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Village funds and poverty reduction in Indonesia: new policy insight

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Abstract

This short communication describes the current experience of implementing village funds in Indonesia, with an emphasis on the impact on poverty reduction. The authors' field observation is complemented by structured interviews and regression analysis. Our findings suggest that the potential of village funds is not fully realized. We point out that officials underestimated the significance of bottlenecks related to the capacity of local governments, to the implementation of coordination mechanisms, and to the installation of feedback mechanisms, each of which critically hinge on administrative and technical policy processes. At the same time, we felt that the officials overestimated the importance and effectiveness their own political agendas promoting community empowerment and corruption prevention.

1 Introduction

The research undertaken by our team was focused on the impacts of village funds on poverty reduction in Indonesia. As is typical for many developing countries, Indonesia has a large population (270,20 million inhabitants) and a high population density (141 people per km²) [1]. These demographic characteristics present one of the factors contributing to pressing social problems, first of all poverty [1]. To tackle these problems, Indonesia implemented fiscal decentralization reforms which were supposed to overcome the centralized system that existed during the 32 years of Soeharto presidency. Under Soeharto, local governments lacked powers of self-development and ultimately failed to bring prosperity to local communities. In the period between 2014 and 2019, the Indonesian government has been using village funds policies for empowering the villagers' economic wellbeing and achieving a reduction of rural poverty [1]. Data from the Central Bureau of Statistics (2022) indeed show that, compared with the year 2015, the 2022 poverty rate decreased, with the number of poor people falling from 28,51 million to 26,16 million, as of March 2022 [1]. A look at the trend of the previous years confirms that the reduction in poverty by 2022 is even greater, despite a setback induced by the Covid-19 pandemic in 2022 [1]. All in all, it seems fair to say that the village funds have considerably contributed to improving the welfare of Indonesian rural villages by strengthening their infrastructures, such as schools, health service centres, and clean water supply facilities.

At the same time, in the Western development literature, decentralization reforms in developing countries are known to have brought a lot of frustration [2]. In Indonesia, these reforms were aimed at improving service delivery at the lowest administrative tier in order to reduce social inequality and poverty [3]. Yet, as shown by [3], the funds allocation

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mechanisms used in the process took little account of the heterogeneity of villages and suffered from incompetency in local financial management, lack of accountability for public service delivery, and high levels of corruption. Further studies confirmed that improving transparency and accountability remains the key governance challenge of the Indonesian decentralization reforms, especially in view of the strong variation among Indonesian provinces [4], and the prevalence of political and ideological biases in the Indonesian public sector auditing [5].

We can complement this state of art with our own subjective impressions and experiences of presenting the results of our research on village funds to senior Indonesian government and other public officials. Briefly, we felt that officials underestimated the significance of bottlenecks related to the capacity of local governments, to the implementation of coordination mechanisms, and to the installation of feedback mechanisms, each of which critically hinge on administrative and technical policy processes. At the same time, we felt that the officials overestimated their own political agendas related to issues such as community empowerment and corruption prevention. What we perceived as under- and overestimation is necessarily subjective; but what may claim more objectivity is our observation that the village funds policies tend to be based on the beliefs of officials rather than on hard scholarly evidence.

2 Village funds in Indonesia: background

The decentralization era in Indonesia was ushered in by the adoption of the Laws No. 22 and 25 in 1999, and the Law No. 33 in 2003, which regulated the balance of finance between the central and local governments [1]. The delegation of financial management to local governments has been a powerful signal that local provinces were indeed given authority to run their own households. In addition, the Law No. 28 of 2009 on Regional Taxes and Regional Levies regulated the responsibility of Regional Governments for helping local communities to obtain funding for regional development. Thus it seems fair to say that fiscal decentralization reforms in Indonesia are aimed at creating regional independence through the delegation of authority in all fields, except foreign policy, defense, security, judicial, monetary and religious affairs. The reforms are guided by the „money follows function“ principle which serves to reduce horizontal and vertical imbalances [6]. According to [7], the reforms contributed to improving the quality of public service delivery in the local regions and to reducing disparities between them.

In the context of the decentralization reforms, village funds have been an effective instrument of the realization of the governmental goal of promoting equitable development at the lowest level. This effect of the village funds is anchored in the 3rd Cita in the President Jokowi Government Nawacita 2014–2019, under the title *“Membangun Indonesia dari pinggiran dengan memperkuat daerah-daerah dan desa dalam kerangka Negara Kesatuan Republik Indonesia”* (Developing Indonesia from the periphery by strengthening the regions and villages within the framework of the Unitary Republic of Indonesia) [1].

Kartohadikoesoemo [8] traced the historical roots of the village funds in Indonesia back to the Dutch colonial era, and more specifically to the adoption of the *Inlandsche Gemeente Ordonnantie* in 1906. At that time, the Pamong Praja managed to arrange village funds in the Java to Madura area with the intention to make sure that village households would be able to cover the necessary expenses [1]. The village funds were collected by withdrawing the contributions from the villagers according to the sub-district head’s orders. Then, the funds that had been so collected were handed over to the village head and used for the village infrastructure development.

In the current Indonesian practice, the village funds operate as conditional grants that are targeted at specific activities planned by the beneficiary and unavailable for any other activities. Operated in this way, the village funds promote rural development and reduce poverty, particularly by encouraging the consumption of public goods according to the needs of the village community. At the same time, the village funds, especially if they are substantial, pose a serious governance challenge for the village council as well as for the central government which has to oversee the use of these funds by village councils throughout the country [1].

In the period between 2014 and 2019, the Indonesian government has shifted the prioritization of the village funds away from building infrastructure to empowering the villagers’ economic wellbeing, with the specific purpose of rural poverty reduction. Data from the [9] indeed show that, compared with the year 2015, the 2022 poverty rate decreased, with the

number of poor people falling from 28,51 million to 26,16 million, as of March 2022. A look at the trend of the previous years confirms that the reduction in poverty by 2022 is even greater. This trend, however, was countered by the Covid-19 pandemic, which likely caused the increase of poverty in 2020 to 27,55 million people, from 24,79 million in 2019. All in all, it seems fair to say that the village funds have considerably contributed to improving the welfare of Indonesian rural villages by strengthening their infrastructures, such as schools, health service centres, and clean water supply facilities. Following fig.1 shows development of village funds in details.

3 Data and methods

For our research, we used a mixed method approach which was based on the following approaches structured interview, econometric analysis, field research and personal observation. we believe that our approach based on a combination of several methods will help us reduce the complexity of the problem under study.

The first step was to conduct structured interviews with policy makers. The Table 2 in appendix presents basic information about the design of the structured interviews. Our strategy in delivering structured interview questions is through direct communication that we do with the respondents via email. We presented twelve structured interview questions that have been developed based on the research questions and their relationship to our research objectives. Therefore, with all these questions, a complete picture of the management of village funds and their relationship to poverty reduction in Indonesia is expected. All respondents are asked the same research questions. Our research questions were sent via email in May 2022. Answers were received in the period from June to July 2022. In addition, to strengthen the results of the study, we conducted field research from 2020 to 2022 which consisted of observations, discussions with local officials, the non-profit sector, and the community. Direct observations to conduct field research were carried out from 2020 to 2022 in five villages consisting of three villages in Bangkalan Regency, one village in Sumenep Regency, and one village in Indramayu Regency [1].

The econometric model that we use in this research is based on the IDM data. The research model approach offered by [10] can be seen in the following model equation

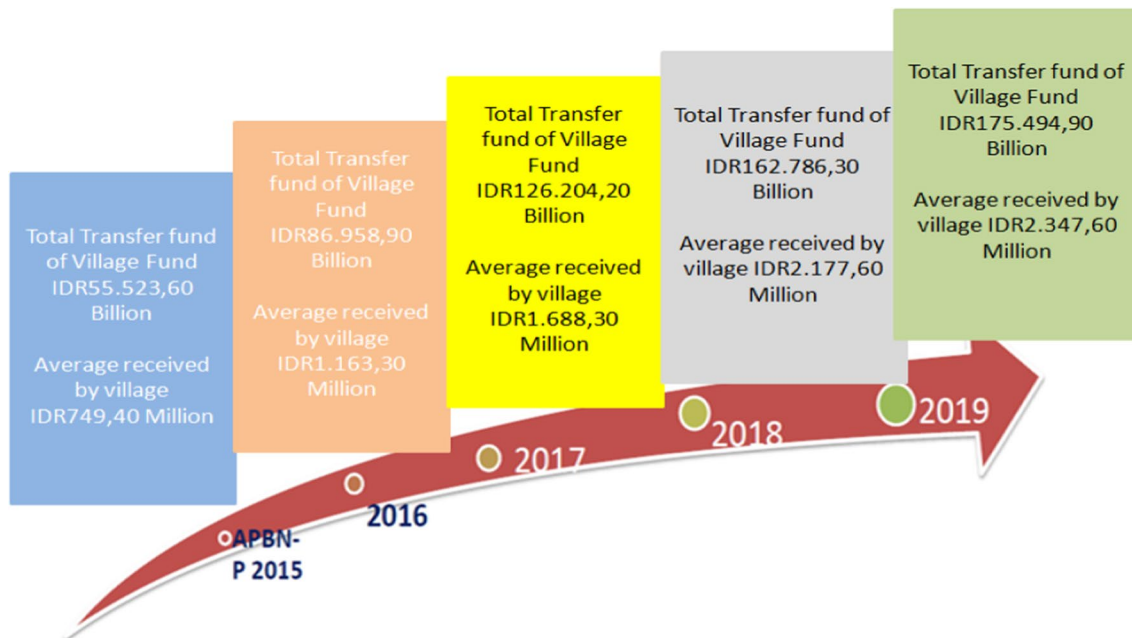


Fig. 1 Village fund details in 2015 to 2019. Source: [1]

$$\begin{aligned}
Y \text{ [poor families]} = & a + \beta_1 X_1 \text{ [share of village fund/pc]} \\
& + \beta_2 X_2 \text{ [village fund/prop]} \\
& + \beta_3 X_3 \text{ [spending]} + \beta_4 X_4 \text{ [population]} \\
& + \beta_5 X_5 \text{ [unemployment rate]} \\
& + \beta_6 X_6 \text{ [drink water]} + \beta_7 X_7 \text{ [internet access]} \\
& + \beta_8 X_8 \text{ [school building]} \\
& + \beta_9 X_9 \text{ [medical assistant]} \\
& + \beta_{10} X_{10} \text{ [government bank]} \\
& + \beta_{11} X_{11} \text{ [private bank]} \\
& + \beta_{12} X_{12} \text{ [villagers education]} + \beta_{13} X_{13} \text{ [road quality]} \\
& + \beta_{14} X_{14} \text{ [market]} \\
& + \beta_{15} X_{15} \text{ [gender]} \\
& + \beta_{16} X_{16} \text{ [education level of head of village]} \\
& + \beta_{16} X_{16} \text{ [transparency and accountability]} \\
& + \beta_{17} X_{17} \text{ [public participation]} + \varepsilon
\end{aligned}$$

The IDM data that we have consists of 3 years. Those are 2019, 2020, and 2021. We get a different number of data from village samples each year. In the year 2019, We obtained data sampling of 48.702 villages. In 2020, we got data sampling of 71.106 villages. Meanwhile, in 2021, we collected 76.750 data samples. The full results of model are presented in appendix.

The last method used was personal observation. In August 2022, two members of our team visited Indonesia, where they had the opportunity to meet with the country's top officials and present the results of their research.

4 Results

In this section we present the empirical results of our research and a reflection on the personal observation. The empirical results are based on a linear regression model that uses official IDF data. The regression model is supplemented with anonymized illustrative statements that represent the results of the structured interviews. The last section is illustrated by the authors' own reflection based on personal observation.

4.1 Empirical findings

Our qualitative and quantitative (see the full results of regression model in appendix Table 3) results confirm that the village funds have an appreciable effect on poverty reduction, both in terms of direct cash assistance strengthening people's purchasing power and additional benefits for the village progress, such as infrastructure development. Regression show connection fund village (Village.funds.pc) with poverty significant negative on 2019, 2020, and 2021. That is, every addition fund village one rupiah (Village.funds.pc) will lower poverty by $-3.684e-05$, $-3.885e-05$ and $-8.130e-07$ on 2019, 2020 and 2021, *ceteris paribus*.

At the same time, our results shows that the effectiveness of village funds policies depends on several conditions. For one, these policies must take account of the number of village residents, as this number influences the transfers from the central government to the village. Furthermore, these policies may hamper village independence and actually increase poverty if the village becomes too dependent on transfers from the central government. Based on our results, we draw attention to the desirability of minimizing this dependence by increasing the village's own income which is managed by the village itself.

Anonymized illustrative clam from interview: „*Due to the misuse of the village fund budget will have a very negative impact on the ideals of accelerating village development and improving the welfare of rural communities.*“

We also note the asymmetric impacts of village funds in specific regions; whereas in some regions village funds reduce the number of poor households, they worsen the situation in others. The provincial variable has a positive (+) and negative (-) impact with significant results on the number of poor families at the rural community level in Indonesia.

There are five provinces that have a positive impact, namely Central Java, East Java, West Java, DI Yogyakarta and Nusa Southeastern West. While the other thirteen provinces have a negative relationship (for detailed results please see Table 3 in the appendix). Another interesting conclusion is that community participation in managing village funds does not seem to have been maximized.

Anonymized illustrative claim from interview: „*There is still a lack of awareness and community participation in participating in the deliberation in the development planning process in the village.*“

The village heads seem to retain a privileged position in the village funds management. This is likely due to her own vested interests as well as to the low level of public education in the community. Even though we observed community participation in several villages, it did not have a significant impact on poverty in overall terms. It seems fair to say that whereas the implementation of village funds has helped to reduce poverty level, it continues to suffer from persisting problems with governance and accountability of local governments.

Our results lead us to believe that the most effective and simple step to improve the outcome of village funds is to let the central government precisely specify their objectives, followed by the setting of control indicators by the Supreme Audit Office.

Anonymized illustrative claim from interview: „*Audit office assesses that the village ministry does not yet have a clear role and authority, so there is a potential for overlapping tasks and authorities between agencies in managing village funds.*“

These steps will signify an improvement of accountability and transparency mechanisms in the village funds implementation. While our results show that the transparency variable is not statistically significant, we see evidence that mayors and villagers have a better understanding of what needs to be financed with village funds than the central government. Thus we conclude that the effectiveness of village funds in combating poverty will be strengthened by bringing in a supreme audit office to provide external control.

Another significant problem in the management of village funds is the low administrative capacity of villages which results in the inability of mayors to make effective decisions about the use of funds.

Anonymized illustrative claim from interview: „*The main tasks and functions that are not paid attention to at the village level are the Village Head.*“

The problems of the low administrative capacity are manifest in the considerable variation in the effects of village funds across jurisdictions. We believe that these problems can be addressed by strengthening the coordinating role of the central government, which could set minimum standards and provide public goods and services in each village.

4.2 Reflection on personal observation

In September this year, two of us, undertook a research trip to Indonesia and had a unique chance to talk to one of the top officials of the Indonesian government, accompanied by several close advisers. We presented our research findings about the impact of village funds on poverty reduction in this country, a topic in which our Indonesian colleagues took genuine interest. Our results on the whole confirmed that village funds indeed had that impact, and that was the message that our Indonesian hosts warmly welcomed. But that was not all that we said. We went on to present data that showed the effects of village funds to strongly vary across provinces, and drew attention to the existence of some bottlenecks of village fund administration, with issues of administrative capacity and accountability being particularly crucial. Interestingly, these were the details that our highly respected Indonesian colleagues were less keen to hear. One of the advisers remarked that the main purpose of village funds was to support the local communities by putting the money as close to the people as possible. The very nature of this purpose implied, he instructed us, strict public controls, high accountability requirements, and a virtual impossibility of any sort of corruption. The meeting ended on a friendly note encouraging us to deepen our practical understanding of the subject-latter in such a way as to bring it closer to the standpoint of our hosts. Thereafter, we continued our trip and visited some local provinces. At a meeting with one of the local officials in a very poor and underdeveloped province, we could not help but notice his designer sneakers worth several thousand dollars. He was in charge of the administration of local village funds.

Contemplating the official's outfit, we were struck by the perseverance of a weird gap between the policymakers' perceptions of the way village funds operate and the scholarly evidence of their effectiveness. The evidence was less optimistic than the policymakers. Our qualitative and quantitative results confirmed that the village funds have an appreciable effect on poverty reduction, both in terms of direct cash assistance strengthening people's purchasing power and additional benefits for the village progress, such as infrastructure development.

In the following Table 1, we summarize the main observed differences between policy makers' perceptions and our empirical results.

Table 1 Main observed differences between policy makers’ perceptions and our empirical results

Issue	Policymakers’ claim	Our research results
Significance of context	"Your country has socialism, we have a capitalist system. Your experience is not transferable."	We found many similarities in the reform trajectory, not only in developing countries but also in Western countries
Different understanding of key terms	"There is no corruption in the administration of village funds;" "Village funds are transparent and properly controlled;"	In structured interviews, we found that politicians perceive control and transparency differently than representatives of audit bodies. Also, the results of the econometric model showed that transparency and accountability variables are not statistically significant in the given context
Lack of trust	"We are currently collecting our own data to analyse the problem effectively".	In our analysis we also used data from official sources, some of the data show problems
Political interest	The implementation of village funds has been successful. We want to give the local community the opportunity to decide where the money goes. That is the best method. We are developing very dynamically and more decentralisation will help us move things forward	The potential of village funds is not fully realized; the effects of village funds vary by jurisdiction. Also, the conditions for effective participation of all groups are not created. Local governments do not have the capacity to implement challenging programmes

Sources: example [11–14]

5 Concluding remarks

We support the prevalent belief of the Indonesian policy-makers that village funds may promote poverty reduction, but we see a considerable need for adding nuance. Despite their salutary effects, village funds are not free of problems related to asymmetric impacts and to the limited capacity of local governments to use them effectively. Problems of accountability and transparency are no less serious. These results are consistent with recent empirical studies focusing on research on the impact of village funds in Indonesia (see [15–18]).

All these problems have been addressed by much prior scholarly work, but strangely absent from the policy-makers' mental models. Even though policy-makers did admit a lack of solid empirical evidence on the performance of village funds, they were not ready to register the evidence if it did not fit the mental model. We felt that that was the case with the evidence on corruption, lack of capacity, and lack of coordination.

Our analysis showed that there is considerable variation in the effects of village funds across jurisdictions. In some places they improve the situation and in others they make it significantly worse. There is therefore a need to provide local government support to reduce the variation in the quality of implementation. The creation of implementation or support units within regions to assist individual mayors with implementation appears to be an appropriate tool.

Briefly, we felt that officials underestimated the significance of bottlenecks related to the capacity of local governments, to the implementation of coordination mechanisms, and to the installation of feedback mechanisms, each of which critically hinge on administrative and technical policy processes. At the same time, we felt that the officials overestimated the importance and effectiveness of their own political agendas promoting community empowerment and corruption prevention. We believe that understanding the beliefs of the officials is important because the village funds policies tend to be based precisely on these beliefs rather than on hard scholarly evidence.

In view of the interesting experiences that we made, we call on researchers to explore the process of how politicians and policy-makers update their beliefs in the light of the results of academic studies [19]. Perhaps this updating is more effective if the presentation of research findings puts less emphasis on regression coefficients and confidence intervals and rather relies on lively stories and interactive discussions. We hope that the story that we present in this communication will stimulate a closer interaction of scholars and policy-makers.

Author contributions MP prepared research design. CA was responsible for qualitative and quantitative data gathering. VV worked on discussion and conclusion. CdC was responsible for econometrics modelling. All authors contributed equally to the study.

Data availability The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request.

Declarations

Competing interests The authors declare no competing interests.

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Appendix

See Tables 2 and 3.

Table 2 Design of structured interviews

Respondents	Associate with village funds	Interview questions
Minister of Village	As a representative of the Central Government which makes regulations on priority for the use of village funds	Has the Village Fund succeeded in reducing poverty in rural communities in Indonesia?
Minister of Interior Affairs	As a representative of the Central Government which makes regulations on village financial management and supervision of village funds	Are there any obstacles in managing the Village Fund in the village? Is there any corruption in the management of the Village Fund?
Member of Supreme Audit Board	External auditor of the Indonesian government who has the duty and authority to conduct audits on financial management and implementation of village fund policies	Does the Village Fund have an impact on economic growth in the village? Does the Village Fund have an impact on the quality of service and education in the village?
Governor	As a representative of the central government who carries out the task of Supervision and Guidance on the Management of Village Funds in the provincial area to the Major	Has the Village Fund provided the public procurement needed by the village community? Has the Village Fund been managed by implementing good governance in the village?
Mayor	As a representative of the central government who carries out the task of Supervision and Guidance on the Management of Village Funds in the provincial area to the village head	Has the use of Village Funds in the village been carried out with adequate supervision and monitoring?
Head of Village	As the executor of village funds in the village	Has the Village Fund been implemented and used according to the provisions?
Communities	Carry out direct supervision of the implementation of village funds carried out by the village government	Is the Village Fund fully managed according to the wishes of the village, or is there intervention from the central government? Have there been any unwanted positive or negative impacts from the Village Fund implementation? Should the Village Fund Policy be continued in the future?

Table 3 The estimation of impact of willage funds on powerty

	2019			2020			2021					
	Full Model		Stepwise model	Full Model		Stepwise model	Full Model		Stepwise model			
	Estimate	Pr(> t)	Estimate	Pr(> t)	Estimate	Pr(> t)	Estimate	Pr(> t)	Estimate	Pr(> t)		
(Intercept)	- 4.270e+02	0.007785**	- 3.656e+02	0.012166*	- 5.202e+01	0.867037	- 4.777e+01	0.048188*	- 1.105e+01	0.900368	3.307e+01	0.267296
Village.funds.pc	- 3.684e-05	< 2e-16***	- 3.718e-05	< 2e-16***	- 3.885e-05	< 2e-16***	- 3.907e-05	< 2e-16***	- 8.130e-07	< 2e-16***	- 8.049e-07	< 2e-16***
Village.funds.prop	1.771e+00	< 2e-16***	1.779e+00	< 2e-16***	2.052e+00	< 2e-16***	2.034e+00	< 2e-16***	1.710e+00	< 2e-16***	1.707e+00	< 2e-16***
Total.Cost	6.481e-08	< 2e-16***	6.521e-08	< 2e-16***	5.864e-08	< 2e-16***	5.804e-08	< 2e-16***	1.017e-07	< 2e-16***	1.017e-07	< 2e-16***
Village.administra- tion.expenditure. prop	2.568e+00	0.079416	2.489e+00	0.088681	- 6.716e-01	0.823646			- 7.892e-01	0.000911***	- 7.521e-01	3.95e-05***
Cost.of.Village.Build- ing.prop	3.537e+00	0.014879*	3.463e+00	0.017013*	- 7.782e-01	0.795967			- 4.628e-02	0.780472	3.601e-01	0.140178
Cost.of.Village.Com- munity.Develop- ment.prop	3.039e+00	0.037755*	2.961e+00	0.042716*	- 1.772e+00	0.554969	- 1.006e+00	7.75e-05***	3.268e-01	0.219162	- 7.635e-01	0.041769*
Cost.of.Village.Com- munity.Empower- ment.prop	3.481e+00	0.017324*	3.409e+00	0.019665*	- 8.107e-01	0.787916			- 7.800e-01	0.050576		
Cost.for.natural. disasters.prop	4.082e-02	< 2e-16***	4.068e-02	< 2e-16***	4.407e-02	< 2e-16***	4.409e-02	< 2e-16***	1.103e-02	< 2e-16***	1.104e-02	< 2e-16***
Village.population	- 1.169e+02	4.94e-05***	- 1.179e+02	4.01e-05***	- 1.431e+02	6.53e-06***	- 1.453e+02	4.19e-06***	- 8.151e+01	0.026207*	- 8.410e+01	0.021245*
Name.of.province[T. BALU]	- 5.123e+01	0.001033**	- 4.952e+01	0.00137**	- 6.621e+01	0.000129***	- 6.517e+01	0.000127***	6.435e+01	0.001230**	6.302e+01	0.001231**
Name.of.province[T. DIYOGYAKARTA]	2.146e+02	7.40e-10***	2.163e+02	4.73e-10***	2.234e+02	5.54e-09***	2.253e+02	3.41e-09***	2.434e+02	7.181E-08***	2.422e+02	7.51e-08***
Name.of.province[T. GORONTALO]	- 3.166e+01	0.016036*	- 3.108e+01	0.01622*	- 1.685e+01	0.238395	- 1.768e+01	0.203141	- 3.708e+01	0.026152*	- 3.780e+01	0.020319*
Name.of.province[T. JAMBI]	- 9.616e+01	4.24e-11***	- 9.319e+01	1.00e-10***	- 8.464e+01	1.17e-07***	- 8.304e+01	1.16e-07***	- 1.020e+02	4.477E-08***	- 1.028e+02	1.87e-08***
Name.of.province[T. JAWA BARAT]	5.006e+01	4.19e-08***	5.186e+01	5.54e-09***	7.763e+01	5.79e-14***	7.792e+01	4.16e-15***	1.840e+02	< 2e-16***	1.825e+02	< 2e-16***
Name.of.province[T. JAWA TENGAH]	3.033e+01	0.000687***	3.185e+01	0.000248***	5.652e+01	1.83e-08***	5.668e+01	4.12e-09***	9.757e+01	< 2e-16***	9.649e+01	< 2e-16***
Name.of.province[T. JAWA TIMUR]	3.885e+01	2.35e-05***	4.010e+01	7.34e-06***	4.684e+01	4.39e-06***	4.713e+01	1.20e-06***	1.062e+02	< 2e-16***	1.052e+02	< 2e-16***
Name.of.province[T. KALIMANTAN BARAT]	- 1.110e+02	< 2e-16***	- 1.091e+02	< 2e-16***	- 1.074e+02	< 2e-16***	- 1.066e+02	< 2e-16***	- 8.945e+01	2.51E-09***	- 9.052e+01	5.25e-10***
Name.of.province[T. KALIMANTAN SELATAN]	- 7.269e+01	6.53e-12***	- 7.124e+01	8.75e-12***	- 7.071e+01	8.03e-10***	- 6.985e+01	4.15e-10***	- 7.176e+01	6.592E-08***	- 7.308e+01	1.94e-08***
Name.of.province[T. KALIMANTAN TENGAH]	- 8.360e+01	2.17e-05***	- 8.188e+01	2.64e-05***	- 8.503e+01	8.48e-05***	- 8.458e+01	7.25e-05***	- 9.421e+01	0.000176***	- 9.848e+01	7.00e-05***

Table 3 (continued)

	2019			2020			2021					
	Full Model		Stepwise model	Full Model		Stepwise model	Full Model		Stepwise model			
	Estimate	Pr(> t)	Estimate	Pr(> t)	Estimate	Pr(> t)	Estimate	Pr(> t)	Estimate	Pr(> t)		
Name.of.province[T. KALIMANTAN TIMUR]	- 5.725e+01	0.356971	- 5.722e+01	0.357003	- 6.296e+01	0.356841	- 6.060e+01	0.374298	- 9.526e+01	0.228717	- 9.559e+01	0.226528
Name.of.province[T. KALIMANTAN UTARA]	- 1.395e+02	0.287053	- 1.426e+02	0.276039	- 1.671e+02	0.246008	- 1.706e+02	0.235552	- 1.717e+02	0.303738	- 1.717e+02	0.303395
Name.of.province[T. KEPULAUAN BANGKA BELITUNG]	- 1.394e+02	6.44e-05***	- 1.365e+02	8.82e-05***	- 1.440e+02	0.000169***	- 1.433e+02	0.000169***	- 1.166e+02	0.008506**	- 1.182e+02	0.007522**
Name.of.province[T. KEPULAUAN RIAU]	- 4.788e+01	0.127876	- 4.546e+01	0.1147026	- 5.728e+01	0.097581	- 5.504e+01	0.109546	- 7.699e+01	0.054433	- 7.824e+01	0.049675*
Name.of.province[T. LAMPUNG]	- 9.600e+00	0.323029	- 7.989e+00	0.401724	3.140e+00	0.768578	3.639e+00	0.724335	2.749e+01	0.029079*	2.658e+01	0.02989*
Name.of.province[T. MALUKU]	5.512e+00	0.823428	7.340e+00	0.764886	1.625e+01	0.544106	1.657e+01	0.530266	2.266e+01	0.481245	2.198e+01	0.490075
Name.of.province[T. MALUKU UTARA]	- 8.201e+01	0.002228**	- 8.180e+01	0.002228**	- 9.332e+01	0.001547**	- 9.452e+01	0.001253**	- 1.172e+02	0.000604***	- 1.185e+02	0.000484***
Name.of.province[T. NUSA TENGGARA BARAT]	1.946e+02	< 2e-16***	1.947e+02	< 2e-16***	1.997e+02	< 2e-16***	1.992e+02	< 2e-16***	2.817e+02	< 2e-16***	2.809e+02	< 2e-16***
Name.of.province[T. NUSA TENGGARA TIMUR]	- 4.562e+01	3.89e-05***	- 4.439e+01	4.44e-05***	- 3.508e+01	0.003952**	- 3.557e+01	0.002591**	- 3.146e+01	0.029226*	- 3.237e+01	0.021256*
Name.of.province[T. PAPUA]	- 2.807e+01	0.1119273	- 2.668e+01	0.121084	- 1.239e+01	0.51391	- 1.425e+01	0.4116899	- 3.536e+00	0.880457	- 1.548e+00	0.944011
Name.of.province[T. RIAU]	- 6.620e+01	2.05e-08***	- 6.531e+01	2.16e-08***	- 6.357e+01	1.07e-06***	- 6.289e+01	7.60e-07***	- 6.623e+01	0.000012944***	- 6.748e+01	5.31e-06***
Name.of.province[T. SULAWESI BARAT]	8.025e+00	0.744847	8.383e+00	0.733,065	1.839e+01	0.504358	1.788e+01	0.513485	2.419e+01	0.461863	2.102e+01	0.519751
Name.of.province[T. SULAWESI SELATAN]	- 3.359e+01	0.001513**	- 3.368e+01	0.001176**	- 3.157e+01	0.007074**	- 3.264e+01	0.00397**	- 1.853e+01	0.170309	- 1.972e+01	0.131532
Name.of.province[T. SULAWESI TENGAH]	- 4.084e+01	2.92e-05***	- 3.909e+01	3.83e-05***	- 4.029e+01	0.000185***	- 3.974e+01	9.17e-05***	- 4.500e+01	0.000347***	- 4.647e+01	0.000115***
Name.of.province[T. SULAWESI TENGAH]	- 3.915e+01	0.000129***	- 3.899e+01	0.000101***	- 3.448e+01	0.002066**	- 3.602e+01	0.000869***	- 4.472e+01	0.000604***	- 4.535e+01	0.000297***
Name.of.province[T. SULAWESI UTARA]	- 5.163e+01	1.04e-06***	- 5.021e+01	8.85e-07***	- 4.573e+01	7.56e-05***	- 4.615e+01	3.56e-05***	- 6.537e+01	1.02974E-06***	- 6.581e+01	3.63e-07***
Name.of.province[T. SUMATERA BARAT]	- 2.591e+01	0.089213	- 2.478e+01	0.101,154	- 3.510e+01	0.036475*	- 3.470e+01	0.035689*	- 5.402e+00	0.782866	- 6.656e+00	0.730933

Table 3 (continued)

	2019			2020			2021					
	Full Model	Stepwise model		Full Model	Stepwise model		Full Model	Stepwise model				
	Estimate	Pr(> t)	Estimate	Estimate	Pr(> t)	Estimate	Estimate	Pr(> t)	Estimate	Pr(> t)		
Name.of.province[<i>T</i> .SUMATERA SELATAN]	- 5.702e+01	9.11e-09***	- 5.480e+01	1.72e-08***	- 5.069e+01	2.61e-06***	- 4.946e+01	2.09e-06***	- 4.902e+01	0.000104***	- 5.015e+01	4.21e-05***
Name.of.province[<i>T</i> .SUMATERA UTARA]	- 3.665e+01	3.39e-05***	- 3.526e+01	4.93e-05***	- 3.856e+01	6.63e-05***	- 3.826e+01	4.60e-05***	- 1.702e+01	0.130427	- 1.790e+01	0.099947
Percentage.of.Unemployment	- 3.203e+01	3.34e-05***	- 3.219e+01	3.02e-05***	- 2.272e+01	0.00348**	- 2.281e+01	0.003312**	3.319e+01	0.001510**	3.314e+01	0.001486**
Drinking.water[<i>T</i> .Yes]	1.947e+01	0.622385			1.634e+01	0.70067			Na	Na		
Internet.Access.in.Village[<i>T</i> .Yes]	- 1.085e+01	0.001753**	- 1.099e+01	0.001489**	- 8.719e+00	0.147083	- 8.595e+00	0.152247	- 6.145e+00	0.503171	- 6.145e+00	0.503171
Primary.School[<i>T</i> .Yes]	3.080e+00	0.622805			2.216e+00	0.770554			1.049e+01	0.446088		
Pre.School[<i>T</i> .Yes]	4.360e+00	0.390504			1.109e+00	0.868689			- 4.345e+00	0.595535		
Junior.High.School[<i>T</i> .Yes]	2.002e+01	1.18e-08***	2.021e+01	6.78e-09***	2.182e+01	1.11e-08***	2.212e+01	5.77e-09***	- 7.886e+00	0.523031		
Senior.High.School[<i>T</i> .Yes]	1.601e+01	7.44e-05***	1.593e+01	7.87e-05***	1.706e+01	6.09e-05***	1.686e+01	7.09e-05***	5.395e+01	< 2e-16***	5.402e+01	< 2e-16***
Village.health.facility[<i>T</i> .Yes]	- 6.561e+00	0.138337	- 6.584e+00	0.135.354	- 2.782e+00	0.690176			2.368e+00	0.773839		
Medical.personnel[<i>T</i> .Yes]	- 3.110e+00	0.660646			3.263e-01	0.977513			- 1.083e-01	0.994637		
Government.Bank[<i>T</i> .Yes]	- 1.253e+01	0.019647*	- 1.469e+01	0.001324**	- 1.643e+01	0.002425**	- 1.947e+01	2.85e-05***	1.224e+01	0.041111*	1.377e+01	0.008196**
Private.Bank[<i>T</i> .Yes]	- 4.442e+00	0.495286			- 7.332e+00	0.238393			3.158e+00	0.643755		
Education.level.of.most.of.the.villagers[<i>T</i> .Master]	3.636e+01	0.010454*	3.689e+01	0.009333**	4.455e+01	0.004326**	4.538e+01	0.003608**	- 4.956e+00	0.785873	- 5.447e+00	0.764996
Education.level.of.most.of.the.villagers[<i>T</i> .No Education]	5.436e+01	0.00142**	5.493e+01	0.001245**	6.450e+01	0.000559***	6.510e+01	0.000485***	4.110e+00	0.851502	3.831e+00	0.861321
Education.level.of.most.of.the.villagers[<i>T</i> .Primary School]	4.694e+01	0.000956***	4.769e+01	0.00078***	5.522e+01	0.000406***	5.620e+01	0.000312***	4.052e-01	0.982278	- 1.452e-02	0.999364
Education.level.of.most.of.the.villagers[<i>T</i> .Senior High School]	1.147e+01	0.417217	1.173e+01	0.406354	1.362e+01	0.380695	1.407e+01	0.364627	- 2.291e+01	0.207174	- 2.346e+01	0.195974

Table 3 (continued)

	2019			2020			2021			
	Full Model		Stepwise model	Full Model		Stepwise model	Full Model		Stepwise model	
	Estimate	Pr(> t)	Estimate	Pr(> t)	Estimate	Pr(> t)	Estimate	Pr(> t)	Estimate	Pr(> t)
Road.Surface.Quality[T:good]	-2.891e+01	7.45e-07***	-2.906e+01	6.21e-07***	-4.379e+01	2.72e-10***	-4.393e+01	2.06e-10***	-5.504e+01	1.78E-09***
Road.Surface.Quality[T:moderately damaged]	-5.111e+00	0.370304	-5.019e+00	0.37833	-8.660e+00	0.203425	-8.716e+00	0.199307	-1.632e+01	0.069394
Market[T:Yes]	-3.064e-01	0.937223			3.474e+00	0.391073			1.836e+01	7.67033E-05***
Gender.of.village.head[T:Women]	2.879e+00	0.645597			1.380e+00	0.841411			2.043e+00	0.799401
Education.level.of.village.head[T: Diploma]	1.930e+00	0.832657			-7.465e+00	0.458947			-1.283e+01	0.275321
Education.level.of.village.head[T: Doctoral/PhD]	-4.432e+01	0.242973			-5.528e+01	0.185046			-1.026e+02	0.033869*
Education.level.of.village.head[T: Junior high school]	1.120e+01	0.106675			1.191e+01	0.117805			1.378e+00	0.877126
Education.level.of.village.head[T: Master]	-2.878e+00	0.796509			2.102e+00	0.8635			5.504e+00	0.699110
Education.level.of.village.head[T: Never went to school]	9.533e+01	0.467402			8.471e+01	0.556852			1.762e+02	0.291679
Education.level.of.village.head[T: Not completed in primary school]	-8.405e+00	0.928299			1.209e+01	0.885967			-3.605e+01	0.793263
Education.level.of.village.head[T: Primary School]	-5.165e+00	0.890243			7.914e-01	0.984133			1.012e+00	0.985466
Education.level.of.village.head[T: Senior high school]	7.329e+00	0.042873*			6.705e+00	0.092363			-1.330e+00	0.774408
Transparency.and.Accountability.in.Village[T:Yes]	-1.545e+00	0.778713			1.865e+01	0.385185			-4.544e+00	0.921873
Public.participation[T: Yes]	2.888e+01	0.574538			3.649e+01	0.518482			5.678e+01	0.386421
Observations	15.300		15.300		15.300		15.300		15.066	
F stat	187.9		251.7		182.7		269.9		131.5	
									15.066	
									184.6	

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