THE MACROECONOMIC IMPACT OF REGIONAL MINIMUM WAGEs: A CROSS-PROVINCE DATA EVIDENCE FROM INDONESIA

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Abstract

The main purpose of our study is to determine the causality relationship between economic growth, regional minimum wages (RMWs), unemployment rate and labor force participation rate (LFP). Using cross-section data set of 27 provinces from Indonesia for the period of 2003-2015, data analyzed using panel co-integration test, panel vector error correction model, and Granger causality test. Panel co-integration test indicates that there is a long-run relationship between the variables. In the long-run, LFP positively related to the economic growth, and negatively related to RMWs. The unemployment is positively related to both the economic growth and RMWs. In the short-run, RMWS has a significant and positive effect on economic growth. The unemployment and LFP have a negative and significant effect on RMWs. LFP has a negative and significant effect on unemployment and RMWs has a positive and significant effect on LFP. Furthermore, economic growth has a negative and significant effect on LFP. The result of Granger causality test points out that there is a bidirectional causality relationship between economic growth and RMWs and between RMWs and LFP. In addition, unemployment rate causes RMWs, and LFP causes unemployment.

Keywords: Economic growth, regional minimum wages, labor force participation, unemployment and panel vector error correction model

JEL classification: J31, O4, R23

1. Introduction

The minimum wage policy set by the government can affect macroeconomic variables especially the employment variables. Moreover, the wages can determine the demand and supply of labor in the labor market. The labor force's desire to enter the labor market is motivated by their desires to earn wages. The higher the wage rate, the higher the willingness to work. This means that RMWsof a region affects labor force participation and unemployment rates in the area. In turn, the linkage between wages with these two variables can impact on regional economic growth.

Research on the relationship amongthe LFP, unemployment rate and economic growth has been largely done by previous researchers. The result of their studiesis still varied and paradoxical, so the natureof the relationship of these variables isan open question. The wage has no impact on the unemployment rate (Muravyev&Oshchepkov, 2013; Angeles-Castro et al., 2014). Empirical research conducted by Belman & Paul (2014) concludes that the minimum age has a negative and insignificant impact on unemployment, where a minimum wage increases of 10% causes the unemployment rate to fall between 0.03% and 0.6%. In contrast, Akpansung (2014) reveals empirical evidence that minimum wages are positively correlated with unemployment rates.

Regarding the relationship between minimum wage and economic growth, conventional neoclassical theory predicts a negative relationship between the two variables. However, previous studies provide the empirical evidence that when labor supply increases there is a positive relationship between wages and output. On the contrary, when labor demand increases the relationship between the two variables isunclear (Kim, 2005). Watanabe (2013) proves that minimum wages promote economic growth. In contrast to Watanabe's findings, empirical research conducted by Dube (2013) found a negative relationship between the two variables.

The results of empirical studies on the linkages between the unemployment rate and economic growth also still provide various conclusions. Several researchers found an inverse

relationship between the two variables (Rosoiu & Rosoiu, 2014; Phiri, 2014; & Yelwa et al., 2015). Not inline with researchers, Sadiku, Ibraimi & Sadiku (2015) and Nikoli (2014) found no inverse relationship between unemployment and economic growth. Previously, there were also studies that found a negative relationship between the two variables (Brooks, 2002; Yam et al., 2002, &Totan et al., 2013). In contrast, Chang-Shuai & Zi-Juan (2012) concluded that the relationship between the two variables is positive. A recent study conducted by Abraham & Ozemhoka (2017) for the case of low-income countries in Sub-Saharan Africa provides two different conclusions. Firstly, using cross-nations data sets there is a negative relationship between unemployment and economic growth. Secondly, using individual countries case the unemployment rate positively related to economic growth.

Studies on the nature of the relationship between the unemployment rate, labor force participation and economic growth are still paradoxical. The unemployment rate and economic growth affect the LFP positively and significantly (Tasseven, Altas & Un., 2016). The unemployment rate has a negative and significant impact on LFP (Zaheer & Qaiser, 2016). The LFP is positively related to economic growth (Amir, Khan, & Bilal, 2015 and Forgha & Mbella, 2016). Economic growth increases the LFP, after a reaching a certain point economic growth decreases LFP. So, there is an inverse U-shaped relationship between the two variables (Dogan & Akyuz, 2017).

So far, the study on the relationship between regional minimum wage, unemployment rate, LFP and regional economic growth in Indonesia has not been much empirically expressed yet. Whereas, the determination of the minimum wage by the local government impact on both the employment variables and regional economic growth. In contrast to previous research, our study analyzed the long-term and short-term relationships between the four variables and simultaneously tested the causality relationship between the variables. The use of panel co-integration test, panel vector error correction model (VECM), and Granger causality test can reveal a short-term and long-term relationship as well as causality relationship between the four variables.

The systematic arrangement of the paper is divided into five sections, following this introduction is section two explaining the literature reviews regarding the linkage of RMWs economic growthLFP and unemployment. The data source, measurement of variables and estimation techniques are explained in section three. Both the results and discussion are discussed in section four, while section five concludes the paper.

2. THE LITERATURE REVIEW

2.1. The links of unemployment and economic growth

Among the many linkages between macroeconomic variables studied by researchers is the relationship between economic growth and the unemployment rate. The relationship between the two variables has long been the focus of economic studies. Beginning with research conducted by Okun (1962) for the case of American economy provided the empirical evidence indicating the inverse relationship between the two variables (Rosoiu & Rosoiu, 2014). The increase in economic growth of 3% would reduce the unemployment rate by 1%. That is, economic growth has a negative impact on the unemployment rate. The higher the economic growth the higher the unemployment rates. The research findings go on to known as Okun's Law.

In the next period, there are a number of studies that provide empirical evidence about the direction of the relationship between these variables. However, the studies present ambiguous results. On the one hand, there is research that supports Okun's findings that there is an inverse relationship between economic growth and unemployment, and on the other hand, there is also research that presented a positive relationship between the two variables. The unemployment is positively associated with economic growth. In addition, there are also researchers who did not find the relationship between the two variables.

Empirical research conducted by Noor, Nor & Judhiana (2007) for Malaysian economy proven an inverse relationship between economic growth and the unemployment rate. Consistent with the findings, Yelwa et al. (2015) also provide the empirical evidence pointing out the inverse linkage between the two variables. Furthermore, research conducted by Rosoiu & Rosoiu (2014) for the economy of United States and Resurreccion (2014) in the Philippines

as wel as Phiri (2014) in South Africa also confirm an inverse relationship between economic growth and the unemployment rate. In contrast to these studies, Sadiku, Ibraimi, & Sadiku (2015) in their study in Macedonian countries did not find an inverse linkage between unemployment rates and economic growth. Similarly, Nikoli's (2014) study with the Albanian economic case failed to prove Okun's Law.

Several other studies have found a negative relationship between unemployment and economic growth. Such as research conducted by Brooks (2002) in the Philippines concluded that the decline in the unemployment rate increased economic growth. The same study conducted by Totan et al. (2013) in Romania also provides empirical evidence regarding the opposite relationship between the two variables, where economic growth lowers the unemployment rate. Similarly, Abdul-Khaliq, Soufan & Shihab's (2014) studies in Arab countries revealed that an increase in economic growth of 1 percent lowered the unemployment rate by 0.16 percent. The higher the economic growth rate, the lower the unemployment rate. On the contrary, the slow economic growth is positively associated with the high unemployment rate (Aqifi & Malaj, 2015). In the short term, unemployment has a negative and significant impact on economic growth (Michael, Emeka & Emmanuel, 2016).

The empirical studies conducted by Ozel, Sezgin & Topkaya (2013) using panel data in G7 Countries also concluded that economic growth has a strong and significant effect on the decline in the unemployment rate before the crisis period, but becomes insignificant and very small after the crisis, whereas the effect of economic growth as a decreasing effect over unemployment continues and its impact level rises.

Other research findings on the linkage between unemployment and economic growth suggest an asymmetric relationship. The unemployment rate responds to economic growth asymmetrically. The response of the unemployment rates to economic growth is greater in times of recession from expansion (Crespo-Cuaresma, 2003). In the pre-crisis period, the unemployment response to economic growth was negative and very strong where an increase in economic growth could significantly reduce the unemployment rate. However, the response was not significant under conditions of economic crisis (Ozel, Sezgin & Topkaya, 2013). Silvapulee et al. (2004) also present similar findings supporting asymmetric unemployment responses to economic growth.

Viren (2001) uses cross-country dataset of 20 developing countries also presents evidence of asymmetric behavior between unemployment and economic growth. In bad times the response to the unemployment rate is near zero, and at a lower unemployment rate, the effect of output growth is greater. The existence of asymmetric information relating to the relationship between unemployment and economic growth is also expressed by research findings Abraham & Ozemhoka (2017) for the case of low-income countries from in Sub-Saharan Africa. Firstly, using cross-nations data sets there is a negative relationship between the unemployment rate and economic growth. Secondly, by using individual countries in case, the unemployment rate is positively related to economic growth.

Related to the direction of causality relationship between unemployment rate and economic growth is also still present inconsistent results. In the long run, there is an equilibrium relationship between the two variables, where economic growth is positively related to the unemployment rate (Chang-Shuai & Zi-Juan, 2012). Thayaparan (2014) and Mosikari (2013) conclude there is no causality between economic growth and the unemployment rate. In contrast, Michael, Emeka & Emmanuel's (2016) researchsin Nigeria found Granger causality results indicated unidirectional causality relationship running from economic growth to the unemployment rate.

2.2. The links of labor force participation and economic growth

The labor force participation rate is expected to increase output in the economy. The greater the willingness of the labor force to participate in various fields of work the greater the value of goods and services produced. Research findings conducted by previous researchers provide empirical evidence of the relationship between the two variables. Amir, Khan & Bilal (2015) in their research in Pakistan using ECM concluded that educated labor force has a significant impact on economic growth in the long run. Forgha & Mbella's (2016) studies in

Cameroon concluded that female labor force participation and positively impact on economic growth of the country.

Furthermore, research conducted by Rahmadana & Simatupang (2016) found that in the agricultural sector, there is a two-way relationship between economic growth and employment. While in the mining and quarrying sector, construction sector, transport and communication sector, and services sector only have one-way direction relationship from absorption of labor to economic growth. Empirical research conducted by Tasseven, Altas, &Un (2016) in the OECD Countries concluded that unemployment, and per capita income, affect the labor force participation in a positive and significant way. Zaheer & Qaiser's (2016) studies also found that unemployment rates have a negative and significant effect on labor force participation. Dogan & Akyuz (2017) show that economic growth increases the labor force participation rate. After reaching a certain point, economic growth decreases labor force participation. Thus, there is an inverted U-shaped relationship between the two variables.

2.3. The links of regional minimum wage and economic growth

Neoclassical theory predicts a negative relationship between real wages and outputs. However, previous studies provide the empirical evidence that when a supply-side shock exists, there is a positive correlation between real wage and output. In contrast, when there is a demand-side shock, the relationship is not clear (Kim, 2005). Minimum wage is also positively associated with productivity. Similar to Angeles-Castro et al's (2014) studies for the American economy found that average wage growth boosted economic growth. Previously, Watanabe's (2013) studies also proved that minimum wage increases boosted economic growth. The higher the wage rate, the higher the economic growth.

2.4. The links of the regional minimum wage, labor force participation and unemployment rate

The result of an empirical study on the relationship between RMWs, LFP and unemployment rate is still an open question. Until now there has been no consensus on the direction of the relationship between these variables. Related to the relationship between wages and employment, for example, empirical research conducted by Imobighe (2007) for the Nigerian economy revealed that there is a positive relationship between minimum wages and employment. In contrast, Dube's (2013) study found a negative relationship between minimum wage and aggregate employment growth. An Increase in the minimum wage may decrease employment. Similar to Dube's findings, Meer and West (2015) found that minimum wages have a negative impact on employment growth.

Related to the relationship between unemployment rates and labor force participation, previous research findings still present different results. Yildirim (2014) found no strong evidence that the unemployment rate is the main driving force behind the low participation of the labor force. Long-term estimates show that for educated women an increase of 1% unemployment causes an increase in labor force participation between 0.64% and 0.74%. Tansel, Ozdemir, & Aksoy (2015) in their study for Turkey economy also provide the same conclusion that there is no long-term relationship between labor force participation and the unemployment rate.

With regard to the relationship between minimum wage and unemployment rates, Muravyev & Oshchepkov's (2013) studies using panel data concludes that minimum wages have no effect on unemployment rates for workers aged 25-72 years old. This is supported by the Angeles-Castro et al. (2014) in America also revealed that average wage growth does not affect the unemployment rate. In contrast to the results of the both studies, Gunsoy &Tekeli (2013) used time series data from 1988-2009 in Turkey, indicating no significant relationship between minimum wage and employment. The results of Muhammad, Sa'idu & Yakubu's (2013) studies in Nigeria conclude that unemployment rates have a positive and significant effect on wage levels. Pantea's (2017) studies in Romania using panel data concludes that the increase in the minimum wage has a significant effect on employment. Previously, Belman & Paul (2014) concluded that the increase in minimum wages had a less significant impact on unemployment, where a minimum wage increases of 10 percent, causing the unemployment rate to fall between 0.03 and 0.6 percent

Some studies also provide empirical evidence of a direct relationship between the minimum wage and the unemployment rate. Fidrmuc & Tena (2013) study in the UK founding out that the minimum wage has a negative effect on the employment of men aged 21 years old. This means that the higher the minimum wage the lower the employment opportunity so that the impact on increasing the unemployment rate. In line with these findings, empirical research by Akpansung (2014) in Nigeria gives the same conclusion that the minimum wage is positively correlated with the unemployment rate with a correlation coefficient of 0.8328. The higher the minimum wage the greater the unemployment rate. Even a minimum wage increases of 1 percent could decrease employment by 6.4 percent. But the findings of his research did not find any causality between the two variables. Bossler & Gerner's (2016) study on the labor impact of minimum wage policy in Germany also provides similar results, where increased wages have an impact on the decline in employment. They concluded that an average wage increases of up to 4.8 percent had a 1.9 percent reduction in employment. This implies that the employment elasticity to wages is -0.3.

3. RESEARCH METHODS

The data used in this study are provided by Indonesian central bureau of statistics.The data are panel dataset of 27 provinces in Indonesia for the period of 2003-2015. The province comprises of Aceh province, North Sumatera, West Sumatera, Riau, Jambi, South Sumatera, Bengkulu, Lampung, Bangka Belitung, West Java, Central Java, Yogyakarta, East Java, Banten, Bali, West Nusatenggara, East Nusatenggara, West Kalimantan, Central Kalimantan, South Kalimantan, North Sulawesi, Central Sulawesi, South Sulawesi, Southeast Sulawesi, Gorontalo, Maluku and Papua province. Economic growth was measured by yearly per capita income based on constant prices in 2000. Regional minimum wage is measured from monthly provincial minimum wages. Labor participation rate measured by unit percent. Furthermore, unemployment proxied from the rates of open unemployment is the ratio of the unemployed to the total labor force.

The first stage in my empirical study is represented by the analysis of stationarity. The Levine–Lin–Chu (LLC) method (Levine, Lin, & Chu, 2002) and then I'm–Pesaran–Shin (IPS) method (Im, Pesaran, & Shin, 2003) are utilized to check the order of integration to see where the time series variable attains stationarity. Both the LLC and IPS methods were deployed on the principles of the conventional Augmented Dickey-Fuller (ADF) test. The LLC method explores the heterogeneity of intercepts across members of the panel, while the IPS method explores the heterogeneity in the intercepts, as well as in the slope coefficients. Both tests were applied by averaging individual ADF t-statistics across cross-section units. The test follows the estimation using the following equation:

$$\Delta Y_t = \mu_i + \gamma_i Y x_{it-1} + \sum_{j=1}^{Pi} \beta_{ij} \Delta Y_{it-j} + \delta_i t + \epsilon_{it}$$

where i =1, 2, … n: t=1, 2, T: Y_{it} is the series for province i in the panel over period t; p_i is the number of lags selected for the ADF regression; Δ is the first difference filter; ε_{it} refers to independently and normally distributed random variables for all i and t with zero means and finite heterogenous variance. The others method of unit roots test of the panel data is ADF-Fisher, ADF-Choi, PP-Fisher, and PP-Choi. In this research, we also use the four methods in order to test the data stationarity more perfect.

The second stage in the method of the analysis is cointegration test. The concept of cointegration, introduced by Granger (1969), is relevant to the problem of determining the long-run relationship between the variables. The basic idea that underpins cointegration is simple. If the difference between two non-stationary series is itself stationary, then the two series are cointegrated. If two or more series cointegrated, it is possible to interpret the variables in these series as being in a long-run equilibrium relationship (Engle & Granger, 1987). By contrast, a lack of cointegration suggests that the variables have no long-run relationship-thus, in principle, the postulated variables can arbitrarily move far away from each other.

In the third stage, the causality analysis between the four variables is performed by means of a panel vector auto regression (PVAR) model. The panel data VAR methodology combines the traditional VAR approach, which treats all thevariables in the system as endogenous, with the panel-data approach, which allows for unobservedindividual heterogeneity. The optimal

of lag length is evaluated by means of the Schwarz information criterion. VECM model employed to examine the causality relationship among economic growth, regional minimum wages, labor force participation and open unemployment is formulated as follow:

$$\Delta LRPI_{it} = \propto_0 + \sum_{j=1}^{n} \beta_{1j} \Delta LRPI_{i,t-j} + \sum_{j=1}^{n} \beta_{2j} \Delta LRMWs_{i,t-j} + \sum_{j=1}^{n} \beta_{3j} \Delta LLFP_{i,t-j} + \sum_{j=1}^{n} \beta_{3j} \Delta LUnem_{i,t-j} + \gamma e_{i,t-1} + \mu_{it}$$

$$\Delta LRMWs_{it} = \propto_0 + \sum_{j=1}^{n} \beta_{1j} \Delta LRMWs_{i,t-j} + \sum_{j=1}^{n} \beta_{2j} \Delta LRPI_{i,t-j} + \sum_{j=1}^{n} \beta_{3j} \Delta LLFP_{i,t-j} + \sum_{j=1}^{n} \beta_{4j} \Delta LUnem_{i,t-j} + \gamma e_{i,t-1} + \varepsilon_{it}$$

$$\Delta LLFP_{it} = \propto_0 + \sum_{j=1}^{n} \beta_{1j} \Delta LLFP_{i,t-j} + \sum_{j=1}^{n} \beta_{2j} \Delta LRMWs_{i,t-j} + \sum_{j=1}^{n} \beta_{3j} \Delta LLFP_{i,t-j} + \sum_{j=1}^{n} \beta_{4j} \Delta LUnem_{i,t-j} + \gamma e_{i,t-1} + \epsilon_{it}$$

$$\Delta LUnem_{it} = \propto_0 + \sum_{j=1}^{n} \beta_{1j} \Delta LUnem_{i,t-j} + \sum_{j=1}^{n} \beta_{2j} \Delta LRMWs_{i,t-j} + \sum_{j=1}^{n} \beta_{3j} \Delta LLFP_{i,t-j} + \sum_{j=1}^{n} \beta_{4j} \Delta LRPI_{i,t-j} + \gamma e_{i,t-1} + v_{it}$$

where ΔLRPI is the first difference of the natural logarithm of regional per capita income, as the measurement of the provincial economic growth, ΔLRMWs is the first difference of the natural logarithm of the regional minimum wages, ΔLFP is the first difference of the natural logarithm of the labor force participation rate, and ΔLUnem is the first difference of the natural logarithm of open unemployment rate.

The model above can avoid the loss of short-term information. Short-term deviations toward long-term balance are adjusted directly to long-run equilibrium. Therefore, the term of error helps to correct the proportion of imbalances in the next period. The term of error correction model (ECM) is represented by the coefficient γ if the variables are cointegrated.

Furthermore, Impulse Response Function (IRF) is used to check the shock response of each dependent variable to the independent variable. Finally, Granger causality is used to test the causality relationship between the variables studied.

4. THE RESULT AND DISCUSSION

4.1. The result of unit root test

As explained earlier, the unit panel of the root test can use six methods consisting of Levin, Lin & Chu (LLC), ImPesaran& Shin (IPS), ADF-Fisher, ADF-Choi, PP-Fisher, and PP-Choi. The stationarity of the data is based on the probability value. If the p-value <0.05, the data has reached the stationary. Conversely, if the p-value> 0.5 indicates the data is not stationary.

The result of panel unit root test at data level indicates that only labor force participation reaches stationary at level. On the contrary, economic growth, regional minimum wage, and unemployment rate are not stationary at the level. Thus, a unit root test is performed on the

first difference. The results show that all variables reach the stationer at first difference. For more details about the panel result, unit root test can be seen Table 1.

Table 1. The result of panel unit root test

No	Variable	Methods	Individual Intercept				Intercept & Trend			
			Level		First Difference		Level		First Difference	
			T-stat	P-value	T-stat	P-value	T-stat	P-value	T-stat	P-value
1	*L*RPI	Levin, Lin & Chu	0.993	0.839	-4.098	0.000**	-3.707	0.000	-3.172	0.000**
		Im, Pesaran& Shin	7.257	1.000	-2.667	0.004**	0.199	0.579	0.168	0.567
		ADF - Fisher X^2	16.039	1.000	80.361	0.012*	53.973	0.476	55.474	0.419
		ADF - Choi Z-stat	7.461	1.000	-3.037	0.001**	0.167	0.566	0.238	0.594
		PP – Fisher	18.732	1.000	114.479	0.000**	38.903	0.939	103.638	0.000**
		PP – Choi	10.678	1.000	-4.316	0.000**	3.039	0.999	-0.955	0.169
2	*L*RMWs	Levin, Lin & Chu	5.927	1.000	-5.206	0.000**	-1.082	0.139	-4.426	0.000**
		Im, Pesaran& Shin	8.640	1.000	-2.879	0.002**	2.292	0.989	-0.823	0.205
		ADF - Fisher X^2	6.069	1.000	87.145	0.003**	40.507	0.913	66.726	0.115
		ADF - Choi Z-stat	9.261	1.000	-3.007	0.001**	2.824	0.998	-1.060	0.145
		PP – Fisher	8.575	1.000	149.254	0.000**	58.962	0.299	191.661	0.000**
		PP – Choi	10.911	1.000	-6.898	0.000**	3.237	0.999	-7.562	0.000**
3	*L*LFP	Levin, Lin & Chu	-5.969	0.000**	-12.109	0.000**	-5.381	0.000	-11.647	0.000**
		Im, Pesaran& Shin	-4.276	0.000**	-8.958	0.000**	-2.518	0.006	-5.565	0.000**
		ADF - Fisher X^2	105.260	0.000**	177.823	0.000**	83.268	0.006	125.614	0.000**
		ADF - Choi Z-stat	-4.546	0.000**	-8.383	0.000**	-3.103	0.001	-5.365	0.000**
		PP – Fisher	155.196	0.000**	339.609	0.000**	148.934	0.000	279.807	0.000**
		PP – Choi	-6.967	0.000**	-14.422	0.000**	-6.284	0.000	-12.198	0.000**
4	*L*Unem	Levin, Lin & Chu	-4.698	0.000**	-6.958	0.000**	0.471	0.681	-8.552	0.000**
		Im, Pesaran& Shin	0.289	0.614	-4.866	0.000**	0.861	0.806	-2.352	0.009**
		ADF - Fisher X^2	42.765	0.865	112.590	0.000**	47.483	0.722	81.548	0.009**
		ADF - Choi Z-stat	0.392	0.652	-5.183	0.000**	0.919	0.821	-2.805	0.003**
		PP – Fisher	30.323	0.996	182.515	0.000**	51.016	0.590	165.620	0.000**
		PP - Choi	1.671	0.953	-8.542	0.000**	0.565	0.714	-6.147	0.000**

Source: Own calculation by E-views software

Note: * indicate the significant at 95% level, and ** indicate the significant at 99% level.

As shown in Table 1 above, the results of the unit root test indicate that the variables achieve stationary after first difference. This pointed out by the p-value of the methods of the unit root test is less than 0.05 for all variables, respectively.

4.2. The result of co-integtation test

Since the four variables reach stationary at first difference, we can perform a cointegration test to test for a long-term equilibrium relationship between economic growth, regional minimum wage, labor force participation and unemployment rate. In the research, cointegration test using Pedroni's Residual-Based Cointegration Test, Kao's Residual Panel Cointegration Test and Johansen Fisher Panel Cointegration Test.

Pedroni (1999) suggests seven statistical tests to determine the presence of panel cointegration. The statistical methods divided into two groups. The first group is consists of panel v-statistic, rho-statistic panel, PP-statistic panel and ADF-statistics panel. The all statistical test is termed "within-dimension" (Panel test). The second group of the tests consists of group rho-statistic, group PP-statistic and ADF-statistic group, is termed "between-dimension" (group test). The null hypothesis proposed in the cointegration test is that there is no cointegration between regional economic growth, regional minimum wages, unemployment and labor force participation rate, while the alternative hypothesis is that the four variables are cointegrated. Acceptance of one hypothesis is based on p-value with the provision that if p-value <0.05, the alternative hypothesis is accepted. Conversely, if p-value>0.05 then the null hypothesis is accepted. The result Pedroni'scointegration test can be seen in Table 2.

Table 2. The Result foPedroni's Residual-Based Cointegration Test

Panel Cointegration Statistics (Within-Dimension)		
Test Statistics	Statistical Values	
	Intercept	Intercept and Trend
Panel v-Statistic	0.259 (0.398)	22.421 (0.000)*
Panel rho-Statistic	1.495 (0.933)	3.502 (0.999)
Panel PP-Statistic	-8.473 (0.000)*	-13.848 (0.000)*
Panel ADF-Statistic	-4.072 (0.000)*	-4.124 (0.000)*
Group Mean Panel Cointegration Statistics (Between-Dimension)		
Test Statistics	Statistical Values	
	Intercept	Intercept
Group rho-Statistic	4.179 (1.000)	6.443 (1.000)
Group PP-Statistic	-8.750 (0.000)*	-5.306 (0.000)*
Group ADF-Statistic	-4.947 (0.000)*	0.764 (0.778)

Note: The values in parentheses give the probabilities values. Ho: no cointegration; * and ** indicate the rejection of null hypothesis at 1% significant level.

Table 2 above shows the results of Pedroni (1999) "s panel cointegration tests that some of the p-values are greater than 0.05, especially for rho-rho and group-rho statistic panels. However, the p-value of the Panel PP, ADF Panel, Group PP and Group ADF-Statistic is smaller than 0.05. Thus, there is strong evidence indicating the existence of long-run cointegration relationships among the four variables.

Furthermore, the acceptance or rejection of the hypothesis with kao's residual panel cointegration testalso based on p-value. If the p-value <0.05 means there are cointegration and vice versa. The result of Kao's residual panel cointegration test in Table 3.

Table 3. The Result of Kao's Residual Panel Cointegration Test

Null Hypothesis	T-Statistic	P-value
No cointegration	-5.1493***	0.0000
Residual Variance	0.0022	
HAC variance	0.0023	

Note: *** Indicates the rejection of null hypothesis at 1% level of significance.

Table 3 provides the results of Kao (1999) panel cointegration test pointing outthe p-value of 0.000 less than 0.05. Thus, the null hypothesis is rejected. It can be concluded that there is strong evidence pointing out that the variables co-integrated in the long-term. Finally, Johansen Fisher panel cointegration test utilized to determine the number of co-integration equation. The result of the test can be seen as follows:

Table 4. Johansen Fisher Panel Cointegration Test

Null Hypothesis	Alternative Hypothesis	Fisher Stat.* (from trace test)		Fisher Stat.* (from max-eigen test)	
		Trace test	p-value	Max-eigen test	p-value
$r = 0$	$r \neq 0$	55.26***	0.0000	55.26***	0.0000
$r \leq 1$	$r > 1$	55.26***	0.0000	55.26***	0.0000
$r \leq 2$	$r > 2$	16.86***	0.0098	17.51***	0.0076
$r \leq 3$	$r > 3$	6.29	0.3906	6.29	0.3906

* p-value are computed using asymptotic Chi-square distribution.

*** Indicates the rejection of null hypothesis at 1% significant level.

As explained earlier, for the co-integration test we found the long-run relationship between the four variables. Base on the table above can conclude that at least there is two co-integration equations. Hence, we employee panel vector error correction model (VECM) as means of the data analysis.

4.3. The Result of the lag length criteria

The tests used were determined based on informational criteria - the Akaike information criterion (AIC), Hannan-Quinn (HQ), and Schwarz information criterion (SC), taking into consideration that if the number of lags is too small then the model does not capture all the information while if there are too many lags then the degree of freedom is wasted. Different information criteria suggest different optimal lag lengths for the VAR model, as shown in Table 5. The standard information criteria of Hannan-Quinn (HQ) and Akaike information criterionshows an optimal lag length of 2, respectively.

Table 5. The result of Lag Length Criteria Test

Lag	LogL	LR	FPE	AIC	SC	HQ
0	91.93278	NA	2.31e-06	-1.628385	-1.529047	-1.588107
1	732.6913	1222.188	2.18e-11	-13.19799	-12.70130	-12.99660
2	778.6822	84.31653	1.25e-11	-13.75337	-12.85933*	-13.39087
3	807.8600	51.33144	9.84e-12	-13.99741	-12.70601	-13.47379
4	834.5847	45.03598	8.12e-12	-14.19601	-12.50726	-13.51129
5	878.1682	70.21799	4.92e-12	-14.70682	-12.62072	-13.86098*
6	895.5221	26.67348	4.86e-12*	-14.73189*	-12.24844	-13.72494
7	905.2901	14.29026	5.57e-12	-14.61648	-11.73568	-13.44842
8	924.8176	27.12151*	5.36e-12	-14.68181	-11.40365	-13.35263

* indicates lag order selected by the criterion; LR: sequential modified LR test statistic (each test at 5% level); FPE: Final prediction error; AIC: Akaike information criterion; SC: Schwarz information criterion; HQ: Hannan-Quinn information criterion

Since the variable achieved stationarity after the first difference and Schwarz information criterion shows an optimal lag length of 2, then the lag length in utilizing panel vector error correction model as means of data analysis technique. The result of using econometrics method comprised of two parts covering short-term and long-term effects as described in the following sections.

4.4. The Result of panel vector error correlation model (VECM)

The result of VECM provides empirical evidence deal with the long-run relationship between the variables. There are two co-integration equations representing the long run equilibrium relations of the variables. Each of the equation as follows:

$$\Delta lRPI = -41.579 + \underset{[3.580]^*}{1.643\Delta lUnem_{t-1}} + \underset{[3.913]^*}{11.216\Delta lLFP_{t-1}} \quad (1)$$

$$\Delta lRMWs = 27.142 + \underset{[1.737]}{0.427\Delta lUnem_{t-1}} - \underset{[-2.343]^*}{3.596\Delta lLFP_{t-1}} \quad (2)$$

First equation represents the long-run equilibrium relations between economic growth, unemployment rate, and LFP. Unemployment and LFP rate is positively related to economic growth in long term. Second equation represents the co-integration equation between RMWs, unemployment, and LFP. Unemployment is positively related to minimum regional wages whileLFP rate negatively related to RMWs.

In the long-run, the LFP rate positively effects on economic growth. The higher the LFP rate, the higher the economic growth. The existence of the long-run relationship between LFP rate and economic growth indicates that the increase in regional economic output in Indonesia is significantly affected by LFP rate. The improvement of LFP means that the increase in the number of the labor forces at work (and trying to find a job for those who have not worked yet). This condition encourages increased production of goods and services which ultimately positively impacts the economic growth of the region.

In the long-run, the LFP rate also has a negative and significant effect on RMWs. This means the higher the LFP rate, the lower the RMWs. The RMWs is the minimum wage that

employers have to pay for their employees. The decision of the local government to determine the number of wages, due to labor demands for wage increases. In fact, in almost any region of Indonesia, the decision of the local government to raise the provincial minimum wage is preceded by labor demonstrations which in turn may lead to a mass strike. Such conditions lead to a decrease in LFP rate. Therefore, an increase in the RMWs due to the decrease in the LFP rate. When LFP rate is relatively high, labor demands for higher wages are not usually considered by the local government. This is what causes in the long-run, there is an inverse relationship between the LFP level and the RMWs. The LFP rate also has a negative and significant impact on the unemployment rate. The higher the LFP rate, the lower the unemployment rate.

4.5. The Short-run effect between the variables

In the short-run, if economic growth lies above long-term equilibrium, then the LFP rate will increase in the next period. Similar to the unemployment rate, the increase in the unemployment rates caused by the effect of population growth and labor force. So, it as though that there is a positive relationship between the economic growth and unemployment rates. In the short-run, if the RMWs lies above the long-run equilibrium, then in the next period unemployment rates is rising, and labor force participation is declining. This is due to the RMWs set by the local government must be obeyed by companies operating in the area. In turn, an unable company to payminimum wages in accordance with established wage standards will reduce the number of employees. The result of PVECM representing the short run equation related to the causality relationship between the variables summarized in table 6.

Table 6. The Summary of Short-run Equation

Dependent Variable	*Constant*	*Independent Variable*							
		ΔLRPI		ΔLRMWs		ΔLUnem		ΔLLFP	
		Lag 1	Lag 2	Lag 1	Lag 2	Lag 1	Lag 2	Lag 1	Lag 2
ΔLRPI	0.020 [5.246]	(0.029) [0.547]	(0.323) **[6.933]**	**(0.085)** **[2.925]**	**(0.104)** **[3.603]**	(-0.013) [-1.221]	(-0.015) [-1.393]	(0.063) [0.969]	(-0.038) [-0.634]
ΔLRMWs	0.044 [5.173]	(-0.067) [-0.582]	(0.211) **[2.089]**	(-0.025) [-0.399]	(0.005) [0.077]	(0.087) **[3.817]**	(0.007) [0.314]	(-0.487) **[-3.439]**	(-0.093) [-0.714]
ΔLUnem	-0.078 [-3.363]	(-0.022) [-0.071]	(-0.208) [-0.752]	(-0.186) [-1.081]	(0.008) [0.047]	(-0.121) [-1.946]	(-0.228) **[-3.675]**	(-1.501) **[-3.859]**	(-0.605) [-1.688]
ΔLLFP	0.005 [1.364]	(-0.185) **[-3.934]**	(-0.017) [-0.412]	(0.052) **[2.054]**	(0.018) [0.711]	(-0.002) [-0.295]	(0.013) [1.454]	(-0.255) **[-4.417]**	(-0.139) **[-2.623]**

Note: Number in ( ) is regression coefficient of the variables

Number in [ ] is t statistics.

Based on Table 6 above, it can be seen that regional economic growth in Indonesia is significantly influenced by itself and the RMWs of the region, respectively. The significanteffect of the economic growth on itself occurs at the 2-period horizon. Furthermore, the significant effect of the provincial minimum wage on economic growth takes place on the 1-2 period horizons. In the short term, open unemployment rates and LFP have no significant effect on economic growth. The positive and significant impacts of RMWs on economic growth support Watanabe's (2013) findings concluding that an increase in minimum wages promotes economic growth. Imobighe (2007) and Angeles-Castro et al. (2014) also provides the same conclusion that minimum wages have a positive impact on labor productivity and economic growth.

Based on Table 4 above, it can be seen that the unemployment rate has no significant effect on economic growth. This finding is consistent with the results of the Sa'idu & Muhammad (2015) empirical study in Nigeria concluding that unemployment rates have no significant impact on economic growth. Saget (2000) in the European countries also concluded that there is no relationship between unemployment and the rate of economic growth in the short term. But this study differs from the findings of Michael, Emeka & Emmanuel (2016) research in Nigeria concluding that the unemployment rate has a negative and significant effect on regional economic growth.

In the short run, the RMWs is affected by economic growth, open unemployment rate, and the LFP rate. The effect of economic growth on the RMWs occurs in lag 2 (positive). This means that economic growth over a given year period has a positive impact on increasing RMWs in the next two periods. The unemployment rate positively affects the RMWs in lag 1. The higher the unemployment rates in a certain period, the higher the RMWs in the next period. The local governments' decision to raise minimum wages is usually due to some workers leaving their jobs because the wages they receive are considered unable to meet the needs of decent living. This finding is consistent with the findings of Muravyev & Oshchepkov (2013) in Russian Regions also indicating a direct relationship between the two variables. Previously, Brooks (2002) and Akpansung (2014) also found that the minimum wage was positively related to the unemployment rate.

Furthermore, the LFP rate has a negative and significant impact on the RMWs at lag 1, indicated by the regression coefficient of the variable of -0.487, and the t-test of -4.439. The increases in the LFP rate in a certain year period significantly lead to the decline of the RMWs at the next period. As explained before, even though the RMWs regulated by the local government, the determination of the wage amount is expressed in local government regulations depend on the demands of workers on wage increases. As long as workers have not felt the need for increased wages, the LFP rate is still relatively high so that the demand for wage increases has not occurred yet. In this condition, the government not interested to increase the RMWs. This what causes the LFP rate have an inverse relation with the RMWs.

In the short-run, the open unemployment rate is negatively affected by itself on the 2-period horizon with the coefficient of -0.228 and t statistic of -3.675, and labor force participation on the 1-period horizon with coefficients of -1.501 and the statistical t value of -3.859. This means that an increase in the unemployment rate in a certain period, impacts on the decline in unemployment rates in the 2-next period horizon. Furthermore, an increase in the LFP rate in a period lead to decrease the unemployment rate in the 1-next period. This finding is in contrast to the results of Aqifi & Malaj's (2015) research in the Republic of Macedonia concluding that unemployment in a certain year is positively and significantly affected by the unemployment rate on 1-year before

Furthermore, the RMWs has no effect on the unemployment rate. This finding is consistent with the findings of the Angeles-Castro et al. (2014) and Pantea (2017) which provide empirical evidence that wages have no significant effect on the unemployment rate. However, unlike the findings of Muravyev & Oshchepkov's (2013) studies in Russia pointing out that minimum wages increase unemployment especially in workers aged 15-24 years, and Fidrmuc & Tena's (2013) research findings in the UK proving the existence of a negative relationship between the two variables.

The LFP rate is negatively affected by itself at the 1-2 period horizon and economic growth at the 1-period horizon and is positively influenced by the RMWs at the 1-period horizon. An increase in economic growth in a certain period has a significant impact on the decrease in LFP in the 1- next period. Furthermore, the increase of RMWs in certain period causes the increase of LFP rate in the next period. In contrast, the unemployment rate has no significant effect on the LFP rate either at one or two periods. The negative effect of economic growth on the LFP rate is different from the findings of the Tasseven, Altas, & Un's (2016) studies for the case of OECD Countries concluding that economic growth affects labor force participation positively and significantly.

4.6. The result of Granger causality test

In order to test the causality relationship between the four variables, VECM Granger causality test used as a data analysis technique. The result of the test indicates that there is a unidirectional causality running from economic growth to LFP rate, from unemployment rate to RMWs and from LFP rate to unemployment rate. Further, there is a bidirectional causality relationship between economic growth and RMWs, and between LFP and RMWs. For more details about the results of causality test can be seen in table 8.

Tabel 8. VAR Granger Causality/Block Exogeneity Wald Tests

Dependent Variable	*Independent Variable*			
	ΔLRPI	ΔLRMWs	ΔLUnem	ΔLLFP
ΔLRPI	-	(21.667) [0.000]***	(2.877) [0.237]	(1.552) [0.460]
ΔLRMWs	(6.185) [0.045]**	-	(14.763) [0.000]**	(11.879) [0.003]**
ΔLUnem	(0.602) [0.740]	(1.169) [0.557]	-	(16.204) [0.000]***
ΔLLFP	(16.365) [0.000]***	(4.744) [0.093]*	(2.464) [0.292]	-

Note: Δ is the first difference operator, the values in parentheses ( ) are chi-square, the values in bracket [ ] are p-values. * indicate the significant at 90% level, ** indicate the significant at 95% level, and *** indicate significant at 99% level.

In the short run, the unemployment rate does not cause regional economic growth in Indonesia. This finding is consistent with the result of the empirical studies conducted by Thayaparan (2014) for the case of Sri Lanka, and Mosikari's (2013) studies in South Africa discovering that there is no causal relationship between unemployment rate and economic growth. However, this finding is different from the result of Yelwa et al's (2015) studies for the Nigerian economy confirming the causal linkage between unemployment and economic growth in Nigeria. Others research conducted by Michael, Emeka & Emmanuel (2016) for the Nigerian economy also found that there is unidirectional causality relationship running from economic growth to unemployment. Finally, the findings of this study indicating a two-way causality between the RMWs and LFP are different from Gunsoy & Tekeli's (2013) research results in Turkey indicating that there is no significant relationship between the two variables.

5. CONCLUSION

This paper analyzes the economic impact of RMWs. The economic impacts referred to in this study are economic growth, open unemployment and labor force participation (LFP). Using panel dataset of 27 selected provinces from Indonesia for the period of 2003 to 2015 the main finding of the research can be explained as follows: Firstly, there is a long-run co-integration between the variables. In the long-run, the LFP has a positive impact on economic growth but has a negative impact on the unemployment rate. The unemployment rate is also positively related to the regional economic growth. In the short-run, the RMWs have a positive and significant effect on regional economic growth and LFP. Conversely, unemployment and regional economic growth have positive effects on RMWs, and then economic growth has a negative effect on LFP. Secondly, the result of Granger causality test indicates that there is a unidirectional causality running from the economic growth to LFP, from the unemployment rate to the RMWs and running from LFP to the unemployment rate. Further, there is a bidirectional causality relationship between the economic growth and the RMWs, and between the LFP and the RMWs.

References

Abdul-Khaliq, S., Soufan, T., &Shihab, R. A. (2014). The Relationship between Unemployment and Economic Growth Rate in Arab Country, Developing Country Studies, 4(7), 62-66

Abraham, I. O., &Ozemhoka, A. M. (2017). Youth Unemployment and Economic Growth: Lesson from Low-Income Countries in Sub-Saharan Africa, European Journal of Economics, Law and Politics, 4(2), 1-15.

Akpansung, A. O. (2014). An Empirical Assessment of the Effects of Minimum Wage Increases on Unemployment during Democratic Governance in Nigeria, International Journal of Humanities and Social Science, 4(13), 87-98

Amir, H., Khan, M., & Bilal, K. (2015). Impact of educated labor force on Economic growth of Pakistan: A human capital perspective, European Online Journal of Natural and Social Sciences, 4(4), 814-831.

Angeles-Castro, G., Juarez-Cruz, J., & Flores-Ortega, M. (2014). The Effect of Average Wages on the Economy: The Case of the United States, International Journal of Business and Social Science, 5(11), 30-39

Aqifi, E., and Malaj, V. (2015). Impact of economic growth on unemployment in Republic of Macedonia, International Journal of Economics, Commerce and Management, 4(1), 139-146.
Belman, D., & Paul, W. (2014). What Does the Minimum Wage Do? Kalamazoo: Upjohn Institute.
Bossler, M., &Gerner, H-D. (2016). Employment effects of the new German minimum wage: Evidence from establishment-level micro data, IAB-Discussion Paper 10, Institute for Employment Research.
Brooks, R. (2002). Why Is Unemployment High in the Philippines? IMF Working Paper, Asia and Pacific Department.
Chang-Shuai, L and Zi-juan, L. (2012). Study on the Relationship among Chinese Unemployment Rate, Economic Growth and Inflation, Advances in Applied Economics and Finance, 1(1): 1- 6.
Crespo-Cuaresma, J. (2003), Revisiting Okun's Law: a Piecewise-linear Approach, Oxford Bulletin of Economics and Statistics, 65, 439–451.
Dogan, B., and Akyuz, M. (2017) Famale Labor Force Participation Rate and Economic Growth in The Framework of Kuznet Curve: Evidence from Turkey. Review of Economic & Business, 10(1), 33-54.
Dube, A. (2013). Minimum Wages and Aggregate Job Growth: Causal Effect or Statistical Artifact? IZA Discussion Paper, No. 7674.
Engle, R. F. and Granger, C.W.J. (1987) Co-integration and error correction: Representation, estimation, and testing, Econometrica, 55(2), 251–76.
Fidrmuc, J., &Tena, J. D. (2013). National minimum wage and employment of young workers in the UK, Economics and Finance Working Paper, No. 13-13
Forgha, N. G., &Mbella, M. E. (2016). The implication of female labour force participation on economic growth in Cameroon, International Journal of Development and Economic Sustainability, 4(1), 34-47.
Granger, C.W.J. (1969) Investigating causal relations by econometric models and cross-spectral methods, Econometrica, 37(3), 424–438.
Gunsoy, G., &Tekeli, S. (2013). Time Series Analysis for Effect of the Minimum Wage on Female Employment in Turkey, International Journal of Business and Social Science, 4(6), 119-129.
Im, K.S., Pesaran, M.H. & Y. Shin, (2003) esting for Unit Roots in Heterogeneous Panels, Journal of Econometrics, 115, 53-74.
Imobighe, M. D. (2007). The Impact of Minimum Wage on Employment Level and Productivity in Nigeria.Journal of Research in National Development, 5(21), 1-17.
Ivanov, V., &Kilian, L. (2005). A Practitioner's Guide to Lag Order Selection for VAR Impulse Response Analysis, Studies in Nonlinier Dynamics & Econometrics, 9(1), 1-34.
Kao, C. (1999), Spurious regression and residual-based tests for cointegration in panel data. Journal of Econometrics, 90 (1), 1–44.
Kim, D. (2005). Real Wage and Nominal Shock: Evidence from Pacific-Rim Countries. International Advances in Economic Research, 11, 249-255.
Levin, A., Lin, C.F., and Chu, C. (2002) Unit Root Tests in Panel Data: Asymptotic and Finite-Sample Properties, Journal of Econometrics, 108, 1-24.
Meer, J., & West, J. (2015). Effects of the Minimum Wage on Employment Dynamics.Upjohn Institute Working Paper 15-233.
Michael, E. O., Emeka, A., & Emmanuel, E. N. (2016). The Relationship between Unemployment and Economic Growth in Nigeria: Granger Causality Approach, Research Journal of Finance and Accounting, 7(24), 153-162.
Mosikari, T. J. (2013). The Effect of Unemployment Rate on Gross Domestic Product: Case of South Africa, Mediterranean Journal of Social Sciences, 4(6), 429-434.
Muhammad, A. A., Sa'idu, B. M., &Yakubu, K. M. (2013). Effect of Unemployment and Inflation on Wages in Nigeria, Journal of Emerging Trends in Economics and Management Sciences, 4(2), 181-188.
Muravyev, A., &Oshchepkov, A. (2013). Minimum Wages, Unemployment and Informality: Evidence from Panel Data on Russian Regions, IZA Discussion Paper No. 7878
Nikoli, E. (2014). Economic growth and unemployment rate. Case of Albania, European Journal of Social Sciences Education and Research,1(1), 217-227
Noor, Z. M., Nor, N. M., &Judhiana A. C. (2007). The relationship between output and unemployment in Malaysia: Does Okun's law exist? International Journal of Economics and Management, 3, 337-344.
Ozel, H. A., Sezgin, F. H., &Topkaya, O. (2013). Investigation of Economic Growth and Unemployment Relationship for G7 Countries Using Panel Regression Analysis, International Journal of Business and Social Science, 4(6), 163-171.
Pantea, S. (2017). Did minimum wage increases reduce employment? Panel data evidence from Romania, Munich Personal RePEc Archive Paper,

Pedroni, P. (1999), Critical values for cointegration tests in heterogeneous panels with multiple regressors, Oxford Bulletin of Economics and Statistics, 61(1): 653–670.
Phiri, A. (2014). Nonlinear Co-Integration Between Unemployment and Economic Growth in South Africa, Managing Global Transitions, 12 (4): 303–324
Rahmadana, M. F., & Simatupang, S. (2016). Using Granger Causality to Examine the Relationship Between Economic Growth and Absorption of Labor in North Sumatera Province – Indonesia, International Journal of Business and Management Invention, 5(2), 38-43.
Resurreccion, P. F. (2014). Linking unemployment to inflation and economic growth: toward a better understanding of unemployment in the Philippines, Asian Journal of Economic Modelling, 2(4), 156-168
Rosoiu, I., & Rosoiu, A. (2014). The Relation between Unemployment Rate and Economic Growth in USA, International Journal of Economic Practices and Theories, 4(2), 162-167
Sa'idu, B. M., & Muhammad, A. A. (2015). Do Unemployment and Inflation Substantially Affect Economic Growth? Journal of Economics and Development Studies, 3(2), 132-139.
Sadiku, M., Ibraimi, A., & Sadiku, L. (2015). Econometric Estimation of the Relationship between Unemployment Rate and Economic Growth of FYR of Macedonia, Procedia Economics and Finance, 19, 69 – 81.
Saget, C. (2000), Can the Level of Employment be Explained by GDP Growth in Transition Countries? (Theory versus the Quality of Data), Labour, 14(4), 623-643.
Silvapulle, P., Moosa, I. A., &Silvapulle, M.J. (2004), Asymmetry in Okun's Law, The Canadian Journal of Economics, 37(2), 353-374.
Tansel, A., Ozdemir, Z. A., & Aksoy, E. (2015). Unemployment and labor force participation in Turkey, IZADiscussion Paper No. 8834
Tasseven, O., Altas, D., and Un, T. (2016). The Determinants of Female Labor Force Participation for OECD Countries, International Journal of Economic Studies, 2(2), 27-38.
Thayaparan, A. (2014). Impact of Inflation and Economic Growth on Unemployment in Sri Lanka: A Study of Time Series Analysis, Global Journal of Management and Business Research, 13(5), 44-53.
Totan, L. S., Popescu, B. B., and Cristache, S. E. (2013). The impact of unemployment on economic growth in Romania, during the crisis, Romanian Statistical Review 6, 32-40
Viren, M. (2001), The Okun Curve is Non-linear, Economics Letters, 70, 253-257.
Watanabe, M. (2013). Minimum Wage, Public Investment, Economic Growth, Theoretical Economics Letters, 3, 288-291
Yam, T.K., Wu, F., Heng, T.M., Ping, J.T., Sia, H.Y. (2002), Employment Growth will Trail Economic Recovery in 2002: Evidence from Econometric Estimates. Economic Survey of Singapore, First Quarter, 45-52.
Yelwa, M., David, O. O. K., & Omonivi, A. E. (2015). Analysis of the Relationship between Inflation, Unemployment and Economic Growth in Nigeria: 1987-2012, Applied Economics and Finance, 2(3), 102-109
Yildirim, Z. (2014). The Unemployment Rate and Labor Force Participation Rate Nexus for Female: Evidence from Turkey, International Journal of Economics and Finance, 6(5), 139-146.
Zaheer, R., & Qaiser, M. S. (2016). Factors that affect the participation of female in labor force: A macro level study of Pakistan, Journal of Economics and Finance, 7(2), 20-24.