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Transaction Costs and The Choice of Red Chili Marketing Channels in West Java-Indonesia

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Abstract: *Farmers have two fundamental selling decisions for their agricultural production (red chili), namely selling on the farm (farmgate) or in the market center (traveling to market). Any decision taken will be charged a transaction fee. The objectives of this study are to identify transaction costs in red chili farming, analyze the factors that influence the selling decisions of red chili and the impact of transaction costs on red chili farming. The respondents of this study were farmer households who grew red chili commodities in Garut Regency. This study used multiple regression analysis, logit analysis and Propensity Score Matching (PSM). The results showed that four variables significantly affected the transaction costs, namely the land area of chili cultivation, the time allocation of non-family labor, the harvesting frequency and the distance from land cultivation to the nearest highway. The variables that significantly affected the farmers' decision one marketing channels in Garut Regency were the allocation of time for price searching, the time allocation for negotiation, the ownership of communication tools, production and transaction costs. The results of PSM analyses showed that the transaction costs affected the performance of red chili farming such as improving income, productivity, and prices received by farmers.*

Keywords: *transaction cost, selling decision, red chili, farm's performance*
JEL Classification: *D23, M31, Q19*

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I. Introduction

There has been a progressive transformation in the agricultural sector recently. Farmers have changed from production to meet household consumption towards creation to sell in the market. Commercialization in this sector requires an increase in the ability of small farmers to participate in the market. Farmers' access to the market is an essential component of market participation (Sebatta et al. 2014) because the market is an important point in the process of agricultural transformation (Siziba et al. 2011). This shift requires the existence of production decisions and input decisions based on profit maximization to strengthen vertical relationships between input markets and output markets (Olwande et al. 2015).

Farmers' understanding of market conditions is necessary since they will earn income from selling their products in the market. According to Abu et al. (2014), the emphasis on increasing access to the market for farmer households has the potential to help small farmers in alleviating their poverty. By encouraging the participation of farmer households in the market, it is expected that farmer households will change their agricultural system from subsistence or semi-commercial to commercial ones. This is supported by Muamba (2001) who argues that farmers will produce agricultural products with comparative advantage.

One of the horticulture plants that has a promising economic value could be developed both in various land conditions and cultivated all the time is the red chili plant (Capsicum L annum). Red chili farming can provide attractive benefits for farmers. However, constant demand and fluctuating prices are the challenges faced by farmers, and thus, farmers must have the ability to manage their farming well.

In Indonesia, almost 70% of chili consumption (red chili, green chili, and cayenne paper) are fresh products both for household and industrial needs. The most prominent use of chili consumption is for household needs. According to Susenas data in Table 1, chili consumption in the period of 2006-2015 is relatively fluctuating but tends to increase from year to year. In that period, the total use of chili per capita household increased at a rate of 4.79% per year (Director General of Horticulture 2016). Of the three types of chili consumed by households in Indonesia, the consumption of red chili is relatively the most abundant followed by cayenne pepper and green chili.

Table 1. The Growth of Chili Consumption for Households in Indonesia

Year	Red Chili	Green Chili	Cayenne Pepper	Total
2006	1.382	0.235	1.168	2.785
2007	1.47	0.302	1.517	3.289
2008	1.549	0.266	1.444	3.259
2009	1.523	0.235	1.288	3.406
2010	1.528	0.256	1.298	3.082
2011	1.497	0.261	1.21	2.968
2012	1.653	0.214	1.403	3.270
2013	1.424	0.198	1.272	2.894
2014	1.622	0.207	1.395	3.224
2015	1.646	0.211	1.416	3.273
Growth (%/th)	2.26	-0.35	2.89	4.798

Source: Director General of Horticulture (2016)

Chili supply in Indonesia is mostly or around 93.8% supplied from domestic production, while the realization of imports is relatively small (Director General of Horticulture 2016). Higher production compared to the imports could be seen from the monthly chili production in Indonesia which tends to fluctuate with similar trends every year. The fluctuation of chili supply is shown by the availability of the red chili in the consumer center (market) which is not spread evenly. The uneven distribution of red chili in the market has made the price of red chili to be very varied. One of the reasons for the uneven distribution is the low productivity of chili which is caused by the cultivation methods that have not been optimal, climate changes, as well as pests and disease attacks.

Various problems faced by farmers in the production of red chili are the reasons for the higher cost of production and transactions. In red chili farming, transaction costs include many dimensions that are tied to a set of norms both formal and informal. The transaction costs for red chili commodities are not only in the input (cultivation) side but also in the output (marketing) side.

In managing their farming, farmers often calculate production costs only. Other costs are difficult to identify but will indirectly increase farming costs and determine the net income received by farmers. These costs are very diverse and ubiquitous. These costs are considered as transaction costs. For small farms, farmers are difficult to identify these costs. Therefore, it is also difficult to calculate the whole total costs. Meanwhile, the transaction costs could influence the production process, the allocation of labor and the expenditure on household consumption (Elly et al. 2015). Transaction costs even can have a negative and significant effect on farm profits.

The transaction cost is not only on the input side but also on the output side. Farm households have to decide where they have to sell their crops. Every farm household has its way of connecting to the market. As a result, they also respond differently to prices. The reasons for this different way of relating to the market are the quantity output produced by farmer households and the transaction costs to the market (Key et al. 2000). Farmers' decision to choose a marketing channel is greatly influenced by the quantity output produced, the cost of production, the prices received by farmers, and the transaction costs. There are two alternatives for marketing agricultural products, namely selling at farm-gate with low price or traveling to the market at a higher rate but with additional transaction costs.

However, it is important to emphasize that when farmers participate in the market, there are higher costs of market exchange or transaction costs. As a result, farmer households are reluctant to participate in the market. Another consideration for farmers' participation in the market is a hidden cost associated with the exchange system in the market (Coase, 1960; Delgado et al. 1999; Holloway et al.2000; Makhura et al. 2001). A higher transaction cost will increase loss for farmer households (Elly et al. 2015). Farmer households will not enter the market when the value of participating is not equal to the cost of the transaction (Sadoulet and de Janvry 1995).

Therefore, it is important to understand further the behavior of farmer households in selecting the market and its impact on their farming. By understanding farmer households' preferences to market under the influence of transaction costs, the basic information will be available. This information could be used to encourage farmers to participate in a more competitive marketing channel. According to those facts, the objectives of this study are to describe factors influencing transaction cost, the impact of transaction cost and other variables to farmer households' marketing channel, as well as the impact of transaction cost to the performance of red chili farming.

II. Framework

Farmer households have to face two fundamental decisions in marketing. First, they can sell their products on the farm, while other is to sell their products on the market. Whatever marketing decision they make, farmers are trying to find the best price by considering the cost of production and profit they will obtain. In their farming activities, farmers usually calculate not only the production cost but also other

costs that sometimes are neglected by farmers. When farmers exchange their products, this means farmers transfer the products from one party to another party either for supplying input or for selling output. This exchange activities lead to the transaction cost.

For small farming, the total cost paid by farmers is difficult to calculate since farmers difficult to identify the costs. Farmers often consider the costs as something usual, and they do not think it as an expense that has to be calculated. These unmeasured costs can be categorized as transaction costs. Although this transaction cost is difficult to identify, this cost of the transaction could increase farming cost and decrease profit, and thus, it could influence the farming's performance.

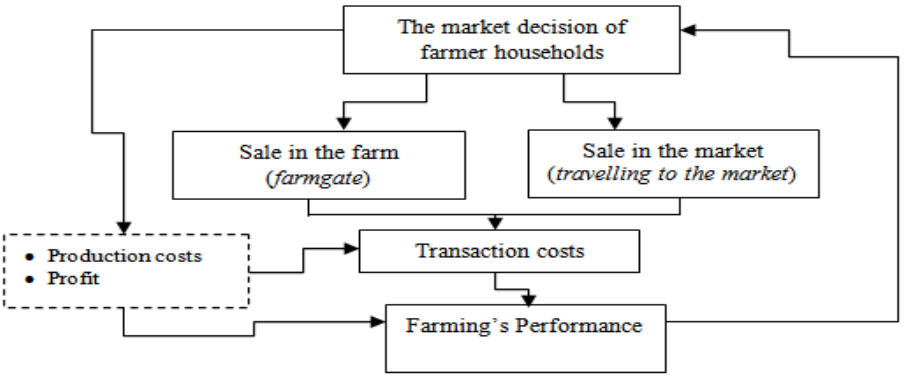

Figure 1. Analytical Framework

III. Methodology

1. Type and Source of Data

This research was conducted in Garut Regency, West Java Province. West Java Province was selected purposively with a consideration that the province was the biggest production center of chili in Indonesia. Garut Regency was chosen since it had the highest share production of chili in West Java. Garut Regency contributed 34.74% of West Java total production or 6.45% of total national production (Director General of Horticulture 2016). The subdistricts and village were also selected purposively according to the highest total output for every subdistrict and village. The selected research area consists of two sub-districts and ten villages. The respondents of this research were farmers who cultivated red chili commodities. The sample respondents selected were 145 farmers.

The type of data used in cross-section data. The data sources are primary and secondary data. Primary data are obtained directly by interviewing respondents who are growing red chili. An organized questionnaire is used as a research instrument. Secondary data are collected from related agencies such as Garut Regency Central Agency for Statistics, Garut Regency Office for Agricultural and Plantation, and others.

2. Data analysis

This study has three objectives that will be answered using different analytic tools. The first objective of this study compiles transaction costs faced by farmer households and other influencing variables using multiple regression analysis. Dependent variable used is the transaction cost in red chili farming (BTC), while independent variables are land area planted with red chili (LC), productivity (YC), working hour of non-family labor (CKL), the harvesting frequency of red chili (FPROD), and distant to the nearest highway (Jroad). The equation model used is as follow:

$$BTC_i = a_0 + a_1 LC + a_2 YC + a_3 CKL + a_4 FPROD + a_5 Jroad + u_i$$

Hypothesis: $a_1, a_2, a_3, a_4 > 0$ and $a_5 < 0$

Where : a_0 = Intercept (constant); $a_1 - a_{10}$ = parameter coefficient for every variable; u_i = error term

Table 2. The Description of Variables Influencing Transaction Cost

No	Variable	Variable's Description	Measurement Unit	Hypothesis
1	LC	The plantation area	Ha	+
2	YC	Productivity	Kg/Ha	+
3	FPROD	Harvest Frequency	times	+
4	CKL	Working Hour for non-Family Labor	Hour/Daily Working Hour (DWH)	+
5	Jroad	Distant from the Plantation to the Nearest Highway	Km	-

The second objective of this study is to analyze the impact of transaction costs and other variables on the selling decision of farmer households by using logit regression analysis. The dependent variable used in the logit regression is the decision of farmer households in selecting the marketing channel (Y).

The independent variables in this study include distant to the nearest market (Jmrkt), the time length for price searching (Tsrch), the time length for negotiating (Tneg), the time length for paying (Tpay), dummy for road condition (Droad), dummy for access to information (Dinf), dummy for mobile phone ownership (DHp), dummy for selling to the same channel (DS), the production of red chili (PRODC) and the transaction cost (BTC). The equation model could be written as follow :

$$Y = b_0 + b_1\,Jmrkt + b_2\,Tsrch + b_3\,Tneg + b_4\,Tpay + b_5\,Droad + b_6\,Dinf + b_7\,DHp + b_8\,DS + b_9\,PRODC + b_{10}\,BTC + U_i$$

Hypotheses : $b_5, b_6, b_7, b_8, b_9 > 0$ and $b_1, b_2, b_3, b_4, b_{10} < 0$

where: b_0 = Intercept (constant); $b_1 - b_{12}$ = parameter coefficient for every variable; u_i = error term

The third objective of this study is to analyze the impact of transaction cost to the performance of red chili farming in Garut Regency, West Java. The farming performance examined includes: (1) Income from red chili farming (IC); (2) Income from non-red chili farming (INC); (3) Total Household Income (IRT); (4) The red chili price (HC); (4) Productivity (YC); (5) the working hour of family labor (CKD); (6) the working hour of non-family labor (CKL). A logistic regression model with Propensity Score Matching (PSM) approach is used to analyze the impact of transaction cost to the performance of red chili farming.

Table 3. The Description of Variables Influencing Marketing Channel Selection

No	Variables	Description of Variables	Measurement Unit	Hypothesis
1	Y	Marketing Chanel	1 = market 0 = farmgateor others	
2	Jmkrt	Distant to the nearest market	year	
3	Tsrch	The time length for price searching	day	-
4	Tneg	The time spent on negotiating	hour	-
5	Tpay	The time length for paying	day	-
6	Droad	Dummy for road condition	1 = good, 0 = bad	+
7	Dinf	Dummy for access to information	1= easy, 0 = difficult	+
8	DHp	Dummy for cell phone ownership	1 = own 0 = none	+
9	DS	Dummy to the same marketing channel	1 = yes 0 = no	+
10	BTC	The transaction cost	IDR/year	-

IV. Results and Discussion

1. The characteristic of farmer households

The statistic description of farmer households' characteristics is useful to describe the condition of farmer households who plant red chili and their involvement in farming.

Of 145 farmer households taken as respondents, 91 farmer households sell their products on the farm (farmgate), while the remaining 54 households sell their products to the market (traveling to market). According to the research's result, the characteristics of farmer households who sell their products on the farm and in the market are almost similar.

Table 4 shows that farmer respondents generally are categorized as productive or in the productive age. It is expected that younger farmers will have a better bargaining position compared to the older ones. According to their education level, the majority of farmer respondents have a lower education level. Meanwhile, the education level will indirectly influence farmers' mindset in selling decisions. The farming experience will also influence farmers' knowledge and skills in managing their farming. Marketing experience will lead farmers to be credible and knowledgeable in a bargaining position.

The number of family members could give a positive or negative impact on farmer households. The number of family members could be a source of labor for farming activity. Large family size is expected to increase the ability of farmers to participate in the market, and it will decrease transaction cost proportionally. On the other hand, the larger the number of a family members, the expenses for consumption are getting bigger.

Income obtained from the agricultural activity is expected to decrease the cost spent on transactions proportionally in market participation decisions. Farmer households who sell their products in the market will obtain higher income compared to farmer households who sell it on the farm. Higher-income received by farmers who sell their products on the market is reasonable since farmers who sell their products in the market will receive a higher price.

Table 4. The Characteristic Description of Farmer Households according to their Selling Decision

No	The Characteristic of Farmer Households	Selling on the farm (farmgate)		Selling in the market (traveling to market)		lag	T-test
		Mean	Std. Dev	Mean	Std. Dev		
1	The age of Head Household (year)	46.02	12.51	43.33	11.18	2.68	0.1956
2	The Age of Housewife (year)	41.14	10.89	38.25	11.71	2.88	0.1362
3	The education level of head of household (year)	8.39	3.29	8.88	3.31	-0.49	0.3859
4	The education level of a housewife (year)	7.84	2.91	8.93	3.30	-1.09	0.0399
5	Farming experience (year)	14.15	11.51	15.20	10.14	-1.05	0.5803
6	The number of family members)	3.92	1.73	4.18	1.50	-0.26	0.3574
7	The number of the family member involved in the farming activity (people)	2.12	1.10	1.72	0.94	0.39	0.0281
8	Distant from the land to the nearest road (Jroad)	1.15	1.13	1.44	1.45	-0.29	0.0870
9	Distant to the nearest market (Jmkrt)	4.28	2.19	4.23	2.53	0.44	0.5449
10	The land area (ha)	0.42	0.37	0.65	0.55	-0.23	0.0018
11	Production (kg/ha/yr)	4.102	6.624	12.235	13.030	-8.133	0.0000
12	Productivity (kg/yr)	12.481	13.521	30.940	68.401	-18.458	0.0068
13	Price at the farmer level (IDR)	11.137	7.458	13.518	13.024	-2.381	0.0817
14	Farming Income (Million IDR/year)	32.500	44.000	84.600	129.000	-52.100	0.0003

2. Transaction Cost Analysis in Red Chili Farming

According to previous research results, the higher transaction cost is suspected to influence farmers' participation in exchange activity. More upper or lower transaction cost in the exchange activity is very much affected by farming scale as well as other determinant variables.

By understanding variables that could determine higher or lower transaction costs in red chili farming, it is expected that it will be able to provide input in policy-making to reduce the actual transaction costs. By using multiple regression analysis, four variables significantly influence the transaction cost, such as the land area of chili cultivation (LC), the working hour of the non-family member (CKL), harvest frequency (FPROD) and distant from the land to the nearest road (Jroad). The result estimation of multiple regression analysis to analyze transaction cost and other determinant variables could be seen in Table 5.

Table 5. The Result Estimation of Transaction Cost Model in Red Chili Farming

Variable	Coefficient	Standard Errors	t-value	P > |t|
Land area of cultivation (LC)	10.8168.6	25571.95	4.23	0.000
Chili Productivity (YC)	-0.0023	0.1581	-0.01	0.988
The working hour of non-family member (CKL)	83.1368	28.2985	2.94	0.004
Harvest Frequency (FPROD)	4094.01	1609.423	2.54	0.012
Distant from land to the nearest road (Jroad)	-24863.56	7572.25	-3.28	0.001
Constant	408745.2	33774.39	12.10	0.000

The research results in Table 5 indicate the value of F(5,139) at 11.65. The value of F means the number of variables tested is around5 (five) and the number of observations minus the number of variables around 139 (145-6). The probability value > F = 0.0000 is smaller than α (α=5%) which indicates the influence of all independent variables and the significant impact of those independent variables to the transaction cost. Furthermore, those variables have been through the heteroscedasticity test, and it is found that the p-value is higher than 0.05, and thus, it could be concluded that the regression model has been free from the symptom of heteroscedasticity. In other words, the model has homoscedasticity.

The estimation of factors influencing transaction costs leads to the conclusion that factors affecting significantly to transaction costs are the land area for cultivation, the working hour of non-family labor, harvest frequency, and distant from the land to the nearest road. The working hour variable has a

strong relationship with the harvesting frequency of red chili. The higher the harvesting frequency will increase the working hour of non-family labor. The distance from the plantation to the nearest road had a negative sign and influenced transaction cost significantly. The closer the distance from the land cultivation to the nearest road, the transaction cost per unit will increase.

3. The Analysis of Transaction Cost to Selling Decision of Red Chili

The result estimation using the logit model analysis could be seen in Table 6. Table 6 shows the impact of transaction cost variables on the selling decision of red chili in Garut Regency, West Java. The dependent variable in this research is a dummy variable with the value of 1 when farmers are selling their products to market (traveling to market) and the value of 0 when farmer households selling their products on the farm (farmgate).

The goodness of fit could be measured by using the value of X2. The value shows that the explanatory variables in the model could explain very well on farmers' decision to participate in the market. According to the estimation result, it shows that the probability value of X_2 is around 0.0000. The probability value indicates the ability of all independent variables to influence the dependent variable significantly. In other words, this model could be categorized as a good model. The value of pseudo R2is 0.2233. It explains that the model could only represent 22,33% of farmers' behavior to participate in the market.

In general, there are five variables of transaction cost that significantly influence the participation of farmers in the market in Garut Regency. Those variables are the price searching period (Tsrch), negotiation period (Tneg), cellphone ownerships (DHp), production (PRODC) and transaction cost (BTC).

The price searching period has negative and significantly influenced the selling decision of farmer households. The negative sign indicates the longer the period for price searching, the farmers' opportunity to sell in the market will be smaller. The time spent for price searching indicates the difficulty in accessing the information in the region.

Table 6. The Estimation Result of Red Chili Selling Decision Model

Variable	Coefficient	Standard Errors	z-value	P > |z|	Odss Ratio
Distant to the nearest market (Jmrkt)	-0.0377	0.0900	-0.42	0.675	0.963
Price searching period (Tsrch)	-0.4638	0.2471	-1.88	0.061	0.628
Negotiation period (Tneg)	-1.8807	1.0839	-1.74	0.083	0.152
Payment Period (Tpay)	-0.3604	0.4325	-0.83	0.405	0.697
Dummy for road condition (Droad)	0.4388	0.4168	1.05	0.293	1.551
Dummy to access of information (Dinf)	0.4659	0.8477	0.55	0.583	1.593
Dummy of cellphone ownership (DHp)	1.8879	0.7006	2.69	0.007	6.605
Dummy of similar selling network (DS)	0.2739	0.47512	0.58	0.564	1.315
Chili Production (PRODC)	0.0001	0.0000	4.10	0.000	1.000
Transaction Cost (BTC)	-0.0000	0.0000	-2.40	0.016	0.999
Constant	2.6837	1.8234	1.47	0.141	14.638
Number of Obs	145		LR Chi^2 (10)	42.75	
Prob > chi2	0.0000		Pseudo R^2	0.2233	

The time spent to negotiate has a negative and significant influenced on selling decisions. When carrying out an exchange or transaction, there are negotiation costs, namely the expenses incurred in the agreement to make a sale. This variable is closely related to the theory of imperfect individual rationality. According to this perspective, one's preference for making a decision is incomplete, and someone tends to make decision changes from time to time. Williamson (1975) consistently emphasizes the importance of transaction cost in economic relations which is to deal with the limitations of rationality in decision making due to the existence of opportunistic behaviors.

In the transaction cost component, negotiation costs are one of the expenses incurred when an agreement is made by each business actor involved in a transaction activity (Williamson 1989). The other research, have seen the component of negotiation costs as the highest component of transaction costs compared to other parts. This is also in line with the findings of Maina et al. (2015) which states that negotiation time significantly influences marketing channel selection and increased negotiation time will increase marketing channels through local traders and decrease direct sales to the market.

The communication device ownership has a positive sign and has a significant effect on the sales decision of red chili. The mobile property has a positive, and it can be said that ownership of communication devices (HP) in farm households provides a more significant opportunity for farm households to be able to participate in the market. The use of cellphones has an essential effect on farmer households' market participation behavior. Chowdhury (2002), through his study on market information access in Bangladesh, has found that access to information tends to improve skills in making decisions. Skills in decision making will

influence the opportunities for market participants because information never decreases the expected utility (Nicholson 1992). Therefore, the more market information that is owned by farmer households will reduce transaction costs, and ultimately increase market participation.

Production has a positive and significant sign on the decision to sell red chili in Garut Regency. The higher the output of red chili, the chances of farmers to sell directly to the market will increase. Increased production can be done by increasing land productivity. Additionally, production is also closely related to the area of arable land, where the area of arable land is increasingly widespread, the amount of production will also increase, and thus, it will affect the profits of farming.

According to the estimation results, the calculation of transaction costs gives a negative sign and has a significant effect on the sales decision of red chili. The negative sign means that the higher the transaction costs will reduce the participation of farmer households in the market. Alene et al. (2007) state that the higher transaction cost in maize farming will cause low participation of farmers in the market.

Additionally, a higher transaction cost will also influence profits obtained by farmer households. Transaction costs are costs that are able to create uncertainty. The uncertainty factor of transaction costs could decrease the incentives that will be obtained by farmers. As a result, farmers tend to choose a safe strategy by conducting transactions with low costs, but with a lower selling price than the market. Higher transaction costs have motivated farmers to sell their products on the farm (farmgate) to brokers with cheaper transaction costs. Although farmers will receive a higher price when they sell directly to the market, farmers will remain selling on the farm to avoid the risk of market uncertainty.

4. The Impact of Transaction Cost to Red Chili Farming Performance

The farmer households' decision to participate in the market will have an impact on their farming performance. The improvement of red chili farming performance could be made by minimizing the transaction costs faced by every farm households in red chili farming activity. The impact treatment could be measured by dividing into two groups, namely the treatment group and the control group. The treatment group in this study is farmer households that sell to the market (traveling to market) while those included in the control group are farmer households that trade in the farm (farmgate). The impact of transaction costs on the performance of red chili farming can be seen in Table 7.

Table 7. The Impact of Transaction Cost to Red Chili Farming Performance

Variables	Sample	Coefficient	Standard Error	p>|z|	Percentage
Red Chili Income (IC)	ATET	3.43e+07	1.57e+07	0.029	55
Red Chili Productivity (YC)	ATET	13940.88	8182.079	0.088	16
Red Chili Price (HC)	ATET	1481.481	676.9966	0.029	63
Non-chili Income (INC)	ATET	-2.56e+07	3.26e+07	0.432	42
Total Income of Households (IRT)	ATET	3.91e+07	2.82e+07	0.166	37
The Working Hour of Family Labor (CKD)	ATET	-25.41667	38.9272	0.514	9
The Working Hour of Non-Family Labor (CKL)	ATET	95.83333	102.3699	0.349	10

Note : ATET = average treatment effects on treated

In Table 7, it could be seen that the impact of transaction cost to farming performance could be analyzed using the Propensity Score Matching (PSM) approach through two steps, teffects psmatch and psmatch (Cerulli 2015, Widhiyanto 2018). According to the table, there is no possibility of bias. Variables used as a covariate in the matching procedure are the same variables used in the regression for selling decisions (market participation).

Those variables are distant to the nearest market (Jmrkt), price searching period (Tsrch), negotiation period (Tneg), payment duration (Tpay), dummy for road condition (Droad), dummy to access of information (Dinf), dummy for mobile ownerships (DHp), dummy for the same selling network (DS), chili production (PRODC) and transaction cost (BTC).

Farming performance arising from market choice decisions is measured using PSM with the nearest neighbor matching with no replacement method. This method will match the value of the closest propensity of each treatment group respondent (selling o the market) with a control group (selling on the farm) with a single match. This matching will give the average treatment on treated value (ATT/ATET). ATT or ATET is the difference between the treatment group and the control group. The difference in the performance of the treatment group and the control group was calculated using the psmatch2 and teaffects psmatch method on the Stata 13 program as was done in the Widhiyanto (2018).

By comparing the value of ATT and ATET using both methods, it finds that both approaches have given similar results for all performance variables. Therefore, the effects on the impact of transaction cost on the performance of red chili farming are valid.

V. Conclusion

According to the research results previously mentioned, it could be concluded that transaction cost in red chili farming is influenced by land area planted by chili, the working hour of non-family labor, the harvesting frequency of chili, and the distance of the plantation to the nearest road. The selling decision of red chili is influenced by the duration of price searching, the time needed to negotiate, cellphone ownership, production and transaction cost. According to the result on the impact of transaction costs to red chili farming performance, it indicates that to decrease transaction cost, farmers try to raise their performance by increasing their income from red chili farming, productivity, prices received, and total revenue.

The existence of transaction costs could limit the participation of farmer households in the market. Therefore, farmers need to be educated to increase their awareness of transaction costs. By increasing farmers' ability to identify transaction costs in red chili farming, it is expected that farmers could decline the transaction cost by increasing red chili farming performance. This research is expected to rise the new policy issues that could decrease the transaction cost, and thus, it could increase farmers' access to the market which is more competitive.

VI. Policy recommendations

This research raises new policy issues which, if considered, are possible to reduce fixed and proportional transaction costs, particularly by increasing access to market information facilities for farmers. The results of this study also support the results of previous studies that the existence of transaction costs limits farmers' market participation. While transaction costs are difficult to measure, understanding their impact on farmers' behavior is very important because it can inform the design of policies aimed at reducing the high transaction costs.

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