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ANALYSIS FORECASTING OF OPERATIONAL EXPENSE OF PT. BANK RAKYAT INDONESIA (PERSERO) TBK

by :
Dellavitrya Putri Khairunnisa,
Universitas Singaperbangsa Karawang (Accounting) Email :
1910631030074@student.unsika.ac.id
Nola Halwatunnissa,
Universitas Singaperbangsa Karawang (Accounting) Email :
1910631030202@student.unsika.ac.id
Dian Hakip Nurdiansyah,
Universitas Singaperbangsa Karawang (Accounting) Email :
dian.hakipnurdiansyah@staff.unsika.ac.id

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Abstract
This study uses PT Bank Rakyat Indonesia (Persero) Tbk as the object of research. This study was conducted with the aim of analyzing how to forecast operating expenses at Bank BRI. The data used in this study is secondary data, namely the operating expenses of PT Bank BRI obtained from the Financial Statements of PT Bank BRI where the data is obtained from the official website of PT Bank BRI from 2016 in the 1st quarter to 2020 in the 4th quarter. The method used in this study is the Times Series method by calculating the calculation of the error rate (the difference between the results of the incident and the results of the study). The type of times series method in this journal is the Least Square Method which is based on the calculations of previous years that have been running, while the Mean Absolute Defiation (MAD) and Mean Absolute Percentage Error (MAPE) are used to calculate the forecast error. The results of the study can be concluded that by using the least squares method to predict the operating expenses of PT Bank Rakyat Indonesia (Persero) Tbk in the 4th quarter of 2021 and 2022 are Rp 96,140,848 and Rp 106,155,635, with forecasting errors obtained from calculations, namely MAD Rp 23,190,171 and MAPE 52 ,38%.

***Keywords* :**
Forecasting, Operational Expense, Least Square Method.

1. INTRODUCTION

In carrying out the duties of a company leader, he is always faced with a lot of things. To overcome the cases he faces, the company's leadership cannot be separated from the decision-making process. One of them is how the company can operate as optimally as possible, and can achieve maximum profit.

Efforts to make a profit is the most primary thing in a company. Profit can put high economic benefits for the company as a tool to support the company's operational activities so that the company can carry out its activities continuously and continuously (going).

PT Bank Rakyat Indonesia (Persero) TBK is one of the businesses in the banking sector that is included in the State-Owned Enterprises (BUMN). Bank Rakyat Indonesia is one of the largest state-owned banks in Indonesia. Bank BRI has a desire to become The Most Valuable Bank and Home to The Best Talent, therefore the role of managers and employees is very important and is needed to realize this desire. A common problem managers face is how to predict future customer desires based on pre-existing

data. This forecasting greatly influences the

manager's decision making to estimate the amount of production of goods provided by the company (Rachman, 2018).

Forecasting is one of the most crucial elements in the decision-making process. Forecasting is usually based on the past which is then analyzed using certain methods. The past data is then collected, studied, analyzed and also connected by using and considering the passage of time, because of the time factor, then from the data the results of the analysis can predict what will happen in the future. Forecasting aims so that the predictions made are able to minimize forecasting errors, meaning that the difference between reality and forecast is not too far away. The company can create an action, policy or decision that is carried out effectively and efficiently in order to achieve the company's goals.

The least squares method is divided into two cases: the even number case and the odd number case. The least squares method is most often used to predict Y because it is more accurate, provides good accuracy in prediction results, and has more components (Sadli and Safwandi, 2017). Operating Expenses-Expenses related to the entity's daily activities during the reporting period are not related to sales; These activities are carried out except for financing, investing and other activities. Operating expenses reflect costs incurred during the reporting period and related to the company's business activities. Operating expenses can be divided into selling expenses and general management expenses.

Hernadewita and friends in their research entitled "PERAMALAN PENJUALAN OBAT GENERIK MELALUI TIME SERIES FORECASTING MODEL PADA PERUSAHAAN FARMASI DI TANGERANG: STUDI KASUS", forecasting sales of generic drugs, and also obtaining the results of forecasting sales of generic drugs for the next period, starting from April 2020 to March 2021 using the time series method. The result is that the company can determine which forecasting number is the best to use, so that the accumulation of raw materials, as well as the regular cash flow in an inventory will not occur again, or there is a material shortage that has a sudden urgency. According to Ihsan, in his research entitled " PERANCANGAN APLIKASI PERAMALAN PENJUALAN MOTOR HONDA MENGGUNAKAN METODE LEAST SQUARE (STUDI KASUS : PT. HD MOTOR 99 GRESIK)" and MAD for forecasting motorcycle sales for the next one month period using the Least Square method and using MAPE to calculating the forecasting error or margin of error from the data obtained by 5% which is a good enough result, therefore the least squares method is very suitable for predicting future results.

Based on previous studies, we as researchers have an interest in predicting the operational costs of PT Bank Rakyat Indonesia (Persero) Tbk, which will later be able to predict operational costs which can be used to make decisions, provide information on future costs due to decision making. decisions regarding the future. Information on future expenditures is not obtained from records because it is not recorded but is obtained from forecasting results. This study uses the least square forecasting method (the trend with the least squares method) in analyzing the operational cost forecasting of PT Bank Rakyat Indonesia (Persero) Tbk, . The error rate is calculated in mean absolute deviation (MAD) and mean fundamental percentage error (MAPE).

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Forecasting is a very important element in the decision-making process. Forecasting is generally based on the past which is then analyzed using certain methods. Past data is collected, studied, analyzed and connected with the passage of time, because of the time factor, then from the data the results of the analysis can predict what will happen in the future. Forecasting aims so that the predictions made can minimize forecasting errors, meaning that the difference between reality and forecast is not too far away. The company can make an appropriate action, policy or decision to achieve the target.

Factors that influence forecasting include the nature of the product, namely whether the product produced is long-term or short-term, the distribution method, namely where is the company's position and whether it has a distance that can be reached by the market, the size of the company compared to competing companies is whether the company's position as a a market leader, market challenger, or market follower, the level of competition is how the position of a company compares to the position of other companies in marketing and historical data is data needed to forecast at least five years ago.

Forecasting is important in business because it is able to predict trends and future events accurately and is useful in many contexts, including business management. opportunities for successful business ventures, formulating effective plans for the future, promoting teamwork in the workplace and helping organizations improve.

Operational costs are costs incurred to

carry out the daily activities of a company. Operating expenses include things like payroll, sales commissions, employee benefits and retirement contributions, transportation and travel, amortization and depreciation, rent, repairs, and taxes.

The recording of operational costs must be carried out routinely by the company, as well as costs that are not directly related to operational activities, or also known as non-operational costs. By recording these two types of expenses, the company accountant can determine how these costs relate to activities that generate income for the company. Another function of recording operational costs is to see the future of the company, whether its business can still run smoothly or not.

The operational costs of a company are categorized from two major financing components, namely Fixed Costs and Variable Costs. Fixed costs are costs that do not change despite an increase in sales and productivity. This fee must always be paid, regardless of the company's activities and performance. This includes rent payments, salaries for employees, non-production, to insurance. Meanwhile, variable costs consist of costs that are not fixed, depending on the production activities carried out. Unlike fixed costs which do not change and cannot be affected by other costs, variable costs will increase as production increases. If production decreases, variable costs also decrease. Examples include raw materials and shipping costs.

Least Square Method: The method used for time series analysis is the Free Hand Method, the Semi Average Method, the Moving Average Method and the Least Square Method. square method). In this case, it will be more devoted to discussing time series analysis using the least squares method which is divided into two cases, namely the case of even data and the case of odd data. In general, the linear equation of the time series analysis is:

Y = a + b X.
Y = Trend value in actual period
a = Intercept, which is the value of Y if the value of X = 0
b = Slope of a trend line, that is a change in Y variable for every change of one unit of variable X
X = Period of time
In determining the value of x / t, alternative techniques are often used by giving a score or code. In this case, the data is divided into two groups, namely:

- The data is even, then the t-value score is: …, -5, -3, -1,1, 3, 5,…
- Odd data, then the t-value score is: …, -3, -2, -1, 0, 1, 2, 3,…

Then to find out the coefficients a and b are sought by equations 2 and 3.

$$a = \frac{\sum Y}{n}$$

$$b = \frac{\sum t\,Y}{\sum t^2}$$

3. RESEARCH METHODOLOGY

Quantitative data analysis is carried out to predict the analysis of operating expenses in the next period by using the time series forecasting method. The historical data uses secondary data, namely the operating expenses of PT Bank BRI obtained from the Financial Statements of PT Bank BRI where the data is obtained from the official website of PT Bank BRI from 2016 in the 1st quarter to 2020 in the 4th quarter. Processed with least squares approach. The selection of the best forecasting method is based on the level of prediction error with the assumption expressed by Santoso (2009:40), that the smaller the error rate generated, the more precise a method in predicting. The calculation of the error rate used in the form of mean absolute deviation (MAD) and mean absolute percent error (MAPE).

4. RESULT AND DISCUSSION

The data that must be available in making forecasts or predictions is to use actual data from operating costs starting from the first quarter of 2016 to the last quarter of data, namely the fourth quarter of 2020 at PT Bank Rakyat Indonesia (Persero) Tbk (Bank BRI).

The following is a display of operational cost data and a description of forecasting using the Least Square method. The data source that will be used is the company's total operating costs for approximately five years.

Year	Quarter	Operational Expense (Y)
2016	Q1	19.629.858
	Q2	41.233.388
	Q3	61.680.383
	Q4	80.511.138
2017	Q1	21.326.169
	Q2	45.136.372
	Q3	68.232.421
	Q4	88.973.490
2018	Q1	23.217.698
	Q2	47.411.914
	Q3	71.785.812
	Q4	97.460.570
2019	Q1	25.932.396
	Q2	54.446.776
	Q3	82.116.493
	Q4	112.137.230
2020	Q1	30.733.901
	Q2	57.576.426
	Q3	91.446.143
	Q4	125.830.903

Tabel 1 Operational Expense of PT Bank Rakyat Indonesia (Persero) Tbk

The first calculation process begins by determining the number of n (number of periods/quarters) and the number of data groups used in the forecast as the main period. After determining the value of a (trend value), then the system will calculate the value of b (trend value of change) against X (period). The result of the calculation will be used to determine the value of Yt (estimated) or forecast developments in the period estimated at the level of operational costs (Rahmawita and Fazri, 2018).

The following is a graph of the company's operating expenses for 20 quarterly periods.

Graph 1. Operating Expense of PT. Bank Rakyat Indonesia (Persero) Tbk

In

Graph 1, it is known that operating costs change every quarter. The increase in operating expenses occurred in the fourth quarter, and the highest growth occurred in the fourth quarter of 2020. Several things resulted in an increase in operating expenses, among others, an increase in selling and administrative costs to obtain income, excluding current costs, which have been calculated in the price of goods sold and depreciation.

A. Forecasting Calculation

Examples of calculating the development of operating expenses for each period are: The values of Y (the value of operating expenses per quarter), n (amount of data = 20), and X (quarterly) are needed to find the values of a and b in the equation Y = a + bX. The value of X will not be easy if we use real values like 2016, 2017, and one more year.

For even data, the two middle years are given a value of 0.5 and 0.5, so each year it becomes 1.5; 2.5; -3.5 and so on. Therefore a code number is used, so the value of X for 2018 quarter 2 = 0.5 for 2018 quarter 3 = 0.5. As for odd data. N (number of data = 19) used a code number, namely middle = 0, then the year after was added by one and the previous year became 1 (Suharyadi and SK, 2015).

Years	Quartal	Operational Expense (Y)	X	XY	X^2
2016	Q1	19.629.858	-9,5	-186.483.651	90,25
	Q2	41.233.388	-8,5	-350.483.798	72,25
	Q3	61.680.383	-7,5	-462.602.873	56,25
	Q4	80.511.138	-6,5	-523.322.397	42,25
2017	Q1	21.326.169	-5,5	-117.293.930	30,25
	Q2	45.136.372	-4,5	-203.113.674	20,25
	Q3	68.232.421	-3,5	-238.813.474	12,25
	Q4	88.973.490	-2,5	-222.433.725	6,25
2018	Q1	23.217.698	-1,5	-34.826.547	2,25
	Q2	47.411.914	-0,5	-23.705.957	0,25
	Q3	71.785.812	0,5	35.892.906	0,25
	Q4	97.460.570	1,5	146.190.855	2,25
2019	Q1	25.932.396	2,5	64.830.990	6,25
	Q2	54.446.776	3,5	190.563.716	12,25
	Q3	82.116.493	4,5	369.524.219	20,25
	Q4	112.137.230	5,5	616.754.765	30,25
2020	Q1	30.733.901	6,5	199.770.357	42,25
	Q2	57.576.426	7,5	431.823.195	56,25
	Q3	91.446.143	8,5	777.292.216	72,25
	Q4	125.830.903	9,5	1.195.393.579	90,25

Tabel 2 Forecasting Calculations Using The Least Square Method of PT Bank Rakyat Indonesia (Persero) Tbk

The calculation results of each variable contained in table 2 are as follows :

$\sum Y$ (Total actual value of operational costs) = Rp 1.246.819.481

$\sum X^2$ (Total Squared X) = 665

$\sum XY$ (Total multiplication between time and actual value) = Rp 1.664.956.772

n (total of rows) = 20

Calculation using the Least Square Methods :

Y = a + bX

Y = Trend value in actual period

a = Intercept, which is the value of Y if the value of X = 0

b = Slope of a trend line, that is a change in Y variable for every change of one unit of variable X

X = Period of time

Calculation (a) of each operating cost :

$a = \sum Y / n$

a = Rp 1.246.819.481 / 20

a = Rp 62.340.974,05

Calculation the slope of the trend line (b) of each operating cost :

$b = \sum XY / \sum X^2$

b = Rp 1.664.956.772 / 665

b = Rp 2.503.694,39

Then the equation for the Least Square Method following the above formula is as follows:

Y = Rp 62.340.974,05 + (Rp 2.503.694,39) X

From the equation above, it's obtained the forecasting of operational expense for the next period 4th quarter in 2021 and for 4th quarter in 2022 are :

$Y_{(4th\ quarter\ in\ 2021)}$ = Rp 62.340.974,05 + (Rp 2.503.694,39) X

= Rp 62.340.974,05 + (Rp 2.503.694,39) (13,5)

= Rp 62.340.974,05 + Rp 33.799.874,265

= Rp 96.140.848,315 rounded to (Rp 96.140.848)

$Y_{(4th\ quarter\ in\ 2022)}$ = Rp 62.340.974,05 + (Rp 2.503.694,39) X

= Rp 62.340.974,05 + (Rp 2.503.694,39) (17,5)

= Rp 62.340.974,05 + Rp 43.814.651,825

= Rp 106.155.634,875 rounded to (Rp106.155.635)

So the number of operating expense in the 4th quarter of 2021 and 2022 of PT Bank Rakyat Indonesia (Persero) Tbk is predicted to be Rp 96.140.848 and Rp106.155.635, with a value of Rp Rp 62.340.974,05 and value of b Rp 2.503.694,39 in the equation.

B. Error Calculation

Years	Quartal	perational Expense (Y)	X	Forecast Yt	Error Y - Yt	| Y – Yt |	| (Y – Yt) / Y |
2016	Q1	19.629.858	-9,5	38.555.877,35	- 18.926.019,35	18.926.019,35	0,96414
	Q2	41.233.388	-8,5	41.059.571,74	173.816,27	173.816,27	0,00422
	Q3	61.680.383	-7,5	43.563.266,13	18.117.116,88	18.117.116,88	0,29373
	Q4	80.511.138	-6,5	46.066.960,52	34.444.177,49	34.444.177,49	0,42782
2017	Q1	21.326.169	-5,5	48.570.654,91	- 27.244.485,91	27.244.485,91	1,27751
	Q2	45.136.372	-4,5	51.074.349,30	- 5.937.977,29	5.937.977,29	0,13156
	Q3	68.232.421	-3,5	53.578.043,69	14.654.377,32	14.654.377,32	0,21477
	Q4	88.973.490	-2,5	56.081.738,08	32.891.751,93	32.891.751,93	0,36968
2018	Q1	23.217.698	-1,5	58.585.432,47	- 35.367.734,47	35.367.734,47	1,52331
	Q2	47.411.914	-0,5	61.089.126,86	- 13.677.212,86	13.677.212,86	0,28848
	Q3	71.785.812	0,5	63.592.821,25	8.192.990,76	8.192.990,76	0,11413
	Q4	97.460.570	1,5	66.096.515,64	31.364.054,37	31.364.054,37	0,32181
2019	Q1	25.932.396	2,5	68.600.210,03	- 42.667.814,03	42.667.814,03	1,64535
	Q2	54.446.776	3,5	71.103.904,42	- 16.657.128,42	` 16.657.128,42	0,30593
	Q3	82.116.493	4,5	73.607.598,81	8.508.894,20	8.508.894,20	0,10362
	Q4	112.137.230	5,5	76.111.293,20	36.025.936,81	36.025.936,81	0,32127
2020	Q1	30.733.901	6,5	78.614.987,59	- 47.881.086,59	47.881.086,59	1,55792
	Q2	57.576.426	7,5	81.118.681,98	- 23.542.255,98	23.542.255,98	0,40889
	Q3	91.446.143	8,5	83.622.376,37	7.823.766,64	7.823.766,64	0,08556
	Q4	125.830.903	9,5	86.126.070,76	39.704.832,25	39.704.832,25	0,31554

Tabel 3 Error Calculations (MAD and MAPE) of PT Bank Rakyat Indonesia (Persero) Tbk

According to Khair et al. (2017), then use various indicators (Mean Absolute Deviation, and Mean Absolute Percentage Error) and instructions to determine the following method: Mean Absolute Deviation (MAD).

Methods for evaluating forecasting methods use a number of simple errors. MAD measures prediction accuracy by the average of the expected errors (the absolute value of each error). MAD is useful when calculating prediction errors in the same units as the original sequence. The following formula can be used to determine the MAD value.

$MAD = \sum [| Y - Yt |] / n$

MAD = Rp 463.803.429,82 / 20

MAD = Rp 23.190.171,49 rounded to (Rp 23.190.171)

Mean Absolute Percentage Error (MAPE) This is calculated using the relative error in each period divided by the observed value for that period. Then, it is averaged for a fixed percentage. This approach has a function when size significant predictive variable in evaluating prediction accuracy. MAPE shows how big error when predicting compared to the true value. MAPE is shown in the form forecast error percentage information.

$MAPE = \sum [| (Y - Yt) | / Y] / n$ X 100 %

MAPE = 10,68 / 20 x 100 %

MAPE = 52,38 %

5. CONCLUSION

Based on the output or results of research at PT Bank Rakyat Indonesia (Persero) Tbk listed on the official website for the period 2016 first quarter to 2020 fourth quarter, it can be concluded that the Financial Statements for the 2016-2020 period show a movement in the growth of Operating Expenses and relatively volatile financial ratios, Based on This study was selected by sampling as many as 20 periods/quarters using the least method square because based on the researchers it is very good at predicting how much the company's operating expenses are in future. The final result of our research is expected to be able to estimate the cost future operations efficiently, minimize errors, and can be used to form accurate and fast forecasts. The prediction error method has three analyzes: MAD (average absolute deviation) and MAPE (average absolute percentage error). It can be seen that the number of errors from each method are Rp 23,190,171 (MAD) and 52.38% (MAPE). The error can be trusted significantly because the data processed is included in expenditure data, where the nominal amount is very large. However, this is not a problem because the author only intends to flatten monthly operating costs every month year by forecasting the operational costs of PT Bank Rakyat Indonesia (Persero) Tbk.

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