East African Scholars Multidisciplinary Bulletin
Abbreviated Key Title: East African Scholars Multidiscip Bull
ISSN 2617-4413 (Print) | ISSN 2617-717X (Online) |
Published By East African Scholars Publisher, Kenya

OPEN ACCESS

DOI: 10.36349/easmb.2019.v02i08.005 Volume-2 | Issue-8 | Aug-2019 |

Research Article

Do Zakah and Tax Reduce Income Disparity? A Panel Autoregressive Distributed Lag Model

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Abstract: This study aims to explore and analyze the short- and long-run effects of zakah and tax on income disparity across 23 districts in Aceh Province, Indonesia over the period 2009-2017. Based on the Autoregressive Distributed Lag (ARDL) approach, the study found that in the short-run zakah has a positive and significant effect on income disparity, while in the long-run it has a negative effect on income disparity. In the short run, zakah recipients tend to use of zakah funds for consumptive purposes, while in the long run, zakah has been channeled in the form of productive activities. On the other hand, the tax has an insignificant effect on income disparity in the long run, while in the long run, it has a positive effect on income disparity. The use of a larger portion of the tax to support government routine expenditures rather than to investment that creates jobs opportunities for people has enlarged income disparity in the long-run. These findings suggest that, to further reduce income disparity, zakah should be allocated more for the productive purposes in the short run, while tax should be spent for job creation.

Keywords: Zakah, Tax, Income disparity, Gini ratio, Panel ARDL.

INTRODUCTION

Disparity or inequality is at the core of economic problems in many underdeveloped and developing countries. The disparity of income and unequal distribution of income has the potential to trigger the emergence of various economic problems such as inflation, unemployment, and poverty (Waluyo, 2017). Income disparity has increased in recent years in most countries in the world, including Indonesia. As a developing country, poverty and income inequality remain major problems across the provinces in Indonesia (Ayuniyyah *et al.*, 2018).

Of 34 provinces in Indonesia, Aceh has been recording a relatively lower level of income disparity rate, but it has been increasing recently. As reported by the Central Bureau of Statistics of Indonesia (2018), although the Gini ratio of Aceh province has been below the national level for the last few years, but it has experienced a significant increase from 0.30 in 2016 to 0.35 in 2017, which was faster than an increase in the level of income disparity at the national level form 0.41 in 2016 to 0.42 in 2017. This shows an increasing trend of income inequality caused by the unjust economic development process, as indicated by an increasing trend in the Gini ratio, a measure of income inequality (Mahardiki and Santoso, 2013). The unequal distribution of income is not only occurring at the national and provincial levels, but also across districts in the province. The success of provincial Development in each district is a good foundation for the success of national Development since national development is inseparable from the performance of district development. The success of regional development will provide a sizable correlation on increasing national development outcomes.

As the only province in Indonesia that has implemented Islamic law, Muslim in Aceh province obliged to pay Zakah, as the third pillar of Islam. Apart from tax, the collection of Zakah funds have been an additional source of provincial revenue to be allocated only for the needy, poor, orphans, disabled etc., as required by the Islamic law. If zakah is managed with a trustworthy, professional, and integrated management system has been an economic driver in the community,

Quick Response Code

Journal homepage:
http://www.easpublisher.com/easmb/

Article History
Received:15.07.2019
Accepted: 26.07.2019
Published: 13.08.2019

it has a potential to reduce economic inequality between the haves and haves-not groups (Indra, 2017). If zakah management is carried out in a systematic and well-organized manner, it will have a large multiplier effect on increasing income due to an acceleration of money circulation in a country's economy (Nasrullah, 2010).

Aceh Province, is well-known as the Veranda of Mecca of Indonesia, has a majority Muslim population of 4.4 million, 90% of the total population in 2010. Thus, zakah has great potential to reducing poverty and income disparity, this is due to paying Zakah is one of the obligations that must be carried out by Muslim communities so that zakah funds can be used for the welfare of society. Based on the report of Baitul Mal of Aceh Province (2018) and the National Zakah Body of BAZNAS (2018), over the period 2007-2017, at the national level, the zakah funds has continued to increase IDR740.00 billion in 2007 to IDR6 trillion in 2017, whereas in Aceh Province zakah receipts has increased from IDR22 billion to IDR147 billion in the similar period. This shows the increasing role of zakah for the national and provincial economies to reduce income disparity in Indonesia.

Both zakah and tax are the sources of revenues for the government of Aceh province. However, there are differences between the two. Zakah is only obliged to be paid (*muzakki*) by those who have reached their income or property up to the minimum level (*nisab*) determined by the Islamic law, while taxes are on the income of people who are taxpayers. Zakah funds should only be allocated to those (*mustahik*) who are poor, needy, disabled, orphans, etc., determined by the Islamic law, while tax funds could be allocated to every economic sector determined by the state. These differences make zakah to be fairer than the tax because zakah is obliged to the rich and is not obligatory to the poor so they can achieve social justice (Almatar, 2015). Zakah funds can only be distributed to poor people who are Muslim, so that the use of zakah is fully enjoyed by the poor, whereas tax is a fiscal policy that uses more for development compared to empowering the poor, this causes taxes to be enjoyed by the rich as well as in infrastructure development, investment, government spending. This causes that zakah is also more effective in reducing income disparity because the target is directed to the weak economic community; while the tax has an indirect target to the poor meaning that its use is wider. Taxes are the main means of achieving the goals of the state to provide prosperity and prosperity to all the people of Indonesia. Government revenue from taxes depends on the level of the country's economy and the number of people in an economy (Maidar *et al.*, 2017).

Regional Assets and Financial Management Authority of Aceh Province (2017) reported that, over the period 2007-2017 taxes collection in Indonesia have increased from IDR425.4 trillion in 2007 to IDR1,498.90 trillion in 2017. However, in 2009, tax revenues decreased to IDr544.5 trillion compared to IDR571.1 trillion in 2008 due to the effects of the 2008 world economic crisis. Although taxes and zakah collection in Indonesia has increased every year, however, the level of income disparity also increases, as indicated by an increasing trend of the Gini ratio from 0.38 in 2007 to 0.41 in 2011. Similarly, the Gini ratio also increased from 0.27 in 2007 0.33 in 2015 in the Aceh Province. These facts indicate the ineffectiveness of zakah funds to reduce income disparity in Indonesia.

There has been a study conducted to explore the effects of zakah on income disparity in Indonesia by Raraswanti and Dewanti (2018). In their study, Raraswanti and Dewanti (2018) investigated the effect of zakah on the distribution the income of pineapple farmers in Pemalang Regency, Centre Java Province, Indonesia using primary data of 100 samples. Unlike the study by Raraswanti and Dewanti (2018) that only focused on the effect of zakah of the pineapple farmers in the Pemalang Regency on their income, this study focused its analysis of the effects of both the zakah and taxes across 23 districts in the Aceh Province over a period 2009-2017. Thus, this study is among the first attempts to explore the effects of both zakah and tax on income disparity using the advanced cointegration bound testing approach of the Autoregressive Distributed Lag (ARDL).

The findings of the study are also hoped to be useful for enriching the existing empirical evidence as it has been relatively scarce, considering the huge potentiality of zakah in reducing income disparity in the Indonesian economy. It is also hoped to offer references for the policy-makers to enhance the use of zakah for improving the welfare of the citizens.

The rest of this study is structured in the following sequences. Section 2 provides a relevant literature review. Section 3 provides an empirical framework and data, followed by discussing the findings of the study. Finally, Section 5 concludes the paper.

LITERATURE REVIEW

Income disparity is a major problem in most developing economies as it shows the failure of economic growth to prosper all level of societies. Agusalim (2016) defines income disparity is a difference in the level of income distribution in a country at a certain time period. Piketty (2014) in his book "Capital in the Twenty-First Century" discovered a general theory of capital and inequality. Income inequality is caused by the increasing concentration of capital on the few people who encourage their owners to treat capital as a scarce and extremely valuable resource so that the capitalists demand high returns. For example in the 18-19th century, countries were marked by high inequality in which private wealth dominated

national income and was concentrated in only a handful of rich families because class relations with rigid structures were still in effect.

The World Bank (2015) reported that one of the instruments that can reduce current and future income disparities is to use taxes and government budgets. Establish an appropriate fiscal policy so as to increase state spending on infrastructure, health and education, social assistance and social security. The government creates more equal opportunities in the future and better employment in the present so that households have the ability to protect themselves. Furthermore, the International NGO Forum on Indonesian Development (2017) reported that one of the things that can be done by the government to reduce inequality between rich groups and poor groups is to increase the tax ratio to Gross Domestic Product (GDP) so that it can achieve tax potential optimally. Islam et al. (2017) found that an increase in income inequality was caused by a decrease in the tax ratio, this increase in inequality put pressure on the national budget and debt. Income inequality also limits the ability of the government to reform taxes especially in terms of expanding the tax base.

Furthermore, apart from tax, Kafh (1995) states that zakah and inheritance systems in Islam tend to act as an egalitarian system of property distribution, so that assets will always circulate and circulate to all levels of society, because the accumulation of property in the hands of a person or a group is strictly prohibited Al-Qur'an (Majid, 2017). In an Islamic economic system, zakah plays a role in preventing the accumulation of wealth in some people and requires rich people to distribute their wealth to groups of needy and poor people, zakah also acts as a potential source of funds to reduce poverty and income inequality, then zakah also functions as capital employment for the poor to be able to open up employment opportunities (Atabik, 2015).

The above-reviewed studies show that both tax and zakah could play a vital role to reduce income inequality in an economy. However, there have been studies investigated the role of tax and zakah on economy separately, and almost none of them has investigated the role of both zakah and tax on income disparity. Thus, this study intends to fill this research gap by exploring both zakah and tax and their effects on income inequality reduction.

RESEARCH METHODS

Data

To exploring the effects of zakah and tax on income inequality reduction across 23 districts in Aceh, Indonesia, the secondary panel data (207 observations) over the period 2009-2017 were used. To measure zakah funds, the total annual zakah receipts were used and obtained from Baitul Mal Aceh, while to measure tax funds, the tax from motor vehicle receipts were used and obtained from the Aceh Provincial Financial and Asset Management Agency. Finally, to measure the income disparity, the Gini ratio data gathered from the Aceh Provincial Statistics Agency were used.

Model of Analysis

The Panel Autoregressive Distributed Lag (ARDL) model is adopted to answer the objective of the study. This model is suitable for the analysis as it allows differences in the level of data, it can be used with a small number of samples, and it enables us to measure short-term and long-term estimates (Majid, 2007a; Majid, 2007b; Majid, 2007c; Majid, 2008). Referring to Pesaran et al. (2001) and Dogan et al. (2014), this study estimates the following ARDL equation:

$$\Delta LID_{j,t} = \alpha_{01} + \sum_{i=1}^{n} \alpha_{1i} \Delta LID_{j,t-1} + \sum_{i=1}^{n} \alpha_{2i} \Delta LZF_{j,t-1} + \sum_{i=1}^{n} \alpha_{3i} \Delta LTF_{j,t-1} \beta_{11} LID_{j,t-1} + \beta_{21} LZF_{j,t-1} + \beta_{31} LTF_{j,t-1} + u_{j,t} \quad (3.1)$$

where *LID* is the income disparity, *LZF* is zakah funds, *LTF* is the tax funds, α_{ii} are the estimated coefficients for short run, β_{ii} are the estimated coefficients for long run, *t* is the period of study, *j* is the district area of the study, *i* is the number of lag, and *u* is the error term. All variables were measured in the natural logarithm.

Based on Bildirici and Kayikci (2013), the study estimates the short-run effect using the following equation:

$$\Delta LID_{j,t} = \alpha_{01} + \sum_{i=1}^{n} \alpha_{1i} \Delta LID_{j,t-1} + \sum_{i=1}^{n} \alpha_{2i} \Delta LZF_{j,t-1} + \sum_{i=1}^{n} \alpha_{3i} \Delta LTF_{j,t-1} + \theta_1 ECT_{t-1} + u_{3it} \quad (3.2)$$

Meanwhile, referring to Bildirici and Kayikci (2013), the study estimates the long-run effect using the following equation:

$$LID_{j,t} = \beta_{01} + \beta_{11} LID_{j,t-1} + \beta_{21} LZF_{j,t-1} + \beta_{31} LTF_{j,t,1} + \varepsilon_t \quad (3.3)$$

Before the study estimate the ARDL equation, the tests of stationarity and cointegration will be conducted first. The test of stationarity is conducted using the Levin, Lin, and Chu (LLC), Im, Pesaran, and Shin (IPS), ADF Fisher Chi-Square (ADF Fisher), and PP-Fisher (PP-Fisher) approaches, while for cointegration test, the Predoni cointegration and Pedroni, Kao and Fisher (KAO) cointegration approaches are used.

FINDING AND DISCUSSION

Table 1 reports the findings of the stationary test. As observed from Table 1, the unit root tests based on the individual intercept and trend model of the Levin, Lin, and Chu (LLC), Im, Pesaran, and Shin (IPS), ADF Fisher Chi-Square (ADF Fisher), and PP-Fisher (PP-Fisher) showed that the variables showed that there were differences in stationarity levels. Some variables were stationary at the level, while some others were stationary at the first difference. This confirms the suitability of the use of the ARDL model in the study to analyze the effects of zakah and tax on income disparity.

Table1. ***Panel unit root test***

Individual Intercept and Trend				
	LLC	**IPS**	**ADF-Fisher**	**PP-Fisher**
ZF	-10.139*** (0.000)	-0.002(0.491)	55.969(0.148)	110.988*** (0.000)
TF	-56.738*** (0.000)	-4.179*** (0.000)	97.091*** (0.000)	110.759*** (0.000)
ID	-9.689*** (0.000)	-0.437(0.331)	59.780* (0.083)	124.881*** (0.000)
ΔZF	-10.149*** (0.000)	-0.751(0.226)	70.774*** (0.010)	176.980*** (0.000)
ΔTF	-64.269*** (0.000)	-3.311*** (0.000)	71.206*** (0.010)	215.517*** (0.000)
ΔID	-6.266*** (0.000)	0.179(0.571)	47.566(0.408)	165.982*** (0.000)

Note: Figures in bracket is the p-value.
*** And * indicate significance at the 1% and 10% levels, respectively.

After testing the stationarity of the data, a cointegration test will then be conducted with the aims to identify the presence of a long-term balance between the dependent variable and the independent variable. The panel cointegration tests of Predoni and Pedroni, Kao and Fisher (KAO) is conducted, where their findings are reported in Table 2. As illustrated in Table 2, the study found a cointegration between zakah, tax, and income disparity at least at the 10% level based on both Predoni and KAO cointegration tests. This finding shows the existence of long run equilibrium among variables. Thus, to predict a variable in the model, we could rely on other variables as those variables were moving together towards long-run equilibrium.

Table2. Findings from panel cointegration

Predoni Cointegration Test	**Statistic**	**Weighted Statistic**
Panel v-Statistic	-3.194 (0.999)	-4.091 (1.000)
Panel rho-Statistic	3.343 (0.999)	3.427 (0.999)
Panel PP-Statistic	-4.495*** (0.000)	-7.499*** (0.000)
Panel ADF-Statistic	-1.289* (0.098)	-3.038*** (0.001)
Group rho-Statistic	4.735 (1.000)	
Group PP-Statistic	-11.382*** (0.000)	
Group ADF-Statistic	-1.593** (0.055)	
KAO Cointegration Test	**t-statistic**	
ADF	-2.740*** (0.003)	

Note: Figures in bracket is the p-value.
***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

After confirming the existence of cointegration among the variables, the ARDL will be estimated. Since the model incorporates the lag into the model, the lag-length criteria of Akaike Information Criterion (AIC) is used to determine the used of lag. The study found a lag-length of 1 to be suitable to incorporate into the model.

Table 3 reports the findings from ARDL estimate, showing the effect of short-term and long-term on income disparity across 23 districts in Aceh Province, Indonesia. Table 3 shows that in the long run, the variable zakah has a negative and significant effect on income disparity. This can be seen from the coefficient value of -0.0765 and the p-value <0.01, which is 0.003, meaning that every 1% increase in zakah can reduce income disparity by 0.0765%. Meanwhile, in the short term, the variable zakah has a positive and significant effect on income disparity. This can be seen from the coefficient value of 0.103 and the p-value <0.05, which is 0.023, meaning that a 1% increase in zakah caused an increase in income disparity

by 0.103%. These results indicate that the effect of zakah funds in reducing income disparities occurs in the long run, whereas in the short run zakah funds were actually influential in increasing income disparities.

Table3. Findings from the ARDL panel regression

Estimate	Variable	Coefficient	t-Statistic (P-value)
Long run	LZF	-0.0766***	-2.9449 (0.003)
	LTF	0.1849***	7.0645 (0.000)
Short run	C	-1.9050***	-8.5772 (0.000)
	ΔLZF	0.1030**	2.3037 (0.023)
	ΔLTF	-0.0983	-1.5491 (0.124)
	ECT_{t-1}	-0.8391***	-9.0375 (0.000)

Note: *** and ** indicate significance at the 1% and 5% levels, respectively.

On the other hand, as for tax variable, in the long run it has a positive and significant effect on income disparity, this can be seen from the coefficient value of 0.1849 and p-value < 0.01, which is 0,000, meaning that every 1% an increase in tax caused an increase in income disparity by 0.184%. However, in the short term, the tax has a negative insignificant effect on income disparity, as indicated by the estimated coefficient value of -0.0983 and p-value > 0.05 which is 0.1241. These results indicate that the tax variable has no effect in reducing income disparity in the short term, but taxes increase income disparity in the long run.

These findings imply that, in the short run, zakah recipients tend to use of zakah funds for consumptive purposes, while in the long run, zakah has been channeled in the form of productive activities. On the other hand, the tax has an insignificant effect on income disparity in the long run, while in the long run, it has a positive effect on income disparity. The use of a larger portion of the tax to support government routine expenditures rather than to investment that creates jobs opportunities for people has enlarged income disparity in the long-run. These findings suggest that, to further reduce income disparity, zakah should be allocated more for the productive purposes in the short run, while tax should be spent for job creation.

Finally, the coefficient value of the short-term to long-term balance adjustment in the estimation results shows a negative and significant value of -0.839128 and a significance of 0.000, this means that an 83.9% of zakah and tax variables are adjusted from the short-term to the long-term. In other words, it needs 1.6 years for the short-run disequilibrium to be cleared to restore back to its long-run equilibrium.

Next, Table 4 reports the short term relationship between zakah and tax on income disparity in 23 districts in Aceh Province, Indonesia. As observed in Table 4, the study found that: Zakah was negative and insignificant for the district of Langsa, significant negative for the districts of Simeulue, South Aceh, Southeast Aceh, Pidie; positive and insignificant for the districts of East Aceh, Central Aceh, Nagan Raya, Bener Meriah; positive and significant for the cases of West Aceh, Aceh Besar, Bireun, Aceh Utara, Aceh Barat Daya, Gayo Lues, Aceh Tamiang, Aceh Jaya, Pidie Jaya, Banda Aceh, Sabang, Lhokseumawe, and Subulussalam. On the other hand, the tax was found to be negative and insignificant for the districts of Aceh Tengah, and Banda Aceh; negative and significant for the cases of Simeulue, East Aceh, West Aceh, Aceh Besar, Pidie, North Aceh, Southwest Aceh, Nagan Raya, Aceh Jaya, Pidie Jaya, Sabang, Langsa, and Subulussalam; positive and insignificant for the cases of Aceh Singkil, South Aceh, Southeast Aceh, Southwest Aceh, and Bener Meriah, and positive and significant for the cases of Aceh Tamiang and Lhokseumawe.

Table4. Findings of short-run relationships across 23 districts in Aceh, Indonesia

District/Cities	*Variable*	
	LZF	LTF
Simeulu	-0.057*** (0.000)	-0.266** (0.047)
Aceh Singkil	0.126*** (0.000)	0.044 (0.188)
South Aceh	-0.142** (0.030)	0.112 (0.588)
Southeast Aceh	-0.138*** (0.000)	0.183** (0.066)
East Aceh	0.033 (0.117)	-0.236** (0.037)
Central Aceh	0.022 (0.537)	-0.150* (0.064)
West Aceh	0.731*** (0.011)	-1.244** (0.038)
Aceh Besar	0.071*** (0.000)	-0.105*** (0.000)
Pidie	-0.062*** (0.000)	-0.088*** (0.000)
Bireuen	0.097*** (0.000)	-0.108*** (0.000)
North Utara	0.080*** (0.002)	-0.364*** (0.003)
Southwest Aceh	0.093*** (0.001)	0.141 (0.519)

Gayo Lues	0.095*** (0.000)	-0.255*** (0.000)
Aceh Tamiang	0.104*** (0.000)	0.476*** (0.006)
Nagan Raya	0.043* (0.099)	-0.102*** (0.011)
Aceh Jaya	0.089*** (0.000)	-0.094*** (0.005)
Bener Meriah	0.017 (0.290)	0.030 (0.877)
Pidie Jaya	0.098*** (0.000)	-0.038*** (0.007)
Banda Aceh	0.150*** (0.000)	-0.078 (0.101)
Sabang	0.735** (0.014)	-0.049** (0.027)
Langsa	-0.031 (0.549)	-0.066** (0.017)
Lhokseumawe	0.093** (0.035)	0.049*** (0.005)
Subulussalam	0.119*** (0.003)	-0.053*** (0.011)

Note: ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

These findings show the different importance of zakah and tax in reducing income inequality in different periods across districts. These different findings were influenced by geographical location, population, education level, economic conditions in each district. The influence of zakah and tax in regencies could be a solution in reducing income disparity and other economic problems in Aceh.

To further enhance the contribution of zakah to income inequality reduction, the government policies should set binding regulations for all Muslim to pay zakah such as taxes so that the realization of zakah collected could be enhanced and achieve the set target. Consequently, zakah could be a solution in reducing income disparity among the poor, as well as making regulations of tax exemption for Muslim communities who already paid zakah.

CONCLUSION

This study explored and analyzed the short- and long-run effects of zakah and tax on income disparity across 23 districts in Aceh Province, Indonesia over the period 2009-2017 using the Autoregressive Distributed Lag (ARDL) approach. The study recorded that, in the short-run, zakah has a positive and significant effect on income disparity, while, in the long-run, it has a negative effect on income disparity. In the short run, zakah recipients tend to use of zakah funds for consumptive purposes, while in the long run, zakah has been channeled in the form of productive activities.

On the other hand, the tax has an insignificant effect on income disparity in the long run, while in the long run, it has a positive effect on income disparity. The use of a larger portion of the tax to support government routine expenditures rather than to investment that creates jobs opportunities for people has enlarged income disparity in the long-run. These findings suggest that, to further reduce income disparity, zakah should be allocated more for the productive purposes in the short run, while tax should be spent for job creation.

Further studies on this issue are suggested to incorporate other macroeconomic determinants, cover more time spans, and include more regions to provide comprehensive empirical evidence on the role of zakah and tax on income inequality reduction.

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