informal businesses in Uganda. *The Southern African Journal of Entrepreneurship and Small Business Management*, 11(1), 1-10. DOI:10.4102/sajesbm.v11i1.200

Tarozzi, A., Jaikishan, D. & K. Johnson. (2015). The impacts of microcredit: Evidence from Ethiopia. *American Economic Journal: Applied Economics* ,7(1), 54–89.

Terano, R., Mohamed, Z. & Jusri, J.H.H. (2015). Effectiveness of microcredit program and determinants of income among small business entrepreneurs in Malaysia. *Journal of Global Entrepreneurship Research*, 5(22), 1-14. DOI:10.1186/s40497-015-0038-3

Tham, S.Y., & Tambunan, T. (2018). Accidental and Intentional Exporters: Comparing Indonesian and Malaysian MSMEs. *Trends in Southeast Asia*, 5, 1–3. Singapore: ISEAS–Yusof Ishak Institute Singapore.

Twyeafur, M.R., & Hafiz T.K. (2012). The Effectiveness of the Microcredit Programme in Bangladesh. *Local Economy*, 28(1), 85–98.

United Nation (1995). *Microentreprise Development Brief No. 18 Role of microcredit in the eradication of poverty: report of the Secretary-General*. New York: UN.

Wright, G.A.N. (2000). *Microfinance Systems: Designing quality financial services for the poor*, Dhaka: The University Press Limited.

Yaron, J., Benjamin, M., & Charitonenko, S. (1998). Promoting efficient rural financial intermediation. *The World Bank Research Observer,* 13(2), 147-170.

Yoshino, N., & Taghizadeh-Hesary, F. (Ed.). (2019). *Unlocking SME Finance in Asia: Roles of credit rating and credit guarantee schemes*. London: Routledge. DOI: 10.4324/9780429401060