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# Seasonal Variation and Its Impact on Rice Price Adjustment in Tasikmalaya City

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A B S T R A C T

Changing marketing margins through speed of price adjustments is an indicator of efficient markets. This research analyzes differences in price adjustments according to rice quality based on production period in Tasikmalaya City. Data used is weekly price at wholesalers and retailers from January 2019 to January 2022. Analysis uses an independent sample t-test to compare rice price adjustments based on harvest and non-harvest times. Results show, price adjustment responses tend to be different, especially for low and medium-quality rice at harvest period, while premium quality shows same price adjustment response. During non-harvest period, price adjustment response tends to be same for all rice. Application of basic prices is not only at producer prices but also in other rice marketing channels especially at harvest period.

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## INTRODUCTION

Marketing margin is an indicator in detecting marketing inefficiencies in agricultural commodities. Rice is an important commodity that is included in volatile food, and this means that rice contributes to inflation in Indonesia. This data illustrates that the price of rice for final consumers tends to increase. Rice as the main food ingredient in Indonesia can also be seen from the implementation of policies, one of which is the floor price policy. This policy is a form of protecting farmers' prices during the main harvest season. However, the condition of rice being included in the volatile food group means that the effectiveness of this policy is only on the upstream side.

Tasikmalaya City is one of the cities in West Java Province with the second highest contribution to inflation after Bandung City. Data shows that rice is one of the commodities with the highest contribution from the food group at 0.131 points in 2022 in Tasikmalaya City (BPS et al., 2022). Salam et al. (2023) found that four of the six qualities of rice traded had marketing inefficiencies like lower quality II rice, medium I quality rice, medium II quality rice, and super I quality rice.

The formation of downstream rice prices is a process of price adjustment as a result of price changes. Price changes are influenced by the amount of production related to production time. Jati (2018) found that the dry season has a significant effect on variations in rice prices compared to the rainy season. Meanwhile, Makama et. al. (2016) found that seasonal factors influenced variations in rice prices. High price variations can cause speculative actions in price formation.

Meanwhile, Mgale, Shauri, and Dimoso (2022) explained that prices in production center areas tend to fluctuate more than prices in production center areas. This difference triggers the potential for frequent price play on the downstream side of marketing this commodity. Research by Ruslan and Pramita (2022) found that there was a price game in rice, which was caused by market forces compared to food commodities such as chilies and chicken meat.

The supply side is dominant in the balance of the agricultural market in Indonesia. As a result, during the harvest season, prices will fluctuate with a downward trend. The variations in rice prices at wholesale and retail levels based on production time in Tasikmalaya City are as follows:

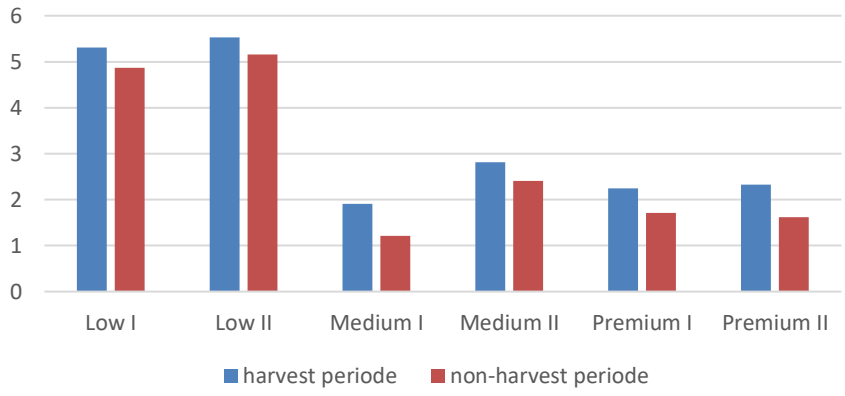


Figure 1. Coefficient of variation in rice prices based on quality at the wholesale level in Tasikmalaya City 2019 – 2022

Data in Figure 1 shows that the largest variations in wholesale rice prices are for lower-quality rice. Rice with low variations is medium rice I and premium rice (I and II). However, the biggest difference in price variation is for medium I rice compared to other rice qualities. Results are different at the retail level, with medium quality rice being the rice with the highest fluctuations during harvest and non-harvest. Lower-quality rice is also the rice with the largest price variation after medium-I rice at the retail level. More details can be seen in Figure 2:

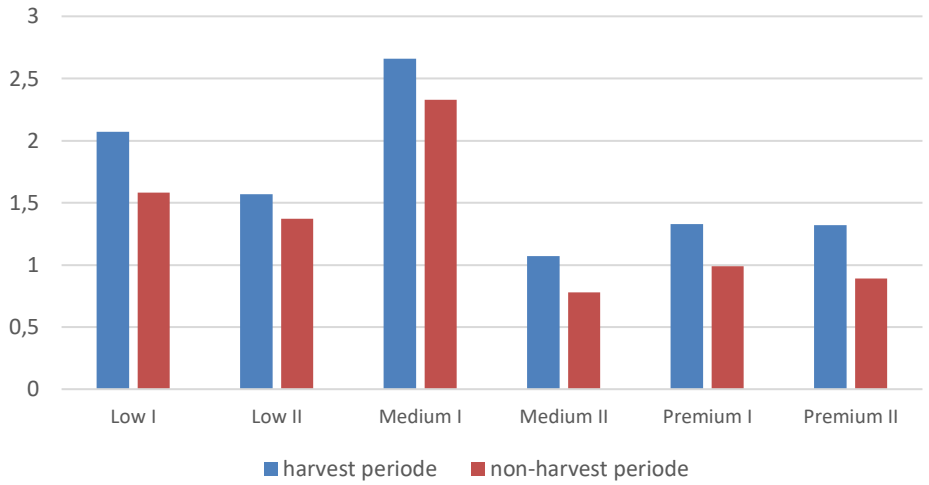


Figure 2. Coefficient of variation in rice prices based on quality at retail level in Tasikmalaya City 2019 – 2022

Overall, rice price fluctuations during the main harvest are higher than during non-harvest conditions. Fluctuating conditions in wholesale rice prices are higher than in retailers, both during harvest and non-harvest conditions in Tasikmalaya City. Prices fluctuate more during harvest due to abundant rice production, and this gives the idea that prices tend to change more quickly during harvest time.

Variations in different rice prices indicate price adjustments that tend to vary depending on the quality of rice and the level of marketing institution. Irawan (2007) explains that price fluctuations open up opportunities for traders to manipulate prices. This process influences the price transmission process from producers to consumers.

There still needs to be more research analyzing the influence of seasonal variations on the speed of price adjustments in Indonesia. Jati's research (2018) analyzed the effect of the rainy and dry seasons on price variations in Indonesia. Its results showed that the effect of the dry season was more significant on the conditional variance of rice prices compared to the rainy season. Therefore, this research will analyze the effect of seasonal variations on the price adjustment process based on the quality of rice in Tasikmalaya City. This research focuses on differences in price adjustments according to rice quality during harvest and non-harvest conditions.

## THEORETICAL REVIEW

Commodity price fluctuations basically occur due to an imbalance between quantity of supply and demand required by consumers. If there is excess supply, commodity prices will fall, conversely if there is a shortage of supply. In the price formation process, the behavior of farmers and traders plays an important role because they can regulate their sales volume according to consumer needs. Relatively high price fluctuations occur due to the failure of farmers and traders to regulate their supply volume in accordance with consumer needs.

Prices are greatly influenced by the amount of supply. Prices tend to be stable when supply conditions are normal, decrease when supply is abundant and increase when supply is limited. This difference affects the ability to adjust prices during the harvest season and non-harvest season. Sharp price fluctuations due to the seasonal nature of agricultural production cause price fluctuations in producer centers. These price fluctuations affect marketing margins and prices at the marketing institution level.

Related to this, price transmission can be used as an indication of the efficiency that is formed between two interacting markets (Meyer and Von Cramon-Taubadel 2004). Perfect competition market conditions are used as a reference point in assessing transmission process price and level of integration between the two markets. The premise used is that price transmission will run perfectly if there is no friction and distortion in the market (Conforti 2004). The absence of price transmission between markets that carry out transactions with each other is considered to cause inefficiency in resource allocation and reduce economic welfare below the Pareto balance point. In other words, perfect price transmission will lead to markets that run efficiently.

## METHODOLOGY

This research used secondary data of orice rice traded in Tasikmalaya City. Time series of data used is weekly price of rice at rice wholesale and retailers from January 2019 to January 2022. Price data is based on rice quality, low I, low II, medium I, medium II, premium I, and premium II from hargapangan.id. This analysis based on a price adjustment model is error correction model (ECM). The price adjustment model explains that when prices at two marketing institutions are related, the adjustment coefficient is close to zero. The price adjustment model can be written as follows:

$$\Delta CP_t = \beta_0 + \sum_{i=0}^{p-1} \Delta WP_{t-1} + ECT_{t-1} + \varepsilon_t$$

Based on this model, this research will analyze differences in price adjustments according to harvest period conditions. This condition was taken into consideration that the supply side influences the balance of the agricultural market.

Price adjustment is the speed of price changes when price changes occur in marketing institutions from upstream to downstream or vice versa. The speed of price adjustment is related to the ability of price transmission in marketing channels. An efficient market is characterized by changes in price at

one marketing institution so that other marketing institutions will respond with the same speed and magnitude.

The stage of this analysis is to find the residual value. The residual value in this equation is obtained by regressing wholesale rice prices on prices at the retail or consumer level with the following model:

$$CP_t = \beta_0 + \beta_1 WP_t + \varepsilon_t$$
$$ECT_{t-1} = CP_{t-1} - \beta_0 - \beta_1 WP_{t-1}$$
$$ECT_{t-1} = ECT1_{t-1} + ECT2_{t-1}$$

Information
CP : consumer price
WP : wholesale price
$ECT_1$ : speed of adjusment harvest period.
$ECT_2$ : speed of adjusment non harvest period.

The residual value of each speed adjustment is analyzed separately according harvest production time. Testing in this research uses an independent sample t-test formula:

$$\text{t test} = \frac{\overline{X_1 - X_2}}{\sqrt{\frac{(n_1-1)S_1^2+(n_2-1)S_2^2}{n_1+n_2-2}\left(\frac{1}{n_1}+\frac{1}{n_2}\right)}}$$

In this test, hypothesis developed is as follows:

$H_0$: $ECT_1 = ECT_i$
$H_1$: $ECT_1 \neq ECT_i$

This test is to prove whether differences in price adjustments occur during the harvest season or non-harvest season. If the null hypothesis is not rejected, then there is no difference in the response of rice prices at harvest according to rice quality. On the other hand, if the null hypothesis is rejected, there are differences in the response of rice prices at harvest according to quality in Tasikmalaya City.

## RESULTS

Descriptive analysis shows marketing margin during harvest and non-harvest conditions gives quite different results. More details can be seen in Table 2.

Table 2. Rice marketing margin according to quality during harvest and non-harvest period in Tasikmalaya City 2019 – 2021

| Rice quality | Margin (Rp/Kg) | | |
|---|---|---|---|
| | Harvest | Non harvest | difference |
| Low I | 633 | 793 | 160 |
| Low II | 586 | 760 | 174 |
| Medium I | 751 | 816 | 65 |
| Medium II | 353 | 355 | 2 |
| Premium I | 1,036 | 1,078 | 42 |
| Premium II | 603 | 654 | 51 |
| Average | 660 | 742 | 82 |

Source: Hargapangan.id (2022)

Price adjustments is seen based on differences in the average speed of adjustment in each condition, namely harvest and non-harvest. The results of the difference test using the independent as follows:

Tabel 3. Independent t test results at harvest period dan non-harvest period in Tasikmalaya City

| Rice quality | Compare to | Independent t-test results | |
|---|---|---|---|
| | | Harvest period | Non-harvest period |
| Low quality I | Low II | 0.346 | 0.473 |
| | Medium I | 0.009* | 0.033* |
| | Medium II | 0.043* | 0.081 |
| | Premium I | 0.353 | 0.375 |
| | Premium I | 0.039* | 0.071 |
| Low quality II | Low I | 0.346 | 0.473 |
| | Medium I | 0.020* | 0.067 |
| | Medium II | 0.099 | 0.259 |
| | Premium I | 0.804 | 0.827 |
| | Premium I | 0.097 | 0.196 |
| Medium I | Low I | 0.009* | 0.033* |
| | Low II | 0.020* | 0.067 |
| | Medium II | 0.078 | 0.156 |
| | Premium I | 0.042* | 0.087 |
| | Premium I | 0.168 | 0.262 |
| Medium II | Low I | 0.043* | 0.081 |
| | Low II | 0.099 | 0.259 |
| | Medium I | 0.078 | 0.156 |
| | Premium I | 0.415 | 0.410 |
| | Premium II | 0.584 | 0.632 |
| Premium I | Low I | 0.353 | 0.375 |
| | Low II | 0.804 | 0.827 |
| | Medium I | 0.042* | 0.087 |
| | Medium II | 0.415 | 0.410 |
| | Premium II | 0.272 | 0.289 |
| Premium II | Low I | 0.039* | 0.071 |
| | Low II | 0.097 | 0.196 |
| | Medium I | 0.168 | 0.262 |
| | Medium II | 0.584 | 0.632 |
| | Premium I | 0.272 | 0.289 |

*significant at α 5%.

Source: Hargapangan.id (2022).

## DISCUSSION

Price adjustment for lower quality I have the same adjustment pattern for lower quality II rice and premium I rice. Price adjustment for lower quality rice II has a speed of adjustment with various other grains of rice except for medium I rice. Price adjustment for the medium I rice has a different pattern for three of the five existing qualities of rice. Medium I, premium I, and premium II rice have price adjustments that are the same as other rice qualities.

During the harvest season, two of the six existing rice qualities have different adjustment patterns. Lower I and medium I quality rice has price adjustments that tend to be different from other rice qualities. Meanwhile, lower quality II, medium II, premium I, and premium II rice have the same adjustment behavior during the harvest season in Tasikmalaya City. Regarding these findings, Jojo, Feriansyah, and Frasipa (2023) found that rice production influences price fluctuations in the long term.

The harvest season causes prices to decrease at the farmer level. These price changes are transmitted to wholesalers/large traders and retailers. The market-to-be monopsony causes traders to maximize their profits by providing imperfect price information to reduce purchasing prices from farmers. Test results from Table 4 show that price adjustments for six (6) rice qualities during non-harvest conditions tend to be the same in Tasikmalaya City. The difference in price adjustments during non-harvest periods only occurs between lower quality I and medium I rice. Meanwhile, other quality rice, namely lower quality II, medium II, premium I, and premium II, shows insignificant values.

Furthermore, the effect of the harvest season has more influence on differences in price adjustments according to rice quality. Meanwhile, non-harvest time does not affect price adjustments according to rice quality in Tasikmalaya City. Conditions of high price variations support these results during harvest season, which causes speculative behavior in setting prices at the final consumer level. Islam (2020) explain, government should undertake effective policy measures to stabilize the price of paddy. Besides, government can avail advanced information dissemination system so that both farmers and consumers will get information in due time, and thereby seasonal price fluctuations will be reduced significantly.

## CONCLUSIONS AND RECOMMENDATIONS

Harvest and non-harvest conditions cause differences in responses to rice price adjustments in Tasikmalaya City. Lower quality rice has a quite different adjustment response compared to other rice during harvest conditions. Meanwhile, there is no difference in response to price adjustments during non-harvest conditions. The differences in responses that occur during harvest become indicators of speculative actions in price formation at th final consumer level. Application of basic prices is not only set at producer prices but also in other rice marketing channels especially at harvest period.

## FURTHER STUDY

This research analyzes differences in price adjustments during harvest period and non-harvest period. Existence of differences in adjustments at these two period needs to be reviewed regarding price response to increases and decreases related to existence market power in Tasikmalaya City.

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