Etikonomi
Volume 17 (1), 2018: 1 - 10
P-ISSN: 1412-8969; E-ISSN: 2461-0771

Determinants of Inflation in the Local Economy

Jaka Sriyana

Abstract. *This research analyzes the determinants of inflation rate in the local economy. It uses co-integration and vector error correction to capture the long and short run relationship between inflation rate and other economic variables. We find that the determinants of inflation rate in Yogyakarta are minimum wage, economic growth, and monetary variables indicated by BI-rate. More finding, exchange rate also contributes to the price change. This research finds evidence of long-run causality between minimum wage and inflation and unidirectional relationship from wage to inflation in the short run. This finding confirms the proposition of non-neutrality wage on price changes. The inflation rate in the local economy depends not only on the regional indicator but also depends on international changes reflected in the exchange rate. Monetary variable indicated by BI- rate also partially contributes to the price changes at the local level. Overall, the local government has successfully managed the price changes.*

Keywords: *inflation, co-integration, adaptive, monetary, exchange rate*

Abstrak. *Penelitian ini menganalisis faktor-faktor penentu tingkat inflasi dalam perekonomian lokal. Penelitian ini menggunakan pendekatan kointegrasi dan model koreksi keslaahan untuk mengungkap hubungan jangka panjang dan jangka pendek antara tingkat inflasi dengan variabel ekonomi lainnya. Penelitian ini menemukan bahwa faktor penentu tingkat inflasi di Yogyakarta adalah upah minimum, pertumbuhan ekonomi, dan variabel moneter yang ditunjukkan oleh BI rate. Temuan lainnya, nilai tukar juga berkontribusi terhadap perubahan harga. Penelitian ini menemukan bukti adanya kausalitas jangka panjang antara upah minimum dan inflasi dan hubungan searah dari upah terhadap inflasi dalam jangka pendek. Temuan ini menegaskan proposisi upah non-netral terhadap perubahan harga. Tingkat inflasi dalam perekonomian lokal tidak hanya bergantung pada indikator regional tetapi juga bergantung pada perubahan internasional yang tercermin dalam nilai tukar. Variabel moneter yang ditunjukkan oleh BI rate juga berkontribusi secara parsial terhadap perubahan harga di tingkat lokal. Secara keseluruhan, pemerintah daerah telah berhasil mengelola perubahan harga.*

Kata kunci: *inflasi, kointegrasi, adaptif, moneter, nilai tukar*

How to Cite:

Sriyana, J. (2018). Determinants of Inflation in The Local Economy. *Etikonomi: Jurnal Ekonomi*. Vol. 17 (1): 1 – 10. doi: http//dx.doi.org/10.15408/etk.v17i1.7146.

Received: January 8, 2018; Revised: February 9, 2018; Accepted: February 15, 2018
Dept of Economics, Universitas Islam Indonesia. Ring Road Utara, Condongcatur, Yogyakarta, Indonesia
E-mail: jakasriyana@uii.ac.id
DOI: htttp://dx.doi.org/10.15408/etk.v17i1.7146

Introduction

Regional economies in Indonesia have experienced various problems. Problems relating to several economic indicators such as inflation rate, economic growth, fiscal capacity, and exchange rate (Caraka & Sugiyarto, 2016; Tirtosuharto & Adiwilaga, 2013). Inflation is the most important issue which reported at the end of the year as a local economic indicator. Focusing on price changes issue is reasonable since this variable indicates not only economic stability but also affects social welfare in the country (Afandi, Wahyuni, & Sriyana, 2017).

Some papers mentioned that many factors including economic and noneconomic variables might determine inflation (Caraka & Sugiyarto, 2016; Fuddin, 2014; Hossain, 2005). The inflation rate in Indonesia regional economies depend on not only domestic economic variables but also depends on international changes (Duncan & Martínez-García, 2015). The phenomena of international dynamic changes potentially determine local inflation. The international economic linkages in among some countries in the region such as Asian countries cause price transmission from one to other countries.

The main economic factors that may affect inflation in the local economy are output, wage, exchange rate, and other monetary variables. Besides these several economic variables, behavior perception of economic agents such as expectation and psychological factors also potentially contribute to the inflation rate. Economic growth, money supply, wage, and exchange rate dominate the source of price changes (Bozkurt, 2014; Dritsaki, 2016). The relationship between inflation, economic growth, and wage is possible both in the long run and short run. Some papers find evidence of such long-run relationship (Dritsaki, 2016; Ladu & Meleddu, 2016). Other papers find opposite evidence that there is no relationship between output and inflation (Hervino, 2016). Regional wage and economic growth are two variables which potentially affect the inflation rate. Increasing of wage in the local economy will positively shift market demand, and finally, it causes higher prices.

The impact of the international condition on inflation through financial market mechanism indicated by the impact of exchange rate on inflation (Caraka & Sugiyarto, 2016; Duncan & Martínez-García, 2015). The exchange rate movement affects the domestic commodity price through the international trade mechanism. As a small open economy, Indonesia potentially absorbs the regional world price to domestic inflation. The price level in across provinces will adjust to inflation at the national level.

Another factor that may affect price change which also represents the economic agent's behavior is expectation factor (Hervino, 2016). This research attempt to complete the previous findings regarding determinant of inflation rate in the local economy. We emphasize on the analysis of the long-run relationship between inflation and its determinants using co-integration approach. Moreover, this study also analyzes the role of adjustment and adaptive behavior of economic agents in determining inflation.

Method

The analysis involves several variables including inflation (INF), provincial minimum wage (MW), gross regional domestic product (GRDP), exchange rate (ER), and central bank

http://journal.uinjkt.ac.id/index.php/etikonomi
DOI: http://dx.doi.org/10.15408/etk.v17i1.7146

interest rate (BI-rate). Data INF, MW, and GRDP are from Statistic of the special province of Yogyakarta /Daerah Istimewa Yogyakarta (https://yogyakarta.bps.go.id/). Meanwhile, data ER and BI-rate are from Bank Indonesia (http://www.bi.go.id/en/).

The dynamic analysis of a set of economic variables presents the long and short-run relationship of the data. A long run analysis involves co-integration test meanwhile a short run analysis uses such as error correction model. Co-integration approach process a set of stationary time series data to test whether some variables have long run relationship. The data is in the stationary if its mean and variance are zero and constant over time. The level data is usually not in stationary properties. Otherwise, the data will be stationary in the first difference form. Augmented-Dicky-Fuller (ADF) test provides a testing procedure for stationary or not stationary data (Dicky & Fuller, 1981).

Test of stationary of the variables is a prerequisite process for conducting co-integration analysis. A variable is integrated into order *d* if the variable requires differentiation *d* times to achieve its stationary. It the variable has reached stationary at first difference, we can write in *I*(1). After completing the stationary test for all variables and we find that the data stationary in first difference, then we can run the co-integration analysis.

Johansen's multivariate procedure is one of popular approach for the co-integration analysis (Johansen, 1991). This method provides vector autoregression (VAR) model finding the co-integration equation of time series data. Co-integrating equation presents a long run relationship with a set of the variables. Test of some cointegrating vectors uses the maximum eigenvalues (λ_{max}) and trace statistics. The null hypothesis of at least r cointegrating vectors against the alternative hypothesis of full rank based on the likelihood ratio trace test. The probability value of rejecting or accept this hypothesis uses statistics critical values from Osterwald–Lenun (1992). If we reject at least a null hypothesis statement, it implies that co-integrating relationship in the set of variables is true.

After conducting co-integration analysis which provide long rung relationaship of set of time series data, further we analyze the short run behaviour of such variables. A dynamic model, vector error correction model (VECM) is appropriate model explaining this phenomena. The short run model using VECM will captures short run disequilibrium among variables. The econometric models regarding variables such as inflation (INF), GRDP, MW, ER, BI-rate are as follows:

$$\Delta Inf_t = a_1 + \sum_{i=1}^{m} b_i \, \Delta MW_{t-i} + \sum_{i=1}^{n} c_i \, \Delta Inf_{t-i} + \sum_{i=1}^{p} d_i \, \Delta GRDP_{t-i} + \sum_{i=1}^{q} e_i \, \Delta ER_{t-i} + \sum_{i=1}^{s} f_i \, \Delta BI\text{-}rate_{t-i} + \gamma_1 \, ECT_{1t-1} + w_t \quad (1)$$

$$\Delta MW_t = a_2 + \sum_{i=1}^{m} g_i \, \Delta MW_{t-i} + \sum_{i=1}^{n} h_i \, \Delta \, Inf_{t\,t-i} + \sum_{i=1}^{p} j_i \, \Delta GRDP_{t-i} + \sum_{i=1}^{q} k_i \, \Delta ER_{t-i} + \sum_{i=1}^{s} l_i \, \Delta BI\text{-}rate_{t-i} + \lambda_2 \, ECT_{2t-1} + v_t \quad (2)$$

$$\Delta GRDP_t = a_3 + \sum_{i=1}^{m} l_i \, \Delta MW_{t-i} + \sum_{i=1}^{n} m_i \, \Delta \, Inf_{t\,t-i} + \sum_{i=1}^{p} n_i \, \Delta GRDP_{t-i} + \sum_{i=1}^{q} o_i \, \Delta ER_{t-i} + \sum_{i=1}^{s} p_i \, \Delta BI\text{-}rate_{t-i} + \lambda_3 \, ECT_{3t-1} + v_t \quad (3)$$

$$\Delta ER_t = a_4 + \sum_{i=1}^{m} q_i \, \Delta MW_{t-i} + \sum_{i=1}^{n} r_i \, \Delta \, Inf_{t\,t-i} + \sum_{i=1}^{p} s_i \, \Delta GRDP_{t-i} + \sum_{i=1}^{q} t_i \, \Delta ER_{t-i} + \sum_{i=1}^{s} u_i \, \Delta BI\text{-}rate_{t-i} + \lambda_4 ECT_{4t-1} + v_t \quad (4)$$

$$\Delta BI\text{-}rate_t = a_5 + \sum_{i=1}^{m} v_i \, \Delta MW_{t-i} + \sum_{i=1}^{n} w_i \, \Delta \, Inf_{t\,t-i} + \sum_{i=1}^{p} x_i \, \Delta GRDP_{t-i} + \sum_{i=1}^{q} y_i \, \Delta ER_{t-i} + \sum_{i=1}^{s} z_i \, \Delta BI\text{-}rate_{t-i} + \lambda_5 \, ECT_{5t-1} + v_t \quad (5)$$

The estimation procedure of these equations uses least square method in which the optimum lags length of the variables based on information criteria such as Schwarz Criterion and Akaike Information Criterion (AIC). The uniqe indicator of empirical model that presents a short run dynamic relationship amon the variables is the coeficient of error correction term, λ. This coefficient is about 0-1 and has negative value indicating adjustment process. A significant λ in equation (1-5) indicate existing of short run relationship among variables in the equation representing the disequilibrium relationship among the variables in the equation. The error correction term also provides adjustment level from short run deviations to its long-run equilibrium.

This research attempts to reveal the determinant of inflation not only from economic variables, but also to explore the causes of inflation from the behavior perspective. Regarding the inflation rate, adaptive and adjustment process are important factors in the economy. For this purposes, we also analyze an empirical model of inflation using partial adjustment model and adaptive model. The first model is in (6) meanwhile for the second approach is in (7).

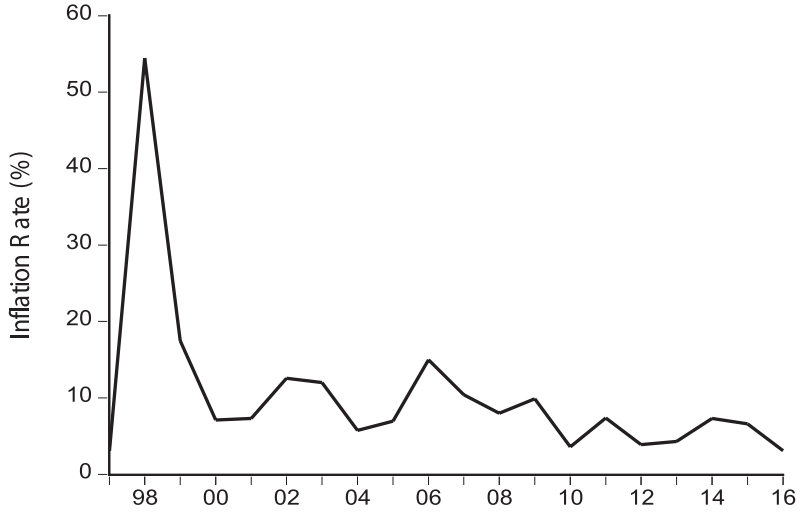
$$Inf_t = a_1 + b_1 MW + b_2 \, GRDP + b_3 \, ER + b_4 \, BI\text{-}rate + b_5 \, Inf_{t-i} + v_t \quad (6)$$

$$Inf_t = c_1 + d_1 MW_{t-i} + d_2 GRDP_{t-i} + d_3 \, ER_{t-i} + d_4 \, BI\text{-}rate_{t-i} + b_5 \, Inf_{t-i} + w_t \quad (7)$$

Results and Discussion

Figure 1 describes the inflation rate for the period 1997-2016 in the province. As an impact of financial crisis, the highest inflation occurred in 1998, as well as in the national inflation which is more than that level. The recent years the domestic process is lower the several years before. Overall, based on the inflation in this period, the provincial government has successfully managed the domestic commodities price.

Figure 1. Inflation Rate in Yogyakarta Special Province, 1997-2016



http://journal.uinjkt.ac.id/index.php/etikonomi
DOI: htttp://dx.doi.org/10.15408/etk.v17i1.7146

Table 1 presents the indicators of statistical descriptive of the data. We can see the mean, median, maximum, minimum, and standard deviation of each variables. Table 1 shows that the mean of annual inflation is 10.98%. Besides that, the average of gross regional domestic bruto is IDR 31.89 trillion.

Table 1. Descriptive Statistic of Variables

Statistical Indicators	Annual Inf. (%)	GRDP (Trillion of IDR)	Provincial Min. Wage (IDR)	Exchange Rate (IDR/$)	BI-rate (%)
Mean	10.98	31.89	495.51	9665.65	9.44
Median	7.32	36.89	430.00	9353.50	6.90
Maximum	77.46	87.68	1044.50	16800.00	70.80
Minimum	2.51	11.88	96.00	2583.00	1.68
Std. Dev.	16.06	26.10	314.23	2822.86	14.63

Meanwhile, the result of Augmented Dicky Fuller (ADF) procedure presents that the data series of variables are stationary in first difference (Table 2). This result implies we can conduct the co-integration test among the variables.

Table 2. ADF Unit Root Test

	Level		First Difference	
Variables	ADF	Probability	ADF	Probability
INF	-4.3	0.03**	-11.09	0.0000***
MW	0.66	0.98	-3.31	0.02**
GRDP	-1.50	0.51	-4.043	0.02**
ER	-0.15	0.62	-5.94	0.0002***
BI-rate	-1.160	0.21	-4.14	0.006***

Note: ***, ** indicate significant at 1 and 5 percent respectively.

Co-integration test involves a set of series data that has stationary in the same degree of integration (Engle & Granger, 1987). The results of the co-integration test using Johansen procedure with one lag finds two co-integrating vectors (Table 3). The equations show a long run relationship between inflation and other variables. It indicates that in the long run, inflation rate depends on local economic growth, provincial minimum wage level and monetary variables indicated by exchange rate and BI-rate. If a set of variables is co-integrated, it indicates the existence of causality relationship in at least one direction (Engle & Granger, 1987). This finding implies that vector error correction model is feasible for further short-run analysis.

Table 3. Empirical Johansen Co-integration Test

Series: INF MW GRDP ER BI-rate Lags interval (in first differences): 1 to 1				
Hypothesized No. of CE(s)	**Eigenvalue**	**Trace Statistic**	**0.05 Critical Value**	**Probability****
None *	0.93	112.90	69.81	0.0000
At most 1 *	0.85	64.46	47.85	0.0007
At most 2	0.63	29.77	29.79	0.05
At most 3	0.47	11.79	15.49	0.16
At most 4	0.01	0.24	3.84	0.61

Trace test indicates two cointegrating equation(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis p-values

The results of vector error correction estimation summarize short-run dynamic relationship among the mentioned variables (Table 4). Only two variables affect inflation rate, minimum wage, and exchange rate although at 10 percent significance. These imply that wage level will contribute to the domestic price especially in this region. The significant effect of exchange rate on inflation on the local economy confirms the import inflation in the short time (Duncan & Martínez-García, 2015).

Table 4. Empirical VECM Estimation

Coefficients	**Δ (INF)**	**Δ (MW)**	**Δ (GRDP)**	**Δ (ER)**	**Δ (BI-rate)**
CointEq1	-0.20	-94.93	-6.49	28.66	0.17
	[-10.05]***	[-0.83]	[-0.11]	[6.94]**	[7.37]***
Δ (INF(-1))	-0.67	5487.29	-1281.10	-145.28	-0.30
	[-1.26]	[1.79]*	[-0.84]	[-1.31]	[-0.47]
Δ (MW(-1))	0.007	0.09	0.04	-0.013	-0.007
	[1.51]*	[0.34]	[0.31]	[-1.42]	[-1.29]
Δ (GRDP(-1))	0.01	-1.17	0.20	0.008	0.01
	[1.03]	[-1.38]	[0.48]	[0.26]	[0.84]
Δ (ER(-1))	0.01	-12.87	4.66	1.63	0.007
	[4.64]***	[-1.10]	[0.81]	[3.88]***	[2.93]***
Δ (BI-rate(-1))	-0.47	-5227.75	719.26	-51.32	-0.46
	[-0.91]	[-1.78]	[0.49]	[-0.48]	[-0.75
C	-2.16	50.84	-3.44	232.4768	-0.450805
	[-0.67]	[2.77]***	[-0.38]	[0.35]	[-0.11]
Adj. R-squared	0.92	-0.05	-0.38	0.84	0.85
F-statistic	36.12	0.85	0.21	16.73	17.94
Akaike AIC	6.91	24.20	22.79	17.56	7.27
Schwarz SC	7.25	24.55	23.14418	17.91	7.62

Note: $\Delta X = \log (X_t) - (X_{t-1})$. Values in the parenthes are t-statistic. ***, **, and * indicate significant at 1, 5, and 10 percent respectively.

Meanwhile, the insignificant impact of BI-rate indicating the neutrality of the monetary sector on the real sector in this area. The results also reject the concept of Cambridge equation

http://journal.uinjkt.ac.id/index.php/etikonomi
DOI: htttp://dx.doi.org/10.15408/etk.v17i1.7146

which states causality relationship between inflation and output. In this research, we highlight that gross regional domestic product and price is neutral.

Table 5. Causality Test of Inflation and Minimum Wage

Dependent Variable	Intercept	F-Statistic of Restriction Test		ECT Coefficient
		Δ Inflation	Δ Minimum Wage	
Δ Inflation	-7.36		(24.07)***	5.15
	(-1.98)*			(2.05)**
Δ Minimum Wage	5.52			-21.05
	(2.49)**			(-1.75)*
		(0.93)		
Short run model: Minimum Wage ⟶ Inflation				
Long run model: Minimum Wage ⟷ Inflation				

Note: ***, **, and * indicate significant at 1, 5, and 10 percent.

The coefficient of the error term in the inflation equation is statistically significant indicating the adjustment process from short-run disequilibrium toward its long-run equilibrium. A negative value of this coefficient indicates the economic agents anticipate the causes of price shocks in the short term. Since the error correction term in wage equation is not significant, it implies that price level restores to equilibrium in a univariate relationship. Both all coefficient of error correction term in inflation and wage equations are negative indicating price level, and wage adjusts in the same direction to the previous period's deviation from their equilibrium. The coefficient of the error term in inflation equation is -0.20 indicating about 20% of the price disequilibrium is corrected within one year.

The empirical based on the VECM present unidirectional relationship between inflation minimum wage. However, we can extend the analysis using the nested test in this model. It uses F-statistic for restriction test of selected independent variables to test the hypothesis of causality relationship. We find a significant restriction in inflation equation meanwhile in minimum wage equation does not (Table 5). Since both coefficients of error correction term are significant in these models, it implies the existence of causality between inflation and minimum wage in the long run. The restriction test of inflation variable in the wage equation gives insignificant F-statistic value. It means that inflation may be dropped from the model. This empirical estimation presents one direction relationship between price and wage in the short run that is from inflation to wage level.

Table 6. Empirical Granger Causality Test

Null Hypothesis:	F-Statistic	Probability
MW does not Granger Cause INF	6.90	0.009***
INF does not Granger Cause MW	0.85	0.44
GRDP does not Granger Cause INF	9.49	0.002***
INF does not Granger Cause GRDP	0.75	0.48
ER does not Granger Cause INF	2.70	0.10*
INF does not Granger Cause KURS	38.40	0.0003***
BI-rate does not Granger Cause INF	0.87	0.44
INF does not Granger Cause BI-rate	120.7	0.0004***

Note: ***, **, and * indicate significant at 1, 5, and 10 percent.

To ensure whether the causality between price and minimum wage exists we can use another alternative approach that is Granger causality test. This procedure based on bivariate restriction using F-statistic. The estimation results reject the hypothesis of causality relationship between these variables (Table 6). Based on the empirical model, it explains the unidirectional relationship, which is from minimum wage to inflation. It means an increase in the minimum wage leads to price increases (Dritsaki, 2016; Ladu & Meleddu, 2016). Unfortunately, the government regulation on wage minimum decision has not accommodated the inflation rate.

Table 7. Estimation Result of Partial Adjustment Model

Dependent Variable: INF				
Independent Variables	**Coefficient**	**Std. Error**	**t-Statistic**	**Probability**
C	99.79	20.74	4.81	0.0004***
MW	0.0001	0.004	2.32	0.03**
GRDP	-1.48	0.64	-2.29	0.04**
ER	-0.008	0.002	-2.92	0.01***
BI-rate	0.016	0.70	0.02	0.98
INF(-1)	0.80	0.72	1.09	0.29
R-squared	0.64	Mean dependent var		11.33
Adjusted R-squared	0.50	S.D. dependent var		16.86
F-statistic	4.40	Durbin-Watson stat		1.31
Prob(F-statistic)	0.016			

Note: *** and ** indicate significant at 1 and 5 percent.

The finding of determinants of inflation rate in this research leads to explore more aspects that may cause a price increase. Next analysis comes to the elaboration of the role of economic agents behavior. It widely accepts that economic agents adjust to achieve their equilibrium. Therefore we analyze the aspect of adjustment and adaptive behavior to capture the inflation rate. Unlike in the previous analysis which we apply dynamic approach, the study of adaptive and adjustment process use single equation regression. Table 7 presents the empirical model of partial adjustment. Meanwhile, table 8 provides the estimation results of the adaptive model. As a result, the partial adjustment confirms the impact of minimum wage and exchange rate on inflation as well as the result of VECM and Granger causality. This model also presents the effect of output on inflation (Bozkurt, 2014; Hossain, 2005). This model does not confirm the adjustment process of the economic agents to price change.

The result of the adaptive model gives unique and different perspective. First, the adaptive process of economic agents exists regarding the price changes. The coefficient of previous inflation rate indicates the economic agents adapt to the inflation rate in the high level. Moreover, monetary variables that are exchange rate and BI-rate significantly determine

http://journal.uinjkt.ac.id/index.php/etikonomi
DOI: htttp://dx.doi.org/10.15408/etk.v17i1.7146

inflation rate. This finding confirms that real sector indicated by price is not neutral from the monetary sector (Antoni, 2011; Purwanda & Rochana, 2017). Again, as well as the result analysis using VECM and Granger causality, this estimation supports the phenomenon that domestic inflation in this region partially comes from other countries.

Table 8. Estimation Result of Adaptive Model

Dependent Variable: INF				
Independent Variables	**Coefficient**	**Std. Error**	**t-Statistic**	**Probability**
C	91.56	18.04	5.07	0.0002***
MW(-1)	0.003	0.004	0.82	0.42
GRDP(-1)	-0.46	0.599	-0.78	0.44
ER(-1)	-0.008	0.0017	-5.40	0.0001***
BI-rate(-1)	0.84	0.25	3.34	0.005***
INF(-1)	-0.56	0.18	-3.03	0.009***
R-squared	0.77	Mean dependent var		10.91
Adjusted R-squared	0.68	S.D. dependent var		16.48
F-statistic	8.93	Durbin-Watson stat		1.25
Prob(F-statistic)	0.0007			

Note: *** indicates significant at 1 percent.

Conclusion

This research highlights that inflation rate in the local economy depends on government regulations and international change. Specifically, the determinants of inflation rate in Yogyakarta province are minimum wage, economic growth, and monetary variables indicated by BI-rate. More finding, exchange rate also contributes to the price change. In the perspective of dynamic analysis, this research finds long-run causality between minimum wage and inflation, meanwhile, in the short run, there is unidirectional relationship from wage to inflation. This finding confirms the proposition of non-neutrality wage on price changes. On the contrary, local output affects inflation rate in the long run process. It implies neutrality of output on price in the short time.

The inflation rate in the local economy depends not only on the regional indicator but also depends on monetary policy at the national level such as BI-rate. Moreover, international economic changes indicated by exchange rate also partially contributes to the price changes at the local level. In fact, the inflation rate in the local economy more depends on external factors than internal variables. In addition to this findings, economic agents in this region effectively adapt the price changes from disequilibrium level towards their equilibrium. Overall, the local government has successfully managed the price changes.

Acknowledgment

The author would like to thank Centre for Economics Studies, Department of Economics, *Universitas Islam Indonesia* for providing the fund for this research.

References

Afandi, A., Wahyuni, D., & Sriyana, J. (2017). Policies to Eliminate Poverty Rate in Indonesia. *International Journal of Economics and Financial Issues*. Vol. 7(1): 435–441.

Antoni. (2011). Dynamic Relation of Money Velocity, Money Volatility, and Inflation Threshold. *Economic Journal of Emerging Markets*. Vol. 3(3): 245–259.

Bozkurt, C. (2014). Money, Inflation and Growth Relationship: The Turkish Case. *International Journal of Economics and Financial Issues*. Vol. 4(2): 309–322.

Caraka, R. E., & Sugiyarto, W. (2016). Inflation Rate Modelling in Indonesia. *Etikonomi: Jurnal Ekonomi*. Vol. 15(2): 111-124. DOI: http://dx.doi.org/10.15408/etk.v15i2.3260

Dicky, D., & Fuller, W. A. (1981). The Likelihood Ratio Statistics for Autoregressive Time Series with a Unit Root. *Econometrica*. Vol. 49(4): 1057–1072.

Dritsaki, C. (2016). Real Wages, Inflation, and Labor Productivity : Evidence from Bulgaria and Romania. *Journal of Economic and Financial Studies*. Vol. 4(5): 24–36.

Duncan, R., & Martínez-García, E. (2015). Forecasting Local Inflation with Global Inflation : When Economic Theory Meets the Facts. *Working Paper No. 235*. Globalization and Monetary Policy, Federal Reserve Bank of Dallas.

Engle, R. F., & Granger, C. W. J. (1987). Cointegration and Error Correction: Representation, Estimation and Testing. *Econometrica*. Vol. 55(2): 251–276.

Fuddin, M. K. (2014). The Effectiveness of Monetary Policy Transmission in Indonesia. *Economic Journal of Emerging Markets*. Vol. 6(2): 119–130.

Hervino, A. D. (2016). A Hybrid Model of New Keynesian Phillips Curve: An Application in Indonesia. *Journal of Economics, Business, and Accountancy Ventura*. Vol. 18(3): 311–316. DOI: http://dx.doi.org/10.14414/jebav.v18i3.502.

Hossain, A. (2005). The Sources and Dynamics of Inflation in Indonesia: An ECM Model Estimation for 1952-2002. *Applied Econometrics and International Development*. Vol. 5(4): 93–116.

Johansen, S. (1991). Estimation and Hypothesis Testing of Cointegration Vectors in Gaussian Vector Autoregressive Models. *Econometrica*. Vol. 59(6): 1551–1580.

Ladu, M.G., & Meleddu, M. (2016). Productivity, Wage and Inflation Relationship for a Sample of Developed Countries : New Evidence from Panel Cointegration Tests with Multiple Structural Breaks. *International Journal of Applied Economics*. Vol. 13 (March): 15–31.

Purwanda, E., & Rochana, S. H. (2017). Measurement of the efficiency of monetary policy. *Economic Journal of Emerging Markets*. Vol. 9(2): 138–149. DOI: http://dx.doi.org/10.20885/ejem.vol9.iss2.art3

Tirtosuharto, D., & Adiwilaga, H. (2013). Decentralization and Regional Inflation in Indonesia. *Buletin Ekonomi Moneter Dan Perbankan*. Vol. 16(2): 149–166.

http://journal.uinjkt.ac.id/index.php/etikonomi
DOI: htttp://dx.doi.org/10.15408/etk.v17i1.7146