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HOW DO SHALLOT PRICE FLUCTUATIONS COMPARE BETWEEN MARKETS IN KUPANG AND MATARAM DURING AND AFTER THE COVID-19 PANDEMIC?

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ABSTRACT

Shallots are a key commodity in Indonesia and play a significant role in household consumption and economic stability. This study aims to: 1) analyze shallot price trends in Mataram and Kupang during the pandemic and post-pandemic periods, 2) assess the degree of price fluctuations in these regions, and 3) compare the variability of shallot prices between the two periods. The research utilizes secondary time-series data spanning from January 2020 to December 2023. The results show significant price fluctuations during and after the pandemic, with CV values exceeding 9%, indicating high variability. In Kupang, the CV increased from 19.16% during the pandemic to 31.62% post-pandemic, while in Mataram, it rose from 16.84% to 26.26%.

KEY WORDS

Shallot price fluctuation, covid-19 pandemic, commodity distribution, pricing, supply, demand.

Indonesia has a wealth of very valuable natural resources that are able to create a conducive environment for the growth of the agricultural sector, especially horticultural crops. Among these crops, shallots have emerged as a promising commodity that can meet domestic and international market demand. Farmers faithfully cultivate shallots, establishing their position as a superior horticultural product. Indonesia is famous throughout the world for its abundant natural resources. According to data from the Food and Agriculture Organization (FAO) reported from the 2015-2019 Food Outlook. The countries that produce the most shallots in the world are China and India, while Indonesia is ranked 22nd as a producer of shallots.

Food is an important need for human survival, where people rely on stable and affordable prices to meet their basic needs. Unfortunately, price fluctuations are a challenge in meeting these needs (Rasyidi, 2017). The instability of staple food prices can be caused by changes in the stability of supply and demand, as well as seasonal factors that have a significant impact on prices (Sukirno, 2005).

One of the main problems that often occur in marketing horticultural commodities is the very large price fluctuations. One of the agricultural sub-sectors that have the most potential to provide a significant impact on economic growth is horticulture, which also contributes to trade, employment, and farmer income. Horticultural products in Indonesia can be categorized into four major categories: ornamental plants, biopharmaceutical plants, vegetable plants, and fruit plants (Maela, 2016).



According to Setiawan et al, (2014) in observing food price fluctuations and their impact on inflation, they found that there was a shortage of supply and high public demand for food causing food price fluctuations which had an impact on the economy of a region. Meanwhile, the price change cycle follows the cycle of seasonal changes (climate), changes in planting and harvest seasons, so that prices follow the mechanism of market principles (Nendissa et al, 2020). Prices vary and become unstable due to this cause. The formation of prices in the market already includes the costs incurred. The price transfer policy is useful for maintaining and protecting farmers from getting low prices when the number of commodities is large and protecting consumers when commodity prices increase sharply (Soekartiwi, 2002)

High price fluctuations provide opportunities for traders to manipulate price information at the trader level. According to Irawan (2003) that price fluctuations basically occur due to an imbalance between the quantity of supply and the quantity of demand needed by consumers, if there is an excess supply then the price of the commodity decreases, conversely if there is a shortage of supply. Thus there is an imbalance between demand and supply, so the opportunity for price fluctuations is greater.

Based on research by the Food Security Agency in 2019, national religious holidays (HKBN), especially the Christmas to New Year period and fasting before Eid al-Fitr, are times when prices often fluctuate. Price changes are driven by a number of variables, including weather-related crop failures, pest problems, and distribution problems, according to Rizaldy (2017).

The Covid-19 pandemic has created challenges in many aspects of life. Based on BPS statistics (2020), Indonesia's economic growth in the first quarter of 2020 was 2.97 percent, down compared to growth in the same period in 2019 of 5.07 percent. This shows that the impact of COVID-19 on the economy is quite large. In addition, the economy and people's income have also been affected by the Covid-19 pandemic. The pandemic outbreak caused by the Covid-19 virus in early 2019 has caused many changes in economic activities in society. With restrictions on activities during the pandemic, food needs cannot operate normally. One of the food needs affected by this outbreak is the red onion commodity.

Inflation is a process in which prices continue to increase continuously, related to market mechanisms. This process can be triggered by various factors, namely increased public consumption, excess liquidity in the market, or disruptions in the distribution of goods. Inflation is a process, not about high or low price levels. High price levels do not necessarily indicate inflation. Inflation is an indicator used to measure the rate of price change and is considered to occur if price increases continue and influence each other (Penangsang et al., 2020).

Shallots are an important commodity for the community. The role and function of shallots are very important, and their widespread use causes this commodity to often experience price fluctuations. The price of shallots usually fluctuates seasonally. The causes of the rise and fall of the price of this agricultural commodity include fluctuations in the price of fertilizers, medicines, seeds, decreased production due to climate, and decreased production due to plant pests and diseases (HPT) and since 2019 Indonesia has been hit by Covid-19 where all community activities are restricted which also causes uneven fluctuations in shallots. The obstacle in selling shallots in the Kupang City and Mataram City markets is the fluctuating price. This is due to the absence of a standard price for shallots set by the government, both during the harvest season and outside the harvest season and the long marketing chain.

Based on the results of a survey in several markets in Kupang City such as Naikoten Market, Oeba Market, and Oesapa Market, shallots sold in the market are local products supplied from surrounding areas such as Rote, Soe and Semau. In this case, the availability of shallot stock can be highly dependent on local production. If there is a decrease in stock availability in the Kupang City area, then the option of importing from other places can be taken as a solution to meet the needs of the community, an effort to maintain continuity of supply and avoid potential imbalances between demand and production of shallots.

The price of shallots tends to be low in the July-October period, ranging from 20,000/kg – 10,000/kg each year when production peaks/during the harvest season. The abundant



supply factor during the season causes a decrease in prices in the market. Conversely, the price of shallots tends to increase when stock is limited in the November-March period, ranging from 35,000/kg-50,000/kg, which can be affected by bad weather conditions such as drought or flooding, and covid-19 causes a decrease in production and an increase in the price of shallots.

Mataram and Kupang City are 2 cities with different potential for shallot commodities where Mataram is the city receiving Supply while Kupang is the city receiving shallot supply from Mataram, in addition, the economic infrastructure conditions are also different so that the flow of food goods will have different obstacles and smoothness causing price differences between the two regions. This study is to observe the difference in shallot prices between the two regions (Mataram and Kupang) during and after Covid.

Based on the problems explained above, which can be formulated as follows: 1. How is the pattern of shallot price movements in the Kupang City market, Mataram City during the pandemic and post-covid-19 pandemic period. 2. How is the fluctuation of shallot prices between regions in the Mataram City market, Kupang City during the pandemic and post-covid-19 pandemic period? 3. How is the comparison of shallot commodity price fluctuations in the Mataram City market, Kupang City during the pandemic and post-covid-19 pandemic period?

METHODS OF RESEARCH

This research was conducted in 2 provinces, namely East Nusa Tenggara Province (Kupang City) and West Nusa Tenggara Province (Mataram City). The data used in this study is time series data from January 2020 - December 2023. It is monthly price data for shallots in kg in Mataram City and Kupang City. The data was obtained from the Agriculture Service of Kupang City and Mataram City, national strategic food price information from Bank Indonesia, BPS of NTT and NTB Provinces and other reference sources related to the study.

RESULTS AND DISCUSSION

During the COVID-19 pandemic in Kupang City, the price of shallots experienced quite significant fluctuations. In January 2020, the price of shallots was at Rp. 30,000, but increased in March 2020 to Rp. 32,500, reaching its highest peak during the pandemic in Kupang City. From January 2020 to September 2021, the price of shallots continued to fluctuate, triggered by the pandemic and the government's appeal to reduce outdoor activities. Distribution disruptions and decreased stock of shallots on the market were the main factors driving the price increase. However, from October to December 2021, the price of shallots decreased to Rp. 16,250, reaching its lowest level during the COVID-19 pandemic in Kupang City.

The coefficient of variation of shallot prices during the pandemic in Kupang City reached 19.16%, indicating quite large fluctuations. Although, from October to December 2021 the price of shallots in Kupang City decreased, the coefficient of variation in Kupang City was $> 9\%$, which means that the price of shallots in Kupang City was normal. This can be seen from the large CV value where the higher the CV value, the greater the price fluctuation and vice versa. The level of fluctuation is stated to be relatively low to moderate, which is around 5% and a maximum approaching 9%, more than that value is said to be high fluctuation (Roy et al., 2018). This study is in line with the research of Aurelia M. da Silva, et al. (2023) which states that the rate of beef price fluctuation in the period before the pandemic was relatively low with an average CV value of 2.50, the same as the level of price fluctuation during the pandemic which is still relatively low where the average CV value is 1.39%. So it can be concluded that the development of beef prices in the period before and during the pandemic tended to be homogeneous or the Covid 19 pandemic resulted in beef price fluctuations being quite homogeneous.

There was an increase and decrease in the price of shallots during Covid-19 in Mataram City, in January 2020 the price of shallots was Rp. 26,750 then increased in



February 2020 to Rp. 35,500/kg which was the highest price during the Covid-19 pandemic in Mataram City. The high price of shallots occurred due to limited supply. The limited supply occurred due to a shift in the harvest season since the end of 2019. This caused the supply of seeds to decrease due to damage so that in December 2021 the price of shallots fell to Rp. 20,000/kg which was the lowest price of shallots during Covid-19 in Mataram City. The decrease in the price of shallots was due to the entry of the harvest season and abundant supply.

The coefficient of variation of shallot prices during the pandemic in Mataram City reached 16.84%, indicating quite large fluctuations. Although, from September to December 2021 the price of shallots in Mataram City decreased, the coefficient of variation in Mataram City was $> 9\%$, which means that the price of shallots in Mataram City is normal. According to Rachman (2020). These price fluctuations can have an impact on the running of businesses or businesses, with price increases reducing demand and vice versa. Therefore, market monitoring and appropriate reactions are key in dealing with shallot price fluctuations during the COVID-19 pandemic. This study is in line with research by Putri, S. K (2022) which shows that red chilies experienced high fluctuations before and during the pandemic $CV > 9\%$. The shallot commodity experienced high fluctuations before the pandemic in Blitar Regency during the pandemic in Nganjuk Regency. Chicken eggs both before and during the pandemic were stable ($CV < 9\%$). The price fluctuation factor before the pandemic tended to be influenced by the amount of supply (supply) while during the pandemic it was influenced by the loss of purchasing power (demand).

The development of shallot prices in Kupang City shows a different fluctuation pattern, although the periods of increase and decrease are relatively the same. In January 2022, the price of shallots was IDR 18,750, then in August 2022 it reached IDR 45,000, which was the highest price after the pandemic in Kupang City, while in October 2023 the price of shallots was IDR 15,000, which was the lowest price after the pandemic. The fluctuation of shallots is reflected in the coefficient of variation in shallot prices during the pandemic in Kupang City reaching 31.62%, indicating quite large fluctuations. The coefficient of variation after the pandemic in Kupang City is $> 9\%$, which means that the price of shallots in Kupang City is normal. The main factor influencing the fluctuation of shallot prices in Kupang City is the availability of supply, which is influenced by uncertain weather and climate conditions. The decline in shallot prices in October was caused by farmers or producers who stored their harvests from June to August and then sold them in September. In addition, important moments such as Eid al-Fitr and Christmas also tend to increase demand for shallots, which contributes to price fluctuations.

This study is in line with the research of Floriana Uba Ola, et al. (2021) that the price of garlic in traditional markets is higher, namely 32.32% and CV in modern markets is 19.37%, this is because there is no fixed price that cannot be negotiated, but in traditional markets in Kupang City it can be negotiated so that fluctuations occur and involve a very long marketing chain so that there is a price game between business actors which causes price irregularities or price fluctuations.

The price of shallots in Mataram City after the COVID-19 pandemic experienced significant fluctuations. In January 2022, the price of shallots was IDR 20,500, then in May 2022, the price of shallots reached IDR 45,000, which was the highest price after the pandemic in Mataram City. Factors that cause prices to be quite high are a number of factors, including government policies related to prices, import and export activities, and the existence of subsidies that can affect the dynamics of shallot prices.

Then, the price of shallots reached its lowest point in September 2023, at IDR 19,250/kg. This decline was due to the entry of the harvest season in September, where local production and increased supply caused a decline in prices. Good weather conditions during the previous planting season also contributed to an abundant harvest, which further depressed the price of shallots or in other words, the fluctuation of shallot prices in Mataram City was influenced by a number of complex factors, including government policies, import and export activities, and local weather and harvest season conditions. Understanding these dynamics is important for market players to respond appropriately to price changes, as well



as to anticipate and manage the risks associated with shallot price fluctuations in the market. This study is in line with previous research by Fadli Husen, et al. (2022) that the shallot market is in an oligopsony imperfect competition market structure. Market behavior observing the pricing mechanism, sales methods, implementation of marketing functions, provides an indication that the behavior of the shallot market carried out with a pricing system controlled by traders so that farmers tend to be price takers while traders are price makers. It is recommended that farmer producers form groups to work together in marketing red onions through assistance facilitated by the government or related institutions.

As a requirement for conducting a paired sample t-test, it is necessary to ensure that the data used is normally distributed. Therefore, in this study, a normality test was conducted for each variable using the Kolmogorov-Smirnov test of normality with the help of SPSS statistical software version 23.

With a significance value of 0.200 in the normality test for the price of shallots during and after the COVID-19 pandemic, which is greater than the significance level generally set at 0.05, we cannot reject the assumption that the data is normally distributed. This means that the price of shallots in Kupang City and Mataram City during and after the COVID-19 pandemic can be considered normally distributed. After that, by using a paired sample test to compare the price of shallots during and after the COVID-19 pandemic, we can determine whether there is a significant difference between the two periods. The results of this difference test will provide further information on whether there is a real change in the price of shallots after the COVID-19 pandemic in both cities.

Based on the results of the difference test (Paired Sample Test) with a significance value of 0.08, which is $>$ from the alpha (α) value which is generally set at 0.05, we can conclude that there is a significant difference in the price of shallots between during and after the COVID-19 pandemic.

By rejecting the null hypothesis (H_0) and accepting the alternative hypothesis (H_a), we can conclude that there is a significant difference between the price of shallots in Mataram City and Kupang City during and after the COVID-19 pandemic. This study is in line with the results of previous research conducted by Sholehan (2019), which showed a significant difference in farmers' income before and after receiving seed assistance. This shows the importance of observing price changes and post-pandemic conditions, as well as the implications that can be taken for economic policies and strategies in both cities.

Fluctuations in shallot prices during and after the COVID-19 pandemic in Kupang and Mataram highlight critical market dynamics influenced by external and internal factors. The pandemic period saw Kupang exhibiting a coefficient of variation (CV) of 19.16%, indicating significant price variability compared to Mataram's 16.84%.

During the pandemic, Kupang's highest recorded price of Rp. 30,000/kg in January 2020 was primarily due to constrained supplies and market inefficiencies. Mataram similarly peaked at Rp. 35,500/kg in February 2020, driven by reduced availability caused by disrupted harvest cycles and inadequate distribution mechanisms. Such supply chain challenges were mirrored in studies that revealed how storage limitations for shallots forced producers to sell at suboptimal prices, further fueling market volatility (Bakari, 2023).

As the pandemic restrictions eased, post-pandemic fluctuations intensified, with Kupang's CV rising sharply to 31.62% and Mataram's to 26.26%. This escalation in price variability underscores the compounded effects of economic recovery, seasonal production surges, and fluctuating demand during festivals. These findings align with research on Jakarta's traditional markets, where post-pandemic horticultural price variations were significantly influenced by disrupted supply chains and inconsistent consumer demand (Zahraturrahmi et al., 2021).

Kupang's lowest post-pandemic price of Rp. 15,000/kg in October 2023 highlighted the market's susceptibility to oversupply and seasonal gluts. Conversely, Mataram's lowest price of Rp. 19,250/kg in September 2023 reflected a similar pattern of seasonal harvest-induced price drops. Studies have illustrated that high levels of CV in horticultural markets, exceeding 9%, are indicative of volatile and unstable market conditions that necessitate robust policy interventions to stabilize supply and demand (Rahmawati et al., 2018).



The paired sample t-tests further confirmed significant differences in overall prices between the pandemic and post-pandemic periods. Such statistical evidence supports the hypothesis that market dynamics were profoundly altered by pandemic-induced disruptions, consistent with findings from studies on Gorontalo Province, where the pandemic was shown to intensify unpredictable price fluctuations (Haryati et al., 2023).

Factors such as limited transportation infrastructure, insufficient storage facilities, and climatic variability further exacerbated price volatility. Evidence from Malang's large market suggests that strengthening supply chain linkages and investing in storage solutions could mitigate such fluctuations and improve price stability (Princess, 2022).

The critical role of government intervention is evident in stabilizing volatile markets. Studies emphasize that policies such as reference price setting, subsidies for storage infrastructure, and enhanced market integration can significantly reduce volatility. This is particularly relevant for regions like Kupang and Mataram, where fragmented supply chains and limited market coordination exacerbate price disparities (Susanawati et al., 2023).

Future research should delve deeper into modeling market behaviors under varying economic scenarios, exploring factors such as global commodity price influences and exchange rate volatility. Such studies could provide actionable insights for policymakers to develop resilient agricultural markets and address the root causes of price instability (Sadiyah, 2021).

CONCLUSION AND IMPLICATIONS

The fluctuations in wholesale prices in Mataram City and Kupang City during and after the COVID-19 pandemic reflect market dynamics influenced by various factors. Price trends show that shallot prices in both cities peaked at specific times, with the highest price in Kupang reaching Rp. 45,000 in June 2022 and the lowest price at Rp. 15,000 in October 2023. In Mataram, the highest price was recorded at Rp. 45,000 in May 2022, while the lowest was Rp. 19,250 in September 2023. Statistical tests revealed significant differences between shallot prices during and after the pandemic, indicating fundamental changes in pricing patterns. Factors such as supply and demand, weather conditions, and distribution disruptions during the pandemic were key contributors to price volatility.

The policy implications highlight the need for government focus on improving transportation and distribution efficiency, setting reference prices to stabilize markets, and providing incentives to farmers to boost production. These measures aim to reduce price volatility, ensure commodity availability, and safeguard community welfare.

Further research using more complex approaches is needed to understand specific factors influencing shallot price dynamics. Such studies could explore producers' and consumers' responses to price changes and identify more effective policies for market stabilization. Future research could also provide deeper insights into the role of external factors, such as climate change and global trade policies, in affecting the price fluctuations of agricultural commodities at the local level.

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