How to Cite:
Hendro, N., Rahayu, E. S., & Fajarningsih, R. U. (2022). Analysis of price variations and red chili market integration in Ciamis regency. *Linguistics and Culture Review*, *6*(S1), 720-730. https://doi.org/10.21744/lingcure.v6nS1.2151

Analysis of Price Variations and Red Chili Market Integration in Ciamis Regency

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***Abstract*---**Market integration can show that no matter what changes occur in the consumer market, it will cause price changes in the producer market. However, price information that has not been properly channeled between consumer and producer markets makes asymmetrical transmission and unintegrated market. This study aims to analyze the level of price variation and market integration of red chili in Ciamis Regency. The coefficient of variation analysis is used to analyze the level of price variation and the Johansen cointegration approach with the Vector Autoregression (VAR) / Vector Error Correction Model (VECM) model to analyze market integration. The results showed that the price fluctuation of red chili at the producer and consumer level was high and unstable. The results of the analysis of market integration show that there is market integration between the producer market and the consumer market in the long run but in the short term, they adjust to each other in the long term

***Keywords*---**cointegration, market integration, red chilies, vector auto regression (VAR), vector error correction model (VECM).

Introduction

The price of horticultural commodities always fluctuates and tends to increase. This results in volatility in food prices and inflation. Price fluctuations for agricultural commodities are caused, by natural disasters, seasonal production,

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Manuscript submitted: 18 Oct 2021, Manuscript revised: 09 Dec 2021, Accepted for publication: 27 Jan 2022

inadequate storage facilities, and inappropriate farmer responses to price signals (Adebusuyi, 2004). The fluctuating prices resulted in inefficient marketing of the red chili commodity. In fact, the efficient marketing of horticultural commodities will benefit producers and consumers because the surplus production in one place can be channeled to other places that have a deficit with proper management costs (Adenegan et al., 2012). Market efficiency is an equilibrium condition in which all profitable opportunities can be utilized by each marketer according to the costs incurred. If the price difference between markets is smaller than the transfer cost, it can be said that the market is running efficiently. However, if the price difference between markets is greater than the transfer costs, it can be concluded that the market is running inefficiently (Negassa et al., 2003).

One of the horticultural commodities that often experience price fluctuations is red chili (Capsicum Annum L) so that red chilies become a strategic commodity that has high economic value and good market prospects and contributes to increased income and welfare of farmers and their families (Asih, 2009). The high contribution of red chilies as a cause of inflation can be seen from the high price fluctuation of this commodity, in which there are still problems of production instability, post-harvest, and storage problems. Production problems are caused by red chilies experienced a production surplus that does not occur throughout the year because the monthly production of this commodity is very volatile, depending on the climate/seasonality, and is easily damaged / rotten (Ariningsih & Tentamia, 2004). Besides, there are problems with poor post-harvest and storage management, causing problems with fluctuations in supply and prices. This price fluctuation reflects the presence of market symptoms that are less consistent with the effect of supply and demand for these commodities (Winarso, 2003). This unpredictable and high price fluctuation can increase price volatility. To overcome the price fluctuation of red chili, one of which is needed is market integration between the red chili marketing channels (Johansen, 1988; Johansen, 2000).

Spatial market integration has relevance to the agricultural sector because agricultural commodities are often bulky, perishable, and production is concentrated in one location, while consumption is concentrated in another which often results in high transportation costs (Sexton et al., 1991). Besides, the functioning of markets and marketing channels is very important to determine the impact of various economic policies, such as macroeconomic and trade policies. A spatially segmented market isolates market participants and limits the transmission of price incentives. Goletti et al. (1995), show that market integration is determined by the behavior of traders and market conditions, the marketing infrastructure associated with transportation, communication, and storage facilities which cause high marketing margins. Government policies can also influence markets through price stabilization policies, trade restrictions, and regulations related to transportation. Rapsomanikis (2009), stated that oligopoly and collusion behavior among traders is the determinant of market integration. Traders can maintain price differences between markets at a higher rate than transfer fees (Kearney & Lucey, 2004; Meyer, 2004).

Carolina et al. (2016) states that a market can be said to be well integrated if the price in a marketing agency can be transformed into other marketing agencies in one marketing chain. Vertical price linkages are often linked to the structure, behavior, and performance of a market. The amount of price change that can be transmitted in each marketing chain can be used as an important indicator to measure the strength of a market (Dang & Lantican, 2016). Market integration will be achieved if there is the same market information, adequate, transferred quickly to other markets, and has a positive relationship between prices in different markets (Baffes & Gardner, 2003). With this integrated market, it is hoped that the information regarding any changes in the price of red chili at the consumer level can be followed by price changes at the producer level so that it does not harm the marketing actors involved in marketing red chili. However, the reality shows that the large change in the price of red chili at the consumer level is not followed by price changes at the producer level of the same magnitude. This is evident from the price development of chili red at the level of producers and consumers in Ciamis district which shows that price changes at the level of the manufacturers are not as big as at the consumer level. This indicates that the price information has not been distributed properly, which means that the transmission rate of red chili prices in Ciamis Regency is still low. The objectives of this study were: (1) to analyze variations in the price of red chili in Ciamis Regency and (2) to analyze the level of market integration of red chili between producers and consumers in Ciamis Regency (Cacciola et al., 2012; Giuffrida et al., 2014).

Method

Secondary data used is monthly time series data with the period 2016-2019. The data analyzed in this study were the price of red chili at the producer level in the production center of Ciamis Regency and the consumer price at the consumer market in Ciamis Regency which were used as data collection samples by the Ministry of Agriculture, namely STA, sweet market and Panumbangan market.
Analyzing the variation in the price of red chili is carried out using the coefficient of variation. The coefficient of variation is obtained from the standard deviation of a variable divided by its average. Mathematically formulated by:

$$Coefficient\ of\ Variation\ (KV) = \frac{\text{Standard deviation}}{\text{Average}} x\ 100\% \qquad (1)$$

The coefficient of variation from price data over time describes the deviation from the average used to determine the price stability of a commodity. The smaller the coefficient of variation, it can be interpreted that prices are relatively stable or have low fluctuations (Rachman, 2005). Prices in a city/province are said to be stable if the value of the coefficient of price variation is in the range of <9%, according to the target of the Indonesian Ministry of Trade until 2019 (Ministry of Trade of the Republic of Indonesia, 2015). If the price coefficient is high and unstable. The analysis method used to see the level of market integration is the VAR / VECM model approach. The stages of forming a VAR / VECM are:

Stationarity test

Price data time series (time series) are generally not stationary. Data that is not stationary will result in spurious regression estimates. Data stationary is a necessary condition in time series data analysis because it can minimize model errors. If this pseudo regression is interpreted, it will produce an incorrect analysis which results in the wrong policies being taken (Brooks, 2008; Widarjono, 2013). In this study using the Augmented Dickey-fuller (ADF) unit root test. With the ADF test formulation as follows:

$$\Delta P_t = \alpha_0 + \Upsilon P_{t-1} + \beta_i \sum_{j=1}^{m} \quad \Delta P_{t-1} + \square_t \qquad (2)$$

Where:
P_t = variable red chili prices at each market level in period t (Rp / kg)
P_{t-1} = variable red chili prices at each market level in the previous period (IDR / kg)
ΔP_t = $P_t - P_{t-1}$
ΔP_{t-1} = $P_{t-1} - P_{(t-1)-1}$
m = amount of *lag*
α_0 = intercept
α_1, β, Υ = parameter coefficient
$\square_t$ = *error term*

Hypothesis test:
H_o : $\Upsilon = 0$ (non stationary time series data)
H_o : $\Upsilon < 0$ (stationary time series data)

Test rule:
- If the ADF statistic > ADF is critical, then reject Ho, meaning that the time series data does not contain unit roots, which means that the data is stationary.
- If the ADF statistic < ADF is critical, then accept Ho, it means that the time series data contains a unit root which means that the data is not stationary.

Determination of optimal lag

Values from the lag of a variable can affect the other variables in the VAR model. The value of the lag of a variable can affect other variables because it takes time for one variable to respond to the movements of other variables. Determination of the optimal lag length in this study using the Akaike Information Criteria (AIC) (Ehrmann et al., 2003; Härdle et al., 1998).

Cointegration test

This test is conducted to determine whether there is integration in the long term or not. The cointegration test in this study uses the Johansen cointegration test, where this test can be used to see the amount of cointegration (cointegration rank) between variables (Rosadi, 2012). To test this hypothesis, the trace statistic or maximum eigenvalue test can be used. Whether there is cointegration is based on the likelihood ratio (LR) test. If the calculated LR value is greater than the critical value, we accept the cointegration of some variables, and vice versa if the calculated LR value is smaller than the critical value, there is no cointegration (Seo, 2006; Guo et al., 2018).

Granger causality test

The Granger causality test is carried out to see whether two variables have a reciprocal relationship or not. In other words, does one variable have a causal relationship with other variables? Since each variable in the study has the opportunity to become an endogenous or exogenous variable (Angreheni et al., 2022; Kasirah et al., 2021).

Vector error correction model (VECM) test

VECM is used when the variables are not stationary at the level but stationary at the same differentiation level and are cointegrated. VECM measures how saving prices can return to a state of equilibrium (Hendy & Juselius, 2000). The VAR / VECM model used in this study are:

$$PP_t = \alpha_0 + \Upsilon P_{ti} \sum_{i=1}^{p} \alpha_i PP_{t-1} + \sum_{i=1}^{p} \Upsilon_i PE_{t-1} + \square_{1t} \tag{3}$$

$$PE_t = \square_O + \sum_{i=1}^{p} \square_i PP_{t-1} + \sum_{i=1}^{p} \varphi_i PE_{t-1} + \square_{1t} \tag{4}$$

Where:

PP_t = producer price of red chili in period *t* (IDR / Kg)
PPt-1 = Lag of the producer price of shallots in the t period (IDR/Kg)
Pet = The price of consumer shallots in period t (IDR/Kg)
PEt-1 = Lag the consumer's shallot price in the t-period (IDR/Kg)
E = remaining vector of size n x 1
p = lag length

VECM analysis describes the short-term dynamic equilibrium relationship and long-term equilibrium in a system of equations. Although there is a long-term equilibrium between markets, there are deviations from the short-term equilibrium relationship. Thus, VECM is a combination of short and long-term relationships between price variables from different markets (Nagubadi et al., 2001; Irawan & Rosmayanti, 2007).

Analysis variance decompositions

Variance decomposition is a slightly different method in dynamic VAR models. This analysis provides the proportion of the movement of the dependent variable caused by disturbances from itself and those from other variables. Disorders of the variables to- I will directly affect not only the variable itself but will be forwarded to the variables more contained in the dynamic structure of the model through VAR. Variance decomposition is used in estimation to describe the dynamic VAR system (Baque et al., 2020; Handayani et al., 2019). Variance decomposition describes the relative importance of each variable in the VAR system due to shocks. Variance decomposition is used to predict the percentage contribution of the variance of each variable due to changes in certain variables in the VAR system (Widarjono, 2013).

Results and Discussion

The coefficient of red chili price variation in Ciamis Regency can be seen that the price fluctuation of red chili at the producer and consumer level is high and unstable based on the criteria of the Ministry of Trade because it is above 9%. The causes of this high fluctuation include uneven distribution throughout the year and stock management that has not been going well so that production during the in-season is not able to meet the needs during the off-season (Reza et al., 2015). Red chilies that do not last long when stored and are easily damaged, causing red chilies stored during the main harvest cannot be used for stock during the off-season. The results of the complete coefficient of variation analysis are presented in Table 1.

Table 1
Results of Analysis of the Coefficient of Red Chili Price Variations in Ciamis Regency, 2016-2019

Years	KV Producer Price	KV Consumer Price
2019	52	39
2018	37	19
2017	26	21
2016	24	45
Average	34,75	31

Analysis of market integration approach VAR method / VECM ad was as follows:

- Stationarity Test
  The results of the stationarity test using the ADF test showed that the variable producer and consumer prices were stationary at the level because the ADF statistical k > ADF was the critical value and the probability was smaller than 0.005. Based on the test results, it can be concluded that all data variables used are stationary at the level so that it can be said to be free from pseudo regression. The stationary test results are shown in Table 2, below:

Table 2
ADF test results at level

Variable	Critical Value 5%	t-stat	Prob
Producer	-2.925.169	-3.135.300	0.0307
Consumer	-2.925.169	-3.423.871	0.0150

Information: *** = significant at the 5% confidence level

- Optimal Lag Test
  The optimal lag test results are shown in Table 3, as follows:

Table 3
Optimal lag test result

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-935.04	NA	4.19e+15	41.65	41.73	41.68
1	-911.34	44.25*	1.74e+15*	40.77*	41.01*	40.86*
2	-910.57	1.38	2.02e+15	40.91	41.32	41.06
3	-907.02	5.99	2.06e+15	40.93	41.49	41.14

The optimal lag test results with AIC criteria show that lag 1 is the optimal lag. This means that lag 1 from an economic point of view implies that all the variables in the model influence each other not only in the current period but the price variables in the previous period. VAR stability needs to be done with a stability test because if the VAR estimation results are combined with an unstable error correction model, the Impulse Response Function and Decomposition will be invalid. The results of the stability test show that all modulus values are below 1, so that they meet the stability conditions as shown in Table 4, below:

Table 4
Stability condition

Root	Modulus
0.681115	0.681115
0.581383	0.581383
No root lies outside the unit circle.	
VAR satisfies the stability condition.	

- Contingency Test

  The results of the contingency test in this study used the cointegration test method of the Johansen Trace Statistic test. Based on the cointegration test between producer prices and consumer prices for red chilies both in the trace and maximum value tests, the test result is to accept the null hypothesis, below the 5% level and there are two integrated positive relationships. This means that there is a stable and long-term equilibrium relationship between producer prices and consumer prices. The results of the Johansen Trace Statistic test are shown in Table 5 as follows:

Table 5
Unrestriced cointegrasi rank test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob. **
None *	0.204452	17.42823	15.49471	0.0253
At most 1 *	0.139422	6.906940	3.841465	0.0086

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

- Granger Causality Test

  The results of the Granger causality test are presented in Table 6, as follows:

Table 6
Granger Causality Results

Null Hypothesis	Obs	F-Statistic	Prob
KONSUMEN does not Granger Cause PRODUSEN	47	0.10028	0.753
PRODUSEN does not Granger Cause KONSUMEN		0.00756	0.9311

The results of the Granger causality test show that the analysis of the price relationship at the producer level and the price at the consumer level is independent of one another. Also seen from the probability value that each is greater than 0.05, namely 0.753 and 0.9311 (the results of both are accept the null hypothesis).

- Vector Error Correction Model (VECM) Test

Table 7
Estimation results for producer and retail VECM models

Error Correction:	D(PRODUSEN)	D(KONSUMEN)
CointEq1	-0.261246	-0.378962
	(0.08188)	(0.12482)
	[-3.19057]	[-3.03596]
D(PRODUSEN(-1))	0.157159	0.550196
	(0.24334)	(0.37097)
	[0.64584]	[1.48314]
D(KONSUMEN(-1))	-0.002675	-0.269202
	(0.15905)	(0.24246)
	[-0.01682]	[-1.11027]
C	-204.6877	-144.3862
	(1001.89)	(1527.35)
	[-0.20430]	[-0.09453]
R-squared	0.199065	0.213318

Based on Table 7, changes in producer prices are influenced by the long-term relationship between producers and consumers. In the short term changes in producer prices are only influenced by changes in producer prices themselves in the previous month and are not influenced by changes in consumer prices. Changes in consumer prices are influenced by the long-term relationship between producers and consumers. In the short term, changes in consumer prices are only influenced by changes in consumer prices themselves in the previous month and are not influenced by changes in producer prices. This indicates that in the short term the producer market with the consumer market is not integrated.

- Analysis of variance decomposition
  The results of variance decomposition showed that producer prices in the first month is affected by its price. However, in the second month to the projection in the last month can be known that price variability is influenced by consumer prices. In the last month to come, the variation in producer prices can be explained by itself as 63.11% and 36.88% by retail prices. In the short term, consumer prices do not affect producer prices, but in the long run, there is an influence on the formation of producer prices. Consumer prices in the first month of price variability are influenced by producer prices by 65% and the prices themselves by 35%. The projection of variability in consumer prices in the last month can be influenced by producers 22.62% and 77.38% themselves (Vocroix, 2021; Rinartha et al., 2018).

Conclusion

Based on the results of the research that has been done, the following conclusions can be drawn:

- The results of the analysis of monthly price variations show that the average value of the coefficient of variation in the price of red chili at the producer and consumer levels in Ciamis Regency is highly volatile and unstable based on the criteria of the Ministry of Trade.
- The results of the analysis of market integration show that there is market integration between the producer market and the consumer market in the long term but in the short term, it adjusts to one another in the long term.

References

Adebusuyi, B. S. (2004, November). Stabilization of commodity market of interest to Africa. In *Workshop on Constraints to Growth in Sub-Saharan Africa, organized by the Intergovernmental Group of Twenty-Four in Pretoria, South Africa*.

Adenegan, K. O., Adepoju, A., & Nwauwa, L. O. E. (2012). Determinants of market participation of maize farmers in rural Osun State of Nigeria. *International Journal of Agricultural Economics & Rural Development*, *5*(1), 28-39.

Angreheni, D., Darma, R., & Asrul, L. (2022). The impacts contract farming on cultivation and postharvest practices on red chili farm in Magelang District, Indonesia. *Linguistics and Culture Review*, *6*(S3), 201-212. https://doi.org/10.21744/lingcure.v6nS3.2120

Ariningsih, E., & Tentamia, M. K. (2004). Faktor-Faktor yang Mempengaruhi Penawarandan Permintaan Bawang Merah di Indonesia. *Pusat Penelitian dan Pengembangan Sosial Ekonomi, Badan Penelitian dan Pengembangan Pertanian. Bogor*.

Asih, D. N. (2009). Analisis karakteristik dan tingkat pendapatan usahatani bawang merah di Sulawesi Tengah. *Agroland: Jurnal Ilmu-ilmu Pertanian*, *16*(1).

Baffes, J., & Gardner, B. (2003). The transmission of world commodity prices to domestic markets under policy reforms in developing countries. *Policy Reform*, *6*(3), 159-180.

Baque, P. G. C. ., Cevallos, M. A. M. ., Natasha, Z. B. M. ., & Lino, M. M. B. . (2020). The contribution of connectivism in learning by competencies to improve meaningful learning. *International Research Journal of Management, IT and Social Sciences*, *7*(6), 1-8. https://doi.org/10.21744/irjmis.v7n6.1002

Brooks, C. (2008). RATS Handbook to accompany introductory econometrics for finance. *Cambridge Books*.

Cacciola, F., Donato, P., Giuffrida, D., Torre, G., Dugo, P., & Mondello, L. (2012). Ultra high pressure in the second dimension of a comprehensive two-dimensional liquid chromatographic system for carotenoid separation in red chili peppers. *Journal of Chromatography A*, *1255*, 244-251. https://doi.org/10.1016/j.chroma.2012.06.076

Carolina Rezende de Carvalho Ferreira, M., Amorim Sobreiro, V., Kimura, H., & Luiz de Moraes Barboza, F. (2016). A systematic review of literature about finance and sustainability. *Journal of Sustainable Finance & Investment*, *6*(2), 112-147.

Dang, N. V., & Lantican, F. A. (2016). Vertical integration of tea markets in Vietnam.

Ehrmann, M., Ellison, M., & Valla, N. (2003). Regime-dependent impulse response functions in a Markov-switching vector autoregression model. *Economics Letters*, *78*(3), 295-299. https://doi.org/10.1016/S0165-1765(02)00256-2

Giuffrida, D., Dugo, P., Torre, G., Bignardi, C., Cavazza, A., Corradini, C., & Dugo, G. (2014). Evaluation of carotenoid and capsaicinoid contents in powder of red chili peppers during one year of storage. *Food Research International*, *65*, 163-170. https://doi.org/10.1016/j.foodres.2014.06.019

Goletti, F., Ahmed, R., & Farid, N. (1995). Structural determinants of market integration: The case of rice markets in Bangladesh. *The Developing Economies*, *33*(2), 196-198.

Guo, H., Chen, Q., Xia, Q., Kang, C., & Zhang, X. (2018). A monthly electricity consumption forecasting method based on vector error correction model and self-adaptive screening method. *International Journal of Electrical Power & Energy Systems*, *95*, 427-439. https://doi.org/10.1016/j.ijepes.2017.09.011

Handayani, N. D., Mantra, I. B. N., & Suwandi, I. N. (2019). Integrating collaborative learning in cyclic learning sessions to promote students' reading comprehension and critical thinking. *International Research Journal of Management, IT and Social Sciences*, *6*(5), 303-308. https://doi.org/10.21744/irjmis.v6n5.777

Härdle, W., Tsybakov, A., & Yang, L. (1998). Nonparametric vector autoregression. *Journal of Statistical Planning and Inference*, *68*(2), 221-245. https://doi.org/10.1016/S0378-3758(97)00143-2

Hendy, D. F., & Juselius, K. (2000). Explaining Co-integration Analysis: Part I. *Energy Journal*, *21*, 44.

Irawan, A., Rosmayanti, D. (2007). Analisis integrasi pasar beras di Bengkulu.

Johansen, S. (1988). Statistical analysis of cointegration vectors. *Journal of economic dynamics and control*, *12*(2-3), 231-254. https://doi.org/10.1016/0165-1889(88)90041-3

Johansen, S. (2000). Modelling of cointegration in the vector autoregressive model. *Economic modelling*, *17*(3), 359-373. https://doi.org/10.1016/S0264-9993(99)00043-7

Kasirah, I., Nadiroh, N., & Abbas, H. (2021). Developing environmental integration teaching materials to improve cognitive flexibility. *Linguistics and Culture Review*, *5*(S3), 1558-1573. https://doi.org/10.21744/lingcure.v5nS3.1826

Kearney, C., & Lucey, B. M. (2004). International equity market integration: Theory, evidence and implications. *International Review of Financial Analysis*, *13*(5), 571-583. https://doi.org/10.1016/j.irfa.2004.02.013

Meyer, J. (2004). Measuring market integration in the presence of transaction costs—a threshold vector error correction approach. *Agricultural Economics*, *31*(2-3), 327-334. https://doi.org/10.1016/j.agecon.2004.09.017

Ministry of Trade of the Republic of Indonesia. (2015). The Ministry of Trade's Strategic Plan for the Period of 2015-2019. Ministry of Trade, Jakarta.

Nagubadi, V., Munn, I. A., & Tahai, A. (2001). Integration of hardwood stumpage markets in the southcentral United States. *Journal of Forest Economics*, *7*, 69-98.

Negassa, A., Myers, R. J., & Gabre-Madhin, E. Z. (2003). *Grain marketing policy changes and spatial efficiency of maize and wheat markets in Ethiopia* (No. 596-2016-40053).

Rachman, H. P. (2005). Metode analisis harga pangan. *Disampaikan pada Apresiasi Distribusi Pangan dan Harga Pangan oleh Badan Ketahanan Pangan. Departemen Pertanian, Bogor*.

Rapsomanikis, G. (2009). *The 2007-2008 food price swing: Impact and policies in Eastern and Southern Africa*. Rome: Food and Agriculture Organization of the United Nations.

Reza, M. A., Firdaus, M., & Novianti, T. (2015). *Analysis of Food Price Stabilization in Indonesia* (Doctoral dissertation, thesis, Bogor Agricultural University, Bogor).

Rinartha, K., Suryasa, W., & Kartika, L. G. S. (2018). Comparative Analysis of String Similarity on Dynamic Query Suggestions. In 2018 Electrical Power, Electronics, Communications, Controls and Informatics Seminar (EECCIS) (pp. 399-404). IEEE.

Rosadi, D. (2012). Econometrics and Applied Time Series Analysis with Eviews.

Seo, M. (2006). Bootstrap testing for the null of no cointegration in a threshold vector error correction model. *Journal of Econometrics*, *134*(1), 129-150. https://doi.org/10.1016/j.jeconom.2005.06.018

Sexton, R. J., Kling, C. L., & Carman, H. F. (1991). Market integration, efficiency of arbitrage, and imperfect competition: methodology and application to US celery. *American journal of agricultural economics*, *73*(3), 568-580.

Vocroix, L. (2021). Morphology in micro linguistics and macro linguistics. *Macrolinguistics and Microlinguistics*, *2*(1), 1–20. Retrieved from https://mami.nyc/index.php/journal/article/view/11

Widarjono, A. (2013). Introductory Econometrics and Its Application Accompanied by the EViews Guide. UPP STIM YKPN, Yogyakarta.

Winarso, D. (2003). Physical Characteristic Change Due To Difference of Age, Muscle Type, Cooking Time and Temperature Combination Native Chicken Meat. *Jurnal Sain Veteriner*, *27*(2).