아태연구 제30권 제1호 (2023) https://doi.org/10.18107/japs.2023.30.1.004

IMPACT OF THE VILLAGE FUND PROGRAM ON POVERTY ALLEVIATION IN INDONESIA*

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| Contents |

| Abstract |

High poverty incidence and stagnant decrease in poverty rates have always been a big challenge for developing countries. To address this issue, the Government of Indonesia made a breakthrough by implementing a program called Village Fund Transfer in 2015. The government is committed to enhancing its economy and development, especially in the rural and outermost regions, by granting funds and authority to each of over seventy thousand villages in Indonesia. This study explores the causal effect of the Village Fund Program on poverty alleviation in Indonesia using an Impact Evaluation approach by applying the Difference-in-Difference Event Study Framework. Due to data limitation, the study uses approximately 500 district-level data and compares the poverty rates of districts receiving the program funds and those not receiving the program funds between 2011 and

* This article is a substantially revised version based on Riza Andina's unpublished Masters dissertation. The authors wish to thank the anonymous reviewers for their valuable comments and suggestions.
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2021. By employing this identification strategy, this study is able to provide more robust estimates of the program's impact and its dynamic variation yet is unable to consider the intensity variations within the recipient districts. In addition, the observed districts were divided into three groups based on their geographical conditions using a Construction Cost Index. The empirical results on all districts data found a significant impact of the Village Fund Program on reducing poverty four years after the program's inception in 2015. A significant impact was also seen starting in 2017 for districts with low geographical disadvantage, and from 2018 for districts with intermediate geographical disadvantage. However, the study also revealed that this program has no significant impact in highly geographically disadvantaged districts. This emphasizes the importance of initial geographical and infrastructure conditions. Therefore, it is argued that the highly geographically disadvantaged regions should prioritize their village fund on infrastructure development rather than community empowerment programs.

▪ Key words: Village Fund, Poverty, Indonesia, DiD, Event Study

Ⅰ. Introduction

Poverty incidence and low levels of welfare have long been perceived by governments as a persistent socioeconomic problem that needs to be urgently addressed. Despite all the efforts undertaken, over 27.54 million people in Indonesia (10.14 percent of the whole population) still live under the poverty line.[1] Among them, 10.86 million people (four percent) live in extreme poverty.

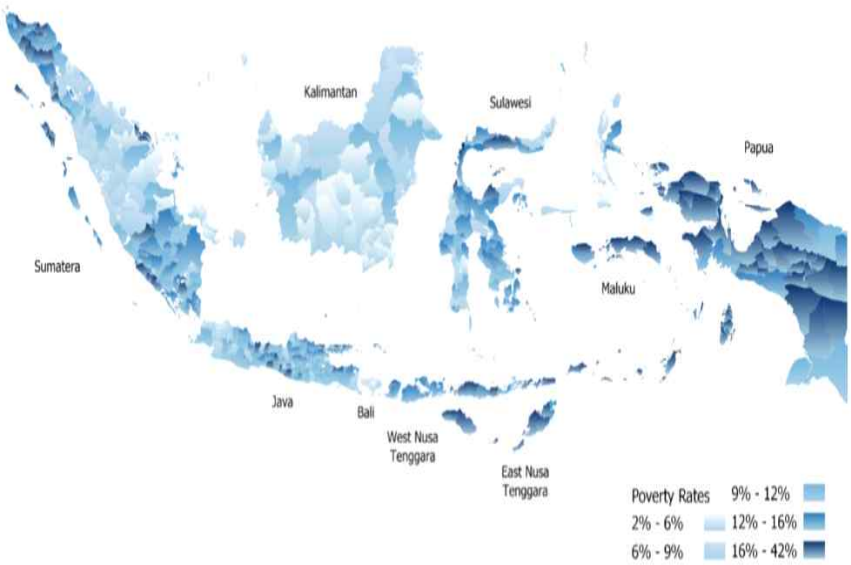
Indonesia has been facing a stagnant decrease in the poverty rate for

1) Statistics Indonesia (2021), "Number of Poor People by Region (Million People)", https://www.bps.go.id/indicator/23/183/1/number-of-poor-people-by-region.html. (accessed on August 1, 2022)

the last decade. During the last decade, the Indonesian government was only able to lower the poverty rate by 2.4 percentage points. This is rather disappointing when compared to the previous performance, where the government actually reduced the poverty rate by 5.79 percentage points within six years since 2006.

In 2020, the government of Indonesia set up a target of getting rid of extreme poverty by 2024, six years earlier than the initial target year from the Sustainable Development Goals. In order to reach this ambitious target, the government had to increase its capacity by tenfold.[2)]

<Figure 1> Map of Poverty Rates by Districts in Indonesia[3)]



2) The National Team for The Acceleration of Poverty Reduction (2022), "Target for Eliminating Extreme Poverty by 2024: Ambitious, But Not Impossible", https://www.tnp2k.go.id/articles/target-for-eliminating-extreme-poverty-by-2024-ambitious-but-not-impossible. (accessed on October 2, 2022)

3) Statistics Indonesia (2021), "Percentage of Poor People (P0) by Area 2021-2022", https://www.bps.go.id/indicator/23/184/1/persentase-penduduk-miskin-p0-menurut-daerah.html. (accessed on August 1, 2022)

Indonesia has a diverse demographic and geographical landscape, and poverty incidence is unevenly spread throughout different regions.[4] The poverty rates by districts in 2021 can be seen in <Figure 1>. Darker hues point to areas of greater poverty, concentrated mostly in districts located on the Papua, Maluku, and Nusa Tenggara Islands. This is in sharp contrast to the other three major islands, where we can find many districts with low poverty rates with only several instances of high poverty.

The Indonesian government has introduced various fiscal policy measures to address this issue. One of the most notable measures is the Village Fund instrument, which has been in force since 2015. With this program, the government is determined to building Indonesia from its outermost and borderline regions, including more development in the villages. Under Village Law No. 6 of 2014, the central government is mandated to appropriate and transfer a certain amount of money from the Central Government Budget each year. Funding is provided to each of the seventy thousand villages to support their development activities. As stipulated by Ministry Regulation No. 7 of 2021 and Village Law No. 6 of 2014, the village administrative body is granted powers to manage and allocate the budget provided it is in line with the National Priority Program.

The fund may be utilized to assist with village administration, the execution of village development, and the empowerment initiatives at the local community-level. The villages are granted authority and sufficient funding to improve their potential to promote their community welfare (Ministry of Finance 2017, iii; World Bank 2021, 4). Due to this program's nature and scale, Village Fund is considered the first and biggest in the world (Ministry of Finance 2017, 2).

The Village Fund allocation by the Indonesian Government increased

4) Statistics Indonesia (2021), "Percentage of Poor People (P0) by Area 2021-2022", https://www.bps.go.id/indicator/23/184/1/persentase-penduduk-miskin-p0-menurut-daerah.html. (accessed on August 1, 2022)

considerably since its inception. The total amount dispersed increased from 20.76 trillion Rupiahs in 2015 to 72 trillion Rupiahs in 2021. The average sum received by each village also increased from 280 million Rupiahs in 2015 to almost one billion Rupiahs in 2021. The program has increased available funding for villages by tenfold (Antlöv 2019, 18). Village transfers added up to approximately ten percent of entire sub-national transfers in 2020 (World Bank 2021). This funding is likely to increase further, considering the commitment of the Government of Indonesia to meet the amount of allocations mandated by the Village Law (KOMPAK et al. 2017).[5)]

A large body of literature has attempted to explore the impact of this policy on various welfare indicators, including poverty rates. However, studies using impact evaluation methods are rather limited. Previous studies on the topic are primarily descriptive or based on correlations. As such, they fail to analyze the causality of the Village Fund Program (Hartojo et al. 2022). This paper will use an impact analysis methodology called the Difference-in-Difference Event Study Framework to evaluate the program's impact on poverty alleviation. Besides providing more robust identification, this methodology enables us to see a program's impact and its dynamic or temporal variation.

This paper purports to examine how the implementation of Indonesia's Village Fund has affected poverty levels. The introduction includes an overview of the questions, the purpose and aim of the study, research question to be addressed, as well as the significance of the study. Prior literature on the several control variables that may impact poverty is reviewed in the following section. Section three introduces the research methodology used, while section four analyzes the findings and results. The conclusions, limitations, and areas for possible future study are provided in the last section.

5) KOMPAK is an Australia-Indonesia partnership program which supports the Indonesian Government's efforts in reducing poverty through provisions of basic services and opportunities for the poor.

Ⅱ. Literature Review

1. Literature Review on the Impact of the Village Fund Program

Empirical work on the impact of the Village Fund Program on various indicators of poverty and welfare using an impact evaluation method is rather limited. Additionally, they yield different conclusions. Studies by Saragi et al. (2021), Udjianto et al. (2021), as well as Maulany and Fafurida (2021), for example, use either descriptive or qualitative analysis to investigate the impact of the program. In general, those studies found that village funds contribute significantly in enhancing community welfare through the implementation of development and empowerment initiatives. Nonetheless, the goal of the Village Fund to alleviate poverty is achieved rather slowly (Saragi et al. 2021).

Unlike the studies above, Badrudin et al. (2021), Diatmika et al. (2021), Ratwianingsih et al. (2021), and Joetarto et al. (2020) use statistical inferences to inspect the impact of the Village Fund Program. While Badrudin et al. (2021) and Ratwianingsih et al. (2021) found that there is no significant direct effect the Village Fund has on community welfare and it has been unable to reduce poverty, the other two studies found that village funds may positively contribute to higher community welfare.

Two similar studies employing an impact evaluation approach using the Difference-in-Difference methodology also found relatively contradicting results. Mujiwardhani et al. (2019) found that village fund implementation was unable to improve welfare conditions. However, by using a similar method, Martak et al. (2018) concluded that this program has been able to increase welfare for several cohorts though it is unable to reduce extreme poverty.

2. Impact of Unemployment

Labor market condition is an essential dimension to eradicate poverty and improve the welfare of the people. High rates of unemployment have conduced to increasing poverty, particularly in the rural regions where job opportunities are quite confined (Litchfield & McGregor 2008). Employment status and participation in formal wage employment are found to contribute to a substantial growth in welfare (Biyase & Zwane 2018; Mukherjee & Benson 2003). They also significantly affect poverty, hence the importance of promoting job creation (Litchfield & McGregor 2008).

3. Impact of Economic Growth and Structure

Economic growth has long been affiliated with an improvement in the welfare of the people, particularly for the poor (Balisacan et al. 2003) For developing countries especially, economic growth is mentioned as the most robust instrument in alleviating poverty and raising the quality of life (DFID 2008). In Indonesia, economic growth contributes significantly in reducing poverty in Indonesia, thus signifying the importance of achieving higher economic growth (De Silva & Sumarto 2014). However, Janjua and Kamal (2011) found that growth only moderately contributes to poverty alleviation.

Despite having the possibility to generate welfare through an increase in opportunities, under different conditions, similar economic growth rates may have different impacts on poverty rates and welfare improvement since the pace, and structural pattern of economic growth is crucial in eradicating poverty (DFID 2008). Kuznets (1955) argues that poverty and inequality will increase at the beginning of economic development as the industrial sector increases and decrease at the later phase of development

as the growth of the industrial sector slows down. Lewis (1954) also mentioned that welfare could be achieved when the industrial sector dominates the economy. In contrast, Oshima (1993) argues that in the beginning stages of economic development, more poverty reduction can be achieved by shifting the economic structure toward the agriculture sector.

4. Impact of Education

As an essential part of human capital accumulation, education has been promulgated as the primary weapon against poverty. Investment in education has been considered an important tool to improve the underlying structures of poverty.[6] According to human capital theory, investment in education together with vocational training can increase skills and productive knowledge that will increase the productivity of the people, and thus their earnings as well (Tilak 2002). Therefore, higher education has been associated with higher per capita income and lower poverty status (Adekoya 2018; Awan et al. 2011).

5. Impact of the Dependency Ratio

The dependency ratio is an indicator that can reflect compositional changes in population age. This variable can provide an indication of the potential effect of those changes on socioeconomic development factors, especially those related to social support requirements. A high dependency ratio means that the working-aged (economically productive) population may have a greater burden to support the non-working-aged (economically dependent) population (United Nations 2007). A higher dependency ratio has

6) Kulid, V. (2014), “Role of Education in Ending Extreme Poverty – Taking a Global Lead”, https://www.norad.no/en/front/about-norad/news/role-of-education-in-ending-extreme-poverty—taking-a-global-lead/. (accessed on August 2, 2022)

been correlated with less welfare since the burden in society increases (Akerele & Adewuyi 2011; Litchfield & McGregor 2008).

6. Impact of Intergovernmental Transfers

The term intergovernmental transfer is mainly associated with a fiscal relationship among different levels of government. In most developing countries, top-down intergovernmental fiscal transfers are often considered one of the most important sources of revenue (Shah 1995). They are used to achieve national, regional, and municipal goals, including equality and fairness, and to establish a common economic union. They are also used to guarantee that revenues approximately meet the spending demands of different levels of subnational governments (Boadway & Shah 2007). Three types of intergovernmental transfers made from the central government exist in Indonesia: General Allocation Fund (hereafter, GAF), Special Allocation Fund (hereafter, SAF), and Revenue Sharing Funds (hereafter, RSF). These three types of transfers are the result of the decentralization policy that the Government of Indonesia has pursued since 2001.

Ⅲ. Research Methodology and Framework

1. Research Methodology and Data Source

The most effective and commonly used method in evaluating the impact of a program is the Randomized Controlled Trial (hereafter, RCT). It offers a highly potent answer to causality questions, assisting program implementers and examiners in understanding that what has been achieved is solely the result of the policy intervention (White et al. 2014).

However, RCT can only be done within an experimental setting where the treatment receivers are chosen randomly. It is not possible to apply RCT for this study since the receiver of the village fund is not chosen randomly; as such, there is no clear counterfactual group.

To overcome this challenge, this study applies an extended version of the Difference-in-Difference (hereafter, DiD), called the DiD Event Study Framework (hereafter, Event Study), in order to analyze the impact of the Village Fund Program implementation on poverty alleviation. This paper will use annual panel data on approximately 500 districts level in Indonesia between 2011 and 2021. The basic DiD method has been used to analyze the causal impact of this policy by Mujiwardhani et al. (2019), Wardhana et al. (2018), and Martak et al. (2018).

DiD is an assessment technique utilized predominantly in non-experimental contexts to evaluate the program's causal effects when there is a non-random assignment to treatment group; therefore, no evident control group exists (Fredriksson & Oliveira 2019, 519). This method is able to provide more robust identification (ibid., 520-521) by making comparison of outcomes in the treatment group (policy receiver) to a control group (non-receiver) from before and after the policy's adoption to evaluate the impact of a non-randomly administered policy.

The extension of DiD into DiD Event Study allows the estimation of both event lags and leads coefficients by taking into account the change in outcomes of interest around the implementation of a policy compared to a particular reference period as the baseline (Clarke & Tapia-Schythe 2021). The coefficients also allow for the examination of the nature or dynamics of the policy's effects, such as whether they are momentary or long-lasting and how they vary over time (ibid.). As a result, it helps researchers to clearly see the visual representation of the event's causal effects.

This study utilizes secondary data obtained from two main sources.

Data on the unemployment rate, dependency ratio, average years of schooling, economic growth, and GDP were obtained from Statistics Indonesia, the official entity responsible for conducting national statistics activities. Data on SAF, GAF, RSF, and village fund recipients were obtained from the Ministry of Finance, which oversee the organization and monitoring of the public financial system. (Brief operational definitions of the variables are provided in <Appendix 1>.)

2. Event Study Regression Model

To identify the causal impact of the Village Fund Program on poverty, we use an event study framework with the following specifications:

$$Pzero_{it} = \alpha + \sum_{-4}^{-1} \beta_k \ . \ Lag_{ik} + \sum_{1}^{6} \rho_k \ . \ Lead_{ik} + X'c + \varnothing_i + \gamma_t + \epsilon_{it}$$

Here, the dependent variable $Pzero_{it}$ is the poverty rate in district i at year t, presented in percentages. The policy variable is the Village Fund Program. It is identified in the model as whether a particular district receives the program funding or not. $Lead_{ik}$ and Lag_{ik} are dummy variables, equaling 1 if the observational period relative to the district i's first treated period is the same value as lag / lead period k; 0 otherwise, or if the observation i is in the control group. In the absence of the policy treatment, it is expected and assumed that the differences between the two groups would have been similar to the differences in the baseline period (i.e., parallel trend assumption) (Clarke & Tapia-Schythe 2021, 6).

The coefficient of lags and leads β_k and ρ_k will capture the difference between treatment and control districts compared to the difference omitted in the baseline period. If the program has no impact on the treated groups, the poverty rates difference between the two groups

would be the same as in the baseline period. In this case, ρ_k would not be statistically significant from 0. On the contrary, if policy intervention impacts the treatment group's poverty rates, there would be statistically significant changes in the poverty rates difference between the two groups compared to the difference in the baseline period. In this case, ρ_k would be statistically significant from 0 and we will see a negative sign as the village fund is predicted to reduce poverty rates.

To increase the estimations precision of the village fund's causal effect on the poverty rate, we include district fixed-effect ϕ_i and time fixed-effect γ_t. Additionally, nine variables are used as control variables X' based on the review of the literature. The nine variables include average years of schooling, unemployment rate, dependency ratio, SAF, GAF, RSF, growth of GRDP per capita at constant prices, the share of primary sector in GRDP, and share of secondary sector in GRDP.

As in Rodriguez-Castelan (2020), the variables SAF, GAF, and RSF, are time-lagged because these kinds of intergovernmental transfers are transferred gradually from the central government to the local governments throughout the year. Meanwhile, the poverty rate data for the district level is collected in March for a particular year. Thus, intergovernmental transfers from the previous year affect the poverty rate for a given year. This study uses clustered standard error to give robustness by allowing correlations among observations that belong in the same cluster (Cameron & Miller 2015, 318).

3. Data Analysis Implementation and Identification Strategy

To implement the DiD Event Study Framework, it is essential to identify the counterfactual and treatment groups, as well as the time-period relative to the initial implementation period. The Village Fund Program was designed explicitly to target "villages" and not "kelurahan",

although they are on the same administrative level. As such, some districts do not receive village funds due to unavailability of "villages" under their jurisdiction. This allows us to use these districts as a counterfactual group while the rest are included in the treatment group. For data processing purposes, districts under the treatment group are given code 1, while districts under the control group are given code 0.

Although the event study allows for different first implementation periods for different observations, the Village Fund Program was put in effect for all districts in 2015. Thus, the same initial implementation period of 2015 will be used for all observations to identify their leads and lags periods. All 2011, 2012, 2013, and 2014 observational treated group data will be coded as lag 4 (-4), lag 3 (-3), lag 2 (-2), and lag 1 (-1), respectively. Similarly, all 2015 until 2021 observational treated group data will be coded as lead 0 (0), lead 1 (+1), and so forth until lead 6 (+6).

For all districts under the control group, these leads and lags are coded as 0. A single lag or lead variable will be omitted from the regression specification to be used as a baseline and to prevent a perfect multicollinearity problem. For this study, lead 0, or the year 2015, will be used as the baseline. <Appendix 2> provides an illustrated example of the identification.

Ⅳ. Analysis and Discussion

1. Impact of the Village Fund on Poverty – All Districts Estimation

<Table 1> summarizes the event study regression result of the effect of the Village Fund Program on poverty for all districts in Indonesia. <Appendix 3> provides the descriptive statistics of all variables. According to the regression analysis, the Village Fund Program has a

statistically significant impact on poverty rate alleviation. This is implied by the negative and significant sign for coefficients of the year 2019, 2020, and 2021. Starting from four years after the implementation of the program, the difference in poverty rates between districts receiving village fund and districts not receiving village fund is significantly lower compared to the poverty rates difference in 2015 as the baseline period.

<Table 1> Regression Result of the DiD Event Study Framework for all Districts

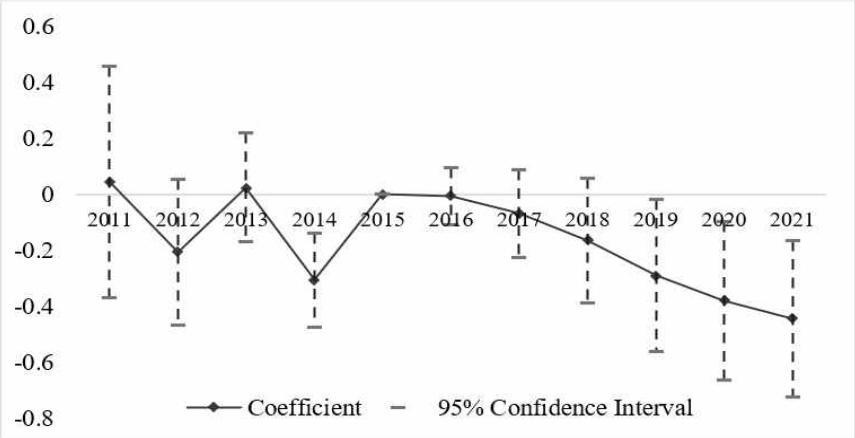
Variables	Coefficient	Robust Standard Error	95% Confidence Interval	
			Lower Bound	Upper Bound
$Lag_{i(-4)}$ (2011)	0.045	0.210	-0.368	0.460
$Lag_{i(-3)}$ (2012)	-0.205	0.133	-0.467	0.055
$Lag_{i(-2)}$ (2013)	0.024	0.098	-0.169	0.219
$Lag_{i(-1)}$ (2014)	-0.306***	0.085	-0.475	-0.137
$Lead_{i(1)}$ (2016)	-0.005	0.051	-0.107	0.095
$Lead_{i(2)}$ (2017)	-0.068	0.079	-0.224	0.087
$Lead_{i(3)}$ (2018)	-0.164	0.113	-0.386	0.058
$Lead_{i(4)}$ (2019)	-0.290**	0.138	-0.561	-0.018
$Lead_{i(5)}$ (2020)	-0.380***	0.144	-0.664	-0.096
$Lead_{i(6)}$ (2021)	-0.444***	0.142	-0.724	-0.163
$Growthpercap$	0.0067	0.005	-0.004	0.018
AYS	-0.422**	0.179	-0.775	-0.070
$SAF_{i,t-1}$	-0.0009**	0.0003	-0.001	-0.0001
$GAF_{i,t-1}$	-0.001***	0.0005	-0.002	-0.0003
$RSF_{i,t-1}$	-0.0002	0.0002	-0.0007	0.0001
$Primary$	-0.033	0.023	-0.079	0.012
$Secondary$	-0.082***	0.029	-0.139	-0.024
$Depend$	0.061	0.056	-0.049	0.171
$Unemp$	0.042***	0.016	0.010	0.075
$Constant$	16.686***	3.428	9.950	23.423

Notes: Dependent variable is poverty rate.
Number of observations is 5247. R^2_{adj} is 0.9827.
*** *1 percent significance level (0.01)*
** *5 percent significance level (0.05)*
* *10 percent significance level (0.10)*

▪ STATA output

<Figure 2> plots the estimated coefficients of variables Leads and Lags and their confidence intervals from <Table 1>. Graphical representation is a means to present event study results in a simple yet effective way. The Y axis shows the estimated coefficients of variables of Leads and Lags, indicating the program impact, while the X axis shows the time-period.

<Figure 2> The Coefficient Plots of Event Study Results for All Districts



▪ Authors' illustration

There are several cautionary notes when interpreting these results. The Difference-in-Difference methodology relies its evaluation on a common trend assumption. Before the intervention, the differences between the two groups are expected to be statistically similar to the baseline. For this study, it is shown by the Lags coefficients, which are not statistically significant. However, a statistically significant negative result is observed in the pre-reform period in Lag (1). This indicates several things. First, in 2014 the difference in poverty rates between treated and control districts was significantly lower compared to the difference in 2015. Second, there was a significant increase in the poverty

rate in 2015, which might be more prominent for the treated districts.

It is important to note that we are not using that lag as a baseline period. Additionally, the lags before that are not statistically significant, and the significant result is likely to owe to structural changes. Around the inception of the Village Fund Program, Indonesia experienced high inflation, causing a substantial increase in poverty in 2015. The government also stopped an empowerment-based poverty alleviation program called Program Nasional Pemberdayaan Masyarakat Mandiri (hereafter, PNPM Mandiri) at year-end 2014, which directly affected the poor.

The negative and significant coefficients following the initial implementation period in 2015 show that the Village Fund Program may considerably lower the poverty rate. However, these negative and significant results only began to appear in 2019, indicated by the upper bound limits of confidence intervals for the year 2019, 2020, and 2021 which are below zero. It suggests that the impact has been slow as it was unable to significantly lower the poverty rate within the first three years of implementation. However, <Figure 2> reveals that the program's impact becomes more significant over the years. Martak et al. (2018, 29) similarly found that the program's impact on per capita expenditure in 2017 was more significant than the impact in 2016 by using the DiD method.

This finding differs from that of Mujiwardhani et al. (2019). Despite applying an impact evaluation approach using the DiD framework, it found that the Village Fund Program was unable to reduce poverty rates. This different result may come from the difference in the data period examined. Mujiwardhani et al. (2019) analyzed the program's impact by employing data until 2017, i.e., two years after the policy implementation. However, according to the event study results of our paper, the Village Fund Program was able to significantly reduce the poverty rate

beginning in 2019. Prior to 2019, although the poverty rate was declining, the impact was still very low, thus not statistically significant, and could not be captured in those previous studies.

The slow impact of the program in alleviating poverty is also supported by Saragi et al. (2021), which through descriptive statistics, concluded that poverty rates were slightly declining despite the significant increase in the village fund disbursement. The Center for Budget Studies Expertise Board of the Legislative Body of Indonesia (2020) also found that the poverty decrease is not as sharp as one might expect.

The government of Indonesia also introduced other poverty alleviation programs. They include the Indonesian Conditional Cash Transfer Program under the name of "Program Keluarga Harapan" and the Unconditional Cash Transfer Program under the name of "Bantuan Langsung Tunai". These two programs are designed as direct cash transfer, thus immediately able to affect consumption and expenditure of the poor.

If provided around the poverty data collection period, this would surely affect the poverty rate since Indonesia uses a monetary expenditure approach to measure poverty. The latest unconditional cash transfer was provided by the government particularly for the rural poor as a response to the economic consequences of the COVID-19 pandemic in 2020. This transfer immediately decreased the rural poverty rate in 2020 by 0.03 percentage points compared to the rural poverty rate in 2019.[7] In contrast, the urban poverty rate increased by 0.69 percentage points.

Even though one of the primary purposes of the Village Fund Program is to alleviate poverty and promote community welfare, by design, this program is not a cash transfer directly given to the poor. As such,

7) KOMPAS (2020), "BLT Dana Desa Dinilai Ampuh Menurunkan Angka Kemiskinan", https://nasional.kompas.com/read/020/07/21/19443601/blt-dana-desa-dinilai-ampuh-menurunkan-angka-kemiskinan. (accessed on March 16, 2023)

compared to other programs, it is not possible to instantly relieve the community and quickly affect poverty. Instead, it is mandated and regulated by the President Regulation to fund development and community empowerment.[8)]

Specifically, the government stipulated that priority be directed to financing the execution of local village-scale programs and activities aimed at reducing poverty and enhancing the community's welfare and quality of life. Among them are the programs to fulfill basic needs, such as building health and education facilities, and programs to build community facilities and infrastructures, such as roads and irrigation systems. It is also prioritized for programs aimed at improving local economic potential, increasing entrepreneurship capacity, increasing income, and expanding the economic scale, such as building village markets and village business units (Setiawan et al. 2020).[9)] In other words, the program is designed to provide relief to the poor and promote community welfare through improvement in the standard of living and productive means that may have a long-term impact. Consequently, it will take some time for the programs to fully take effect since it takes time to formulate, establish, and implement them.

Additionally, at the beginning, the village fund budget was mainly spent on infrastructure and physical development rather than community empowerment (Adhayanto et al. 2019; Sutiyono et al. 2018, ii). KOMPAK et al. (2017) noted that the share of village fund used for infrastructure was 84 percent, while the share of economic empowerment was only 6.5

8) Ministry of Villages (2021), "Regulation of the Ministry of Villages, Development of Disadvantaged Regions, and Transmigration No. 7/2021 of Priority Use of Village Funds", https://peraturan.bpk. go.id/Home/Details/199693/ permendesa-pdtt-no-7-tahun-2021. (accessed on October 14, 2022)

9) Ministry of Finance (2021), "Village Fund: Definitions, Sources of Fund, and Priorities", https://djpb.kemenkeu.go.id/kppn/bukittinggi/id/data-publikasi/artikel/2951-dana-desa-pengertian,-sumber-dana,-penyaluran-dana,-dan-prioritasnya.html. (accessed on October 14, 2022)

percent. Thus, since the end of 2018, the government has encouraged the villages to shift their priority from infrastructure to empowerment.[10)]

The slow effect of village funds in alleviating poverty may also result from human factors. Initially, there were difficulties adapting to the new program (Center for Budget Studies Expertise Board of the Legislative Body of Indonesia 2020). Human resource competency and the local community's capacity in managing the fund are still low (Ramly et al. 2018). This leads to difficulties in formulating a solid plan, completing reports, and preparing for accountability (Center for Budget Studies Expertise Board of the Legislative Body of Indonesia 2020, 7). Community participation in managing the fund is also inadequate due to insufficient information. The government had only decided to commence capacity building for those managing the village fund in 2018. (Center for Budget Studies Expertise Board of the Legislative Body of Indonesia 2021).

2. Impact of the Village Fund on Poverty – Subsample Estimation

For a more extensive analysis of the impact of the funds, this study will follow a heterogenous analysis strategy by dividing the sample into smaller groups, commonly called subsample estimation. Distribution of the sample is done by looking at a characteristic called Construction Cost Index (hereafter, CCI). As previously mentioned in the Introduction, poverty incidence in Indonesia is heavily concentrated in a few regions, mainly in the eastern part. Therefore, this study employs a geographical measure to divide the sample into several groups.

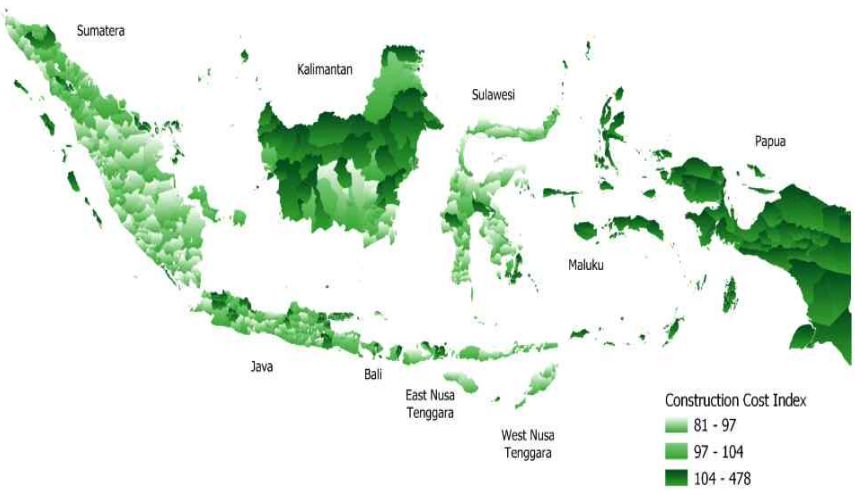
CCI is an index used to measure the cost of constructing a building in a region. This index is a spatial index, meaning it is used to compare

10) Local Government of Bekasi Regency (2018), "Dana Desa agar dimanfaatkan bagi Pemberdayaan Ekonomi", https://www.bekasikab.go.id/dana-desa-agar-dimanfaatkan-bagi-pemberdayaan-ekonomi. (accessed on October 12, 2022)

areas (Lolyta & Hariyanto 2022). A higher CCI indicates a higher cost required to construct a building in a particular area compared to the others. This index has been long used primarily for policy planning by the Government of Indonesia as a proxy to measure geographical disadvantages, including it as a basis to allocate intergovernmental transfers, such as GAF and SAF (Ministry of National Development Planning Indonesia 2020). This index also reflects the infrastructure condition of a region (Andina 2023).

Even though there is no common ground on how to divide CCI, this study will use the division of geographical characteristics that has been used by Joetarto et al. (2020) and Adinugroho et al. (2016). The CCI will be employed as a geographical indicator to divide the sample into three different groups: districts with high CCI, districts with medium CCI, and districts with low CCI. The cutoff value used is the quantile 3 division generated from the Stata application that divides the districts into three groups with fairly equal sizes.

<Figure 3> Map of Construction Cost Index by Districts in Indonesia



▪ Ministry of National Development Planning Indonesia (2020)

To better illustrate geographical disadvantage dispersion in Indonesia, a map portraying CCI by districts is presented in <Figure 3>. This map shows that districts located in the eastern part of Indonesia, particularly the Papua and Maluku Islands, have higher CCI, suggesting that they have poorer infrastructure and greater geographical disadvantage. While only a few districts in other parts of Indonesia have high geographical disadvantage, all districts in Papua and Maluku are highly disadvantaged. This is consistent with <Figure 1>, which shows that all districts in Papua and Maluku have significantly higher poverty rates compared to other regions.

<Appendix 4> summarizes the regression results of the three different districts subsamples divided based on their geographical disadvantages. To provide a more straightforward illustration, the estimated coefficients from the regression results are plotted in <Figure 4>.

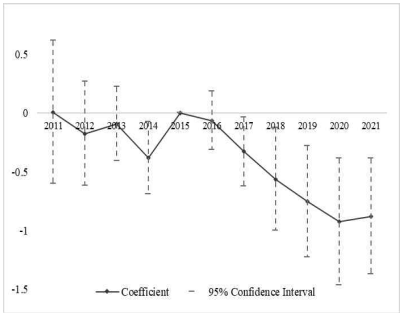
<Figure 4a> provides the coefficient plots of estimated coefficients for districts with low CCI or less geographical disadvantage compared to the other districts. <Figure 4b> illustrates districts with medium CCI or intermediate geographical disadvantage. Lastly, <Figure 4c> provides the plots for districts with high CCI, implying that these districts have high geographical disadvantage.

<Figure 4a> and <Figure 4b> show that the Village Fund Program could significantly lower the poverty rates in less geographically disadvantaged (low CCI) and moderately geographically disadvantaged districts (medium CCI), with similar magnitude and pattern as the previous estimate with all districts included. In these two types of districts, the Village Fund Program was only able to significantly decrease the poverty rate sometime after the program was first implemented in 2015. In the case of less geographically disadvantaged districts, the significant impact came in 2017, slightly faster compared to the districts with medium geographical disadvantage, whose significant

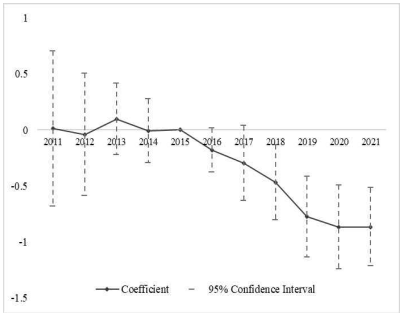
impact came in 2018.

<Figure 4> The Coefficient Plots of Event Study of Subsample Estimation by CCI

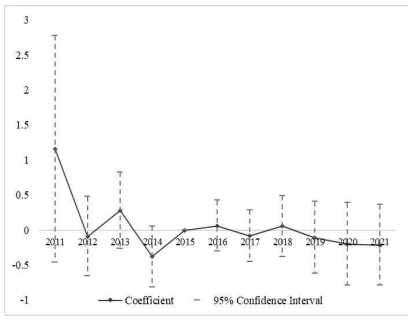
4a. Low CCI Districts



4b. Medium CCI Districts



4c. High CCI Districts



However, for the case of districts with high geographical disadvantage, <Figure 4c> suggests that the Village Fund Program has not significantly reduced the poverty rate. This is indicated by the estimate coefficients, which are not statistically significant from zero even until the year 2021.

This subsample estimation indicates the importance of geographical and infrastructure conditions for the Village Fund Program to alleviate poverty significantly. The magnitude and the dynamic of the program's impact differ and depend on the geographical and infrastructure condition. Therefore, it is essential to consider this aspect when implementing the

Village Fund Program.

This result is similar to Setiawan et al. (2020) which found that the village fund has more substantial impacts in areas with good geographic access or low geographical disadvantage. Also, the village fund is found to be unable to promote the community-level social welfare in the eastern part of Indonesia, which have higher geographical disadvantage than the western part (Badrudin et al. 2021). This is because welfare can be increased more significantly in areas with better infrastructure and low geographical disadvantage compared to regions with higher disadvantage and poorer infrastructure (Joetarto et al. 2020).

Several studies have emphasized that good geographical and infrastructure conditions are fundamental factors in alleviating poverty. Good infrastructure and low geographical disadvantage can reduce poverty through more active engagement from the poor during the process of economic growth by expanding their access to product and factor markets, lowering risks, increasing asset mobilization and utilization, and fostering empowerment (OECD 2007). This last aspect of promoting employment is particularly essential for implementing village fund since one of the priorities of this program is community empowerment. Therefore, the effect of the Village Fund Program can be compounded.

Similarly, Gaal and Afrah (2017) mentioned that infrastructure is a crucial component in poverty alleviation since it serves as a catalyst for development and amplifies the effects of policies implemented to increase access of the poor to other resources. Additionally, lowering geographic challenges increases agricultural and non-agricultural production and productivity, as well as job and income prospects (Ali & Pernia 2003). This means that it is imperative that the village authority in challenging areas prioritize the village funds into the infrastructure programs since the initial geographical condition in those regions are not yet favorable to

support poverty reduction and welfare enhancement. Thus, instead of encouraging all villages to shift their priority from infrastructure to empowerment, as promoted by the government since year-end 2018, the government should encourage more infrastructure development for these highly geographically disadvantaged districts.

The results signify several aspects to consider when implementing the Village Fund Program. First, as this program is designed to provide relief to the poor and increase welfare through programs related to infrastructure development and community empowerment, it takes time for the program to take effect in reducing poverty. As such, at the beginning, the program was not able to significantly alleviate poverty, although a slight impact can be observed. Hence, a careful and more prolonged examination is needed when examining the effect of this program. Second, capacity and capability building, especially for the village officials responsible for managing the village fund, should be pursued continuously to expedite the program's impact. Third, the village fund priority should be based on a consideration of the geographical and infrastructure condition of a particular region to ensure that the program has strong impact.

Despite being able to provide more robust estimates of the impact of a program, the DiD Event Study Framework with the chosen identification strategy for this study is unable to consider the difference in intensity of the program within the treated districts. Thus, this study is not able to predict the change in the poverty rate for one additional Rupiah of village fund provided for treated districts. The result of this study, therefore, should not be interpreted as the impact of the money provision itself. Instead, it should be only interpreted as the impact of implementing a set of transfer designs as a whole to program recipients by comparing them to non-recipients.

To capture the difference in intensity, future research can implement the DiD Event Study Framework with continuous treatment to capture the difference in the amount of village fund provided for each treated

district. Future research may also implement different identification strategies by dividing treated districts into several sub-treatment groups based on the amount of village funds provided. The most challenging part of any study is data availability. This study could only obtain data up to the district level (one level above the village) even though the fund is dispersed for each village. Therefore, it could not capture each village's different characteristics, which may provide a more robust estimation of the impact of the fund implementation.

Ⅴ. Conclusion

This paper investigates the impact of the Village Fund Program on poverty alleviation in Indonesia, using approximately 500 district-level data from 2011 to 2021. Previous studies are largely descriptive or based on correlations, thus failing to analyze the causality of the Village Fund Program. Therefore, this research applies an impact evaluation approach called Difference-in-Difference Event Study Framework. This is possible due to the availability of more extended data periods before and after the initial policy implementation. Besides providing more robust identification, this study enables us to examine a program's impact and its dynamic or temporal variation.

For all districts cases, the analysis shows that the Village Fund Program does have a significant impact on reducing poverty rates, even though the effect is slow and could only be seen significantly four years after the inception in 2015. The results also show that the impact is becoming more significant over the years. Studies show that this slow effect of village fund may result from several factors.

First, the Village Fund Program is not designed as a cash transfer directly to the people. Thus, it is not possible to provide direct relief to

the community and quickly reduce the poverty rate. Instead, it is mandated and regulated by the President Regulation to prioritize infrastructure development, such as building health and education facilities, and directed to fund community empowerment, such as increasing entrepreneurship capacity and building village business units. Consequently, it will take time for the programs to fully take effect.

Second, in practice, the village fund has been invested mostly to infrastructure and physical projects rather than community empowerment at the beginning. The government started encouraging villages to shift their priority from infrastructure to empowerment at year-end 2018. This also may explain why the policy began to take effect significantly in 2019.

Lastly, the slow effect of the village fund comes from a limited aptitude and competency of the village officials and the community not only in administering the fund but also in formulating a plan, completing reports, and preparing for accountability. Furthermore, at the beginning, there were difficulties adapting to the new program.

The results from the subsample estimation dividing the districts based on their geographical disadvantages found that the fund has no impact on reducing poverty in areas with high geographical disadvantage and poor infrastructure. Previous studies have emphasized the importance of infrastructure and geographical conditions in alleviating poverty by increasing productivity, reducing risk, increasing asset mobilization and access, increasing employment, and promoting empowerment. Thus, it is suggested that the Indonesian government not force these highly geographically disadvantaged regions to prioritize empowerment since their initial geographical conditions do not support poverty alleviation. Instead, they should prioritize the village fund for infrastructure development.

Although this study contributes to a better understanding of the issue at hand by applying an impact evaluation approach, it is not free from certain limitations. Despite being able to provide more robust estimates of

the impact of the village fund, the chosen identification strategy cannot consider the difference in the amount of village fund provided among the treated districts. Also, due to data limitation, this study uses district-level data, although the Village Fund Program is implemented on a village basis. Consequently, this might overlook differences in the characteristics of each village and might affect the estimation results.

<Appendix 1> Operational Definitions of Variables

No.	Variables	Operational Definitions	Data Source	Data Unit
1	Poverty Rate (Head Count Index - P0)	Percentage of the country's population living below the poverty line (Taufiq et al. 2021).	Statistics Indonesia	Percent
2	Unemployment Rate	Percentage of the unemployed to all available labor force. It reflects the proportion of the labor force who do not possess jobs, are actively looking for one, and are willing to work (Statistics Indonesia 2022, 111).	Statistics Indonesia	Percent
3	Average Years of Schooling	The number of years spent by residents 25 and older in taking formal education. It reflects the human capital stock of a region and people's ability to access education (Nugroho et al. 2021, 11).	Statistics Indonesia	Years
4	Dependency Ratio	The proportion of the population who are not economically productive (0-14 and over 64 years old) to those who are of working-age (15-64) (United Nations 2007, 58)	Statistics Indonesia	Percent
5	General Allocation Fund (GAF)	GAF is a fund drawn from the central budget and provided to all regions in Indonesia to distribute financial resources equally to support local needs while adopting decentralization.[11]	Ministry of Finance	Billion Rupiahs
6	Special Allocation Fund (SAF)	SAF is funding provided only to specific regions to fund special programs in accordance with national priorities.[12]	Ministry of Finance	Billion Rupiahs
7	Revenue Sharing Fund (RSF)	RSF is money sourced from the national budget and disbursed to the regions based upon some percentages.	Ministry of Finance	Billion Rupiahs
8	Growth of Gross Regional Domestic Product (GRDP) at 2010 Constant Prices	The annual change in GRDP at 2010 Constant Prices. GRDP at constant prices is used to compute economic growth as it represents the value-added of all products and services in a given year using baseline price (Logaritma 2022).	Statistics Indonesia	Percent
9	Percentage of GRDP at Current Prices by Types of Sectors	GRDP at current prices may be used to show how the economy is changing and how it is structured (Logaritma 2022). In Indonesia, they can be grouped into three big sectors: Primary, Secondary, & Tertiary.	Statistics Indonesia	Percent

11) Ministry of Finance (2006), "Law No. 13/2005 of Central Budget Fiscal Year 2006", https://www.dpr.go.id/dokjdih/document/uu/55.pdf. (accessed on October 14, 2022)

12) ibid.

<Appendix 2> Operational Definitions of Variables

District id (i)	Year (t)	Event	Post-Event	Time to Event	Lag4	Lag3	…	Lead 5	Lead 6
1305	2011	2015	0	-4	1	0	…	0	0
1305	2012	2015	0	-3	0	1	…	0	0
1305	2013	2015	0	-2	0	0	…	0	0
1305	2014	2015	0	-1	0	0	…	0	0
1305	2015	2015	1	0	0	0	…	0	0
1305	2016	2015	1	1	0	0	…	0	0
1305	2017	2015	1	2	0	0	…	0	0
1305	2018	2015	1	3	0	0	…	0	0
1305	2019	2015	1	4	0	0	…	0	0
1305	2020	2015	1	5	0	0	…	1	0
1305	2021	2015	1	6	0	0	…	0	1
3175	2011	.	0	.	0	0	…	0	0
3175	2012	.	0	.	0	0	…	0	0
3175	2013	.	0	.	0	0	…	0	0
3175	2014	.	0	.	0	0	…	0	0
3175	2015	.	0	.	0	0	…	0	0
3175	2016	.	0	.	0	0	…	0	0
3175	2017	.	0	.	0	0	…	0	0
3175	2018	.	0	.	0	0	…	0	0
3175	2019	.	0	.	0	0	…	0	0
3175	2020	.	0	.	0	0	…	0	0
3175	2021	.	0	.	0	0	…	0	0

▪ Authors' illustration

<Appendix 3> Descriptive Statistics

Variable	Obs.	Mean	Standard Deviation	Min. Value	Max. Value
Code	5247	-	-	1101	9471
Year	5247	-	-	2011	2021
District	5247	-	-	-	-
Poverty Rate (pzero)	5247	12.52	7.46	1.33	47.52
Treatment Control Dummy (treat)	5247	0.84	2.93	-4.00	6.00
Village Fund	5247	72.51	97.15	0	635.31
Average Years of Schooling (AYS)	5247	7.94	1.64	1.64	12.83
General Allocation Fund (GAF)	5247	625.11	285.36	0	2163.43
Special Allocation Fund (SAF)	5247	177.88	136.63	0	851.44
Revenue Sharing Fund (RSF)	5247	131.65	307.21	6.23	5176.04
GRDP per capita at 2010 Constant Prices growth (growthpercap)	5247	3.24	4.41	-63.39	36.15
Share of Primary Sector in GRDP (primary)	5247	33.50	19.21	0.09	91.87
Share of Secondary Sector in GRDP (secondary)	5247	23.91	14.22	2.08	91.15
Dependency Ratio (depend)	5247	52.17	8.62	34.03	89.31
Unemployment Rate (unemp)	5247	5.25	2.91	0.05	19.33

▪ Calculated using STATA

<Appendix 4> Regression Results for Subsample based on Construction Cost Index

Variables	CCI		
	Quantile 1 CCI (Low)	Quantile 2 CCI (Medium)	Quantile 3 CCI (High)
	(1)	(2)	(3)
$Lag_{i(-4)}$ (2011)	0.006 0.309	0.010 0.352	1.159 0.822
$Lag_{i(-3)}$ (2012)	-0.175 0.225	-0.041 0.278	-0.090 0.287
$Lag_{i(-2)}$ (2013)	-0.093** 0.159	0.096 0.163	0.280 0.277
$Lag_{i(-1)}$ (2014)	-0.380 0.155	-0.010 0.145	-0.380 0.221
$Lead_{i(1)}$ (2016)	-0.065 0.126	-0.180 0.101	0.060 0.183
$Lead_{i(2)}$ (2017)	-0.326** 0.148	-0.296 0.169	-0.083 0.188
$Lead_{i(3)}$ (2018)	-0.562** 0.222	-0.467*** 0.170	0.056 0.220
$Lead_{i(4)}$ (2019)	-0.750*** 0.240	-0.776*** 0.184	-0.108 0.261
$Lead_{i(5)}$ (2020)	-0.922*** 0.273	-0.867*** 0.190	-0.200 -0.299
$Lead_{i(6)}$ (2021)	-0.877*** 0.248	-0.865*** 0.177	-0.214 0.292
$Growthpercap$	-0.011 0.007	-0.020*** 0.006	0.004 0.008
AYS	-0.205 0.264	-0.125 0.265	-0.210 0.267
$SAF_{i,t-1}$	-0.0005 0.0005	-0.0007* 0.0004	-0.0003 0.0008
$GAF_{i,t-1}$	-0.0004 0.0007	-0.0006 0.0007	0.00002 0.001
$RSF_{i,t-1}$	0.0004 0.0004	-0.0002 0.0002	-0.00007 0.0003

Primary	-0.127*** 0.034	-0.048* 0.028	-0.009 0.037
Secondary	-0.075** 0.037	-0.048 0.031	-0.054 0.050
Depend	-0.721*** 0.099	-0.243*** 0.072	0.381 0.053
Unemp	-0.019 0.021	0.059** 0.024	0.036 0.027
Constant	58.208*** 5.925	28.311*** 4.614	-3.021 4.199
Number of Observations	1634	1825	1653
R^2_{adj}	0.981	0.983	0.989
F- Statistics	5.80	4.38	7.70
Notes: Dependent variable is Poverty Rate. Robust Standard Error is in parentheses. *** 1 percent significance level (0.01) ** 5 percent significance level (0.05) * 10 percent significance level (0.10)			

▪ STATA output

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| **논문투고일** : 2023년 01월 30일 |
| **논문심사일** : 2023년 03월 02일 |
| **게재확정일** : 2023년 03월 19일 |

| 국문초록 |

인도네시아 빈곤 완화에 대한 마을 기금 프로그램의 영향 분석

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높은 빈곤율은 개도국들에게 큰 과제이다. 인도네시아 정부는 이를 해결하기 위해 2015년부터 마을 기금 프로그램을 운영하고 있다. 이 프로그램은 7만 개의 마을에 기금과 기금운영 권한을 부여함으로써 해당 지역의 경제성장을 촉진하는 데 그 목적이 있다. 본 연구는 이중차분법 사건연구 프레임워크를 적용한 영향평가 접근법을 사용하여 이 프로그램이 빈곤 완화에 얼마나 기여하고 있는지 고찰하였다. 본 연구는 약 500개의 지역구를 대상으로 2011년부터 2021년까지 기금을 지원받은 곳과 지원받지 않은 곳의 빈곤율을 비교·분석하였다. 이러한 식별전략을 통해 동 프로그램의 영향과 동적 변화에 대한 보다 정밀한 추정치를 산출할 수 있었지만, 기금 정도에 따라 수혜 지역 빈곤율이 얼마나 감소되는지는 고려할 수 없었다. 관찰된 지역구는 지리적 난이도 조건을 기준으로 세 그룹으로 구분하였다. 실증 결과는 마을 기금 프로그램이 2015년 처음 도입 후 4년 뒤 모든 지역구 내 빈곤율 감소에 유의미한 영향을 미쳤다는 것을 보여준다. 지리적 난이도가 낮은 지역구에서는 2017년부터 빈곤율 감소에 유의미한 영향이 나타났고 지리적 난이도가 보통인 지역에서도 2018년부터 유의미한 영향이 나타났다. 그러나, 이 프로그램은 지리적 난이도가 높은 지역의 빈곤율 감소에는 큰 영향을 미치지 않았다. 이는 초기의 지리적 조건 및 인프라 여건의 중요성을 시사하고 있다. 지리적 난이도가 높은 지역에서는 마을 기금을 지역 사회 역량 강화의 목적으로 사용하는 것보다 인프라 개발에 중점을 두는 것이 보다 도움

이 될 것으로 보인다.

▪ 주제어: 마을 기금, 빈곤, 인도네시아, DiD, 사건연구