

ANALYSIS OF MARKET INTEGRATION AND PRICE TRANSMISSION OF RICE IN EAST KALIMANTAN

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ABSTRACT

Market integration and transmission elasticity are indicators of achieving marketing efficiency. Marketing rice as a staple food commodity is important for economic purposes. The objective research was to identify trends in rice prices at the producer and the retailer, to determine market integration, and the elasticity of rice transmission. The research was conducted in East Kalimantan Province. This study used secondary data. The secondary data used are weekly series data of January-December 2023, from The National Strategic Food Price Information Center, Bank Indonesia. Data obtained by Bank Indonesia through The Daily Food Price Survey is a survey conducted by Bank Indonesia. Trends in rice price were analyzed using descriptive analysis, market integration was analyzed using Index Market Connection (IMC), and price transmission was analyzed using price elasticity transmission. The results showed that trends in retail rice prices faced price volatility at 4.62 percent and rice prices at the producer level faced price volatility at 5.37 percent. The rice market in East Kalimantan is not integrated in the short run, but integrated in the long run with $IMC > 1$ and the integrated coefficient is 1,0949. Transmission elasticity of rice prices in East Kalimantan was 0,7896. Rice prices have not been transmitted efficiently. The policy implication for the government is to improve market price information and rice stock management as a market intervention. Government collaboration with market players, especially rice distributors, can be an alternative to ensure the availability of rice in the region. To improve local food security, regulating planting time, and planting frequency, increasing farm productivity, and guaranteeing output prices is the focus of improving market mechanisms in the region.

Keywords: food; market; price; rice; volatility

ANALISIS INTEGRASI PASAR DAN TRANSMISI HARGA BERAS DI KALIMANTAN TIMUR

ABSTRAK

Integrasi pasar dan elastisitas transmisi merupakan indikator dalam tercapainya efisiensi pemasaran. Pemasaran beras sebagai komoditas pangan pokok menjadi penting untuk kepentingan ekonomi. Penelitian ini bertujuan untuk mengidentifikasi perkembangan harga beras di tingkat produsen dan di tingkat pengecer, mengetahui keterpaduan pasar, dan mengetahui elastisitas transmisi beras. Penelitian ini dilakukan di Provinsi Kalimantan Timur dengan menggunakan data sekunder. Data sekunder yang digunakan adalah harga beras mingguan pada tingkat produsen dan harga di tingkat pengecer pasar tradisional dari Januari-Desember 2023. Data bersumber dari publikasi Pusat Informasi Harga Pangan Strategis Bank Indonesia. Data diperoleh oleh Bank Indonesia melalui Survei Harga Pangan Harian adalah survei yang diselenggarakan oleh Bank Indonesia. Perkembangan harga beras dianalisis menggunakan analisis deskriptif, integrasi pasar menggunakan analisis Index Market Connection, dan transmisi harga menggunakan analisis elastisitas transmisi harga. Hasil penelitian menunjukkan bahwa volatilitas harga beras di tingkat produsen sebesar 5,37 persen dan di Tingkat pengecer sebesar 4,62 persen. Pasar beras di Kalimantan Timur belum terintegrasi dalam jangka pendek, namun terintegrasi dalam jangka Panjang. Elastisitas transmisi harga beras sebesar 0,7896. Hal ini berarti bahwa harga beras belum ditransmisikan secara efisien dari tingkat konsumen ke tingkat produsen. Implikasi kebijakan yang dapat dilakukan oleh pemerintah adalah meningkatkan informasi harga pasar dan manajemen stok beras sebagai intervensi pasar. Kolaborasi pemerintah dengan para pelaku pasar terutama distributor beras dapat menjadi alternatif menjamin ketersediaan beras dalam wilayah. Untuk meningkatkan ketahanan pangan lokal maka pengaturan waktu tanam, frekuensi tanam, peningkatan produktivitas usahatani, dan jaminan harga output menjadi fokus perbaikan mekanisme pasar dalam wilayah.

Kata kunci: beras; harga; pangan; pasar; volatilitas

INTRODUCTION

Rice is a strategic commodity that is a basic need for the general Indonesian people. The public's need for rice causes a high demand for

rice and leads to demands for the availability of rice production on the market. The availability and ability to access food is an indicator of food security in a region (Timmer, 2014). The gap between rice production and demand will cause

price differences in its distribution. Rice prices in several previous studies have shown a correlation with poverty, economic growth, and food security (Girik Allo et al., 2019; Krisnamurthi & Utami, 2022); Ruspayandi et al., 2022; Be, 2022; Joseph Silaban et al., 2023). Household expenditure on rice is the largest expenditure. An increase in the price of rice can reduce the purchasing power of low-income households and cause an increase in poverty. An increase in rice prices can also cause inflation. Inflation is one of the factors that affect economic growth. Rising rice prices reflect the scarcity or lack of rice supply and increasing demand for rice. Insufficient rice supply indicates less domestic rice production.

Rice is one of the priority commodities in agricultural development in East Kalimantan Province. Some districts/cities are local rice-producing areas. However, local rice production has not been able to meet the needs of the region. Rice supply in Kalimantan Timur is mostly supplied from outside the region. The supply of rice in East Kalimantan can affect local rice prices. The price of rice in the market will affect the rice price at the local farm level and become a driving factor for rice production.

The agricultural marketing system plays an important role in determining consumers' prices. A marketing system must be developed to increase food production. Food prices occur due to the balance between supply and demand. The equilibrium price that occurs in the market is a guide for producers to produce commodities and is market information for consumers, and can be satisfying for producers and consumers, able to smooth the market mechanism, and spread the available supply. The overall price can maintain commodity marketing. Price is a measure of availability because prices tend to rise as food supply falls about to demand and prices tend to fall as supply increases. Price as a relative market scarcity signal or abundance of product. Prices also function as a stimulus to direct the allocation of economic resources the economic structure and the level of economic growth. Prices vary throughout most of the year and understanding trends in such variations is important for planning by producers, consumers, and policy makers. Rice marketing involves various intermediary institutions from production at the farm level to consumers. Where each marketing institution will incur marketing costs for marketing services and profits. Consumer demand at the retailer level will be reduced to the demand of marketing institutions to farmers. Primary demand is consumer demand for a product at the retailer level. Derivative demand is the demand for a product at the farm level, as this demand is derived from consumer demand at the retailer level.

Derived from consumer demand at the retailer level. The price paid by consumers is the price at the retailer level, which is the intersection of the primary demand curve and the derivative demand curve. The intersection of the primary demand curve and the derived supply curve. Meanwhile, the price at the farm level is the intersection between the derived demand curve and the primary supply curve. The primary demand for rice comes from consumers and will be transmitted to rice producers. Changes in rice prices at the consumer level are expected to be transmitted to the producer level. Changes in price to higher levels at the consumer level provide incentives for producers to produce.

East Kalimantan is a province that can provide rice production which cannot be fully met by local production. Based on Area Sampling Frame (ASF) BPS-Statistics Indonesia, paddy production in East Kalimantan for 2021-2022 has decreased. The dry-milled grain paddy production decreased 2,15 percent from 244.68 thousand tons in 2021 to 239.42 thousand tons in 2022. The decline in local rice production has caused the production of rice supplied to the market to decline. Local rice prices will rise, and the shortage of supply compared to demand will remain stable. This provides an opportunity for rice supplies from outside the region to enter East Kalimantan. Declining rice production from within the region will reduce the availability of rice within the region. Rice fulfillment depends on supplies from outside the region. The price of local rice will compete with rice from outside the region. The price of local rice is often higher than that of out-of-region rice.

The availability of land for lowland paddy farming is decreasing. Harvested area will decline from 66,269 hectares in 2021 to 64,970.01 hectares in 2022. Rice productivity is declining from 3.69 tons/ha in 2021 to 3.62 tons/ha in 2022. East Kalimantan has great potential production of dryland paddy. Dryland paddy has high economic value if it is developed and can become an export commodity.

The decline in rice production will affect the availability of rice on the market and rice prices. Rice production in East Kalimantan is not sufficient for the population's rice consumption (Adi et al., 2021; Ramadan et al., 2023). The designation of East Kalimantan as the new national capital also caused an increase in population and demand for rice.

Conditions of supply and demand gaps can influence the bargaining position between rice producers and intermediary traders who are directly in contact with consumers. The government intervenes to maintain the balance of supply and demand for stable rice prices. Rice price stability will provide support for the

development of food crop agriculture by increasing economic efficiency and reducing price uncertainty (Kusumaningsih, 2015). Price stabilization policies will be more effective in integrated markets.

Integration of agricultural commodity markets is a necessity for the effectiveness of agricultural marketing reform programs. Market integration ensures the transmission of price signal from food deficit areas to surplus areas and helps the farmers to increase specialization and comparative advantage and profits from trade. Market integration is an alternative approach to stabilize prices, allocate resources, and correct market imperfections. If markets are well integrated the government can stabilize prices in one reference market and rely on commercialization to produce the same results in other markets. This will reduce stabilization costs and farmers will not be limited by local demand conditions.

Changes in rice prices at the consumer level are expected to be transmitted to rice producers. Transmission elasticity shows the possibility of opportunities for business competition, balance of supply and demand (preventing price fluctuations), the possibility of developing traders between regions, reducing risk in production and marketing, opportunity to improve the market (Sutisna, 2021).

The research objective is to identify trends in retail rice prices and rice prices at the producer level, and to analyze market integration and transmission elasticity of rice prices in East Kalimantan. Rice price transmission is expected to realize efficient rice marketing in East Kalimantan Province for both producers and consumers. Rice price transmission is an important condition for market integration with efficiently transmitted price information.

METHOD

Analysis of the market integration of rice in this research used secondary data. Secondary data source from The National Strategic Food Price Information Center, Bank Indonesia. Weekly data on rice prices at the producer (milling) and the retailer price on the traditional market in 2023. Data obtained by Bank Indonesia through The Daily Food Price Survey.

The research analysis used is descriptive analysis, market integration analysis, and price transmission analysis. Measuring market integration using the index of market connection (IMC).

This analysis aims to measure how the integration of rice among rice prices at the producer and retailer in Samarinda City and Balikpapan City, East Kalimantan. The model used is Autoregressive Distributed Lag model

with Ordinary Least Squares method. The mathematical equation is as follows:

$$P_{P_t} = b_0 + b_1 P_{P_{t-1}} + b_2 P_{R_t} - P_{R_{t-1}} + b_3 P_{R_{t-1}} + e_t$$

P_{P_t} is rice price at the producer in time-t

$P_{P_{t-1}}$ is rice price at the producer in time- t-1

P_{R_t} is rice price at the retailer in time-t

$P_{R_{t-1}}$ is rice price at the retailer in time- t-1

$b_0 - b_3$ is coefficient regression

e_t is error term

The formulation of Index Market Connection (IMC) is as follows:

$$IMC = b_1/b_3$$

The market integration in short term if $IMC < 1$, it means the reference market has a strong relationship. If $IMC > 1$, it means reference market does not exist. Long term integration is shown by coefficient b_2 , if $b_2 = 1$, it means integration occurs in long term (prices from the reference market are transmitted proportionally to the secondary market).

Price transmission analysis uses transmission elasticity. The linear regression is as follows:

$$P_{P_t} = b_0 + b_1 P_R$$

Transmission elasticity is as follows:

$$ET = \frac{\partial P_P}{\partial P_R} \times \frac{\bar{P}_R}{\bar{P}_P}$$

ET is transmission elasticity

∂P_P is change of rice price at producer

∂P_R is change of rice price at retailer

$\bar{P}_R$ is the average of rice price at the retailer

$\bar{P}_P$ is the average of rice price at the producer

The criteria of ET are as follows:

1. If $ET = 1$, then a 1% change in price at the retail level results in a 1% price change at the producer level, a perfectly competitive market, and an efficient market.
2. If $ET > 1$, then a 1% change in price at the retail level results in a price change of greater than 1% at the producer level, market is not perfect, and the market is not yet efficient.
3. If $ET < 1$, then a 1% change in price at the retail level results in a price change of less than 1% at the producer level, the market is imperfectly competitive, and the market is inefficient.

RESULTS AND DISCUSSION

Rice Production and Food Expenditure

East Kalimantan Province consists of ten regency/municipalities. The rice production comes from lowland paddy and dryland paddy. The production from dryland paddy is low productivity. The farming of dryland practices includes traditional knowledge. Harvested area of East Kalimantan is 64,970.01 hectares. The highest harvested areas are Kutai Kartanegara Regency, Penajam Paser Utara, and Paser Regency with areas 27,981.31 hectares, 13,531.22 hectares, 11,663.9 hectare respectively. The harvested area in Kabupaten Kutai Kartanegara increase from 27,635.02 hectare to 27,981.31 hectare, harvested area in Penajam Paser Utara Regency increase from 13,501.60 hectare to 13,531.22 hectare, and harvested area in Berau increase from 5,756.54 hectare to 6,229.84 hectare. Harvested area in others districts (Kutai Timur, Kutai Barat, Mahakam Ulu, Kota Samarinda, Kota Balikpapan, and Kota Bontang) showed a decline.

The paddy production of East Kalimantan in 2022 is 239,425.30 ton. The highest paddy production is Kutai Kartanegara Regency, Paser, and Penajam Paser Utara Regency with production 105,025.70 ton, 48,202.66 ton, 45,160.69 ton, respectively. The paddy productivity in East Kalimantan is 3.63 ton/hectare. The highest productivity is Kutai Kartanegara and Paser Regency with 3.78 ton/hectare and 3.76 ton/hectare. East Kalimantan's rice productivity is below the national average productivity of 5.23 ton/hectare.

Rice production in East Kalimantan in 2022 will be 139.26 thousand tons. The regency producing rice production in East Kalimantan are Kutai Kartanegara, Kabupaten Paser, and Kabupaten Penajam Paser Utara. The highest rice contributing district is Kutai Kartanegara Regency with rice production of 61.09 thousand tons (43.87 percent from total rice production in East Kalimantan), Paser regency (20.13 percent), and Penajam Paser Utara (18.86 percent). Kutai Barat and Mahakam Ulu are two districts with low production in rice. Production from the three regency supplies rice to markets in others regency/municipality in Samarinda and Balikpapan. Paddy and Rice production is displayed in Table 1.

If the population of is East Kalimantan in 2022 is projected to be 3.86 million people with rice consumption per capita is 89.5 kg/capita/year, then the need for rice in 2022 is 345,470 tons. Rice availability from regional production is 40.31 percent. Rice production in East Kalimantan is

deficit. The shortage of rice is supplied from outside the region. This deficit condition still continues until 2032 based on the predicted from research by (Ramadan et al., 2023).

The need for rice in East Kalimantan will also increase with plans to move residents to the new capital. In the first stage of migration on July-November 2024 as 3,246 civil society. Population growth causes demand for food to increase, including rice. The local food diversification program has not been implemented well.

Paddy production in East Kalimantan in 2023 is 215,290.60 tons or if conversion to rice is 139,938.90 tons. Harvested area 57,143.29 hectare. Paddy productivity 3.76 ton/hectare. This production decrease from 2022 as much -10.08 percent.

East Kalimantan's inability to meet its rice needs is due to a decrease in harvested area, productivity that is below production potential, planting frequency of only 1-2 plantings per year, irrigation for rice cultivation that relies on rainfed system. Several efforts made by the government through the Office of Food, Food Crops, and Horticulture of East Kalimantan Province have attempted to increase rice production including increasing the rice planting index, providing lime for rice fields, provision of superior rice seeds, assistance and technical cultivation training.

Table 1. Paddy and Rice Production by Regency/Municipality, 2021-2022

Regency/ Municipality	Paddy Production (ton)		Rice Production (ton)	
	2021	2022	2021	2022
Regency				
Paser	51,972.06	48,202.66	30,230.50	28,037.95
Kutai Barat	2,021.46	1,284.77	1,175.83	747.33
Kutai Kartanegara	104,441.83	10,5025.70	60,750.49	61,090.11
Kutai Timur	13,119.61	12,076.25	7,631.26	7,024.36
Berau	22,364.87	21,135.98	13,008.91	12,294.14
Penajam Paser Utara	42,130.12	45,160.69	24,505.74	26,268.52
Mahakam Ulu	932.09	489.42	542.17	284.68
Municipality				
Balikpapan	354.13	302.10	205.99	175.72
Samarinda	6,988.91	5,492.34	4,065.23	3,194.72
Bontang	352.88	255.43	205.26	148.57
East Kalimantan	244,677.96	239,425.34	142,321.38	139,266.10

Source: BPS-Statistics East Kalimantan, 2023

The shift in the rice demand curve is also caused by household food expenditure. Per capita consumption of food products in East Kalimantan has exhibited significant change over time. Food expenditure consist of cereals including rice, tubers, fish/shrimp/common squid/shells, meat, eggs and milk, vegetables, legumes, fruits, oil and coconut, beverages stuffs, spices, miscellaneous food items, prepared food and beverages, and cigarettes. Monthly average of food expenditure per capita in 2022 is IDR 813,447.68 (45.25 percent from IDR 1,797,485.53). Food expenditure has increased from 2021, namely IDR 736,465.00 (42.85 percent from IDR 1,718,611.00). It means, proportion of food expenditure is lower than non-food expenditure. Purchasing power of food indicated welfare of society.

Price is determined by a balance between given levels of demand and supply. The impact of changes in the level of population can be eliminated by considering demand on a per capita basis. The percentage of monthly expenditure per capita for cereals (including rice) is 4.07 percent of food expenditure. The proportion of expenditure on these cereals is relatively stable when compared with other types of food. The highest monthly expenditure per capita is prepared food and beverages 13.97 percent of food expenditure. This showed the high consumer demand for prepared food and beverages. Household expenditure on food affects the level of household welfare. An increase in food prices can reduce the purchasing power of households. Rice is the food group that causes welfare changes in the rural, poor, and agricultural household groups, while the animal food group, the fruit group, processed food and beverages, and cigarettes cause a decrease in welfare. cause a decline in welfare households in urban, non-poor, and non-agricultural groups (Yuliana et al., 2019).

Table 2. Percentage of Monthly Average of Food Expenditure per Capita

Description	2021	2022
Cereals	4.05	4.07
Tubers	0.38	0.4
Fish/shrimp/common squid/shells	4.86	5.32
Meat	2.23	2.65
Eggs and Milk	2.77	2.84
Vegetables	3.61	3.72
Legumes	0.85	0.89
Fruits	1.88	1.99
Oil and coconuts	0.98	1.43
Beverage stuffs	1.28	1.24
Spices	0.98	1.09
Miscellaneous food items	0.97	1.04

Description	2021	2022
Prepared food and beverages	13.31	13.97
Cigarettes	4.69	4.59
Food	45.85	45.25

Source: BPS-Statistics East Kalimantan, 2023

Trends of Rice Price in East Kalimantan

The intersection of the market supply curve with the market demand curve determines the market clearing price in a competitive market. This point indicates that the price at which quantity consumers are willing to buy and all producers are willing to sell are just equal. The factors of rice market supply are prices of inputs, prices of other products that can be produced with the same resources, technology, and the number of firms. Rice marketing from farmers is generally in the form of harvested dry grain and milled dry grain. The mill buys farmers' grain to be processed into rice. The rice market is a driving force for the development of rice farming (Suparmo et al., 2001).

The producers' rice price at the beginning of the year is IDR 12,000.00 and at the end year is IDR 13,850.00. The lowest rice price at producer in 2023 is IDR 12,000.00 and the highest rice price in 2023 is IDR 13,850.00. The average rice price at producers in 2023 is IDR12.783,33. The average price of rice at producer/miller is below the national average price (premium rice IDR 13,480.00; medium rice IDR 12,320.00) for both premium and medium rice.

The traditional market rice price at the beginning of the year is IDR 13,350.00 and at the end year is IDR 15,500.00. The lowest rice price at retailers in 2023 is IDR 13,350.00 and the highest rice price in 2023 is IDR 15,500.00. The average price of rice at retailers in the traditional market is IDR14,499.02. The line of rice prices at the producer level shows varying lines. The average price of rice at retailers is below the national average price (premium rice IDR 15,780.00; medium rice IDR 13,840.00) for both premium and medium rice. The trend of rice prices in 2023 is presented in Figure 1.

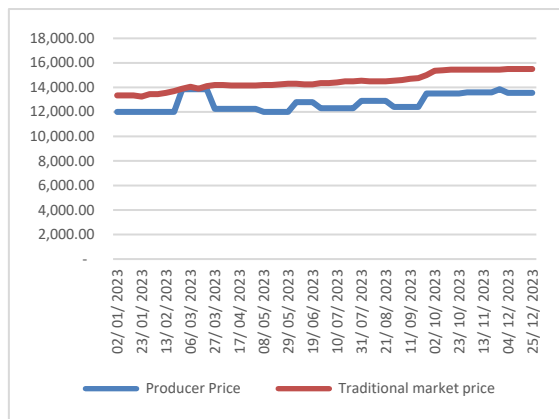


Figure 1. Trend of Rice Price in 2023

Source: BPS-Statistics East Kalimantan, 2023

Figure 1 showed that Rice prices in 2023 increased from the 9th week to the 12th week and 39 weeks to 52 weeks. Rice prices will increase in March 2023 ahead of the fasting month. Increasing rice price in September to December 2023 entering the harvest season and end year of 2023.

Rice production fluctuations are also relatively high compared to rice price fluctuations at the retail level fluctuations in rice production occur because of the harvest seasons in rice production. The Coefficient Variation of rice price at producers is 5.37 percent and at retailers in the traditional market is 4.62 percent. The rice price at the producer has a higher price volatility than the rice price at the retailer. Grain prices more volatile than rice prices at consumer (Aryani, 2012). Producers, rice millers, wholesalers, and retailers faced price volatility at 24.9 percent, 18.3 percent and 18.1 percent, 8.7 percent respectively (Khotimah et al., 2016). Price fluctuations can be controlled by supply and distribution arrangements. The results of coefficient variation are presented in Table 3.

Producers face fluctuations in the availability of grain from farmers, risk in post-harvest processes, cost of production, and risk of damage during storage before distribution to the market. Farmers as grain producers face challenges in the aspects of cultivation and risk in the selling price. Grain from farmers has varying qualities. Milling as a rice producer carries out the drying, milling process, storage, and packaging.

Table 3. Coefficient Variation of Rice Price

Description	Producer Price	Traditional Market Price
Average Price	12,783.33	14,499.02
Standard Deviation	686,19	669,74
Coefficient Variation (%)	5.37	4.62

Source: National Strategic Food Price Information Center, Bank Indonesia, processed 2023

Seasonal price movement occurs because of recurring seasonal patterns of demand/or the biological nature of farm production which determines to a considerable extent the rate at which farmers market their products. For storable commodities including rice, seasonal price variability should be related to the storage cost. Low-cost storage items should have less variation than products costly to store. The kinds of costs are involved in this process: (1) the direct cost of providing the physical storage facilities and (2) the costs that are due to is risk of price changes that occur while the product is in storage.

An increase in rice prices of 5-15 percent causes an increase in production of 0.10 percent (Indarwati, 2021). High price fluctuations create a lot of price risk nominal value that occurs compared to relative price fluctuations low. The implication is that price stabilization can minimize high price fluctuations and maintain nominal price stability that can minimize its impact on inflation. Changes in rice prices affect household expenditure on food. Price increases lead to an increase in expenditure on rice and a reduction in the proportion of other expenditures. Rising rice prices will reduce the purchasing power of low-income households for certain qualities of rice. The inflation in East Kalimantan in 2023 ranges between 0.43 percent in January and 0.39 percent in December.

The capital owned by farmers and millers greatly determines their decisions to buy products and remarket them. Rice producers in East Kalimantan consist of small rice mills, large rice mills, and Rice Milling Unit (RMU). These rice mills are spread across various districts on a limited scale.

An increase in the price of rice can trigger an increase in the prices of other goods. An increase in rice prices will increase the inflation rate and reduce people's purchasing power. Consumers consider the physical characteristics of rice when purchasing rice in the market (aroma, grain shape, size, broken level, and brightness). The level of household income determines the purchase of rice.

Market Integration

The principle of market integration relies on the Law of One Prices which is a characteristic of the model or theory of perfect competition. Perfect competition is a market situation where there are so many firms (sellers) and buyers that none of them has a significant influence on prices, homogenous products, ease of entry of new firms into the market, and perfect information. The benefits of market integration are: (1) Reduction of production costs; (2) Job opportunities from

industry, supermarkets, and other entrepreneurship; (3) Develop production skills; and (4) Building the capacity to empower farmers effectively.

The degree of market integration can provide information to the government so that it can take effective action if there is a lack of supply or excess demand which causes price fluctuations in the districts/cities of East Kalimantan. The results of market integration analysis of rice prices at producer level (milling) and rice price in consumer (retailer) in East Kalimantan can be seen in Table 4.

Table 4. Results of Market Integration Analysis

Variable	Coefficient		<i>t</i>	<i>sig</i>	<i>IMC</i>
Intercept	972,3222		0,7956	0,4302	
LP _P	0,6558 ***		5,9981	2,709E-07	2,7873
P _R -LP _R	1,0949 *		1,7181	0,0923	
LP _R	0,2352 **		2,1006	0,0411	

Source: Primary data, processed 2023

Note: *** for p values <0.001; * for p values <0.05; ** for p values <0.10

The Value of IMC >1 indicates that there is no price integration in the short term between rice price at producer and rice price at consumer at traditional market. It means there is no reference market in the rice market of East Kalimantan. The coefficient *b*₂ is 1,0949, its means that there is integration of rice price in long term. Short-run integration indicates that price changes in one market some of the time quickly causes price changes in the other market. This reflects the sensitivity of price margins in both markets. There is no short-term market integration in East Kalimantan Province for several reasons: rice marketing is controlled by a few large traders, price transmission problems between traders at various levels, and price changes in the consumer market are not well transmitted to all market levels.

The existence of a market as a reference market is necessary to control the price and volume of rice trade within the region. The research from (Aryani, 2012) results show that movements in producer grain prices and consumer rice prices in Indonesia show almost the same direction, but producer grain prices are more volatile than consumer rice prices. The grain producer market and the rice retail market are not yet fully integrated. In the short time, the producer grain market is influenced by the retail rice price, but the producer grain price does not affect the retail rice price. Government intervention is very necessary in the producer grain market. If the producer grain market and the raise retail market are fully integrated, this means that changes in the

retail price of rice are also followed by changes in the price of producers.

The rice price in the rice market chain in Indonesia is not transmitted (Khotimah et al., 2016). There are two cointegration relationships between producer price-rice miller price and wholesaler price-retailer price. Meanwhile, there are no cointegration between producer price-wholesaler price, producer price-retailer price, rice miller price-wholesaler price, and rice miller price-retailer price (Khotimah, 2013).

Supporting infrastructure affected market integration. Supporting infrastructure includes physical and non-physical infrastructure. Physical infrastructure includes infrastructure that supports the smooth running of transportation and communication systems, warehousing/storage infrastructure.

Most of the rice in East Kalimantan is imported from outside the region, including from the islands of Java and Sulawesi. Rice is also imported from Banjarmasin, South Kalimantan. This amount of rice affects the supply of rice in East Kalimantan. The high cost of transportation between islands affects the price of rice in the region. Rice is imported via Semayang Port, Balikpapan, and Samarinda Port. The volume of purchases and the frequency of arrival of rice from outside the region determine rice stocks in East Kalimantan. The change cost of food transportation has an impact on the quantities bought or sold and the price paid or received. As transportation costs increase, farmers receive lower prices and consumers must pay more for their food. These findings are in accordance (Ismet et al., 1998) (Hidayanto et al., 2014), who reported that transportation infrastructure is affected by market integration. Transportation infrastructure encourages people's physical accessibility to food. Bad weather during shipping from the port of Surabaya or Sulawesi to the port of East Kalimantan will cause delays in rice supplies. The lack of rice supply can increase the selling price of rice in East Kalimantan.

The government can play a role in building information works (Agung & Daryanto, 2017). Access to information allows market players to know other market conditions and adapt their products to other markets. Prices vary in all markets and unless all sellers are located in one place, a buyer cannot know what all the selling prices are without undertaking a search for price information. The cost of the search is a variable of special interest to buyers is the expected savings that could accrue because of their search. The expected savings will be greater if prices are more dispersed and if the expenditure on the item is greater. The role of widely accessible digital agricultural marketing can encourage rice market integration. The research from (Sutisna, 2021) in Lampung Province shows that there is a high

market integration in Central Lampung Regency between the price of grain at the milling factory level and the price of grain received by rice farmers (producers). There is short-term price integration between Central Lampung and East Lampung and there is short-term and long-term integration between farmers in Metro and Tanggamus with farmers in Central Lampung both in the short and long term. Similarly, market integration of the rice market in Bali province, where the Bali rice market is integrated in the short run with other provinces except with Central Java, South Sumatra, and Lampung. with other provinces in the short term except with Central Java, South Sumatra, and Lampung. Bali Rice Market is integrated with other provinces, and best integrated with West Java, Central Java, Yogyakarta, East Java, and NTB in the long run (Agung & Daryanto, 2017).

The proportion of household expenditure for cereal is higher than food expenditure. The population in East Kalimantan has not yet diversified food into food other than rice. An increase in per capita income encourages household income. Per Capita income is affected by market integration (Hermawan et al., 2017; Hidayanto et al., 2014).

Price Transmission Elasticity

The regression analysis to analyze price transmission is as follows:

$$P_{P_t} = 2.689,003 + 0,6962P_R$$

Transmission elasticity values obtained is 0,7896. It means 1% change in price at the retail level results in a price change of less than 1% at the producer level. The market is imperfectly competitive and the market is inefficient.

The price transmission is low indicated that the rice market of East Kalimantan tends to be oligopsony. The traders can control the purchasing rice price. Obstacles to improving the efficiency of rice marketing are related to the structure of rice farming which is dominated by small scale and is not consolidated. The farmers as grain producers do not have a bargaining position. Determining the purchase price for grain from farmers will affect the selling price of rice at the mill. The involvement of multiple marketing agencies lengthens the marketing channel. Farmer groups and farmer group associations still need to increase their role in marketing grain production to mills.

There are several rice distributors in the district/city of East Kalimantan. All important staple foodstuffs in Balikpapan city that come from outside enter through one port, namely

PELNI port (PELINDO Region IV). There are three expedition transport companies operating in Balikpapan city, namely SPIL, Tanto, and Tempuran Emas. There are 14 traditional markets in Samarinda city, including Segiri, Rahmat, Sungai Dama, Ijabah, Subuh, and Merdeka markets. Segiri market is a main market that supplies rice, vegetables, fruit, fish chicken, and other foods from several areas such as South Sulawesi, Surabaya, and Mamuju. Segiri market overseas markets include Ijabah market, Bengkuring Market, Merdeka Market, Rahmat Market, and Kedondong Market.

Asymmetric price transmission can also be caused by differences in the quality of rice sold. Rice sold in the market of East Kalimantan consists of medium I, medium II, and super quality rice. In other research, it was found that price changes for harvested dry grain at the producer level are more sensitive than price changes at the consumer level for premium and medium rice (Lastinawati et al., 2019).

CONCLUSION

The trend of retail rice prices in East Kalimantan Province at the farmer and retailer levels shows a stable trend with low price fluctuations. Rice market integration in East Kalimantan Province does not have a short-term equilibrium relationship where price changes are not directly responded to by the market and market participants can respond to changes in market prices in the long run.

Based on the results of this study, the government should continue to intervene in the rice market by providing price information and stock management that regulates the availability of rice for local needs. Rice traders can benefit from rice marketing while still considering the marketing functions performed so that consumers are not harmed. Local farmers as local rice producers need to pay attention to the time of production and the quality of rice produced so that they can compete with rice entering the local market from outside the region.

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