Analysis of Indonesian Tax Revenue

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Abstract

This study analyzes the long-run and short-run effect of macroeconomic factors, such as real Gross Domestic Product (GDP), inflation rate, exchange rate and government spending on Indonesia's tax revenue during 1976-2013, by utilizing the Error Correction Model (ECM). The finding of the study demontrates that in the long-run; the real GDP, exchange rate, and government spending affect Indonesia's tax revenue, except the inflation rate. In short-run, Indonesia's tax revenue statisically affected by government spending, while others variable do not influence Indonesia's tax revenue. Error Correction Term (ECT) coefficient is 0.221, explains incompatibility tax revenue occur in long-run is corrected of 22 percent in one period.

1. INTRODUCTION

As one of the duties, the Government works to create prosperity for the people in his country through economic development. To carry out the role, the Government needs funds to finance all the activities. The funding comes from government's revenue, which is derived from various sources, such as; taxes, loans, assistance from other levels of government, administration fees, servicing, as well as the income of the business (Poole, 1956).

In general, the government's revenue comes from two sources: first, the tax revenue from mandatory dues, which are deducted relating to certain activities (Hyman, 2011). Second, the non-tax revenues, which are obtained aside of tax revenue, such as income from natural resources, the revenue from the profit enterprises or state-owned enterprises, and other non-tax revenue.
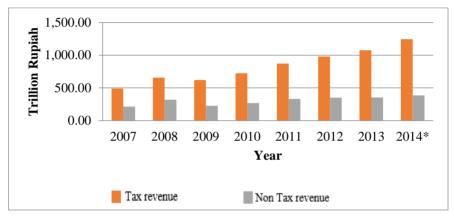
In several western countries such as Spain, Hungary, Italy, the UK, countries of the European Union, and the United States, the majority of government revenue comes from tax revenues, which reached more than 50 percent of country's total revenue. In Asian countries such as Japan, Thailand, China, India, including Indonesia, the largest government revenue also comes from taxes.

The Government of Indonesia's (GOI) revenue is dominated by tax for years. Figure 1 shows that the high contribution of the tax compare to the non-tax revenue throughout the past eight years. In 2007, the tax is accounted about 70 percent of domestic revenues. The role of tax as a source of domestic revenue increased annually and reach 76 percent of the total revenue in 2014.

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Tax as the largest source of state revenues are shown in Figure 2. During the past seven years, the trend of the average proportion of tax revenues continued to rise and reached 65 percent in financing state expenditure, while the rest is funded from non-tax revenues, grants, and loans.
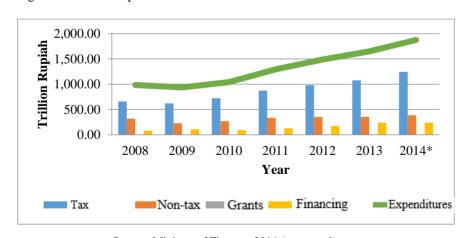
Related to its role as a major source of the GOI's revenue and expenditure, tax revenues also have risks associated with tax target that has been set by the GOI. Over the last five years, the tax revenue shows shortfall condition. In 2009, the difference between actual and targeted tax of Rp 32,032.60 billion and that number has increased up to 2013 to Rp 76,246 billion. Those problems have implications for the importance of the preparation of tax revenue policy model.

Note: *APBN-P (GOI budget correction)
Source: Ministry of Finance, 2014 (processed)
Figure 1 The Development of Tax and Non-Tax Revenue of Indonesia 2007-2014

Source: Ministry of Finance, 2014 (processed)
Figure 2 The Development of Funding Sources and Expenditures of Government of Indonesia 2008-2014

To optimize the tax revenue, the tax model is developed by involving factors that expected to affect the tax revenue. These factors may include the traditional

elements of the tax base or commonly called tax handles, such as the model developed by Ahmed (1994) and Ghura (1998). In addition, the tax model also consider macro-economic factors, such as; economic growth, inflation, exchange rates and government spending.

The focus of this study is to analyze the influence of macroeconomic indicators against the tax revenues, and by employing cointegration approach and error correction model (ECM) it is observed how the dynamics of the effect of macroeconomic variables to tax revenues. Macroeconomic variables that are expected to affect taxes include gross domestic product (GDP), inflation rate, exchange rate against the USD, and the state budget.

2.   THEORITICAL FRAMEWORK AND HYPOTHESIS

The public economic theory explains that the role of government is essential in the economy. According to Musgrave and Musgrave (1989), the government has three main functions in the economy of a country, i.e. the function of the allocation, distribution, and stability. Due (1963) adds one more function of government, namely the commercial function which explains that the goods or services would be more efficient if it is produced or provided by the government.

As the operator of the state, the government works to create public welfare through development. The government is also in charge for providing goods and services that can not be provided by the market. The role of government in the economy can be explained by the circular flow of income and expenditure as shown in Figure 3 (Musgrave and Musgrave, 1989). Supposed that the economy consists of two sectors, namely the private sector (companies) and households, the flow of funds in the economy can be described as follows: The household sector will earn revenue through the sale of production factors in the factor markets (line 1). Revenues earned are then used for consumption (line 4) and/or saved (line 5). If there is a portion of income that is saved, the saving then finances capital expenditures (line 6). Line 4 and line 6 is a combination of the purchase of products in the market a product that will boost its revenue will be used to buy the factors of production.

Since in the economy is added the role of the public sector (government), the factors of production are not only purchased by the private sector, but also by the government sector (line 2). The government is also purchased the output generated by the private sector (line 7). In addition to purchasing the factors of production and output, the government also pays allowances (line 8). Furthermore, for the purchase and payment of allowances, the government needs the revenue from taxes (line 9) and loans (line 10).

──── : The flow of income and expenditure in the private sector

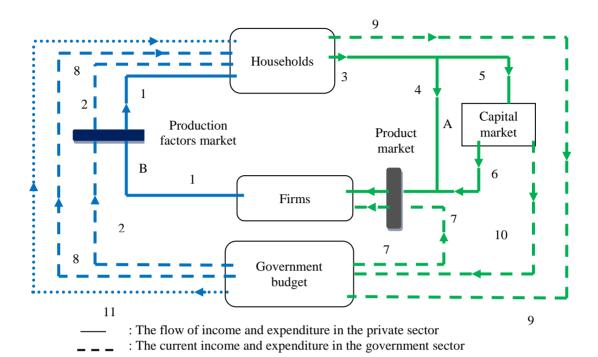– – – : The current income and expenditure in the government sector

Figure 3 Flow of Funds of the Public Sector in Economy
Source: adapted from Musgrave and Musgrave (1989)

In providing these goods and services, the Government requires a source of funding, which comes from tax and non-tax revenue. Tax revenues are the largest and potential source of state revenues, and to increase the revenue, the government needs to develop appropriate policies for tax in accordance with economic conditions.

Macroeconomic factors affect positively or negatively to the tax revenue. An increase in the rate of economic growth, the country's spending, and overvaluation of the domestic exchange rate against USD (assuming that the balance of payment is surplus) will increase the real value of the tax objects. The increase in the real value of the tax basis implies an increase in the tax levied, and vice versa. In contrast to these three factors, the increase in inflation can increase or decrease the tax revenue. The increase in inflation could increase tax revenue if the tax is charged in the form of ad valorem. The increase in inflation can also reduce tax revenue if the tax is charged in the specific form (Tanzi, 1989).

Several empirical studies that investigate the relation of macroeconomic factors and tax revenues have been conducted by researchers in various countries. One of these studies was conducted by Muibi and Sinbo (2013). They observed the influence of macroeconomic factors to tax revenues in Nigeria. By using error correction model (ECM), they found that the economic growth positively affects the Nigeria tax revenue while the exchange rate depreciation and inflation rates negatively affect the tax revenue. In the short-term, the variables such as GDP,

exchange rate, inflation rate statistically affects the tax revenues, while the openness of trade and foreign debt are statistically not significant affect the tax revenues.

An empirical research using Indonesia as the study case was conducted by Sinaga (2010). Sinaga estimated the effect of macroeconomic variables towards tax revenue, and revenue from the other forms of tax, i.e. income tax, value added tax, land tax and building tax. The OLS analysis shows that total tax revenue and revenue of value added tax are affected by GDP, Indonesian Rupiah (IDR) exchange rate to United State of America's dollar (USD), import value, and inflation. Revenue of income tax is caused by GDP, IDR exchange rate to USD, Indonesia's central bank certificate (SBI) rate; meanwhile land tax and building tax, and land and building transfer tax is caused by GDP, IDR exchange rate to USD, and crude oil price.

According to the theory base and literatures review, hypothesis are listed as follow:
1. Real GDP might positively affects tax revenue
2. Inflation negatively might affects tax revenue
3. Overvaluation of IDR exchange rate to USD might cause the decreasing of tax revenue; in the other hand, IDR exchange rate to USD positively affect tax revenue (assumption: if balance of payment is in surplus condition);
4. Government expenditure might positively affect tax revenue.

3. RESEARCH METHOD

This research is estimated by *Error Correction Model* (ECM) to assess the effect of independent variable towards tax revenue in Indonesia within long-term and short-term. ECM is a method employed to estimate the effect of independent variable towards dependent variable by accommodating lagged in the model. ECM is also used to designate imbalance relationship or short-term relationship of one model (Thomas, 1997). Estimation of ECM is run by employing *Engle-Granger two-stage procedure.* Firstly, estimation of long-run parameter and cointegration test is executed. Afterwards, estimation of short-run parameter is performed. Estimation of long-run model can be defined as follow:

$$LNTR_t = \alpha_0 + \beta_0 LNGDP_t + \beta_1 Inf_t + \beta_2 LNSp_t + \beta_3 LNER_t + u_t \qquad (1)$$

Where, $LNTR$ is tax revenue, $LNGDP$ is real GDP, Inf was inflation, $LNSp$ is expenditure, and $LNER$ is IDR exchange rate to USD. According to the long-run model, the short-run model can be derived as follow:

$$\Delta TR_t = b_0 + b_1 \Delta GDP_t + b_3 \Delta Inf_t + b_5 \Delta Sp_t + b_7 \Delta ER_t - \lambda(TR_{t-1} - \alpha_0 - \beta_1 GDP_{t-1} - \beta_2 Inf_{t-1} - \beta_3 Sp_{t-1} - \beta_4 ER_{t-1}) + \varepsilon_t \qquad (2)$$

where $(TR_{t-1} - \alpha_0 - \beta_1 GDP_{t-1} - \beta_2 Inf_{t-1} - \beta_3 Sp_{t-1} - \beta_4 ER_{t-1})$ is *Error Correction Term* (ECT).

Tax revenue represents government revenue gathered from a compulsory contribution of citizen to government according to Acts. Data of tax revenue is cumulative accumulated tax of central government during one fiscal year, constituting income tax, value added tax, land tax and building tax, luxury sales tax, international trade tax, and so forth—counted in billion rupiah. GDP reflects Indonesia's national income. This variable also depicts total value added of each unit of business in a country—meaning a summation of the whole final value of

goods and services produced in one unit of economy. To expanse of this study, real GDP is used (base year=2005) in trillion rupiah.

Inflation can be defined as a general increase in price of goods and services; that is staple needs of its citizen. Data of inflation is calculated based on Consumer Price Index (base year=2000). Exchange rate represents the price of foreign currency quoted by domestic currency which is determined by Bank of Indonesia as Indonesia monetary authority. This research used rupiah as domestic currency and US dollar as foreign currency. Government expenditure denotes total expenditure of one country in one fiscal year which divert current equity and is a compulsory expenditure of government. Total expenditure is a summation of expenditure of central government and transfer payment (in billion rupiah).

Data used in this research is secondary data gathered from related institutions. The data is stockpiled in yearly time-series—embraces 1976 until 2013. Data of total tax revenue and government expenditure is collected from The Indonesian Budget issued by Ministry of Finance of Indonesia. Data of real GDP and inflation is gathered from Statistics Indonesia; whereas IDR exchange rate to USD is gathered from Bank Indonesia.

4. DISCUSSION
4.1 Recent Development of Variables

During the research period, tax revenue tend to have a concurrent trend with macroeconomic variables i.e real GDP, IDR exchange rate to USD, and government spending. Exhibit 3 shows that when the real GDP rises and so does IDR exchange rate to USD, concurrently tax revenue experiences an increment.
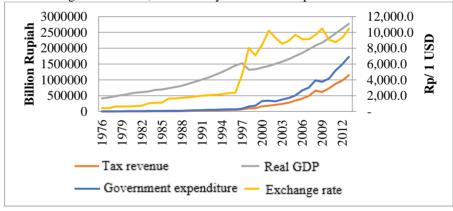

Figure 4 Trend of Tax Revenue, Government Expenditure, IDR exchange rate to USD, and Real GDP of Indonesia (1976-2013)
Source: Ministry of Finance (2014); BPS (2014); and BI (2014), processed

According to Figure in 1998, the decline in real GDP is not followed by the decline of tax revenue. In the purported year, real GDP declined due to monetary crisis. Tax levied attains a remarkable increment counted for 43.7 percent. The asynchronous alteration between real GDP and tax revenue was due to following repercussion of tax reformation in the prior year. Reformation enactment came in the form of four-tax Acts constituting board of tax-dispute.

Another pertinent aspect of trend of tax revenue in Indonesia could be observed in 2010. In the prevailing year, the strengthening rupiah is not followed by the decline of tax revenue. In 2010, tax revenue raises 16.67 percent over prior year. The increment was a repercussion of skyrocketing taxpayer number as extensification and intensification of tax was enacted in 2010.

Aside from the three macroeconomic variables, the trend of tax revenue also tends to be concurrent with Consumer Price Index (CPI)—which depicts inflation. The increment could be seen in Figure 4. The increment of CPI causes the proportion of levied tax; accordingly, the tax revenue raises. In the other hand, exorbitant CPI indicates high inflation rate; accordingly, revenue might decline due to plummeting value of tax object.
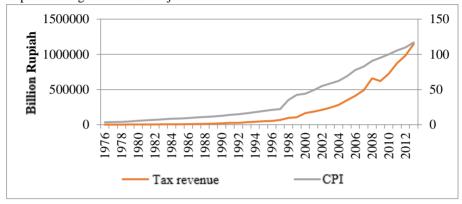

Figure 5 Trend of Tax Revenue and Consumer Price Index (1976-2013)
Source: Ministry of Finance (2014), and World Bank (2014), processed

4.2 Estimation Result and Analysis

Table 1 shows a summary of the estimation result of the model of long-term tax revenue. In accordance with the hypothesis, the variable of the real GDP, IDR exchange rate to the USD, and the government expenditure have a positive influence on Indonesia's tax revenue. It designates that the increase of the real GDP, state spending and the depreciation of the exchange rate will lead to the increase of the Indonesia's tax revenue. In contrast to these three variables, the variable of inflation has a negative effect on the tax revenue. As inflation increases, Indonesia's tax revenue decrease. This inverse correlation is due to the high inflation rate which indicates the vulnerability of a country's economy that might lead to economic activities to fall off, hence tax levies will be automatically reduced and tax revenue will also be decreased.

As can be seen from Table 1, the variables of the real GDP, IDR exchange rate to the USD, and the partial government expenditure significantly affect Indonesia's tax revenue while the variable of inflation does not significantly affect the tax revenue. The insignificant effects of inflation towards the tax revenue happened because during the study period, the change of the inflation rate is not always accompanied by the change of the tax revenue. The increase of the Indonesia's inflation is not always accompanied by the decrease in the Indonesia's tax revenue, as occurred in 1983, 1985, 1997, and 1998. During that period, the inflation rate and tax revenue had increased. This increment is due to government reforms of taxation in 1983, 1985, 1997, and 1998—resulting the increment of

Indonesia's tax revenue, although the economic conditions fall off due to the high inflation rate.

Table 1 Estimation Result of the Long-term Tax Revenue

Variable	Coefficient (t-stat)
Constant	-19,220 (-7,302)***
GDP	1,529 (7,003)***
Inf	-0,0006 (-0,575)
ER	0,329 (3,805)***
Sp	0,525 (5,995)***
R-squared	0,9962
Adj. R-squared	0,9957
F-stat	2.153,715
Durbin Watson	0,688

*** Significant at alpha 1 percent
** Significant at alpha 5 percent
* Significant at alpha 10 percent

Source: Results of the data processed by EViews 8.0

In the long term, the variable of GDP, IDR exchange rate to the USD, and the government expenditure affect tax revenue through the tax basis. The increment of the GDP value also shows the improvement of economic sectors. Several economic sectors are also utilized as an object of taxation, hence, in the case GDP increases, the condition of the economic sectors will also increase as well as the real value of the tax object. The increase of the tax object value will raise the amount of taxes levied so that tax revenue will also be raised. In addition, the influence of the GDP to tax revenue can also happen through the changes in income and consumption pattern of the individual. The increase of GDP will tend to raise the income of the individual and encourage consumers to consume more goods and services. It can raise the amount of income tax and value added tax, and vice versa if the value of real GDP decrease.

The changes of the IDR exchange rate variable to the USD will affect tax revenue through the changes in the volume and value of exports and imports of the products. The strengthening of the IDR to the USD can prompt the price of exports to appear higher in the foreign market. It has implication to the decline in demand for domestic goods in the international market so that the export volume will decrease. The decline in export volume will have implication for the reduction in export taxes to be drawn hence tax revenue will also decrease. In addition, the strengthening of the rupiah to the USD can prompt the prices of imports appears to

be lower in the domestic market. Such low prices will lead to the demand for the imported products. The increase of demand for imported product induces the increase of the imported volume, so the tax on imports will raise as well. Based on the explanation, with a balance of payment surplus (exports is greater than imports) Indonesia, the strengthening of the IDR exchange rate to the USD has implications for the decrease of Indonesia's tax revenue, and vice versa.

As the influence of the GDP and the IDR exchange rate to the USD is positive, the variable of government expenditure also holds a positive effect on the long-term tax revenue. The positive effects of the government expenditure towards the Indonesia's tax revenues occur because a number of government expenditure are also an object of taxation, such as personnel expenditure. If the personnel expenditure is increased, the income of civil servants will be increased as well. The increased income will have an implication in the increase of the object of the tax income so that the tax revenue which comes from the tax income will also increase.

After a long-term model of the estimation, cointegration test is performed to ensure the long-term balance in the tax revenue model that had been developed. In this study, cointegration test is performed by employing Engle-Granger test. In the Engle-Granger test, the result shows the value of t count of -3.650 which is greater than the value of t-critic of (-2.943). It shows that all variables are mutually cointegrated.

Furthermore, the estimation model of short-term Indonesia's tax revenue is tested. Table 2 shows the summary of the estimation results of the model of short-term Indonesia's tax revenue. In Table 2, it is shown that it is partially only the variable of government expenditure that significantly affects tax revenue, while the three other variables did not significantly affect Indonesia's tax revenue. The insignificant influences of these three variables occur because the tax revenue in the short term is more likely to be affected by rates and tax base as set out in the constitution. This is because the model of macroeconomic variables and the tax receipts is a long-term model that tax revenues cannot directly adjust to the changes of the GDP, inflation, and the IDR exchange rate to the USD. Tax revenue needs time to adjust to the changes in economic conditions.

Unlike the three other variables, the short-term government expenditure has a positive and significant impact on tax revenue. the positive and significant impact on the state budget towards tax revenues happen because as described previously, the changes in the government expenditure will cause a change in real value over the tax basis and will also affect tax revenue. The changes in government expenditure will automatically change the value of the tax base without requiring the lag. For example, the changes in personnel expenditure causing the value of tax base are changed so the tax revenue will also change automatically.

Table 2 Estimation Result of the Short-term Tax Revenue

Variable	Coefficient (t-stat)
Constants	0,121 (3,908)***
GDP	0,164 (0,580)

Variable	Coefficient
Inf	0,001
	(1,446)
ER	0,029
	(0,353)
Sp	0,327
	(3,481)***
U(-1)	-0,206
	(-1.983)*
R-squared	0,482
Adj. R-squared	0,398
F-stat	5,765

*** Significant at alpha 1 percent
** Significant at alpha 5 percent
* Significant at alpha 10 percent

Source: Results of the data processed by Eviews 8.0

Short-term estimation result indicates that all independent variables have a positive effect on the short-term tax revenue. In this short-term model, the estimation result shows that the error correction term (ECT) has a negative and significant sign. The coefficient of ECT of 0.206 indicates that the incompatibility of the Indonesia's tax revenue that occurs in the long-term and short-term period will be corrected by 20.6 percent.

5. SUMMARY
5.1 Conclusion

The estimation results of the long-term are consistent with the hypothesis, showing that the variables of the GDP, the exchange rate of rupiah against the USD, and the state expenditure, have positive significant effects on the tax revenue. GDP, the exchange rate of rupiah against the USD, as well as the expenditure does not affect the tax revenue, but through the tax base. The changes of the value of GDP, the exchange rate, and the state expenditure, lead to the changes in volume and or the real value of the tax base. Different from the three other variables, the inflation rate is not significant statistically on tax revenue in the long-term.

In the short-term, the government spending positively significant affect the tax revenue, but the state expenditure, GDP, inflation, and the exchange rate of rupiah against the USD statistically have no significant effect on the tax revenue. The tax revenues can not directly and need the longer time to adjust the changes of the magnitude of the three variables.

5.2 Implication

The study results strengthen empirically that in the implementation of fiscal policy, especially in terms of tax revenue, the government also always maintain the macroeconomic conditions, specifically in the stabilization of economic growth. From the estimation of elasticity, note that the value of GDP has the most impact

on tax revenue compared to other variables. Such policies, especially policies to stimulate savings to strengthen capital accumulation determiner of economic growth.

Formulation of fiscal policy from the expenditure side should be appropriately done as it implications for the economy in the short term and long term. By allocating qualified expenditures such as infrastructure development that can have an impact in the long term, and the spending on government employees which can have an impact in the short term on the demand side and the impulse of the tax revenue.

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