



RELATIONSHIP BETWEEN TOTAL POPULATION, TRANSACTION AND INFLATION TO TAX PROPERTY REVENUE IN REGIONAL ECONOMIC IN INDONESIA

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Abstract

This study aims to formulate the empirical model of tax revenue on the acquisition duty of rights on land and building (BPHTB) in Malang. This study uses the data of population, transaction numbers and regional inflation. The data analysis method is the Vector Error Correction Model (VECM). The study shows that there are no significance influence between the population, the transaction number and inflation on tax revenues of BPHTB in Malang in the short-term period. Whereas, there is a long-term relationship between the population, the number of transactions, inflation and tax revenue of BPHTB. Therefore, it is necessary for the local government to continue to maintain the stability of the economy especially inflation in the long-term to maintain the sustainability of tax revenue of BPHTB.

Keywords: Tax Revenue, Vector Error Correction Model, BPHTB, Local Government, Regional Economic

INTRODUCTION

The implementation of the Law on Regional Autonomy and Fiscal Decentralization in Indonesia aims to strengthen the regional fiscal capability. Thus, it can have an impact on the regional financial independence to improve the welfare of local communities. The local government should be able to explore the region's financial potential for financing the development undertaken in the region. The effort to explore the financial potential of the area can be made on the taxes imposed on the acquisition of land and building rights. This tax type is known as the

Acquisition Duty of Right on Land and Building (BPHTB). As referred to in Article 2 sub-article 2 letter a and b of Law Number 20 Year 2000 regarding BPHTB, what is meant by tax object is acquisition of rights on land and/or building which covers among others because of the sale and purchase transactions of land and or building and also the existence of business merger event. The increased tax revenues of BPHTB illustrate an increase of transactions that reflect the economic capacity of the community that willing to pay some of its revenues for ownership of the desired property. Determination of tax rates is an essential factor in affecting tax revenue and property purchase transactions. Some studies provide essential information about the effect of property tax rates on property prices. Song and Zenou (2006) concluded that high property taxes produce smaller cities and reduce population density in the United States. The results of research conducted by Tajani, et al (2017) concluded that there is an indirect relationship between property taxes and housing prices. In this case a significant increase in revenue has a major impact on the impact of property price increases in Italy.

In the regional financial structure, the components of regional revenue (PAD) have an essential role in increasing the regional financial independence in the Regional Budget (APBD). Sources of PAD in the APBD include; Regional Taxes, Regional Retributions, Results of Separate Regional Property Management, and other legitimate PAD. In the PAD component, the type of tax revenue in the category of BPHTB is fundamental in increasing the regional income in Malang. As is known, Malang is the second largest city in East Java Province Indonesia. Rapid development in regional development in the city of Malang is supported by the service industry, trade, hospitality, education and tourism. The image of Malang as a city of education and tourism city became an attraction for economic players to invest in Malang.

In the few years of its development, Malang City has attracted property developers to build housing, shops, shop houses and apartments. The various facilities and administrative services offered by the Government of Malang City can improve the competitiveness of the region in attracting investment in property. Increased investment in this property sector can encourage public interest both residents and from outside the city of Malang to make property purchases both for the needs of its residents and for investment needs. The increase of population becomes a necessity as a result of the increasing number of immigrants in Malang. Increasing population will undoubtedly increase the housing tax (Weber and Buchanan, 1980). Similarly, the development of the price of goods also shows an increase as a result of the increasing demand for goods and services. Specifically the increase in housing prices will increase the property tax as a whole (Lutz, 2008). One of the effects of increasing inflation is the price of a land and building will increase, so that the tax object selling price (NJOP) of land and buildings can increase. With an increased NJOP, the tax object acquisition value (NPOP)

should be increased as a basis for tax imposition and will automatically encourage tax revenue of BPHTB.

The data from BP2D Malang City, Indonesia (2017) show that within the period of 2011-2016 the annual tax revenue realization of BPHTB continued to increase, with the achievement of the target always exceeding 100%. The increasing of the tax revenue of BPHTB of Malang City was because the potential of BPHTB in Malang City is very high. This is because the Malang City is known to have a growing residential area, both settlements for student boarding houses, as well as residential areas and housing. This situation resulted in high transactions of land and building rights transfer in Malang City. The high potential of BPHTB tax revenue is also accompanied by an increase in the realization of BPHTB revenues.

The measurement of the amount of BPHTB tax revenue is very important not only in relation to the increase in PAD revenue in APBD of the Malang City Government, but also to improve the competitiveness of Malang City in attracting investment in property. Therefore, some studies identify and estimate the amount of BPHTB revenue in the future. It can help the government to formulate their policy in enhancing the prosperity of community. Tajani, et al (2017) suggested that property tax play an important role in influencing public interest in owning property.

Ihlandfeldt (2004) attempts to formulate an econometric model to estimate the amount of property tax. The results provide evidence of the accuracy of the econometric model in estimating the amount of property tax revenues even in the case of small regions (Florida Counties). Lutz (2008) formulated a property tax revenue model in the United States, where property tax revenue is a function of mechanical factors and policy factors. The estimation model of tax revenue for the Land and Building Rights Acquisition Duty is important, because the acquisition will affect the fiscal capacity and also the financial independence of the local government of Malang City. Large fiscal capacity and higher financial independence will be able to improve regional financial capacity in financing regional development (Simanjuntak and Mukhlis, 2017). Therefore, it is important to formulate an empirical model in order to increase regional tax revenues specifically the land and building rights acquisition (BPHTB) tax types. This study will estimate the empirical model of tax revenue on the acquisition duty of rights on land and building (BPHTB) in Malang, and identify the influence of some variables on tax revenues of BPHTB in Malang in the short-term and long-term period.

LITERATURE REVIEW

Lewis (2003) clarifies that in the early of Indonesian decentralization era, new taxes and charges had created by local governments. One of them is the property tax (taxes that are charges to individuals who make purchase transactions on a property (eg, houses, shops,

apartments). Since in the post-1965 era, the Government of Indonesia has been making a determined effort to revive land taxation as a source of revenue and, to use the revenues as a means of promoting regional government initiative in the selection and carrying out of local development projects (Booth, 1974). As the land taxation, property tax is an important component in the effort to increase regional revenues sourced from other legal income¹. The data shows that the property tax revenue has a large share in increasing the Regional Original Revenue in the regional financial structure. This tax rate is set differently in various countries in accordance with the tax regime adopted. It would be a common knowledge that the property tax revenue is influenced by the quality of property tax assessment.

The importance of property tax in establishment the development, encourage this study to identify the variables that influences property tax revenue. Therefore, this study identify the effect of some variables based on the previous research. The results of research conducted by Eom (2016) conclude that quality of property tax assessment is influenced by the median tax share, the median property value as a share of median income, the ratio of state aid to total expenditures, and the share of adults with college or higher education. The focus of this study is to determine the model of BPHTB tax revenue, and identifying the influence of some variables on tax revenues of BPHTB in Malang. It would be important because according to the data BP2D Malang City, East Java Province, Indonesia (2017), the realization of tax revenue of BPHTB in Malang city always exceed the target.

Property market especially in Malang City had increased from year to year. The increasing of property market lead to the increase BPHTB tax revenue. Gnagey and Tans (2018) envisage that there are some obstacles to an understanding of property markets in Indonesia as the developing countries. First, property markets are often less established, because of the quantity of individuals leaving subsistence livelihoods. Second, the housing quality in Indonesia especially, is lower, and has less land tenure security than the developed countries. Third, the lack of disclosure requirements, an existing the organized association of realtors leads to the difficulty of obtaining the information of property-price. It also causes the difficulty of BPHTB calculation as the tax revenue, and find the determinant of BPHTB tax revenue.

The research of Weber and Buchanan (1980) and Lutz (2008) emphasizes the importance of econometric-based estimation models. That model can be used to estimate the amount of property tax revenue that can be obtained. Based on the results of that researches the factors that affect property tax, include; population, tax rates, and government policy. The

validity of the estimation model is very important to be used as a consideration by the government in formulating the amount of property tax rates and the strategy to increase property tax revenues. Based on the formulation of Lutz (2008), property tax revenues can be written as:

$$R = \tau * V$$

Where, R is the revenue of the property tax, τ is the level of tax effectiveness, and V is the market value of taxable property. The formula suggests that the increase in the market value of the property, followed by the increase in property tax revenue. In an effort to maximize the revenue of the property tax, can be reach by improving the level of tax effectiveness and the market value of taxable property. To determine the tax base (value of taxable property), policymakers are not enough to rely solely on the mechanism of market price increases. Therefore, the government will make various adjustments to the effective tax rate (τ). Thus the change in tax revenue is influenced by the sum of the mechanical factors and the policy factors. The other research, Shone (2009) had provided a justification that property taxes are a function of fiscal parameters, market factors in the property sector, demographic, and political factors. The results of his research indicate that the increase in property tax revenue can be caused by a higher income tax, other taxes, fines and fees at the regional level. From the perspective of macroeconomic scale, the results of research conducted by Felix and Watkins (2013) found that the level of state tax revenue in the USA has a relationship with the age of the population. In that study, the conclusion is that the aging age level in the USA (Aging U.S. Population) has a negative influence on the tax revenue of individual income and sales tax revenue. The results of that study are also supported by research conducted by Beznoska and Hentze (2017) in Germany. Based on the simulation results, he concluded that there was a 7% decrease in tax revenue in the next 20 years when there was no control over the population in Germany. It means that the population variable has a significant effect in determining the amount of collected tax.

In terms of the relationship between tax revenues and inflation, research conducted by Lucotte (2012) concludes that the implementation of inflation targeting policies can have a positive effect on the collection of tax revenues in various countries during 1980-2009. While the results of research conducted by Radnia (2013) conclude that the rise and fall of inflation will affect the amount of tax revenue in Iran. Therefore, this study will accommodate the significant variable in the previous research to determine the model of BPHTB tax revenue, and identifying the influence of some variables on tax revenues of BPHTB in Malang in the short-term and long-term period. Thus, this study use variable population, inflation, and the amount of transaction

number in determining Tax Property Revenue (Tax Receipts of Land and Building Rights Acquisition).

RESEARCH METHOD

According to Weber and Buchanan (1980) and Lutz (2008) the variables that robust influence the property tax, are population, and inflation. The variables used in this study are the population, the number of property transactions, inflation and tax revenue type is BPHTB in Malang, Province, East Java, Indonesia in 2014-2017 monthly. Data obtained from various sources, such as; Central Bureau of Statistics (BPS) Malang, Population and Civil Registration Office of Malang City, Government and Regional Tax Service Agency of Malang City Government. Data analysis methods used in this study include the following stages:

Data Stationary Test

The stationary data test is used to test data stationarity. This test is important because when the research data is not stationary, the estimation results will produce spurious regression. To do stationary test, Augmented Dickey Fuller (ADF) test is used. If the value of t-ADF is less than the critical value of MacKinnon, it can be concluded that the data used is stationary (not containing the root of the unit). The ADF test has an equation:

$$\Delta Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + \gamma_i \sum_{i=1}^m \Delta Y_{t-i} + \varepsilon_t$$

Where:

- ΔY_t = first difference dari Y
- β_1 = constant value or *intercept*
- β_2 = regression coefficient for trend
- δ = regression coefficient for *lag Y*
- γ = regression coefficient for *difference lag Y*
- ε = error
- t = time

With the hypothesis:

$H_0: \delta = 0$ (there is a subunit, variable Y is not stationer)

$H_1: \delta \neq 0$ there is no a subunit, variable Y is stationer)

Cointegration Test

Cointegration test is conducted to test whether there is a long-term relationship between the observed variables. This long-term relationship is important in relation to conformity with the theory used in analyzing relationships between variables. The cointegration approach can also be seen as a test of theory and is an important part of the formulation and estimation of a dynamic model (Engle and Granger, 1987). The cointegration test is done using the Johansen method. Johansen test uses trace statistical analysis and critical value at a confidence level = 5%. The null hypothesis is that if the trace statistic value is greater than the critical value at the confidence level = 5%, then there is cointegration. The cointegration test with the johansen method is as follows:

The trace statistics -

$$\lambda_{trace}(r) = -T \sum_{i=r+1}^k \ln(1 - \hat{\lambda}_i)$$

Vector Error Correction Model (VECM)

The VECM method is a derivative method of VAR. VECM is a form of VAR that is estimated because of the existence of data forms that are not stationary but cointegrated. VECM in estimating empirical phenomena can analyze both in the short and long term. VECM restricts the long-term relationships of endogenous variables to converge into their cointegration relationships, while still allowing short-term dynamisation. The VECM equation model is as follows:

$$\Delta PB Y = \alpha + \sum_{i=1}^m \beta_i \Delta PB Y_{t-i} + \sum_{j=1}^n \gamma_j \Delta JPX 1_{t-j} + \sum_{k=1}^o \delta_k \Delta JTX 2_{t-k} + \sum_{l=1}^p \lambda_l \Delta INFX 3_{t-l} + \theta ECT_{t-1} + \varepsilon$$

Where:

PBY	= Tax Property Revenue (Tax Receipts of Land and Building Rights Acquisition)
JPX1	= total population
JTX2	= Transaction Number
INFX3	= Inflation
ECT	= Error Correction Term

Impulse Response Functions (IRF)

The analysis in the IRF traces the impact of a shock to a variable on the system (all variables) over a period of time. In this case IRF is used to describe how the shock rate for a variable reacts to the response of other variables. IRF analysis results can also be used to determine the

length of impact of shocks from one variable to another (Pyndick and Rubinfeld, 1998; Tsay, 2014).

RESULTS AND DISCUSSION

Data Stationary Test

In the econometric testing using the Vector Error Correction Models (VECM) method, it must be tested against the unit roots. Stationary test data in this study uses the ADF unit root test to see whether the data used in this research is stationary or not stationary. Data is said to be stationary if the average value or variant of the time series data does not change systematically all the time or can be interpreted constant or fixed. The stationarity test carried out by the ADF test is done by comparing the ADF statistics with the MacKinnon critical value on the significance of 1%, 5%, and 10%.

Table 1 Test Results for Stationary Data Using the ADF Method

Variable	Stationarity: Level	Result	Stationarity: First Different	Result
PBY	1%,5%,10%	Stationary	1%,5%,10%	Stationary
JPX1	1%,5%,10%	Non Stationary	1%,5%,10%	Stationary
JTX2	1%,5%,10%	Stationary	1%,5%,10%	Stationary
INFX3	1%,5%,10%	Stationary	1%,5%,10%	Stationary

Based on the table above it can be concluded that at the level stationary test, all variables are not stationary at the same degree. Of all the above variables, only JPX1 variable is not stationary (contains root unit). Therefore it is tested stationarity at first differences level d (I)). The results show that all variables used in the study are stationary.

Cointegration Test

Data of the variables that were not initially stationary at stationary level but stationary at the first difference level were likely to occur cointegration, meaning that there was a long-term relationship between the two.

The Johansen cointegration test was conducted to determine the long-term consistency of the assumptions analysed. Relationships that affect each other can be seen from the cointegration that occurs among variables. If there is no cointegration occurs, then it will be tested using the Vector Autoregressive (VAR) model, but if there is cointegration in the analysed

data, it will use an alternative model analysis of VAR that is Vector Error Correction Model (VECM).

Table 2 Cointegration Test Results by Using Johansen Method

Cointegration Rank Test Using Trace			
H ₀ : Rank=r	H ₁ : Rank>r	Trace	5% Critical Value
0	0	76.44358	47.85613
1	1	48.39124	29.79707
2	2	24.90989	15.49471
3	3	8.391239	3.841466

The table above explains that Trace Statistic value is higher than its Critical Value. It means the null hypothesis (h₀) which states that no cointegration is rejected. The alternative hypothesis (h₁) that states the existence of cointegration cannot be rejected or accepted. Based on the above cointegration test results indicate that all variables have a relationship of stability/equilibrium and long-term movement in common. In other words, the variables used have long-term relationships (cointegration) with each other. In this case can be concluded that variable of the population, the variable of transaction amount and variable of inflation have a long-term relationship to tax revenue variable of BPHTB.

Vector Error Correction Model Estimation Test (VECM)

To know the short-run relationship among variables, parameter estimation is done using Vector Error Correction Model (VECM). This model is used because the observed variables do not contain the root of the unit (stationary) although on different degrees and cointegrate. From the data processing done give the result of equation in long term as follows:

$$\begin{aligned}
 \text{PBY}_{t-1} = & 0.00000000202 - 2400.7\text{JPX1}_{t-1} + 154239.8\text{JTX2}_{t-1} - 0.0000000113\text{INFX3}_{t-1} \\
 & [-3.81546] \quad [3.49764] \quad [-5.14937]
 \end{aligned}$$

Note: The number in parentheses shows the t statistic value

Based on the equation, in the long-term, there is a significant long-term relationship between population (JPX1), number of purchase transactions (JTX2) and regional inflation (INFX3). In this case, the direction of the population relationship and tax revenue BPHTB is negative. The relationship between the number of transactions with tax revenue BPHTB is positive, and the

relationship between inflation with tax revenue BPHTB is negative. The short-term relationship between the variables formulated as follows:

$$\begin{aligned} \Delta \text{PBY}_t = & -0.00383 \text{ECT}_t - 0.832391 \Delta \text{PBY}_{t-1} - 0.34349 \Delta \text{PBY}_{t-2} + 2548.222 \Delta \text{JPX1}_{t-1} \\ & [-0.17547] \quad [-3.12806] \quad [-1.25007] \quad [1.42588] \\ & -145.6124 \Delta \text{JPX1}_{t-2} + 3502.859 \Delta \text{JTX2}_{t-1} + 1684.411 \Delta \text{JTX2}_{t-2} \\ & [0.72508] \quad [-0.08127] \quad [0.38148] \\ & -203368.2 \Delta \text{INFX3}_{t-1} - 1934378 \Delta \text{INFX3}_{t-2} + 2717633 \\ & [-0.08863] \quad [-1.31843] \end{aligned}$$

Description:

Adj R^2 = 0.508

F count = 3.330566

The number in the period is a statistic t value.

Based on the estimation results using the VECM method, it can be concluded that the resulting VECM model has an error correction (ECT) coefficient of 0.003830 with a negative and insignificant sign. Among the available variables, only the previous BPHTB (ΔPBY_{t-1}) revenue variable (t-1) has a significant relationship and has a negative sign with BPHTB revenue for a certain time period (ΔPBY_t). The value of R^2_{Adj} is 0.508 0, which means that the variation in the BPHTB tax revenue variable can be explained by 50.8% in the variables of population, number of transactions and inflation in the region. While the remaining 49.2% variation in BPHTB revenue is explained by other variables that are not included in the regression equation model. The value of F test shows the level of significance simultaneously the relationship of population variable, the number of transactions and inflation with tax revenue BPHTB. Based on the value of Adj R2 and F statistic value indicates that the estimation model is fitted.

The empirical estimation results using the VECM method above show that the estimation of BPHTB tax revenue model in Malang City cannot be explained using exogenous variables of population, number of transactions and regional inflation. In this case the complexity that occurs in BPHTB tax revenue in the City of Malang requires identification and also detailed mapping of potential revenues. The growing development of Malang City in terms of population growth, economic activity, and public infrastructure can basically increase the potential of regional BPHTB tax revenue. However, the speed of regional economic growth cannot be offset by a significant increase in BPHTB tax revenue in the City of Malang. In the short term, existing exogenous variables are unable to contribute positively to BPHTB tax revenue in Malang City. The ECT coefficient results are negative but not statistically significant. This indicates that

existing exogenous variables cannot make adjustments from short-term to long-term to the endogenous variables. The existence of an imbalance that occurs cannot be immediately adjusted by the existing variables.

Theoretically, the existence of an increasing number of people can contribute to tax revenue. But this requires the requirements of the population in question productive and absorbed in the existing employment. Results of research conducted by Felix and Watkins (2013); Beznoska and Hentze (2017) reminded again of the importance of controlling population as well as the age of the population. In other words, uncontrolled population and unbalanced population age between children, adults and old age, this condition may reduce tax revenue in a country. However, on the other hand as stated in the theory of economic growth, it is stated clearly that the population in the category of productive labor is the main production factor in producing the economic output of a country (Lieberman and Kang, 2008)

In this case, the population in the working category has the purchasing power to fulfill the needs of goods and services. The need for ownership of residences is a priority for young families. The existence of permanent income owned by young workers will increase the demand for decent housing. In this case, the City of Malang as the City of Education and the City of Services has an increasingly modern regional economic development. The trade sector, food and beverage industry, hospitality and the construction sector are the leading sectors of Malang City. The growing economic sector will encourage increased population mobility. This will increase the need for shelter in both horizontal and vertical occupancy. The existence of permanent income owned by the population will have an impact on the number of residential transactions that tend to be higher transactions. This will encourage the realization of ownership of existing land and houses. So that this will increase BPHTB tax revenue in Malang City. The higher demand for housing both by indigenous people and by migrants can have an impact on the potential for increasing BPHTB tax revenues in Malang City.

Regional inflation basically reflects the increasing dynamics in relation to the availability of output with output demand. Theoretically based on the results of research by Lucotte (2012) and Radnia (2013) showed a significant influence between inflation and tax revenue. In the macroeconomic context, tax revenue basically reflects the fiscal capacity of a country. Increasing fiscal capacity is supported by the economic capacity of the population which is reflected by the level of income per capita. In the case of various countries, an increase in income is usually followed by an increasingly large marginal propensity to consumption (MPC). The increase in consumption that exceeds the availability of existing goods and services will cause inflation. Inflation that occurs can erode the income and purchasing power of the population. This can lead to reduced tax revenues.

Impulse Response Function (IRF)

The IRF results in this analysis indicate that the response to changes in exogenous variables to the indogenous variables does not show extreme development. There is only an extreme dynamics of the BPHTB tax revenue variable on the changes that occur in the inflation that develops in the City of Malang. The complete results of IRF can be seen in the following figure:

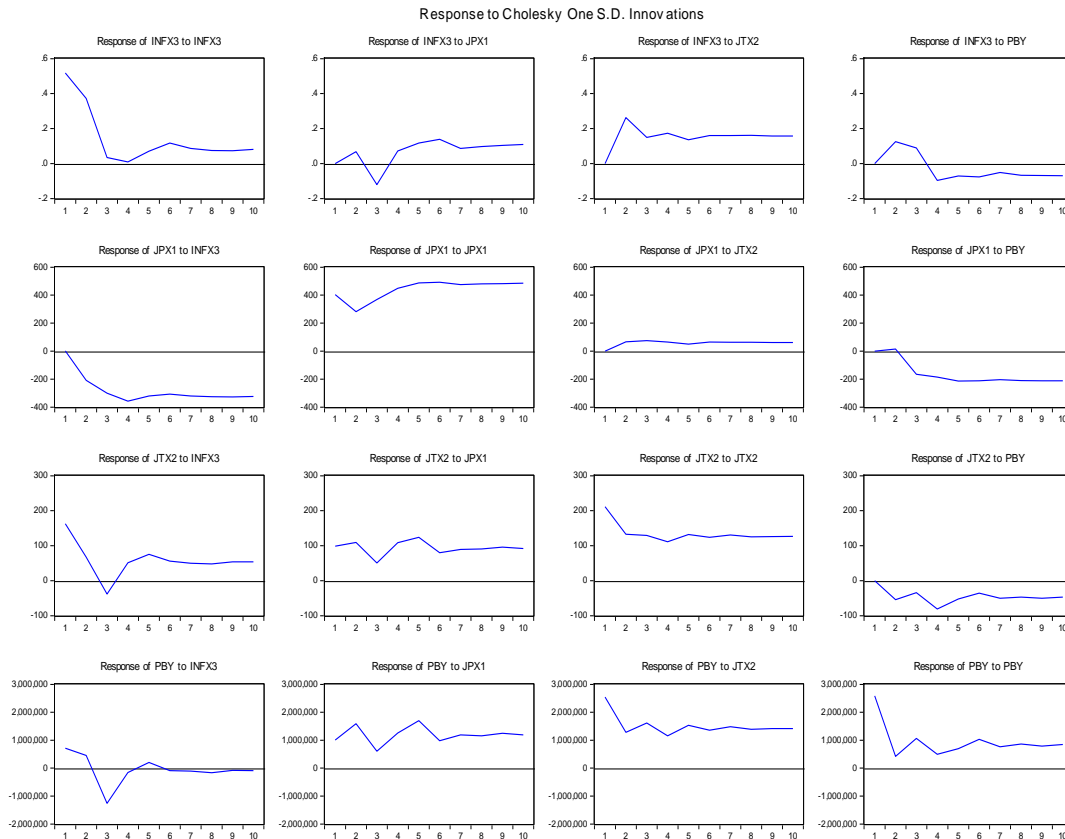


Figure 1. IRF Results on Changes in Exogenous Variables and Endogenous Variables

In this case the inflation change response (INFX3) occurs in period three where the impact of shock that occurs can be responded by tax revenue BPHTB. After the 3rd period, the shock that occurs in inflation relative does not affect the tax revenue BPHTB. While the shock that occurs in the variable population and the number of transactions relative no impact on tax revenue BPHTB. This happens because the changes caused by the two variables basically require a relatively longer time compared to changes that occur in inflation. In this case the dynamics that occur in inflation give significant effect on the condition of the economy. This is in line with the findings of a study conducted by Agbonlahor (2012) which concludes that inflation and money supply are two powerful policy instruments for promoting economic growth in the United Kingdom. In this case the stability that occurs in the regional economy will have an impact on

the running of the economy which will ultimately produce the output needed by the population. Economic stability will facilitate mapping and identification of potential taxation. In order to intensify the tax collection efforts, the city government of Malang formed an institution in the form of Regional Tax Service Agency (BP2D). The agency specifically handles local tax revenues through various policies, both intensive and extensive. The latest policy carried out by BP2D is to provide reward and punishment for taxpayers in fulfilling their tax obligations. As a result of existing policies indicates that in the development of tax revenues over a period of time, the realization of local tax revenues in Malang exceeded the target set by the city government.

CONCLUSION AND RECOMMENDATIONS

Based on the results of the data analysis it would be concluded that the variables population, the number of transactions, and inflation has a significant relationship with the variable tax revenue BPHTB in Malang City, East Java Province Indonesia. The population and inflation variables have a negative relationship with BPHTB tax revenue. The number of transactions has a positive relationship with BPHTB tax revenue. It also concluded that all exogenous variables do not have a significant relationship in the long run. In addition, the results of this study also resulted in the conclusion that the coefficient of ECT produced by the VECM model is negative and not statistically significant. This means that in the developed VECM model there is no process of adjusting the balance between exogenous variables and exogenous variables in the short run to the long term.

With regard to these results, it can be recommended that the policy of intensive coordination between the local government and the monetary authorities in order to control the existing inflation can maintain a balance between the increase in purchasing power and the ability to pay taxpayers. This can be done by controlling the price of basic commodities so that people's purchasing power can be maintained. In addition, population control can be conducted so that the growth of existing population is proportional to the availability of land for residential residents. Data collection on migrant populations needs to be intensified so that the potential for taxation can be mapped by age group, occupation type and income level of the population. Besides that, its important to other research to explore models of tax in regional economy with expand the time periods and relevant variable.

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