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Analysis of Local Tax Performance Through Tax Capacity and Tax Effort in Indonesia 2014-2018

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Abstract

Purpose: This study aims to analyze the performance of local taxes in Indonesia through the estimation of tax capacity and tax effort, as well as classifying provinces based on the estimated value of tax capacity and tax effort. **Research design, data and methodology:** this study uses panel data of 34 provinces in Indonesia for the period of 2014-2018. The analytical method used in the tax capacity model is panel data regression to explain the factors that influence tax performance. Tax effort is estimated by the ratio of tax to tax capacity. **Results:** The results of the analysis show that gini ratio and regional expenditures have a significant positive effect on the tax ratio, while the share of GRDP in the manufacturing sector and HDI has a significant negative effect on the tax ratio. Based on the results, there are 19 provinces that have low tax capacity and 16 provinces that have low tax effort. **Conclusions:** The development of local tax performance tends to fluctuate with an average of 1.24 percent per year. Gini ratio and regional expenditure have a significant positive effect on the tax ratio, while the share of GRDP in the manufacturing sector and HDI have a significant negative effect on the tax ratio.

Keywords : Local Taxes, Panel Data Regression, Tax Capacity in Indonesia, Tax Effort

JEL Classification Code : E62, H21, H71

1. Introduction

Economic development in a country requires good financial conditions that can arise from good sources of income both from abroad and domestically. Domestic revenue comes from tax revenues, namely from oil and gas and non-oil and gas tax revenues (BAPPENAS, 1994). Tax performance is usually measured by tax ratio, which is the ratio between tax revenue and a GDP in a country. World Bank (2019) shows that Indonesia has a tax ratio of 10.23%, which is still low when compared to other countries, especially to those in Association of South East Asia Nation (ASEAN). Indonesia's tax ratio is only higher than that of Myanmar, which has the lowest tax ratio in ASEAN. In addition, Indonesia's tax ratio is below the IMF recommendation, which set the ideal tax ratio for Indonesia at 12.5-15%. This fact shows that tax performance in Indonesia has not been maximized in increasing government revenues.

Since 2001, Indonesia has implemented the regional autonomy policy. This policy gives the broadest authority for regions to manage their own businesses. In financial sector, it is known as the Fiscal Decentralization policy. This policy gives the individual regions wider authority to

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maximize the financial resources that are owned by the regions and supported by balancing funds from the Central Government. Balancing funds are funds given by the Central Government to the Local Government to assist regions in digging their own income. The components of regional revenue since the fiscal decentralization policy are Regional Original Revenue (PAD), Balancing Funds, and other legitimate regional revenues (Law No. 33 of 2004). PAD consist of local taxes, regional levies, the result of separated regional wealth management, and other legitimate PAD. Meanwhile, the Balancing Fund consists of the General Allocation Fund (DAU), the Special Allocation Fund (DAK), and the Revenue Sharing Fund (DBH). This policy aims to create regional self-independence, which is indicated by the proportion of PAD in excess of the Balancing Fund.

Local governments have responded to this policy by focusing on maximizing the local taxes. This is because local taxes are the main component in PAD. Local taxes are expected to encourage the contribution of PAD in regional revenues to achieve regional independence as goal of fiscal decentralization. Unfortunately, Ministry of Finance (2018) shows that in 2018, the contribution of local taxes was only 17.48% of the regional revenues, which is lower than the contribution of DAU (36.22%). Thus, the proportion of PAD is difficult to increase. It can be seen that the contribution of PAD is only 24.64%, which is lower than the contribution of Balancing Fund (59.87%). This fact shows that regional independence has not yet been realized in Indonesia. Thus, the objective of fiscal decentralization has not been achieved.

The low performance of local taxes can be caused by the using tax ratio to measure tax performance by the government as a reference in designing tax policies. The tax ratio that has been used cannot specifically measure the tax performance it has. Musgrave (1987) and Le, Dodson, and Rojchaichaninthorn (2008) state that the tax ratio can only compare tax performance between regions or countries with the same economic structure and income level. Lotz and Morss (1967) also states that the tax ratio does not take into account the characteristics of a country's tax and non-tax systems. This fact shows that other measures are needed to measure tax performance based on conditions in the region. Measures that can be used are tax capacity, which describes the maximum potential tax that can be obtained (Pessino & Fenochietto, 2013) and tax effort, which describes the government's ability to explore tax capacity (Leuthold, 1991). This has become the interest of researchers to measure tax performance through estimation of tax capacity and tax effort in Indonesia because of the diversity of income level on each province.

Based on the empirical fact above, this study aims to provide an overview of the performance of local taxes in Indonesia for 2014-2018 as well as to estimate and analyze tax capacity using the share of manufacturing sector GRDP, gini ratio, Human Development Index (HDI), and regional expenditure variables. Based on the resulting model, an estimation of the value of tax capacity and the value of tax effort is made, as well as grouping the provinces in Indonesia based on the estimated tax capacity and tax effort. This is expected to be a reference for local government in designing and setting targets and mechanisms for taxation policies in their regions based on their own existing conditions.

2. Literature Review

Mustaqiem (2014) defining taxes as a levies by the government to the people based on the law without a direct feedback from the government for the peoples. Taxes have a very important role in the implementation of development because taxes are the main source of state income to finance all expenditures including development expenditures. The fiscal decentralization which has been implemented since 2001 has resulted in the division of taxes into central taxes and local taxes. Central tax is a tax collected by the central government, while local tax is a tax collected by the local government. Tax performance is measured by using the tax ratio, which is a comparison between actual tax revenues and the country's GDP or regional's GRDP. However, the tax ratio cannot measure the performance of local tax specifically, so other measuring tools are needed that can measure tax performance based on the conditions of each region, namely through tax capacity and tax effort.

Le, Dodson, and Rojchaichaninthorn (2008) define that tax capacity is an estimate of the maximum tax potential calculated using the estimated coefficient of the regression model and considering the specific characteristics of a country. Pessino and Fenochietto (2013) explain that tax capacity is the maximum level of a tax revenue that can be achieved by a country. Leuthold (1991) defines tax effort as an attempt by a country to collect tax revenues considering the availability of tax capacity. Tax effort is the ratio between tax ratio and tax capacity. Tax effort > 1 indicates that the country is making good use of its tax base to increase tax revenues and vice versa (Stotsky, 1997).

Based on several previous studies, there are several factors that affecting tax revenue. Le, Dodson, and Bayraktar (2012) stated that GDP per capita and trade openness had a significant positive effect on tax revenue, while population growth, agricultural sector GDP, and the corruption index had a significant negative effect on tax revenue. Boustan, Ferreira, Winkler, and Zolt (2013) showed that an increase in income inequality has an effect on increasing tax revenue and public expenditure in urban

areas and school districts in the United States. Bashayreh and Oran (2016) showed that the share of GDP in manufacturing sector and trade openness has a positive effect on tax capacity, while the share of GDP in agricultural and mining sector has a negative effect on tax capacity. Piancastelli and Thirwall (2019) showed that trade openness and share of GDP in agricultural sector have a positive and significant effect on tax revenue. GDP per capita, the percentage of money in circulation, and the share of GDP in the service sector have a positive but not a significant effect on tax revenues, while the share of GDP in the industrial sector has a negative but not a significant effect on tax revenues. Therefore, the hypothesis proposed in this study is a two-way hypothesis. This means that all the variables used, namely, the share of GRDP in the manufacturing sector, gini ratio, HDI, and regional expenditures, have an effect on the tax ratio.

3. Research Methods and Materials

This study focuses on local tax revenues for 34 provinces in Indonesia with a research period of 2014-2018. The variables used are the GRDP in the manufacturing sector, gini ratio, HDI, and regional expenditure. The data used in this study is secondary data sourced from the Statistics Indonesia, and the local tax revenue data is obtained from the publication of Regional Financial Statistics. The share of GRDP in the manufacturing sector data is from the publication of the Gross Regional Domestic Product of all provinces in Indonesia, and the gini ratio and HDI data are from www.bps.go.id. Realization of regional expenditure data is obtained from the publication of Regional Financial Statistics.

The analytical methods used in this study consist of descriptive analysis to provide an overview of the performance of local taxes in Indonesia for the period of 2014-2018 and inferential analysis to explain the factors that affect tax performance as well as modelling to estimate the value of tax capacity. Descriptive analysis figured by using line and bar chart, while inferential analysis method used panel data regression. The models used in this study as follows:

$$TR_{it} = \alpha + \beta_1 shareMANU_{it} + \beta_2 GINI_{it} + \beta_3 HDI_{it} + \beta_4 ln\, EXP_{it} + u_{it} \quad (1)$$

Where TRit is the tax ratio that is a proxy for the performance of local taxes in province I in period t, shareMANUit shows the percentage contribution of the GRDP of the manufacturing sector in province i in period t. GINIit shows the distribution of people's income in province i period t, IPMit shows the province's human development index i in period t, lnEXPit shows the realization of provincial regional expenditures in period t, and uit is the error component.

The stages of the analysis in this study are as follows:

1. Formatting panel data
   The first step of analysis is creating a panel data format for dependent and independent variables.
2. Model Selection
   The next stage is selecting the best model among the Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM). The Chow test was used to select the model between the CEM and FEM models, the Hausman test was used to select the model between FEM and REM, then the BP-LM test was used to select the model between CEM and REM.
3. Testing the Variance-Covariance Structure
   If the selected model is FEM, the next step is to test the structure of the variance-covariance matrix to identify the presence of heteroscedasticity and cross-sectional correlation. If the result are significant, then the estimation method used is Generalized Least Square (GLS).
4. Classical Assumption Test
   After selecting the best model, perform a classic assumption test. If the estimation method used is Ordinary Least Square (OLS), then the assumption test would be only on normality, non-autocorrelation, homoscedasticity, and non-multicollinearity. However, if the estimation method used is Generalized Least Square (GLS), then the assumption test would be only on normality and non-multicollinearity.
5. Model Significance Test (Adj-R2, F test, and t test)
6. Estimated tax capacity
   The best model equation obtained is used further in calculating the estimated value of tax capacity
7. Estimated tax effort
   After obtaining the estimated value of tax capacity, the next step is to calculate the estimated value of tax effort by dividing the tax ratio by tax capacity.
8. Provinces classification based on tax capacity and tax effort
   The final step in this study is classifying the provinces in Indonesia based on the tax capacity and tax effort obtained. Classification refers to Le, Dodson, and Bayraktar (2012), where the central tendency is the cut-off point for tax capacity, which means that if a province has a tax capacity greater than the central tendency, it is classified into the high category and vice versa. Meanwhile if the value is smaller, then included in the low category. The cut-off point for tax effort is set to 1, which means that if a province's tax effort is more than 1, then the province's tax effort is high.

4. Results and Discussion

4.1. Overview of Local Tax Performance in Indonesia for the period of 2014-2018

Local taxes are the component that has the largest contribution to PAD. High local tax revenue will increase the contribution of PAD to regional income. This means that local taxes are a crucial aspect that can determine regional independence. Tax performance can be described through the tax ratio, which is the ratio between local tax revenues and the GRDP of each province. In general, the development of local tax ratio in Indonesia can be seen in Figure 1.

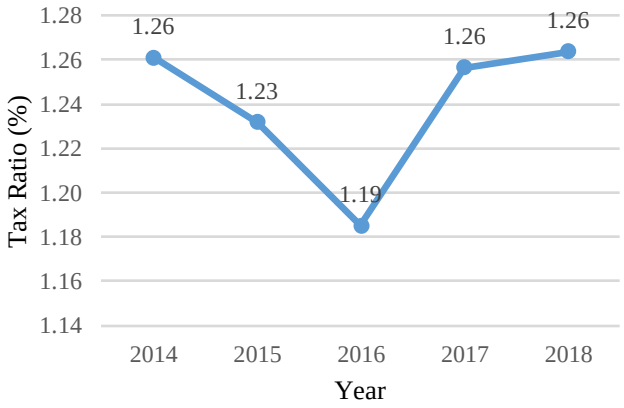

Figure 1: The development of local taxes ratio in Indonesia 2014-2018

Figure 1 shows that the average local tax ratio is 1.23%. Development of tax ratio is declining from 1.26% in 2014 to 1.19% in 2016. Then, it is increasing until 2018 to 1.26%.

There are 13 out of 34 provinces that have a tax ratio above the national average. The distribution of the tax ratio for all provinces can be seen in Figure 2.

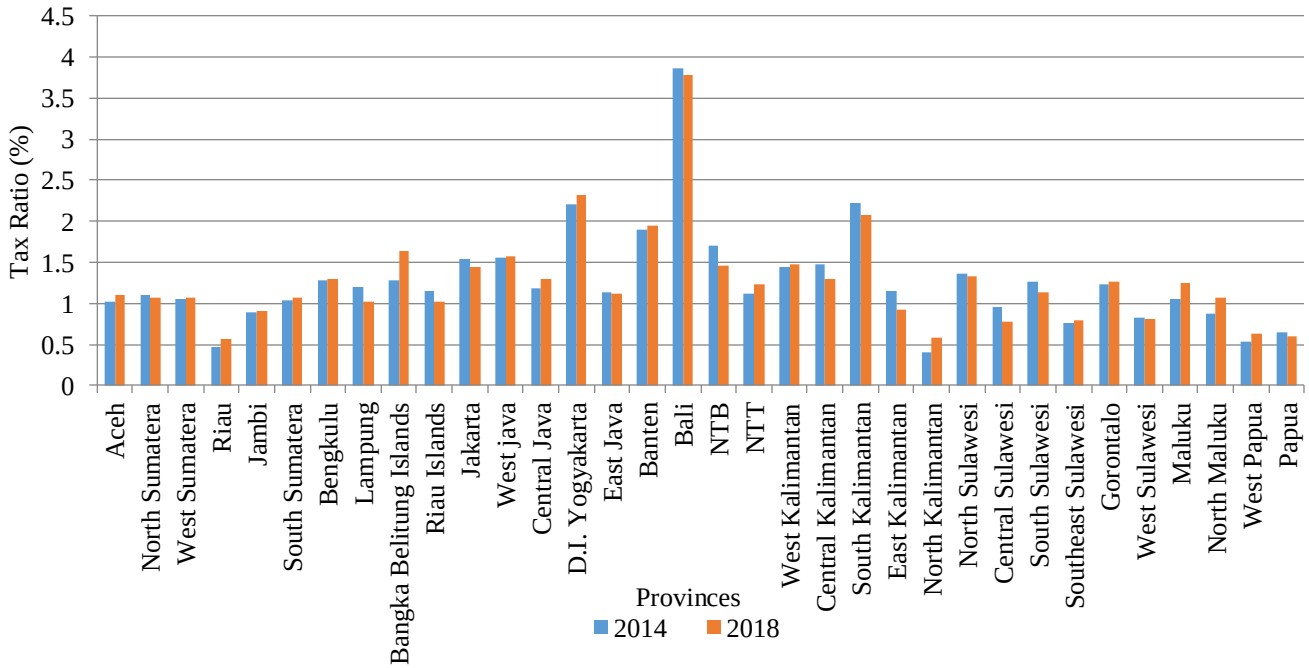

Figure 2: Distribution of the local tax ratio for all provinces in Indonesia 2014-2018

Figure 2 shows that the highest tax ratio is Bali with an average of 3.72% per year. However, its development tends to decline from 3.76% in 2014 to 3.72% in 2018. The accommodation and food and beverage sector as a leading sector with the contribution of 23.34% to GRDP made the tax ratio higher than others. The high number of tourists visiting Bali has an impact on the high collection of local taxes through hotel taxes, restaurant taxes, entertainment taxes, and others local tax components. The province that has the lowest tax rate is Riau with an average tax ratio of 0.51%. In 2014, the tax ratio of this province was 0.47% with its developments tending to increase until 2018 to 0.56%. The mining sector as the leading sector of the economy in this province causes a low local tax ratio. This is because taxes from the mining sector are included in the central tax.

4.2. Estimation of Tax Capacity and Tax Effort

In panel data regression, there are three best candidate models, namely, Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM). The CEM model does not pay attention to differences for each individual. The FEM model pays attention to differences for each individual which is marked by differences in intercepts. In the REM model, the differences that exist in each individual are random. To determine the model used in the analysis, three candidate models were selected through statistical testing.

4.2.1. Model Selection

The first step is to select the best model between CEM and FEM through the chow test. Appendix 1 showed that the p-value 0.0000 which gave a decision to reject null hypothesis which means that FEM is better than CEM. Then, the hausman test used to select a model between FEM and REM. Appendix 2 showed that the p-value 0.0158 which gave a decision to reject null hypothesis which means that FEM is better than REM. So, the best model that chosen is FEM. Next step is LM test to identify the presence of heteroscedasticity in the model. The result of the test has statistical value 84.0090 which greater than = 47.3999 then gave decision reject null hypothesis which means that there is presence of heteroscedasticity. Next step is λlm test to identify cross-sectional correlation between individual. The result of the test has the statistical value 1747.7986 which greater than = 617.2098 then gave a decision to reject null hypothesis which means that there is a presence of cross-sectional correlation. Thus, the appropriate estimation method is Seemingly Unrelated Regression (SUR). A summary of the test results can be seen in Table 1.

Table 1. Summary of the best model selection

Test	Hypothesis null (H_0)	Decision	Conclusion
Chow Test	CEM is better than FEM	Reject H_0	FEM is better than CEM
Hausman test	REM is better than FEM	Reject H_0	FEM is better than CEM
LM test	There is no heteroscedasticity	Reject H_0	There is heteroscedasticiy
Lambda LM Test	There is no cross-sectional correlation	Reject H_0	There is cross-sectional correlation
Model selected			**FEM-SUR**

Classical Assumptions Test

A good model is a model that has fulfilled the classical assumptions. After selecting the best model, the FEM model with the SUR estimation method is obtained. The FEM model with the SUR estimation method has accommodated the problems of heteroscedasticity and autocorrelation, so that the classical assumption tests that have not been carried out are normality and non-multicollinearity. In the normality test, the JB statistic value 5.612 with a p-value of 0.0757. The p-value obtained is more than alpha 5% so that the decision obtained fails to reject hypothesis null. This means that the residuals are normally distributed and that the assumption of normality is fulfilled. The non-multicollinearity test was carried out by looking at the VIF value for each variable. Appendix 6 shows that there is no variable that has a VIF value > 10, which means that there is no presence of multicollinearity and the assumption of non-multicollinearity is fulfilled.

4.2.2. Panel Data Regression Estimation Model

The estimation results obtained can be seen in Table 2.

Table 2: Panel regression estimation results

Variable	Coefficient	*P-value*
C	0.4850	0.0507
shareMANU	-0.0177	0.0000
GINI	0.6780	0.0008
HDI	-0.209	0.0005
lnEXP	0.1440	0.0000
Adjusted R-Square		0.9899
F-Statistic		448.29
Prob (F-Statistic)		0.0000

Based on the estimation results, the value of Adj-R2 is 0.9899 which means that the variation of the tax ratio can be explained by the variables used 98.99%, while the remaining 1.01% is explained by other variables that are not included in the model. The simultaneous test results obtained give a p-value (F-Stat) of 0.0000 indicating that there is at least one variable in the model that has a significant effect on the tax ratio at a significance level of 5%. The results of the partial test of each variable also show

a p-value below alpha 5%, which indicates that all variables proposed in the model have a significant effect on the tax ratio at a significance level of 5%.

The estimation equation obtained is as follows:

$$\hat{TR} = (0{,}4850 + \mu_i) - 0{,}0177\,shareMANU_{it}^{*} + 0{,}6780\,GINI_{it}^{*} - 0{,}0209\,HDI_{it}^{*} + 0{,}1440\,lnEXP_{it}^{*} \quad (2)$$

*significant alpha 5%

The GRDP in the manufacturing sector variable has a negative and significant effect on the tax ratio at a significance level of 5%. For every 1% increase in GRDP in the manufacturing sector, the tax ratio will decrease by 0.0177%. This result is distinct with Eltony (2002) states that manufacturing sector is easier to taxed than agriculture. This is because most provinces in Indonesia still rely on sectors such as agriculture. So that the manufacturing sector tax is still low because the region still focused on the agricultural sector as the leading sector. Only a few provinces on Java Island have the highest GRDP in the manufacturing sector in Indonesia. The Gini ratio variable has a positive and significant effect on the tax ratio at a significance level of 5%. For every increase in the gini ratio of 1 unit, the tax ratio will increase by 0.6780%. This result is corroborated by Boustan L, et al. (2013), which shows that increasing income inequality has caused an increase in taxes and public expenditure in urban areas and school districts in the United States during 1970-2000. The HDI variable has a negative and significant effect on the tax ratio at significance level of 5%. For every increase of 1 unit in HDI, the tax ratio will decrease by 0.0209%. The regional expenditure variable has a positive and significant effect on the tax ratio at a significance level of 5 percent. For every 1 percent increase in regional expenditure, the tax ratio will increase by 0.1440 percent. This result is in line with research by Garg, et al. (2014), which states that government spending has a positive and significant effect on tax revenue.

Equation (2) is further used to obtain the estimated value of tax capacity. The next step is calculate estimated tax effort by dividing the tax ratio by tax capacity. The results of the estimation of tax capacity can be seen in Figure 3.

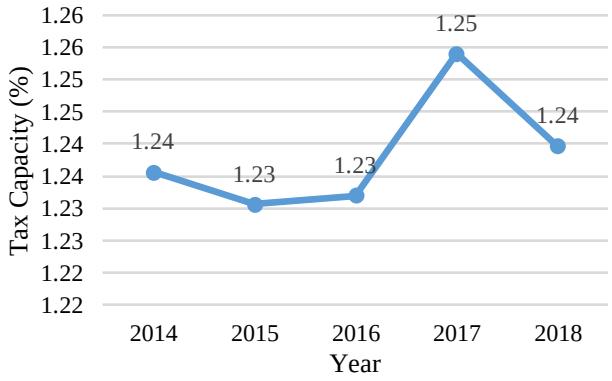

Figure 3: The development of tax capacity in Indonesia 2014-2018 (%)

Figure 3 shows that the development of tax capacity has tended to increase during the period of 2014-2018 with an average tax capacity value of 1.24%. Overall, 15 provinces have tax capacity above the national average, while 19 others have tax capacity below the national average. Development of tax capacity for each province can be seen in Figure 4.

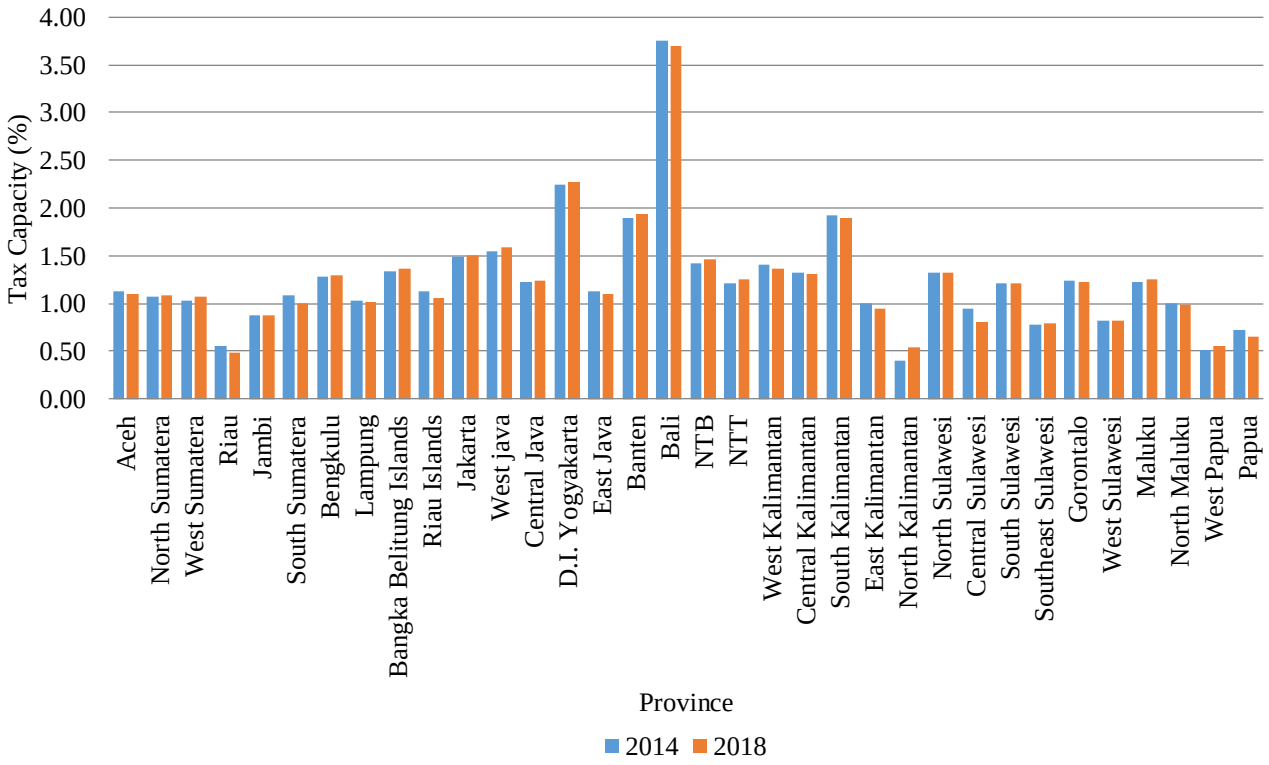

Figure 4: The Development of tax capacity for all provinces in Indonesia 2014-2018

Figure 4 shows that Bali has highest tax capacity with an average of 3.72% annually. In 2014, the tax capacity of this province of 3.76% and decrease until 2018 to 3.72%. Riau has the lowest tax capacity with an average of 0.51% annually. In 2014, the tax capacity of this province of 0.56% and decreased every year until 2018 to 0.4%.

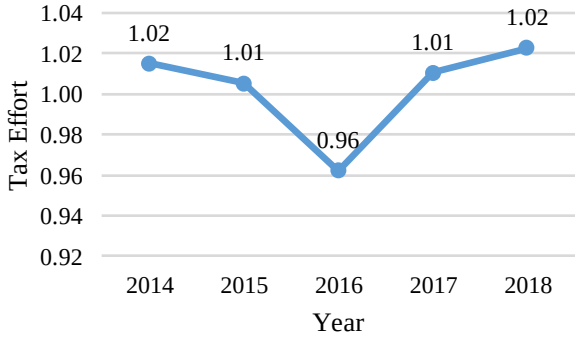

Figure 5: The development of tax effort in Indonesia 2014-2018 (%)

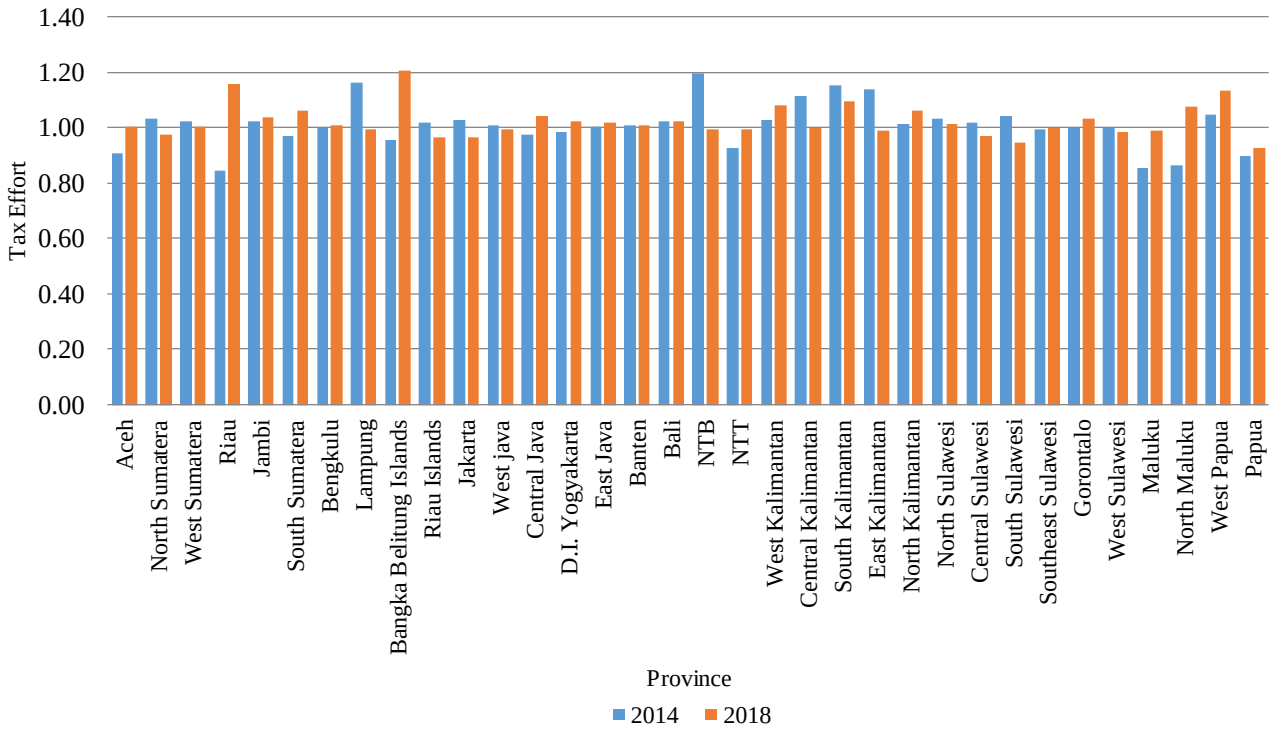

Figure 6: The Development of tax effort for all provinces in Indonesia 2014-2018

Figure 5 shows the development of tax effort for all provinces. The development tends to fluctuate with an average tax effort value of 1. This means that, in general, the .ability to collect taxes is quite good but cannot be said to be high. There are 18 provinces that have the tax effort above the national average, while 16 others have a tax effort below the national average. The development of tax effort for each province can be seen in figure 6. Bangka Belitung Islands has the highest tax effort in 2018 with a tax effort value of 1.21. This value has increased quite high from 2014, which had a tax effort value of 0.96. The average value of tax effort for the period 2014-2018 for this province of 0.99 per year.

Papua has the lowest tax effort in 2018 with the tax effort value of 0.93. This value has increased from 2014, which had a tax effort value of 0.89. The average value of tax effort for this province is 1.

4.2.3. Province Classification Based on Tax Capacity and Tax Effort

The provinces are grouped into four different groups based on the tax capacity and tax effort obtained in the estimation. The tax effort grouping uses a value of 1 as the cut-off point (Stotsky, 1997) while the tax capacity uses the central value (Le, Dodson, and Bayraktar, 2012). The central value of tax capacity in 2014 and 2018 is 1.24%, which is the mean value of the data. The grouping result of provinces in 2014 and 2018 can be seen in figure 7a and 7b.

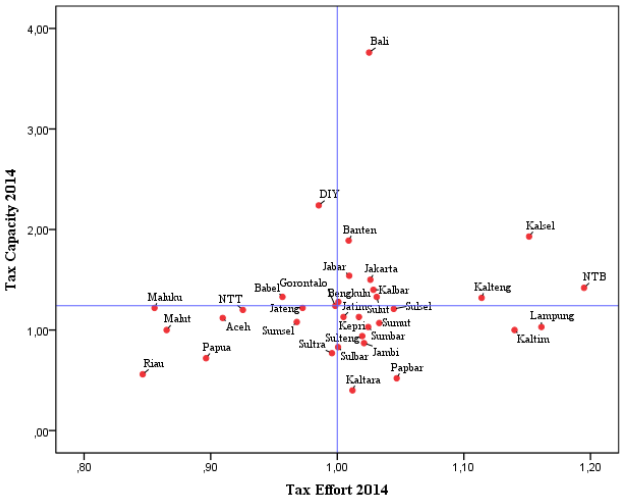

Figure 7a: Provinces Classification based on tax capacity and tax effort in 2014

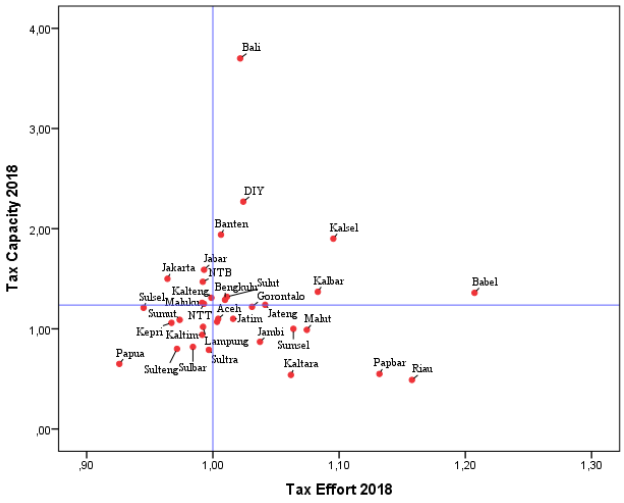

Figure 7b: Provinces classification based on tax capacity and tax effort in 2018

Provinces that have high tax capacity and low tax effort can evaluate existing policies and establish policies that can maximize their exploration for the tax capacity. Provinces that are included in this group for 2014 are D.I. Yogyakarta, Bangka Belitung Islands, and Gorontalo. Meanwhile, provinces that are included in this group for 2018 are Jakarta, West Java, NTT, NTB, Central Kalimantan, and Maluku.

Provinces that have high tax capacity and tax effort can maintain the tax collection policies that have been implemented. Provinces that are included in this group for 2014 are Bali, Banten, West Java, Jakarta, West Kalimantan, North Sulawesi, Bengkulu, Central Kalimantan, South Kalimantan, and NTB. Provinces that are included in this group for 2018 are Banten, Bengkulu, D.I. Yogyakarta, Central Java, North Sulawesi, West Kalimantan, South Kalimantan, and Bangka Belitung Islands.

Provinces that have low tax capacity and tax effort can be caused by the lack of sectors that have the potential to be taxed, or there are many sectors that can actually be taxed but so far have not been explored by local governments to be used as potential local taxes. In addition, the level of achievement of tax capacity in these provinces is still lower than others. Provinces that are included in this group for 2014 were Maluku, North Maluku, NTT, Central Java, Aceh, South Sumatera, Southeast Sulawesi, Riau, and Papua. Provinces that are included in this group for 2018 are North Sumatera, Lampung, Riau Islands, East Kalimantan, South Sulawesi, Central Sulawesi, West Sulawesi, Southeast Sulawesi, and Papua.

Provinces that have low tax capacity and high tax effort have the ability to explore more of their local tax potential. However, the tax potential is still lower than others. Thus, the Local Governments are expected to increase the sectors that can be taxed to increase their tax capacity. Provinces that are included in this group for 2014 are East Java, Riau Islands, Central Sulawesi, West Sulawesi, North Kalimantan, North Sumatera, West Sumatera, Jambi, South Sulawesi, Lampung, East Kalimantan, and West Papua. Provinces that are included in this group for 2018 are Aceh, East Java, West Sumatera, South Sumatera, Jambi, Gorontalo, North Maluku, North Kalimantan, Riau, and West Papua.

Classification results shows that 21 provinces of 34 provinces in 2014 and 19 provinces of 34 provinces in 2018 still had low tax capacity. In addition, there are 12 provinces in 2014 and 16 provinces in 2018 that still have low tax effort. This means that most provinces are expected to establish policies that can increase their tax potential, one of which is by adding objects that can be taxed. In addition, provinces that have low tax effort can establish policies that make it easier for taxpayers to pay their taxes and improve the quality of existing tax services in order to increase motivation of people to pay taxes.

5. Conclusions

Based on the results of the analysis, it can be concluded that the development of local tax performance in Indonesia as measured by the tax ratio tends to fluctuate with an average of 1.24% for all provinces every year. Only 13 out of 34 provinces have tax ratio above the national average. In addition, the results of inferential analysis show that variables of regional expenditures and gini ratio have a significant positive effect on the tax ratio, while the share of GRDP in the manufacturing sector and HDI have a

significant negative effect on the tax ratio. Based on the tax capacity and tax effort obtained from the estimation results, there are 19 provinces that have low tax capacity and 16 provinces that have low tax effort.

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