

Efficiency of Papaya Marketing (*Carica papaya* L.) in Indramayu Regency, West Java Province of Indonesia

Hartini Widyaningsih, Teguh Iman Santoso*, Hanny Stephanie, Neneng Sri Mulyati

Agriculture Faculty
Universitas Wiralodra
Indramayu, Indonesia

hartiniwidyaningsih.ai@gmail.com, *teguhimans@unwir.ac.id, hanny.stephanie@gmail.com, nenengsrimulyati44@gmail.com

Abstract—Papaya is one of the suitable plants cultivated in Indramayu Regency. This study determines the price transmission elasticity and marketing efficiency of papaya in Indramayu Regency. It applies an econometric model using producer and consumer monthly prices of papaya in Indramayu Regency from January 2012 to December 2016. The result shows that the price transmission elasticity of papaya marketing in Indramayu Regency is 0.921. It implies that papaya marketing structure is not applied in perfect competition market. The price transmission from consumers to farmers are asymmetric, so the price change at consumer level are not transmitted to the price at farmer level. It can be concluded that the papaya marketing in Indramayu Regency is not efficient. Weak farmers bargaining position leads to lower farmers' share. Therefore, it is important to strengthen farmers' institutions, especially in agricultural products marketing chain. There is a need for cooperation between farmers, farmers group and entrepreneurs (business partnerships) so that farmers are financially independent. It will broaden the opportunity to establish the market prices.

Keywords: asymmetric market, price transmission elasticity, marketing efficiency, market integration

I. INTRODUCTION

Agricultural development in Indonesia continues to be regarded as important from macroeconomic development point of view. The agricultural sector is not only able to provide food, absorb labour, reduce the number of poor people, promote foreign exchange, promote the emergence of agroindustry, promote the modernization of rural areas, but also used as an instrument of development policy to protect marginalized people from being overburdened by global pressure [1]. Agriculture is an important sector in the Indonesian economy because it plays a strategic role in national development, that is: (1) suppliers of staple foods to the population, (2) suppliers of industrial raw materials, (3) the largest providers of employment, (4) producers of value added or gross domestic product (GDP) and (5) sources of foreign exchange [2].

Indramayu Regency is an agricultural area that has the potential to develop horticultural crops. It meets nutritional needs and support regional economic development. Papaya

plants are suitable for cultivation in the Indramayu Regency, as it can grow on different land types. The optimal growth of the papaya plants needs land which rich in organic matter, good drainage and aeration support. At Indramayu, papaya is planted in the home yard with less than 10 trees per household. The papaya production in Indramayu Regency has been fluctuated as a result of cultivation in small scale [3]. Number of Harvested Tree, Production and productivity of Papaya in Indramayu Regency 2012-2016 are shown in Table 1.

TABLE I. NUMBER OF HARVESTED TREE, PRODUCTION AND PRODUCTIVITY OF PAPAYA IN INDRAMAYU REGENCY 2012-2016

No	Year	Number of Harvested Tree (Tree)	Papaya Production (100 Kg)	Productivity (100 Kg/Tree)
1	2012	10.582	5.195,00	0,49
2	2013	9.854	5.379,00	0,55
3	2014	28.127	6.105,00	0,22
4	2015	13.356	8.429,20	0,63
5	2016	28.682	1.183,11	0,04
Total		90.601	26.291,31	1,93
Average		18.120,2	5.258,26	0,39

An increase in production and productivity is a success for the implementation of agricultural activities. However, it must be supported by a good authoring system so that it benefits farmers as producers, marketers and cause no harm to consumers. Marketing of horticultural raw materials often refers to marketing institutions, that connect farmers and consumers. The institutions that play a role in the marketing of horticultural products may include farmers, collectors, intermediaries/wholesalers and retailers. It brings additional value for products in a marketing system.

Based on the observations, papaya producers are often confronted with price fluctuations. During harvest, prices for agricultural commodities tend to fall due to the oversupply of the produced products. Hence, the farmers' share is low. Consequently, the benefits received by farmers as producers are lower than the share of prices received by the other marketing institutions. Show the distribution of wealth as a result of price changes on marketers are not transferred at producer level. In other words, the average price change at

producer level is less than the price changes at marketer's level, so the effect of price transfer does not work (asymmetric price transfer). The marketing of agricultural products on the market side is not symmetrical (asymmetric market), the elasticity of the transfer of agricultural commodity prices is low, so that price increases on the consumer level do not benefit producers.

Marketing is the activity, set of institution, and processes, for creating, communicating, delivering and exchanging offering that have value for costumer, clients, parttimers and society at large. There are four main activities in marketing, namely: creation, communication, delivery and exchange of offers [4,5,6].

Marketing efficiency is a competitive market that always refers to information about price changes of a commodity. Marketing efficiency analysis is certainly important as it is useful for assessing the performance of marketing and economic activities. If marketing become inefficient, it will affect the performance of a sector in the country [7].

Inefficient domestic agricultural market is one of the factors leading to a decline in farmer productivity and a decline in agricultural sector performance in developing countries. Market development and market integration are positively correlated because developed stock markets usually attract higher capital flows [8].

The market integration analysis can be performed by observing the price mechanism that occurs at different marketing levels. If there is asymmetry in the price transmission mechanism, accordingly vertical market integration does not occur. Vice versa, if there is no asymmetry in the mechanism, subsequently the market integration occurs, which means that any price change at the marketing level is followed by price changes at the level of other market players [9].

The study of market cohesiveness is important to see to what extent the smoothness of information and marketing efficiency in markets. Market integration shows the selling power that occurs between markets. This definition includes the process by which demand, supply, and transaction costs in different markets together determine prices and trade flows, as well as the transmission of price shocks from one market to the other markets. If the market is integrated, then a market is not only based on local demand but also on the situation that occurs in other markets [10]. The integration of agricultural markets can be analysed in three dimensions: vertically (along the supply chain), horizontally or spatially (between regions and countries) and temporally (between spot and future markets) [11].

The purpose of this research is to:

- Know the efficiency of papaya marketing in Indramayu Regency.
- Know the efficiency of papaya marketing in Indramayu Regency.

II. RESEARCH METHODOLOGY

The design of this study is causal comparative research that aims to investigate the possibility of causal relationships based on the observations of existing effects and to finds the causative factors based on specific data. The main features of this study are *ex-post-facto*, means data collected after all the events occurred. This study used monthly producer and consumer average papaya prices from January 2012 to December 2016. The data used in this analysis is the monthly papaya price report from the Indramayu district BPS of West Java province.

The comparative causal research design aims to analyse the magnitude of transmission elasticity and efficiency in local papaya marketing in Indramayu Regency. To analyse the efficiency of papaya marketing, a price transfer analysis with the following formula were used:

$$P_f = \beta_0 + P_r^{\beta_1} e \quad (1)$$

Then transformed in linear form to:

$$L_n P_f = L_n \beta_0 + \beta_1 L_n P_r + e \quad (2)$$

where:

β_0 : Intercept

β_1 : Elasticity coefficient

P_r : Monthly average price at retailer level (IDR)

P_f : Monthly average price at farmer level (IDR)

e : error term

This study used time series data. Therefore, an autocorrelation test was performed as autocorrelation problems often occurred in time series data [12]. Auto-correlation is defined as the correlation between members of a series of observations sorted by time [13]. Durbin Waston (DW) test was used to find the existence of autocorrelation in the study. If autocorrelation occurs, the OLS estimator is not efficient. Therefore, it is necessary to take corrective action by transforming the data and searching for values based on the Durbin Waston statistics.

$$d = 2(1 - \hat{\rho}) \quad (3)$$

$$\hat{\rho} = 1 - \frac{1}{2} \quad (4)$$

By using the above estimates, the data transformed as follow:

$$(L_n HP - \hat{\rho} L_n P_f_{t-1}) \text{ and } (L_n HK - \hat{\rho} L_n P_r_{t-1}) \quad (5)$$

The first value of $L_n P_f$ and $L_n P_r$ were obtained by transforming data as follow:

$$\sqrt{(1 - \hat{\rho}^2)} L_n P_f_1 \text{ and } \sqrt{(1 - \hat{\rho}^2)} L_n P_r_1 \quad (6)$$

The value obtained from β_1 is the value of the transmission elasticity when $E_r > 1$. It indicates the percentage price increase is higher at consumer level than at producer level. If $E_r > 1$, then the percentage price increase at consumer level is lower than at producer level. It can be concluded that market

conditions reflect imperfect competitive markets and the marketing is considered inefficient. If $E_r = 1$, then the percentage price change at consumer level leads to a price change at consumer level of the same percentage. A 1% change at producers' level is followed by a 1% price change at consumer's level. Thus, it can be concluded that market reflect imperfect competitive markets and the marketing is efficient.

III. RESULTS AND DISCUSSION

This study found that the size of the transmission elasticity of papaya price in Indramayu Regency is equal to 0.921 or $E_r < 1$. It can be interpreted that a 1% price change at the consumer level is transmitted as big as 0.921% price change at the producer level. This result reflects inefficient marketing system in the industry. In inefficient marketing system, commodity prices changes do not transmit perfectly between marketing institution from consumers to farmer's level.

Asymmetric price transmission between vertically related markets (in a marketing chain) generated by the existence of anti-competitive behaviour between intermediaries, especially in a concentrated market. Generally, intermediaries will try to maintain the profit levels and will not change the prices in line with the actual price signal. Intermediary traders will react faster to price increases than to price decreases. It leads to imperfect or asymmetric price transmission between producer and consumer levels, lead to the inefficient local papaya marketing in Indramayu Regency.

Farmers low payment and weak bargaining position due to frequent oversupply at the harvest time leading to low prices for farmers. Therefore, the marketing of agricultural products is inefficient [14].

Based on this study, farmers usually have difficulties in accessing capital due to nonbankable characteristics in small scale farmer. Consequencies, they often rely on the loans from intermediaries to fund the fields. Therefore, they have complicated relationship with the intermediaries. At harvest time, the farmers sold their products to the lender so the farmers bargaining position is weak. It also happens that the intermediaries are relatives to farmers, so the farmers are at disadvantage position.

Marketing actors have both social and economic ties with farmers by providing loans both for agricultural capital and to cover their daily needs. The bonds between marketing actors and farmers are not good enough to establish the prices. Prices at farmer level are set by buyers who lend money, and farmers are blocked from market information, so the information received is not proportional or referred to as asymmetric information. Asymmetric information at farmer level is caused by the moral hazard of market participants.

Based on the results, the main problem for producers is weak access to market information and financial institution, leading to a weak bargaining position for farmers. As farmers' lives under poverty, efforts are needed to improve access to information and financial institution. Efforts are being made to develop potential markets and overcome market failures and also to achieve efficient marketing for farmers by removing market access barriers [15]. Cooperatives in rural areas through

the development of agricultural products based on agricultural trade can be a solution. The cooperative acts as a financial institution, building community capital through savings, providing inputs, marketing products, training and mentoring farmers, and above all to strengthen the position of agricultural negotiations.

IV. CONCLUSION AND SUGGESTION

A. Conclusion

Based on the results, it can be concluded as follows:

- The value of the elasticity of the price elasticity is 0.921.
- Papaya marketing in Indramayu Regency is inefficient because the value of $E_t < 1$ and market conditions do not reflect perfect competition.

B. Suggestion

Based on the above conclusions, the following proposals can be obtained:

- Weak farmers bargaining position leads to lower farmers' share. Therefore, it is important to strengthen farmers' institutions, especially in agricultural products marketing chain. Existing agricultural institutions such as farmers' groups, cooperatives and institutions suggested to applied the concept of "market orientation", which supported by 3 components, that is the needs and desires of customers, the organization of work and the achievement of objectives.
- There is a need for cooperation between farmers, farmers group and entrepreneurs (business partnerships) so that farmers are financially independent. It will broaden the opportunity to establish the market prices.

REFERENCES

- [1] S. Soekartawi, "Perlu Sentuhan Information and Communication Technology (ITC) dalam Pengembangan Agribisnis di Indonesia," Bunga Rampai Agribisnis Seri Pemasaran. Departemen Agribisnis Fakultas Ekonomi dan Manajemen Institut Pertanian Bogor, 2009.
- [2] R.A. Asmarantaka, "Pemasaran Produk Pertanian. Bunga Rampai Agribisnis Seri Pemasaran," Departemen Agribisnis Fakultas Ekonomi dan Manajemen Institut Pertanian Bogor. Bogor, 2009.
- [3] Badan Pusat Statistik Kabupaten Indramayu, Indramayu dalam Angka 2016. Indramayu, 2017.
- [4] American Marketing Association, Definition Of Marketing [Online]. Retrieved from: www.Ama.Org/The-Definition-Of-Marketing/ Accessed on May 11, 2019, 2013.
- [5] G. Armstrong, S. Adam, S. Danize, and P. Kotler, Principles of Marketing. Melbourne: Pearson Australia, 2015.
- [6] R.K. Muljono, Digital Marketing Concept. Jakarta: Gramedia Pustaka Utama. Jakarta. 2019.
- [7] C.D. Kirkpatrick and J.R. Dahlquist, Technical Analysis. The Complete Resource for Financial Market Technicians. New Jersey, USA: Pearson Education, Inc., 2011.
- [8] C. Guangxi, H. Yan, and C. Weijun, "Time-Varying Long Memories of the Chinesecurrency and Stock Markets Based on the Hurst Exponent," Fluctuation and Noise Letters, vol. 13, no. 1, pp. 1-15, 2014.

- [9] M.B. Kaabia, J.M. Gil, and M. Ameer, "Vertical Integration and Non-Linear Price Adjustments: The Spanish Poultry Sector. *Repec*, Wiley Periodicals, Inc.," *Agribusiness*, vol. 21, no. 2, pp. 253-271, 2011.
- [10] S. Issa, "Spatial Integration of the Rice Market: Empirical Evidence from Mid-west and Far-west Nepal, and the Nepalese-Indian Border," *Munich Personal Repec Archive (MPRA)*, vol. 14488, pp. 18-25, 2009.
- [11] M. Hamulczuk, O. Makarchuk, and E. Sica, "Searching for Market Integration: Evidence from Ukrainian And European Union Rapeseed Market," *Land Use Policy*, vol. 87, 2019.
- [12] A.A. Rasul, *Ekonometrika, Formula dan Aplikasi Dalam Manajemen*. Jakarta: Uhamka Press, 2011.
- [13] D.N. Gujarati and D.C. Porter, *Basic Econometric*. New York: McGraw-hill Irwin, 2009.
- [14] E.S. Rahayu, "Mereposisi Pemasaran Pertanian dalam Revitalisasi Pertanian," *Proceeding*, Presented at Sidang Senat Terbuka Universitas Negeri Surakarta at Desember 10, 2009.
- [15] H. Kyomugisha, C. Sebatta, and J. Mugisha, "Potato Market Access, Marketing Efficiency and On-Farm Value Addition In Uganda," *Scientific Asian*, vol. 1, pp. 1-14, 2018.