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EFFICIENCY ANALYSIS OF INDONESIAN TAX OFFICES: THE ROLES OF AUDIT EFFORT AND COMMUNITY EDUCATION

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ABSTRACT

Studi ini mengkaji efisiensi teknis Kantor Pelayanan Pajak (KPP) di Indonesia dengan model stochastic frontier analysis. Observasi berupa agregasi data KPP pada tingkat Provinsi selama kurun waktu 7 tahun (2010 – 2016) untuk seluruh KPP di Indonesia, selain KPP yang berada di lingkup Kanwil DJP Wajib Pajak Besar dan Kanwil DJP Jakarta Khusus. Hasil analisis menunjukkan adanya perbedaan tingkat efisiensi teknis pemungutan pajak antar provinsi. Berdasar hasil analisis determinan efisiensi, efisiensi teknis pemungutan pajak dipengaruhi oleh faktor internal KPP, seperti: upaya audit, maupun faktor eksternal, seperti: tingkat pendidikan masyarakat. Peningkatan kedua hal tersebut dapat meningkatkan efisiensi dan produktivitas KPP.

This research studies the technical efficiency of Tax Offices (KPP) in Indonesia by applying stochastic frontier analysis model. Observation was in the form of data aggregation at the level of province to all Tax Offices in Indonesia, besides those within the scopes of the Large Taxpayer Regional Office and Jakarta Special Regional Offices for approximately seven years (from 2010 to 2016). Results of the analysis show different rates of technical efficiency in inter-provinces taxation. Analysis on the efficiency determinants reveals a number of internal factors contributing to the technical efficiency of taxation, like the audit effort and external factors, such as community education level. Increase on these two can improve the efficiency and productivity of tax offices.

1. INTRODUCTION

Tax revenue is increasingly relied upon as a major source of funding for government budgets. In average, tax revenue contributes 67% to state expenditure financing, with an average revenue growth of 13% per year [1] in the last ten years (2007 to 2016). However, Indonesia's tax ratio has experienced a downward trend in the last five years, from 11.4% in 2012 to 10.3% in 2016. To ensure the stability of state finances, effective tax administration is required to optimize tax revenue. Efficiency and productivity are commonly used as a measurement in discussing performance. Productivity is measured by the ratio between the output generated to the input used, whether the input used has been able to produce optimal output. Meanwhile, efficiency is measured by comparing the optimal value of output and input between observations (Fried, Lovell, & Schmidt, 2008).

According to Esteller-Moré (2005), taxation performance is influenced by several factors, both under and outside the control of the Tax Offices (KPP). Therefore, any policy pursued to optimize the tax revenue must take into consideration a number of external factors affecting the productivity of KPP. Various policies have been made, inter-alia reorganization tax service branch, addition and adjustment of employees' roles, and efforts of audit along with law enforcement. The number of tax officers from 2010 to 2016 had increased as much as 25%, from about 32,000 to 40,000 employees. However, the trend of tax revenue growth has tended to decrease since 2010. Presumably, it has something to do with efficiency in utilizing KPP resources to enhance tax revenue.

In general, the growth of tax ratio in developing countries is lower than that in the developed ones (Besley & Persson, 2014). It is possibly as the result of different awareness of the taxpayers to pay their expenses in that those in the developed countries are more highly-educated and thus are more tax-aware. Being informed about taxation is an important element of individual's voluntary compliance, especially in determining appropriate tax with the regulation (Saad, 2014).

There are two primary methods which have been commonly used to measure the productivity of public sector, namely Data Envelopment Analysis (DEA) and Stochastic Frontier Analysis (SFA) which involve mathematic programming and econometric method (Coelli, Rao, O'Donnell, & Battese, 2005). Tax revenue is also much depending on factors outside the control of the tax service institutions. Among of those factors is the global economic development triggering international taxation rivalry, either by lowering the tarrifs or providing taxation facilities. More and more companies are running multinationally, and thus can adjust their tax planning scheme to lower their expenses. The indeterminancy of global economic development, government policy, and growing change of business scheme have definitely influenced the taxation sector. Therefore, analysis on the efficiency and productivity of tax revenue should include this element of indeterminancy (stochastic), in order to obtain more accurate description of the current state of the tax revenue.

A number of empirical researches has been conducted to measure the efficiency of tax institutions at the official level (Tsakas & Katharaki, 2014; Barros, 2005); state level (Jha, Mohanty, Chatterjee, & Chitkara, 1999), local tax at district level (Postali, 2015) and provincial level (Esteller-Moré, 2005). Researches in Indonesia mostly used DEA method (Yulia Rahmasari, 2008; Sunarto, 2010; Andi Mulya, 2012; Pramudya, 2014). There has not been one to include tax basis as its input variable, whereas it is the input that describes taxation capacity (Jha et.al., 1999; Esteller-Moré, 2005). Ismail (2009) studied eficiency by using SFA method, but his observation was limited to Central Jakarta area.

Regarding those concerns, it can be seen that there are allegations of technical efficiency problems in taxation in Indonesia. Considering the need for alternative solutions to increase the productivity of KPP, it is necessary to study the factors that influence the efficiency of tax revenue. Therefore, this study is prepared with several objectives, including: determining the form of estimation of production function in accordance with tax collection in Indonesia; identify differences in the efficiency level of tax offices between provinces; measure the effect of tax audit efforts on tax collection efficiency; and measuring the influence of the level of public education on the efficiency of tax collection.

2. LITERATURE REVIEW AND HYPOTHESIS

2.1. Concept of Efficiency

The government, in this case Directorate General of Taxes (DGT), is faced with the challenge of increasing tax revenues by optimizing available resources. Palmer and Torgerson (1999) state that according to economists, increasing the efficiency of resource constraints should be the main criterion in determining priorities. The production function can be used to determine the level of efficiency of an institution, namely the conditions at which institutions use a combination of technically efficient inputs to produce the most appropriate level of output. Furthermore, efficiency is calculated relative to its production function.

Koopmans (1951) provides a formal definition of technical efficiency, namely: producers are called technically efficient if any increase in output requires a

[1] Financial Report of Central Government (LKPP), 2007-2016

reduction in at least one other output or an increase in at least one input, and if any reduction in input requires increasing at least one other input or will cause a reduction in at least one output. While Lau and Yotopoulus (1971) suggested that a producer is more technically efficient than other producers, if consistently able to produce higher products, using the same production factors.

The technique of measuring efficiency was introduced by Farrel (1957) with two approaches, namely input-oriented efficiency and output-oriented efficiency. The *stochastic frontier* approach is more superior as it involves *disturbance term* which represents exogenous interruption, false measurement, and *shock* outside the control of the institution. Adiyoga (1999) suggests that the major criticism for the *deterministic frontier* method is that it does not involve possible influence of false measurement and other interruptions toward the frontier. In point of fact, institution's performance is influenced by both internal and external factors. External factors include change in policy, market failure, luck, broken machine, erronous measurement, and so forth. These things also form the basis that the production function that matches the characteristics of tax collection is a stochastic model, as shown in Figure 1 below:

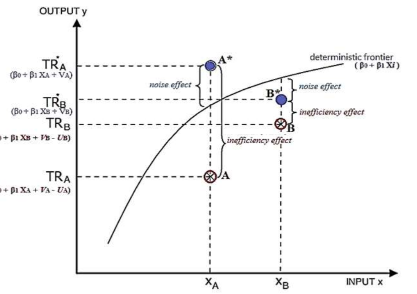

Fig 1 Tax Revenue Stochastic Production Function
Source: Pessino & Fenochietto (2010), modified

The horizontal line in Figure 1 shows the value of the input used by the tax office and the community in province-*i*, while the vertical line shows the level of tax revenue. Points A and B show actual tax revenues from two provinces (A and B). Without an inefficiency effect, province A will be able to collect a tax of A* (potential tax revenue), and province B will be able to reach B*. The noise effect in province A is positive, so the stochastic frontier is above the deterministic frontier. On the other hand, the noise effect in province B is negative, so the stochastic frontier is below the deterministic frontier.

As cited in Coelli et al. (2005), *stochastic frontier*'s data panel by Aigner et al. (1977) is written in general function as follow:

$$\ln q_i = X_i{'}\beta + v_i - u_i \qquad (1)$$

in which *random error* is divided into two parts. Component u_i represents the fact that the production from each unit has got an upper limitation in the frontier production and has got non-negative clipped distribution ($u_i \geq 0$); or usually assumed as half normal random distribution, so that $u_i \sim N^{+}(\mu, \sigma_u^2)$. u_i relates to the technical inefficiency in production. Meanwhile, v_i is a random component assumed to be independent and identically distributed (i.i.d.), representing *shock* outside the unit's control, so that $v_i \sim$ N $(0, \sigma_v^2)$, and CoV (v_i , u_i) = 0. Next, *error term* $\varepsilon i = v_i - u_i$ is asymmetric, since $u_i \geq 0$. If $u_i = 0$, and $\varepsilon i = v_i$, then the data does not support the effect of technical efficiency. However, if $u_i > 0$, and $\varepsilon i = v_i - u_i$, *error term* is negative, and then it can be concluded that there is an effect of technical efficiency from the data.

Technical efficiency can be estimated through two steps. The first step is by doing estimation model as if u_i does not depend on z_i, so that it results in $\hat{u}_i$. The second one is by doing an estimation with such model of regressive relation between $\hat{u}_i$ and z_i. Then, (Battese & Coelli, 1992) point out that the technical efficency of the i[th] company in the period –t observation is defined as a ratio between actual output (y_{it}) and its potential output (y_{it}^{p}),

$$TE_{it} = \frac{\ln y_{it}}{\ln y_{it}^{p}} = \exp[-U_{it}|(v_{it} - u_{it})] \qquad (2)$$

$$\text{with:} \quad \ln y_{it}^{p} = f(X_{it}, \beta) + v_{it} \qquad (3)$$

After estimating the efficiency, the next logical question is due to the factors influencing the technical efficiency of the instituion which cause the company to result in lower actual output than its potential one. Efforts to identify those factors can be in the form of regression analysis toward presumably influencing variables toward the company performance, both internal and external factors. The relation between the technical efficiency and the series of presumably influecing variables is shown in the function below.

$$TE_{it} = d_0 + d_1 Z_{1it} + d_2 Z_{2it} + d_3 Z_{3it} + \cdots + d_n Z_{nit} + W_{it} \qquad (4)$$

In which: TE_{it} is the rate of technical efficiency of company i in period t; $Z_{1it}, Z_{2it}, Z_{3it}, \ldots, Z_{nit}$ are independent variables presumably influencing the technical efficiency;, $d_0, d_{1,} d_2, \ldots, d_n$ are parameter vectors to estimate; while W_{it} is *error term.*

2.2. Determinants of Efficiency in Taxation

One reason behind the non-optimum tax revenue resulting in the low rate of efficiency and productivity of KPP is tax evasion. Andreoni, Erard and Feinstein (1998) group a number of factors that influence the tax evasion, among of which are the audit probability and demographical as well as social factors of the community. Only the audit probability is under the control of KPP, that is through improving tax audits. Meanwhile, demographical and social factors belong to external factors to KPP, which can be reflected by community education level.

The impact of auditing activities on increasing KPP's output can be obtained through some factors. First of all, improving auditing makes it possible to improve early detection rate for tax evasion. Disclosure of the tax evasion will definitely increase the tax revenue, resulted from the difference of unpaid expenses and penalties. Second of all, the impact of auditing activities is connected to the behavior of the taxpayers, in which the improving audits will increase the probability of taxpayers' reports to audit, which in turn will improve the compliance of the taxpayers becauce of the increasing risks for the evasion to be more easily detected and heavily fined (Allingham & Sandmo, 1972).

The next factors are related to the demographic and social conditions of the community, inter-alia is their education level. Those who are more highly-educated are expected to be better informed about taxation (Castro & Camarillo, 2014; Murphy, 2008). Kirchler et.al. (2008) has developed a theoretical framework dealing with tax compliance, namely *slippery slope framework*, in which tax compliance is built of two different sides, namely forced compliance and voluntary compliance. Forced compliance refers to compliances encouraged by the worry about being detected and fined. Meanwhile, voluntary compliance is the one encouraged by public trust and understanding on tax regulation and function in the governance. Furthermore, Kirchler et.al. (2008) defines tax compliance as the taxpayers' willingness to pay their expenses voluntarily and admitedly. Good voluntary tax compliance will surely increase the tax revenue and decrease the tax evasion.

Other than both factors above, there are many things that influence the efficiency, either from internal factors or the external ones. The internal factors are such as: the employees and assets quality, the efforts done, and managerial factors (Syverson, 2011). The factors outside KPP's control but affecting the taxation can be classified into some groups, namely: economic characteristics, social community, and infrastructure availability (Esteller-Moré, 2005; Castro & Camarillo, 2014; Besley & Persson, 2014). Economic characteristics refers to the scale of informality and effort, in which informality causes difficulty in tax imposition, and thus increases inefficiency. Meanwhile, infrastructure is related to the governement capacity in implemeting the public administration, which can also affect the community trust.

2.3. Empirical Review

This research consists of two parts: the first one is to calculate the efficiency of the tax office, and the second one is to discuss the determinants influencing efficiency in tax collection.. Many researches have been carried out in relation to tax office's efficiency and productivity, from the levels of office, city, to internation. Those researches made use of DEA method as non-parametic approach and SFA method as parametic one. Some other researches using stochastic approach have also included determinants influencing tax revenues.

Some researches support the theory suggesting that there is a connection between auditing and decreasing the number of tax evasion (Alm, Jackson, & McKee, 1992; Blackwell, 2007; Verboon & Dijke, 2011; Gangl, Torgler, Kirchler, & Hofmann, 2014; Kosonen & Ropponen, 2015). However, there are also researches suggesting that possible improvement in audit does not have significant influence (Andreoni, Erard, & Feinstein, 1998). A number of empirical researches on the employees' special skills result in analyses which do not always support theory. In his study, Syverson (2011) mentions various findings supporting this theory. However, researches on small and medium industries' efficiency show precisely that the ratio of the use of labor with special skills has negative impact on efficiency (Charoenrat & Harvie, 2014).

On the other hand, researches which specifically discuss the relation between external conditions and tax office's inefficiency are very limited. The first ones are demographic and social factors, in which in the researches are related to tax revenue determinants and social charactristics like education level positively influencing the tax revenue since the community is also expected to be better informed about tax (Castro & Camarillo, 2014; Murphy, 2008). The second one is economic characteristics, in which in some previous researches the variable of industrial sector's contribution was used (Alm & Duncan, 2014; Castro & Camarillo, 2014). The next one is dealing with the employee's formality, in which the more employees working in the informal sectors; the more difficult the tax imposition is (Savić, et al., 2015). The last one is due to the policy and facilities availability. Researches in United States have found that the productivity growth is inter-alia boosted by the availability of electrical power (Beaudreau, 1995).

3. RESEARCH METHODOLOGY

The arrangement of this research is based on the objectives having been determined. The first objective was to estimate the production function in Indonesian tax offices by using the appropriate *stochastic frontier* model. The scope of the study had been limited to Indonesia, to be more focused on comparing the interregional efficiency, which was later used to review the interregional input allocation. When the appropriate model of production function had been obtained, the prediction of taxation technical efficiency at the provincial level was calculated to identify the difference in inter-provinces technical efficiency. Then, since the tax revenue performance is also influenced by both internal and external factors, an analysis on presumably influencing determinants in taxation was done.

In term of administration area, KPPs in Indonesia can be divided into two groups, namely non-territorial KPP, which are under the control of Large Taxpayer

Regional Office and Jakarta Special Regional Offices which administer all taxpayers in Indonesia which have been determined in the corresponding regulation, and KPPs which are under the control of territorial Regional Offices, which administer Taxpayers based on their locations. In relation to those criteria, non-territorial KPPs, which are under the control of Large Taxpayer Regional Office and Jakarta Special Regional Offices had been excluded from the study. In addition, the province of North Kalimantan, which was the separated region from East Kalimantan, was just officially announced in 2012, and thus would make the observation panel unbalanced.

3.1. Estimating Production Function

Method of estimation used in the study refers to the study of Esteller-Moré (2005). It was chosen because it enables the stochastic frontier of the potential maximum amount to collect or received amount, with various restrictions in the administrative input and tax base capacity. The structure of stochastic frontier used in the study is similar to the one used by Hunter and Nelson (1996), except for their including administrative input as their input variable, as well as their measuring output just based on the amount of expenses collected through auditing process. The basic model of production function used in the study is translog with *technological progress*. This translog function is conceptually simpler and has no limitaiton of substitution elasticity and *return to scale* and thereby can be used extensively in an empirical analysis. Here is the translog function used for this research:

$$\begin{aligned}\ln TaxRev_{it} = {} & \beta_0 + \beta_K \ln K_{it} \\ & + \beta_L \ln L_{it} + \beta_X \ln GRDP_{it} + \beta_T\ t \\ & + \frac{1}{2}\ [\beta_{KK}(\ln K_{it})^2 + \beta_{LL}(\ln L_{it})^2 \\ & + \beta_{XX}(\ln GRDP_{it})^2 + \beta_{TT}\ t^2] \\ & + \beta_{KL}\ \ln K_{it} \ln L_{it} \\ & + \beta_{KX}\ \ln K_{it} \ln GRDP_{it} \\ & + \beta_{LX}\ \ln L_{it} \ln GRDP_{it} + \beta_{KT}\ t \ln K_{it} \\ & + \beta_{LT}\ t \ln L_{it} + \beta_{XT}\ t \ln GRDP_{it} + (V_{it} \\ & - U_{it})\end{aligned}$$

In which:

$TaxRev_{it}$	:	The total tax revenue from all KPPs in province i in the year of t,
K	:	The sum of assets owned by KPPs in one province,
L	:	The number of KPP labors/tax officer in one province,
GRDP	:	Tax base capacity represented in GRDP at the provincial level

Other models can be alternatives to translog, for instance: *Hicks Neutral* model, *no technological progress* translog, and modified Cobb Douglas model. During the analysis of production function, testing of some production model was done to determine which model was more appropriate in predicting the production function in accordance with the characteristics of tax revenue. The model selection was done by testing and comparing the translog model with the four alternative models. All models were tested through a null hypothesis to suggest that the model being tested is feasible. Rejection of the null hypothesis states that the basic model of translog is the right model.

To eliminate the effect of inflation, all the variable nominal values in rupiah were converted into constant prices in the base year of 2010. To obtain total tax revenue at constant prices, the total value of tax revenue was deducted by the Consumer Price Index. The capital input was proxied to the assets used by the KPP, which consists of assets in the form of land and buildings, and equipment as well as machinery. Furthermore, GRDP is a proxy of tax base capacity in a province, reflecting the potential tax input. Because it is difficult to determine the value of the right potential, the tax base is usually assumed to be equivalent to economic activity, with some researches using a measure of GDP at the country level or GRDP for the regional level (Ismail, 2009).

3.2. Determinants of Technical Efficiency

After the appropriate estimation of production function was obtained, the value of technical efficiency of each decision unit was calculated. With the identification, the technical efficiency of decision unit i in period t is defined as:

$$TE_{it} = \frac{E(Taxrev_{it}|u_{it},\ Inputs_{it})}{E(Taxrev_{it}|u_{it} = 0,\ Inputs_{it})} = \exp(-U_{it})$$

In which $0 \leq TE_{it} \leq 1$. The value of ϕ from TE_{it} that the decision unit only results in (ϕ x 100%) of the possible maximum amount of tax revenue, with a given input. The function of the determinant of efficiency, as described with the conceptual and empirical framework in the previous section, is expressed in the following function:

$$\begin{aligned}TE_{it} = {} & d_0 + d_1 Audit\_effort_{it} + d_2\, Educ_{it} \\ & + d_3\, lnCost\_KPP_{it} + d_4\, KPP\_Madya \\ & + d_5 staff\_allocation_{it} + d_6\, M\_age_{it} + d_7\, M\_age2_{it} \\ & + d_8\, Industry_{it} + d_9 \inf\_lab_{it} + d_{10}\, electricity_{it} \\ & + W_{it}\end{aligned}$$

In which:

Audit_effort	:	The average number of completed checks (SKP) by one auditor
Educ	:	The ratio of population aged 15 years and over who completed high school education and above
Cost_KPP	:	Average operating cost of each tax office
KPP_Madya	:	The number of Medium Tax Office (KPP Madya) in one province,

Staff_allocation	:	The ratio of the number of auditor and Account Representative (AR) to number of employees,
M_age	:	The average age of the head of the KPP within a province,
M_age2	:	The square of the average age of the head of the KPP within a province,
industry	:	Contribution of industrial sector to GRDP
inf_lab	:	*Share* of the informal workforce of the entire workforce in the province,
electricity	:	Average installed power capacity per customer (kVA)

In conducting efficiency determinant analysis, a model test was performed to select the best model, related to the use of data panels. First is the chow test, if prob> α then there is no individual effect and so the OLS model is used, otherwise the *fixed effect* or *random* method. To select between fixed and random, hausman test was performed. If prob values> α individual effects is not correlated and thus random effect is used. Furthermore, a test was performed toward classical assumption to get a good regression model.

3.3. Research Data

The data used in this research are panel data which are combinations of *cross section* data from 34 provinces in Indonesia, with *time series* data, in the form of year 2010 until year 2016. Dealing with the work area of tax office which do not follow administrative area of government, the data of KPP to be used are aggregate data of several KPPs located in each Provincial region based on their working area. Data related to the size of input and output in the production function to be used in this research sourced from the Directorate General of Taxation. Additionally, the tax base data in the form of Provincial Gross Regional Domestic Products (GRDP) at the constant price 2010, as the proxy of tas imposition base (in billion rupiah) sourced from Provincial GRDP by Business Field from Statistics Indonesia (BPS).

Data related to the determinants of efficiency sourced from the Directorate General of Taxation, Statistics Indonesia and the Ministry of Energy and Mineral Resources, consisting of: audit efforts, operational costs per office, the number of Medium Tax Office, the allocation of employees on the Account Representative (AR) & Auditor, as well as data on the age of the KPP heads from the Directorate General of Taxation. Furthermore, the educational data, in the form of ratio of the number of population aged 15 years and above who completed high school and college, sourced from the Statistics of People's Welfare. Industry sector contribution data on provincial Gross Domestic Product derived from GRDP Provincial Publication by Industrial Origin. Informality data in the form of percentage of labor in informal sector to total amount of labor sourced from the publication of Indicators of Indonesian Labor Market. While data of electricity network in the form of electric power capacity installed per customer, sourced from the publication of Statistic of Electricity, Ministry of Energy and Mineral Resources.

4. RESULTS AND FINDINGS

4.1. Production Function Model Selection

Before doing the analysis of determinants of efficiency of Tax Service Office, the first thing to do was analyzing the production function by using Stochastic Frontier method to get technical efficiency value. The first stage in the Stochastic Frontier method is to select the most appropriate model of production function in accordance with the characteristics of tax revenue. Other models that can be alternatives to Translog are Hicks Neutral model, non-technological progress translog, and Cobb Douglas model development. Estimation results with translog model and other alternative models can be seen in the table (Appendix 2).

The likelihood ratio test was then performed, with the null hypothesis is rejected if the λ value exceeds the chrydystic value of the Chi Square (x^2) table, so that the model chosen is an unstable model. Based on the test results, there is not enough evidence to reject the null hypothesis of alternative model 4, so the selected model is Cobb-Douglas model with time interaction (Model 4).

Table 1 Model Selection with AIC

Model	*AIC*	*Log-likelihood*
Model 1	-247.5648	142.7824
Model 2	-243.5108	137.7554
Model 3	-242.7772	135.3886
Model 4	**-251.7287**	**137.8644**
Model 5	-201.7908	107.8954

Source: estimation result

To test the consistency of model selection test results, the next alternative model was chosen, that is Akaike's Information Criterion (AIC) method. Based on the smallest AIC value among other models, Model 4 is consistently more preferred than other alternative models.

The value of η (eta) in the selected model (Model 4) shows the monotony of the production function. The positive value coefficient indicates that technical efficiency has increased over time. The value of γ (gamma) is between 0-1. The value of γ (gamma) is part of the frontier distance explanation for inefficiency effect. The value of γ (gamma) in the chosen model of 0.9293 shows that 92.93% deviation from frontier production is due to technical inefficiency, while the rest is caused by random error.

Almost all input variables significantly affect the output of KPP in generating tax revenue, but the asset is negative. This is similar to Esteller's estimation result (2005) in which the coefficient of office width variable is also negative. However, the interaction variables between capital and time was examined, it shows a positive and significant result. This means that the use of capital input in generating output takes time and will increase over time. This is understandable because the procurement of new capital goods, such as a new computer model or a new *software*, will take time for users to be able to use it optimally.

Table 2 Tax Revenue Production Function Estimation Result

Variable	Parameter	Coefisien (standard eror)
Kapital	β_K	-0.2231 (-2.325)*
Labor	β_L	0.2836 (3.076)**
GRDP	β_X	0.9682 (10.536)***
Time	β_T	-0.069 (-1.282)
Kapital*Time	β_{KT}	0.0326 (2.456)*
Labor* Time	β_{LT}	-0.0194 (-1.332)
GRDP*Time	β_{XT}	0.0025 (0.261)
Constant	β_0	-2.7672 (-3.077)**
Gamma	γ	.9293378
Eta	η	.0123653
Log-likelihood		137.86437

Asterics indicate significance at the 1% (***), 5%(**), 10%(*)

The variable of labor or employee of tax shows a positive and significant influence to tax revenue. It means that with the addition of tax employees, tax revenue will increase. This result is in accordance with Esteller's (2005) and Postali's (2015) research findings related to the number of auditors. Meanwhile, the interaction of labor variable with time (*Labor*Time*) shows a negative coefficient, but not significant. It indicates that there has been no significant change in labor productivity over time during the study period. Therefore, it will be interesting to see how effective DGT develops its personnel capacity in specific research.

Furthermore, the tax base variable certainly has a positive and significant effect on tax revenue, since the characteristics of the tax is a rate multiplied by the tax base. Therefore, if there is no change in tariffs, an increase in the tax base will certainly be followed by an increase in tax revenues, in case of no increase in tax evasion. As in this study, where there is no significant effect of the interaction between GRDP with time (*GRDP*Time*), which shows there are no major changes in tax policy that affect tax ratio. These results are consistent with previous studies (Esteller-Moré, 2005; Jha, Mohanty, Chatterjee, & Chitkara, 1999; Postali, 2015). However, since the input variables in this model involve interacting with time trends, the estimation results can not be directly interpreted as elasticity, as they vary over time.

4.2. Efficiency Analysis

Based on the calculation of *stochastic frontier function* with the selected model, the obtained average value of technical efficiency in observation was quite low, that is equal to 0.41. This result is consistent with that shown in the *cross-country* study of *tax effort*, which shows that the value of Indonesian tax effort in 2011 was 0.42 (Fenochietto & Pessino, 2013). Meanwhile, Alm & Duncan (2014) showed that the results of estimation of the technical efficiency of tax agencies in developed countries (OECD) on average showed a very good efficiency score, or it could be said that the tax revenue performance was high.

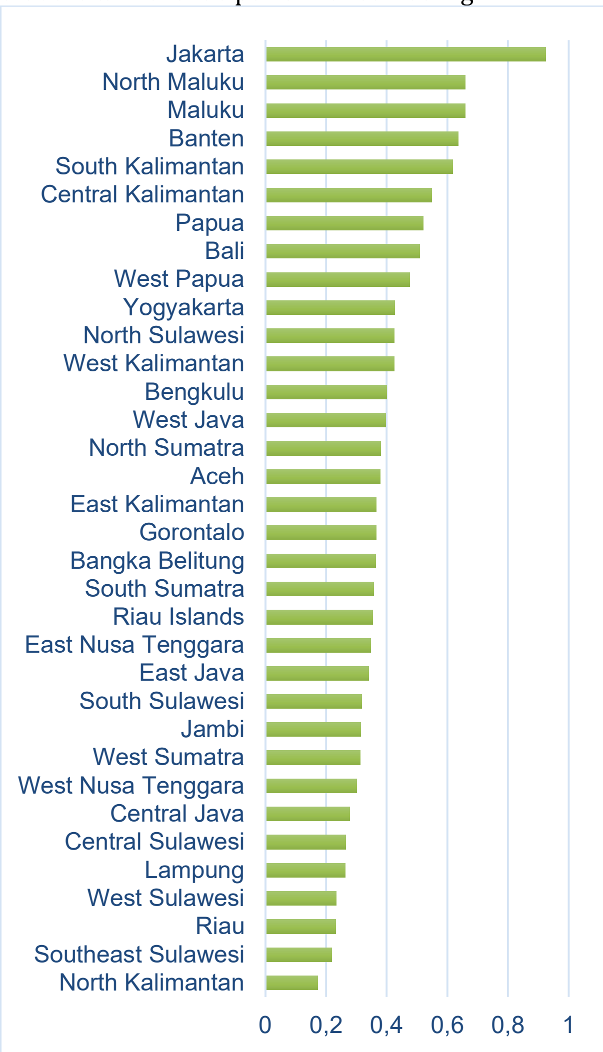

Fig. 2 Technical Efficiency Comparison among Provinces in Indonesia
Source: estimation result

Moreover, based on the technical efficiency value in Figure 2, there is no indication of the difference in the level of technical efficiency that is striking between the islands, but there are variations in inter-provinces efficiency levels within one island. It is seen that there are variations in technical efficiency inter-provinces in one island though. For example, on the island of Java, Jakarta is the most efficient province with an average efficiency level of 0.9, while Central Java is the most inefficient province in Java, with an average efficiency below 0.4, which means it is below the national average efficiency level. While the lowest value of technical efficiency is in North Kalimantan, which is a new province. Within the DGT administration area, North Kalimantan is still incorporated with the East Kalimantan Regional Office of DGT, so that there is still the possibility of several medium taxpayers in the region which are registered at Balikpapan Medium Tax Office.

4.3. Determinant of Efficiency

There are three approaches in making panel data regression, *Pooled Least Square* (PLS), *Fixed Effect* (FEM) and *Random Effect* (REM). To choose between PLS and FEM, Chow test is used following the F statistic distribution in which if the value of F statistic obtained is greater than the value of F table then H_0 is rejected with the hypothesis that H_0: PLS is better than FEM. According to Nachrowi and Usman (2006), the selection of fixed and random models can be based on the ratio between the number of *cross-section* units and the time units. For panel models with more *n* than *t*, the *Random effect* model can be directly used. In this research, the number of cross-section units is more than 34 provinces, compared with time series data for 7 years.

Based on these conclusions, a better approach is the *Random Effect Model* (REM). In addition, there are also exogenous variables that do not change over time, i.e. the amount of Medium Tax Office, so they are omitted on the *fixed effect* estimation. REM using the *Generalized Least Square* (GLS) method can ignore the problem of classical assumption violations of heteroscedasticity and autocorrelation (Greene, 2008), since it can still produce unbiased and consistent estimators.

Table 3 Technical Efficiency Determinants Estimation

Variable	Coefisien (standard eror)
Audit_effort	0.0002 (4.721)***
Education	0.0015 (7.489)***
ln cost_KPP	0.0225 (8.366)***
KPP_Madya	0.0461 (1.980)*
Staff_alocation	-0.0109 (-1.398)
m_age	-0.0039 (-1.355)
m_age2	0.0000 (-0.437)
Industry	0.0062 (0.250)
Informal_labor	-0.0787 (-6.332)***
Electricity	0.0074 (3.389)***
Konstanta	-0.0491 (-0.564)

Asterics indicate significance at the 1% (***), 5%(**), 10%(*)

The analysis on the effect of audit *effort* and public education on the technical efficiency of tax collection is estimated by *Random Effect Model (REM*). The *effort* variable of the audit activity is proxied by the number of audit activities completed by one auditor in a year, meaning that the greater the effort, the more often the audit activity is performed. The level of public education was proxied with the ratio of population aged 15 years and over who have the highest education high school and college. The age population is assumed to be a potential tax subject and the level of education reflects the ability to understand the tax laws better.

Based on the estimation result, it can be seen that the effort of audit activity has positive influence with 1% significance to the level of technical efficiency of tax collection. From the coefficient value of audit effort variable, it can be seen that each addition of 1 unit of audit activity from each auditor will increase the efficiency of KPP by 0.0002. The descriptive statistics table shows that during the observation period, the minimum number of audits conducted is as many as three audit activities in a year, so one audit activity takes four months. In average, the number of audit activities conducted is as many as fourteen in a year, meaning there is still a chance to increase the effort of audit activities.

This result is consistent with the conceptual framework and literature discussed earlier, that the impact of inspection activities on increasing the output of the KPP can be through two sides. Firstly, increased inspection activity will increase the disclosure of tax evasion, which comes from the unpaid tax differences as well as the penalties imposed. The second one is the impact of activity on taxpayers' behavior, in which increased probability of taxpayer report to audit will encourage previously non-compliant taxpayers to become more compliant (Allingham & Sandmo, 1972). In relation to the empirical literature discussing the impact of examination on taxpayers' compliance, the results of this study are consistent with studies which suggest that there is a significant effect of the oversight measures on reducing the number of taxes (Alm, Jackson, & McKee, 1992; Blackwell, 2007; Verboon & Dijke, 2011; Gangl, Torgler, Kirchler, & Hofmann, 2014; Kosonen & Ropponen, 2015). With the reduction of the amount of non-compliant taxpayers, the tax revenue in the KPP will certainly increase.

Furthermore, the influence of demographic variables in the form of public education level to the efficiency of tax collection also shows a positive and significant influence, in that the greater percentage of the adult population who is highly educated (high school and above) will increase the efficiency of tax collection. Any addition of 1% of the highly educated adult population will have an impact on improving the technical efficiency of tax collection of 0.0015. This supports Kramer's (1999) assertion that an efficient tax authority depends on the willingness of individuals in society to comply with regulated tax laws. Given that good knowledge of taxation will encourage the implementation of the correct tax regulation, given the taxation is very possible mistakes that are not realized by the taxpayer, which occurs due to ignorance or mistakes in understanding the rules (Murphy, 2008). Therefore, higher levels of community education will encourage better understanding of taxation, and thereby increase efficiency in tax collection.

These results also support studies related to the determinants of tax revenues, in which social characteristics such as the level of public education have a positive effect on tax revenues (Castro & Camarillo, 2014). This is also supported by data showing that developed countries, where community education is better than developing countries, have a higher tax revenue ratio (Besley & Persson, 2014). Therefore, government support in the field of education to increase the level of school participation for the community will certainly contribute positively to the taxation revenue in Indonesia.

In addition to the above two main variables, the regression results can also be used to explain the various effects of KPP's characteristics as well as external factors that influence the technical efficiency of tax collection. The first is the operational cost or the office budget, which includes the expense of office and employe. Regression results indicate that provinces with larger budget per KPP have higher efficiency, in which a 1% increase in operating costs per office will increase efficiency by 0.0225. The addition of operational costs means the availability of larger budgets for the implementation of KPP activities, such as socialization and extension activities, visits to taxpayers sites for monitoring and extensification activities to seek potential new taxpayers that have not been registered.

The existence of a special office, namely the segmented Medium Tax Office (KPP Madya) to administer medium taxpayers in the region does not show a significant influence on the efficiency of tax revenue. This is possible because there are only nine provinces that have Medium Tax Office, namely: Jakarta, West Java, Central Java, East Java, Riau, Riau Islands, South Sumatra, East Kalimantan and South Sulawesi. Therefore, it is necessary to evaluate the criteria and the follow-up of segmentation that have been done. Segmentation in taxation can be done with several criteria, including by industry sector, business scale or risk of non-compliance (Stankevicius & Kundeliene, 2017).

The allocation of employees on the specific function, i.e. client / taxpayer management (AR) and auditor, does not show any significant effect on the efficiency of KPP. This may happen because the allocation of personnel based on these functions have only been done in recent years. Thus, there are still possibly many employees in the specific function who do not have adequate knowledge and experience in carrying out their work. Given that in developed countries, the allocation of these employees has been done for a longer period of time. In addition, more than 40% of Indonesian tax employees are under 30 years of age, whereas in average, in OECD countries the number of employees under the age of 30 is only 10% of the total employee and in non-OECD countries as much as 16.46%.

Furthermore, although the number of personnels, DGT employees, is quite a lot, when compared to the ratio of the number of tax employees to the total workforce, Indonesia belongs to a low state compared with other countries. Thus, too many taxpayers must be overseen by tax officials. In 2010, on average, every Indonesian tax employee is responsible for overseeing more than 2,000 taxpayers, while on average the country of the world, each employee oversees about 1,500 taxpayers. Furthermore, although the number of tax employees has increased until 2016, the average supervisory ratio has increased to 3,000 taxpayers per employee (AR and Auditor), or twice the world average. Therefore, the ratio of employees of tax auditors in Indonesia has not been able to give a significant influence, considering the amount that has not been comparable with the amount to be supervised.

Factor related to the last internal characteristic is managerial role, which in this research is measured from two things, namely head office age which is a proxy of knowledge and experience of manager and squad age of head office which is proxy of *diminishing* productivity. Based on the estimation result, the age of the head office did not show any significant effect on the efficiency of KPP. This may be due to the bias in the proxy's decision based on the average age of head office in one province. For example, two provinces consist of two KPPs each: one with a head office of 40 years and 56 years, while other with the second age of 48 years, produce the same average age score. Meanwhile, based on the theoretical literature, the experience of managers will increase with age, but will decrease after going through the optimal value until retirement.

Meanwhile, economic characteristics are measured from two kinds of variables, namely the contribution of the industrial sector and the scale of informality of workers. Based on the regression results, the contribution of the industrial sector has no significant effect on the efficiency of tax collection. This is possible because most large industries in Indonesia have become a taxpayer administered by the KPP at the Regional Office of Big Expense Taxpayers, and thus the potential revenue is not a realization for the tax office in the location of the industry. On the other hand, the scale of informality of workers shows a significant negative effect on the efficiency of tax collection. This is in line with the theory that the informal sector is a difficult sector to be taxed, because it is difficult to know its existence and the absence of adequate legality to be established as a tax subject. In fact, some literature analogizes informality with tax evasion activities (Savić, et al., 2015).

In relation to informality, included into the informal worker category is informal self-employment and informal wage employment, which include employees without formal contracts, workers' assurances or social protection. Thus, the problem in taxation is related to the absence of data and legality of the business or the status of informal workers. Because of this, so many people have not registered as Taxpayers. Based on OECD data (2011), the number of private individuals who have registered as taxpayers in Indonesia is only about 11% of the total workforce. Meanwhile, in other non OECD countries the number of registered individual taxpayers has reached 36% of the total workforce in average.

The last one is the policy factor or availability of facilities. Supporting facilities proxied with the average electricity power capacity of customers, based on regression results, have a positive and significant effect on the efficiency of tax collection. The availability of adequate power sources will encourage businesses to be more productive and increase trust in the government in providing business support infrastructure. Therefore, the presence of sufficient power resources for business actors and the public will increase efficiency in tax collection. Thus, the determinants of the success of tax collection are not only related to the design and tax regulations set, but also to what extent the government is able to facilitate and encourage better governance (Bahl, 2008).

5. CONCLUSIONS

Considering the characteristics of tax collection which are also highly dependent on factors outside the control of the KPP, such as the character of the regional economy, the social character of the community, the availability of infrastructure and the government policy, it is necessary to include stochastic elements in the tax office´s efficiency/ productivity analysis. The analysis was performed using Cobb Douglas model which involves time interaction with *stochastic frontier* method. Then the level of technical efficiency in each observation unit was calculated. Furthermore, determinant analysis, which includes internal factors under the control of the tax office and external factors outside the control of the tax office was performed.

Various findings that can be concluded from this research include the level of technical efficiency of KPP in Indonesia from 2010 to 2016, which in average are in the low middle level, which is 0.41 from the scale 1. Meanwhile, in developed countries, the average level of efficiency is already high (Savić, et al., 2015; Tsakas & Katharaki, 2014). Secondly, there are variations in the level of efficiency of tax collection among provinces in Indonesia, in which most provinces are in the middle level. Provinces with high efficiency levels are Jakarta, Banten, South Kalimantan, Maluku and North Maluku. Meanwhile, provinces with low KPP efficiency are North Kalimantan, Central Java, Lampung, Central Sulawesi, Southeast Sulawesi, West Sulawesi, and Riau.

Related to the determinants of KPP efficiency, the increased effort to conduct audit activities has proven to be significantly improve the efficiency of KPP. However, the allocation of personnel to supervisory and examination functions has no significant effect on the efficiency of KPP. Furthermore, the progress of public education in a province proxied with a high educated adult population ratio has also proven to increase efficiency in tax collection.

Besides both factors, some other factors also influence the efficiency of tax collection by KPP. Firstly, the higher operational costs per KPP can increase productivity, because with the availability of the budget, employee empowerment and asset utilization of KPP can be optimized as long as it is managed properly and appropriately. The availability of adequate electricity networks also has a positive impact on the efficiency of tax revenue, because it can expedite the work process. While the informality of labor has a negative impact on the efficiency of KPP, since the increasing ratio of labor and business in the informal sector will lead to a decrease in the efficiency of tax collection.

6. IMPLICATIONS AND LIMITATIONS

Based on the results of the study, in addition to the improvement of audit effort, there are other alternative activities that can be done by the DGT to increase efficiency and productivity. It is related to the positive influence of public education on efficient KPP. For instance, the DGT can provide higher targets for tax offices located in the work area with a relatively highly-educated community, as it is expected to have a higher awareness. In addition, the activities of socialization and extension of taxation is also an alternative effort to increase tax revenue. These activities are expected to increase the knowledge of the community against tax regulations.

Equally important, due to the negative impact from the informalities for tax efficiency, the tax system for it must be designed to provide convenience and low administrative costs. The presumptive tax that is currently applied for small businesses is the right decision. However, for the long term, tax system and regulations must be designed to encourage formalization for small and medium businesses, through cooperation with relevant institutions to conduct employment training and entrepeneurship development programs. It also supported by the positive impact from tax office´s operational cost on tax revenue efficiency, thereby with the increase in operational costs, tax offices are expected to be able to expand and improve it services quality.

This study has several limitations in various matters related to the limited access and availability of data. The first is the scope of research in the form of data aggregation at the provincial level, in relation to differences in administrative areas of government and working areas of the KPP. This can lead to inaccuracy in assessing the efficiency of KPP, given the possibility of differences in performance among KPPs within a province. Then, the input variables in the estimation of the production function only takes into account the input of a quantitative variable, without qualitative factor analysis, such as: the type and quality of assets, education and work experience of the employee. Similarly, the proxy of the tax base involves only GRDP values, in the absence of data reflecting the true tax potential of a KPP working area. Thus, there is the possibility of less precise calculation of the potential output or maximum tax revenue from the observation unit.

In addition, there is the possibility of measurement error in proxying the research variables, due since they cannot sufficiently represent the actual variables. For example, the variable availability of electricity, which should be measured by stability of the power grid or the frequency level of power outages, but because the data is not available, it is proxied with the installed power capacity per customer. Then it is related to managerial factors, as measured by the average age of head office. Meanwhile, one's experience and managerial skills are also influenced by several other things, such as: individual quality, work experience, education and motivation that can not be accommodated in this study. Limitations in the measurement of these variables can result in a bias in measuring the magnitude of the impact of each variable.

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APPENDIX

Appendix 1 Data Variables Descriptive Statistics

Variable	Information	Unit	Obs	Min	Max	Mean	Std. Dev.
TR	Sum of tax revenue	billion rupiah	235	243.00	151,009.00	9,847.47	21,740.22
Frontier (Input Variables)							
Cap	Sum of fix assets	billion rupiah	235	21.00	2,053.00	286.29	411.96
Lab	Sum of tax officer	orang	235	40	4638	577.74	879.64
GTDP	Gross Regional Domestic Product	billion rupiah	235	14,984	1,539,377	243,403	339,541
Technical efficiency determinants							
Audit_effort	Sum of finished audit activities per auditor	unit	235	3.333	43.333	14.234	6.298
Educ	The ratio of population aged 15 years and over who completed high school education and above	percent	235	21.58	60.67	34.0128	8.437
cost_KPP	Average operating cost of each tax office	million rupiah	235	2,280	9,710	5,890	1,260
kppmadya	Sum of KPP Madya	unit	235	0.00	5.00	0.57	1.04
Staff_allocation	rasio jumlah auditor dan Ratio of the number of auditor and Account Representative (AR) to number of employees	ratio	235	0.28	0.46	0.37	0.04
m_age	The average age of the head of the KPP within a province	year	235	40.00	56.00	46.93	2.69
m_age2	The square of the average age of the head of the KPP	year	235	40.00	56.00	46.93	2.69
industry	Contribution of industrial sector to GRDP	ratio	235	0.0123	0.445	0.1558	0.110
inf_l	Share of the informal workforce of the entire workforce in the province	ratio	235	0.210	0.800	0.560	0.122
Electricity	Average installed power capacity per customer	kVA	235	0.749	4.373	1.461	0.648

Source: DJP, BPS, Kementerian ESDM

Appendix 2 Stochastic Frontier Production Function´s Estimation

Variable		Model 1	Model 2	Model 3	Model 4	Model 5
Kapital	β_K	-1.1295 (-1.246)	-1.3074 (-1.413)	-1.2967 (-1.397)	-0.2231 (-2.325)*	-0.0335 (-0.767)
Labor	β_L	0.0629 (0.057)	0.0283 (0.026)	0.2397 (0.226)	0.2836 (3.076)**	0.1563 (2.081)*
GRDP	β_X	0.6747 (0.444)	-0.0877 (-0.061)	-0.257 (-0.185)	0.9682 (10.536)***	1.1406 (13.611)***
time	β_T	-0.0267 (-0.373)	-0.0214 (-0.832)		-0.069 (-1.282)	
(Kapital)^2	β_{KK}	-0.1557 (-2.350)*	-0.1248 (-1.863)	-0.1206 (-1.791)		
(Labor)^2	β_{LL}	-0.0216 (-0.180)	-0.0191 (-0.158)	0.0098 (0.082)		
(GRDP)^2	β_{XX}	-0.0222 (-0.192)	-0.0105 (-0.093)	-0.0127 (-0.116)		
(Waktu)^2	β_{TT}	0.0028 (0.916)	0.0047 -1.537			
Kapital*Labor	β_{KL}	0.0933 (0.680)	-0.0183 (-0.136)	-0.0774 (-0.579)		
Kapital* GRDP	β_{KX}	0.1706 (1.103)	0.2323 (1.48)	0.2559 (1.635)		
Labor*GRDP	β_{LX}	-0.0025 (-0.014)	0.0283 (0.158)	0.0197 (0.111)		
Kapital*time	β_{KT}	0.0399 (2.938)**			0.0326 (2.456)*	
Labor* time	β_{LT}	-0.0318 (-2.104)*			-0.0194 (-1.332)	
GRDP*time	β_{XT}	0.0002 (0.017)			0.0025 (0.261)	
Constant	β_0	1.1787 (0.205)	6.2653 (1.189)	8.2606 (1.595)	-2.7672 (-3.077)**	-4.9916 (-8.390)***
Gamma	γ	.9490073	.9443407	.9078422	.9293378	.9328602
Eta	η	.0169514	0.0161	.0166101	.0123653	-
Log-likelihood		142.78242	137.75541	135.38862	137.86437	107.89539

Notes: Model 1 Translog with Technological Progress; Model 2 Hicks-neutral; Model 3 No Technological Progress; Model 4 Cobb Douglas with time interactions; Model 5 Cobb Douglas
Asterics indicate significance at the 1% (***), 5%(**), 10%(*)

Appendix 3. Provincial Tax Collection Technical Efficiency

Year	2010	2011	2012	2013	2014	2015	2016
Sumatera	**0.3219**	**0.3264**	**0.3308**	**0.3353**	**0.3398**	**0.3443**	**0.3488**
Aceh	0.3649	0.3695	0.3740	0.3786	0.3831	0.3876	0.3922
Bangka Belitung	0.3496	0.3542	0.3587	0.3632	0.3678	0.3723	0.3769
Bengkulu	0.3865	0.3910	0.3955	0.4001	0.4046	0.4091	0.4136
Jambi	0.3002	0.3047	0.3091	0.3136	0.3181	0.3226	0.3271
Lampung	0.2503	0.2546	0.2589	0.2632	0.2676	0.2720	0.2763
North Sumatra	0.3654	0.3700	0.3745	0.3791	0.3836	0.3882	0.3927
Riau	0.2197	0.2238	0.2279	0.2321	0.2363	0.2405	0.2448
Riau Islands	0.3395	0.3440	0.3486	0.3531	0.3577	0.3622	0.3667
South Sumatra	0.3439	0.3484	0.3529	0.3575	0.3620	0.3666	0.3711
West Sumatra	0.2992	0.3036	0.3081	0.3126	0.3171	0.3216	0.3261
Java	**0.4892**	**0.4930**	**0.4967**	**0.5004**	**0.5042**	**0.5079**	**0.5116**
Banten	0.6257	0.6293	0.6329	0.6365	0.6400	0.6435	0.6470
Central Java	0.2652	0.2696	0.2740	0.2783	0.2827	0.2872	0.2916
East Java	0.3267	0.3312	0.3357	0.3403	0.3448	0.3494	0.3539
Jakarta	0.9216	0.9225	0.9234	0.9243	0.9252	0.9261	0.9270
West Java	0.3831	0.3877	0.3922	0.3967	0.4013	0.4058	0.4103
Yogyakarta	0.4130	0.4175	0.4220	0.4265	0.4310	0.4355	0.4399
Kalimantan	**0.4763**	**0.4805**	**0.4848**	**0.4247**	**0.4288**	**0.4329**	**0.4370**
Central Kalimantan	0.5365	0.5406	0.5447	0.5488	0.5529	0.5569	0.5609
East Kalimantan	0.3518	0.3563	0.3609	0.3654	0.3699	0.3745	0.3790
North Kalimantan				0.1676	0.1713	0.1751	0.1788
South Kalimantan	0.6060	0.6097	0.6134	0.6171	0.6208	0.6244	0.6280
West Kalimantan	0.4110	0.4155	0.4200	0.4245	0.4290	0.4335	0.4380
Bali & Nusa Tenggara	**0.3723**	**0.3767**	**0.3811**	**0.3855**	**0.3900**	**0.3944**	**0.3988**
Bali	0.4955	0.4997	0.5040	0.5083	0.5125	0.5167	0.5209
East Nusa Tenggara	0.3329	0.3375	0.3420	0.3465	0.3511	0.3556	0.3602
West Nusa Tenggara	0.2884	0.2929	0.2973	0.3018	0.3063	0.3108	0.3153
Sulawesi & Maluku Utara	**0.3422**	**0.3464**	**0.3506**	**0.3549**	**0.3591**	**0.3633**	**0.3676**
Central Sulawesi	0.2530	0.2573	0.2617	0.2660	0.2704	0.2747	0.2791
Gorontalo	0.3513	0.3558	0.3604	0.3649	0.3695	0.3740	0.3785
North Maluku	0.6482	0.6516	0.6551	0.6585	0.6619	0.6652	0.6686
North Sulawesi	0.4118	0.4164	0.4209	0.4254	0.4298	0.4343	0.4388
South Sulawesi	0.3052	0.3097	0.3142	0.3187	0.3232	0.3277	0.3322
Southeast Sulawesi	0.2058	0.2099	0.2139	0.2180	0.2221	0.2263	0.2304
West Sulawesi	0.2202	0.2243	0.2284	0.2326	0.2368	0.2411	0.2453
Papua & Maluku	**0.5393**	**0.5433**	**0.5474**	**0.5514**	**0.5553**	**0.5593**	**0.5632**
Maluku	0.6474	0.6508	0.6543	0.6577	0.6611	0.6644	0.6678
Papua	0.5074	0.5117	0.5159	0.5201	0.5243	0.5285	0.5326
West Papua	0.4632	0.4676	0.4719	0.4763	0.4807	0.4850	0.4893
National Average	**0.3997**	**0.4039**	**0.4081**	**0.4051**	**0.4093**	**0.4135**	**0.4177**

Source: estimation result