

# PROCEEDING

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## PREFACE

Covid-19 pandemic brought many challenges in all sectors, including agriculture. Even people were not ready, but all must face the impacts from the pandemic. The 2<sup>nd</sup> International Conference on Agribusiness and Rural Development (IConARD) 2021 has been held on 25-26 October 2021 in Yogyakarta Indonesia (blended with online method). This conference also brought Covid-19 pandemic as one issue in the discussion.

Sustainability and Innovation in Agribusiness for a Better Life become the main topic of this conference, where some of researchers that presented their research were talking about the Covid-19 pandemic in agriculture point of view. Agribusiness, agricultural economic, agricultural technology and rural development are the focus and scope of this conference, which could brough various opinions and contribution in agriculture development, especially post Covid-19 pandemic.

Many researchers have been participated in this conference, such as from Russia, Malaysia, Thailand, Australia, Philippine and Indonesia. With editors and reviewers from expertise in related areas, make the published papers have high quality, and hopefully can contribute significantly on agriculture development in the world.

The works to make better life of human being is not stop here, but should be further brought to the next level, which is the research findings implementation in human life. Inter stakeholder coordination and cooperation are needed to make any effort in the agriculture and rural development can be conducted effectively.

We would like to deliver big gratitude to all participants, keynote speakers and committees. And other parties that helped this conference.

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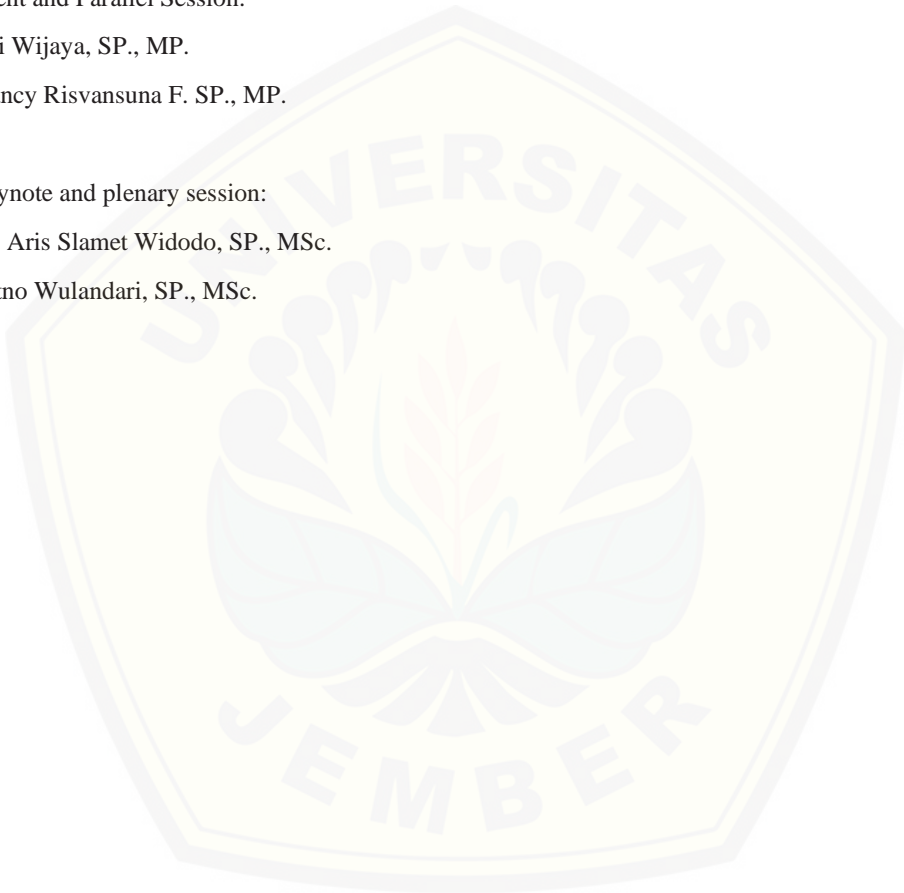
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25 October 2021

# Market Integration: How Does It Work in National Shallot Commodity Market in The Middle of Covid-19 Pandemic?

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**Abstract.** The impact affected by the covid-19 pandemic influences various sectors in Indonesia, with no exception in agriculture sector. However, the agriculture sector still becomes a sustaining sector for other economic sectors because society's necessity is fulfilled by agriculture. Shallot is one of seven important commodities as basic needs for Indonesian and horticulture primadonna. Covid-19 pandemic presence influences shallot marketing indirectly from farmer till modern market. This research was conducted to analyze market efficiency of national shallot before and after covid-19 pandemic breaking out in Indonesia and used secondary data, which was approached through price data in farmers, wholesalers, traditional markets, and modern markets. This research would be analyzed using Ordinary Least Square approach on Ravallion Model. The research result showed that national shallot market was inefficient in the middle of a pandemic. Characteristic of shallot market was certainly volatile and had fluctuated prices, but it was more volatile in the middle of pandemic than before the pandemic broke out. It could be seen from market connection index and variance value. One of causes that is undeniable is distribution and information obstruction, which is caused by pandemic breaking. Besides, Large Scale Social Restriction rule caused shallot distribution disturbed.

## 1 Introduction

Shallot is one of the important and strategic commodities for Indonesia. Shallot commodity is getting important because it has a role in economic, political, and social conditions. The following things cause shallots to have an important and strategic role, namely (1) the commodity of shallots as part of the horticulture sub-sector has the potential to be developed as a source of new development and has the potential to increase the GDP of the agricultural sector; (2) Shallots are also one of the commodities that determine the rate of inflation in Indonesia [1–3].

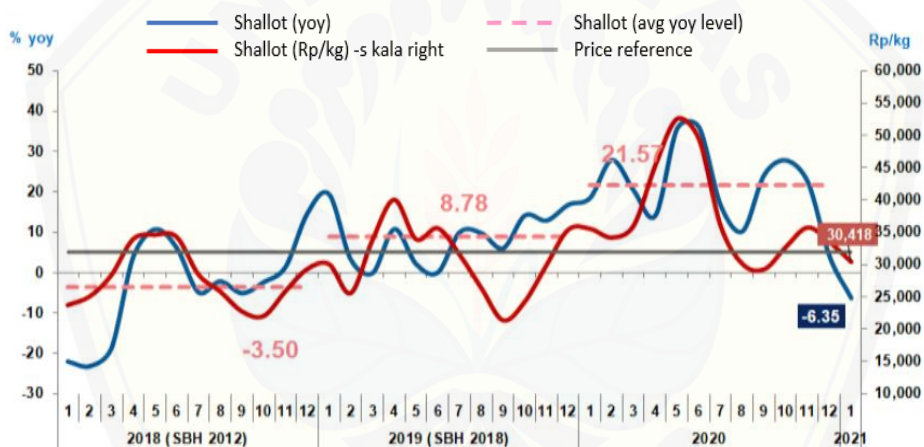
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Over the last decade, shallot consumption tends to have an increasing trend in which shallot consumption is higher than shallot production. This is caused by the increase in the total Indonesian population [4]. However, the shallot production centralized in Java Island (East Java, East Java, and West Java) causes an imbalance between shallot production and consumption in Indonesia in which there are provinces with shallot surplus but the other regions experiencing the deficits. This certainly impacts price disparity between producer area (central) and consumer area [5,6].

The covid-19 pandemic in Indonesia since March 2<sup>nd</sup>, 2020, has affected the balance of the shallot market in Indonesia. Shallot price in the consumer-level tends to increase at the beginning of covid – 19 pandemics [7], which has reached IDR 55,000.00 per kg. Those increasing prices are high enough if compared by the increasing shallot price before the pandemic has occurred, which has reached IDR 40,000.00 per kg. This is due to the existence of a Large – Scale Social Restriction (or PSBB) policy conducted by several major cities in Indonesia, which has caused shallot price to increase in several cities in Indonesia. That increasing price is not necessarily transmitted to shallot producers or shallot farmers. Therefore, it is important to research the market integration of shallot commodity during the covid – 19 pandemic.



**Fig. 1.** The Fluctuation of Shallot Price in Indonesia Before and After Covid – 19 Pandemic Breaking Out

Source: [1]

Market integration is one of the market efficiency indicators [8]. Market integration is a measurement that represents how much the price changes which is occurred in the reference market (a market that is at a higher level, such as a retailer) will cause the change on its follower markets (example, market at farmer level) [9]. There are two kinds of market integration; they are vertical integration and spatial integration [10]. Spatial market integration is relationship linkages between regional markets and another regional markets. Based on Tomek & Robinson [11], The relationship of a price from geographically separated markets for the same commodity can be analyzed by the concept of spatial market integration. Two markets are said to be integrated if a change in the price of one market will affect the price of another market in the same direction and to the same degree [12]. Meanwhile, vertical integration is integration which is understood to be occurred in the industry (agribusiness system), it is the linkage between a marketing institution and other marketing institutions in a certain market chain (example from the institution at farmer level and institution in the factory or consumer-level) [9].

The research about shallot market integration has already been done before, such as the research of Layade et al. (2014)[13]; Singh (2014)[14]; Tomycho et al. (2020)[6], Nendissa et al. (2021)[4]; Ahmed et al. (2017)[15]; Magfiroh et al. (2017)[16]. Those researches have analyzed shallot integration using multiple linear regression, Ravallion, and VECM (Vector Error Correction Model). Those research results have shown that shallot price, both vertically and spatially, has the same tendency; however, it is not occurred a perfect market integration, either vertically or spatially. Those show a price gap in shallot commodity price, especially in Indonesia [17–19]. Recently, this research aims at analyzing of shallot market integration in middle covid – 19 pandemic.

## 2 Material and Methods

This research used daily secondary data of national shallot price with the data total is 236 units from November 2019 till October 2020. Shallot data used was the price data from several marketing levels such as farmers, wholesalers, traditional markets, and modern markets. The data used came from The Ministry of Agriculture, The Ministry of Trade, The Information Centre of Strategic Food Price, Statistic Indonesia, and PD Pasar Jaya.

Before conducting the analysis related to price integration performance, which occurred in shallot commodity at the price level of farmers, wholesalers, traditional markets, and modern markets, price variation was conducted using the coefficient of variation. The coefficient of variation is obtained from standard of deviation of a variable divided by its mean [20–22]. Those mathematically have formulated with :

$$\text{Coefficient of Variation (KV)} = \frac{\text{Standard of deviation}}{\text{Mean}} \times 100\% \quad (1)$$

The coefficient of variation of the price time series data describes the fluctuation (average difference) used. This is to determine the price stability of a commodity. [23]. The smaller value could be interpreted that the relative price was stable or had low fluctuations [7]. Based on the Ministry of Trade calculation (2010), it has been stated that the commodity price could be determined stable if the value of the coefficient of variation had been around the range of 5 – 9 percent. If the value of the coefficient of variation was more than 9 percent, it indicated the price was highly fluctuated and unstable. The comparison of the coefficient of variation in shallot price was before and after the pandemic was breaking out would be conducted to observe the variation of shallot price.

Ravallion's model of Ravallion (1986)[24] was used to analyze the performance of shallot integration vertically in the middle of the covid – 19 pandemic. Ravallion Model has been widely used, improved, and discussed in the analysis of market integration. In general, the Ravallion Model was used to analyze the cohesiveness of two markets, and there are reference markets and local markets [13,25]. Market integration or cohesiveness was one of the indicators describing market efficiency [26]. The existence of those integrated markets was expected that the information about every price change of shallot at the consumer level could be followed by the change of price at the producer level so that it did not harm the marketing channels involved in the middle of shallot marketing.

Generally, the structural model which was conducted by [27–29], there are :

$$P_t = b_1P_{t-1} + b_2(R_t - R_{t-1}) + b_3R_{t-1} + \varepsilon_t \quad (2)$$

Where  $P_t$  was shallot price in local market level,  $R_t$  was shallot price in reference market level. This market integration model estimates the reference market price

affecting the local market price by considering the past and current prices. Table 1 shows that there are six models of market integration in which each model has a local price and reference price.

**Table 1.** Pairs of Shallot Price on Ravallion Model

		<i>Reference Market</i>		
		<b>Wholesalers</b>	<b>Traditional Market</b>	<b>Modern Market</b>
<i>Local Market</i>	Farmers	V	V	V
	Wholesalers		V	V
	Traditional Market			V

The analysis used to see the effect of past reference market prices and local market past prices on price formation at the local market level at a certain time is the Index of Market Connection (IMC). IMC was defined as the ratio of local market coefficient to reference market coefficient [30], such as :

$$IMC = b_1 / b_3 \tag{3}$$

The IMC value was around  $0 < IMC < 1$ , reflecting the occurrence of short-term integration. The IMC value approached zero indicated a higher degree of integration [31]. If the value of IMC was more than 1, the market could be categorized as weekly integrated with the short term. On the contrary, if the value of IMC was less than 0, the market could be said isolated from the reference market, which meant that the price of those markets did not influence price formation in the local market. In this approach, the hypothesis of short term integration could be formulated, such as :

$$H_0 : b_1 = 0$$

$$H_1 : b_1 \neq 0$$

For Statistic test was used :

$$T_{count} = \frac{b_1 - 0}{S(b_1)} \tag{4}$$

A hypothesis test was conducted by comparing  $t_{count}$  with  $t_{table}$ . If the null hypothesis was rejected, it indicated that the market was not integrated into the short term.

The coefficient of  $b_2$  on equation 1 reflected how the price changes in reference market-level proceeded to the price in local market level. This parameter measured long-term integration, in which value 1 indicated the existence of perfect integration in the long term. In other words, if the price in the reference market changed by 1 percent, the price in the local market would change by  $b_2$  percent. The coefficient  $b_2$  also showed the elasticity of price transmission; it was the percentage change in prices in the local market due to price changes in the reference market [28]. The elasticity of transmission would be higher in the integrated market than in the non-integrated market. The high price transmission elasticity would show that the market was vertically integrated; this would also show marketing and information efficiency [32]. The long-run integration hypothesis was formulated as follows:

$$H_0 : b_2 = 1$$

$$H_1 : b_2 \neq 1$$

Statistic test was obtained from statistics:

$$T_{count} = \frac{b_2 - 1}{S(b_2)} \tag{5}$$

A hypothesis test was conducted by comparing  $t_{count}$  with  $t_{table}$ . If the null hypothesis was rejected, the market was not integrated into the long term.

### 3 Result and Discussion

#### 3.1 The Performance of Shallot Price Before and During Covid – 19 Pandemic Covid – 19

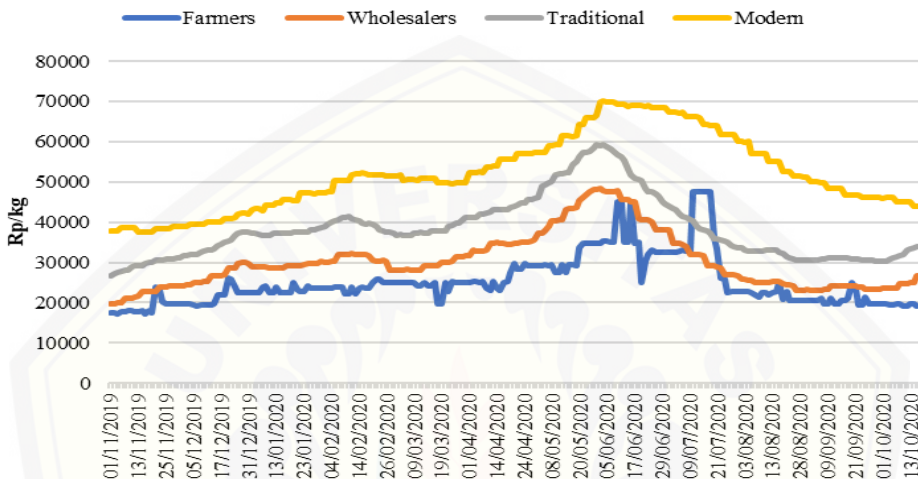


Fig. 2. Shallot Price During Research Period

Before the Covid-19 pandemic occurred and took place in Indonesia, shallot commodity was a commodity with fluctuating prices. At the beginning of the research period, it was on November 1<sup>st</sup>, 2019, the shallot price at the farmers, wholesalers, traditional markets, and modern markets level was respectively IDR 17,500.00; IDR 19,800.00; IDR 27,150.00; and IDR 37,800.00. During the period until March 2<sup>nd</sup>, 2020 (when the first case of Covid-19 in Indonesia was confirmed), there was an increase in the price of shallots with an average daily price increase of 0.60 percent at the farmer level, at wholesalers by 0.45 percent, at the traditional market level by 0.39 percent, and at the modern market level by 0.39 percent. If comparing the prices at the beginning and end of the research period, the results showed that there was an increasing price at the farmer level reached IDR 19,400.00 (increase by 10.86 percent), at the wholesalers level, reached IDR 26,700.00 (increase by 34.85 percent), at the market traditional market price reached IDR 34,000.00 (increase by 25.23 percent), and in the modern market reached IDR 44,050.00 (increase by 16.53 percent). During the research period, the average increase of shallot price at the farmer level reached 0.33 percent, at the wholesalers level reached 0.15 percent, in traditional markets reached 0.1 percent, and in modern markets reached 0.07 percent.

Price changes at the farm level at the beginning of the research period (before covid-19 cases were found in Indonesia) to the end of the research period (the ongoing covid-19 pandemic) had the smallest percentage compared to the price level of other channels, but price fluctuations per day showed the largest percentage. It showed that farmers experienced the greatest price uncertainty compared to other channels. The daily price of shallot at farmer level changed relatively quickly compared to other channels, but with a downward trend due to price differences at the beginning of the pandemic and when the pandemic lasts, it only increased by 10.86 percent, which was the smallest percentage



compared to the trend of increasing prices at wholesalers level. Wholesalers had the highest price increase between before and after covid – 19 pandemic emerged in Indonesia, one of them was caused due to insufficient information regarding industrial and transportation restrictions, which led to supply disruptions and delivery delays, resulting in supply disruptions and delivery delays in scarcity and price increasing.

The highest peaks of shallot price occurred at different times at the farmer level and the other three channels. At the farmer price level, the highest price reached IDR 47,500.00, which occurred in the second week of July. The lowest price at the farmer level occurred before the pandemic occurred, with the shallot price reached IDR 17,300.00. At the wholesalers, traditional markets, and modern markets price level, the highest prices occurred in the first week of June after the religious holiday, was Eid al-Fitr. The highest price at wholesalers reached IDR 48,400.00, with the lowest price occurred when the pandemic had not yet occurred, IDR 19,800.00. The highest price in traditional markets reached IDR 59,200.00, with the lowest price, occurred before the pandemic, which was IDR 26,750.00. The highest price in the modern market reached IDR 70,100.00, with the lowest price reached IDR 37,550.00. The existence of the covid – 19 pandemics made the shallot price was fluctuated rapidly every day with an increasing trend compared to the price when the pandemic had not yet occurred.

**Table 2.** The Coefficient of Variation of National Shallot Price

	Farmer Price		Modern Market Price		Wholesalers Price		Traditional Market Price	
	Before	After	Before	After	Before	After	Before	After
Mean	21,449.71	25,181.36	42,197.23	52,054.77	24,184.18	30,278.18	31,376.67	38,438.77
Std. of Deviation	4,750.40	6,345.83	5,961.69	9,349.68	4,947.59	6,866.02	5,961.68	7,750.39
CV	22.15%	25.20%	14.13%	17.96%	20.46%	22.68%	19.00%	20.16%

Based on the coefficient of variation analysis, it can be seen that the price fluctuations of shallots at the level of farmers, wholesalers, traditional markets, and modern markets are high and unstable because they are above 9 percent (based on the criteria of the Ministry of Trade). The causes of high fluctuations include uneven distribution and stock mechanisms that have not worked well [33]. Shallot storage in conventional warehouses can cause weight loss between 30 – 50 percent, is not durable, and is accessible to damage (growing roots/shoots and rotten). This causes shallot that is stored too long enough cannot be sold in the market

The price at the farmer level has the highest coefficient of variation compared to prices at other channel levels [5]. This shows that prices at the farm level are the most unstable and fluctuate. A high percentage of the coefficient of price variation indicates that there is no price stability for the shallot commodity, especially during covid – 19 pandemic because in the midst of a pandemic, price has become more unstable than before pandemic occurred.

## 3.2 Shallot Market Integration in The Middle of Covid – 19 Pandemic

### 3.2.1 Short Term Market Integration

Market integration in the short term is the linkage between the local market and the reference market, which is represented by the market integration index and is indicated by the IMC (Index of Market Connection) value. In this study, there were three reference

markets, they were wholesalers, traditional markets, and modern markets. In contrast, for the local market, there were three channels, they were wholesalers and traditional markets.

The coefficient ( $b_1$ ) of the price variable at the farmer level on shallot commodity with the reference market of wholesalers is 0.823, which means that if there is price increasing at wholesalers level is IDR 100, the price at the farmer level will increase by IDR 82.3 per kilogram. The coefficient ( $b_3$ ) of the previous price variable at the wholesalers level for shallot commodity is 0.131, which means that if there is an increase in the previous price at the wholesalers level, IDR 100 per kilogram, it will increase the price at the farmer level by IDR 13.1 per kilogram. The coefficient ( $b_1$ ) of the price variable at the farmer level on shallots with the traditional market as a reference market is 0.817, which means that if there is a price increasing at the traditional market level is IDR 100 per kilogram, the price at farmer level will increase by IDR 81.7 per kilogram. The coefficient ( $b_3$ ) of the previous price variable at the traditional market level for shallots is 0.115, which means that if there is an increase in the previous price at the traditional market level is IDR 100 per kilogram, the price at the farmer level will increase by IDR 11.5 per kilogram. The coefficient ( $b_1$ ) of price variable at the farmer level on shallots with the modern market as reference market is 0.499, which means that if there is a price increasing in modern market level is IDR 100 per kilogram, the price at the farmer level will increase by IDR 49.9 per kilogram. The coefficient ( $b_3$ ) of the previous price variable at the modern market level for the shallot commodity is 0.097, which means that if there is an increase during the last price at the modern market level is IDR 100 per kilogram, it will increase the price at the farmer level by IDR 9.7 per kilogram.

The estimation results showed that the price at wholesalers, traditional markets, and modern markets level had a significant effect on price change at the farmer level. However, the main determinant of price changing at the farm level was the current price because the price contribution in the previous period was smaller than the contribution of the current price. The biggest contribution of changing at the farm level was the current price changing at the wholesalers level.

The coefficient of the price variable at the wholesaler level ( $b_1$ ) for the shallot commodity with the traditional market as the reference market is 0.513. This value indicates that if there is an increase in prices in traditional markets by IDR 100 per kilogram, it will increase prices at wholesalers to a level of IDR 51.3 per kilogram. The coefficient ( $b_3$ ) of the previous price variable at the traditional market level for shallots is 0.423, which means that if there is an increase in the previous price at the traditional market level is IDR 100 per kilogram, the price at wholesalers level will increase by IDR 42.3 per kilogram. The coefficient ( $b_1$ ) of price variable at wholesalers level for shallot commodity with the modern market as reference market is 1.021, which means that if there is price increasing at modern market level is IDR 100 per kilogram, the price at wholesalers level will increase by IDR 102.1 per kilogram. The coefficient ( $b_3$ ) of the previous price variable at modern market level for shallot commodity is 0.029, which means that if there is an increase in the previous price at modern market level is IDR 100 per kilogram, it will increase the price at the wholesalers level by IDR 2.9 per kilogram.

The estimation results showed that price at traditional and modern markets has a significant effect on price changing at the wholesalers level. However, the main determinant of price changes at the wholesale level is the current price. This is because prices' contribution in the previous period is smaller than the contribution of current prices. The most significant contribution to changes at the wholesale level is the current price changes at the wholesale level at the modern market level.

The coefficient of the price variable at the traditional market level ( $b_1$ ) for the shallot commodity with the modern market as the reference market is 1.031. This value indicates that if there is a price increase at the modern market level of IDR 100 per kilogram, the



price at the traditional market level will increase by IDR 103.1 per kilogram. The coefficient ( $b_3$ ) of the previous price variable at the modern market level for shallot is 0.041, which means that if there is an increase in the previous price at the modern market level is IDR 100 per kilogram, the price at the traditional market level will increase by IDR 4.1 per kilogram. The estimation results showed that price at the modern market level had a significant effect on price changing at the traditional market level. However, the main determinant of price changing at the traditional market level was the current price because the price contribution in the previous period was smaller than the contribution of the current price.

**Table 3.** The Ravallion Model Estimation of National Shallot in Several Market Level

Reference Market	HPB			HPT			HPM		
Local Market	$b_1$	$b_2$	$b_3$	$b_1$	$b_2$	$b_3$	$b_1$	$b_2$	$b_3$
HP	0.823***	-0.146	0.131***	0.817***	-0.541	0.115***	0.499**	0.815***	0.097***
HPB				0.513***	0.156	0.423***	1.021***	0.033	0.029***
HPT							1.031***	-0.016	0.041***

The Index of Market Connection (IMC) calculated from the regression results of the Ravallion model for the national shallot market can be seen in table 4. The IMC value indicates that there is no market integration in the short term at the level of farmers – wholesalers, farmers – traditional markets, farmers – modern markets, wholesalers – modern markets, and traditional markets – modern markets. While the IMC value for wholesalers - traditional markets show a very weak integration with an IMC value is 1.201. Without vertically market integration, profit margins are not distributed well at each channel level in the distribution chain.

The analysis results indicate that for non-integrated canals, which is reflected in the very high IMC value at the farm level. Suppose there is a change in the price of shallots at the level of wholesalers, traditional markets, and modern markets at the farmer level. In that case, the previous period does not affect the current price of shallots at the farmer level. At the wholesalers level, it showed that changes of shallot price at the modern market level in the previous period did not affect the current price of shallot at the wholesalers level. At the traditional market level, it showed that shallot prices at the modern market level in the previous period did not affect the current price of shallot at the traditional market level. Meanwhile, the weak integration between wholesalers and traditional markets showed that the current wholesaler's prices, although very weak, were influenced by the traditional market prices in the past [34].

**Table 4.** Index of Market Connection of National Shallot in Several Market Level

Harga Acuan	HPB	HPT	HPM
Harga Pengikut	IMC		
HP	6.245	7.078	5.119
HPB		1.201	34.2
HPT			25.16

### 3.2.2 Long Term Market Integration

Meanwhile, the long-term relationship between the local market and the reference market could be seen from the value of coefficient  $b_2$ . Long-term integration showed how price changes based on time in the reference market were directly transmitted to the local market. The  $b_2$  coefficient value from the equation showed the percentage of price changing in local

market due to price changes in the reference market. The analysis which was conducted was to observe the relationship between farmers - wholesalers, farmers - traditional markets, farmers - modern markets, wholesalers - traditional markets, wholesalers - modern markets, and traditional markets - modern markets. The value of  $b_2$  which is smaller than 0 in the relationship between farmers - wholesalers ( $b_2 = -0.146$ ), farmers - traditional markets ( $b_2 = -0.541$ ), and traditional markets - modern markets ( $b_2 = -0.016$ ) indicates that in the long term the relationship it is not integrated. It can be concluded that the market is isolated or the market moves independently. The relationship between wholesalers - traditional markets ( $b_2 = 0.156$ ) and wholesalers - modern markets ( $b_2 = 0.033$ ), which has a  $b_2$  value close to 0, indicates that in the long run, the relationship is also not integrated. Furthermore, the relationship between farmers - modern markets ( $b_2 = 0.815$ ) in the long term is strong, indicating the value of  $b_2$  approaching 1.

In the long term Ravallion model, with wholesalers as the reference market, the  $b_2$  coefficient value is  $-0.146$  indicates that every 1% change in the shallot price at the wholesalers level will reduce the shallot price at the farmer level by 0.146%. With the traditional market as the reference market, the  $b_2$  coefficient value of  $-0.541$  indicates that every 1% change in the shallot price at the traditional market level will reduce the shallot price at the farmer level by 0.541%. With the modern market as the reference market, the  $b_2$  coefficient value of  $-0.016$  indicates that every 1% change in the shallot price at the modern market level will reduce the shallot price at the traditional market level by 0.016%. In addition, in the long-term Ravallion model with the traditional market as reference market, the  $b_2$  coefficient value is  $0.156$  indicates that every 1% change in the shallot price at the traditional market level will increase the shallot price wholesalers level by 0.156%. With the modern market as a reference market, the  $b_2$  coefficient value of  $0.033$  indicates that every 1% change in the shallot price at the modern market level will increase the shallot price at the wholesalers level by 0.033%.

The coefficient of  $b_2$  also showed the elasticity of price transmission; it was the percentage of price changing in the local market as a consequence of price changing in the reference market. A market could be stated to be integrated if price changing in the reference market could be transformed to the local market. The elasticity of transmission would be higher in the integrated market than in the non-integrated market. The high elasticity of price transmission would show that the market was spatially integrated; this would also show the efficiency of marketing and information. Those estimation results indicated the weak price transmission that occurred in the shallot reference market to the local market.

Otherwise, in the long term Ravallion model with the modern market as reference market, the coefficient of  $b_2$  value is  $0.815$  indicates that every 1% change in the shallot price at the modern market level will increase the shallot price at the farmer level by 0.815%. The estimation results indicated a price transmission that occurred in the shallot reference market to the local market.

### 3.3 Policy Implication

Previous research stated that differences in price integration among others could be caused by differences in transportation infrastructure and productivity [35]. This would have occurred to shallot commodity during covid – 19 pandemic in which by large scale restrictions disrupted the distribution of shallots. Besides, the center of shallot production has been centered on Java Island. Efforts were needed to improve transmission through increasing access to information, marketing chain efficiency, and distribution efficiency to get around large-scale restrictions.

Based on the findings in this research, a recommendation was obtained that could be input for the Indonesian government in determining agricultural policies, especially for the shallot commodity during the covid – 19 pandemic. The government needs to formulate policies such as infrastructure improvements to prevent market exploitation and information asymmetry from the consumer market to the shallot producer market. Besides that, the government needs a price policy to reduce price disparities at the shallot producers and consumers level. To determine a reasonable price, the government needs to pay attention to a price level that is not exploitative to consumers while it is still providing an ideal margin for traders and a price that is not harmful to shallot farmers.

## 4 Conclusion

The covid – 19 pandemics has made the shallot price more fluctuated, which shallot has had a volatile price. The shallot production centers were concentrated on Java Island, while the shallot consumers were spread throughout Indonesia. Shallot also has had a marketing chain that tends to be long and uncompetitive, causing marketing inefficiencies. Each marketing agency in the shallot marketing chain avoided risk by reducing the price to other marketing institutions, especially due to the covid – 19 pandemic and the risk of shrinkage.

Price changing at the wholesaler's level had a significant effect. It became the main determinant of price changing at the farmer level. In contrast, for wholesalers and traditional markets, price changes in the modern market were the main determinants of price changing at the wholesalers level and traditional markets with a significant effect. Based on the analysis results, at the farmer level, it showed that price changing of shallots at wholesalers, traditional markets, and modern markets level did not affect the shallot price at the farmer level at this time. At the wholesalers level, it showed that price changing of shallots at a modern market level in previous did not affect the shallot price at wholesalers level at this time. The traditional market-level showed that changing the shallot price at the modern market-level did not affect the shallot price at the traditional market level. Meanwhile, weak integration between wholesalers and traditional markets showed that the current wholesaler price, although very weak, was influenced by the previous traditional market prices.

Based on the results of the long-term analysis, reference markets and local markets that were not integrated were farmers - wholesalers, farmers - traditional markets, traditional markets - modern markets level. Besides that, some were not integrated at wholesalers – traditional markets and wholesalers – modern markets level. For the farmer-modern market level, in the long term, the results showed that there was a strong integration, and it was suspected that there was price transmission from the shallot reference market to the local market.

A recommendation that can be input for the government is the government must formulate policies such as infrastructure improvements so that market exploitation and information asymmetry do not occur from the consumer market to the shallot producer market. The government needs a price policy to reduce price disparities at the shallot producers and consumers level. The government also needs to pay attention to price levels that are not exploitative to consumers while still providing ideal margins for traders and not harmful prices to shallot farmers.

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