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The Effects of Market Integration on Rice Market Performance and it's Implication on National Food Security in Indonesia

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Abstract
This research is aimed to assess the rice market performance by identifying the rice price, market and marketing situation nationally and domestically and factors that influence the rice market performance within the last ten years as well as its impact to the national food security level. The primary data was conducted by distributing the open- and close-ended questioners to the trade, famers, and agents. The Secondary data was collected from Central Bureau of Statistic (BPS) and Food Security Agency based on time series data. Structural Equation Modeling (SEM) applied to test the model that has been previously formed and at the same time examine all the hypotheses. Ultimately, this research finds that: (1) the market integration is significantly and positively influences the rice market performance in Indonesia. (2) The rice market performance also significantly and positively influences the national food security. (3) The integration of rice market also significantly and positively influences national food security.
Keywords: Market integration, Market performance, Food security

1. Introduction

Food security has become a central issue for any government policies, because it concerns the fundamental and crucial livelihood of every people. The demands for rice in Indonesia tend to rise following the increase in number of population. The government of Indonesia remains focused on ensuring the availability of food to overcome its scarcity and insecurity in this country with various policies from increasing domestic production, managing food procurement system and policy in base price of food grain. However these policies still cannot meet the demands and needs of the dynamic markets.

The less dynamic and effective of policies implemented by the government within these few decades have had impact on the insecurity of food in many areas, despite the fact that rice production teds to continue to increase. It is similar to the import policies applied by the government to cover food shortages that has caused many new problems particularly regarding the rice performance in this country, from the instability and scarcity of rice supply to the increase and fluctuating price. This unfavorable performance is exacerbated by the behavior of traders who dominate the marketing system and the lack functioning of government institution to control the price and rice supply.

In some areas, freight charge is still very expensive that inhibit the mobilization of rice crops to other targeted market. This constraint also slows down the market integration and price transmission between two markets that spatially separated. In the rice market in this country often found that the price in one market is determined by other markets. The price in one market is sometimes a reference for other markets. However, it is not always happen that lower market price is determined by the higher one, but it can conversely take place. One thing that needs to be observed is the potentiality of changing the price, not the problem of which market that determines the price, so the difference among the market is relatively small and getting smaller as a reflection of those markets which are perfectly integrated.

The study of market of market integration has usually tried to characterize the degree of movement of price across spatially separated markets. Since prices are the most rapidly available and often the most reliable information on developing marketing system, marketing integration studies have almost exclusively referred to events resulting in price changes. Most specifically, market integration is stricter to interdependence of price change across spatially separated location in market.

Markets are complex institution, encompassing hierarchies and interlinked transactions that may involve the simultaneous consideration of various commodities. This paper addresses the issue of marketing integration and marketing performance and its implication for national food security in Indonesia.

2. Literature Review

There are many factors that influence the rice commodity market performance in a country, from economic variable to political and cultural variables that are likely to contribute to the market performance. The important factor that often discussed in viewing the market performance is the low of deviation of price between producers and consumers, between domestic and local as well as its profit margin. Besides, the instability of price will affect on farmers as producer and community as consumers, this reflects that the rice marketing in Indonesia is always indicates the loss to smaller degree. Moreover, the availability and equity of rice distribution as well as

the affordability of communities' purchasing power in Indonesia is still a central issue that affect to national economic policy (Bambang, 2007)

Studying market integration has important implications for economic welfare (Bakucs and Ferto, 2006). Integration of agricultural markets to influence the overall level of output and input prices, the volume of international trade and the consequent impact on agricultural production will indirectly affect the structure, the size of the population of farmers, farmers' income, production cost factory inputs and outputs as well as the impact on the overall industry revenue and national economic resource allocation (Giesbertz and Tonjes 2004 in Bakucs and Ferto, 2006). The approach is simple and is commonly used to measure market integration is to calculate the correlation between variables, which is usually the difference between the price and the market (Alexander and Wyeth, 2006 Bakucs and Ferto, 2006).

Integration or unification of market price movements show the relationship between the two markets perfectly, but it was never found in reality. Market integration is a feature of markets and efficient marketing. Ravallion (1986) Standard Granger (1969) is often used in the literature to investigate the effect of market integration and domistik in the short term, which reflects the change in the price of a response to the market and the other markets in the long-term integration that describes the relationship between the two markets and the existence of price stability in the long term . Until 2008 the use of the measurement methodology of integration is a technique that is commonly used vector autoregressive models and model Engle Granger (1987) as an expansion of the standard model granger (1969) as Arshad, 1990, Rapsomanikis et al, 2003).

Market performance is a result of the economic structure and market behavior that occurs, mainly reflected in the relationship between the distribution margins and production costs of marketing services (Bain, 1959 in Harriss, 1979). Performance of a market is influenced by two main factors, namely (1) structural characteristics of the market and (2) the competitive behavior of actors or participants in the market. Understanding The second factor is the proficiency level to determine how each of these factors work independently and can be the basis for identifying opportunities that can be exploited and overcome the obstacles faced by the market (Ajala dan Adesehinwa, 2007)

Based on the basis theoretical concepts and the results of previous studies prepared framework empirical in this research as in Figure 1.

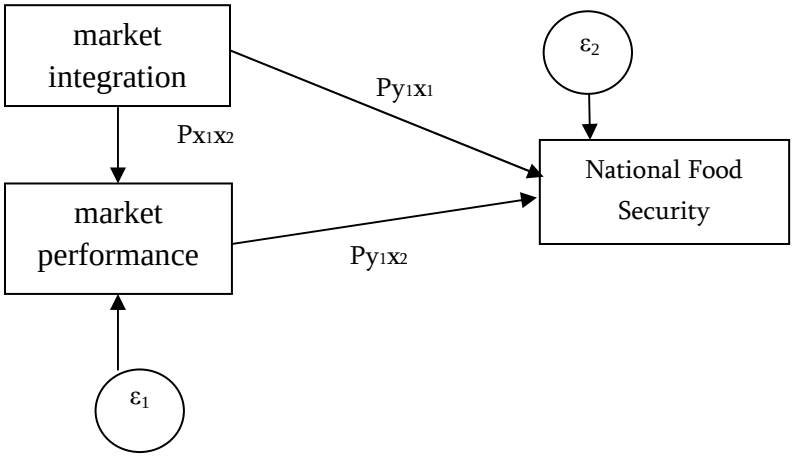

Figure 1. Research Model

The formulations of the hypothesis in this research are as follows:
H1: market integration affects market performance positively
H2: market integration affects national food security positively
H3: market performance affects national food security positively

3. Research Methodology

Primary data collection in this research was conducted by distributing the open- and close-ended questionnaires to the trade, famers, and agents. At the same time, formal and informal interviews were conducted with several marketing agents. This research is conducted in central market Jakarta (Cipinang) and other central market of domestic rice trading in some selected province in Indonesia such as Sumatra Utara, West Java and Aceh. The Secondary data was collected from Central Bureau of Statistic and Food Security Agency based on time series data.

This research is essentially a explanatory research with the objective to examine the hypothesis about the correlation between the studied variables and the formulated hypothesis. For the purposes of explaining the

relationship between marketing integration and marketing performance as described in the formulation of the problem, the various relationships between variables were analyzed using descriptive statistics and inferential statistics. The Structural Equation Model (SEM) is used for inferential statistics.

4. Result and Discussion

The integration of consumer and producer rice market in Indonesia, the rice price at consumer level is often changed from time to time, but this change at consumer level or retail does not necessarily change the price received by farmers as the producers. To initiate the understanding about the integration between producers and consumers of rice commodity, the following displays the development of rice price 2003 to 2012.

Table 4. 1 The development of the average price of rice in producer and consumer's level in Indonesia, 200-2009 (IDR/kg)

Year	Average price in consumer level	% of the rising price	Average price in producer level	% of the rising price
2003	1.360	-	1.013	-
2004	1.490	9,56	1.119	10,46
2005	1.567	5,17	1.231	10,01
2006	1.605	2,43	1.224	-0,57
2007	1.627	1,37	1.226	0,16
2008	1.833	12,66	1.519	23,90
2009	2.413	31,64	2.052	35,09
2010	2.712	12,39	2.357	14,86
2011	2.875	6,01	2.491	5,69
2012	3.062	6,50	2.701	8,43

Source: Central Bureau of Statistic and Food Security Agency 2012 (processed)

In the period of this recently ten years, the consumer price average has been increase between 1,37 – 31,64 percents, while the price at producer's level also increases from 0,16 – 35,09 percents. The price reduction at producer's level had occurred in 2004-2006 that 0,57%. The producer's average price reach almost 10,8 percent while the price at the consumer level only increase about 8,77 percent. If the collected data is true, at the state of the increase of consumer price, the rising price at the producer level in a bigger proportion will also occurred. The rising indication at these two level markets reflected that the two markets have been integrated. Ideally, the rising proportion is same so that the rising of one percent in consumer level will also increase one percent at the producer level.

The integration of foreign market and domestic market, where the price of imported rice is significantly influences the domestic rice price. By using the development of the average rice price data from 2003-2012, it is found that the correlation between these two level market is quite high reaching 0,873 percents which means that at the rising of imported price of one percents, it will influences the rising price of domestic rice of o,873 percents. The development of international and domestic rice price in the period of 2003-2012 is as shown in the table below.

Tabel 4.2.The development of the average price of rice at the foreign market level and domestic market level in Indonesia, 2003-2012 (IDR/kg)

Year	Average price in consumer level	% of the rising price	Average price in producer level	% of the rising price
2003	2.178	-	2.127	-
2004	2.314	6,24	2.260	6,25
2005	2.355	1,77	2.624	16,11
2006	2.286	-2,93	2.692	2,59
2007	2.829	23,75	2.569	-4,57
2008	3.450	21,95	2.986	16,23
2009	3.687	6,87	4.076	36,50
2010	4.183	13,45	4.782	17,32
2011	6.237	49,10	5.046	5,52
2012	4.980	-20,15	5.234	3,73

Source: Central Bureau of Statistic and Food Security Agency 2012 (processed)

The share of consumer price that received by farmers as a producer who tends to increase from time to time. This indicates that there is an improvement on farmers' income as an expected outcome from the implementation of agriculture development program in Indonesia.

Table 4.3.Producer Share 2003-2012 (IDR)

Year	Amount per Year (Rp)	Averages per Month (Rp)	% Improvement
2003	899,18	74,93	-
2004	901,64	75,14	0,28
2005	942,67	78,56	4,55
2006	916,04	76,34	-2,83
2007	933,05	77,75	1,85
2008	990,52	82,54	6,16
2009	1.020,10	85,01	2,99
2010	1.043,45	86,95	2,28
2011	1.038,89	86,57	-0,44
2012	1.059,02	88,25	1,94
Average	**974.456**	**81,20**	

Source: Central Bureau of Statistic and Food Security Agency 2012 (processed)

From table 4.3 above, it can revealed that the consumer share price that received by farmers (producer's share) is continue increase from 74,93 percents in 2003 to 88,25 percents in 2012 or 1,33 percents per year. The increase of this producer's share can be an indication of improvement in terms of market efficiency and domestic rice commodity marketing. The condition of food surplus or the increase of domestic rice availability has a relatively small effect to the food security because of the farmers' exchange rate which is still low. This low exchange rate has been one of the cause of the low farmer's purchasing power, thus the farmers group or farmers' household in rural areas is highly vulnerable to the food security issue. The amount of income they receive from their farming crops cannot fully finance their household needs

Table 4.4.Purchasing Power (Household Income) 2003-2012

Year	Amount per Year (IDR)	Averages per Month (IDR)	% Improvement
2003	9.989.904	832.492	-
2004	10.619.760	884.980	6,30
2005	11.249.616	937.468	5,93
2006	11.879472	989.956	5,60
2007	12.509328	1.042.444	5,30
2008	13.139.184	1.094.932	5,04
2009	13.769.040	1.147.420	4,79
2010	14.398.896	1.199.908	4,57
2011	15.028.752	1.252.396	4,37
2012	15.658.608	1.304.884	4,19
Average	**12.824.256**	**1.068.688**	

Source: Central Bureau of Statistic and Food Security Agency 2012 (processed)

The people's purchasing power affected to the household food security. From the data above, it is know that the people's purchasing power measured from income per capita has a significant increase from Rp. 9.999.904 in 2003 to Rp. 15.658.608 in 2012 or increase 5,67 percents per year. The farmers' income rise high in 2001 and tend to decrease in the following years until 2009. The increase on this income growth supports the food security within community as the consequence of the improvement of food price system in the market. The impact from the increase of domestic production since 2007 has been able to reduce rice imports with a continuing decline in volume. The development of rice imports from 2003 to 2012 is shown in this below table.

Table 4.5.Rice Imports in Indonesia 2003-2012

Year	Rice Import (ton)	The increase Decrease rate (%)
2003	1.355.005	-
2004	642.036	-52,62
2005	1.798.144	180,07
2006	1.427.375	-20,62
2007	234.563	-83,57
2008	188.911	-19,46
2009	438.028	131,87
2010	1.406.800	221,17
2011	289.700	-79,41
2012	250.500	-13,53
Average	**749.626**	**19,24**

Source: Central Bureau of Statistic and Food Security Agency 2012 (processed)

From the above table, it can be describe that the rice imports within the last three years tend to decrease from 1.406.800 tons in 2007 to 250.500 tons in 2012. Although in the average rate, the rice imports in the last 10 years is still increase of about 19,24 percent per year, but the decrease in the last three years supports the food security program that sourced from the domestic production and save a substantial foreign exchange. The lower the import value, the higher the national food self-sufficiency.

Structural equation modeling applied in this research is feasible to use to discuss and prove the proposed hypothesis, both directly and indirectly which is indicated by the fulfillment of required goodness of fit index. The analysis of the goodness of fit index is as shown in the table 4.6:

Table 4.6. Analysis of Goodness of Fit Index

Goodness of fit index	Recommended Value	Result of study
Chi-square (CMIN)	Small	514.077
Degree of freedom	-	424
Probability	>0.05	.0001
Chi-square/degree of freedom (χ^2 / df), CMIN/df	<2.00	1.586
Goodness of fit index (GFI)	>0.90	.914
Adjust goodness of fit index (AGFI)	>0.90	.921
Tucker-Lewis index (TLI)	>0.90	.934
Incremental fit index (IFI)	>0.90	.929
Comparative fit index (CFI)	>0.90	.936
Root mean square error approximation (RMSEA)	<0.08	.040

The computer calculation result as shown in the table 5.10 above indicates that the large *chi-square* **(χ^2)** value of about 514.077 which is significant in the 1% degree of error interpreted that the model is not fit because of the *chi-square* value is large. *Chi-square* value is very sensitive to the magnitude of the sample size (Sharma 1996). With that condition, it is need to further analyze the result by examining the *chi-square/degree of freedom* **(χ^2 / df)** or CMIN/df value. Hair et. al. (1998) and Sharma (1996) stated that a good and recommended CMIN/df value is lessthan 2. Based on data processing result, the CMIN/df value obtained from this research is 1.586. Thus the implemented model is fit.

With other goodness of fit index indicator, it obtained GFI = 0.941, AGFI = 0.921, TLI = 0.934, FI = 929, CFI = 0.936 and RMSEA = 0.040. This could be a hint that this is the best fit value. Steiger (1990) describes that a good value of goodness of fit index will result a covariant structure from an accepted population and the difference among the observed matrix covariant which is also predicted to be accepted. The recapitulation of the calculation result is shown in the following table.

Table 4. 7.The Effect of Exogenous and Endogenous Construct
(Maximum Likelihood Estimation)

Construct effect	Significance	Standardised Regression Weights		
		Direct	Indirect	Amount
IP-KP	0.021	0.724	-	0.724
IP-KT	0.009	0.532	-	0.532
KP-KT	0.012	0.592	-	0.592

The market performance is influenced by market integration. Based on the applied analysis model, at

the 95 percents of trust level, it is directly influences the rice market performance in Indonesia. With the coefficient regression of 0,724, it shows that at each integration change of 1 percent, it will influence the rice market performance of 0,724 percents. The food security is influenced by market integration.

Based on the applied analysis model, at the 95 percents of confident level, the market integration is directly influence the food security in Indonesia, especially rice. With coefficient of 0,532, it shows that each percent of change in the market integration will affect the food stability of 0,532 percents. Explicitly, a better market performance will bring positive impact to the increase of food security. Based on the applied analysis model, at the 95 percents of trust level, the market performance is directly bring positive impact to food security in Indonesia, especially rice as the object in this research. With coefficient regression of 0,592, it shows that each percents of change in market performance will bring impact to food security of about 59,2 percents.

5. Conclusions

Further research should quantify the factors that play a role and carry out economy-wide impact analyses, employing a combination of macro and micro-level tools, and presenting a comprehensive set of indicators that adequately capture broader societal impacts.. This allows policy makers to better target policy and resources, identify complementary policies, and move beyond target-setting to addressing the underlying causes, whereby it is important to consider the whole food supply chain. Supply chain actors could contribute in terms of practical and innovative solutions where they matter most, and feed research and policy makers on the bottlenecks that explain why food losses and waste occur, and their relative importance. The national food security especially rice is influenced by many factors.

The market integration and performance of rice give a significant contribution to the food security condition in the country. The increase of rice price in Indonesia is often occurred, but the movement of market price between two markets is relatively perfect. Therefore, each increasing of price at a certain level of market will immediately change the price in other markets. If the price in the central market is change the price at local market. By using a food availability indicator, it is found that the food security in Indonesia tend to significantly increase, but due to the low of people's purchasing and farmer's exchange value, the farmer's access to the needed food is remained weak, thus the farmers who live in rural areas experience food disruption with vulnerable to food status.

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