Research Article

The Impact of Credit on Multidimensional Poverty in Rural Areas: A Case Study of the Indonesian Agricultural Sector

Tegar Rismanuar Nuryitmawan[a,]

[a] Research Institute of Socio-Economic Development (RISED), Gubeng Kertajaya VC/47, Surabaya (60286), Indonesia
tegar@rised.or.id
* corresponding author: tegar@rised.or.id*

A R T I C L E   I N F O

A B S T R A C T

Poor farmer households are a vulnerable group in rural areas. Various poverty alleviation measures have been launched to help poor farmer groups become more prosperous. The policies launched were in the form of cash transfers, empowerment, and access to formal financial institutions. Policies for providing formal financial access continue to face many obstacles, one of which is credit risk and farmer literacy. The study aims to estimate the impact of credit on multidimensional poverty in poor farmer households in Indonesia. Secondary data were obtained from the Indonesian Family Life Survey (IFLS) batch 4 and 5. The impact estimation method used *was propensity* score matching combined with the difference in differences. The results showed that credit programs for poor farmers, initiated by official financial institutions, significantly helped farmers out of poverty, although the value was small. The addition of control variables such as education, ownership of household assets, and ownership of agricultural land actually made the credit program more modifiable at the policy level. Credit can be used as a complement to policies related to improving farmer education and knowledge in the form of agricultural modernization, as well as to scale-up of farmer household businesses.

INTRODUCTION

Since 2014, President Jokowi has issued nine major development programs called NawaCita. The third letter of NawaCita contains an interpretation of a new development paradigm, namely the development of Indonesia from the periphery by strengthening regions and villages within the framework of a unitary state (KPU, 2014). The implication of this paradigm is to empower the economy of lower-class communities that are widely distributed in rural and suburban areas (Arham et al., 2020). Rural has special characteristics with agricultural and fishery activities or other extraction activities, where the contribution to the economy is no longer dominant. Meanwhile, the contribution of the manufacturing industry is increasingly dominant. This phenomenon is known as sectoral shifting or structural shifting from the primary to the secondary sector (Helleiner et al., 1976). The Statistics Indonesia (2020) confirms a shift where during the Covid-19 pandemic the industrial sector had the largest share in Gross Domestic Product (GDP), namely 19.98 percent while the share of agriculture was only 12.84 percent.

As a developing country, Indonesia has experienced a shift in the economic structure that has an impact on reducing the agricultural production share of GDP (Byerlee et al., 2009). In fact, villages and towns still have inequality problems in several fields such as living standards, welfare, children's education levels, and also health aspects both in terms of accessibility or utility (Demissie&Kasie, 2017; Miranti, 2017). Based on data from the Statistics Indonesia (2020), the number of poor people in rural areas is 15.26 million, which is more than in urban areas, namely 11.16 million people. Based on the number of poor people, more than 60 percent of the poorest population are farmers. Therefore, farmers are referred to groups of people who are very vulnerable in the face of poverty. This condition is because the majority of farmers in Indonesia are classified as subsistence farmers with low wages (Arham et al., 2020). Besides, in general, the agricultural sector has a lower level of multiplier effect due to small business and capital capacities, so it is slower to reduce poverty (Dewbre et al., 2011).

Farmers have difficulty accessing economic sources such as capital and farming financing (Sayaka&Rivai, 2011). The difficulty of farmers is due to their small business scale, so they cannot accumulate capital. After each harvest, the proceeds from the sale are used to pay for loans for production facilities and daily needs (FAO, 2005). In terms of literacy, Dove (2012) states that Indonesian farmers are less able to understand the procedures that are complex in formal financial institutions. Apart from that, collateral requirements are also a big obstacle that farmers must face (Sayaka & Rivai, 2011). If agricultural land is used as collateral, it is almost certain that most farmers are not eligible for capital from formal financial institutions. This is because the owner-tenants generally do not have land certificates, especially if they are tenants of other farmers' land (Arham et al., 2020). The banking sector is not interested in financing the agricultural sector because it is considered high risk, either due to natural disturbances or fluctuations in product prices (Asante-Addo et al., 2017).

The difficulty for farmers to access credit has negated the condition of the government's policy of accelerating poverty alleviation through the banking channel in the form of a low-cost credit program for the population (Rifai & Associates, 2013). Although adjustments have been made to increase the absorption capacity of debtors, it is imperative to assess the socio-economic conditions of farmers and rural communities in general who benefit from the anti-poverty program. According to the Coordinating Ministry for Economic Affairs (2020), the assessment is related to the ambition for (KUR, Kredit Usaha Rakyat) distribution and the reluctance of banks to channel due to the risk factor of bad credit history. In addition, in developing an anti-poverty policy in the agricultural sector, it is necessary to consider the movement of the Farmer Exchange Rate (NTP, NilaiTukar Petani), as it describes the indicators of farmer welfare. Credit assistance schemes, socio-economic conditions, asset ownership, arable land area, farmers would be more suitable if a poverty reduction program with direct cash assistance programs could directly benefit farmers (Coleman, 2000; Coulibaly & Yogo, 2016; Elsas & Krahnen, 2000; Fianto et al., 2018; Sun et al., 2020).

Therefore, this study will examine the level of theoretical suitability regarding the ability of credit in the form of microfinance which according to Idolor & Eriki (2012) will increase the economic capacity of the poor, especially in rural areas, so that they will have a greater opportunity to grow into a large area. Rural financing according to Sun et al. (2020) has an important position to boost agricultural development, rural economies, and most importantly farmers' income. It is also believed that empowerment and increasing income in the agricultural sector have a strong influence on poverty reduction (Cervantes-Godoy & Dewbre, 2010; Chen & Ravallion, 2004; Christiaensen & Demery, 2007). This premise will support the development paradigm from the periphery to the geographic center.

Finally, the link between poverty reduction and access to credit will contribute to effective anti-poverty policy and other policy options such as the unconditional cash transfer program. The results of the evaluation of these two policies are expected to provide a conclusion on whether the credit is a substitute or a complementary policy. If credit is a substitute policy, budget planning in the form of credit subsidies can be

Nuryitmawan et.al (The Impact of Credit on...., Multidimensional Poverty, Crredit, Poor Farmer Households)

carried out, whereas if it is complementary, certain anti-poverty policies can be used as a companion to credit as an effort to reduce poverty in rural areas of Indonesia.

THEORETICAL REVIEW

Multidimensional Poverty

Commencing with the writings of Townsend (1979) and Sen (1985), poverty has been viewed from a different perspective that is broader and multidimensional. Amartya Sen (1980 and 2000) criticized the poverty approach using income analysis. According to him, the monetary approach only portrays a small part of the enormous poverty problem. The problem of poverty is not only related to purchasing power, income, or consumption, but there are other and broader dimensions of poverty conditions. Therefore, multidimensional poverty is analyzed by adding a calculation component where previously it was only based on income or consumption expenditure (Batana, 2013). Multidimensional poverty analyzes poverty at the household or individual level. Multidimensional poverty is a combined measure of the dimensions of health, education, and living standards (see Table 1).

Table 1. Dimensions and Indicators of the Multidimensional Poverty Index (MPI)

Dimension	Indicator
Health	Nutrition
	Infant Death
Education	Long Time in School
	Attendance in Education
Quality of Life	Fuel for Cooking
	Sanitation
	Clean water
	Source of Illumination
	House Floor Condition
	Asset Ownership

Source: (OPHI, 2020)

Health is measured using the approach to nutrition and infant mortality. Education is measured by average years of schooling, and the final school diploma completed. Living standards are calculated using the approach of several combinations of community social objects such as cooking fuel, toilet quality, water, electricity, house floors, and the condition of household goods (Artha & Dartanto, 2015). The complexity in calculating multidimensional poverty for United Nations Development Programme (UNDP) makes it an integrated part of the framework for sustainable development goals (SDGs).

Alkire & Foster (2011a) calculated the weighting MPI approach. The weight of the dimensions is the same, which is 1/3 of each dimension. And each aspect in the dimension is also weighted equally. Thus, the weight of the indicators is obtained as follows: the weight of the health indicators which consists of two indicators which are assessed at 1/6, the weight of education which consists of two indicators is assessed as 1/6, and the weight of the quality of life which consists of the good indicators with the score of 1/18. Every person who is assessed as in multidimensional poverty is visible from the indicators assessed. The assessment is in the range from 0 to 1. When a person meets the poverty assessment, based on the multidimensional poverty indicator, it will have a value of 1. The assessment will continue to be carried out on each indicator (Alkire & Foster, 2011b).

This method has been applied in several countries around the world, one of which is in Punjab, Pakistan using the Alkire and Foster's Method (AFM). A study by Awan and Aslam (2011) in Pakistan used eight dimensions to calculate multidimensional poverty. The dimensions referred to are housing, water quality, sanitation, electricity, assets, education, consumption expenditure, and land. The results from the Pakistan study show that land, consumption, sanitation, housing, and education are the main contributions among the variables in multidimensional poverty. Another study was conducted by Batana (2013) in Africa. The dimensions used are assets, health, education, and empowerment. A study by Batana (2013) concluded that

34

AFM is suitable for measuring poverty in developing countries. The results of this study are the same as those of Whelan et al. (2014) which applies AFM with many non-monetary indicators which are grouped into four main dimensions: basic deprivation, consumption, health, and neighborhood environmental for 28 European Union member countries.

Microcredit for the Agricultural Sector

Commercial bank lending for the agricultural sector in Indonesia is still segmented for large and medium-sized farms (Wati et al., 2014). The reason the main sector performs credit segmentation is the credit risk factor. The problem of asymmetric information, lack of collateral, and low profitability have made banks view the agricultural sector as a high-risk consumer (Hanafie, 2010; Yeni Sapta, 2015). In fact, access to finance, either working capital or investment, is needed by farmers of all business scales. Thus, the study from IFAD shows that the lack of formal credit affects the increase in rural poverty (IFAD, 2011).

Observing the limitations and impact of credit on the agricultural sector and rural development in general, the government is trying to develop a *microfinance* scheme to help farmers gain access to finance. Microfinance schemes are actually not a new phenomenon. Efforts to provide microfinance services emerged in the 1960s when developing countries actively modernized agriculture through various agricultural intensification and extension programs (Fard, 2008). Since the inception of the Gremeen Bank in the early 1980s, global financial institutions have begun to pay great attention to microfinance as an effective economic and social empowerment mechanism in poverty alleviation (S. R. Khandker & Haughton, 2009). In Indonesia, microfinance schemes include micro-credit (loans of less than IDR 20 million, without collateral, credit repayment terms of 6 to 12 months), micro-savings (savings value of less than IDR 20 million), and micro-insurance (in general, the premium value is below IDR 50 thousand).

In general, the microcredit program is empowerment with a subsidized pattern due to the high cost and risk of credit being given. In practice, the subsidy scheme can take the form of an interest subsidy, a guarantee fee subsidy, loan exemption, or administrative support for loan providers (Fard, 2008; Hanafie, 2010; IFAD, 2011; Wati et al., 2014; Yeni Sapta, 2015). The credit program that provides subsidies for poor farmers is one of the efforts to intensify agriculture (Yeni Sapta, 2015). The development of credit programs for the agricultural sector is inseparable from the agricultural intensification assistance program. The scheme for distributing microcredit programs for small farmers has actually been popular since the New Order era, namely the Bimas program in the 1970s. This program was marked by the formation of Village Unit Cooperatives (VUC), Village Unit Economic Activities (VUEA), and BRI Village Units to expand production inputs and credit for farmers (Martowijoyo, 2007). After that, many programs have their ups and downs due to fixes from previous failures.
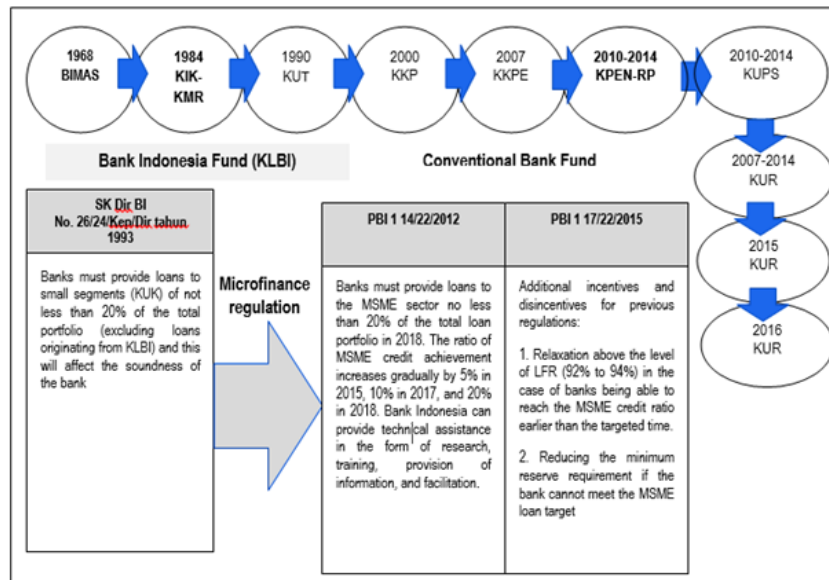
Source: Siregar (2016)

Figure 1. The Progress of the Micro Credit Program in Indonesia

RESEARCH METHOD
Data Analysis

The study uses data from the 4th and 5th batches of the Indonesian Family Live Survey (IFLS) in 2007 and 2014 to estimate and calculate the impact of credit access on the multidimensional poverty of rural farmers. IFLS data is longitudinal survey data or micro survey data that includes data on individuals, households, and communities in Indonesia. IFLS data are collected and compiled by RAND Corporation based on household surveys conducted in 13 provinces out of 27 provinces in Indonesia. The thirteen provinces are Jakarta, West Java, East Java, South Kalimantan, South Sulawesi, South Sumatra, West Nusa Tenggara, Central Java, Yogyakarta, Bali, North Sumatra, West Sumatra, and Lampung. The survey resulted in a sample that represents about 83% of the Indonesian population and includes more than 30,000 people living in 13 of the 27 provinces.

Calculation of the Multidimensional Poverty Index using the Alkire-Foster method

The Alkire-Foster method (Alkire & Foster, 2011a) is used to calculate the *multidimensional poverty index*. This method uses a poverty vulnerability matrix (deprived). The matrix contains indicators in the dimensions of the *multidimensional poverty index*. For each indicator, a weighted measurement will be carried out. The measurement of the weighted dimensions must be the same, namely, 1/3 (one-third) of each dimension, and each indicator in the dimension is also weighed the same. If d> = 2 is the number of dimensions and x = [xij] is the nxd matrix, which is the selected event, where xij is the selected occurrence of individual I (i = 1,…, n) in dimension j (j = 1, ... , d). Then x is depicted in the matrix below:

$$x = \begin{pmatrix} x_{11} & . & x_{1j} & . & x_{1d} \\ . & . & . & . & . \\ x_{i1} & . & x_{ij} & . & x_{id} \\ . & . & . & . & . \\ x_{n1} & . & x_{nj} & . & x_{nd} \end{pmatrix}$$

$$(1)$$

Suppose, z is the row vector of a particular dimension in the household zj, xi is the row vector of each individual I selected for each dimension, and xj is the *column vector* of dimension j selected among the analyzed households. Thus, the deprivation matrix $X0_{ij}$ = 1 means that individual I is indicated as poor (deprived) in dimension j, and if x0ij = 0 then the individual is not indicated as poor in dimension j. Further, suppose k is the cut-off line, by adding up each row (x0ij), we will get column vector c, which is the selected poor event which contains ci, which is the number of selected poor events for individual i, someone (individual i) will be considered poor if ci > = k.

Furthermore, for the first calculation, namely calculating the *headcount ratio*. Notate qk as the number of poor people in each vector z household and at the limit (cut-off k), the headcount ratio (H) can be illustrated as follows:

$$H = \frac{q_k}{n} \quad ; \quad q_k = \sum_{i=1}^{n} p_k \qquad (2)$$

Then if it is seen that the possibility of people being classified as poor in each dimension can be illustrated as follows:

$$\overline{c_i}(k) = \frac{1}{d}[c_i p_k] \qquad (3)$$

Meanwhile, the average deprivation for each poor individual can be illustrated as:

$$A = \frac{1}{q_k d} \sum_{i=1}^{n} c_i p_k \qquad (4)$$

Budiantoro, et al. (2013: 4) also calculated the Multidimensional Poverty Index by simplifying the illustration of its mathematical function. Budiantoro performs calculations in three main stages. This stage is to carry out weighting on each indicator in the dimensions of each individual to find out individuals who experience deficiency or are below the limit of people who are considered poor in dimensions. Individual assessment for each dimension has a range from 0 to 1. When a person meets the poverty assessment according to the MPI indicator, that person will be subject to point 1. The assessment will continue to be carried out on each indicator. After obtaining an assessment of all indicators and dimensions, it will be calculated based on the following formula:

$$Ci = w_1 I_1 + w_2 I_2 + w_3 I_3 + \ldots + w_d I_d \qquad (5)$$

Where, I1 = 1 if someone is exposed in indicator I, and I1 = 0 if not. Wi is the weight of the indicator with $\sum_{i=1}^{d}$

Propensity Score Matching and Difference in Differences

This study uses two quantitative approaches using the Propensity Score Matching (PSM) and Difference in Differences (DD) methods. The collaboration of the two methods is carried out to find out the effect of an intervention (treatment) on the outcome to be studied by proving the similarity of the characteristics of the two sample groups being compared (S. Khandker et al., 2009). The advantages of these two methods are considered to be able to answer the research hypothesis, namely that access to credit affects changes in poverty status. PSM is applied to obtain a sample group that will be used in estimating DD based on the probability of a farmer household receiving credit with multiple observed household characteristics. The implementation of PSM will eliminate households that do not have similar characteristics. Combining PSM and DD can include observable and unobservable characteristics with constant assumptions over time (Khandker,

Nuryitmawan et.al (The Impact of Credit on...., Multidimensional Poverty, Crredit, Poor Farmer Households)

Koolwal & Samad, 2010). DD is used to estimate the effect of credit on the poverty status of farmer households.

DD is assessed using panel data. The use of DD with panel data requires the availability of data in the *baseline* period, in this study data from 2007. Estimation is carried out by measuring the *outcomes* and *covariates* for groups receiving farmer household credit from formal or informal financial institutions. The *fixed effects panel regression* model is used to maintain unobservable *time-invariant* heterogeneity and observable characteristic heterogeneity over many observation periods. Khandker and Houghton (2009) explain the DD estimation with the *panel fixed effect* regression model in an equation, which is as follows:

$$Y_{it} = \phi Y_{it} + \delta X_{it} + \eta_{it} + \varepsilon_{it} Y_{it} = \phi Y_{it} + \delta X_{it} + \eta_{it} + \varepsilon_{it} \tag{1}$$

$$(Y_{it} - Y_{it-1}) = \phi(Y_{it} - Y_{it-1}) + \delta(X_{it} - X_{it-1}) + (\eta_i - \eta_i) + (\varepsilon_{it} - \varepsilon_{it})$$
$$(Y_{it} - Y_{it-1}) = \phi(Y_{it} - Y_{it-1}) + \delta(X_{it} - X_{it-1}) + (\eta_i - \eta_i) + (\varepsilon_{it} - \varepsilon_{it}) \tag{2}$$

$$\Delta Y_{it} = \phi \Delta T_{it} + \delta \Delta X_{it} + \Delta \varepsilon_{it} \Delta Y_{it} = \phi \Delta T_{it} + \delta \Delta X_{it} + \Delta \varepsilon_{it} \tag{3}$$

The equation above explains that the *outcome* Y_{it} can be estimated on T_{it} *treatment* with X_{it} covariates and the unobservable heterogeneity of time-invariant η_i which may correlate well with treatment and other characteristics that cannot be observed by ε_{it}. The derivation of equation (2) is carried out considering the change in time and results in equation (3). It should be noted that heterogeneity ηi is time-invariant, so this variable is excluded from the equation. The treatment impact is analyzed by Ordinary Least Square (OLS).

The following is an econometric model for estimating the impact of credit on multidimensional poverty in farmer households in Indonesia:

$$Y_{it}^* = \alpha + \beta T_{it} + \rho t + \Upsilon(T_{it} \times t) + \sum_{j=1}^n \beta COV_{jit} + \varepsilon_{it}$$
$$Y_{it}^* = \alpha + \beta T_{it} + \rho t + \Upsilon(T_{it} \times t) + \sum_{j=1}^n \beta COV_{jit} + \varepsilon_{it} \tag{4}$$

Y_{it} is the result of household poverty status, where (*) indicates each poverty status, namely being not poor or becoming poor. α denotes the intercept, with T_{it} as the dummy variable receiving credit. t is a dummy variable that shows the time before and after receiving credit, β refers to the treatment coefficient which is a household characteristic that supports someone falling into poverty or out of poverty. The calculation of the effect of credit on poverty status will be seen when the average value of the credit effect is multiplied by the probability of change in household poverty status.

RESULTS AND DISCUSSION

The Results of the Propensity Score Matching on Credit Recipient Farmers Households

The estimation of the Propensity Score Matching (PSM) was carried out only on the IFLS 4 data from 2007, in order to eliminate the unequal characteristics when analyzed. PSM estimates in 2007 and used as the base year for clustering analysis of multidimensional poor farmer households with details of the number of 425 poor households and 3,484 multidimensional non-poor households (see Figure 2).
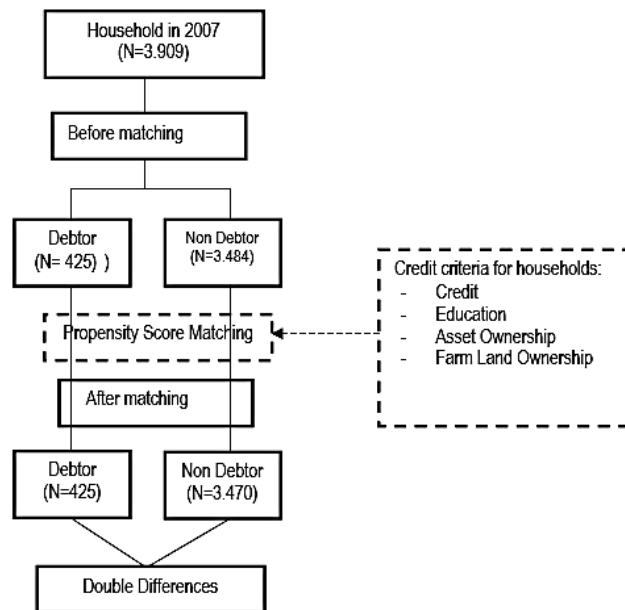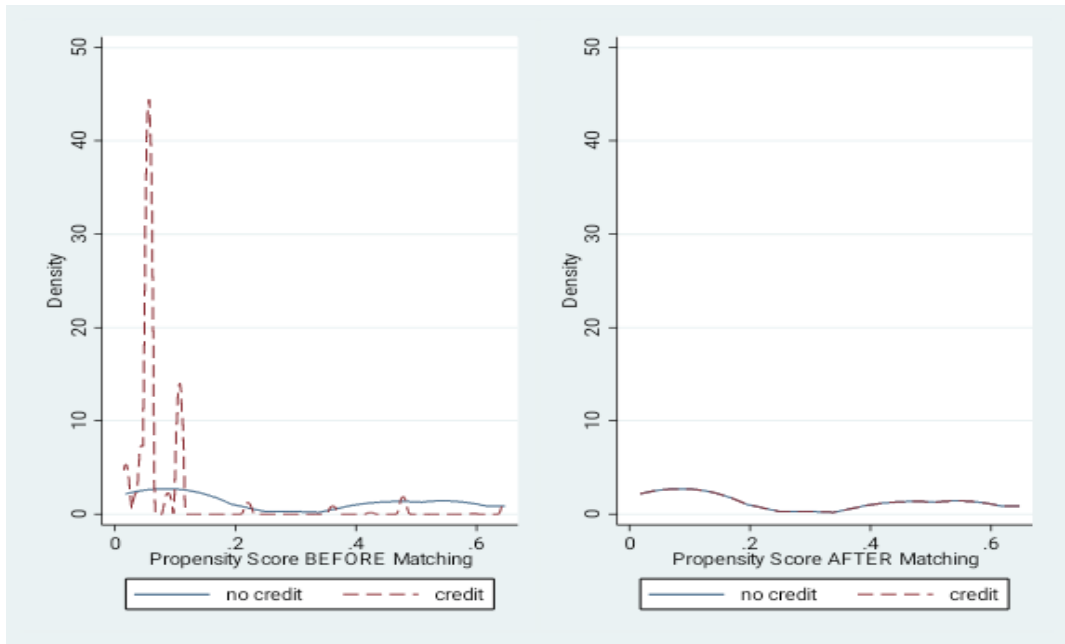
Figure 2. Multidimensional Poverty Clusterization of Farmers

The original 3,909 households in 2007 (IFLS4) were eliminated by the PSM estimate and the remaining 3,895 households were due to unequal characteristics. Table 2 shows the characteristics of multidimensional poor farmer households, namely receiving credit, owning farmland, owning household assets, ladder, and level of education. These four characteristics are obtained after trying to select several similarities of characteristics so that the best balancing test value is obtained. Khandker (2010) states that the search for the characteristics that best represent a data match must be carried out until the balancing test value is satisfactory.

Tabel 2. Balancing Test Propensity Score

Inferior of the block of propensity score	Household		Total
	Multidimensional Not Poor	Multidimensional Poor	
0.0181564	633	20	653
0.05	1.902	97	1.000
0.075	99	16	115
0.1	602	88	690
0.2	91	29	120
0.4	92	109	201
0.6	51	66	117
Total	3.470	425	3.895

Source: Calculations Based on (S. R. Khandker et al., 2010)

Figure 3. Region of Common Support (Propensity Score) for Poor Farmer households after receiving and not receiving credit

Figure 3 shows good *balancing test* results since there are visually many overlap areas between groups of credit recipient households and non-credit recipient households (Caliendo & Parro, 2015; S. R. Khandker et al., 2010). Table 3 shows the control variables that explain the characteristics of poor farmer households receiving credit. All the control variables show a significant value in statistics.

Table 3. Estimation Results of Propensity Score Matching Poor Farmer Households Receiving Credit

Variable	Multidimensional Poor Farmer Households
Credit	-0.219
	(0.198)
Farming Business Land	0.696***
	(0.118)
Head of RT Education	2.727***
	(0.128)
Household Assets	1.177***
	(0.199)
Constant	-3.990***
	(0.210)
Observations	3,909

Standard errors in parentheses
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

The estimation results from the PSM will be used as the initial assumption to determine the consistency of the calculation of the impact of credit on farmer households. Preliminary results indicate that credit does not affect farmer poverty. Household economic variables such as land ownership, education of the head of the household, and ownership of household assets affect poverty in Indonesian farming households. These results are consistent with findings from Sun et al., (2020) in rural China, and Demissie & Kasie (2017) Ethiopia.

The Impact of Credit on Farmers Household Efforts to Move Out of Multidimensional Poverty

The difference in Differences (DD) estimation is performed as a step to obtain counterfactual value on outcomes. Two groups of households that are characteristic of similarities, namely households that receive credit will be compared for their respective outcomes in the periods before and after receiving credit. Control variables are also included in the DD test to obtain the net effect of credit on household poverty status (outcomes). The use of fixed-effect options is carried out to control unobservable household characteristics and temporal options that can affect the outcome value (Khandker et al., 2010).

Table 4. The Impact of Credit on Multidimensional Poverty of Farmers in Indonesia

VARIABLE	Multidimensional Poverty 0 = poor 1 = not poor		
	Simple Logit	Full Logit	Odds Ratio
period	0.0000536	0.000180**	0.000180**
1= 2014	(0.0000535)	(0.0000756)	(0.000756)
0= 2007			
Credit Treatment	**0.000415****	**0.000489***	**0.000489***
1 = recieve credit	(0.000202)	(0.000250)	(0.000250)
0 = do not receive credit			
Credit	-0.224	-0.366	-0.366
	(0.223)	(0.280)	(0.280)
KRT Education		3.384***	3.384***
		(0.396)	(0.396)
RT assets		1.467***	1.467***
		(0.353)	(0.353)
RT Farming Land		0.0901	0.0901
		(0.288)	(0.288)
Number of Panels	904	904	904
Number of Poor Farmer of RT	452	452	452

The numbers in parentheses are Standard *Error*** $p<0.01$, ** $p<0.05$, * $p<0.1$

The results of the difference in differences analysis, in the form of an assessing the impact of the program on poor farmer households, show the difference in impact before and after they receive credit from formal financial institutions. Table 3 and Table 4 show consistent results where credit has a negative impact on poverty. This means that the head of the poor farmer household who receives credit for agriculture will have the opportunity to move out of poverty. These results are consistent with previous studies by Addury (2019); Coulibaly & Yogo, (2016); Damayanti & Adam, (2015); Sun et al., (2020); Coulibaly & Yogo, (2016). However, although the impact of credit may reduce the probability of poor farmer households emerging from poor status, in fact, the coefficient value is very small. The small impact of credit is due to several factors such as the ceiling given considering that the agricultural sector is relatively avoided due to large risk factors by banks (Arham et al., 2020; Asante-Addo et al., 2017; Sayaka & Rivai, 2011),

In Table 4 the credit treatment coefficient is below 1 percent, either a simple logit test or the addition of other control variables. In fact, other control variables such as education and household asset ownership have a much larger coefficient. Education has three times greater opportunity to help poor farmer households move out of poverty (Psacharopoulos & Patrinos, 2018). Meanwhile, ownership of household assets got them out of poverty 1.4 times faster. This means that there is a need to alleviate multidimensional poverty in farmer's houses, it is not enough just to provide credit but further treats must also be given to human capital capacity in the form of education and household monetary aspects in the form of sufficient assets. Education describes the ability of human capital to understand and solve problems. Higher education shows a person's capacity to overcome and find a way out of a problem (Salam et al., 2020).

An interesting estimation result is the farmer's land ownership. Based on this analysis, land ownership is insignificant, which allows farm households to escape multidimensional poverty. Even though the coefficient

value is positive, it has a probability to escape from multidimensional poverty, the insignificant results show that farmland ownership is not an issue in this study, as long as farmers have access to formal financial institutions, higher education levels, because it will affect the way of thinking and knowledge, as well as owning increasingly large household assets. Increasing household assets gives farmer households flexibility to set up new businesses or as collateral, as well as competitiveness when faced with new capital attempts (Arham et al., 2020).

Table 5. Estimation Results of Difference in Differences

Outcome Variable	Multidimensional Poverty
Before	
Control	0.120
Treated	0.088
Diff (T-C)	-0.032*
	(0.018)
After	
Control	0.107
Treated	0.079
Diff (T-C)	-0.028**
	(0.013)
Diff-in-Diff	**0.004**

The numbers in parentheses are *Standard Error**** $p<0.01$, ** $p<0.05$, * $p<0.1$
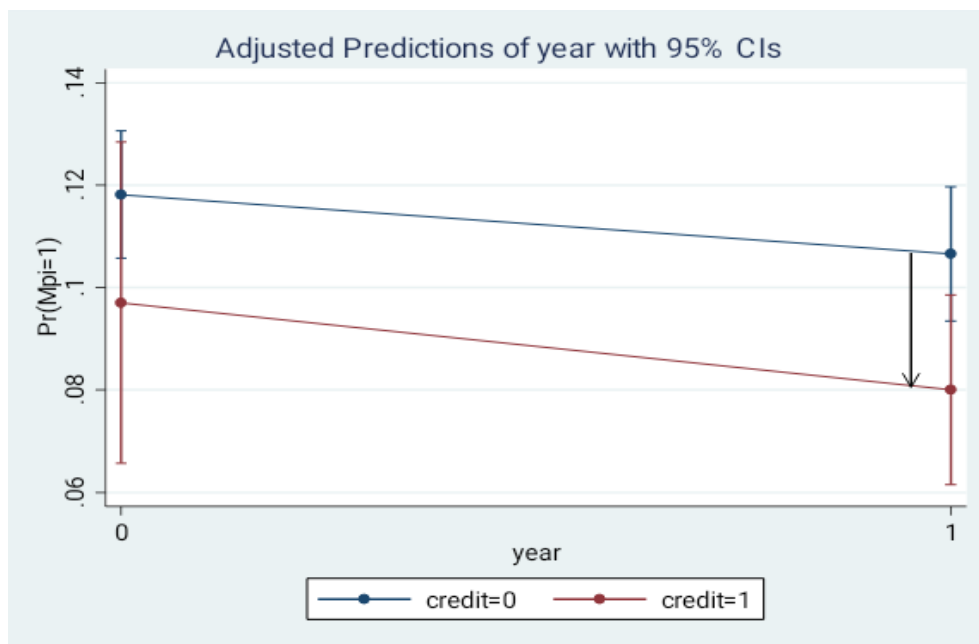

Figure 3. Graph of Differences in Poor Farmer Households After Obtaining Credit

Table 5 and Figure 3 illustrate the differences in the conditions of poor farm households in obtaining credit from formal financial institutions. The calculated differentiation score was 0.004 or 0.4 percent for escape from multidimensional poverty. More clearly, the illustration in Figure 3 shows the shift of the axis from the blue one down to the red one.

CONCLUSION

Based on the results of the research that went through the process of analysis and discussion, the conclusion of this study can be formulated, namely as follows:

1. The Credit Program for poor farmer households has a probability to lift out of multidimensional poverty even though the impact is small.

2. The credit program for farmers cannot operate alone, other aspects must be added, such as improving farmer household education, including increasing household asset ownership so that farmers are able to have competitiveness and access to capital. The small impact of credit on multidimensional poverty reduction efforts is due to several factors such as the ceiling which is generally of small value, and a high risk associated with collateral held by farmer households.
3. Ownership of farmland does not significantly help alleviate multidimensional poverty. This is because the cultivated land area in this study is not implicitly depicted. The binary form implies that the most important is the variable of farmer household asset ownership and the level of education of the farmers.

Thus, after concluding the results of the study, we need to provide some policy proposals that can be made based on the findings, including forming a modern farming group to catalyze farmland ownership. Farmer organizations can be allowed to receive education and knowledge about agriculture and its business. So that farmers are able to master modern agricultural business models and adopt technologies. With access to formal financial institutions, this capital can be converted into investment in agricultural technology and cooperation with research and development institutions in the agricultural sector. So in the future, agriculture may become more modern both in terms of production and business.

ACKNOWLEDGMENT

REFERENCE

Addury, M. M. (2019). Impact of Financial Inclusion for Welfare : Analyze to Household Level. *Journal of Finance and Islamic Banking*, *1*(2), 90. https://doi.org/10.22515/jfib.v1i2.1450

Alkire, S., & Foster, J. (2011a). Counting and multidimensional poverty measurement. *Journal of Public Economics*, *95*(7–8), 476–487.

Alkire, S., & Foster, J. (2011b). Understandings and misunderstandings of multidimensional poverty measurement. *The Journal of Economic Inequality*, *9*(2), 289–314.

Arham, M. A., Fadhli, A., & Dai, S. I. (2020). Does Agricultural Performance Contribute to Rural Poverty Reduction in Indonesia? *Jejak*, *13*(1), 69–83. https://doi.org/10.15294/jejak.v13i1.20178

Artha, D. R. P., &Dartanto, T. (2015). Multidimensional Approach to Poverty Measurement in Indonesia. *LPEM-FEUI Working Paper*, *002*, 1–17.

Asante-Addo, C., Mockshell, J., Zeller, M., Siddig, K., &Egyir, I. S. (2017). Agricultural credit provision: what really determines farmers' participation and credit rationing? *Agricultural Finance Review*, *77*(2), 239–256. https://doi.org/10.1108/AFR-02-2016-0010

Awan, M. S., & Aslam, M. A. (2011). Multidimensional poverty in Pakistan: case of Punjab province. *Journal of Economics and Behavioral Studies*, *3*(2), 133–144.

Batana, Y. M. (2013). Multidimensional Measurement of Poverty Among Women in Sub-Saharan Africa. *Social Indicators Research*, *112*(2), 337–362. https://doi.org/10.1007/s11205-013-0251-9

BPS. (2020). StatistikPertumbuhanEkonomi Indonesia Triwulan I-2020. *Www.Bps.Go.Id*, *17*, 2. https://www.bps.go.id/pressrelease/2020/02/05/1755/ekonomi-indonesia-2019-tumbuh-5-02-persen.html

Byerlee, D., De Janvry, A., &Sadoulet, E. (2009). *Agriculture for development: Toward a new paradigm.*

Caliendo, L., &Parro, F. (2015). Estimates of the Trade and Welfare Effects of NAFTA. *The Review of Economic Studies*, *82*(1), 1–44.

Cervantes-Godoy, D., &Dewbre, J. (2010). *Economic importance of agriculture for poverty reduction.*

Chen, S., &Ravallion, M. (2004). *China's (uneven) progress against poverty.* The World Bank.

Christiaensen, L., & Demery, L. (2007). *Down to earth: agriculture and poverty reduction in Africa.* The World Bank.

Coleman, S. (2000). Access to capital and terms of credit: A comparison of men- and women- owned small

Nuryitmawan et.al (The Impact of Credit on...., Multidimensional Poverty, Crredit, Poor Farmer Households)

businesses. *Journal of Small Business Management*, 38(3), 37–52.

Coulibaly, A., &Yogo, U. T. (2016). *Access to Financial Services and Working Poverty in Developing Countries*.

Damayanti, M., & Adam, L. (2015). *TNP2K*.

Demissie, B. S., &Kasie, T. A. (2017). Rural Households' Vulnerability to Poverty in Ethiopia. *Journal of Poverty*, 21(6), 528–542. https://doi.org/10.1080/10875549.2017.1348425

Dewbre, J., Cervantes-Godoy, D., &Sorescu, S. (2011). *Agricultural progress and poverty reduction: Synthesis report*.

Dove, M. R. (2012). Swidden Agriculture in Indonesia: The Subsistence Strategies of the Kalimantan Kant. *Swidden Agriculture in Indonesia*, *January 1985*. https://doi.org/10.1515/9783110870275

Elsas, R., &Krahnen, J. P. (2000). *Collateral, default risk, and relationship lending: An empirical study on financial contracting*. CFS Working Paper.

FAO. (2005). Fertilizer use by crop in Indonesia. In *Fao*. http://www.fao.org/3/y7063e/y7063e00.htm#Contents

Fard. (2008). What Can Microfinance Contribute to Agriculture in Developing Countries ? *FARM, Fondation Pour l'agriculturee et La RuraliteDans Le Monde*, *December 2007*, 4–6.

Fianto, B. A., Gan, C., Hu, B., &Roudaki, J. (2018). Equity financing and debt-based financing: Evidence from Islamic microfinance institutions in Indonesia. *Pacific-Basin Finance Journal*, *52*, 163–172.

Hanafie, R. (2010). *Pengantarekonomipertanian*. Penerbit Andi.

Helleiner, G.K., Chenery, H. B., &Syrquin, M. (1976). Patterns of Development, 1950-1970. *African Economic History*, *2*, 56. https://doi.org/10.2307/3601520

Idolor, J., &Eriki, P. O. (2012). FINANCIAL ANALYSIS OF ASSESSMENT OF IMPACT OF MICRO-FINANCING INSITUTIONS TOWARDS POVERTY REDUCTION IN NIGERIA. *Journal of Financial Management & Analysis*, 25(1).

IFAD. (2011). *Rural poverty report 2011. New realities, new challenges: new opportunities for tomorrow's generation*. IFAD Rome.

KementrianKoordinatorBidangPerekonomianRepublik Indonesia. (2020). *PenyalurKredit Usaha Rakyat BerdasarkanPenyalur*. https://kur.ekon.go.id/

Khandker, S., B. Koolwal, G., &Samad, H. (2009). *Handbook on impact evaluation: quantitative methods and practices*. The World Bank.

Khandker, S. R., & Haughton, J. (2009). *Handbook on poverty and inequality*. World Bank.

Khandker, S. R., Koolwal, F. G. B., &Samad, H. A. (2010). *Handbook on Impact Evaluation: Quantitative Methods and Practices*. World Bank.

KPU. (2014). Visi-Misi Program Aksi Ir. H. Joko Widodo – Drs. H.M. JusufKallaPemiluPresidendan Wakil PresidenTahun 2014. *Kpu*, 1–2. https://www.kpu.go.id/koleksigambar/Visi_Misi_JOKOWI-JK.pdf

Martowijoyo, S. (2007). Indonesian Microfinance at the Crossroads. *Caught between Popular and Populist Policies. Essays on Regulation and Supervision No23*.

Miranti, R. (2017). Understanding the Relationships between Development Factors and Regional Poverty: What Have We Learned from Indonesia? *Journal of Poverty*, *21*(6), 483–507. https://doi.org/10.1080/10875549.2017.1348420

OPHI. (2020). *Multidimensional Poverty Index Indicators*. Oxford Poverty & Human Initiative. https://ophi.org.uk/publications/dimensions/

Psacharopoulos, G., &Patrinos, H. A. (2018). Returns to Investment in Education Result in Singapore and other countries. *Economics*, *April*, 2. http://econ.worldbank.org.

Rifai, B., & Associates, N. (2013). *The impact study of kreditusaharakyat (kur) for poverty alleviation in indonesia: case study three provinces (central java, east java and bengkulu)*.

Salam, A., Pratomo, D. S., &Saputra, P. M. A. (2020). Sosio-economic determinants of multidimensional poverty in the rural and urban areas of East Java. *International Journal of Scientific and Technology Research*, 9(4), 1445–1449.

Sayaka, B., &Rivai, R. S. (2011). PeningkatanAksesPetaniTerhadapKreditKetahananPangandanEnergi. *PSE LitbangPertanian*, *1*(2), 188–208.

Sen, A. (1985). *Commodities and capabilities. Amsterdam New York New York, NY*. USA: North-Holland Sole distributors for the USA and Canada, Elsevier ….

Siregar, M. E. (2016). *Microfinance policy and regulation in banking sector*.

Sun, H., Li, X., & Li, W. (2020). The nexus between credit channels and farm household vulnerability to poverty: Evidence from rural China. *Sustainability (Switzerland)*, *12*(7), 1–18. https://doi.org/10.3390/su12073019

Townsend, P. (1979). *Poverty in the United Kingdom: a survey of household resources and standards of living*. Univ of California Press.

Wati, D. R., Nuryartono, N., &Anggraeni, L. (2014). *AKSES DAN DAMPAK KREDIT MIKRO TERHADAP PRODUKSI PADI ORGANIK DI KABUPATEN BOGOR*. *3*(2), 8–22.

Whelan, C. T., Nolan, B., &Maitre, B. (2014). Multidimensional poverty measurement in Europe: An application of the adjusted headcount approach. *Journal of European Social Policy*, *24*(2), 183–197.

YeniSapta, A. E. N. (2015). Penguatanperan program kreditmikrodalammendorongpengembangan UMKM di sektorpertanian. In *ActaUniversitatisAgriculturae et SilviculturaeMendelianaeBrunensis* (Vol. 53, Issue 9). http://publications.lib.chalmers.se/records/fulltext/245180/245180.pdf%0Ahttps://hdl.handle.net/20.500.12380/245180%0Ahttp://dx.doi.org/10.1016/j.jsames.2011.03.003%0Ahttps://doi.org/10.1016/j.gr.2017.08.001%0Ahttp://dx.doi.org/10.1016/j.precamres.2014.12

Nuryitmawan et.al (The Impact of Credit on...., Multidimensional Poverty, Crredit, Poor Farmer Households)