# Determinant of Rent Value of Shallot Agriculture in Sub-District Brebes, Indonesia

Yenni Khristiana
Yosephine Angelina Yulia
Lukman Ahmad Imron Pahlevi

School of Economics Sciense, Adi Unggul Bhirawa (AUB), Surakarta, Indonesia

**Abstract**. This research aims to analyze the factors influencing rent value in Subdistrict of Brebes, Indonesia. The factors influence rent value are wide land, productivity, distance to urban center, and facility of irigation. Cross section data used land rent this research come from purposed sampling on agriculture shallot area in subdistrict of Brebes. There are 60 samples used land rent of this research. Analysis method for the current study is regression analysis aimed to find out the factors that influence the agriculture ground rent value. The result of the research showed that wide land, productivity, distance to urban center, and facility of irigation, have significant influence to ground rent value in Subdistrict of Brebes.

**Key words**: land value, rent value, shallot agriculture.

## Introduction

The capitalization rate is a quantity used to convert the income generated by a property to the value of the property (Fathullah and Karseno, 2004: 43; Gujarati, 1998: 67-73). The capitalization rate is the ratio between the net income generated from a property and its property value. Therefore, if the property market value and the level of capitalism are known, a reasonable property rental value can be determined. Knowledge of property capitalization levels will be very helpful in making property investment decisions, especially in the agricultural land sector, because agricultural land is the most dominant and most frequently traded property type.

Agricultural land is one of the factors relied on in generating income. This type of crop commodity is one of the factors that will affect the rent value of agricultural land. Assessment in determining the selling value of agricultural land tax objects so far uses a comparison approach to market data and only based on the location and physical factors without seeing the potential that can be produced. Other assessments of agricultural land are also often carried out for the purpose of loan credit guarantees. This assessment also still uses a market data comparison approach. As a result of this assessment, there is often a value below or above the market value. The main varieties of modern technologies and principles of work which are used in agriculture are considered a moment. The modern market of agricultural technologies in East Europe such Ukraine and the agro-industrial complex as a whole are also analyzed (Dubovskyi, 2018).

The ability of investment in generating profits. The tendency of granting of credit funds according to the sectors of the economy is considered and the dynamics of loans issued according to maturities are analyzed (Syniuta, 2018), especially in the property sector can be seen by looking at the potential value of agricultural land which is reflected in the pattern of income flows. Baum and Mackmin (1989: 74-75) argue that property value is a function of the expected income from the property. The higher the farm land to generate income, the higher the value. Payment of agricultural land income shows the return of economic value which is a net surplus of the total value of the product which exceeds the costs incurred for production.

Horticultural plants are one of the priorities in development in the Brebes area, given that the agricultural sector in the broadest sense and horticultural crops in particular, contribute to the formation of the Brebes economy. Subdistrict Brebes is the largest red onion commodity producing region in Indonesia, reaching 30% of the need (Keputusan Direktorat Jendral Pajak Nomor, 2000), seeing that potential will attract investors to invest in agricultural land, especially shallot farming in the Brebes area. The following is the data of land area and productivity of shallots.

Table 1. The percentage of the total area of agricultural land in Subdistrict Brebes

| Year | Productivity (KW/HA) | Land Area Shallot Agricultur (Ha) | Land Area Agriculture (Ha) | Procentase Use Area (Ha) | Average Production /(Ha) |
|---|---|---|---|---|---|
| 2010 | 565474,0 | 5915,0 | 15.822,0 | 37% | 95,6 |
| 2011 | 352488,0 | 4886,0 | 14.559,0 | 33% | 72,1 |
| 2012 | 495576,0 | 4984,0 | 12.676,0 | 39% | 99,4 |
| 2013 | 476652,0 | 4467,0 | 12.729,0 | 35% | 106,7 |
| 2014 | 373276,0 | 3744,0 | 14.495,0 | 25% | 99,7 |
| 2015 | 352840,0 | 4033,0 | 14.440,0 | 27% | 87,5 |
| 2016 | 271966,0 | 3332,0 | 12.308,0 | 27% | 81,6 |

The data above (Table 1) demonstrate a decrease in productivity and area of shallot agriculture in Subdistrict Brebes, a decrease in productivity can affect the value of agricultural land rent because investors tend to ignore investing due to low productivity but the value of high agricultural land is also better. To see whether the agricultural land has the potential or not, information about capitalization is needed. The decision to invest in agricultural land property can be seen from the amount of capitalization that can be produced by the agricultural property.

The main problem that drew this research was the tendency of a decrease in productivity and the area of shallot agriculture. Is this decrease in land area and productivity due to the level of capitalization of shallot agriculture not attractive to investors. With the study of capitalization level analysis, the results can be used as a consideration for investors in agriculture, especially onion farming. This research will emphasize on the level of land capitalization of agricultural value and analysis of the relationship between capitalization levels and factors that affect the rent value.

**Theoretical Framework and Research Models**

Rent value is a basic land  rent represents potential net income that can be generated by agricultural land. Agricultural land rent is a residual economic surplus and as part of the total value of the product or total income after deducting the payment of the total cost to produce (Hidayati and Harjanto, 2003; Siregar, 2014).

The income approach is a standard valuation approach based on annual net income received from the property. The value of agricultural land actually reflects the value of land use as agricultural land rather than market value and land cultivators will try to maximize the use of agricultural land. Based on the theory of capitalization, to convert income flow into a value property then a certain level of capitalization is needed. Agricultural land that has higher productivity will have the ability to generate rent value so the  capitalism rate will also be higher (Rahman, 2010: 957-964; Nurlaela and Pamungkas, 2014: 96-105).

The direct capitalization of property values (V0) can be obtained by dividing annual net income (I0) with the overall capitalization rate (R0). In theory, ultimately it must meet at one market value for one property at a certain time (Akerson, 2003: 31).

$$V_0 = \frac{I_0}{R_0}$$

At yield capitalization, the appraiser analyzes market data to determine the capitalization rate which is then applied to the revenue flow that will be received to obtain the market value of the revenue flow. The general form of this model is:

$$V = \frac{I_1}{1+Y} + \frac{I_2}{(1+Y)^2} + \frac{I_3}{(1+Y)^3} + ..... + \frac{I_n}{(1+Y)^n}$$

*Note:*
V= Property Value
I= Income/nett operational income
Y= Yield/Pendiskon Factor
n= Number of Periods

The capitalization rate is the ratio between net income generated from a property and its property value. In the practice of valuing property with an income approach, the capitalization rate is used to convert the income generated by a property into a property value. Martin and Sussman (1997: 149-155) have developed an overall capitalization level, namely:

$$R_0 = (MxR_M) + (1-M)Y_E - MxP.1/S_n - \Delta_0.1/S_n$$

Basic rent land can be capitalized by an appropriate capitalization rate to obtain the estimates of the market value of the land. The capitalization rate derived from the market used to convert a basic rental of land per year with the appropriate capitalization. The results of the capitalization show the estimated land value (Harjanto, 2006), the value of land through this method is formulated as follows.

$$LV = \frac{GRV}{R_0}$$

$$R_0 = \frac{GRV}{LV}$$

*Note:*
LV: Land Value
GRV: Basic Land Rent
Ro: Capitalization Rate

Factors that influence rental income can be divided into 3 groups, namely location factors, physical property factors and external factors. Location factors may include

access to the highway, access to public transportation, proximity to public service facilities. Physical factors can include land area, building area, land forms, building form, the width of the front side, the quality of buildings, age of the building. External factors include economic, social, political, legal, and governmental situations that will influence the state of property.

The framework is exploited in a model research. The model is everything that is constructed through specific parameters that are measured both in structure, form, content, number, and meaning with all limitations (Husain, 2019). The research model is formulated as follows (Fig. 1):

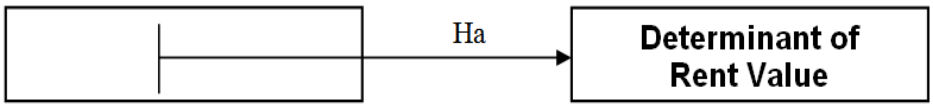


Fig. 1. Simulation Research Model

The simulation research model is compute to the following hypothesis:

$H_0$, Surface Area (LT); Distance to CBD (JR); Productivity (PD); and *Dummy Irrigation* (DIR) each is no influence onto the determinant of Rent Value.

$H_a$, Surface Area (LT); Distance to CBD (JR); Productivity (PD); and *Dummy Irrigation* (DIR) each is influence onto the determinant of Rent Value.

**Methodology**

Regression analysis is used to determine the factors that influence the value of rent. the completion of the model using Eviews 3.0 program to generate an output which can then be formed regression equation. The model for testing the effect of land area (LT), productivity (PD), distance of CBD (JR), availability of dummy irrigation (DIR) on rental value (NS) can be written in the following functions:

$$NS = \beta_0 + \beta_1 LT + \beta_3 PD + \beta CBD + \beta_4 DIR + \varepsilon$$

*Note:*
NS : Land Rent Value (m2)
PD : Productivity (kwintal/m2)
LT : Surface Area
CBD : Distance to CBD (km)
DIR : Dummy Variable (irrigate channels available = 1, not available = 0)

Theoretical test concerns the problem of the sign and direction of the economic relations studied. Economic theories have determined the sign and magnitude of the coefficient on the variable studied to become a benchmark. A statistical test is also called a first-order test that concerns the criteria in the estimator. Criteria often used is the regression coefficient and standard deviation estimator.

Regression coefficients are used to measure the degree of economic relations studied.

The calculation of the capitalization rate of shallot farmland is calculated by dividing the estimated value of the net rent of shallot farmland by the market value of the adjusted transaction price for the farm, as formulated below:

$$R_0 = \frac{GRV}{LV}$$

*Note:*
Ro = Capitalization Rate
GRV = Net Rental Income/year
MV = Market Value or Selling Price

Econometric testing concerns classical assumptions which consist of multicollinearity, heteroscedasticity and autocracy. A good model should be free from multicollinearity, heteroscedasticity and autocorelation.

Calculation of the level of capitalization of agricultural land is calculated based on buying and selling transaction data. Rent net each purchase transaction data is calculated based on the estimated rental value estimated using a model of the rent that has been formed.

Processing and analysis of data and discussion with various test tools based on theoretical criteria, statistics and ekonomotrik supporting research purposes.

The sampling technique at the research site was carried out by purposive sampling technique on latitude data in the Brebes Regency area. The number of data samples of ground rent as many as 60 samples are derived from primary data, direct observation of the property. The number of samples of data on buying and selling of agricultural land as many as 80 samples derived from the monthly report of PPAT Brebes Regency, the time adjustment for the sale and purchase of agricultural land is adjusted to the formula that refers to Eckert (1990: 581).

Data validation is intended to examine the truth of field data obtained. Data validation includes mean, median, maximum, minimum, standard deviation, skewness, and kurtosis (Surat Edaran Direktur Jendral Pajak Nomor: SE-55/PJ.6/1999, 1999). Data lease as many as 60 samples were used to calculate and determine a model for estimating the rental value of land, while data on the sale and purchase of agricultural land by 80 samples used to calculate the level of capitalization after the estimated rental value of land is obtained, then the sample data that is obtained when buying or selling customized with adjustments the type of transaction data then adjusts the time of the transaction by bringing it to one valuation date, January 1, 2017 (Table 2).

Table 2. Adjustment value of land to the time factor and the type of transaction data

| No | Transaction Time | Adjusted |
|---|---|---|
| 1 | 1-3 Month | 2% |
| 2 | 3-6 Month | 3% |
| 3 | 6-9 Month | 4% |
| 4 | 9-12 Month | 5% |
| 5 | >1-2 Year | 12% |
| 6 | > 2-3 Year | 20% |
| 7 | > 3-6 Year | 28% |
| 8 | > 6 Year | 57% |

**Results and Discussion**

Tests are performed using multiple linear regression analysis to estimate the magnitude of the regression coefficients which show the relationship between the independent variable and the dependent variable.

Table 3. The Regression Coefficients

| Coefficient | Linier | Lin-Log | Log-lin | Double Log |
|---|---|---|---|---|
| C | - 966246.9 (-5.463001) | - 11270.18 (- 8.206170) | 12.34791 (114.2548) | - 1.183339 ( - 1.710490) |
| Surface Area (LT) | 1850.663 (5.566315) | 1171.552 (3.189691) | 0.000912 (4.490236) | 0.777281 (4.201132) |
| Distance to CBD (JR) | -19.99482 (-1.508276) | -35.79507 (-0.538266) | -0.0000124 (-1.536478) | -0.024021 (-0.717066) |
| Productivity (PD) | 5755.660 (1.988683) | 1043.504 (2.562250) | 0.005088 (2.877200) | 0.627133 (3.056950) |
| Dummy Irrigation | 361043.6 (2.498127) | 494.6773 (2.608997) | 0.367361 (4.159932) | 0.397847 (4.165523) |
| Adjusted R-squared | 0.845725 | 0.738726 | 0.849981 | 0.827829 |
| F-statistic | 81.85832 | 42.70417 | 84.57120 | 71.92083 |
| Durbin-Watson stat | 1.583623 | 1.524334 | 1.505709 | 1.356290 |

The Table 3 above shows the estimation results in the Brebes Regency region with 60 samples to estimate the land rent value based on the variable land area, distance to the CBD, and irrigation dummy, in the linear model, lin-log, log lin and double log. In addition to the measurement of goodness of fit, the regression model is also carried out classical assumption. After data processing, there are no classic assumption problems.

The next step is to find out the extent of the significance of the factors that influence the rent value of agricultural land used in this study to test hypotheses through t test, F test, and $R^2$ test.

Table 4. t test

| Variable | t-stats | t-table | Information |
|---|---|---|---|
| LT | 4.490236 | 2.00 | Significant 5% |
| PD | 2.877200 | 2.00 | Significant 5% |
| JR | 1.536478 | 2.00 | Not Significant 5% |
| IR | 4.159932 | 2.00 | Significant 5% |

The Table 4 above shows can be concluded that with 95% confidence level all independent variables individually significantly affect the dependent variable in the form of rent value of agricultural land. The results of the F test can be concluded that F counts the statistic greater than F table, so that all the independent variables together significantly influence the dependent variable. The $R^2$ test results can be seen in appendix 8 showing that about 86.0152% of the variation in the dependent variable is explained by variations in the free variation in the model. The remaining 12.6812%, the variation of the dependent variable is explained by variations in other free variations outside the model.

The equation of the empirical model used will look as follows:

$$NS = f(LT, PD, JR, DIR)$$

$$Log(NS) = 12.34791 + 0.000912LT + 0.005088PD - 0.0000124JR + 0.367361DIR$$

*Note:*

(Prob) = (0.0000) (0.0000) (0.0057) (0.1302) (0.0001)

$T_{statistics}$ (114.2548) (4.490236) (2.877200) ( -1.536478) (4.159932)

R-square= 0.860152
Adjusted R-square= 0.849981
F-statistik= 84.57120
Prob (F-statistic)= 0.0000

Based on the empirical equation above, it can be explained as follows:

Significant constants of 0.0000 indicate that there are other important variables outside the model that affect the value of rent.

The land area variable coefficient shows a positive value, which means that the relationship between land area and land rent value is a positive relationship, where the more land area in a region, the higher the positive value of land prices. This is in accordance with Bible and Hsieh's (1999) research which states that land area has a positive influence on land prices. However, the comparison of changes in land rent and changes in land area is very small, which is equal to 0.000912 or if the land footprint is wider than 1 m2, it will increase the value of land by 0.091% of the original land rent.

The coefficient of productivity variables also shows a positive start, so that the higher the level of productivity in this case the ability of agricultural land to produce quarterly yield in m2 per year, the higher the rent value of the farm. As stated by Glenn A. Helmers (2004), namely land that has high productivity, it will increasingly contribute high in land valuation planning. The coefficient of 0.005088 means that for every 1 quintal increase in productivity, the land rent value will increase by 0.50% from the original land rent.

The variable distance coefficient to CBD also shows a negative value, so that the farther the distance from the CBD in this market area, the land value will decrease further. However, this variable is not t-statistically significant because theoretically the land located near the city center has easy accessibility related to relative costs and the relative ease of location to location (Suharno, 2003; Widarjono, 2005). The coefficient of 0.0000124 means that every increase in distance to the CBD is 1 unit, the land rent value will decrease by 0.0000124% from the original land rent.

The dummy of availability of irrigation channels is positive shows that the availability of irrigation channels has a positive impact on land rent value. The assessment of this variable is based on the opinion of Helmers (2004).

The calculation of the estimated value of rent in the research area of Brebes Regency is obtained (appendix 11), for the maximum capitalization rate in the Brebes Regency region to yield 3.03% and a minimum capitalization rate of 0.47% with an average value of 1.70% (appendix 12). Based on these figures, it shows that the average net rental income per year or data means the rate of return received by the property owner is 1.71% of the property value, but this figure does not include capital gains that can be generated by the property because of the increase in selling value of time-to-time.

## Conclusion

The area of land has a positive effect on the value of rent. Investors tend to choose wider land to get maximum results, the area of land has a positive impact on increasing the income of shallot farmers. Land productivity has a positive effect on rental value, indicating that the higher productivity of a land will increase production yields which also have a positive impact on increasing the income of shallot farmers.

The distance to the nearest market has a non-significant effect in the direction of the negative relationship to the value of the rent. In the theory of costs that are

increasingly distant to the highway, it will further reduce revenues, but in the process buyers prefer buying systems in place by visiting shallot farmers. The availability of irrigation facilities has a significant effect in the direction of a positive relationship with the rent value.

From the results of the study indicate that the average capitalization rate of the rent value of agricultural land in the region is 1.70%. So that it can be concluded that the average rate of return expected to be received by investors from investments made on onion agricultural property in Brebes Regency is 1.70%, the value generated through the process of realization is the present value of an accumulated net income expected to be received every year up to an infinite period of time, taking into account the rate of return.

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