

# Causality Analysis Real Wages and Opportunities in Indonesia with a Dynamic Model Approach

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**Abstract.** Wages are one of the deciding indicators in employment opportunities, wage improvements in the economic development process are absolutely necessary. With an increase in wages, it means an increase in income, an increase in purchasing power and an increase in people's welfare. Increased income of the community will have an impact on increasing demand for goods and services, then in turn at a macro level will encourage companies to develop. This study aims to determine the effect of real wages on employment opportunities in Indonesia by using the Vector Auto Regression (VAR) approach. The data used in this study are time series data during the 1980-2015 period. The analytical method used in this study is the Vector Auto Regression (VAR) model. Estimation results show that employment opportunities and stationary real wages are at different rates using Philips-Perron. The results of the analysis did not occur co-integration in the long run. Real wages have a negative effect on employment opportunities in Indonesia. This condition illustrates that during the study period the increase in real wages that occurred in Indonesia was not followed by a balanced increase in productivity, so that an increase in real wages led to a reduction in demand for labor.

**Keywords:** Real wage causality relationship · Job opportunities

## 1 Introductions

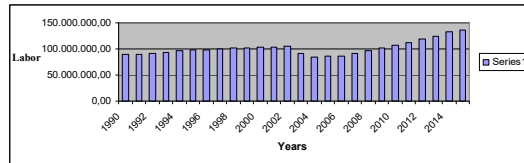
The employment problem in Indonesia is very large and complex. Great because it requires millions of workers. Complex because labor problems affect simultaneously by many interrelated factors, taking a pattern that is not easy to formulate (Tobing, 2006). Demographic factors influence the number and composition of the workforce. Indonesia has been quite successful in reducing the number of births and deaths to a full extent. However, this reverses the impact on working population growth which is much faster than overall population growth (Ananta, 2003).

There are several main problems in the labor field that discuss about Indonesia, namely the matter of employment opportunities, relatively high levels of labor force growth, low wage rates, and labor productivity, which are compared between regions, both in terms of wages and labor rates. This problem is not only related to the region, but also a national problem (Hasibuan, 2007: 32).

The creation of employment opportunities is done by growing the business world through various policies including in the fields of production, monetary, fiscal, distribution, prices and wages, exports - imports, and in the field of employment. Thus,

every decision in the field of employment and employment opportunities taken in general, always has a political dimension. Labor issues also address wages and social security issues, setting minimum wages, employment requirements, labor protection, dispute agreements, freedom of association and industrial relations, and international relations and cooperation. All of them contain economic, social and political dimensions. In other words, this employment problem has multiple dimensions, is complex and very complex.

The development of labor in Indonesia for the period 1990-2015 can be seen in Figure 1:



Source: Department of Population and Labor Mobility of Indonesia, (data processed, 2016)

**Fig. 1.** Development of Manpower in Indonesia Period 1990-2015.

From Figure 1 illustrates the development of labor in Indonesia, shows. In 1990 the workforce in Indonesia was 89,794,936 people, then in 1991 it increased by 0.53 percent or to 90,273,568 people. In 1992 the number of workers in Indonesia increased again to 91,230,888 people, this situation continued to increase each year until 2002 the workforce in Indonesia reached 104,631,968.00 people. In 2003 it decreased by 11.94 percent or 92,142,064.00 people. In 2004 the workforce in Indonesia again decreased by 85,268,624.00 people or 7.46 percent. The development of the number of workers in Indonesia until 2005 has increased again and in 2006 has decreased again, however the number of workers in Indonesia over time with increasing population conditions and improving economic conditions, the number of workers in Indonesia is also increasingly increased, namely in 2015 reaching 135,541,032 inhabitants.

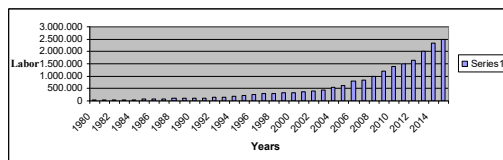
For employers, wages are seen as a cost burden thus encouraging employers to act rationally, namely by setting wages equal to the marginal value of products of labor. However, the government's policy which requires employers to take into account the Minimum Physical Needs of workers in setting wages has caused the average wage rate of workers to increase, because now the wages received by some workers are higher than the marginal product value it produces.

This Regional Minimum Wage Policy often brings criticism from the business community. Because in reality the productivity level of most workers is still below the minimum wage level, the establishment of the minimum wage is seen as an increase in production costs. The way out by entrepreneurs to ensure their business continuity is to increase the selling price of products or reduce the amount of labor used. Both of these alternatives have consequences for labor. The decision of employers to increase the selling price of products will lead to inflation, and that means that the real wages received by workers do not increase. On the other hand, if the solution taken by the employer is to lay off some workers, then that means there is unemployment.

The minimum wage was first introduced in Indonesia in the early 1970s, and in the later stages of the 1980s along with changes in the labor market, once a minimum wage became important. In the first half of the 1990s the government more than doubled the

real minimum wage. In the second half of the 1990s nominally the minimum wage continued to increase but in real terms the increase was small. Even in 1998 the real value of the minimum wage fell quite large because of high inflation in that year due to the economic crisis that hit Indonesia.

The development of real wages in the 1980-2014 period in Indonesia is seen in Figure 2.



Source: BPS Indonesia, 2014

**Fig. 2.** Development of Real Wages in Indonesia Period 1980-2015.

From Figure 2 illustrates that the development of real wages in Indonesia shows a progressively increasing development. Starting from 1980 the real wage in Indonesia was Rp. 20,000 \ months until 1990 real wages in Indonesia increased to Rp. 110,000 \ month, then in 1990 it increased to Rp. 120,000 \ month. In 1992 real wages in Indonesia again increased to Rp.140,000 \ month, this situation continued to increase each year until 2009 real wages in Indonesia reached Rp. 1,200,000 \ month. This increase continued until 2015. As inflation continued to increase, real wages also increased. Where the real wage is the lowest monthly wage with work time 7 hours a day or 40 hours a week for the 6 day work system and 8 hours or 40 hours a week for the work system 5 days a week.

This study aims to find out how much influence the real wage has on employment opportunities in Indonesia. Job opportunities can be interpreted as an employment or all types of jobs available where workers to make a living to meet their needs.

Djojohadikusumo (2000: 27) defines employment opportunities as positions that arise both inside and outside the company as a result of investment and population growth and the labor force on the one hand will affect the problem of unemployment and expansion of employment opportunities. In addition, employment opportunities can also be interpreted as the number of residents who work or those who have already gotten a job. The more people who work the more extensive job opportunities (Esmara, 2002: 134).

Job opportunities contain an understanding of business opportunities or opportunities available to work as a result of an economic activity, thus employment opportunities include jobs that have been filled and employment opportunities can also be interpreted as participation in development (Sagir, 2004: 52). Based on the definitions of the two descriptions above, it can be concluded that employment opportunities are the number of people who participate in development by doing a job and receive the results of the development.

The definition of employment opportunities or groups of people who work according to the population census in 1980 and 1990 are those who during the week before enumeration did a job with the intention of earning income with working time of at least one hour. This group also includes those who during the week before

enumeration did not do work or worked for less than an hour, but had a permanent job, but while they did not work because of illness, strike and others (BPS, 1999: 32).

Specifically, a request describes the maximum amount of labor employed by the employer to be employed at each possible wage level within a certain period of time. The demand for labor by employers can be seen in the short run (short run) and long run (long run). In the short term employers are more likely to increase employment if they want to increase production. In the long run, the tendency of companies to substitute towards the use of relatively cheaper inputs. The amount of labor demanded, both in the short term and in the long term has a negative relationship with wage levels.

According to Connell, (2009: 133) changes in labor demand can be influenced by various factors, namely the demand for production (output) produced by labor, labor production, the amount of labor available in the labor market, and the price of other resources (substitute goods).

The terminology of wages means labor income received from the employer because he is considered to have done work (Soepomo, 2002: 152). From the above understanding, there are several things that cause given wages to someone. First: wages are earned because of services that have been given by someone to the owner of the object of work in accordance with the work (Kartasapoetra, 2007: 93). Second: wages are earned because someone has done work that should be done or not doing work, because of the dispensation for workers who are sick or unable for reasons that are acceptable to both employers, this is contained in Government Regulation No. 8 of 1981 concerning wage protection (the drafting team of the Republic of Indonesia Department of Labor, 1996: 21 Article 5 Paragraph (1) Letter a).

The National Wage Research Council, states that wages are an acceptance as a reward from the employer to the recipient of work for a job or service that has and will be carried out as a guarantee of a decent survival for humanity and the production is expressed or valued in the form of money stipulated according to an agreement, law or regulation and paid on the basis of an employment agreement between the employer and the recipient of work (Handoko, 2005: 118).

According to Law No. 33 of 1947, concerning compensation payments to workers who had an accident related to work relations. Article 7 Paragraphs (a) and (b) referred to as wages are:

- a. Each payment is in the form of money received by workers in exchange for work.
- b. Housing, food, food and clothing are useless, the value of which is estimated at the general price in that place.

According to Priso (2006: 79) wages or salaries can be seen as a reward or repayment to workers for the production output that has been produced, while the minimum wage is the lowest wage that has been calculated as a basis for the provision of wages that should be sufficient to be used as a survival cost the worker and his family according to their level of need (Kartasapoetra, 2007: 158).

In the economy there are various types of goods and services. From year to year they experience price increases / changes that are not uniform. There is a high price increase and there is a relatively slow increase in price. In addition, various types of goods are very different interests in human life. Some are often bought by consumers, such as food, clothing and rental homes. There are also those whose purchases are not made too often such as buying houses and cars, or traveling abroad. This difference has

a different effect on the welfare of the community if the prices of these items become higher. The problems just described cause difficulties in trying to show the rate of change in prices prevailing in an economy from year to year. This in turn makes it difficult to calculate real wages from year to year.

Each country usually describes changes in prices in its economy by creating a price index, which is an index that gives an idea of the average level of changes in prices over time. One of these price indices is the Consumer Price Index (CPI). This price index can be used to estimate the real wages of workers from year to year (Sukirno, 2012: 352).

Ferdinand (2011) said that the factors that significantly affected employment in the Province of West Sumatra in 2005-2010 were government spending and the amount of Gross Regional Domestic Product (GRDP) which had a positive effect. While real wages have a negative effect on employment. Meanwhile Nazamuddin (1998) the unemployment rate in a place is negatively correlated with the level of wages in that place, so that an area or country where the wage level is relatively high, there is low unemployment. Increasing the level of wages, thus should not have an impact on rising unemployment. On the other hand Nindya and I Wayan (2014), that real wages have a significant negative effect on employment. An increase in real wages will reduce labor absorption. In contrast to research conducted by Setiya (2013) the real wage variable has a positive and significant effect on employment with  $\alpha$  5%.

## 2 Materials and Methods

The data used in this study are time series data for the period 1980 - 2015. The analytical method used in this study is multivariate vector autoregression (VAR). Before arriving at the VAR analysis there are several estimation steps that will be used in the analysis, which consists of:

1. Test data stationarity and degree of integration
2. Determination of the lag length
3. Granger causality test
4. VAR estimation
5. Variance Decomposition

Where :

KK = Job Opportunity

UR = Real Wage

## 3 Results and Discussion

### 3.1 Stationary Test / Unit Root (Unit Root Test)

Stationarity testing is the initial stage before estimating the time series model. Time series data that is directly analyzed will cause spurious in the results because in these

variables often contain unit root. Therefore it is necessary to do a unit root test to see the time series data stationarity. Unit root test is done by the Philips-Perron (PP) method.

**Table 1.** Unit Root Test with Philips-Perron.

Variable	Probabilitas
	2th Difference
KK	0.0000
UR	0.0000

Source: Data Processing Results, 2019

The hypotheses tested were  $H_0: \beta_1 = 0$  (indicating the presence of a root unit or non-stationary data) and  $H_1: \beta_1 \neq 0$ . Here  $\beta_1$  is the PP value. If the PP probability value is greater than the alpha testing level, then the hypothesis  $H_0$  which states that the data contained in the root unit is rejected means that the time series data is stationary, and vice versa. Based on the unit root test results from Table 1, it can be explained that at a significance level of 5 percent, the real variable wage (UR) and employment (KK) has a PP probability value smaller than the 5 percent alpha testing level on lsecond different or I (0).

### 3.2 Determination of Optimal Lag

In determining the optimal lag the values of likelihood ratio (LR), final prediction error (FPE), Akaike information criterion (AIC), Schwarz information criterion (SIC), and Hannan-Quin criterion (HQ) are used. The optimal lag length chosen based on the criteria above is shown in Table 2.

**Table 2.** Optimal Lag Length Based on Several Criteria.

Lag	LogL	LR	FPE
0	-1060.116	NA	3.10e+25
1	-944.4201	210.3561	3.56e+22
2	-936.7871	12.95305	2.87e+22
3	-928.7292	12.69731*	2.26e+22*

Source: Data Processing Results, 2019

Based on Table 2 the LR and FPE criteria choose lag order 3. Thus in this study the optimal lag length that will be used is 3.

### 3.3 Cointegration Test

Cointegration test is a test of whether there is a long-term relationship between independent and dependent variables, this test is a continuation of the unit root test (Unit Root Test) and the degree of integration test (Integration Test). Cointegration test results are seen by comparing the value of the trace test and max-eigen test with the value of critical value. Cointegration test results can be seen in Table 3.

**Table 3.** Cointegration Test Results.

Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.627615	38.95965	25.872	0.00
At most 1	0.175327	6.361346	12.517	0.41

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level

\* denotes rejection of the hypothesis at the 0.05 level

\*\*MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Source: Data Processing Results, 2019

From Table 3 shows that of the two variables tested only one variable occurred cointegration so that from the test results it was stated that the two variables tested did not have cointegration.

### 3.4 Granger Causality Analysis

Causality analysis shows a causal relationship. To know the characteristics of causality relationships, namely changes in a variable that is more influential on other variables, it requires a Granger causality test. To find out the results of the causality test can be seen in Table 4.

**Table 4.** Granger Causality Test Lag 8.

Null Hypothesis:	Obs	F-Statistic	Prob.
UR does not Granger Cause KK	34	6.59548	0.0044
KK does not Granger Cause UR		0.67572	0.5166

Source: Data Processing Results, 2019

From the results of the Granger causality test in Table 4 it can be explained, UR has a one-way causality with KK, meaning that real wages are suitable for use as independent variables and employment opportunities as dependent variables.

### 3.5 Vector Autoregression Estimates Analysis

As previously explained that there are two research variables that are stationary in the second difference so that all variables can be said to be integrated in degree 2 or I (2). Furthermore, the estimated VAR will be performed on the second difference with

endogenous variables DDKK and Cholesky Ordering DDUR → DDKK as follows (statistics t [...]): Equation ..... 1

Vector Autoregression Estimates

	DDKK	DDUR
DDKK(-1)	1.396190 (0.20576) [ 6.78556]	-0.000506 (0.00302) [-0.16743]
DDKK(-2)	-0.516275 (0.33416) [-1.54500]	-0.005122 (0.00490) [-1.04453]
DDKK(-3)	-0.021707 (0.19158) [-0.11331]	0.003464 (0.00281) [ 1.23210]
DDUR(-1)	17.16994 (14.6278) [ 1.17379]	0.621151 (0.21467) [ 2.89346]
DDUR(-2)	-18.91750 (19.8429) [-0.95337]	0.084022 (0.29121) [ 0.28853]
DDUR(-3)	4.582129 (17.5102) [ 0.26168]	0.627216 (0.25698) [ 2.44077]
C	12297440 (6513920) [ 1.88787]	188244.6 (95596.6) [ 1.96916]
R-squared	0.951448	0.995176
Adj. R-squared	0.939309	0.993970
F-statistic	78.38511	825.2033

Source: Data Processing Results, 2019

From equation 1 partially, the real wage has a negative effect on employment in Indonesia in the first period, as well as in the second period, the real wage still has a negative effect on employment opportunities in Indonesia, meaning that if there is a shock to an increase in the real wage, employment opportunities will decrease and vice versa. This is due to the increase in real wages that occur not followed by an increase in balanced productivity, so that an increase in real wages encourages a reduction in demand for labor.



R square value of 0.95 shows that the real wage is able to explain employment opportunities by 95 percent and the remaining 5 percent is explained by other variables outside this research model.

### 3.6 Analysis of Variance Decomposition

Variance decomposition provides estimates of how much a variable contributes to changes in the variable itself and other variables in the coming periods.

**Table 5.** Variance Decomposition.

Variance Decomposition of DDKK:			
Period	S.E.	DDKK	DDUR
1	2838612.	100.0000	0.000000
2	4847961.	97.86369	2.136308
3	6289431.	97.66674	2.333265
4	7073693.	97.50407	2.495928
5	7451087.	96.53752	3.462478
6	7609198.	95.24495	4.755048
7	7672046.	93.88854	6.111461
8	7755015.	92.16676	7.833236
9	7904401.	90.14906	9.850943
10	8125281.	88.03926	11.96074

Source: Data Processing Results, 2019

Table 5 shows that in the first period 100 percent of the variability of employment is explained by the average employment itself, while the real variable is zero percent. In the second period the variability of employment opportunities is explained by the average employment opportunity itself of 97.83 percent, while from the real wage variable of 2.13 percent. In the third period the variability of employment opportunities is explained by the average employment opportunity itself of 97.66 percent, while that of the real wage variable is 2.33 percent. Up to ten percent of the variability of employment opportunities is explained by the average employment opportunity of 88.03 percent, while from the real wage variable of 11.96 percent.

## 4 Conclusion

- Based on the estimation results of the two variables analyzed, namely employment opportunities and stationary real wages at different securities using Philips-Perron.
- Of the two variables analyzed, it turns out that cointegration does not occur in the long run.
- Real wages affect employment opportunities by 95 percent and the remaining 5 percent are explained by other variables outside this research model.

- d. Real wages have a negative effect on employment opportunities in Indonesia. This is due to an increase in real wages that does not occur followed by an increase in balanced productivity, so that an increase in real wages drives a reduction in demand for labor.

## 5 Recommendation

- a. It is expected that the government is able to maintain the minimum wage of labor every year by considering the ability of the company so that there is no termination of employment (PHK), so that the power consumption of workers who receive wages with the standard Wage Rill does not experience a decline.
- b. Then the government is also expected to stabilize inflation, by issuing regulations such as imposing sanctions on traders who sell goods at high prices.
- c. Considering the very limited ability of large and medium industrial sub-sectors to absorb labor, the government should focus more attention on developing small and household industries, especially in the form of facilities to obtain capital and at the same time guidance and guidance in increasing efficiency.

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