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Marketed Surplus of Indonesian Rice Production

by Amzul Rifin

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Marketed Surplus of Indonesian Rice Production

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ABSTRACT

Indonesian rice production has a positive increasing trend over the years. On the other hand, the rice retail price tends to fluctuate although the country has conducted rice import. One of the reasons can be caused by the fact not all of the rice produced are sold to the market or marketed surplus. The objective of the article is to analyze the marketed surplus of Indonesian rice production and its determinants. The rice farmer's survey conducted by Statistics Indonesia in 2014 is utilized with the total number of respondents of 87,330 farmers all over Indonesia. Heckman two step procedure is utilized in order to tackle the sample selectivity bias. The result indicates that rice marketed surplus in Indonesia was 50 percent, with the highest in Java with 57 percent meanwhile outside Java the marketed surplus was 48 percent. From the variables analyzed, there are three variables that are significant and the sign is consistent among locations. These variables are production, family labor, and own finance. Meanwhile output price has different impact on the three locations.

Keywords: marketed surplus, rice, Indonesia
JEL: Q13, Q12

INTRODUCTION

Rice is a staple food for Indonesian population. Most of the rice produced by smallholder farmers which may sell the rice to the market or keep the rice for consumption or other purposes. Indonesia's rice production has an increasing trend over the years. From 1960 until 2019 in average the rice production increase by 2.4 percent annually (Figure 1). Meanwhile the consumption increases in average by 2.2 percent annually in the same period (Figure 1). In recent years, the domestic consumption exceeds the domestic production causing the government importing rice in order to have buffer stock to avoid price increase.

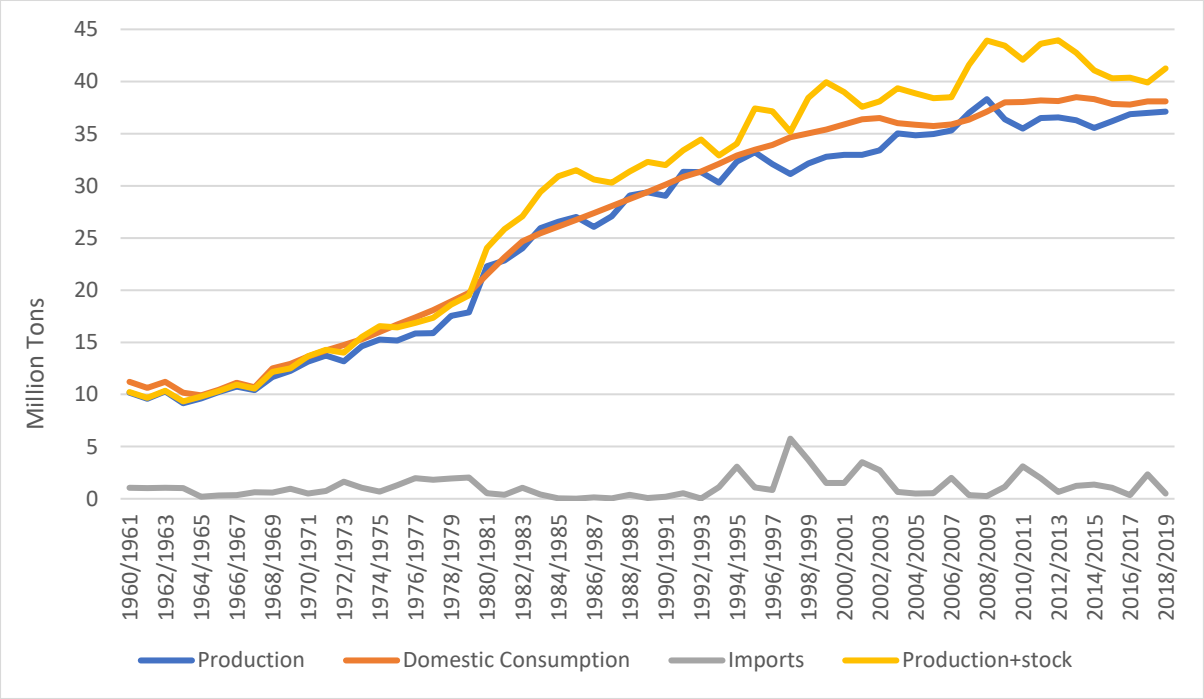


Figure 1. Production, Consumption, Stock and Import of Rice in Indonesia
Source: USDA, 2019

Rice is a commodity which contributes to inflation in Indonesia. Keeping the consumer's price of rice stable is one of the objectives of the government. Although with import has been conducted nevertheless the consumer's price has an increasing trend. From the monthly data from January 2010 until December 2020, the consumer's price increase by average of 0.47 percent monthly (Statistics Indonesia, 2021). The highest increase occurred during 2010 with the average increase of 1.18 percent, meanwhile in 2012 the average price decrease by 0.02 percent (Statistics Indonesia, 2021)

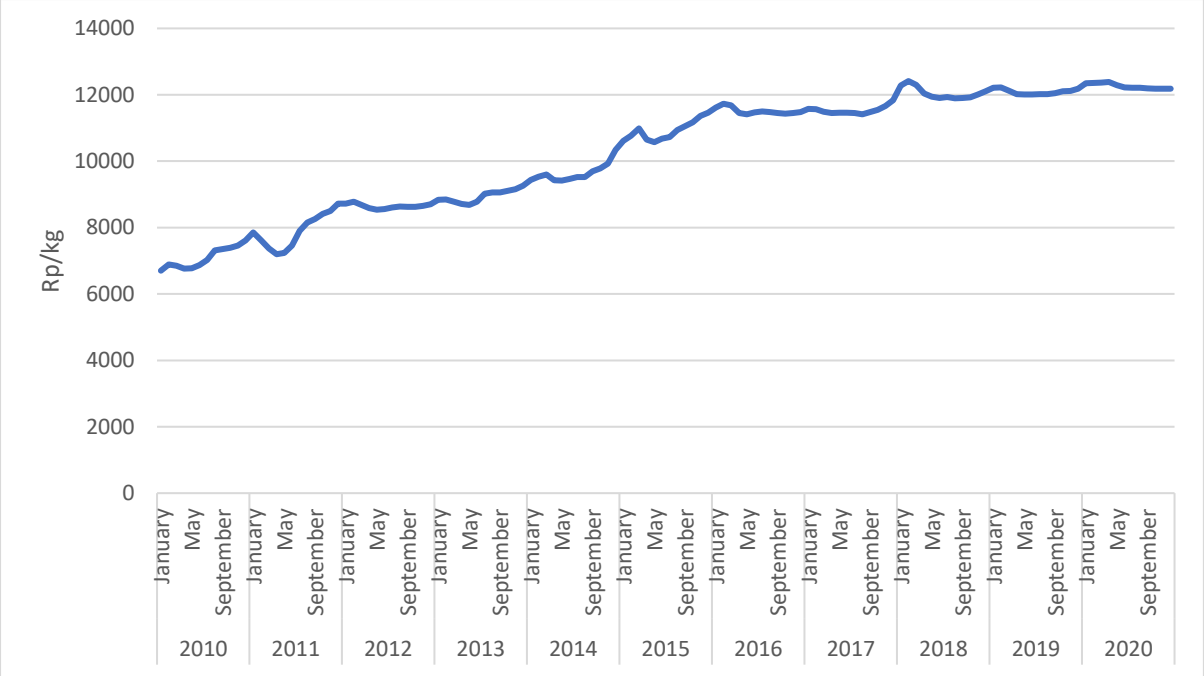


Figure 2. Wholesale Rice Price in Indonesia, January 2010-December 2020
Source: Statistics Indonesia (2021)

One of the reasons that the price still has increasing trend despite rice import is can be caused that not all the production is sold by the farmers or it is called marketed surplus. Marketed surplus is defined as the total quantity of gross output produced by the farming household minus the part used for payments to labor and land owner and for household consumption and other uses or in other words is the quantity sold to the market (Raquibuzzaman, 1966). In the macro level, marketed surplus is important since it indicates supply of product in the market. Assuming that production equals to the amount of product sold in the market can be biased. Therefore, analyzing the amount and determinants of marketed surplus is important to calculate and how to increase the rice supply in the market. The objective of this research is to calculate the amount of rice marketed surplus and analyse the determinants of rice marketed surplus in Indonesia.

LITERATURE REVIEW

Research on marketed or marketable surplus has been conducted since the 1960's. Several authors have constructed the theoretical and empirical framework for marketed and marketable surplus such as the work of Krishna (1962, 1965), Mubyarto (1965), Behrman (1967), Bardhan (1970) Toquero et.al (1975) Chinn (1976). Most of these early research analyze the response of price and output on the marketed and marketable surplus. Strauss

(1985) added not only price and output but also all prices (including wage), household characteristics, farm characteristics, and any exogenous income. Meanwhile Sawit (1993) calculated the elasticity of marketed surplus as a part of a complex household model which involved more than one commodity and more than one season.

Recent research on marketed surplus mostly concerns with the determinants of marketed surplus not only price and output. Abdullah et.al (2019) for the case of Pakistanis rice farmers showed that the determinants of marketed surplus were the gender of the household head, age, number of family member who assist in farming, household size, vocational training, and the farmer being landlord and farm size. In the case of rice farmers in India, Sharma (2016) revealed that price received, access to credit, access to regulated market, farm size, awareness about MSP (minimum support price) is affecting marketed surplus meanwhile family size is not significant. In other area in India, Goyal and Berg (2004) concluded that besides price adjustment, technological improvement and non-price factors are also of critical importance for increasing output supply and, hence, marketed surplus. Kyaw, Ahn and Lee (2018) for the case of rice in Myanmar and using two-step Heckman procedure concluded that the amount of marketed surplus is determined household characteristics such as household head age, education, size, income, livestock ownership, access to roads, distance to market and market information. In addition, it is also affected by the farm characteristics such as rice production, rice price, membership of farmer's organization and access to extension service.

There are three measurements in calculating the marketed surplus. First using the share of product sold to the total production such as used by Nusril et.al (2007), Nusril et.al (2008), Ilham et.al (2010) Sharma (2016). Secondly, using the quantity of sold as a measurement of marketed surplus which is used by Alam and Afruz (2002), Goyal and Berg (2004), Masyhuri and Novia (2014) and Bakari (2018). Using this measurement and with a double log regression, the coefficient will be the elasticity. Lastly using binary variable and calculate the regression using probit or logit. This measurement is conducted by Abdullah et.al (2019).

For the case of Indonesia, Indonesian rice farmers are common to keep the rice produced for their own necessity. Farmers in Indonesia keep their production basically for three reasons. First, farmers still paid hired labor with rice (Ellis et.al, 1992; Nusril et.al, 2007; Ilham et.al, 2010). Farmers paid for the services by allocating or proportion from the production. In Java there two system of payment by production, open and closed (Ellis et.al, 1992). The open system is when the harvest is conducted by only several hired labor meanwhile the open system anyone can participate in harvesting. The close system the proportion between 1:4 until 1:6

meanwhile the close system between 1:9 until 1:10 (Ellis et.al, 1992). The proportion used depends on the availability of labor in the village, the more abundant the labor the less the hired labor received (Ilham et.al, 2010). In some areas, farmers also paid the land rent using harvested rice and some paid input, such as fertilizer, with harvested rice and will be paid after harvest (Nusril et.al, 2007)

Secondly, the rice is used for farming in the coming season as seed. According to the survey conducted by Statistics Indonesia (2014), 50.6 percent of the farmers used their own seed. Lastly, the main objective of farmers keeping their rice is for family consumption (Ellis et.al, 1992; Nusril et.al, 2007; Ilham et.al, 2010). Based on previous research, the share of rice production for consumption varies below 10 percent (Nusril et.al, 2007; Ilham et.al, 2010) but these research mainly on limited area such as village or sub-district. There is also tendency that rice consumption in Java is larger compare to other areas (Ellis et.al, 1992).

Research of marketed surplus in Indonesia is pioneered by the work of Mubyarto (1965). The model postulates that the marketable surplus of rice of the Indonesian farmer is a function of the income and price elasticity of rice production, the income and price elasticity of demand and the output marketing ratio. In recent years, researchers focus more on the determinants of marketed surplus rather than calculating the elasticity. Masyhuri and Novia (2014) for the case in Banyumas conclude that production, seed price, pesticide price, total revenue, food expenditure, land area, farmers's age, number of family members, number of plot and irrigation affected the marketed surplus. Meanwhile for the case in village in Bengkulu province, Sumatra, Nusril et.al (2007) found that production, family members, rice price and land ownership affected the share of product sold to the market. In addition, for the case in one district in Gorontalo province, Sulawesi, Bakari (2018) found that production, off-farm income and farmer's loan is significant affecting marketed surplus. For larger samples, Ilham et.al, (2010) indicate that rice price affected marketed surplus in Java meanwhile family members affected the marketed surplus in household outside Java island.

Most of the research regarding rice marketed surplus in Indonesia only limit in one district or even village except for Ilham et.al (2010) in several locations in Indonesia. In this research, the area covers all over Indonesia with the total number of respondents 82,209 farmers.

THEORETICAL FRAMEWORK

Strauss (1984) defined marketed surplus (MS) as the subtraction between the amount produced (Qp) and the amount consumed (Qc). Therefore, the formula of marketed surplus is as follows:

$MS = Q_p - Q_c$

In order to produce Q_p, farmers need to utilized the available resources available through buying in the market or used its own resource. Therefore, the amount produced (Q_p) will be determined by the price of output (P_y) and price of input (P_x). In addition, it will depend on the farmers farm characteristics (z) and technology (k).

$Qp = f(P_y, P_x, z, k)$

Meanwhile, the amount of product consumed depends on the consumer's food price (P_f), since farmer also act as a net consumer, and farmers household characteristics (h).

$Qc = f(Pf, h)$

Then, the marketed surplus is the function of:

$MS = f(P_y, P_x, P_f, z, k, h)$

METHODS

The data utilized in this research is the Rice Household Survey conducted by Statistics Indonesia in 2014. The data collected is based on the information in 2013. The complete data consists of 87,330 respondents with the coverage of all over Indonesia.

The generalized Heckman two-step model was used for econometric analysis to determine the factors that influence marketed surplus. This procedure corrects sample selection bias from non-randomly sample selected samples (Heckman, 1979). The Heckman two-step model involved the estimation of two equations. Among the two dependent variables, the first dependent variable is whether a household sell their rice to the market or not which is predicted using a probit model or called the market participation equation. The equation is as follows:

$$SSold_i = \alpha_0 + \alpha_1 Age_i + \alpha_2 Educ_i + \alpha_3 Area_i + \alpha_4 Prod_i + \alpha_5 FLab_i + \alpha_6 Price_i + \alpha_7 DSex_i + \alpha_8 DOF_i + \alpha_9 DAid_i + \alpha_{10} DGro_i + \alpha_{11} DLtyp_i + \alpha_{12} DLStat_i + \alpha_{13} DJav_i + \alpha_{14} DSum_i + \varepsilon_i \quad \ldots\ldots (1)$$

In the first equation the dependent variable is in the form of dummy variable where the value equals to one when the farmer sell more than 50 percent of the rice produced and the value equals to zero when the farmer keep more than 50 percent of the rice produced.

Meanwhile the second dependent variable indicates the value sold by the household to the market. In the second equation, the model is solved using ordinary least square (OLS) by adding an inverse Mills ratio (IMR) variable which is calculated from the first equation. The IMR variable controls for the selectivity bias (Heckman, 1979). The equation is as follows:

$$LnSold_i = \beta_0 + \beta_1 LnAge_i + \beta_2 LnEduc_i + \beta_3 LnArea_i + \beta_4 LnProd_i \quad + \beta_5 LnFLab_i + \beta_6 LnPrice_i \quad + \beta_7 DSex_i + \beta_8 DOF_i + \beta_9 DAid_i + \beta_{10} DGro_i + \beta_{11} DLtyp_i + \beta_{12} DLStat_i + \beta_{13} DJav_i + \beta_{14} DSum_i + \beta_{15} IMR_i + \varepsilon_i \ \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \ (2)$$

Where:

LSold = amount of rice sold (kg)

DSold = value of 1when the farmer sells their rice and 0 when farmer keep all their rice

Age = age of farmer (years)

Educ = number of farmer's education year (years)

Area = amound of harvested area (m^2)

Prod = amount of unhusked rice produced (kg)

FLab = amount of family labor (man hour)

Price = price of unhusked rice (Rp/kg)

DSex = dummy of household head (1=man, 0=woman)

DOF = dummy owned finance (1=owned, 0=external)

DAid = dummy government assistance (1=receive assistance, 0=do not receive)

DGro = dummy group member (1=member, 0=non-member)

DLtyp = dummy land type (1=irrigated, 0=non-irrigated)

DLStat = dummy land ownership (1=owned, 0=rent)

DJav = dummy location (1=Java, 0=others)

DSum = dummy location (1=Sumatra, 0=others)

IMR = inverse mills ratio

The independent variables for the two equations are relatively similar only slight difference in the form of logarithmic or not. Production and price are hypothesized to have positive impact on marketed surplus, meanwhile family labor has negative impact. Family labor is the proxy of number of household members. For farmer's age and education can have positive or negative impact for the marketed surplus. For the dummy variables, assistance, group and land ownership are hypothesized to have positive impact on market participation and marketed surplus meanwhile owned finance has negative impact. In addition, land type, land ownership and locations can either have positive or negative impact on market participation and marketed surplus.

These equations will also be calculated for the areas, Java, Sumatra and outside Java and Sumatra islands. Calculating these equations in order to analysed different farmer's behaviour on marketed surplus on the three locations.

CHARACTERISTICS OF RICE MARKETED SURPLUS

Based on the number of households, only 6 percent of the households surveyed sold all their rice in the market meanwhile 27 percent of the households kept all their rice for their own consumption and the other household sell and kept their rice in various percentage (Figure 3). In terms of quantity, 50 percent of the rice produced was sold in the market meanwhile 46 percent was consumed by the household themselves (Figure 4). Compare to other countries, in India the marketed surplus of rice was 78 percent (Sharma, 2016) meanwhile in Bangladesh it depends on the type of rice ranging the marketed surplus from 38 to 57.5 percent (Alam and Afruz, 2002).

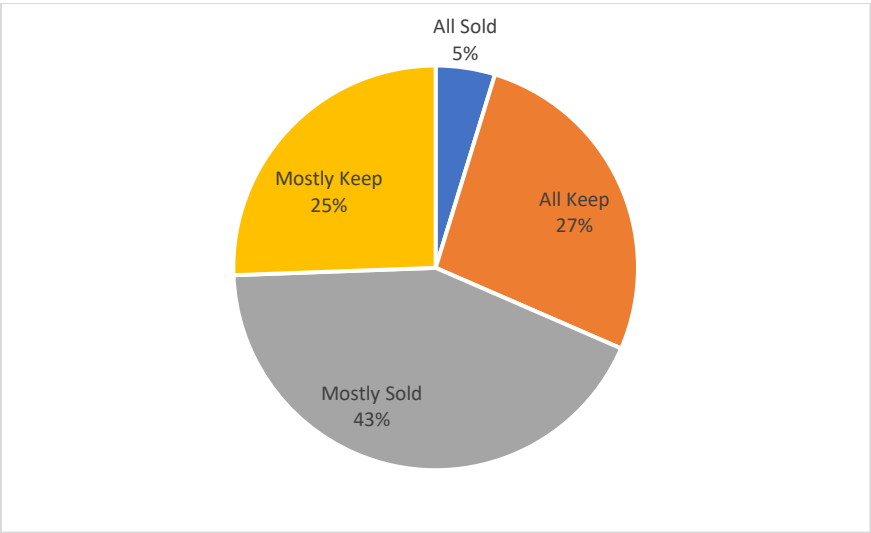


Figure 3. Percentage of Household Selling and Keeping Their Rice Production in Indonesia

Source: Statistics Indonesia (2014)

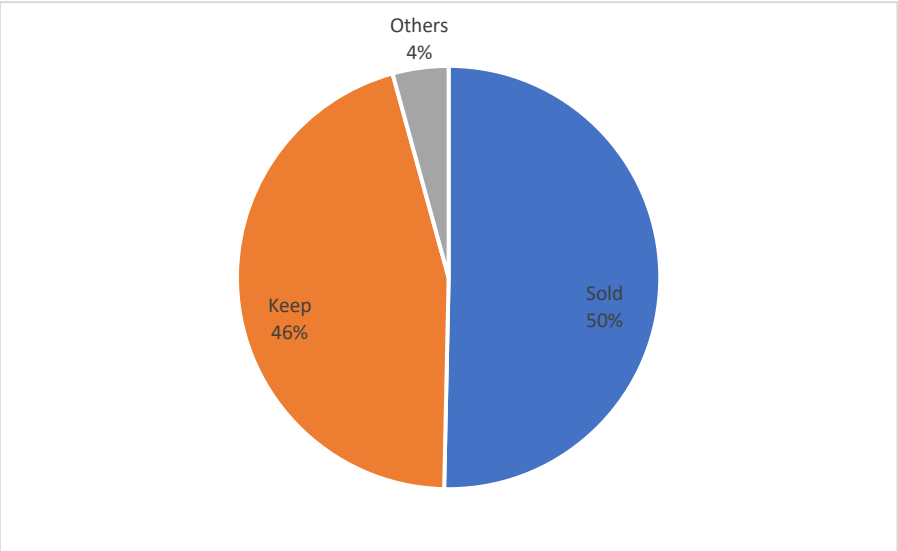


Figure 4. Percentage of Rice Quantity Sold and Kept by Farmers in Indonesia
Source: Statistics Indonesia (2014)

In order to analyse the different behaviour of marketed surplus in different locations, the analysis is break down into three locations, Java, Sumatra and outside Java and Sumatra. Java has the largest percentage of household which sold all the rice (8 percent), meanwhile Sumatra has the largest percentage of household consumed all the rice (29 percent) (Figure 5). The largest percentage of household selling their rice also resembles in the quantity of rice sold in Java, 57 percent of the rice produced in Java was sold to the market meanwhile on the two other locations less than 50 percent are sold to the market (Figure 6). Research by Ilham et.al (2010) the marketed surplus in wet land in Java was 81.85 percent, wet land outside Java 77.04 percent and dry land outside Java the marketed surplus was 76.94 percent. Meanwhile Nusril et.al (2008) for the case in one village in Bengkulu province, Sumatra the rice marketed surplus was 57.38 percent

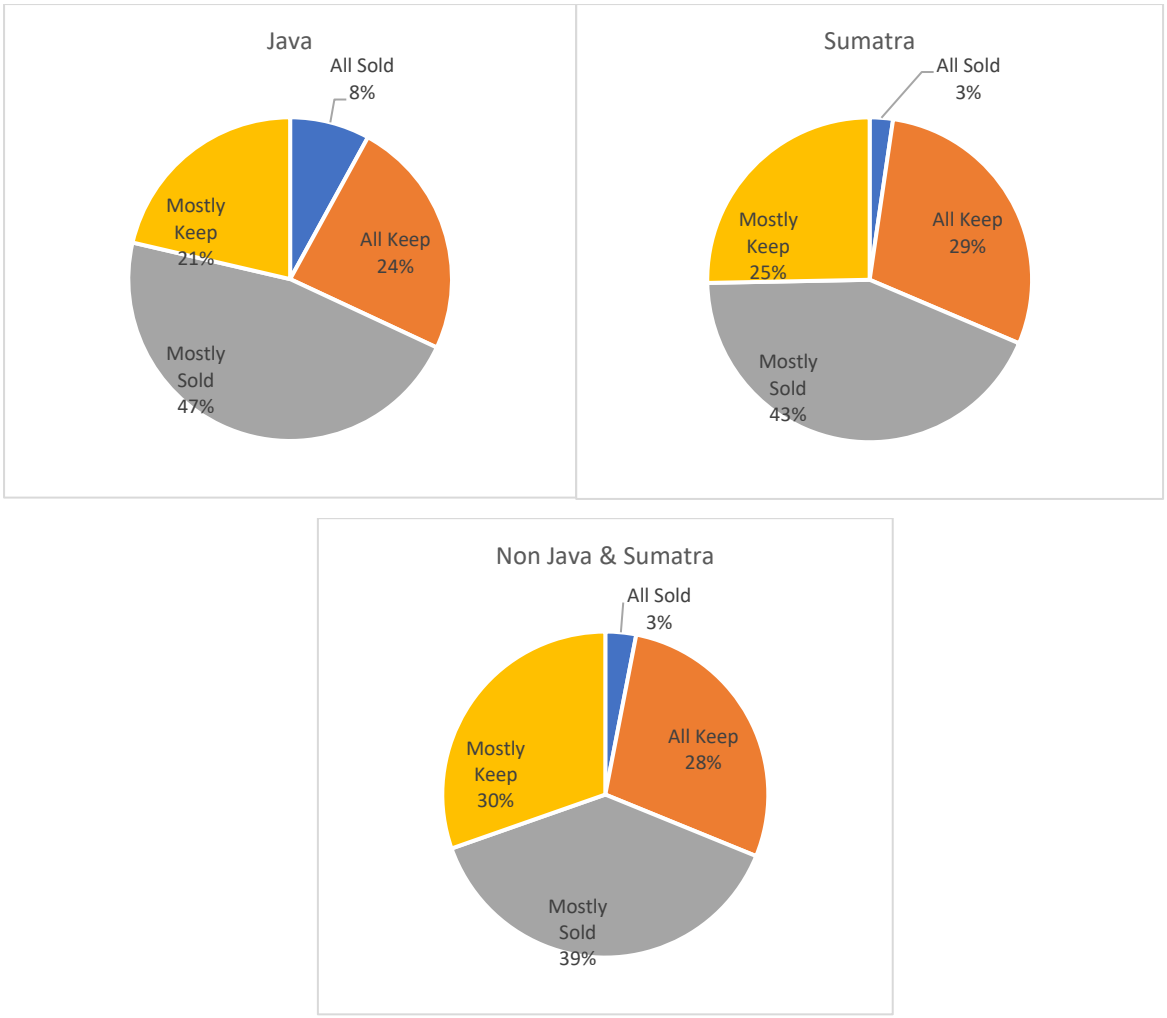
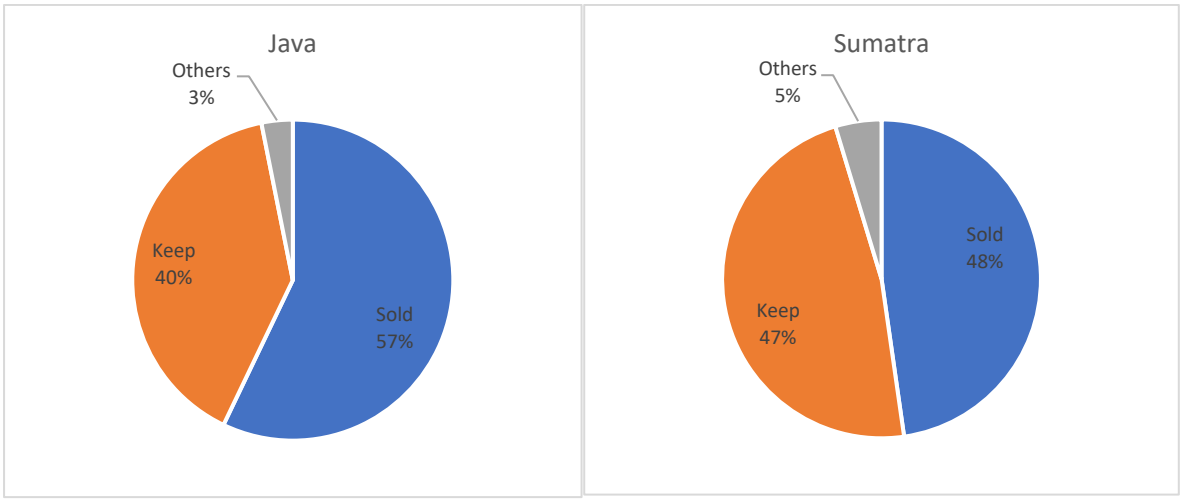


Figure 5. Percentage of Household Selling and Keeping Their Rice Production in Three Locations in Indonesia
Source: Statistics Indonesia (2014)



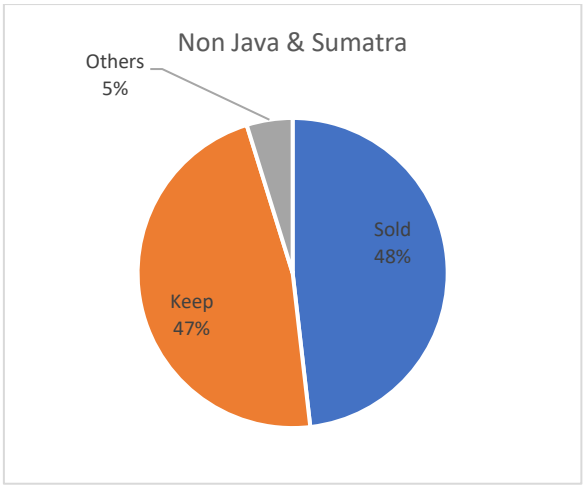


Figure 6. Percentage of Rice Quantity Sold and Kept by Farmers in Three Locations in Indonesia
Source: Statistics Indonesia (2014)

RESULT AND DISCUSSION

The first equation measures the market participation and marketed surplus in the case of Indonesia. From the two-step Heckman procedure, 51,444 farmers are selected in the equation or 62.58 percent of the farmers are selected in the equation in order to avoid the respondent selection bias (Table 1)

Table 1. Equation Results for Market Participation and Marketed Surplus in Indonesia

Variables	Market Participation		Marketed Surplus	
	Coefficient	p-value	Coefficient	p-value
Constant	-0.91 ***	0.00	-2.19 ***	0.00
Age	-0.00 **	0.03	-0.01	0.21
Education	-0.00	0.95	0.00	0.43
Area	0.00 ***	0.00	0.03 ***	0.00
Production	0.00 ***	0.00	1.06 ***	0.00
Family Labor	-0.01 ***	0.00	-0.05 ***	0.00
Price	0.00 ***	0.00	0.14 ***	0.00
Dummy Sex	0.04 ***	0.00	-0.00	0.89
Dummy Owned Finance	0.54 ***	0.00	0.05 ***	0.00
Dummy Aid	0.14 ***	0.00	-0.02 ***	0.00
Dummy Group	0.13 ***	0.00	0.02 ***	0.00
Dummy Land Type	0.33 ***	0.00	0.07 ***	0.00
Dummy Land Status	-0.12 ***	0.00	0.01 **	0.02
Dummy Java	0.39 ***	0.00	0.05 ***	0.00
Dummy Sumatra	0.16 ***	0.00	0.07 ***	0.00
Inverse Mills Ratio (IMR)			-0.44 ***	0.00

Note: ***,**,* significant at 1%, 5% and 10% level, respectively

In the market participation equation, the dependent variable is a dummy variable where 1 is when the farmer sells their rice to the market more than 50 percent and 0 when the farmer keeps the rice more than 50 percent they produced. The result indicates all of the variables are significant except for education. Land area, production and price have positive and significant impact on the decision of farmers to sell their rice although the coefficients are relatively small. Kyaw, Ahn and Lee (2018) also found, in the case of Myanmar, that increase in production will increase the market participation. Meanwhile family labor, as a proxy number of family member, has a negative and significant effect meaning that larger family will make household tend to keep their rice for own consumption. For the dummy variables, the largest coefficient is the owned finance variable indicating that farmer with owned capital has larger probability to sell their rice to the market compare with external finance. Meanwhile for location, farmer

in Java has higher probability to sell their rice in market compare to farmer in outside Java and Sumatra.

For the marketed surplus equation, the result indicates that land area, production and output price have a positive and significant impact on marketed surplus. Production has higher impact compare to price, an increase of one percent in farmer's rice production will increase the rice sold by 1.06 percent meanwhile an increase in one percent of rice price will increase the amount of marketed surplus by only 0.14 percent. This elasticity is relatively low compared found by Sawit (1993) in the case of West Java farmers with the price elasticity of 2.346. Increasing in production can be conducted by increasing productivity or increasing land area and is the most effective in increasing marketed surplus in Indonesia. Based on the data, the average productivity is 2.8 ton/Ha which still can be increased in the future. Meanwhile, increase in producer's price of unhusked rice will have farmers more incentive to sell rather to keep for consuming purposes

Meanwhile for family labor has negative and significant impact on marketed surplus. The family labor variable is the proxy for number of household members which indicates that higher family labor used will decrease the amount the number of unhusked rice sold. Higher number of household members need higher rice consumption, instead of buying the rice from the market, the farmers tend to keep the rice they produced to fulfil the household needs.

For the dummy variables, farmer's with owned finance, belongs to farmer's group, irrigated land, owned land and lived in Java has higher marketed surplus. Farmer belonging to farmer's group and irrigated land are more active farmers and tend to be more commercialize. Meanwhile farmers living in Java has better infrastructure to sell their production or the buyer came to their land.

In order to analyze the market participation and marketed in surplus in three different locations, three pair of equations are calculated. The equations are calculated for Java, Sumatra and outside Java and Sumatra. In Java, for the market participation is relatively similar in the case of significancy and sign. The only difference is on the household characteristics where in Java education has positive and significant impact meanwhile head of household age is not significant (Table 2). Farmers in Java are more well-educated compare to other farmers outside Java.

For the marketed surplus equation, the main difference is the impact of price. In Java, a one percent increase of rice price will decrease the number of rice sold to the market by 0.07 percent. Therefore, in Java an increase in rice price will make household keep their rice for consumption rather selling to the market. Meanwhile the elasticity of production is higher

compare to total Indonesia, in Java an increase of production by one percent will increase the amount of rice sold by 1.12 percent

For the dummy variables, in the case of Java being member of farmer's group do not have any effect on marketed surplus. Meanwhile the effect of irrigation is higher in Java compare to Indonesia. In Java, farmers with irrigation sell 21 percent more their rice to the market compare non-irrigated land farmers, meanwhile the difference in Indonesia is only 7 percent.

Table 2. Equation Results for Market Participation and Marketed Surplus in Java

Variables	Market Participation		Marketed Surplus	
	Coefficient	p-value	Coefficient	p-value
Constant	-0.71 ***	0.00	-0.93 ***	0.00
Age	0.00	0.85	0.00	0.88
Education	0.01 ***	0.00	-0.00	0.43
Area	-0.00 ***	0.00	0.01	0.26
Production	0.00 ***	0.00	1.12 ***	0.00
Family Labor	-0.01 ***	0.00	-0.05 ***	0.00
Price	0.00 ***	0.00	-0.07 ***	0.01
Dummy Sex	0.05 **	0.05	0.02	0.18
Dummy Own Finance	0.65 ***	0.00	0.03 *	0.07
Dummy Aid	0.13 ***	0.00	-0.01	0.31
Dummy Group	0.18 ***	0.00	0.00	0.63
Dummy Land Type	0.40 ***	0.00	0.19 ***	0.00
Dummy Land Status	-0.14 ***	0.00	-0.04 ***	0.02
Inverse Mills Ratio (IMR)			-0.20 ***	0.00

Note: ***,**,* significant at 1%, 5% and 10% level, respectively

The next equation is for Sumatra, rice price variable does not have any significant effect on market participation meanwhile the other variables relatively similar to Indonesia's case (Table 3). For the marketed surplus equation, compare to the other two locations and Indonesia, in Sumatra owned finance variable is the largest with the coefficient of 0.11. This indicates that farmer with own finance sell 12 percent higher rice to the market compare with farmers which

has external finance. Farmers in Sumatra usually own other crops such as estate crops which acted as the cash crop therefore, they do not depend solely on rice for their income.

Table 3. Equation Results for Market Participation and Marketed Surplus in Sumatra

Variables	Market Participation		Marketed Surplus	
	Coefficient	p-value	Coefficient	p-value
Constant	-0.56 ***	0.00	-2.18 ***	0.00
Age	0.00 **	0.03	-0.09 ***	0.00
Education	0.00	0.13	0.00	0.70
Area	-0.00	0.11	0.07 ***	0.00
Production	0.00 ***	0.00	1.07 ***	0.00
Family Labor	-0.01 ***	0.00	-0.06 ***	0.00
Price	0.00	0.66	0.12 ***	0.00
Dummy Sex	0.05 **	0.03	-0.02	0.17
Dummy Own Finance	0.56 ***	0.00	0.11 ***	0.00
Dummy Aid	0.03 *	0.08	0.01	0.16
Dummy Group	0.12 ***	0.00	0.01	0.17
Dummy Land Type	0.32 ***	0.00	-0.00	0.86
Dummy Land Status	-0.08 ***	0.00	0.08 ***	0.00
Inverse Mills Ratio (IMR)			-0.38 ***	0.00

Note: ***,**,* significant at 1%, 5% and 10% level, respectively

The last equation is for outside Java and Sumatra (Table 4). In the market participation equation, is relatively similar with other locations except for outside Java and Sumatra both age and education variables are significant. For the marketed surplus equation, compare to the other two locations the coefficient of rice price is the highest. An increase of one percent in rice price will increase rice sold to the market by 0.23 percent.

Table 4. Equation Results for Market Participation and Marketed Surplus in Outside Java and Sumatra

Variables	Market Participation		Marketed Surplus	
	Coefficient	p-value	Coefficient	p-value
Constant	-0.78 ***	0.00	-2.92 ***	0.00
Age	-0.00 ***	0.00	0.04 **	0.02
Education	-0.01 ***	0.00	0.03 ***	0.01
Area	0.00 ***	0.00	-0.02 *	0.07
Production	0.00 ***	0.00	1.08 ***	0.00
Family Labor	-0.01 ***	0.00	-0.04 ***	0.00
Price	0.00 ***	0.00	0.23 ***	0.00
Dummy Sex	0.04	0.12	-0.02	0.30
Dummy Own Finance	0.50 ***	0.00	0.05 ***	0.00
Dummy Aid	0.25 ***	0.00	-0.05 ***	0.00
Dummy Group	0.08 ***	0.00	0.06 ***	0.17
Dummy Land Type	0.26 ***	0.00	0.05 ***	0.00
Dummy Land Status	-0.15 ***	0.00	-0.01	0.37
Inverse Mills Ratio (IMR)			-0.49 ***	0.00

Note: ***,**,* significant at 1%, 5% and 10% level, respectively

Comparing the three locations, production has positive and significant impact on marketed surplus although the magnitude is relatively small. Meanwhile, family labor has negative and significant impact on marketed surplus. Rice price is also a significant variable on the three locations although the sign is different. In Java, the relation between rice price is negative meanwhile in the other two locations are positive.

For the dummy variables, only own finance is significant and has similar sign in all three locations. Meaning farmers with own finance has higher rice sold to the market compare to farmers with external finance.

From the three equations and three locations, there are three variables that are significant and the impact is consistent in all the locations. These variables are production, family labor and own finance. The impact of production is relatively in marketed surplus equation compare to market participation. It can be inferred that increasing rice production can increase the number of rice sold by farmers who are already selling their rice to the market and

making farmers sell their rice to the market which previously consume all the rice for their family.

Family labor, as a proxy for number of household member, is also consistent for all the equations and locations and the impact is relatively moderate. Higher family labor will decrease the number of rice sold in the market since it will be used for family consumption. On the other hand, the impact of producer's price varies between locations. This indicates that behaviour between locations differ when dealing with change in producer. Therefore, price policy can't be generalized in all the areas in order the increase the marketed surplus of rice. Increasing producer's price will be more effective implemented in areas other than Java rather than Java since it will increase marketed surplus.

CONCLUSION

The amount of rice marketed surplus is 50 percent in Indonesia and between islands have different marketed surplus. Java has the highest marketed surplus with 57 percent, meanwhile in the two other locations the marketed surplus is 48 percent.

Three variables are significant and the sign is consistent in the three locations affecting marketed surplus. These variables are production, family labor, and own finance. Meanwhile output price has different impact on the three locations.

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