

## Determinant of gross regional domestic product (GRDP) in Yogyakarta special province

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### Article Info

#### Article history:

Received : 10 June 2014

Accepted : 5 August 2014

Published : 1 October 2014

#### Keywords:

GRDP, employment, investment, number of tourists

#### JEL Classification:

E60, E61, P24

#### DOI:

<http://dx.doi.org/10.20885/ejem.vol6.iss2.art6>

### Abstract

The aim of this study is to analyze the influence of employment, investment and the number of tourists towards GRDP in Yogyakarta. The data used in this research is a time series data for the period of 1999-2013. This research employed multiple regression and dynamic regression, namely partial adjustment model. The multiple regression estimation shows that employment has negative effect to GRDP, meanwhile the investment and the number of tourists have a positive relation towards dependent variable. Moreover, based on partial adjustment model, adjustment process also influences the output accumulation in Yogyakarta. Therefore, to develop the local economy, the government may invite more tourists as well as increase investment in Yogyakarta.

### Abstrak

Tujuan penelitian ini adalah menganalisis pengaruh jumlah orang bekerja, investasi dan jumlah wisatawan terhadap PDRB harga konstan di Yogyakarta. Data yang digunakan dalam analisis ini adalah data runtut waktu (*time series*) pada periode 1999-2013. Penelitian ini menggunakan metode regresi berganda dan regresi dinamis model penyesuaian parsial. Hasilnya analisis regresi berganda menunjukkan bahwa jumlah orang bekerja berpengaruh signifikan dan negatif terhadap PDRB, sedangkan investasi dan jumlah wisatawan berpengaruh signifikan dan positif terhadap PDRB. Selanjutnya, berdasarkan model penyesuaian parsial, terjadi proses penyesuaian yang tinggi pada akumulasi PDRB. Untuk meningkatkan perekonomian lokal, pemerintah daerah perlu mengundang wisatawan lebih banyak, dan juga meningkatkan investasi di Yogyakarta.

### Introduction

The role of GRDP is very important in macro-economic analysis. The main economic indicator such as GRDP can be used as an indicator of macro economic performance in the local economy. The GRDP in Yogyakarta Special Province (DIY) from 2007 to 2013 shows an increasing tendency. This indicates that the economic performance of Yogyakarta is improving in this period.

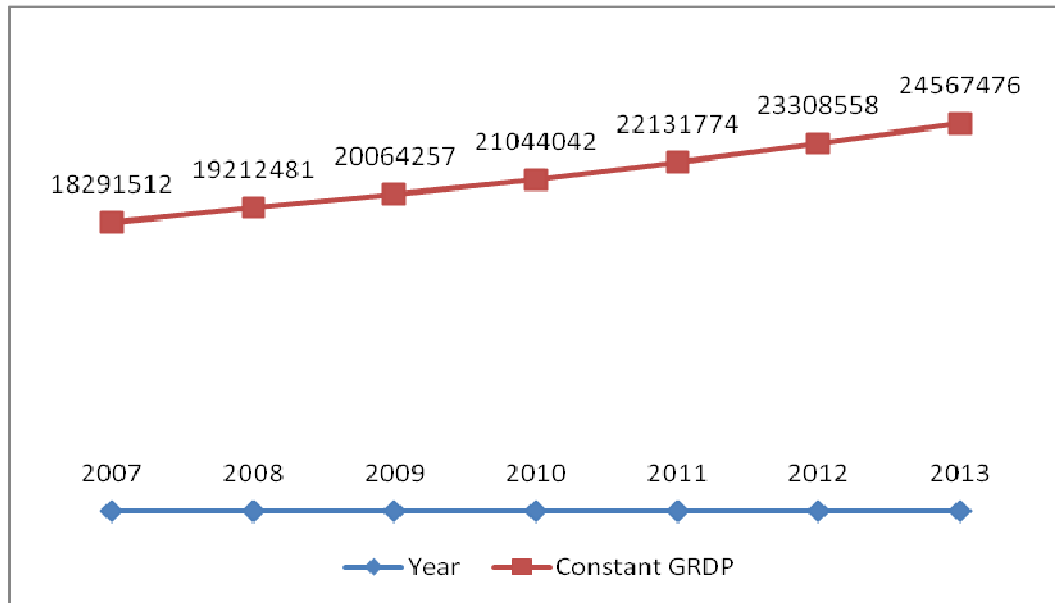
Despite the increasing of the constant GRDP of Yogyakarta at 2000, the contribution of income in Yogyakarta to

the national income tends to decline. In the year 2007 the income contribution of Yogyakarta to national is 0.931%, in 2009 it was declining to 0.921%, while in 2011 it was 0.898% and in 2013 it kept decreasing to only 0.887%.

Investment is an essential factor for the process of economic development. Economic development involves the activities of production (goods and services) in all sectors. Production activities will create employment opportunities and will encourage public revenue, which create or increase the demand in the market. When the

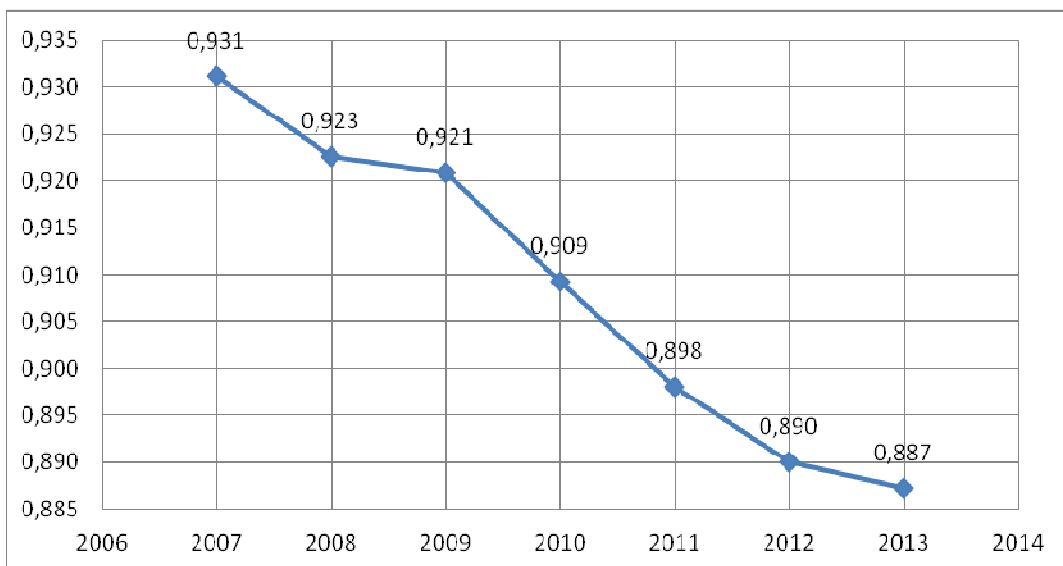
market is growing, it means the volume of production activities are increasing, and it will increase the employment and income of the country. Thus it will create economic development in Yogyakarta and around the area. Omankhalen (2012) stated that investment and GRDP is the indicators that can be used to measure to level of economic performance.

Based on the data of approval investment in Yogyakarta during 2007-2013, it shows the tendency of a significant increase. Despite the increase in the number of substantial investment each year in Yogyakarta, it still needs a further study of the impact on the GRDP in Yogyakarta. It is possible that a misallocation of investment results less significant effect on the regional economic development.



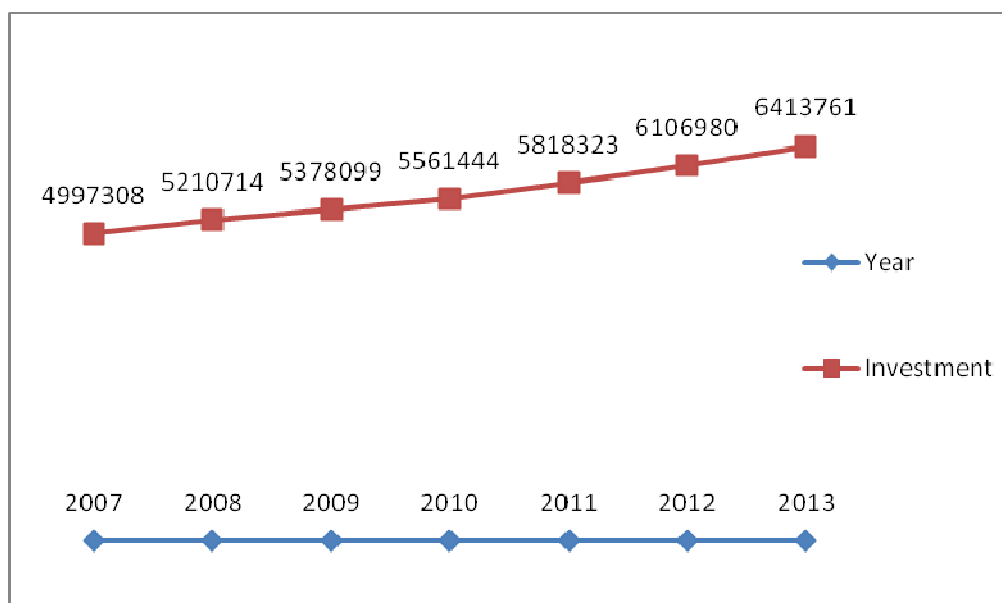
Source: Central Bureau of Statistics, 2008-2014.

**Figure 1:** GRDP in Yogyakarta, 2007-2013 (Rp. Million)



Source: Central Bureau of Statistics, 2008-2014.

**Figure 2:** Contribution of Yogyakarta GRDP to National Income (%), 2007-2013



Source: Central Bureau of Statistics, 2008-2014.

**Figure 3:** Investment in Yogyakarta, 2007-2013 (Rp. Million)

As a second main destination after Bali, Yogyakarta has several plenty of tourism attractions and events which are continually developed by the government. According to Ekanayake (2012), the tourism sector is one of the most forceful service industries to improve in a current global economic condition. The growth of tourists who come to Yogyakarta shows that during 1999-2013 is in a fluctuation with tendency to increase. As an illustration, in 2005 the number of tourists visited Yogyakarta is 5,070,946 people, and in 2006 it experienced a decline to only 2,403,837 people.

Through hard efforts of all parties to manage the attractions and tourist events in Yogyakarta, in 2007 the statistics of tourists visited Yogyakarta was rapidly increasing to 5,249,738 people. This number is constantly rising following the improvement of the facilities in and to the tourist attractions, as well as the additions of cultural events and a massive promotion of Yogyakarta tourism, so that in 2013 the number of tourists visited Yogyakarta has significantly increased to 11,666,232 people. The visit of tourists certainly will create an income specifically to the area with the tourism attractions and events.

Some plenty of economic sectors directly and indirectly will have influenced to the tourism objects, the income of the local citizens the tourism activities, transportations sector, telecommunications, banking, as well as income in other sectors.

This study is interested to analyze the influence of employment, investment and number of tourists towards the GRDP in Yogyakarta. This study is necessary not only to discover its influence and role in the economic development represented by the GRDP, but also to be a basis of policy making regarding the effort to improve the GRDP in Yogyakarta.

**Literature Review**

As one of the measurements in economic development, GRDP is a useful indicator to learn about the productivities of the local economy, especially to measure the output and economic growth (Chamberlin, 2010). Jurun & Pivac (2011) have conducted a comparative study regarding GRDP in Croatia. The country is divided into three parts, with areas separated based on geography and politics instead of social and economic factors. This research discovered

that the GRDP per capita in all three areas were influenced by several factors such as labor force, investment, agricultural production, the value of construction work, exports, imports, foreign tourists visits, and so on.

Juessen (2009) used the non-parametric technique of research to study about the GRDP convergence in Germany, and according to his result the convergence of GRDP in Germany is very substantial. The convergence of GRDP in Germany is uniting the calculation of GRDP in both areas which are Western Germany and Eastern Germany. Afterwards, in the early years after the unification of the Western and Eastern Germany, the distribution of GDP there is divided based on the characteristics of two capitals. The aim of the unification of GRDP is to improve the economic development in both areas.

Ying & Riming (2008) have also studied about GRDP in China, which aimed to simulate foreign trade, FDI, and GRDP as well as to explore the significance of both variables towards GRDP in China. The result is that new evidence has been found that with PMA and diverse foreign trade, the margin of GRDP in several areas in China is positive. The simulation result also showed that an economic decentralization happened in the several areas of the country.

According to Law No. 13 of 2003 on Labor, the definition of labor force is each of which is able to work in order to produce goods and services to meet their own needs as well as to the public. The Central Bureau of Statistics defined working as population aged 15 years and older who engage in economic activities with a view to obtain or help earn income or profit, at least carried out for 1 hour (uninterrupted) in the past week. The past week is a period of seven consecutive days which ends a day prior to the date of enumeration.

The relationship between labor force and the GRDP growth have been

stated by Thompson & Merchant (2011) which studied a few automotive manufacture industries in the United States. The automotive industry in the US is divided into three categories, namely the Motor Vehicle Manufacturing industry, Motor Vehicle Body and Trailer and Motor Vehicle Parts. The result, it is discovered that there is a trend of decline simultaneously in the number of labors and the volatility growth or GDP between the period of 1998-2008. The researchers also stated that in the same period, the growth of the rival automotive industries from Japan has also shown a positive trend.

Sawtelle (2007) also studied about the phenomenon of jobless recovery happened to the US economy a while ago, his research showed that the real GDP and the number of labors have a negative elasticity correlation. While Rispoli (2009), in his research discussed about the trend of relationship between private labors and GDP, and discovered a different result from Sawtelle's. Rispoli found that the number of labors in private sectors has a strong positive influence for the growth of GDP.

The influence of the number of labors towards the GDP is also found negative by Magazzino (2014). The research was using the time series method to measure the relationship between causalities of the electricity energy usage, Real GDP Per Capita, and the number of labor in Italy during the period of 1970-2009. The estimated result illustrated the relationship of causalities between the three variables, in the long term the number of labors and the usage of electricity energy have a negative influence to GDP.

Theoretically, investment is defined as expenditure for procurement of capital goods including: manufacture own, the purchase of new capital goods from domestic and new or used capital goods from abroad, after being reduced of capital goods sold or given to other parties. Capital goods are goods or equipment used in the produc-

tion process and has a service life of one year or more (referred to as fixed capital goods; while gross reflect that calculation of investment has not yet reduced by the depreciation of capital goods). The research about investment mainly found in the economic literature review in various countries by several researchers. Such as Chamberlin (2010), and Awan, Khan, & Zaman (2011).

Chamberlin (2010) in his article stated that when a recession took place in England, the nett of export had a positive contribution to the economic growth. Even by the end of the economic recession, such contribution has become more significant. Further more, Chamberlin said that such phenomenon described the existence of a bigger domestic expense resulted from the household consumption and the investment that had a positive influence towards the economic growth.

Awan, Khan & Zaman (2011) have done a research about the influence of macro-economic variable which consist of investment, trade openness, and per capita income. Using the time series method from the period of 1996 Q1 – 2008 Q4, the research discovered that trade openness and per capita income variables have a positive influence towards foreign investments in Pakistan.

Stoilova (2013) has conducted a study related to the tourists influence to economic growth in Bulgaria in the period of 1998-2013. In the study Stoilova concluded that the number of tourists visited Bulgaria has a contribution to the economy, however such contribution does not occur on an ongoing basis. A different approach needs to be done especially in terms of the impact of environmental, social and pressures to the economy.

Similar research has also been conducted by Bulin, Miru, & Gheorghe (2014) in the countries around the Black Sea. The conclusion of the research is that the number of tourists has a positive influence to the economic condition there reflected by the GDP. While He & Zheng (2011) and

Shuxin (2011) found similarly that the visit of tourists has a positive influence to the economic growth and development. The result was also conducted in Sinchuan during the period of 1990-2009 and in China during 1996-2008. The local government confirmed that tourism sector is one of six biggest sectors to contribute to the development of the area.

Research conducted in Malaysia by Kadir & Karim (2012) concluded the existence of causalities relationship between the country's income from the foreign visitors with the real economic growth. The result of the research used the regression analysis of data panel has also proved that the visit of tourists had a positive influence and was significant to the real economic growth of the country. Another research concluding that the tourists visit can increase the regional economic growth is Abankina (2013) which conducted the research in Germany, England, and Russia.

Various experts stated that tourism is an effective way in creating job opportunities, encouraging economic growth, and decreasing poverty (Bob, Ghita, & Saseanu, 2010). However, tourists visit can also cause a problem such as the one found by Hall & James (2011) in their research which stated that the foreign visitors can increase the risk of infected disease to the destination countries.

According to the mentioned literatures, we develop a simple model of GRDP which is symbolized by Y as follow:

$$Y = f(X_1, X_2, X_3) \quad (1)$$

where:

Y = constant GRDP (million rupiah)

X1 = labor (person)

X2 = investment (million rupiah)

X3 = number of tourists (person)

## Research Methods

This research used multiple regression and partial adjustment to estimate the equation

1. Multiple regression is a simple model to estimate the respond of independent variables to dependent variable under the static linear relationship. Meanwhile, partial adjustment model is used to cover the role of dynamic relationship among these variables.

### 1. Multiple Regression

Based on the theoretical model which is stated in equation 1, then the econometric model is developed as follows:

$$Y_t = \alpha_0 + \alpha_1 X_{1t} + \alpha_2 X_{2t} + \alpha_3 X_{3t} + e_t \quad (2)$$

As usual, it has constant ( $\alpha_0$ ) and three coefficients  $\alpha_1$ ,  $\alpha_2$ , and  $\alpha_3$ , meanwhile  $e_t$  is residual.

### 2. Partial Adjustment Model

Following Feige (1966), partial adjustment model may cover the dynamic relationship between one and more independent variables and a dependent variable in the regression. To develop the econometric model, the economy can be assumed in disequilibrium condition. The output or GRDP which symbolized by  $Y_t$  will be different from the planned yearly. In the case of GRDP, it may consider the following cost function ( $C_t$ ):

$$C_t = b_1(Y_t - Y_t^*)^2 + b_2(Y_t - Y_{t-1})^2 \quad (3)$$

Where,  $b_1 + b_2 = 1$

Where,  $Y_t$  is actual GRDP, and  $Y_t^*$  is long run desired GRDP. The first component of  $C_t$  is disequilibrium loss with coefficient  $b_1$ , meanwhile the second one is adjustment loss with coefficient  $b_2$ . Minimization of  $C_t$  with respect of  $Y_t$  gives:

$$(\delta C_t / \delta Y_t) = 0$$

$$2b_1(Y_t - Y_t^*) + 2b_2(Y_t - Y_{t-1}) = 0$$

$$(b_1 + b_2) Y_t = b_1 Y_t^* - b_2 Y_{t-1}$$

$$Y_t = [b_1 / (b_1 + b_2)] Y_t^* - [b_2 / (b_1 + b_2)] Y_{t-1}$$

If  $\lambda = b_1 / (b_1 + b_2)$ , then GRDP model can be written as follows:

$$Y_t = \lambda Y_t^* + (1 - \lambda) Y_{t-1} \quad (4)$$

where  $0 < \lambda < 1$

Equation (4) reflects the short term relationship between long run desired GRDP and lag of GRDP as independent variables with actual GRDP as a dependent variable. According to equation 1, the GRDP or  $Y_t$ , depends on labor ( $X_1$ ), investment ( $X_2$ ), and number of tourists ( $X_3$ ). The long run model can be written as follows:

$$Y_t^* = \alpha_0 + \alpha_1 X_{1t} + \alpha_2 X_{2t} + \alpha_3 X_{3t} + e_t \quad (5)$$

Substituting equation (5) into equation (4) gives:

$$Y_t = \varepsilon_0 + \varepsilon_1 X_{1t} + \varepsilon_2 X_{2t} + \varepsilon_3 X_{3t} + \varepsilon_4 Y_{t-1} + v_t \quad (6)$$

where,

$$\lambda = b_1 / (b_1 + b_2)$$

$$\varepsilon_4 = (1 - \lambda)$$

$$\alpha_0 = \varepsilon_0 / \lambda$$

$$\alpha_1 = \varepsilon_1 / \lambda$$

$$\alpha_2 = \varepsilon_2 / \lambda$$

$$\alpha_3 = \varepsilon_3 / \lambda$$

$$v_t = \text{error term}$$

The equation 6 is estimable model using ordinary least square (OLS). Therefore, this research provides empirical model based on this equation.

## Result and Discussion

From the multiple regression result, it can be concluded that the labor variable has a negative significant influence to the constant GRDP of Yogyakarta. The result of this study supports the finding by Sawtelle

(2007), Magazzino (2014). While for the variable of investment and the number of tourists have a positive significant influence to the GRDP. The positive relationship of this research is similar to the previous studies by Chamberlin (2010), Stoilova (2013), Bulin, Miru, & Gheorghe (2014), He & Zheng (2011), Shuxin (2011), Kadir & Karim (2012), and Abankina (2013).

The empirical model based on partial adjustment model give a different result. All independent variables do not affect significantly to the GRDP. The coefficient of lag of dependent variable ( $GRDP_{t-1}$ ) shows a significant relation to the actual GRDP. It means that the adjustment process also work in the output accumulation in Yogyakarta. Therefore, the discussion of the empirical model of GRDP, especially explaining the relationship be-

tween independent variable and dependent variable will be based on the model using multiple regression.

Simultaneously the variables of number of employment, investment and number of tourists have a significant influence to the constant GRDP in DIY. It means that from the multiple regression, it can be concluded that the development of the employment number has to be followed by the rising of other variables (investment and number of tourists), so that the increasing number of labors can increase the GRDP in Yogyakarta. This happened because the employment coefficient is -5.64196. It means the increase of 1 person labor then it will cause the decrease of constant GRDP for 5.64196 million rupiah. From the economic perspective, the condition describes the low quality of labor force in Yogyakarta.

**Table 1:** Result of Multiple Regression Analysis

Variable	Coefficient	t-Statistic	Prob.
C	9475951.	4.434071	0.0010*
X1 <sub>t</sub>	-5.641963	-3.256816	0.0076*
X2 <sub>t</sub>	3.615737	15.12322	0.0000*
X3 <sub>t</sub>	0.192996	3.672579	0.0037*
R-squared		0.992001	
Adjusted R-squared		0.989820	
F-statistic		454.7268	
Prob (F-statistic)		0.000000*	

Note: \* is significant at 5% level significance.

**Table 2:** Result of Partial Adjustment Model

Variable	Coefficient	t-Statistic	Prob.
C	81391.08	0.117863	0.9088
X1 <sub>t</sub>	-0.266108	-0.563794	0.5867
X2 <sub>t</sub>	-0.052999	-0.262118	0.7991
X3 <sub>t</sub>	0.021285	1.635509	0.1364
Y <sub>t-1</sub>	1.075381	18.21937	0.0000*
R-squared		0.999767	
Adjusted R-squared		0.999663	
F-statistic		9636.348	
Prob (F-statistic)		0.000000*	

Note: \* is significant at 5% level significance

Aside from that, a change of economic structure has happened in Yogyakarta. This is reflected from the decrease in the role of agriculture and increasing role of the non-agricultural sector in contributing to the GRDP of Yogyakarta. Such condition is causing the transition of employment opportunity development from the agricultural sector to the non-agricultural sectors. However, the transition of job opportunity to the non-agricultural sectors will not be able to accommodate the shift of workers from the agricultural sector as well as new entrants into the labor force in non-agricultural sector. This happens due to the immature state of the workforce with the skills of the labor required for the non-agricultural sectors. As a result, the addition of labor that goes into the agricultural sector will have a lower productivity.

The coefficient of investment is 3.6157, it shows the significant role to GRDP. The GRDP will increase as much as 3.6157 million rupiah, if the investment increases for 1 million rupiah. This shows the important role of investment to GRDP improvement. It means that a good investment allocation is able to accelerate the economic sectors. Investment becomes a dominant variable of increasing the GRDP in Yogyakarta, since it has the biggest elasticity comparing to other independent variables. This means that the effort to create a better investment climate needs to be improved and upgraded so investors will be interested and willing to invest their funds in various productive sectors in DIY. Therefore, the economic activities in Yogyakarta will improve significantly.

The result of regression shows the coefficient of the tourist number is 0.192996. This has an important meaning of the GRDP change as an effect of the changing of the number of tourists. GRDP will increase for 0.192996 million rupiah, if the number of tourists in Yogyakarta increase for 1 person. Therefore, the government, private sectors, as well as the citizens of

Yogyakarta have to work hard to improve the number of tourist visits to Yogyakarta in order to increase the GRDP.

From economic aspect, the government of Yogyakarta has to continuously improve the investment and be able to encourage the increase of tourists to visit Yogyakarta in order to increase the GRDP. If investment and the number of tourists visit Yogyakarta increase, then it will push the increase of GRDP. Certainly, the increase of GRDP is the result of rising in investment and the number of tourists in Yogyakarta.

Overall, the role of investment as well as the number of tourist visits to Yogyakarta is highly essential in increasing the GRDP of Yogyakarta. Investment can increase the output resulted by the sectors with investments and the number of tourists will be able to encourage economic activities to the sectors related to tourism, such as trade sectors, hotels and restaurants, transportation and communication sectors, as well as other services.

Tourists who come to Yogyakarta may enjoy several attractions such as natural and temple attractions, look for and enjoy the performance and events of art and cultural. The performance of the cultural arts aside being favored by foreign tourists, are also favored by tourists from other regions who want to see the special attractions in some area. Yogyakarta consists of 4 (four) districts which are Sleman, Bantul, Kulon Progo, and Gunung Kidul as well as 1 city of Yogyakarta. Most of this region have a various attractions. The variety and quality of the tourism attractions as well as the cultural art performance will be able to attract tourists and will prolong their stay in Yogyakarta.

The district of Sleman has special traditional ceremonies that are interesting such as traditional ceremony of Saparan Bekakak; Labuhan Merapi, dan Ki Ageng Wonolelo which always attracts many tourists. The district of Bantul has a special art



which is Reog Wayang, Montro Projotamansari dance; and Nini Thowong. Similarly, the district of Kulon Progo has an art performance of Krumpyung which is qualified as an international level of art. Angguk Putri and Ketoprak Lesung are also very well-known. The district of Gunung Kidul has a special art performance of Kethek Ogleng dance and Topeng dance. While the city of Yogyakarta regularly conducts Sekaten ceremony and Grebeg Maulud, as well as Siraman Pusaka Kraton Ngayogyakarta.

### Conclusion

The result of this research shows that the variable of investment as well as the number of tourists visit in Yogyakarta has an important role in improving the GRDP in Yogyakarta. Investment growth can increase the output from other sectors, while the number of tourist are able to encourage the additional economic activities in other sectors which relate to tourism sector, such as trade sectors, hotels and restaurants; transportation and communication; as well as service sectors.

An economic structure in Yogyakarta has changed which is reflected from the decline of the role of agricultural sector and the increase of the role of non-agricultural sectors in contributing for the GRDP of Yogyakarta. Such condition caused a transition in the development of job opportunity from the agricultural sector to the non-agricultural sectors. The quality of labor in the agricultural sector is decreasing which cause a negative impact to the GRDP of Yogyakarta.

Recommendation based on this research is that the government of Yogyakarta and private sectors need to improve the investment and encourage the increase of tourists to visit Yogyakarta so that it will increase the constant GRDP in Yogyakarta. The increase of investment also needs to allocate to the district/city in order to reduce the development gap among the re-

gions. Conducive investment climate should be developed in Yogyakarta through improving services quality for investors. Improvement of the quality of attractions as well as the performance of cultural arts in Yogyakarta should be continued and supported by other sectors such as transport, telephones, banks, hotels and restaurants are getting better quality and service, since it will be able to attract greater number of tourists to come to Yogyakarta. The synergy among institutions, government and the private sectors in improving the public service quality to all stakeholders will be important in increasing the GRDP in Yogyakarta.

### Acknowledgement

The author would like to express gratitude to Bappeda DIY for supporting the raw data and the funding of this research.

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