# Determinants of Unemployment in Regency/ City in Special Province Yogyakarta

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**Abstract:**

*This study analyzed the determinants of unemployment in Special Province Yogyakarta (DIY), partially and simultaneously using panel data regression analysis with data from five regencies/city in DIY from 2010 to 2015.*

*The results indicate that the wage partially has negative and significant impact to unemployment but population variables partially has positive and significant impact to unemployment of regencies/ city in DIY. Variables of education and economic growth partially do not have positive and significant effects for unemployment (UNEM) in DIY.*

*Meanwhile simultaneously the variables Education (EDU), Wage (WG), Population (POP) and Economic Growth (EG) have a significant effect on the unemployment in DIY.*


**Keywords:** *Unemployment, Education, Wage, Population, Economic Growth.*

**JEL code:** *J64.*

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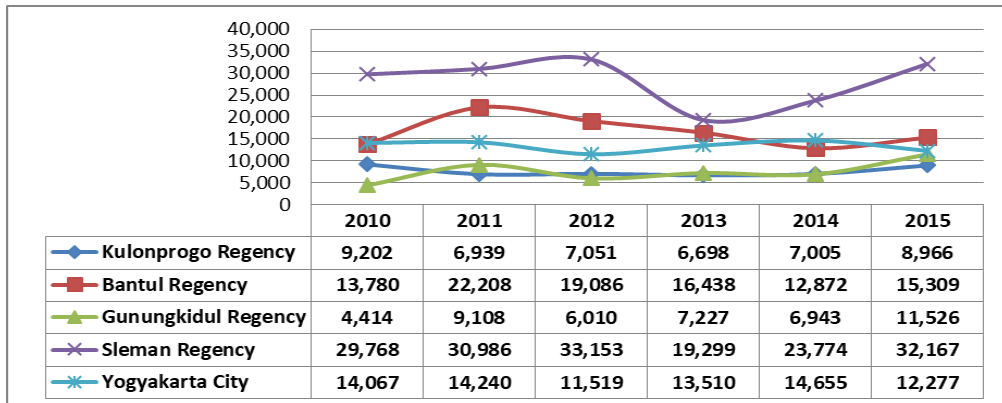[1]*Faculty of Economics, Islamic University of Indonesia,  nur.feriyanto@uii.ac.id*

## 1. Introduction

Unemployment become one of concerning issues in economic studies. In view of Ordine and Rose (2015) who investigate about years of study of labors, prospective labors who have longer years of study (educational mismatch or overeducation) are having the highest possibility to become unemployed rather than those who graduate on time. The cause is supplier in labor market prefer to select candidates who graduated on time. Unemployment becomes burden in the development of DIY province which has four regencies (Gunungkidul, Kulonprogo, Sleman, and Bantul) and one city, Yogyakarta. Each regency and city have a different number of unemployment and the change rate as a result of their own development progress. Labor forces who unemployed are burdening regional development due to their incapability to contribute in economy development by producing output to the economy while they consume and request for public services.

The growth of unemployment in DIY during 2010-2015 are categorized into two. First, regencies/city which had decreasing growth of unemployment. Those are Kulonprogo regency and Yogyakarta city. Both showed the success of government's policy implementation in reducing number of unemployment. In 2010, the number of unemployment in Kulonprogo regency was 9,202. It decreased to 6,698 in 2013 then shrinking to 8,966 in 2015. On the other hand, Yogyakarta city had 14,067 unemployments in 2010 which decreased to 13,510 in 2013. In 2015, this number declined to 12,277 people. Second category is regencies which had increasing growth of unemployment. Bantul, Gunung Kidul, and Sleman regency are part of it. In 2010, Bantul regency had number of 13,780 unemployment which grew to 16,438 people in 2013. The number increased in 2015 to 15,309 people. Furthermore, in Gunungkidul regency, the number of unemployment also rose from 4,414 people in 2010 to 7,227 people in 2013. It escalated to 11,526 people in 2015. Besides that, Sleman regency had the highest number and growth of unemployment in DIY. In 2010, the number of unemployment in the regency was 29,768 people and grew significantly to 32,167 people in 2015. The three regencies need to seriously reduce the number of unemployment for better improvement in their economy development.
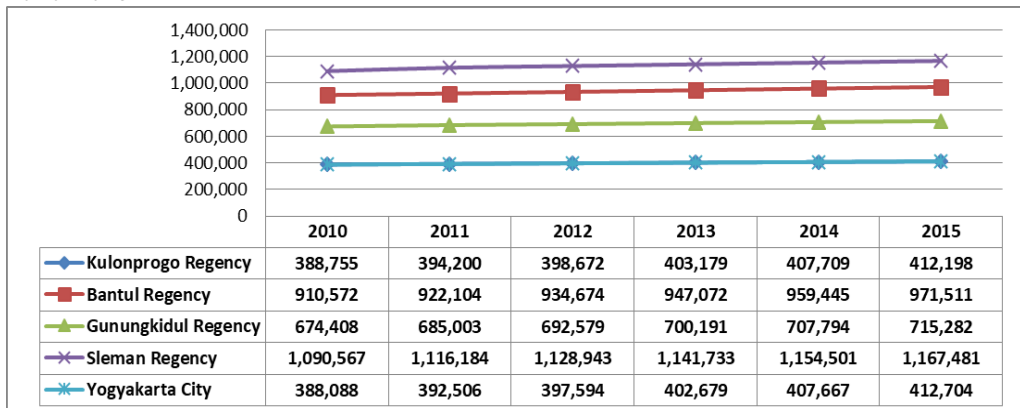
Some studies find that population is one of determinants of unemployment. An increase in population will lead to a raise in the labor force. If the growth of labor force can not be absorbed by employment then the number of unemployment will rise. Generally, population number in DIY tend to grow due to birth and improvement in quality of health. Sleman regency had the highest population in DIY with 1,090,567 people in 2010 which rose to 1,141,733 people in 2013 and grew to 1,167,481 people in 2015. In contrast, Kulonprogo regency had the lowest population in DIY with only 388,755 people in 2010. The number increased to 403,179 people in 2013 and rose to 412,198 people in 2015 (Figure 2).

**Figure 1**. *The Development of Unemployment of Regencies/ City (person) in DIY Year 2010-2015*

| | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|
| Kulonprogo Regency | 9,202 | 6,939 | 7,051 | 6,698 | 7,005 | 8,966 |
| Bantul Regency | 13,780 | 22,208 | 19,086 | 16,438 | 12,872 | 15,309 |
| Gunungkidul Regency | 4,414 | 9,108 | 6,010 | 7,227 | 6,943 | 11,526 |
| Sleman Regency | 29,768 | 30,986 | 33,153 | 19,299 | 23,774 | 32,167 |
| Yogyakarta City | 14,067 | 14,240 | 11,519 | 13,510 | 14,655 | 12,277 |

*Source: Central Bureau of Statistics, DIY.*

**Figure 2.** *The Development of Population (person) of Regencies/ City in DIY Year 2010-2015*

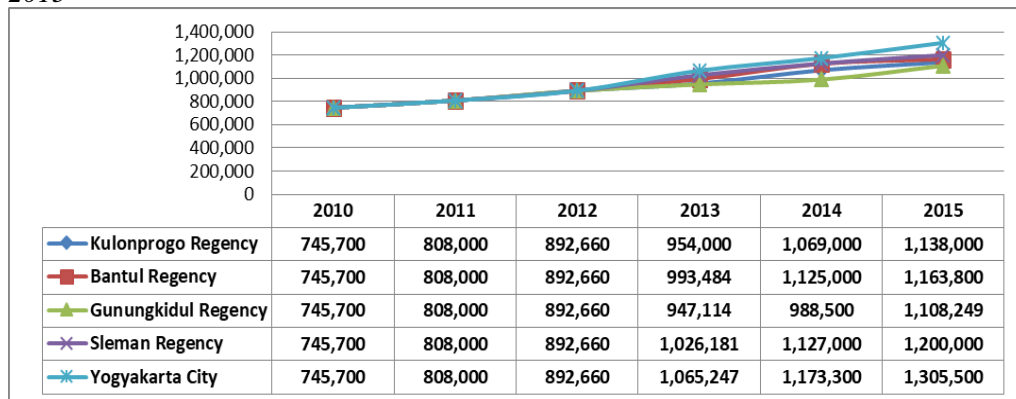| | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|
| Kulonprogo Regency | 388,755 | 394,200 | 398,672 | 403,179 | 407,709 | 412,198 |
| Bantul Regency | 910,572 | 922,104 | 934,674 | 947,072 | 959,445 | 971,511 |
| Gunungkidul Regency | 674,408 | 685,003 | 692,579 | 700,191 | 707,794 | 715,282 |
| Sleman Regency | 1,090,567 | 1,116,184 | 1,128,943 | 1,141,733 | 1,154,501 | 1,167,481 |
| Yogyakarta City | 388,088 | 392,506 | 397,594 | 402,679 | 407,667 | 412,704 |

*Source: Central Bureau of Statistics, DIY.*

Despite its status as a service retribution, wage is used by labor as their income source. DIY province applied wage system called Provincial Minimum Wage (Upah Minimum Provinsi =UMP) until 2012. The system made each regencies and city in DIY to have a same wage rate. However, in 2013, there was a policy change in which the use of UMP was replaced by Regency/ city Minimum Wage (Upah Minimum Kabupaten/Kota = UMK). The new policy differed the wage rate between regencies and city in DIY.

During period of 2013-2015, Yogyakarta city offered the highest UMK with IDR 1,065,247. The nominal grew to IDR 1,173,300 in 2014 then to IDR 1,305,500 in 2015. In opposition to that, Gunungkidul regency has the lowest UMK with IDR 947,114 in 2013. It increased to IDR 988,500 in 2014 and raised to IDR 1,108,249 in 2015. The difference of UMK between regencies and city is due to local

government policy. The government consider some factors such as inflation rate, business activity, and employment market in the regency or city as policy input (Figure 3).

**Figure 3.** *The Development of Wage (IDR) of Regencies/ City  in DIY Year 2010-2015*

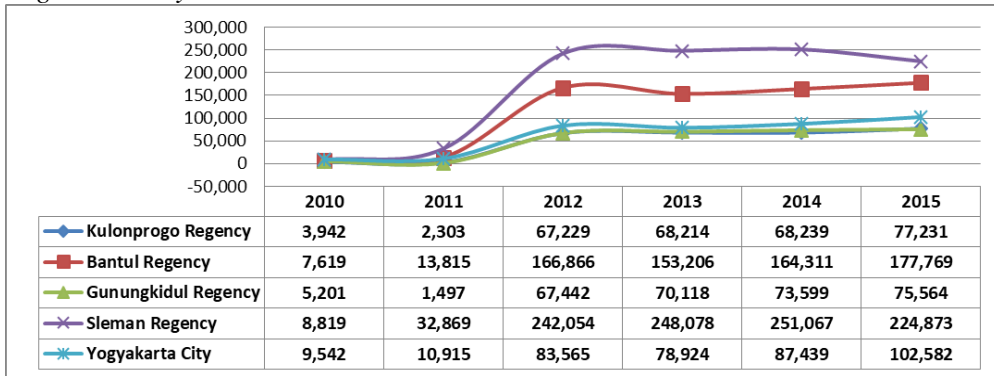| | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|
| Kulonprogo Regency | 745,700 | 808,000 | 892,660 | 954,000 | 1,069,000 | 1,138,000 |
| Bantul Regency | 745,700 | 808,000 | 892,660 | 993,484 | 1,125,000 | 1,163,800 |
| Gunungkidul Regency | 745,700 | 808,000 | 892,660 | 947,114 | 988,500 | 1,108,249 |
| Sleman Regency | 745,700 | 808,000 | 892,660 | 1,026,181 | 1,127,000 | 1,200,000 |
| Yogyakarta City | 745,700 | 808,000 | 892,660 | 1,065,247 | 1,173,300 | 1,305,500 |

*Source: Central Bureau of Statistics, DIY.*

Number of high school graduates is used to indicate a quality of human resources in a region. The availability of high school graduates is expected to improve labor productivity and fulfill the demand in labor market. However, not every enterprise participate in demand of human resources with secondary or tertiary education. It is due to the availability of specific job tasks. DIY is a province which has the number of SMEs bigger than big enterprise. Outputs from SMEs in DIY is handcrafting products which need labor with creativity and skills.

The growth of high school graduates in DIY shows significant growth rate in all regencies and city. It is due to the fact that DIY has numerous well-known high schools and universities which put the province as destination for other students outside the province to study. Aside from that, there is an essential role of nine-year compulsary education policy behind the significant growth. Sleman regency has the highest number of high school graduates while Gunungkidul regency has the lowest. In 2015, the high school graduates in Sleman were 224,873 people. The number was followed by Bantul regency with 177,769 people, Yogyakarta city with 102,582 people, Kulonprogo regency with 77,231 people, and the last Gunungkidul regency with 75,564 people (Figure 4).
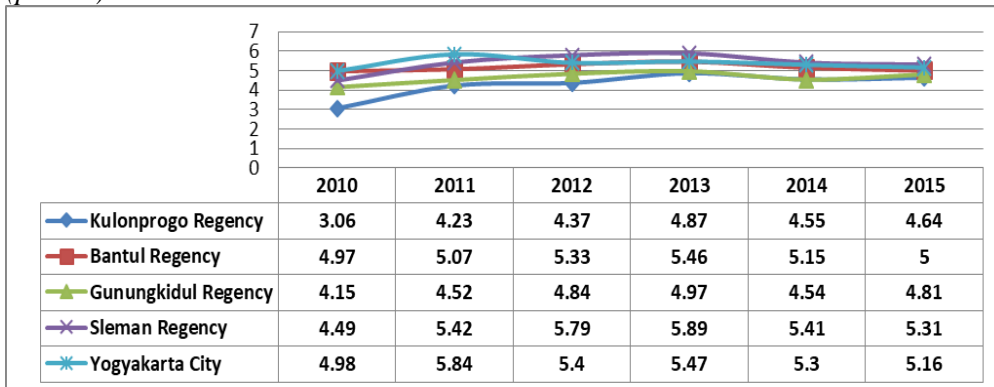
**Figure 4**. *The Development of Number of High School Graduates (person) of Regencies/ City in DIY Year 2010-2015*

| | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|
| Kulonprogo Regency | 3,942 | 2,303 | 67,229 | 68,214 | 68,239 | 77,231 |
| Bantul Regency | 7,619 | 13,815 | 166,866 | 153,206 | 164,311 | 177,769 |
| Gunungkidul Regency | 5,201 | 1,497 | 67,442 | 70,118 | 73,599 | 75,564 |
| Sleman Regency | 8,819 | 32,869 | 242,054 | 248,078 | 251,067 | 224,873 |
| Yogyakarta City | 9,542 | 10,915 | 83,565 | 78,924 | 87,439 | 102,582 |

*Source: Central Bureau of Statistics, DIY.*

Economic growth reflects economy performance of a region. If there is a positive economic growth in certain year then economy performance in the region in the next years will improve and be better than the previous years. In general, economic growth of regencies and city in DIY during 2010-2015 period showed a positive trend. In 2010, Kulonprogo regency had the lowest growth with 3.06 percent while the highest was accomplished by Bantul regency with 4.97 percent. In 2015, although there was a significant growth in Kulonprogo regency (4.64 percent), the number still became the lowest in DIY. The highest economic growth for the year was achieved by Sleman regency with 5.31 percent (see Figure 5).

**Figure 5.** *The Development of Economic Growth Rate (%) of Regencies/City (person) in DIY Year 2010-2015*

| | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|
| Kulonprogo Regency | 3.06 | 4.23 | 4.37 | 4.87 | 4.55 | 4.64 |
| Bantul Regency | 4.97 | 5.07 | 5.33 | 5.46 | 5.15 | 5 |
| Gunungkidul Regency | 4.15 | 4.52 | 4.84 | 4.97 | 4.54 | 4.81 |
| Sleman Regency | 4.49 | 5.42 | 5.79 | 5.89 | 5.41 | 5.31 |
| Yogyakarta City | 4.98 | 5.84 | 5.4 | 5.47 | 5.3 | 5.16 |

*Source: Central Bureau of Statistics, DIY.*

This research has a difference compared to previous studies. The research result from Murawska (2017) in European countries during the period 2006-2015 proved that education has a negative influence on unemployment. Murawska (2017) does not use independent variables in the form of wage, population and economic growth.

The controversy of research result happen from Constantin (2016) who examined the effect of population toward unemployment in Europe used Pearson correlation model. The result proves that population has a significant negative influence unemployment. Another controversy arises from the research result from Šuminas (2015) in Lithuania selama periode 2003-2014 used time series model. Šuminas (2015) found that minimum wage has not influence toward unemployement in Lithuania.

Therefore, the renewal of this research will close the previous research gap by examining the influence of education, wage, population and economic growth on unemployment in DIY Province, Indonesia, during the period of 2010-2015 used panel data regression analysis with a fixed effect model approach.

## 2. Literature Review

A study by Cazzola, *et al.* (2016) revealed that male and female unemployment rate in Italy both have negative correlation to the number of live birth which proxied by male and female fertility rate. An increase in number of unemployment will reduce male and female fertility rate due to unemployed person has less income and strengthen psychological factor not to having more children.

Niang (2014) investigated the determinants of unemployment and shows the result of male and female education affected labor market perception in the recruitment process. There was a significant gap gender between male and female unemployment due to the difference of treatment in labor market. Male labor force have better chance than female labor force. The understanding in labor market is male labor force have better productivity than female labor force. The role of education in determining unemployment also found in Ghana, as referred in a study by Biney, et al. (2015). They found that almost 700 thousand of university graduates were unemployed. The reason is due to inadequacy of job preparation programs for the students. The study suggests that universities need to provide their students with technical skills, vocation, technology, and entrepreneurship to compete in job market.

Majewski (2013) conducted a study in Europe and the result shows that some countries in Europe adjust their education systems in order to fulfill labor demand in international market. A success education type such as vocational system can be an option for countries in Europe. It is due to skills and job training that provided by the system. However, conventional education system still important because it is source of main knowledges and sciences. The study concludes that countries in Europe does not have to applied only one education system. Education system need to be improved to respond demand in the labor market.

Wage rate is one responsive factor to counter number of unemployment. In Spain after financial crisis in 2008, wage rate enhancement became interesting economy

and politics agenda. A study by Font, *et al.* (2015) shows that unemployment in Europe grow 3 times higher after 2008 crisis while real wage rate decreased as an effect of inflation and cannot significantly respond in solving the situation. The conclusion of their study is wage rate becomes a weak proxy and close to insignificant to reduce the number of unemployment while the real wage is more reliable variable.

Chen and Desiderio (2014) and Pacitti (2011) in their studies reveal that poor people tend to accept work with high risk and low wage rate. The reason is because the poors have less access in labor market which leads to less job chance with high risk and low wage rate job as the option left. They suggest that government intervention is needed in labor market by redistribution scheme and more comprehensive policies. Furthermore, a study by Majchrowska and Zolkiewski (2012) in Poland presented the same result that minimum wage negatively correlates with unemployment. A high wage rate can reduce the number of unemployment. The conclusion of the study proposes local government to establish proper minimum wage standard in all region and to reform tertiary education system hence the students can participate in economy activity.

Another study by Schneider (2015) in United States of America and Schellekens and Poppel (2012) in Netherland show that economy recession in the US few years ago cause the significant increase in unemployment rate. High unemployment rate has negative impact to the number of live births in the country. It means that unemployed US citizen tend to postpone their birth plan as a result of difficulties in their economy. In the long run, the situation will also take effect on decreasing number of populations that followed by declining of unemployment.

In contrast, Giulietti *et al.* (2013) and Heid and Larch (2012) who conducted studies in European Union (EU) sum up that there is no significant impact of the population increase by migration to the number of unemployment. The reason due to the number of migrants who enter EU mostly not in the condition to look for job yet already had job offer or other plan.

However, Kasnauskiene and Vebraite (2013) in their study in England have conclusion that the increase of population due to migration has negative correlation with the number of unemployment. The higher the number of populations the higher labor supply. Those stimulate the wage rate and reduce the number of unemployment.

GDP also become one of the determinants. A study by Haririan *et al.* (2009) in MENA countries (Middle East and North Africa) consist of Turkey, Egypt, Israel, and Jordan has a result that there is a negative significant correlation between GDP and unemployment. The same conclusion cannot be conducted for other countries due to a difference of demografic factor. However, this study underlining the result that although GDP has negative effect to unemployment, number of population still

become the main determinant. In oposition of that, Bennafla and Benmeriem (2015) found that in Algeria there is no significant effect of GDP to unemployment. It means that a GDP rate in one period is not directly take effect to unemployment rate in the next period yet the previous unemployment rate does.

A conclusion from Quintana and Royuela (2012) study in Spain reveals that there is no significant effect in GDP growth and unemployment rate. High number of unemployment has close relation to welfare equality rate. An improvement of welfare equality rate is shown by the quality of graduates who able to get high salary. It leads in declining number of unemployment in Spain. Unemployment has wide dimension in conducting problems such as poverty, social distortion, and conflict. Hence, improvement in the quality of educatuon institution is needed in order to reduce the number of unemployment.

## 3. Research Methodology

This study uses secondary data from 2010 to 2015 from four regencies and one city in DIY. Variables in this analysis consist of unemployment (UNEM), number of high school graduates or education (EDU), wage (WG), population (POP), and economic growth (EG). Data was collected through library research from the Central Bureau of Statistics (BPS), DIY. Panel data regression analysis with a fixed effect model approach is the method used in this study. A Specific model built in this research is the unemployment function equation = f (education, wage, population, economic growth). After going through the test model of MWD, it is discovered that the best functional form to estimate unemployment of regencies/ city in DIY is in the form of equation semi-logarithmic (log) as follows:

$$\log UNEM_{it} = \beta_0 + \beta_1 \log EDU_{it} + \beta_2 \log WG_{it} + \beta_3 \log POP_{it} + \beta_4 EG_{it} + e_{it}$$

Description:
UNEM = Unemployment (person)
EDU = Number of high school graduates (person)
WG = Wage (IDR)
POP = Population (person)
EG = Economic Growth (%)
$\beta_0$ = constant; t = the period 2010-2015; and e = error term

## 4. Data Analysis Procedure, Result and Discussion

This study uses data from five regencies/ city (Gunungkidul, Bantul, Kulonprogo, Sleman and Yogyakarta) in DIY. Unemployment models to be estimated are using data from 2010 to 2015 (6 years), so the total pool of observation data exists as much as 30. The test results of empirical data by using Fixed Effect Model are as follows:

**Table 1.** *Result of Redundant Fixed Effects Tests*

*Redundant Fixed Effects Tests*
*Test cross-section fixed effects*

| Effects Test | Statistic | d.f. | Prob.* |
|---|---|---|---|
| Cross-section F | 21.973019 | 4,21 | 0.0000 |
| Cross-section Chi-square | 49.375044 | 4 | 0.0000 |

**Note:** *Ho: Common Model is true; Ha: Fixed Effect is true. *= Ho is rejected at 0.05 significance level, Fixed Effects is better than Common Model.*

F probability value calculated is 0.0000. This shows that the probability of the F-count value is smaller than α = 5 percent hence nul hypothesis is rejected. It means that precise data panel model used is the fixed effect compared with a common effect model.

**Table 2.** *Result of Hausman Test: Fixed and Random Effects*

*Correlated Random Effects - Hausman Test*
*Test cross-section random effects*

| Test Summary | Chi-Sq. Statis | Chi-Sq. d.f. | Prob.* |
|---|---|---|---|
| Cross-section random | 87.891883 | 4 | 0.0000 |

**Note:** *Ho: Random Effects is true; Ha: Fixed Effect is true. *= Ho is rejected at 0.05 significance level, Fixed Effects is better than Random Effects Model.*

From random cross-section calculation the value is equal to 87.891883 and the value of chi-square table with df= 4 at the 5 percent level of significance was 9.49. It shows that the value of chi-square count is greater than the value of chi-square table, thus the null hypothesis is rejected. The conclusion is fixed effect model is better than random effect model.Table 3 shows the result of an empirical assesment data using Fixed Effect Model.

**Table 3.** *Regression Result- Dependent Variable: Log UNEM*

| Independent Variables | Coefficient | t-Statistic |
|---|---|---|
| Constant | -270.4874 | -1.950022 |
| Log EDU | -0.056605 | -1.036173 |
| Log WG | -2.545627 | -1.767658[a] |
| Log POP | 23.59396 | 1.999383[a] |
| EG | -0.072196 | -0.540024 |

| R-squared | 0.893187 |
|---|---|
| Ajusted R-squared | 0.852497 |
| F-statistic | 21.950714[b] |

**Note:** [a] = *significant at 0.10 and* [b] = *significance at 0.01 level respectively.*

$\log UNEM_{it} = \beta_0 + \beta_1 \log EDU_{it} + \beta_2 \log WG_{it} + \beta_3 \log POP_{it} + \beta_4 EG_{it} + e_{it}$

$\log UNEM_{it} = -270.4874 - 0.0566 \log EDU_{it} - 2.5456 \log WG_{it} + 23.59396 \log POP_{it} - 0072196 EG_{it}$

$R^2 = 0.893187$     N= 30     F-stat= 21.950714

Fixed Effect method shows that each regency/city has different coefficient intercept. Negative intercept explains that the development of unemployment in the regencies/city is lower than the unemployment average of regencies/ city in DIY province.

**Table 4.** *Intercept Coefficient Regencies/ city of DIY*

| No. | Regencies/ city | Intercept Coefficient |
|---|---|---|
| 1 | Sleman | -283.32465 |
| 2 | Bantul | -278.80092 |
| 3 | Gunungkidul | -272.69278 |
| 4 | Kulonprogo | -259.60142 |
| 5 | Yogyakarta City | -258.01723 |

**Source:** *The result of eviews calculation.*

### 4.1. Education (EDU)

The findings explain probability of t-statistics is -1.036173 while t-table value (one tail) is 1.316 with $\alpha= 10$ percent and df= 30-5 = 25. The smaller t-statistics means that the study accepts proposed $H_0$ or there is no correlation between education and unemployment in regencies and city in DIY province. The reason is labor absorption in regencies and city in DIY prefer to labor skill not level of education (proxy by number of high school graduates). It is due to output by Small Medium Enterprises (SMEs) in DIY are handcrafting product.

A study by Rosti and Chelli (2012) in Italy find that education process is one from many approaches that used by prospective labor in boosting their work opportunity yet the result show there is no correlation. An important underline in the study is getting a job with proper wage because theoretically and empirically labor willing to spend more in education in order to get better wage in the future.

### 4.2. Wage (WG)

The results point out probability of t-statistics is -1.767658 while t-table value (one tail) is 1.316 with α= 10 percent and df=30-5 = 25. This study rejects proposed $H_0$ due to t-statistics is higher than t-table. It means that when wage rise 1 pecent then UNEM will decrease -2.5445627 percent. It is because the increase of wage become attracts unemployed labor to enter the job market to get better income for their needs. The finding gets along with the study by Boateng (2015) in Ghana. He finds that determinants of unemployment are age, wage, education, marital status, gender, and poverty. Wage has negative correlation with unemployment while education has no correlation with unemployment. The main problem for educated labor is lack of skill and training, hence there is a mismatch between labor skill demand and supply.

Furthermore, Yabuuchi (2011) reveals that wage and job are key role for economy in a country. The increase of wage will reduce the unemployment thus they have negative significant correlation. It is due to high intensity of income distribution that leads to creating more work opportunity and the increase of labor absorption.

### 4.3. Population (POP)

The given table 3 shows that probability of t-statistics is 1.999383. T-table value (one-tail) is 1.316 with α = 10 percent and df = 30-5 = 25. The result rejects proposed $H_0$ which means population has positive significant correlation with the number of unemployment. When the number of population (POP) increase 1 percent then the number of unemployment (UNEM) will rise 23.59396 percent. It is due to the raise in population will boost the labor force. A limit of work opportunity or labor incapability to fulfill work requirement lead to an increase in number of unemployment.

The result is consistent with study in Pakistan by Maqbool, et al. (2013). It reveals that the determinants of unemployment are GDP, population, inflation, and foreign direct investment (FDI). GDP, population, and FDI partially has positive correlation with unemployment. The higher population growth the higher the unemployment in the country.

### 4.4. Economic Growth (EG)

The finding shows probability of t-statistics is -0.540024 with t-table (one tail) is 1.316 with α = 10 percent and df = 30-5 = 25. Due to t-statistics smaller that t-table then proposed $H_0$ is accepted which means EG is insignificant to UNEM. The result is same with a study in Italy by Magazzino (2014), in India by Bhowmik (2016), and in Iran by Kasirlou & Rajaei (2017) which states that GDP growth is insignificant to the number of unemployment.

### 5. Conclusion and Policy Implication

The result indicates that the Wage (WG) partially has negative and significant

impact to Unemployment (UNEM) but population (POP) variables partially has positive and significant impact to unemployment of regencies/ city in DIY. Education (EDU) and Economic Growth (EG) variables partially have not positive and significant effects for Unemployment (UNEM) in DIY. Taken together the variables EDU, WG, POP and EG have a significant effect on the UNEM in DIY.

Regencies and city government in DIY in developing education policy can establish curriculum which responsive to current market dynamics and competencies. Thus, will create human resources and impactful outcome in economic development in DIY. A partnership between the governments and universities in DIY in expanding knowledge and entrepreneurship for Small and Medium Enterprises (SMEs) can be business consulting, technology training, long-term soft loans, and market expansion. The developing of SMEs in DIY will strengthen the competitiveness and encourage better wage and welfare for labor.

Besides that, a regulation for early marriage and birth may reduce the population and optimize more qualified human resources in DIY. This policy aims to decrease new labor growth hence also decrease the unemployment in DIY. A harmonization between Regional-Owned Enterprises (Badan Usaha Milik Daerah = BUMD), Private-Owned Enterprises (Badan Usaha Milik Swasta = BUMS) and Village-Owned Enterprises (Badan Usaha Milik Desa = BUMDes) with SMEs is needed in order to build efficient production, regional autonomy, and export opportunity between region which lead to high economic growth in DIY.

In order to strengthen competitiveness of DIY in tourism, the improvement of better management should be made to offer better service to the tourists. Promotions to other countries and or regions can also attract new domestic and international tourist to visit DIY. Furthermore, the role of investor is needed to participate in development of agriculture, maritime, and tourism sectors which can boost economic growth and employment in DIY.

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