Effect on the Formation of Quality Infrastructure for Rice Price

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Rice is a basic commodity for the majority of the Indonesian population. With the characteristics of different regions, there is a surplus and deficit conditions of the commodity that causes the flow of commodities between regions. Road transportation plays an important role in the transport of goods between regions commodities, especially inside the islands.

This study intends to examine the effect of road quality against rice prices in Indonesia. In addition to road conditions, the characteristics of the area are reviewed as well as producing region or not, assuming the surplus area will have a lower price level because transport distances closer. Analysis tool used is the econometric approach, with price as the dependent variable and condition of road infrastructure as well as the characteristics of the area as a regional staple surplus or deficit as the independent variable. The data used are cross section data in the provincial base. The model will be analyzed with a structured approach to Ordinary Least Square (OLS). Model is selected which has the best value of testing by testing first-order test (R^2 value, the value of t).

The results showed that the stable of road infrastructure has a significant role in reducing the cost of delivery of rice compared to unstable conditions, by a margin of Rp1, 988 per km. Stable road infrastructure will also enhance the competitiveness of f the production areas, so as to reduce the price of Rp532,91 per kg compared to Rp275,657 in production areas with road conditions are not stable.

Keywords: quality of roads, stable, prices of rice, surplus deficit

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Abstrak

Beras merupakan bahan pokok bagi sebagian besar penduduk Indonesia. Dengan karakteristik wilayah yang berbeda-beda, maka terjadi kondisi surplus dan defisit dari komoditas tersebut yang menyebabkan terjadinya aliran komoditas antar wilayah. Moda transportasi jalan memegang peranan penting dalam pengangkutan komoditas barang antar wilayah, khususnya yang berada dalam satu pulau.

Kajian ini bermaksud untuk meneliti sejauhmana kualitas jalan berpengaruh terhadap pembentukan harga beras di Indonesia. Selain kondisi jalan, ditinjau juga karakteristik wilayah sebagai daerah penghasil atau tidak, dengan asumsi daerah surplus akan memiliki tingkat harga yang lebih murah karena jarak transportasi yang lebih dekat. Alat analisis yang digunakan adalah dengan pendekatan ekonometrik, dengan harga sebagai variabel tergantung dan kondisi infrastruktur jalan serta karakteristik daerah sebagai daerah surplus atau defisit bahan pokok sebagai variabel bebas. Data yang digunakan adalah data cross section dengan basis data provinsi. Model yang disusun akan dianalisis dengan pendekatan Ordinary Least Square (OLS). Model dipilih yang memiliki nilai pengujian terbaik dengan pengujian first order test (nilai R2, nilai t).

Hasil penelitian menunjukkan bahwa infrastruktur jalan dengan kondisi mantap memiliki peran yang cukup signifikan dalam mengurangi biaya pengiriman beras dibandingkan kondisi tidak mantap, dengan selisih Rp1,988 per km. Infrastruktur jalan dengan kondisi mantap juga akan meningkatkan daya saing wilayah produksi, sehingga mampu menurunkan harga beras sebesar Rp532,91 per kg dibandingkan Rp275,657 pada wilayah produksi dengan kondisi jalan tidak mantap.

Kata kunci: kualitas jalan, mantap, harga beras, surplus defisit

INTRODUCTION

Indonesian rice consumption is the largest in the world. Data from the Ministry of Agriculture showed that the rice consumption per capita in Indonesia in 2012 by an average of 87.235 kg per year , which has gone down year by year such as 93,440 kg (2008) , 91,302 kg (2009) , 90,155 kg (2010) and 89,477 kg (2011). Although an average has decreased1.7 % per year, but the Indonesian rice consumption is nearly 50 % higher than the average world rice consumption which is 60 kg / year. This fact indicates that rice is an important commodity in the socio-economic activities in the community.

In Indonesia diverse of crops be cultivated in the region in terms of rice production, there are some areas such as West Java, Central Java and South Sulawesi are the central productive area. However the areas faced with the small number of supplier and lower sources for efficient production. Thus, there is a necessary of commodities movements in each region in order to meet the satisfied consumption.

The movements require some supports, needless to say, infrastructure and facilities, one of which is significantly improving transportation. The survey by National Origin Destination in 2006 showed that the land freight transport is less than is 45.05 % by two wheel trucks, followed by 10.14 % by three wheel ones and by 3.61 % by trains. The data expressed that transport system on road plays an important role, especially for rice in Indonesia. In spite of this, the condition of road transport has still many problems, for example, poor road network, infrastructure capacity , overloading , congestion and limited notices(Indonesia Infrastructure Initiative , 2012). Which means that the organizations' implications on freight transport is not well cost performances and efficiency.

In this paper, it was calculated taking into account not only infrastructure aspects but also characteristic of rice consumption, producer and consumer in each region. The approach was used with the econometric model. The general formula is as follows:

$$Y = a + b.X_1 + c.X_2 \quad (1)$$

Y = dependent variable of rice price
X1 = independent variable 1, the condition of the national road infrastructure (steady / unsteady)
X2 = free variables 2, the characteristics of the region (the region producing or consumer)
a = constant
b, c = variable coefficient

The approach model is the Ordinary Least Square (OLS) which test first-order one including the coefficient of determination (R2) and significance (t-test). In addition, the model based with the theoretical assumptions.

a. Compared with a long road in each region, the steady one is possible to keep the low cost more than the no-steady one.

b. The characteristics of surplus production is the lower price than the deficit in each region.

Indicator	Unit	Variable	Sources
The price of rice	Rp /kg	Average of household consumption	National Socio-Economic Survey (NSES), 2011
Condition of infrastructure	Km %	- The length of national roads in steady or unsteady conditions	Integrated Road Management Systems, 2011

		-percentage of national roads condition, steady or unsteady	
Characteristics of the area	1 or 0	As a dummy variable, '1' is dummy variable and '0' is dummy variable	- Data from the Ministry of Agriculture rice production - Consumption data from the National Socio-Economic Survey (NSES), 2011

The modeled data about rice and road infrastructure are presented in Appendices 1 and 2.

ANALYSIS

It indicates that the combination of variables provides the drawing model for best results. Furthermore, the variable is commodity prices of rice influenced by road infrastructure. The model is the following table;

Table 2 Models Used

No Model	dependent variable	constants	Independent variable infrastructure	Independent variable characteristics of the region	F	Adj R^2
1	price	6651,899 (0,000)**	Unsteady 2,410 (0,036) **	SD -275,657 (-0,388)	2,974 (0,066) **	0,110
2	price	6689,904 (0,000)**	Steady 0,422 (0,253)	SD -532,910 (0,163)	2,974 (0,066)**	0,011
3	price	6608,427 (0,000)**	Length 0,439 (0,143)	SD -530,688 (0,141)	1,654 (0,208)	0,039
4	price	9239,296 (0,000)	% of Steady -2553,548 (0,206)	SD -206,576 (0,551)	1,347 (0,275)	0,021
5	price	6685.748 (0.000)	% of unsteady 25.535 (0,206)	SD -206.576 (0,551)	1,347 (0,275)	0,021

Source: Results of modeling (2013)
Description:
- Price = price of rice per kg
- Unsteady = length of national roads in unstable condition (km)
- Steady = length of national roads in steady state (km)
- Length = total length of national roads (km)
- Percentage of steady = percentage of national roads in steady state (%)
- Percentage of unsteady = percentage of national roads in unstable conditions (%)
- SD = rice surplus or deficit
-Value in parentheses is the scores of significant level

The significant level (t-test, F) is decided by the base on the evaluation then the model uses 1, 2 and 3 one. Considering the coefficients value of the independent variables, the significant level of infrastructure basing on the theoretical assumption is analyzed to evaluate the logic of sufficient assumption. A relatively the small number of other factors influences the coefficient of determination in the process of the price formation.

RESULT

In general, the models of price formation on the overall road condition are as follows:
Price = 6608.427 -530.688 + 0.439 * length * SD ---------- (2)
This means that per 1 km of road transport gives the price of rice increased by RP0, 439, while the surplus areas are Rp530,688 lower than deficit areas.
In case of unsteady road condition areas, the price formation models are as follows:
Price = 6651.899 -275.657 + 2.410 * length * SD ---------- (3)

The above result suggests that each 1 km by road transport makes the price increase by Rp2, 41, while surplus areas are Rp275, 657 lower compared to deficit areas.

In terms of the models in steady road conditions are as follows:

Price = 6689.904 -532.910 + 0.422 * length * SD---------- (4)

The figures show every 1 km by road transport goes up the cost by RP0, 422. On the other hand the surplus ones are Rp532, 910 lower than deficit ones.

As four model cases taking into account rice price formation, it finds easily the road condition problems. Moreover, the results can be seen at least in two ways:

a. The steady state road can be lower the rice transport per km (2.410 to 0.422) = Rp1,988 each km compared to unsteady one

b. The steady one is possible to increase the competitiveness of production in areas, as indicated by the decline price by Rp532,91 per kg compared to Rp275,657 in production areas where the unsteady road situation is.

However, the modeling results indicate that most of the prices established by variables outside of infrastructure's state and regional characteristics, such as cost of production , post- harvest processing , storage and milling . This is shown by the constant value with a fairly high level of significance (0 %).

CONCLUSION

Some conclusions of the study are;

The solid road infrastructure have significant role in reducing trustworthy delivery costs more than unsteady one, by Rp1,988 per km.

a. The steady progressing of road infrastructure has a significant role in reducing the cost of delivery of rice compared unsteady conditions, by a margin of Rp1, 988 per km. This suggests that improving road quality gives more and more efficiency rice trading in Indonesian.

b. The reliable road infrastructure develops the competitiveness of producers' territory, so as to reduce the price of Rp532 , 91 per kg compared to Rp275 , 657 in unreliable road production areas.

Advice from the study are:

a. The research data can be updated by the long time span, so that the model can be developed on the basis of pooled data which allows the analysis of more complex approaches ;

b. The analysis conducted with second data, so the next step needs more certain one.

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APPENDIX

Appendix 1 Data Production and Consumption of Rice

Province	price (Rp/kg)	Production (ton/year)	consumption (ton/year)	Surplus - Deficit (ton/year)	Code Surplus – Deficit
Nanggroe Aceh Darussalam	7545	962036	605392	356644	1
Sumatera Utara	7532	1820263	1687022	133241	1
Sumatera Barat	8241	1215976	729490	486486	1
Riau	7570	307481	648718	-341237	0
Jambi	6810	368052	393630	-25579	0

Province	price (Rp/kg)	Production (ton/year)	consumption (ton/year)	Surplus - Deficit (ton/year)	Code Surplus – Deficit
Sumatera Selatan	5989	1269641	961323	308318	1
Bengkulu	6712	304226	235869	68358	1
Lampung	6318	1448293	977223	471070	1
Kepulauan Bangka Belitung	7511	12465	158394	-145930	0
Kepulauan Riau	7446	277	180747	-180470	0
Dki Jakarta	7020	0	839118	-839118	0
Jawa Barat	6174	7026437	5415576	1610861	1
Jawa Tengah	5983	6023656	3759363	2264293	1
Di Yogyakarta	6274	525854	360162	165692	1
Jawa Timur	6365	6628321	4653647	1974674	1
Banten	5959	1160068	1251304	-91236	0
Bali	6520	497692	520367	-22675	0
Nusa Tenggara Barat	6014	892439	725092	167347	1
Nusa Tenggara Timur	7095	361038	797332	-436294	0
Kalimantan Barat	7005	768728	652719	116009	1
Kalimantan Tengah	8150	352896	274674	78221	1
Kalimantan Selatan	7317	1175859	458998	716860	1
Kalimantan Timur	7448	237123	380583	-143460	0
Sulawesi Utara	6588	232094	307991	-75897	0
Sulawesi Tengah	6574	463403	344444	118959	1
Sulawesi Selatan	4894	1888852	1118505	770346	1
Sulawesi Tenggara	5419	107057	304604	-197547	0
Gorontalo	5975	97973	153661	-55688	0
Sulawesi Barat	5830	0	179016	-179016	0
Maluku	7513	0	175634	-175634	0
Maluku Utara	8309	0	123424	-123424	0
Papua Barat	6789	0	76635	-76635	0
Papua	9629	15832	312050	-296218	0

Sumber: Kementerian Pertanian; Badan Pusat Statistik, 2011 (diolah)

Appendix 2 Data Quality National Road

Province	Length (km)	IRI average (m/km)	Road conditions (km)				Stability			
			Good	Normal	RR	RB	steady (km)	No steady (km)	Steady(%)	No steady (%)
Nanggroe Aceh Darussalam	1803,35	4,98	755,15	849,12	94,58	104,51	1604,27	199,09	0,89	11,0%
Sumatera Utara	2249,64	4,2	1.378,95	464,68	249,65	156,36	1843,63	406,01	0,82	18,0%
Sumatera Barat	1212,89	4,92	476,84	618,18	90,64	27,24	1095,02	117,88	0,90	9,7%
Riau	1134,47	4,57	598,26	383,92	119,75	32,53	982,18	152,28	0,87	13,4%
Jambi	936,48	4,12	631,83	192,09	98,38	14,18	823,92	112,56	0,88	12,0%
Sumatera Selatan	1444,26	5,25	648,1	615,37	143,63	37,15	1263,47	180,78	0,87	12,5%
Bengkulu	783,87	4,56	418,61	320,65	29,19	15,41	739,26	44,6	0,94	5,7%
Lampung	1159,57	4,53	615,83	465,66	63,16	14,91	1081,49	78,07	0,93	6,7%
Kepulauan Bangka Belitung	509,59	5,02	34,42	458,27	12,9	3,99	492,69	16,89	0,97	3,3%
Kepulauan Riau	334	6,35	215,79	56,21	22,03	39,97	272	62	0,81	18,6%
Dki Jakarta	142,65	5,69	27,48	106,95	7,8	0,42	134,43	8,22	0,94	5,8%
Jawa Barat	1351,13	4,05	806,9	501,45	41,68	1,1	1308,35	42,78	0,97	3,2%
Jawa Tengah	1390,57	4,48	718,06	577,61	79,5	15,41	1295,67	94,91	0,93	6,8%
Di Yogyakarta	223,16	4,3	104,84	112,28	5,02	1,03	217,12	6,05	0,97	2,7%
Jawa Timur	2027,01	4,53	950,48	895,45	143,17	37,9	1845,93	181,07	0,91	8,9%
Banten	476,49	4,72	152,9	271,83	34,67	17,1	424,73	51,77	0,89	10,9%
Bali	535,23	3,45	487,64	45,84	1,75	0	533,48	1,75	1,00	0,3%
Nusa Tenggara Barat	632,17	4,31	361,77	233,07	21,22	16,12	594,84	37,34	0,94	5,9%
Nusa Tenggara Timur	1406,68	4,43	562,61	766,53	34,06	43,48	1329,14	77,54	0,94	5,5%
Kalimantan Barat	1664,55	3,5	1.480,67	112,07	67,41	4,4	1592,74	71,81	0,96	4,3%

Kalimantan Tengah	1714,83	5,97	794,82	662,49	137,96	119,56	1457,31	257,52	0,85	15,0%
Kalimantan Selatan	866,09	3,62	700,32	142,05	17,93	5,78	842,37	23,71	0,97	2,7%
Kalimantan Timur	2118,17	4,03	1.497,17	316,14	133,67	171,18	1813,31	304,85	0,86	14,4%
Sulawesi Utara	1319,23	4,9	607,73	563,76	42,98	104,77	1171,49	147,75	0,89	11,2%
Sulawesi Tengah	2181,95	4,41	1.300,31	652,32	104,63	124,68	1952,63	229,31	0,89	10,5%
Sulawesi Selatan	1722,86	4,14	1.002,41	588,42	74,48	57,55	1590,83	132,03	0,92	7,7%
Sulawesi Tenggara	1397,05	5,49	629,99	372,18	280,78	114,11	1002,17	394,89	0,72	28,3%
Gorontalo	606,7	3,9	426,92	169,66	7,9	2,2	596,58	10,1	0,98	1,7%
Sulawesi Barat	571,98	4,02	443,15	106,39	9,11	13,33	549,54	22,44	0,96	3,9%
Maluku	1066,65	5,23	611,65	212,87	125,17	116,95	824,52	242,12	0,77	22,7%
Maluku Utara	511,89	3,46	405,08	81,12	16	9,68	486,2	25,68	0,95	5,0%
Papua Barat	963,24	9,72	402,64	179,37	56,14	325,08	582,01	381,22	0,60	39,6%
Papua	2111,44	5,16	1.435,88	54,5	502,11	118,95	1490,38	621,06	0,71	29,4%

Sumber: Integrated Road Management Systems, 2011 (diolah)

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