

Mathematical Model of Business Income in Kud Karya Bhakti Pakong Pamekasan

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Abstrak: Mathematical modeling is the process of deducing a mathematical model of a phenomenon based on the assumptions used. The purpose of a mathematical model is to make decisions based on real situations by analyzing the model. This research aims to obtain a mathematical model of income for KUD Karya Bhakti Pamekasan, to determine the most dominant variables influencing income and to determine the perception of the Karya Bhakti village community regarding income and progress of KUD in the area. The method used in this research is a quantitative method. Data collection techniques through literature study. Data analysis uses linear regression analysis to obtain a mathematical model, namely $Y = 228961935 - 0.197x$. The constant is 228961935, which means that if income (Y) is non-existent or zero (zero), then the SHU (Y) in the cooperative will decrease by IDR 289,61,935. Meanwhile, the b value (regression coefficient) shows a negative value of 0.197. A value of 0.197 means that if income is zero then the SHU remains the same and every additional 1 sale reduces the SHU by 0.197.

Kata kunci: *Mathematical Modeling; Business Income; KUD.*

PENDAHULUAN

Mathematics is the mother of science because mathematics is a source of other sciences, which means that the development of mathematics does not depend on other sciences. Mathematics, like research, is a daily activity that is widely used and applied in the economic sector, especially in the business world. Indonesia has an economic sector which is a national activity for the people, namely cooperatives. This is explained in Law no. 25 of 1992. Cooperatives are commercial entities that include a group of people or legal entities. Based on its principles, cooperatives aim to improve the welfare of society in general and its members in particular and participate in the national economic order to achieve a developed and prosperous community. The activities of cooperative financial participants are very important because they will increase cooperative capital,

especially working capital income and income in determining the amount of SHU obtained by the cooperative. There are factors that influence SHU, namely internal factors and external factors. Internal factors include the number of business units owned, member participation, management performance, manager and employee performance, and the amount of own capital, while external factors include the government, outside consumers other than cooperative members and loan capital from outside members. So in reality there are still many obstacles faced by KUD Karya Bhakti in increasing SHU income. These obstacles include a lack of member participation in helping to improve the KUD business, limited capital due to mandatory savings and principal savings that are not paid regularly by members, and less strategic sales locations. To overcome these obstacles, this can be done by

identifying what factors influence income, then investigating which factors have a significant influence on income using multiple linear regression analysis.

When using regression analysis in problem solving, you must first be able to translate the obstacles that exist in the regression analysis problem into a mathematical formulation. Problems from the real world are first converted into mathematical problems which are then solved mathematically, then the results are translated back into problems from the real world, this process is a mathematical model. A mathematical model is a mathematical formulation obtained from the results of someone's interpretation when translating a regression analysis problem. into mathematical language.

METODE

To collect the necessary data and information, the researcher used the field survey method: In this method stage, it is an activity related to collecting and searching for supporting data related to research object data obtained by observation and interviews.

Research parameters are values or conditions that are used as a benchmark in finding something to fill existing gaps or deficiencies, digging deeper into what already exists, developing and expanding, and testing the truth of what already exists but the truth is still in doubt. The parameters observed in this research are mathematical modeling and income of KUD Karya Bhakti.

This research is quantitative research, which looks for the

relationship between sales turnover from an operation for a cooperative and business results as the ultimate goal of the operational activity. The instruments used to analyze data are the results of observations and interviews and then carry out analysis using statistical formulas. Apart from that, to find out the results, use the Multiple Linear Regression Statistical test. Multiple linear regression analysis is a regression equation that describes the relationship between more than one independent variable (X) and one dependent variable (Y). In this method the data is tested with the help of statistical software, namely SPSS.

HASIL DAN PEMBAHASAN

Cooperative sales proceeds are divided into sales of goods and services. Which includes consumption sales, basic sales and financial services income. The sales turnover report data for 6 years from 2016-2021 can be seen in the table below:

Table 1. Sales Turnover for 6 Years from 2016-2021

Years	Turnover
2016	837.563.231
2017	756.445.521
2018	654.245.246
2019	572.567.345
2020	834.456.234
2021	789.345.234

From the table data above, it shows that during the years (2011–2016) it fluctuated. In terms of percentage, there was a decline that could be seen in 2016. The turnover generated was 279,100.00 at the Nusantara 14 Karya

Bhakti Pakong Pamekasan. This is due to the income generated in the counter service business unit, coffee shop business unit, the large number of competitors. Due to the lack of member participation in capital investment in cooperatives, cooperatives are still very dependent on bank credit even though the costs are expensive.

To analyze the data obtained from the results of this research, quantitative analysis was used with a simple linear regression analysis model. This proof is intended through the regression model used to explain the independent variable (X) against the dependent variable (Y) by testing the significance of the regression coefficient.

The results of calculations using the regression model were obtained with the regression coefficient values for the influence of sales turnover in increasing residual operating results (SHU) at the Nusantara14 Karya Bhakti Pakong Pamekasan.

Table 2. Results of Simple Linear Regression Analysis

Based on calculations with the help of the SPSS program using a regression model, a simple linear regression equation is obtained as follows:

$$Y = a + bx + e$$

$$Y = 2289461,935 - 0,197x + e$$

The constant is 2289461.935, which means that if sales turnover (Y) does

not exist or has a value of 0 (zero) then the SHU (Y) at the Nusantara 14 Karya Bhakti Pakong Pamekasan will decrease by IDR 2,289,461,935. Meanwhile, the value of b (regression coefficient) shows a negative value of 0.197. The value 0.197 means that if turnover is equal to 0 then the SHU is constant and if every addition of 1 turnover will reduce the SHU by 0.197.

Based on the results of the t test calculations described in Table 5.5 above, a t value of 3.004 was obtained with a significance value of 0.040. This shows that the significance level is $0.05 > 0.040$, it can be said that the hypothesis is accepted and significant between sales turnover and remaining operating results.

To find out the correlation coefficient or the amount of contribution between sales turnover and remaining business results (SHU) can be done using the coefficient of determination analysis as follows:

Table 3. Coefficient of Determination Analysis Results

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Sig.
1	.832 ^a	.693	.616	35065989,76967	
				nts	
		B	Std. Error	Beta	

Table 3.0 above shows that the correlation value () obtained is = 0.832, which means that the relationship or level of association of the independent variable, namely sales turnover, with the dependent variable, namely SHU, is strong. This means that if there is an increase in turnover (X), this will also be followed by an increase in SHU (Y). Vice versa, if there is a decrease in

turnover, this will also be followed by a decrease in SHU (Y).

As for the influence of the independent variable on the dependent variable, based on the coefficient of determination (R^2), it shows that the coefficient of determination is 0.693 or 69.3%. This means that variations in SHU changes are influenced by the development of sales turnover by 69.3%, while the remainder is caused by other elements originating from variables that are not studied or errors (e).

Sales turnover is the total value of sales or receipts from goods or services in a time period or financial year relating to the Nusantara 14 Karya Bhakti Pakong Pamekasan. According to the Big Indonesian Dictionary, turnover is "income obtained from the sale of merchandise or products during or during the sale period." The word turnover means amount, while sales means activities in selling goods with the aim of seeking profit or income.

The term residual business results or SHU according to article 45 paragraph (1) UU No.25/1992 is the remaining cooperative business results which are cooperative income obtained in one financial year minus costs, depreciation and other liabilities including taxes in the relevant financial year.

Meanwhile, the term remaining business results or SHU in cooperative business organizations can be viewed from two sides. From the first side, SHU is determined from the method of calculating it, namely as stated in Article 45 Paragraph (1) of the Cooperative Law. So that SHU is profit

or profits obtained from running a business as if it were a non-cooperative company. From the second side, as a business entity that has its own characteristics and values, the term residual business results has a different meaning from profit or profit from a non-cooperative business entity.

Based on the results of the simple linear regression analysis that has been described, it can be seen that the value of a (constant) is 2289461.935, which means that if there is no turnover or x has a value of 0 (zero), then the Remaining Business Results (SHU) in the Nusantara14 Karya Bhakti Employees cooperative, Asahan Regency will be reduced by IDR 2,289,461,935. Meanwhile, the value of b (regression coefficient) shows a negative value of 0.197. A value of 0.197 means that if turnover increases by IDR 1 it will have an impact on increasing SHU by 0.197. The simple linear regression equation model is as follows:

$$Y = a + bx + e = 2289461.935 - 0.197x + e$$

The equation above means that if turnover is equal to 0 then the remaining business results are constant and if each addition of 1 turnover will reduce the remaining business results by 0.197. From the results of test calculations using SPSS, it shows that the t value is 3.004 with a significant value of 0.040. This shows that the significance level of $0.05 > 0.040$ can be said to mean that the hypothesis is accepted and significant.

Meanwhile, to determine the relationship or level of association

between sales turnover and SHU, it can be done using the r test where an r value of 0.693 or 69.3% is obtained. This means that variations in changes in the SHU of the Nusantara 14 Karya Bhakti Pakong Pamekasan, were influenced by turnover growth of 69.3%, while the remainder was caused by other elements originating from unexamined variables or errors ().

Based on the above, the researcher is of the opinion that the sales turnover of a business unit, especially businesses in the cooperative sector, is very important because the sales turnover itself will directly impact the size of the remaining cooperative business results. From the results of this research, which the author measured through statistical analysis with SPSS translation, it shows that sales turnover significantly influences the remaining business results of the Indonesian employee cooperative 14 Karya Bhakti, Pamekasan, namely that turnover decreases every year from 2016-2021 and has a big impact on the decline in remaining annual business results. from 2016-2021 with an average decrease of 69.3%

This research is in line with research conducted by Nurulfajriah with results increasing every year. Although the influence on remaining business results increases because sales turnover also increases. Meanwhile research by Eni Ernawati with significant results, the influence of sales turnover on remaining business results. The results of this research are similar to the results of my research. What they do is that they both experience a decline, but it can still be said that sales turnover greatly

influences the remaining business results.

PENUTUP

The results of calculations using multiple linear regression analysis obtained a mathematical model for business income in the KUD Karya Bhakti Pakong Pamekasan, namely $Y = 2289461.935 - 0.197x + e$. The constant is 2289461.935, which means that if sales turnover (Y) is non-existent or has a value of 0 (zero), then the SHU (Y) in the Cooperative will decrease by IDR 2,289,461,935. Meanwhile, the value of b (regression coefficient) shows a negative value of 0.197. The value 0.197 means that if turnover is equal to 0 then SHU is constant and if each additional 1 turnover will reduce SHU by 0.197.

DAFTAR PUSTAKA

- Achi Rinaldi, Novalia, Syazali. 2020. *Statistika Inferensial untuk Ilmu Sosial dan Pendidikan*. Bogor: IPB Press.
- Agus Tri Basuki, Nano Prawoto. 2016 *Analisis Regresi Dalam Penelitian Ekonomi Dan Bisnis*. Jakarta: PT. Raja Grafindo Persada.
- Alit Nur Apriyanti dan Kirwani. 2020. *Analisis Perkembangan Modal Dan Pendapatan Usaha Koperasi Dalam Rangka Meningkatkan Sisa Hasil Usaha Di Kpri Harapan Mojokerto*. Malang: UM Press.
- Arifin Sitio, Halomoan Tamba. 2006. *Koperasi Teori Dan Praktik*. Jakarta: Erlangga.
- Damodar N. Gujarati. 2006. *Dasar Dasar Ekonometrika*. Jakarta: Erlangga.

- Darmadi Durianto, Sugiarto, Tony Sitinjak. 2004. *Strategi Menaklukan Pasar Melalui Riset Ekuitas Dan Perilaku Merek*. Jakarta: Gramedia Pustaka Utama.
- Dedi Suwarsito P, Erna Zuni A. 2014. *Analisis Regresi Dan Korelasi Antara Pengunjung Dan Pembeli Terhadap Nominal Pembelian Di Indomaret Kedungmundu*. Jakarta: Gramedia.
- Kasmir. 2017. *Analisis Laporan Keuangan*. Jakarta: PT. Rajagrafindo Persada.
- Epri Ayu Hapsari. 2007. *Analisis Rasio Keuangan Untuk Memprediksi Pertumbuhan Laba*. Surabaya: UNESA Press.
- Gestry Romaito B. 2017. Analisis Faktor-Faktor Yang Mempengaruhi Pendapatan Usaha Industri Makanan Khas Di Kota Tebing Tinggi. *Jom Fekon*, Vol. 4.No. 1, 623–24.
- Rozali. 2016. Analisis Partisipasi Anggota Koperasi Terhadap Peningkatan Pendapatan SHU Koperasi Pada Kpn Pandakajaya Kecamatan Merawola Tahun Buku 2002-2012, *Ermadu*, Vol 4, No 1, 37-44.

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