



Integration of Central, East, West Java and Jakartas Shallot Market

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Article Information **Abstract**

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The purpose of this study was to know and analyze the shallot markets of Central Java with shallot markets in East Java, Jakarta, and West Java. The method of data analysis in this study is the Johansen Cointegration Test, Causality Test, and Vektor Error Correction Model (VECM). The data used is secondary data in the form of monthly sources from the Central Statistics Agency and the Ministry of Agriculture. The results of the research are producer markets and consumer markets in Central Java are integrated, the Central Java producer market and the East Java consumer market, Jakarta consumer market, and West Java consumer market are integrated, the Central Java consumer market and East Java consumer market, Jakarta consumer market, and West Java consumer market are integrated. Based on the trial of the causality of market integration carried out is weak, only the consumer market integration of Central Java with East Java consumer market is strong. Based on the results of the VAR / VECM analysis shows that adjustment of the prices of shallots in Central Java producer market slower than adjustments of the price of Central Java, East Java, and Jakarta consumer markets. Efforts to overcome this problem can be done by increasing the implementation of policies on the floor price and the ceiling price.

INTRODUCTION

Central Java is the largest center of shallot production in Indonesia. Central Java contributes to the shallot production in Indonesia by 32,40 percent (BPS, 2018a). The amount of shallot production from 2013 to 2017 tends to increase. Shallot production ranks first as the largest horticultural commodity produced in Central Java compared to several other leading commodities. The growth of shallot production from 2013 to 2017 was 13,5 percent. The percentage of contribution of shallot harvest area in Central Java to the harvest area of shallots in

Indonesia in 2017 was 32,34 percent, a decrease of 1,37 percent compared to 2016 (BPS, 2018a). Shallot harvest area in Central Java is the largest harvested area in Indonesia with an average from 2013 to 2017 of 44.315,5 hectares. Shallot is one of the horticultural commodities that have the potential to be developed in the aspect of farming (on-farm) and outside farming (off-farm). The problem of developing horticultural crops in general is aspects outside farming, namely, the constraints on handling after harvesting and marketing of agricultural products (Irawan, 2007).

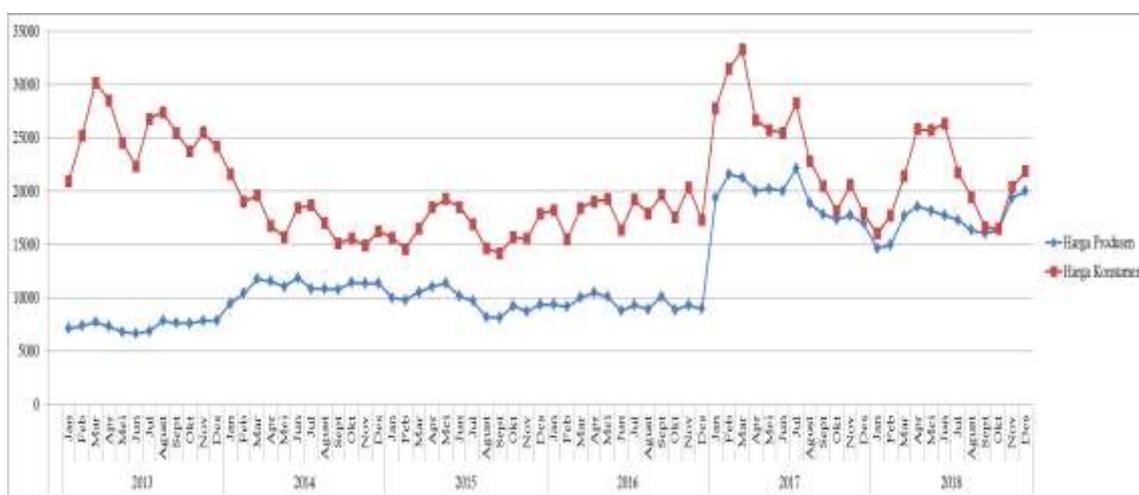


Figure 1. Graph of Shallot Prices in Central Java Producers and Consumers in 2013-2018
Sources: Badan Pusat Statistik, 2013(a,b), 2014(a,b), 2015(a,b), 2016(a,b), 2017(a,b), and 2018(c,d)

The development of shallot prices in producers and consumers is the same that prices tend to fluctuate. The price of shallots in each marketer is different. The price of shallots on the producer market tends to be very low compared to prices on the consumer market. This is indicated by the large difference in the price of shallots in the producer and consumer markets. The average price of shallots on the producer market from 2013 to 2018 was IDR 12.383,24. The highest price occurred in July 2017 amounting to IDR 21.577,30. The lowest price occurred in June 2013 amounting to IDR 6.632,05. Meanwhile, the average price of shallots on the consumer market from 2013 to 2018 was IDR 20.530,04. The highest price occurred in March 2017 amounting to IDR

33.278,00 and the lowest price occurred in August 2015 amounting to IDR 13.750,00.

Fluctuations in commodity prices adversely affect the welfare of producers and consumers because during the harvest season prices will fall so that producers' income is low while in conditions not harvest season will harm consumers because commodity prices will very high (Prastowo, Yanuarti, & Depari, 2008). Price fluctuations occur because of the asymmetry of price transmission caused by adjustment costs and market forces of retailers and the behavior of marketing agents to take profits because price information is often manipulated so that price information from the consumer market to producers and from producers to consumers is asymmetrical (Ruslan, 2016).

The causes of commodity price asymmetry include distribution patterns or product marketing chains at each marketing institution (Mayasari, Sjamsir, & Nurhapsa, 2017). The marketing distribution chain will result in differences in the prices of each market participant. An efficient marketing system plays an important role in reducing post-harvest losses, ensuring adequate returns to farmers, and stimulating expansion in food production thereby increasing the level of food security through adequate information about prices of agricultural products (Obayelu & Alimi, 2013).

The Central Statistics Agency (2018b) states that the distribution pattern of shallot trade in Central Java starts from upstream, namely from farmers to collectors by 16,38 percent, to wholesalers by 0,28 percent, to retail traders by 3,04 percent, outside the remaining 79,97 percent, and the final went to households. Based on this description, it can be identified that the majority of shallot production in Central Java is distributed outside the province. Some of the provinces that were the biggest selling regions were East Java at 17,22 percent, Jakarta at 9,50 percent, and West Java at 3.11 percent (BPS, 2018b). The shallot supply in Central Java, in addition to originating from its production, also originates from outside the province, namely, from East Java by 12,17 percent and Yogyakarta by 2,03 percent (BPS, 2018b).

Actors involved in the shallot market are farmers, collectors, wholesalers, retailers and households (Annisa, Asmarantaka, & Nurmalina, 2018). The behavior of farmers, collectors, and wholesalers as actors in producer markets and the behavior of retailers and households as actors in the consumer market have an important role in the process of price formation. Agricultural crop traders in Indonesia tend to behave in a collusive manner so that the shallot market is not integrated due to the fact that collusion practices from traders can also make markets spatially separate from each other (Deodhar, 2005 in Chengappa, et al., 2012 in Gummagolmath, 2012 in Paul, Das, Debnath, & Mathur, 2017). In addition, the role of market structure is also important in shaping the price of

shallots, where the structure of the shallots market tends to be the oligopsony market (Pagala, Handayani, & Kalaba, 2017). The structure of the shallot market in Indonesia is oligopsonistic where the market is only a few buyers who buy shallots from farmers (Dhewi, 2008 in Magfiroh, Setyawati, & Zainudin, 2017).

The Ministry of Trade (2017) issued a Regulation of the Minister of Trade Number 27 / M-DAG / PER / 5/2017 concerning setting reference prices for purchases at producers and reference prices for sales at consumers, namely the minimum purchase price at producers for shallot commodities amounting to IDR 22.500,00 / kg and for the maximum reference price of sales to consumers is IDR 32.000,00 / kg. The policy was issued to reduce fluctuations in the price of shallots and ensure the certainty of shallot prices. The development of the price of shallots in producers as a result of agreements between farmers and traders tends to fluctuate and tends to increase from 2013 to 2018. The average price of shallots in producers is IDR 17,261.1 / kg (BPS, 2018c). However, the increase in the price of shallots in producers is still lower than the minimum purchase price that has been set at IDR 22.500,00 / kg.

"The government's ability to determine the right pricing policy is very much determined by how the policymakers understand the structure, behavior and market efficiency. One way to understand the structure, behavior and market efficiency is to understand the relative strength of a market and the mechanism of price propagation from one market to another through market integration studies "(Irawan & Rosmayanti 2007).

Asmarantaka (2009) states that market integration is a measure that shows how far the price changes that occur in the reference market (for example, markets at higher levels such as retail traders) will cause changes in the followers 'markets (for example, farmers' markets). Market integration is an effective instrument for stabilizing prices in all regions (Ghosh, 2003 in Mukim, et al., 2009 in Paul, Das, Debnath, & Mathur, 2017). Market integration can be used as an indication of the efficiency formed between

two markets that interact with each other, both vertically and spatially (Meyer & von Camon-Taubadel, 2004 in Yustiningsih, 2012).

Market integration can be divided into two, namely, spatial and vertical market integration. Spatially integrated markets apply The Law of One Price (LOP), in accordance with the opinion of Monke and Petzel (1984) in Jena (2016) that is, LOP means that the same product is sold at relatively the same price in various markets and if LOP applies to all goods on the market are integrated markets. Meanwhile, the market is said to be vertically integrated if price changes at one marketing level will be transformed into other marketing levels in harmony (Goodwin, 2006 in Yustiningsih, 2012). Information on market integration is important in the context of developing products and increasing the welfare of producers and consumers. In line with Ravallion (1986) in Yantu, Juanda, Siregar, Gonarsyah, & Hadi who stated an empirical assessment of the speed of market adjustments to spatial price differentials helped solve the debate on market intervention and non-intervention policies by the government. Information on market integration can provide specific evidence about market competition, the effectiveness of decision making (Cartel and Hamilton, 1989 in Sexton et al., 1991: 568 in Yantu, Juanda, Siregar, Gonarsyah, & Hadi) and the efficiency of pricing (Bucola, 1983 in Sexton et al., 1991: 568, in Yantu, Juanda, Siregar, Gonarsyah, & Hadi).

Central Java is the largest shallot producer in Indonesia. However, the price of shallots tends to change. The shallot market in Central Java is a dominant market that can be a reference market in forecasting the dynamics of shallot prices in Indonesia and is key in the stability of shallot prices in Indonesia (Kustiari, 2017). The purpose of this study is to know and analyze the integration of the Central Java shallots market with the East Java, Jakarta, and West Java shallots markets.

RESEARCH METHODS

Researchers use quantitative methods in collecting, processing, and analyzing data in

research. The data obtained will be analyzed using econometric procedures using the cointegration test, causality test, and VAR / VECM with the E-Views software.

The variables in this study consisted of several variables, namely: The prices of shallots in Central Java producers (Rp / kg) (HP), The price of shallots in Central Java consumers (Rp / kg) (HK), the price of shallots in East Java consumers (Rp / kg) (KT), the price of shallots in Jakarta consumers (Rp / kg) (KJ), the price of shallots in West Java consumers (Rp / kg) (KB).

This research uses the literature study method in data collection. The data in this study are secondary data sourced from the Central Statistics Agency and the Ministry of Agriculture. Secondary data in the form of time-series data (time series) with a period of January 2013 to December 2018.

The steps of data processing and analysis techniques in this study are as follows: Data stationarity test, time-series economic data are generally stochastic in nature, that is, data have non-stationary trends or they have unit roots" (Basuki, 2016). Data that have unit-roots must be stationary to avoid spurious regression. Augmented Dickey-Fuller (ADF) is a method of unit root. If the ADF statistical probability value is smaller than the critical value of 5 percent then the data is stationary. Instead, the data is not stationary if the ADF statistical probability value is biggest than the critical value (Widarjono, 2016).

Determination of the optimal lag, Determination of the optimal lag is very important to do on the VAR model because if the optimal lag that is entered is too short then it is feared that it cannot explain the overall model dynamics. If the optimal lag is too long it will produce inefficient estimates because of the reduced degree of freedom (especially models with small samples) "(Basuki, 2016).

Model stability test, the model stability test is carried out to ascertain whether the model is stable or not. If the model is unstable, the results of variance decomposition become invalid (Setiawan, 2007 in Rusydiana, 2009 in Basuki, 2016). The model is said to be stable if all the

roots have a modulus smaller than one (Basuki, 2016). Cointegration Test, Cointegration test is conducted to find out the relationship between variables whether there will be a balance, in the long run, that is there is a similarity in the movement and stability of the relationship between the variables studied" (Basuki, 2016). Market integration analysis is done by Johansen's cointegration test. The test can be done if each variable is not stationary at level 1 (0) but, both are stationary at the same degree 1 (1). The presence or absence of cointegration is based on the trace statistic or maximum eigenvalue test. If the trace statistic or maximum eigenvalue value is greater than the critical value of 5%, we accept the cointegration of several variables and vice versa if the trace statistic or maximum eigenvalue value is smaller than the critical value, then there is no integration/cohesiveness (Widarjono, 2016).

Causality Test, after cointegration testing is carried out, then causality test is conducted. Variables in the study have the opportunity to be both dependent and independent variables. "If there are two variables x and y, then does x cause y or y to cause x or both do apply or there is no relationship between them" (Basuki & Yusuf, 2018). Based on several previous studies, the causality test is used to determine the strength or weakness of integration between markets. Market integration is said to be strong if the

variable x affects the variable y and the variable y affects the variable x while integration is said to be weak if the two variables namely the variables x and y are independent or have no causal relationship (Kustiari, 2017). VAR/VECM, The VAR / VECM model is formed if the variables studied are not stationary at the level but stationary at the same level of differentiation. VAR / VECM measures how to price deviations can return to a state of equilibrium (Hendy and Juselius, 2000 in Nuraeni, Anindita, & Syafrial, 2015). Analysis of variance decomposition, Variance decomposition test to find out which variable has the biggest role in explaining changes in error prediction on the variable itself and other variables. (Edi, Sirojuzilam, & Rahmanta 2014) "Variance decomposition is used to predict the contribution of the percentage of variance to each variable due to changes in certain variables in the VAR model" (Widarjono, 2016).

RESULTS AND DISCUSSION

Stationarity Test Results, based on the stationarity test results using ADF in table 1 shows that the price of onion prices contains unit roots which mean the data is not stationary at the level. The data has been stationary to the same degree, that is to degree 1 (1). This is indicated by the probability value of t-ADF that is smaller than the 5 percent significance level.

Table 1. ADF Stationarity Test Results

Variable	Level		1 st difference	
	t-statistic	Prob*	t-statistic	Prob*
HP	-1.2337	0.6555	-7.3536	0.0000
HK	-2.7657	0.0687	-4.2959	0.0010
KT	-2.5025	0.1194	-3.4412	0.0128
KJ	-1.7398	0.4068	-5.2751	0.0000
KB	-2.0683	0.2579	-6.3046	0.0000

Source: E-Views Output, 2019

Based on the optimal lag test results by entering AIC, FPE, and LR, the optimal lag is selected for the variable prices of Central Java producers, Central Java consumer prices, East

Java consumer prices, Jakarta consumer prices, and West Java consumer prices are 4 (four) indicated by the sign (*).

Table 2. Optimal Lag Test Results

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-2954.884	NA	6.18e+32	89.69346	89.85934*	89.75901*
1	-2932.436	40.81449	6.69e+32	89.77079	90.76609	90.16408
2	-2914.401	30.05909	8.38e+32	89.98184	91.80655	90.70287
3	-2892.340	33.42569	9.47e+32	90.07090	92.72503	91.11967
4	-2850.071	57.63870*	5.99e+32*	89.54762*	93.03116	90.92413
5	-2830.357	23.89651	7.85e+32	89.70778	94.02074	91.41204

Source: E-Views Output, 2019

Stability Testing Results Model, based on the results of the stability test of the variable model of Central Java producer prices, Central Java consumer prices, East Java consumer prices, Jakarta consumer prices, and West Java consumer prices indicate that the value of all unit-roots has a modulus of less than one. So, it can be said that the model to be used for the analysis of variance decomposition has been stable.

Cointegration Test Results, Johansen's cointegration test results are as follows Integration between producer markets and consumer markets in Central Java

Producer prices and consumer prices of shallots in Central Java have a relationship and there is a balance, in the long run, it can be said to be an integrated market. This is consistent with the results of Kustiari's research (2017) which concluded that there is an integration between prices in the producer market and prices in the consumer market as seen from the results of the cointegration test. The integration of producer and consumer markets in Central Java shows that changes in the price of shallots in the consumer market affect price changes in the producer market and conversely changes in prices in the consumer market affect price changes in the Central Java producer market. Integration between the Central Java producer market and the East Java consumer market.

Central Java producer prices and East Java consumer prices have a relationship and there is a balance, in the long run, it can be said to be an

integrated market. The integration of the Central Java producer market and the East Java consumer market is because Central Java and East Java are the largest shallots producers in Indonesia so that the markets interact with each other to form the distribution pattern of the shallots trade distribution. Central Java distributes shallots supply to East Java by 17,22 percent (BPS, 2018b). In addition to its own production, Central Java also receives a supply of shallots from East Java and is the largest supply from outside the region. Based on BPS (2018b) East Java is also the largest supplier of shallots to Central Java at 12,17 percent.

Integration between the Central Java producer market and the Jakarta consumer market, Central Java producer prices and Jakarta consumer prices have a relationship and there is a balance, in the long run, it can be said to be an integrated market. Market integration occurs because most of the stock of shallots in Central Java is distributed to Jakarta at 9,50 percent (BPS, 2018b).

Integration between the Central Java producer market and the West Java consumer market. Central Java producer prices and West Java consumer prices have a relationship and there is a balance, in the long run, it can be said to be an integrated market. The market is integrated because Central Java distributes most of its shallots to West Java by 3,11 percent and West Java receives the largest supply of shallots from outside the province, which is from Central Java by 35,23 percent (BPS, 2018b).

Integration between the Central Java consumer market and the East Java consumer market, The consumer prices of Central Java shallots and the prices of East Java shallots have a relationship and there is a balance, in the long run, it can be said to be an integrated market. The integration between the Central Java consumer market and the East Java consumer market is because the markets are in different provinces but are close together and at the same market level, that is, both the consumer markets. This is consistent with Kustiari's research (2017) which concluded that the market in North Sumatra is integrated with markets in West Sumatra, and this can occur because the region of West Sumatra is close to North Sumatra.

Integration between the Central Java consumer market and the Jakarta consumer market, Central Java consumer prices and Jakarta consumer prices have a relationship and there is a balance, in the long run, it can be said to be an integrated market. The integration between the Central Java consumer market and the Jakarta consumer market is due to the market being in the adjacent provinces and at the same market level, that is, both the consumer markets.

Table 3. Granger Causality Test Results

Null Hypothesis:	Obs	Prob.
HP does not Granger Cause HK	68	0.1932
HK does not Granger Cause HP		0.3991
KT does not Granger Cause HP	68	0.0773
HP does not Granger Cause KT		0.0145
KJ does not Granger Cause HP	68	0.8619
HP does not Granger Cause KJ		0.6071
KB does not Granger Cause HP	68	0.2590
HP does not Granger Cause KB		0.0879
KT does not Granger Cause HK	68	0.0075
HK does not Granger Cause KT		0.0022
KJ does not Granger Cause HK	68	0.0731
HK does not Granger Cause KJ		0.5883
KB does not Granger Cause HK	68	0.6049
HK does not Granger Cause KB		0.3366

Source: E-Views Output, 2019

Integration between the Central Java consumer market and the West Java consumer market. Central Java consumer prices and West Java consumer prices have a relationship and there is a balance, in the long run, it can be said to be an integrated market. The integration between the Central Java consumer market and the West Java consumer market is because the markets are in the provinces that are close together and at the same market level, that is, both the consumer markets.

Based on the results of the Pairwise Granger Causality test, it is known that the F-statistic relationship has a probability value smaller than the 5% significance level which means that a variable will affect other variables.

The HK variable does not significantly influence the HP variable and the HP variable has no significant on the HK variable as indicated by each probability value greater than 0,05 namely 0,1932 and 0,3991. The HK and HP variables are independent or have no causal relationship with each other. The integration of the shallot market in the producer and consumer markets but does not have a causal relationship between the two shows that the market integration that occurs between producer markets and consumer markets in Central Java is weak (Kustiari, 2017). The weak market integration that occurs shows that the supply chain system that occurs in shallot marketing has not been efficient (Nuraeni, Anindita, & Syafrial, 2015). This condition causes information on price changes in the consumer market to be unable to be perfectly received by producers.

The weak integration between producer markets and consumer markets in Central Java is caused by several factors including the following:

First, the shallot market leads to imperfect competition. This is in accordance with the opinion of Sexton, Killing, and Carman (1991) in (Nuraeni, Anindita, & Syafrial (2015) which revealed that the structure of the agricultural commodity market in producer markets, in general, is oligopsonistic, where market information is not perfectly received by producers so producers accept lower prices.

Second, producers are only recipients of the price (price takers) where producers are not able to easily raise or lower prices. Based on research Ruslan (2016) concluded that the position of producers as price makers makes producers have weak power in setting prices. Thus, the producer will accept any price set by the buyer because if the producer raises the selling price higher than the market price, shallots will not sell and the buyer will switch to other shallots producers. Therefore, collectors/middlemen will offer the lowest price to producers, because collectors/middlemen are sure that producers will accept the price.

Third, the behavior of retailers is collusive. This is following Ruslan (2016) in his study concluded that the existence of collusive behavior among shallot retailers that resulted in the price of onions in the consumer market to be higher or unnatural even though prices at producers were low. Collusion between retailers indicates that there is a cartel in the shallot consumer market. The retailers who are supposed to compete, however, they work together in setting prices to obtain higher profits. So, in practice in the shallot consumer market, there is no price competition and the prices formed are the same. This results in consumers willing to pay the price as determined by the retailer because they have no other choice. The existence of collusive behavior in the shallot consumer market so that the shallot consumer market is only controlled by a few retailers.

Fourth, shallot price fluctuations also cause a weakly integrated market due to high shallot price fluctuations which cause greater marketing margins and lower prices received by producers (Ruslan, 2016). In 2018 the trade margin and transportation of shallots in Central Java was 50,66 percent (BPS, 2018b). The high marketing margin shows that collectors/wholesalers/middlemen and retailers take big profits so that the price difference of shallots in consumers and prices in producers tends to be very large. One of the high price fluctuations was caused by the production of shallots that were only centered in Brebes Regency while all regions in Central Java needed

shallots. In 2017, the area of shallot production in Brebes Regency reached 29.017 hectares, and its production was 2.725.988 quintal (BPS, 2018a). So that around 57.2 percent of shallots in Central Java are produced by Brebes Regency.

KT variable does not significantly influence the HP variable (0,0773), while the HP variable significantly influences the KT variable (0,0145). Based on these results, there is direct causality between the variable KT and HP, which is only the HP variable that significantly influences the KT variable and does not apply otherwise. Thus, integration between the Central Java producer market and the East Java consumer market is weak.

The length of the distribution chain is one of the causes of weak market integration. based on BPS (2018b) the supply of shallots from Central Java to East Java is distributed to farmers then to collectors than to retail traders and then to households. Shallots from Central Java are also distributed through collectors than to retailers and then to households. Finally, shallots from Central Java are distributed to wholesalers, then to supermarkets/supermarkets, households, processing industries, and other business activities.

The KJ variable does not significantly influence the HP variable and the HP variable does not significantly influence the KJ variable indicated by each probability value greater than 0,05 namely 0,8619 and 0,6071. The KJ and HP variables are independent or have no causal relationship with each other. Thus, the integration between the Central Java producer market and the Jakarta consumer market is weak. The reason for the weak integration between the Central Java producer market and the Jakarta consumer market is due to the long marketing distribution chain. Based on BPS (2018b) the supply of shallots from Central Java to Jakarta is distributed to wholesalers then to retail traders and then to households. Shallots from Central Java are also distributed through wholesalers and then to the processing industry, households, other business activities, as well as government and non-profit institutions. The length of the distribution chain is one of the causes of red

onion marketing margins in Jakarta. Based on BPS (2018b) the trade and marketing margin of shallots in Jakarta is 59,29 percent. This indicates that the increase in the price of shallots from producers to end consumers in Jakarta was 59,29 percent. Based on BPS (2018d) shows that the average price of shallots at the consumer level in Jakarta is IDR. 25.128,1. Meanwhile, the price of shallots at the producer level in Central Java is only IDR 17.262,10 (BPS, 2018c). Besides, most of the shallot stock in Central Java is distributed to Jakarta at 9,50 percent (BPS, 2018c). However, the largest supply of shallots in Jakarta comes from West Java at 93,92 percent (BPS, 2018c).

KB variable does not significantly influence the HP variable and the HP variable does not significantly influence the KB variable shown by each probability value greater than 0,05, namely 0,2590 and 0,0879. KB and HP variables are independent or there is no causal relationship with each other. Thus, integration between the Central Java producer market and the West Java consumer market is weak.

The reason for the weak integration between the Central Java producer market and the West Java consumer market is because the integrated shallots market in Central Java and West Java have not been put to good use by each market participant so that the two markets do not have a causal relationship. Central Java distributes most of the shallots to West Java by 3.11 percent and West Java receives the largest supply of shallots from outside the province, which is from Central Java by 35,23 percent (BPS, 2018b). Based on BPS (2018d) shows that the average price of shallots at the consumer level in West Java is IDR 24.077,30. Meanwhile, the price of shallots at the producer level in Central Java is only IDR 17.262,10 (BPS, 2018c).

The variable KT has a significant effect on the variable HK (0.0075) and the variable HK has a significant effect on the variable KT (0.0022). This shows that between the KT and HK variables there is a two-way causality where a causal relationship occurs. Thus, the integration between the Central Java consumer market and the East Java consumer market is strong.

There is a strong market integration between the shallots market at the consumer level of Central Java and the shallots market in East Java because Central Java is a large supplier of shallots to the province of East Java by 17,22 percent and Central Java also receives the largest supply of shallots is from East Java at 12,17 percent (BPS, 2018b). So that the price of shallots in the Central Java and East Java consumer markets is almost the same. Based on BPS (2018c) shows that the average price of shallots at the consumer level in Central Java is IDR 20.796,00. The average price is almost the same as the price of shallots in East Java, which is IDR 20.427,70 (BPS, 2018c).

The KJ variable does not significantly influence the HK variable and the HK variable does not significantly influence the KJ variable indicated by each probability value greater than 0.05 namely 0,0731 and 0,5883. The KJ and HK variables are independent or have no causal relationship with each other. Thus, the integration between the Central Java consumer market and the Jakarta consumer market is weak.

The weak integration of the Central Java and Jakarta shallots consumer markets due to the distribution pattern of shallots in Jakarta not only involving Central Java as a supplier of shallots to Jakarta, however, Jakarta also received the largest supply of shallots from West Java at 93,92 percent (BPS, 2018b). Whereas, Jakarta only receives supplies from Central Java at 6,03 percent (BPS, 2018b).

During 2018 the average price of shallots in the Central Java consumer market was IDR 20.796,00 lower than the average price of shallots in Jakarta at IDR 25.128,10 (BPS, 2018d). The price difference between the two markets indicates that the two markets have not yet experienced asymmetric price and this is contrary to the opinion of Monke and Petzel (1984) in Jena (2016), namely, The Law of One Price (LOP) means that the same product is sold at a price which is relatively the same in various markets.

The KB variable does not significantly influence the HK variable and the HK variable has no significant effect on the KB variable indicated by each probability value greater than 0,05 namely 0,6049 and 0,3366. The KB and HK

variables are independent or have no causal relationship with each other. Thus, the integration between the Central Java consumer market and the West Java consumer market is weak. During 2018 the average price of shallots in West Java was IDR 24.077,30, higher than the price of shallots in the Central Java consumer market of IDR 20.796,00 (BPS, 2018d). This shows that there are differences in prices between the two markets amounting to IDR 3.281,30 so that it is different from the opinion of Monke and Petzel (1984) in Jena (2016) namely, The Law of One Price (LOP) means that the same product is sold with prices that are relatively the same in various markets.

Vector Error Corection Model (VECM) Estimation Results, based on the stationarity test results it is known that the variables used in the study are not stationary at the level of level, but stationary at the level of 1st difference and cointegrated. For this reason, the estimation test uses the VAR model in the form of VECM to identify the balance in the short run or the speed of price adjustment in the short run to the price balance in the long run.

The results of the VECM estimation in the short-term equation of the variables used in the study are as follows:

The HP variable in lag 1 influences the HP variable negatively and significantly. HP coefficient on lag 1 is -0.470367, meaning that if there is an increase in the price of shallots in the Central Java producer market by IDR 1.000,00 in the previous month, it will reduce the price of shallots in the Central Java producer market itself in the current month by IDR 470.367. The HP variable in lag 2 influences the HP variable negatively and significantly. HP coefficient in lag 2 of -0.476965 means that if there is an increase in the price of shallots in the Central Java producer market by IDR 1.000,00 in the previous two months it will reduce the price of shallots in the Central Java producer market in the current month by IDR 476.965.

The HP variable in lag 1 influences the KT variable positively and significantly. The HP coefficient on lag is 1,482, meaning that if there is an increase in the price of shallots in the

Central Java producer market by IDR 1.000,00 in the previous month, it will raise the price of shallots in the East Java consumer market in the current month by IDR 1.482. The HP variable in lag 2 influences the KT variable positively and significantly. HP coefficient in lag 2 of 1,152 means that if there is an increase in the price of shallots in the Central Java producer market by IDR 1.000,00 in the previous two months, it will raise the price of shallots in the East Java consumer market in the current month by IDR 1.152. The HP variable in lag 3 has a positive and significant effect on the KT variable. HP coefficient on lag 3 of 0,758 means that if there is an increase in the price of shallots on the Central Java producer market by IDR 1.000,00 in the previous three months it will raise the price of onions in the East Java consumer market in the current month of IDR 758. KT variable in lag 1 influences the KT variable negatively and significantly. The KT coefficient in lag 1 of -0.375594 means that if there is an increase in the price of shallots in the East Java consumer market by IDR 1.000,00 in the previous month it will reduce the price of shallots in the East Java consumer market itself in the current month of IDR 375,594. KT variable in lag 3 influences the KT variable negatively and significantly. KT coefficient on lag 3 of -0,442744 means that if there is an increase in the price of shallots in the East Java consumer market by IDR 1.000,00 in the previous three months it will reduce the price of shallots in the East Java consumer market itself in the current month of IDR 442, 744.

The HP variable in lag 3 influences the HP variable negatively and significantly. HP coefficient on lag 3 of -0,336595 means that if there is an increase in the price of shallots in the Central Java producer market by Rp1.000,00 in the previous three months it will reduce the price of shallots in the producer market in Central Java in the current month by IDR 336, 595. The KJ variable in lag 1 influences the HP variable positively and significantly. KJ coefficient in lag 1 of 0,169852 means that if there is an increase in the price of shallots on the Jakarta market by IDR 1.000,00 in the previous month it will increase the price of shallots on the Central Java producer

market in the current month by IDR 169,852. KJ variable in lag 2 influences the HP variable positively and significantly. KJ coefficient in lag 2 of 0,146484 means that if there is an increase in the price of shallots on the Jakarta market by IDR 1.000,00 in the previous two months it will increase the price of shallots on the Central Java producer market in the current month by IDR 146,484.

The HP variable in lag 1 influences the KJ variable positively and significantly. HP coefficient on lag 1 of 2,020826 means that if there is an increase in the price of shallots in the Central Java producer market by IDR 1.000,00 in the previous month it will raise the price of shallots in the Jakarta consumer market in the current month of IDR 2.020,826. The HP variable in lag 2 influences the KJ variable positively and significantly. HP coefficient on lag 2 of 1,671189 means that if there is an increase in the price of shallots in the Central Java producer market by IDR 1.000,00 in the previous two months, it will raise the price of shallots in the Jakarta consumer market in the current month of IDR 1.671,189. KJ variable in lag 3 influences KJ variable negatively and significantly. The KJ coefficient in lag 3 of -0,396485 means that if there is an increase in the price of shallots in the Jakarta consumer market by IDR 1.000,00 in the previous three months it will reduce the price of shallots in the Jakarta consumer market itself in the current month by IDR 396,485.

The HP variable in lag 1 influences the HP variable negatively and significantly. HP coefficient on lag 1 of -0,588406 means that if there is an increase in the price of shallots on the Central Java producer market by IDR 1.000,00 in the previous month it will reduce the price of onions in the Central Java producer market itself in the current month of IDR 588,406. The HP variable in lag 2 influences the HP variable negatively and significantly. HP coefficient in lag 2 of -0,605361 means that if there is an increase in the price of shallots on the producer market in Central Java by IDR 1.000,00 in the previous two months it will reduce the price of shallots on the producer market in Central Java in the current month of IDR 605,361. The HP variable in lag 3

influences the HP variable negatively and significantly. HP coefficient in lag 3 of -0,481481 means that if there is an increase in the price of shallots on the producer market in Central Java by IDR 1.000,00 in the previous three months it will reduce the price of shallots on the producer market in Central Java in the current month by IDR 481,481. KB variable in lag 2 influences the HP variable positively and significantly. The KB coefficient in lag 2 of 0,602499 means that if there is an increase in the price of shallots on the West Java market by IDR 1.000,00 in the previous two months it will increase the price of shallots on the Central Java producer market in the current month by IDR 602,499.

The ECT coefficient is negative and significant indicates that there is a mechanism to adjust the price of shallots from the short to long term. The ECT coefficient of the price of shallots on the Central Java consumer market is smaller than the producer price, it shows that the adjustment of Central Java consumer prices to return to equilibrium is faster than the prices of Central Java producers. The ECT coefficient of the price of shallots on the East Java consumer market is smaller than the prices of Central Java producers, this shows that the adjustment of East Java consumer prices to return to equilibrium is faster than the prices of Central Java producers. The ECT coefficient of shallot prices in the Jakarta consumer market is smaller than the prices of Central Java producers, indicating that the adjustment of Jakarta's consumer prices to return to equilibrium is faster than the prices of Central Java producers.

The positive and significant ECT coefficient shows that there is a mechanism for adjusting the price of shallots from the short to long term is very slow. The ECT coefficient of the price of shallots on the Central Java producer market is smaller than the prices of West Java consumers, it shows that the price adjustment of Central Java producers to return to equilibrium is faster than the prices of West Java consumers.

Based on the results of the variance decomposition test can be interpreted as follows: The results of the variance decomposition test of producer prices in Central Java, the price of

shallots in the Central Java producer market in the first month can be explained by changes in the price of shallots themselves by 45.86 percent, changes in prices in the Central Java consumer market by 54.13 percent, and the consumer markets of East Java, Jakarta and West Java have not provided influence. In the second month, price changes in the Central Java producer market were explained by changes in producer prices themselves by 38.33 percent, changes in prices in the Central Java consumer market by 50.26 percent, changes in East Java consumer prices by 9.99 percent, changes in consumer prices Jakarta was 0.08 percent, and the rest was due to changes in the West Java market price of 0.66 percent. In the thirty-sixth month the price changes in the producer market were explained by changes in the prices of the producers' own markets by 36.33 percent, changes in Central Java consumer prices by 52.87 percent, changes in East Java consumer prices by 5.80 percent, changes in consumer prices Jakarta at 2.48, and changes in West Java consumer prices by 2.50 percent. In the seventieth month price changes in the Central Java producer market were explained by changes in prices in the producers' own market by 36.59 percent, changes in Central Java consumer prices by 54.55 percent, changes in East Java consumer prices by 4.50 percent, price changes Jakarta consumers by 1.97 percent, and changes in West Java consumer prices by 2.36 percent.

Based on the description it can be shown that in the first, second, thirty-sixth, and seventy-second changes in the price of shallots in the Central Java consumer market contributed the most to the changes in the price of shallots in the Central Java producer market. However, the integration of the shallot market at the producer level and at the consumer level in Tenga Java is weak. This shows that the large proportion of the shallot price shocks at the consumer level in influencing the price of shallots on the producer market has not been utilized by producers because there is an asymmetry of information caused by the collusive behavior of traders / middlemen and retailers so that changes in the price of shallots at the consumer level are does

not affect the formation of shallot prices at the producer level and vice versa changes in prices in the producer market does not affect changes in prices in the consumer market.

Variance decomposition test results for Central Java consumer prices, changes in the price of shallots in the Central Java consumer market in the first month are only explained by changes in consumer prices by 100 percent. In the second month the change in the price of shallots in the Central Java consumer market can be explained by changes in the prices of Central Java consumers themselves, Central Java producer prices, East Java consumer prices, Jakarta consumer prices, and West Java consumer prices respectively by 77.33 percent, 1.93 percent, 17.64 percent, 2.68 percent and 0.38 percent. In the thirty-sixth month the changes in the price of shallots in the Central Java consumer market can be explained by changes in the prices of Central Java consumers themselves, Central Java producer prices, East Java consumer prices, Jakarta consumer prices, and West Java consumer prices respectively by 76.24 percent, 2.64 percent, 9.36 percent, 3.58 percent and 8.15 percent. In the seventy-sixth month the changes in the price of shallots in the Central Java consumer market can be explained by changes in the prices of Central Java's own consumers, prices of Central Java producers, East Java's consumer prices, Jakarta's consumer prices, and West Java's consumer prices respectively by 80.85 percent, 1.52 percent, 6.97 percent, 2.67 percent and 7.96 percent.

Based on the description above, it can be shown that in the first, second, thirty-sixth, and seventy-two months the proportion of onion price shocks in the Central Java consumer market contributed the most to changes in the price of shallots in the Central Java consumer market itself.

Variance decomposition test results for East Java consumer prices, changes in prices in the East Java consumer market in the first month can be explained by changes in Central Java consumer nutrition, Central Java producer prices, East Java consumer prices themselves, Jakarta consumer prices, and West Java

consumer prices respectively by 57.04 percent, 3, 25 percent, 0.50 percent, 8.47 percent and 30.70 percent. In the second month the price changes in the East Java consumer market can be explained by changes in Central Java consumer nutrition, Central Java producer prices, East Java consumer prices themselves, Jakarta consumer prices, and West Java consumer prices respectively by 56.44 percent, 4, 47 percent, 0.32 percent, 7.27 percent and 31.48 percent. In the thirty-sixth month the price changes in the East Java consumer market can be explained by changes in Central Java consumer nutrition, Central Java producer prices, East Java consumer prices themselves, Jakarta consumer prices, and West Java consumer prices respectively by 49.00 percent, 3.80 percent, 2.15 percent, 32.57 percent and 9.06 percent. In the seventy-sixth-month price changes in the East Java consumer market can be explained by changes in Central Java consumer nutrition, Central Java producer prices, East Java consumer prices themselves, Jakarta consumer prices, and West Java consumer prices respectively by 51.97 percent, 2.56 percent, 1.24 percent, 35.15 percent and 9.06 percent. Based on the description above it can be shown that in the first, second, thirty-sixth, and seventy-two changes in the price of shallots in the Central Java consumer market contributed the most to the change in the price of shallots in East Java.

Variance decomposition test results of Jakarta consumer prices, changes in the price of shallots in the Jakarta consumer market in the first month can be explained by changes in Central Java consumer prices, Central Java producer prices, and Jakarta consumer prices respectively by 19.83 percent, 3.57 percent, and 76.59 percent. In the second-month price changes in the Jakarta consumer market can be explained by changes in Central Java consumer prices, Central Java producer prices, East Java consumer prices, Jakarta consumer prices themselves, and West Java consumer prices respectively by 19.68 percent, 3.97 percent, 0.002 percent, 73.60 percent, and 2.73 percent. In the thirty-sixth month price changes in the Jakarta consumer market can be explained by changes in

Central Java consumer prices, Central Java producer prices, East Java consumer prices, Jakarta consumer prices themselves, and West Java consumer prices respectively by 11.51 percent, 2, 20 percent, 2.70 percent, 81.20 percent and 2.37 percent. In the seventy-sixth month price changes in the Jakarta consumer market can be explained by changes in Central Java consumer prices, Central Java producer prices, East Java consumer prices, Jakarta consumer prices themselves, and West Java consumer prices respectively by 10.46 percent, 1, 28 percent, 2.21 percent, 84.62 percent and 1.40 percent.

Based on the description above it can be shown that in the first, second, thirty-sixth, and seventy-second changes in the price of shallots in Jakarta contributed the most to changes in the price of shallots in Jakarta itself.

Variance decomposition test results in West Java consumer prices, changes in shallot prices in the West Java consumer market in the first month can be explained by changes in Central Java consumer prices, Central Java producer prices, East Java consumer prices, Jakarta consumer prices respectively 47.10 percent, 1.10 percent, 9, 50 percent, 42.27 percent. In the second month the changes in West Java consumer prices can be explained by changes in Central Java consumer prices, Central Java producer prices, East Java consumer prices, Jakarta consumer prices, and West Java consumer prices respectively by 43.46 percent, 4.18 percent, 6.27 percent, 24.10 percent, and 21.96 percent. In the thirty-sixth month of changes in West Java consumer prices can be explained by changes in Central Java consumer prices, Central Java producer prices, East Java consumer prices, Jakarta consumer prices, and West Java consumer prices respectively by 66.43 percent, 2.31 percent, 12.23 percent, 6.53 percent, and 12.47 percent. In the seventieth month of West Java consumer price changes can be explained by changes in Central Java consumer prices, Central Java producer prices, East Java consumer prices, Jakarta consumer prices, and West Java consumer prices

respectively 71.00 percent, 1.29 percent, 12.58 percent, 4.11 percent, and 11.00 percent.

Based on the description above it can be shown that in the first, second, thirty-sixth, and seventy-second proportions of the onion price shocks in the Central Java consumer market contributed the most to changes in the price of shallots in West Java.

CONCLUSION

The results of the study are the producer and consumer shallot markets in Central Java integrated, the Central Java producer market and the East Java, Jakarta, and West Java consumer markets integrated, the Central Java consumer market and the East Java, Jakarta, and West Java consumer markets integrated. Each market is weakly integrated, only the Central Java consumer market and the East Java consumer market are strongly integrated. Based on the results of the VAR / VECM analysis, it is shown that all prices of shallots in each market occur in short-term to long-term price adjustments where price adjustments in the Central Java producer market are slower than price adjustments in the consumer markets of Central Java, East Java, and Jakarta. The Central Java consumer market is the dominant market affecting the formation of prices in the markets of Central Java, East Java, and West Java.

Efforts to overcome these problems can be done by increasing the implementation of government policies on floor prices and ceiling prices appropriately.

Market integration analysis conducted by researchers is able to show the presence or absence and the strength or weakness of market integration. This analysis is not able to explain the direction of price transmission that causes price asymmetry in the shallots market. For this reason, in subsequent studies, research can be conducted in the direction of transmission of the price of shallots.

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