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Does Fiscal Inefficiency and Human Capital Affect Poverty in Aceh Province, Indonesia? A Threshold Approach

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Abstract. *Poverty is a significant social issue that affects all countries, including Indonesia. The various shortcomings and helplessness experienced by those living in poverty highlight this problem. The government considers poverty a severe issue that requires attention every year. Although the government has implemented several measures to alleviate poverty, reducing or eradicating it is challenging due to the numerous dimensions involved. This study investigates the impact of fiscal inefficiency on poverty in 23 districts/cities in Aceh province. Socio-macroeconomic indicators such as education as proxy human capital, economic growth, and inequality are also examined. This research uses balanced panel data from 2011 to 2022. Research data on remaining government spending comes from the Directorate General of Fiscal Balance (DJPK) of the Ministry of Finance. In contrast, education, economic growth, inequality, and poverty are based on the statistics of Aceh Province. The analysis used is the threshold panel. The study results found that education had a negative effect while inequality had a positive effect. The threshold test results on the unspent fund found an optimal value of 1.817 percent. If the remaining spending is above the threshold, poverty will increase, and vice versa. If the remaining spending is below the threshold, then poverty will decrease. Based on these findings, it is necessary to increase the length of schooling, reduce inequality, and increase efficiency (according to planning).*

Keywords: Poverty, Inefficiency fiscal, Education, Economic growth, Inequality, Threshold panel.

JEL Codes: H50, H70

1. Introduction

Indonesia has abundant natural resources, but many residents live in poverty. This starkly contrasts what we might expect, as we would assume that abundant natural resources would benefit the population. However, experts believe abundant natural resources can be a curse (Bahar & Santos, 2018; Rahim et al., 2021). One of the reasons for this is that many people in poverty don't have access to these resources, which limits their ability to benefit from them (Olopade et al., 2019). It is essential to use these resources in a way that is optimal both at the national and regional levels to ensure that everyone can benefit from them.

Poverty is a significant social issue that affects all countries, including Indonesia. The various shortcomings and helplessness experienced by those living in poverty highlight this problem. The government considers poverty a severe issue that requires attention every year. Although the government has implemented several measures to alleviate poverty, reducing or eradicating it is challenging due to the numerous dimensions involved. Consequently, there are several challenges in addressing poverty.

Proper local government relies on resources to drive activities. The primary resource is financial, which is used to fund administration. Regional finance includes assets owned by the region related to rights and obligations in implementing government within the Regional Revenue and Expenditure Budget (APBD). This budget, managed by the local government, plays a crucial role in regional development by reflecting the

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region's ability to explore and manage income sources for appropriate spending and financing. The APBD must prioritize improving people's welfare and reducing poverty.

Immediate action must be taken to address the issue of poverty, as it can quickly become a significant problem. Figure 1 shows that poverty in the district is in a very serious condition, namely above 10 percent on average. The government has made efforts to reduce poverty, and it is essential to note the connection between the budget and poverty. A significant amount of funds is required to resolve poverty. Aceh Province has a larger budget than other provinces in Indonesia, as it was granted special autonomy funds, known as the Special Autonomy Fund (DOKA), along with Papua Province. The government budget receives over 10 trillion rupiahs annually, which can play a crucial role in reducing poverty, but the budget needs to be utilized more effectively. According to data released by the Ministry of Finance in 2023 (Figure 2), the Aceh provincial government has a fiscal inefficiency of over 1 trillion rupiah or 8%, which is spread across 23 districts/cities. The latest 2022 data states that the remaining government spending is around 3 to 4 trillion rupiah. A large inefficiency fiscal is considered detrimental, reflecting poor planning and budgeting quality. If addressed, this issue will have long-term consequences.

Figure 1. Poverty in 23 Districts/Cities in Aceh Province 2011-2022
Source: Statistics of Aceh Province (2023)

Several previous studies revealed that poverty arises from socio-macroeconomic changes such as inequality (Fosu, 2015), education (Gounder & Xing, 2012), and economic growth (Balasubramanian et al., 2023). Based on data from the Statistics of Aceh Province (2023), inequality, as measured by the Gini ratio, is experiencing a movement in the Gini ratio. However, it is slowly starting to increase, thus signalling that poverty is increasing. At the same time, a small proportion is experiencing an increase in income. Finally, education is an expensive utility to obtain. Getting a higher education is an achievement expected by someone, including the poor (Gounder & Xing, 2012). Poor groups still need access to education, so the opportunity to resolve poverty individually is challenging because jobs require specific skills and education to work optimally (Arias et al., 2016). Then, the government's focus on pursuing economic growth has always been the main thing. Economic growth is expected to reduce the problem of poverty. Based on this background, the research problem formulation is how the inefficiency of fiscal, inequality, education, and economic growth affect poverty in the 23 districts/cities of Aceh Province. What is the optimal value in the inefficiency of fiscal spending to reduce poverty?

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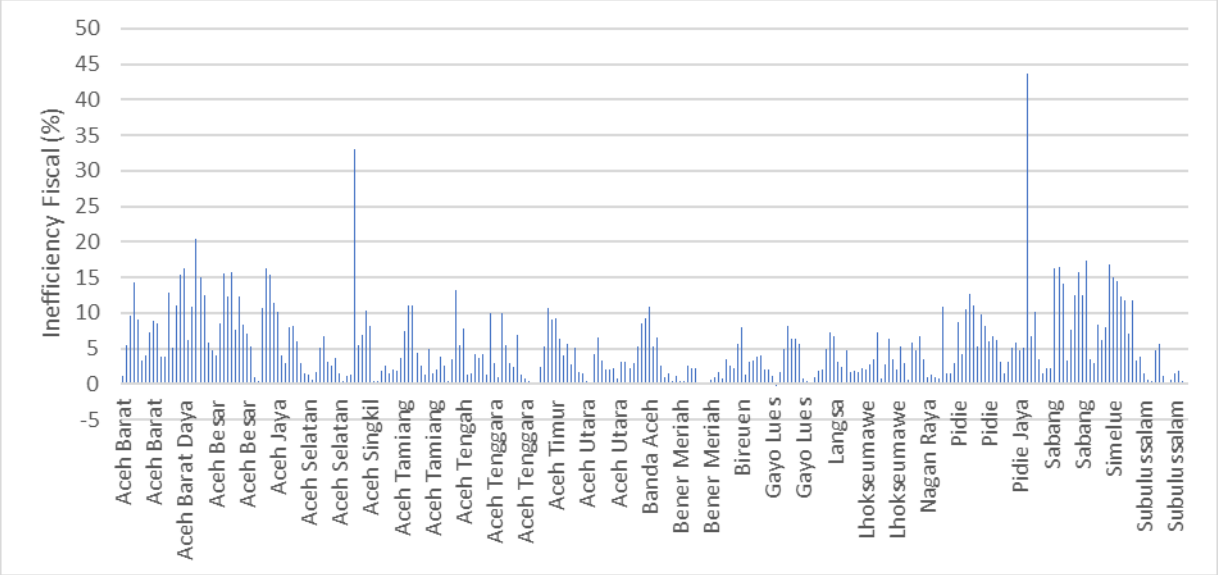


Figure 2. Inefficiency Fiscal 23 Regencies/Cities 2011-2022
Source: Ministry of Finance (2023)

This research has contributed to several views. First, the research examines the relationship between fiscal inefficiency and poverty, in contrast to previous research, which focused more on using government spending, such as those of Adegboyo (2020) and Miar & Greece (2020). Second, the researcher uses a threshold panel to measure the threshold for remaining government spending. Previous research, such as those by Miar & Greece (2020), Taruno (2019), and Adegboyo (2020), used the linear method. This method is expected to help policymakers use the budget. Third, this research was conducted in Aceh Province, a province with special autonomy status in Indonesia. To the researcher's knowledge, this study has never been conducted.

The paper is structured into distinct sections, each focusing on a specific aspect. Part 2 delves into the study of literature, while Section 3 comprehensively covers the data and research methods employed. Section 4 presents the empirical findings and discussion, and Section 5 succinctly outlines the conclusions and recommendations of the research.

2. Literature Reviews

In this section, the researcher uses several references related to the research under study to see the findings that have been made. Asra (2004) conducted a study of inequality and poverty in Indonesia. Estimation is done using a data decomposition approach based on actual data from the National Socioeconomic Survey (SUSENAS Survey). This research found that increasing inequality only significantly impacts poverty in a short time. Still, the effects of inequality can be felt in the long term, both in cities and villages. Tachibanaki (2006) conducted a similar study of inequality to poverty in Japan. The analysis used the mediation model approach. The study results show that reducing inequality by providing financial subsidies does not solve the problem of poverty. However, providing pension assistance can reduce poverty effectively.

Sawar (2011) studied efforts to reduce poverty by linking education in Pakistan. Estimation is carried out using a logistic regression approach where education is essential in reducing poverty. Gounder & Xing (2012) found that education is an effort to increase the power of poor households in gaining access to health, income, and sanitation. The research model was analyzed based on the quantile regression method. A

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study in Indonesia by Putra & Lisna (2020) found that the human development index can significantly reduce the poverty rate. This study was analyzed using the Random Effect Model approach.

Adegboyo (2020) examines the impact of government spending on poverty in Nigeria. The model used to analyze the problem is Autoregressive Distributed Lag (ARDL). The findings from this study explain that several types of government spending can reduce poverty significantly, such as social spending. Meanwhile, a study on government spending and poverty in Indonesia was conducted by Miar & Greece (2020) using a multiple regression approach. The findings show that government spending negatively and significantly impacts poverty. Taruno (2019) uses the FEM approach to find that government programs such as health spending significantly impact poverty in urban areas. Meanwhile, spending on health and education significantly negatively impacted rural areas. A study in Aceh by Yusri (2022) using the Synthetic Control Method explains that government spending from the special autonomy allocation significantly reduces the poverty rate. Campoy-Munoz et al. (2021) researched using a different approach: Computable General Equilibrium (CGE) on fiscal variables. The results of the micro model simulation found that fiscal reduction had a significant impact on poverty and inequality. If the government plans to increase taxes to increase spending, there will be an increase in poverty. However, the goal of raising taxes has succeeded in reducing inequality. The duality of emphasizing poverty or inequality is a dilemma for the government, and it needs to make the right decisions.

De Matteis (2013) sees that economic growth is related to poverty. The study was conducted in 78 countries from 1980-2008 using a simultaneous method. The results of his research explain that economic growth has a negative and significant effect. Balasubramanian et al. (2023) examine the impact of economic growth as a key indicator of reducing poverty in low- and middle-income countries. Based on the elasticity method, economic growth significantly negatively affects poverty in five years and annually. However, Kaouassi & Gakpa (2022) found a different sign in theory, namely positive in West Africa. The findings explain that economic growth will increase poverty by 0.25 percent. Furthermore, Sasmal & Sasmal (2016) looked at India's per capita side of poverty using the Fixed Effect Model. They found that per capita economic growth reduced the poverty rate by 0.001 percent.

Furthermore, Fosu (2015) conducted a study linking inequality and poverty in Sub-Saharan Africa. The research model uses multiple regression. The study results found that inequality positively and significantly affects poverty. Capuno (2022) examines studies on the distribution of inequality and poverty in the Philippines. These two variables are very closely related. His findings explain that emphasizing inequality will reduce poverty at the national and provincial levels. Hofmacher (2021) tries to examine education and poverty in European countries. Several models are used in research, such as OLS and 2SLS. The findings explain that education is very influential in reducing poverty. The range of decline varies widely from 0.01 percent to 0.1 percent.

In Indonesia, there are still very few empirical studies using the inefficiency fiscal variable as an independent variable for poverty, such as Nalle & Affoan (2022). Nalle & Affoan (2022) uses the multiple linear regression method as an analysis tool. The results of his research found that fiscal inefficiency had a positive effect on poverty but was not significant. Therefore, research is motivated to analyze the impact of fiscal inefficiency and macro-social elements on poverty.

Based on this literature, the researcher takes the following hypothesis:

H1: Inequality has a positive effect on poverty.

H2: Education has a negative effect on poverty.

H3: Economic growth has a negative effect on poverty.

H4: Inefficiency fiscal has a positive effect on poverty.

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3. Data and Method

This study uses balanced panel data from 23 districts/cities in Aceh Province from 2011 to 2022, with a total sample of 276. The research data consists of poverty, inefficiency fiscal, the average length of education, economic growth, and inequality. The research data comes from the Aceh Statistics Center and the Ministry of Finance's DPJK. Details regarding our research data are presented in Table 1.

Table 1. Operational variables and data sources

Variable	Symbol	Description	Sign	Source
Poverty	Pov	Percentage of the number of poor people	N/A	Statistics of Aceh Province
Inefficiency fiscal	IF	Percentage of remaining government spending on budget realization as proxy inefficiency fiscal	+	Directorate General of Fiscal Balance (DJPK) Ministry of Finance
Education	Edu	The average length of education as proxy human capital	-	Statistics of Aceh Province
Economic growth	Eg	Economic growth rate based on 2010 base year	-	Statistics of Aceh Province
Gini coefficient	Gini	Inequality ratio	+	Statistics of Aceh Province

This research data analysis uses a threshold panel by Hansen (1999), which requires balanced data (Lin & Li, 2020). The threshold panel is the regression coefficient in the model given a structural break. The regime separates the research sample, so there is no need to include dummy variables based on unknown structural breaks (Mehrara et al., 2015). Su et al. (2022), threshold panels can effectively capture structural mutations in sample data and accurately deal with nonlinear problems in economic systems. This method performs well in general panel data models. In addition, this approach considers aspects related to the problem of fixed effects in data processing. Usually, nonlinear problems are solved by adding the squared terms of the explanatory variables to the regression equation. However, the problem of high collinearity between the explanatory variables and their squared terms must be addressed.

Based on Hansen (1999), the primary form of a single panel threshold is as follows:

$$y_{it} = \delta_i + \beta_1 x_{it} I(q_{it} \leq \gamma) + \beta_2 x_{it} I(q_{it} > \gamma) + \beta_i Z_{it} + e_{it} \quad (1)$$

Where y_{it} is the dependent variable; x_{it} is the independent variable; i is region; t is time; q_{it} is threshold variable with γ whose threshold value is unknown; e_{it} is residual with $iid\ (0, \sigma^2)$; and regime function indicator by threshold variable q_{it}. Whereas Z_{it} is the control variable. Since $q_{it} \leq \gamma$, coefficient value x_{it} is β_1; whereas $q_{it} > \gamma$, coefficient value x_{it} is β_2. In the basic model, the threshold panel can also be illustrated separately (piece-wise) as follows:

$$y_{it} = \begin{cases} \delta_{it} + \beta_1 x_{it} + e_{it} & q_{it} \leq \gamma \\ \delta_{it} + \beta_2 x_{it} + e_{it} & q_{it} > \gamma \end{cases} \quad (2)$$

Based on equation (1), it is possible to enter the single panel threshold research variable as follows:

$$pov_{it} = \delta_i + \beta_1 IF_{it} I(q_{it} \leq \gamma) + \beta_2 IF_{it} I(q_{it} > \gamma) + \beta_3 edu_{it} + \beta_4 eg_{it} + \beta_5 gini_{it} + e_{it} \quad (3)$$

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Where pov_{it} is poverty in region *i* at time *t*; $SiLPA_{it}$ is the remaining government spending in the region *i* at time *t*; edu_{it} is the length of school education, eg_{it} is real economic growth, and $gini_{it}$ is inequality. Education, economic growth, and inequality are Z_{it} vector control variables. In equation (3) it is explained that *IF* is placed as a threshold variable with a regime indicator in the form $I(\cdot).\delta_i$ is an individual effect and e_{it} is residual.

Determination of the threshold value (*IF*) can be seen by the minimum squared residual threshold model. According to Wang (2015), if γ is known (or has been determined) then the model is not much different from the general linear model. However, if γ is not known, there will be problems with parameters where the estimator γ is not standardly distributed. In order to find the γ value, this study followed the steps described by Xu et al. (2020) where there are three steps using the threshold model. First, the threshold model is included in the γ element, then it is transformed into a linear form and the sum of squared residuals $(S_1(\gamma))$ and the β coefficient is estimated by least quadratic regression (OLS). Second, the estimation process is repeated 300 times with different γ values. Finally, the smallest γ is the appropriate threshold for the β coefficient.

Testing whether or not there is a threshold effect can be seen from the *F* statistic (Song, 2021). If the hypothesis $H_0: \beta_1 = \beta_2$ found that there is no threshold effect of residual government spending on poverty. Meanwhile, if a hypothesis is found $H_1: \beta_1 \neq \beta_2$ then there is the existence of differences in the threshold effect of inefficiency fiscalon poverty. The statistical F construct is formed as follows (Wang, 2015):

$$F_1(\gamma) = \frac{S_0 - S_1(\gamma)}{\hat{\sigma}^2} \tag{4}$$

This study used the likelihood ratio statistical test by Hansen (1999) to determine the internal confidence threshold. According to him, this is the best way to test the territory without rejection. Hansen (1999) assumes that the estimated threshold value of γ is consistent with the same truth value of $\gamma(\gamma_0)$. The likelihood ratio test calculation $\gamma = \gamma_0$ is as follows:

$$LR_1(\gamma) = \frac{\{LR_1(\gamma) - LR_1(\hat{\gamma})\}}{\hat{\sigma}^2} \tag{5}$$

Table 2. Descriptive Statistics

Variable		Mean	Std.dev	Min	Max
Pov	Overhall	16.99	3.92	6.9	25.5
	Between		3.65	7.68	21.32
	Within		1.59	13.89	21.45
IF	Overhall	5.32	5.19	-0.23	43.59
	Between		2.93	1.01	11.36
	Within		4.32	-2.88	41.14
Edu	Overhall	8.95	1.32	6.24	13.03
	Between		1.26	7.18	12.49
	Within		0.46	7.74	10.10
Eg	Overhall	3.43	2.77	-20.34	13.23
	Between		1.57	-1.26	7.27
	Within		2.30	-15.63	11.90
Gini	Overhall	0.28	0.03	0.19	0.45
	Between		0.02	0.23	0.35
	Within		0.02	0.22	0.41

Source: Author work.

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Where $LR_1(\gamma)$ is the sum of squared residuals and $\hat{\sigma}^2$ is the variance of the residuals. Hansen (1999) formulated the calculation of the area of rejection with the rejection hypothesis $LR(\gamma) > -2\ln(1-\sqrt{1-\alpha})$ with a significance level of α. With these calculations, critical values can be determined easily at the 10%, 5%, and 1% levels (Xu et al., 2020) so that researchers can make decisions quickly and precisely. In addition, this LR calculation can be used at two thresholds (Xu et al., 2020; Raouf, 2022) or three thresholds (Deng et al., 2013; Su et al., 2022).

Before entering the data analysis stage, the researcher presents a summary of the data in Table 2 and the data correlation in Table 3. Based on Table 1, the average poverty rate in Aceh is 16.99 percent. The average inefficiency fiscal is 5.32 percent. The average education is 8.95 years with an economic growth of 3.43 percent. Finally, the average inequality is 0.28. Movement of highly fluctuating data is on poverty, inefficiency fiscal, and economic growth.

Table 3 is the research correlation between variables. The correlation of the coefficients of the independent variables to the dependent variable was found to be very low except for education at 0.066. Meanwhile, the correlation between the independent variables was found not to have a high relationship. Therefore, the research model to be analyzed does not indicate multicollinearity.

Table 3. Correlation Matrix

Variable	Pov	IF	Edu	Eg	Gini
Pov	1				
IF	0.110	1			
Edu	-0.665	-0.014	1		
Eg	0.016	0.079	0.104	1	
Gini	-0.389	-0.009	0.348	0.005	1

Source: Author work.

4. Empirical Result and Discussion

Entering the panel threshold analysis stage, the researcher first tested the existence of a gap structure in the studied model, namely the inefficiency fiscal. The test results are presented in Table 4 where the existence of a threshold only occurs as much as one for the inefficiency fiscal variable for 23 districts/cities in Aceh Province. Previously tested thresholds were in the form of two and three, but the results were inconsistent and not significant. The value of the F-statistic threshold was found to be 9.51 and a significant value of 5%. The test was repeated 300 times. Based on these findings, we can divide the gap in inefficiency fiscal below and above the threshold.

Table 4. The existence of threshold effects

Threshold	RSS	F-stat	P-value	Crit10	Crit5	Crit1	Bootstrapping
Single	169.21	9.51	0.030**	6.34	7.84	10.52	300

Source: Author work. * Mean 5% level of significance.

After knowing the existence of the threshold, the next step is to estimate the threshold value. Table 5 shows a known threshold of 1.817% for remaining budget. The lowest confidence intervals are 1.783%, and the highest is 1.858%. This confidence interval limit is rational because it is close to the estimated value. In other words, the estimation results are feasible as an analysis tool.

Table 5. Threshold value and 95% confidence intervals

	Estimate	Lower	Upper
Threshold ($\boldsymbol{\gamma}$)	1.817	1.783	1.858

Source: Author work.

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Table 6 is the result of estimating the coefficient of the threshold variable with three independent variables. The education variable was found to have a negative and significant effect at the 1% level. If education increases by one year, poverty will be reduced by 2.495%, assuming ceteris paribus. This finding is in line with Sarwar (2011), Gounder & Xing (2012), and Putra & Lisna (2020). Poverty has more complex problems, so this group cannot escape the vicious circle. One reason is the low level of education. Education reflects a person's opportunity to get a better job. In addition, higher education significantly impacts the wages received (Gounder & Xing, 2012). In addition, higher education provides opportunities to gain access to better health.

Table 6. Threshold regression for single threshold models

Variable	Coefficient	Std. error	t	Upper	Lower
Edu	-2.495	0.130	-19.16***	-2.752	-2.239
Eg	0.019	0.023	0.84	-0.026	0.064
Gini	4.876	2.178	2.24**	0.584	9.168
Threshold					
IF < threshold	-0.102	0.046	-2.21**	-0.194	-0.011
IF > threshold	0.039	0.011	3.67***	0.018	0.061
Cons	37.827	1.265	29.88***	35.332	40.321
Obs.	253				
Number of cross	23				
R-squared	0.423				
F-stat	79.25***				

Source: Author work. **, *** mean 5% and 1% level of significance.

Furthermore, the empirical results of economic growth were found not to affect poverty. This finding differs from De Matteis (2013) and Balasubramanian et al. (2023). Next, inequality is known to have a positive effect on poverty. Statistically, the effect of inequality is at a significance level of 5%. Thus, if inequality increases by 0.1, poverty will increase by 0.48 percent, assuming ceteris paribus. This finding aligns with Asra (2004) and Tachibanaki (2006). According to their study, inequality has an important impact on the problem of poverty. Inequality is not only in terms of income but also how a group gets other important utilities such as education and health. Inequality in villages and cities is generally more pronounced and unequal because all needs are in the cities. In terms of education, of course, people in cities are better than those in villages in terms of health. The bigger the gap, the more poor people will be created.

The remaining expenditure section is divided into two forms, namely below the 1.187% threshold and above 1.817%. The two forms have different signs, which are negative and positive. Statistically, both have a significant effect at the 5% and 1% levels. The interpretation for the area below the threshold is that if an area has remaining government spending lower than 1.187, then poverty will decrease by 0.102%. However, if an area has more than 1.187% of spending left, poverty will increase by 0.039%. Indirectly, the emphasis on remaining government spending is significant in reducing the poverty rate in Aceh Province. An illustration of the threshold for remaining government spending is presented in Figure 3. It can be seen that the greater the inefficiency fiscal, the indirectly the planning and implementation of activities are not completed, causing a real effect on increasing poverty in Aceh Province. However, if the government optimizes inefficiency fiscal to below 1.817%, poverty will decrease significantly. This finding is in line with research conducted by Adegboyo (2020), Miar & Greece (2020), Taruno (2019), and Yusri (2022) but contrasts with Nalle & Affoan (2022).

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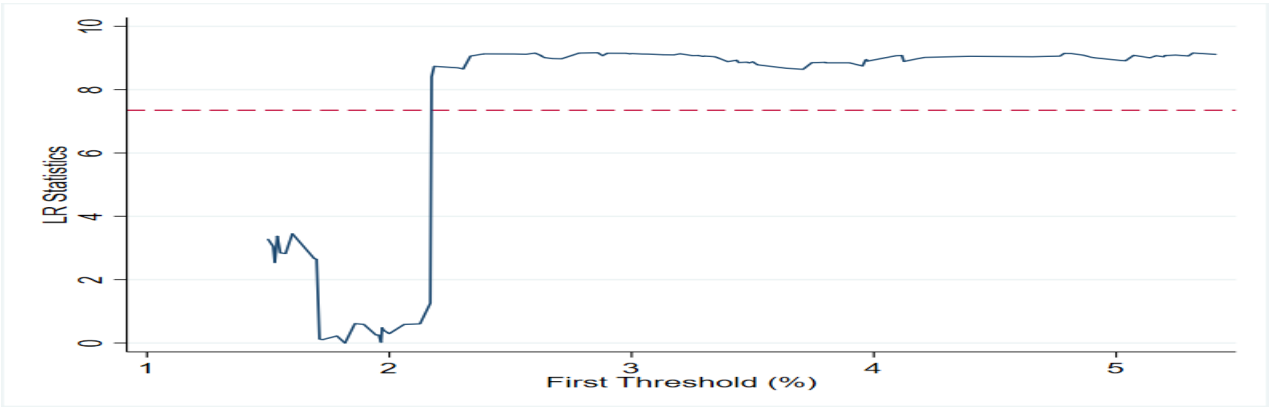


Figure 3. Threshold Inefficiency Fiscal

4.1 Robustness Checks

To ensure model reliability, Thanh (2015), Chu et al. (2019), Abdulahi et al. (2019), and Raouft (2022) suggest using the Generalized Method of Moments dynamic model. The dynamic model is characterized by the existence of a lag dependent which is included as an independent variable. The quadratic function is implemented on the inefficiency fiscal on the GMM equation model, which is formed as follows:

$$Pov_{it} = \theta_0 + \theta_1 Pov_{it-1} + \theta_2 IF_{it} + \theta_3 IF_{it}^2 + \theta_4 Edu_{it} + \theta_5 Eg_{it} + \theta_6 Gini_{it} + \quad (6)$$

Table 7 displays the estimation results from the poverty in the dynamic panel. It can be seen that the inefficiency fiscal has the same sign and is consistent with the estimation results of the threshold panel, namely negative and positive. Furthermore, the inefficiency fiscal variable gives a solid signal to poverty where there is a U relationship. This indicates that the initial stages of fiscal inefficiency still have a poverty reduction effect. However, poverty will increase significantly if the fiscal inefficiencyexceeds a specific limit. Meanwhile, education and inequality have the same negative and positive signs. Both are significantly influential at the 1 percent level. Even though economic growth does not have the same sign, statistically, both the GMM and the threshold models have no significant effect. Finally, based on the Sargan test, the instrument in the model is valid, and the accuracy of the model described by the AR serial correlation was found to have no problem with serial correlation. Based on the results of this test, the threshold model in this study is solid to be used as an analysis model.

Table 7. Dynamic system GMM estimation

Variable	Coefficient	Std. error	z-stat
Pov(t-1)	0.677	0.059	11.40***
IF	-0.066	0.029	-2.30**
IF2	0.003	0.001	2.22**
Edu	-0.884	0.246	-3.58***
Eg	-0.005	0.007	-0.79
Gini	7.364	2.732	2.70***
Cons	11.215	3.075	3.65***
AR(1)	-2.53***		
AR(2)	1.11		
Sargan test	68.31		
Number of instruments	131		

Source: Author work. **, ** mean 5%, and 1% level of significance.

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5. Conclusion and Policy Recommendations

This article explores the connection between fiscal inefficiency and poverty in 23 districts/cities of Aceh province, as well as various indicators, including education, economic growth, and inequality, from 2011 to 2022. To address the issue of poverty, we utilize the panel threshold method as novelty. Through this approach, we discovered that education has a negative effect on poverty by 2.495%, while inequality has a positive effect on poverty by 0.487%. On the other hand, economic growth does not seem to have a significant impact on poverty. Increasing inefficiency fiscal contributes (above threshold 1.817%) to a rise in poverty by 0.039%, while decreased inefficiency fiscal (below threshold 1.817%) leads to a reduction in poverty by 0.102%. The robustness model test was also applied using the GMM approach, and the results showed the same sign as the threshold.

Based on these empirical findings, there are several policy recommendations. First, education is an important key to overcoming the problem of poverty in 23 districts/cities in Aceh province. The impact it gives is greater than the others. For this reason, the government needs to encourage the community to have 12 years of compulsory schooling and improve public education by increasing activity programs such as formally and informally improving skills, expanding access to education for people who can't afford it, and providing subsidized assistance to the poor. The goal is for people to get higher education and equal opportunities to get decent jobs.

Second, the government must reduce inequality through equity in villages and cities. So far, cities have been seen as areas with better access than villages, resulting in jealousy and eliminating opportunities for certain groups, especially the poor. Therefore, equalization measures from all aspects (economy, education, health) need to be done. Also, the government needs to put forward social need subsidy programs for the poor. The focus on equity is not only in developed regions but also in other districts/cities.

Third, based on empirical findings from inefficiency fiscal, the government needs to increase the effectiveness of planning so that government spending (not becoming a large remainder) can help reduce poverty. This step is important because the government is the main motor in suppressing the problem of poverty. In addition, there is a need for synchronization from planning to activity output so that the remaining spending is not higher than a certain limit so that activities are more effective and beneficial to the community, especially the poor. If not immediately pursued, then the problem of poverty will reappear in the future.

Although the research provides valuable insights, it does have some limitations. Firstly, the study only examined government spending (from the inefficient fiscal side) and socio-economic indicators in 23 districts/cities in Aceh Province. It would be beneficial for future research to investigate the impact of provincial spending on poverty in Aceh Province, as special autonomy funds are divided between provinces and districts. Additionally, researchers could consider including other variables like social spending, education, and health to obtain more comprehensive results. Secondly, there is scope for further development of analytical methods like the ARDL Panel to achieve long-term outcomes.

7. References

[1] Abdulahi, M. E., Shu, Y., & Khan, M. A. (2019). Resource rents, economic growth, and the role of institutional quality: A panel threshold analysis. *Resources Policy*, *61*(71673081), 293–303. https://doi.org/10.1016/j.resourpol.2019.02.011

[2] Adegboyo, O. S. (2020). Does government spending reduce poverty in Nigeria? Evidence from Auto-Regressive Distributed Lag Specification. *E-Journal Ekonomi Bisnis Dan Akuntansi*, *7*(2), 86. https://doi.org/10.19184/ejeba.v7i2.17322

ISSN: 2247-6172
Review of Applied Socio- Economic Research
(Volume xx, Issue xx/ 2023), pp. 70-82
URL: http://www.reaser.eu
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[3] Akram, Z., Wajid, S., Mahmood, T., & Sarwar, S. (2011). Impact of poor governance and income inequality of poverty in Pakistan. *Far East Journal of Psychology and Business*, *4*(3), 43–55. http://www.fareastjournals.com/files/fejpbv4n3p4.pdf

[4] Arias, R., Giménez, G., Sánchez, L., Arias, R. ;, & Giménez, G. ; (2016). Impact of Education on Poverty Reduction in Costa Rica: A Regional and Urban-Rural Analysis. *Contemporary Rural Social Work Journal*, *8*(1), 2–32. https://digitalcommons.murraystate.edu/crswAvailableat:https://digitalcommons.murraystate.edu/crsw/vol8/iss1/3

[5] Asra, A. (2000). Poverty and inequality in Indonesia: Estimates, decomposition and key issues. *Journal of the Asia Pacific Economy*, *5*(1–2), 91–111. https://doi.org/10.1080/13547860008540785

[6] Bahar, D., & Santos, M. A. (2018). One more resource curse: Dutch disease and export concentration. *Journal of Development Economics*, *132*(January), 102–114. https://doi.org/10.1016/j.jdeveco.2018.01.002

[7] Balasubramanian, P., Burchi, F., & Malerba, D. (2023). Does economic growth reduce multidimensional poverty? Evidence from low- and middle-income countries. *World Development*, *161*, 106119. https://doi.org/10.1016/j.worlddev.2022.106119

[8] Campoy-Muñoz, P., Cardenete, M. A., Miguel-Vélez, F. J. D., & Pérez-Mayo, J. (2022). How does fiscal austerity impact on poverty and inequality? The Spanish case. *Economia Politica*, *39*(3), 715–737. https://doi.org/10.1007/s40888-021-00253-5

[9] Capuno, J. J. (2022). Growth with redistribution, finally: Regional poverty and inequality in the Philippines, 2000–2018. *Asia and the Global Economy*, *2*(2), 100039. https://doi.org/10.1016/j.aglobe.2022.100039

[10] Chu, J. F., Sek, S. K., & Ismail, M. T. (2019). Threshold effects of inflation on economic growth: Evidence from dynamic panel threshold regression analysis for 18 developed economies. *Journal of Management, Economics, and Industrial Organization*, *3*(1), 51–62. https://doi.org/10.31039/ jomeino.2019.3.1.4

[11] De Matteis, A. (2013). Relevance of poverty and governance for aid allocation. *Review of Development Finance*, *3*(2), 51–60. https://doi.org/10.1016/j.rdf.2013.04.001

[12] Deng, T., Shao, S., Yang, L., & Zhang, X. (2013). Has the transport-led economic growth effect reached a peak in China? A panel threshold regression approach. *Transportation*, *41*(3), 567–587. https://doi.org/10.1007/s11116-013-9503-4

[13] Fosu, A. K. (2015). Growth, Inequality and Poverty in Sub-Saharan Africa: Recent Progress in a Global Context. *Oxford Development Studies*, *43*(1), 44–59. https://doi.org/10.1080/13600818.2014.964195

[14] Gounder, R., & Xing, Z. (2012). Impact of education and health on poverty reduction: Monetary and non-monetary evidence from Fiji. *Economic Modelling*, *29*(3), 787–794. https://doi.org/10.1016/j.econmod.2012.01.018

[15] Hansen, B. E. (1999). Threshold effects in non-dynamic panels : Estimation, testing, and inference. *Journal of Econometrics*, *93*, 345–368.

[16] Hidalgo-Hidalgo, M., & Iturbe-Ormaetxe, I. (2018). Long-run effects of public expenditure on poverty. *Journal of Economic Inequality*, *16*(1), 1–22. https://doi.org/10.1007/s10888-017-9360-z

[17] Hofmarcher, T. (2021). The effect of education on poverty: A European perspective. *Economics of Education Review*, *83*(April), 102124. https://doi.org/10.1016/j.econedurev.2021.102124

ISSN: 2247-6172
Review of Applied Socio- Economic Research
(Volume xx, Issue xx/ 2023), pp. 70-82
URL: http://www.reaser.eu
e-mail: editors@reaser.eu

[18] Kassouri, Y., Altıntaş, H., Alancioğlu, E., & Kacou, K. Y. T. (2021). New insights on the debt-growth nexus: A combination of the interactive fixed effects and panel threshold approach. *International Economics*, *168*(August), 40–55. https://doi.org/10.1016/j.inteco.2021.08.001

[19] Lin, B., & Li, Z. (2020). Is more use of electricity leading to less carbon emission growth? An analysis with a panel threshold model. *Energy Policy*, *137*(November 2019), 111121. https://doi.org/10.1016/j.enpol.2019.111121

[20] Miar, & Yunani, A. (2020). The Analysis of Influence of The Government Expenditure on Poverty in Indonesia. *Jurnal Ekonomi Pembangunan*, *18*(1), 91–102.

[21] Mehrara, M., & Behzadi Soufiani, M. (2015). The Threshold Impact of Fiscal and Monetary Policies on Inflation : Threshold Model Approach. *Journal of Money and Economy*, *10*(4), 1–27.

[22] Olopade, B. C., Okodua, H., Oladosun, M., & Asaleye, A. J. (2019). Human capital and poverty reduction in OPEC member-countries. *Heliyon*, *5*(8), e02279. https://doi.org/10.1016/j.heliyon.2019.e02279

[23] Putra, R. F. I., & Lisna, V. (2020). Segitiga Kemiskinan-Pertumbuhan-Ketimpangan (Pgi Triangle): Pembangunan Keuangan, Pembangunan Manusia, Dan Ketimpangan Pendapatan Di Asia. *Jurnal Ekonomi Dan Pembangunan*, *28*(2), 77–89. https://doi.org/10.14203/jep.28.2.2020.77-89

[24] Raouf, E. (2022). The impact of financial inclusion on tax revenue in EMEA countries: A threshold regression approach. *Borsa Istanbul Review*, *22*(6), 1158–1164. https://doi.org/10.1016/j.bir.2022.08.003

[25] Rahim, S., Murshed, M., Umarbeyli, S., Kirikkaleli, D., Ahmad, M., Tufail, M., & Wahab, S. (2021). Do natural resources abundance and human capital development promote economic growth? A study on the resource curse hypothesis in Next Eleven countries. *Resources, Environment and Sustainability*, *4*(March), 100018. https://doi.org/10.1016/j.resenv.2021.100018

[26] Sarwar, M. (2011). Impact of education on poverty reduction. *Munich Personal RePEc Archive*, *31826*.

[27] Sasmal, R., & Sasmal, J. (2016). Public expenditure, economic growth and poverty alleviation. *International Journal of Social Economics*, *43*(6), 604–618. https://doi.org/10.1108/IJSE-08-2014-0161

[28] Song, Z. (2021). Economic growth and carbon emissions: Estimation of a panel threshold model for the transition process in China. *Journal of Cleaner Production*, *278*, 123773. https://doi.org/10.1016/j.jclepro.2020.123773

[29] Su, X., Pan, C., Zhou, S., & Zhong, X. (2022). Threshold effect of green credit on firms' green technology innovation: Is environmental information disclosure important? *Journal of Cleaner Production*, *380*(P1), 134945. https://doi.org/10.1016/j.jclepro.2022.134945

[30] Tachibanaki, T. (2006). Inequality and poverty in Japan. *Japanese Economic Review*, *57*(1), 1–27. https://doi.org/10.1111/j.1468-5876.2006.00355.x

[31] Taruno, H. T. (2019). Public Spending and Poverty Reduction in Indonesia: The Effects of Economic Growth and Public Spending on Poverty Reduction in Indonesia 2009-2018. *The Indonesian Journal of Planning and Development*, *4*(2), 49–56. https://doi.org/10.14710/ijpd.4.2.49-56

[32] Thanh, S. D. (2015). Threshold effects of inflation on growth in the ASEAN-5 countries: A Panel Smooth Transition Regression approach. *Journal of Economics, Finance and Administrative Science*, *20*(38), 41–48. https://doi.org/10.1016/j.jefas.2015.01.003

ISSN: 2247-6172
Review of Applied Socio- Economic Research
(Volume xx, Issue xx/ 2023), pp. 70-82
URL: http://www.reaser.eu
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[33] Yusri, A. (2022). Does Government Expenditure Affect Poverty, Health, and Education? Evidence from Aceh, Indonesia. *Jurnal Perencanaan Pembangunan: The Indonesian Journal of Development Planning*, *6*(1), 1–20. https://doi.org/10.36574/jpp.v6i1.249

[34] Wang, Q. (2015). Fixed-effect panel threshold model using Stata. *Stata Journal*, *15*(1), 121–134. https://doi.org/10.1177/1536867x1501500108

[35] Xu, X., Zhang, N., Zhao, D., & Liu, C. (2020). The effect of trade openness on the relationship between agricultural technology inputs and carbon emissions: evidence from a panel threshold model. *Environmental Science and Pollution Research*, *28*(8), 9991–10004. https://doi.org/10.1007/s11356-020-11255-4

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