ANALYSIS FORECASTING OF OPERATIONAL EXPENSES OF PT. BANK TABUNGAN NEGARA TBK

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ABSTRACT

One of the strategic aspects of Bank BTN is meeting customer needs by providing quality services to compete in the banking industry. Therefore, it is necessary to have the ability to understand and deal with uncertainty to predict future business conditions so that the company can take appropriate steps or reduce risks in dealing with this uncertainty. This article aims to discuss the analysis of forecasting Bank BTN operating expenses. Forecasting is done by using the time series method by calculating the error rate (the difference between the results of the events and the research results). This article's type of time series method is the least-squares method based on past data, while MAD and MAPE are used to calculate forecast errors. The research data used is included in secondary data, namely BTN operating expenses data obtained from the BTN website from 2013 to the 2nd quarter, to 2020 in the 3rd quarter. Forecasting data analysis shows that using the least square method to predict the operational expenses of the BTN bank in the third quarter of 2021 is Rp. 5,029,126.61, with an error obtained from the calculation, namely MAD Rp. 1,348,106 and MAPE 57.7%.
Keywords: Forecasting, Operating Expenses, Least Square.

ABSTRAK

Salah satu aspek strategis bank BTN adalah memenuhi kebutuhan nasabah dengan memberikan layanan berkualitas untuk bersaing di industri perbankan. Oleh karena itu, diperlukan kemampuan yang harus dimiliki dalam memahami dan menghadapi ketidakpastian untuk memprediksi kondisi bisnis di masa yang akan datang agar perusahaan dapat mengambil langkah-langkah yang tepat atau mengurangi risiko dalam menghadapi ketidakpastian tersebut. Artikel ini bertujuan untuk membahas analisis peramalan beban operasional Bank BTN. Peramalan dilakukan dengan metode time series, dengan menghitung *error rate* (selisih antara hasil kejadian dan hasil penelitian). Jenis metode deret waktu yang digunakan dalam artikel ini adalah metode kuadrat terkecil berdasarkan data masa lalu, sedangkan MAD dan MAPE digunakan untuk menghitung kesalahan ramalan. Data penelitian yang digunakan termasuk dalam jenis data sekunder yaitu data beban usaha BTN yang diperoleh dari website BTN dari tahun 2013 kuartal ke 2, hingga tahun 2020 kuartal ke 3. Analisis data peramalan menunjukkan bahwa dengan menggunakan metode *least square* untuk meramalkan beban operasional bank BTN pada triwulan III tahun 2021 adalah Rp 5,029,126.61, dengan *error* yang didapat dari perhitungan yaitu MAD Rp. 1.348.106 dan MAPE 57,7%.
Kata kunci: Peramalan, Beban Operasional, Kuadrat Terkecil

1. INTRODUCTION

PT Bank Tabungan Negara (Persero), Tbk (Bank BTN) is a state-owned enterprise (BUMN) engaged in the banking industry. One of the strategic aspects of Bank BTN, to compete in the banking world, is to provide superior services to meet customer demands. Therefore the role of a manager to understand and be able to predict future business conditions is needed. A common problem faced by managers 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 predicts several events that will happen in the future, involving many fields, including industry and commerce, government, economics, environmental science, medicine, social and political science, and finance (Montgomery et al., 2015). Forecasts make plans for every business organization and every significant management decision (Sadli and Safwandi, 2017). Many banks make forecasts based on their past data. The assumption used is causality; that is, what happened in the past may occur now and in the future. This causal relationship is not explained when deriving the statistical model. With this assumption, past achievements are used as the basis for predicting future sales, provided that the past causal relationship has not changed. The requester's forecast is derived by matching the best equation into historical data or cross-tabulation data (Kusuma, 2015). The least-square method is divided into two cases: even number case and odd number case. The least squares (least squares) method is most commonly used to predict Y because it is more accurate, provides good accuracy in the prediction results, and has more components (Sadli and Safwandi, 2017). Operating Expenses-Expenses related to the entity's daily activities during the reporting period have nothing to do with sales; these activities are carried out except for financing, investment, and other activities. Operating expenses reflect the costs incurred during the reporting period and are related to the enterprise's business activities. Operating expenses can be divided into sales expenses and general management expenses.

Ratnaningsih, in his research entitled "Forecasting Home Sales Using the Trend Moment Method at PT. Rumakita Prima Karsa, "forecasts home sales to find out whether the target set can be achieved or not by using a trend moment. The result is an increase,

or the company experiences a positive trend. Medyantiwi Rahmawita and Ilham Fazri, in their research entitled "APPLICATION OF DRUG SALES FORECASTING USING THE LEAST SQUARE METHOD AT BHAYANGKARA HOSPITAL" also MAD forecasting of drug sales at Bhayangkara Hospital using the Least Square method and using MAPE to calculate the forecast error. MAPE obtained is 3%, so the least square method is very suitable for predicting future drug stocks.

Based on previous studies, researchers are interested in predicting operational expenses from Bank BTN, which later forecasting operating expenses can be used to make decisions, provide information on future expenses (future expenses) because decision making is related to the future. The future expenses information is not obtained from records because it is not recorded but is obtained from forecasting results. This study uses the least square forecasting method (a trend with the least-squares method) in analyzing the forecasting of Bank BTN's operational expenses. The error rate is calculated in mean absolute deviation (MAD) and mean fundamental percentage error (MAPE).

2. METHODOLOGY

Forecasting is done by using the time series method by calculating the error rate (the difference between the results of the events and the research results). This article's type of time series method is the least-squares method based on past data, while MAD and MAPE are used to calculate forecast errors. The research data used is included in the type of secondary data, namely BTN's operating expenses data obtained from the BTN website, namely www.btn.co.id from 2013 to the 2nd quarter, to 2020 3rd quarter.

3. RESULTS AND DISCUSSION

Data that must be present in making a forecast or prediction is using actual data from an operating expense starting from the 2nd quarter in 2013 to the last quarter data, namely the 3rd quarter in 2020 at PT Bank Tabungan Negara Tbk (Bank BTN).

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

**Table 1 Operational Expenses of PT Bank Tabungan Negara Tbk**

Period	Operational Expense (Y)
2013(Q2)	1.707.404
2013(Q3)	2.707.822
2013(Q4)	3.503.109
2014(Q1)	973.213
2014(Q2)	1.933.726
2014(Q3)	2.933.202
2014(Q4)	3.933.648
2015(Q1)	996.429
2015(Q2)	2.035.823
2015(Q3)	3.238.060
2015(Q4)	4.332.898
2016(Q1)	1.097.996
2016(Q2)	2.310.717
2016(Q3)	3.401.576
2016(Q4)	4.899.540
2017(Q1)	1.252.298
2017(Q2)	2.576.801
2017(Q3)	3.959.874
2017(Q4)	5.552.197
2018(Q1)	1.499.178
2018(Q2)	2.961.147
2018(Q3)	4.743.048
2018(Q4)	6.611.571
2019(Q1)	1.474.282
2019(Q2)	3.001.331
2019(Q3)	5.907.645
2019(Q4)	8.556.230
2020(Q1)	1.748.161
2020(Q2)	3.483.511
2020(Q3)	5.308.914

The first calculation process begins by determining the number of n (number of periods/quarters) and the number of data groups used in forecasting as the primary period. After that is determined the value of a (the value of the trend), then the system will calculate the value of b (change in trend value) against X (period). The results of these calculations will be used to determine the Yt value (estimated) or forecast developments

in the period for which the operational expense level is forecast (Rahmawita and Fazri, 2018).

The following is a graph of the company's operational expenses for 30 quarterly periods.

Graph 1. Bank BTN Operating Expenses
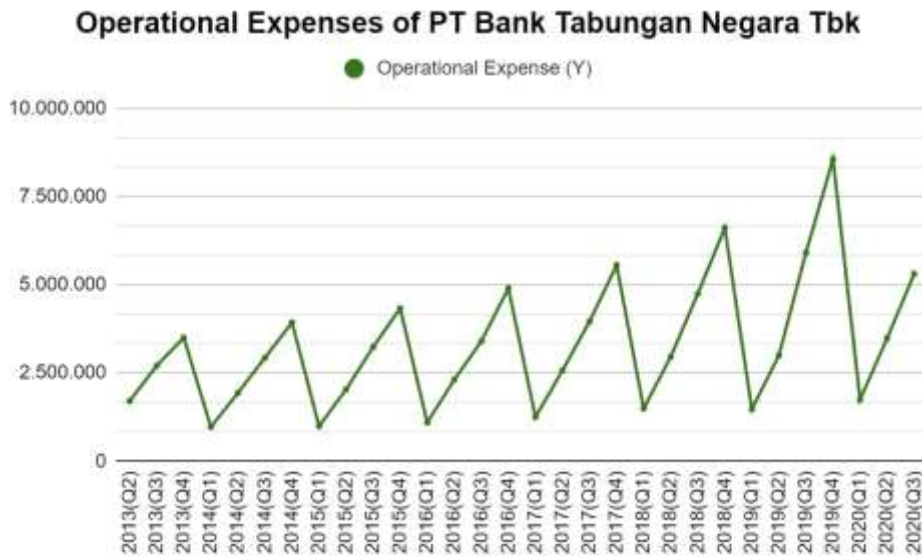
In Graph 1, it is known that operational expenses fluctuate every quarter. The increase in operating expenses occurred in the fourth quarter, and the highest growth occurred in the fourth quarter of 2019. Several things caused the increase in operating expenses; namely, an increase in sales and administration costs to obtain revenue, excluding current expenses, have been calculated in the price of goods sold and depreciation.

3.1. Forecasting Calculation

An example of calculating the development of operational expenses for each period, namely: To The value of Y (value of operational expenses per quarter), n (total data = 30), and X (quarterly) are needed to find the values of a and b in the equation Y = a + bX. X's value will not be easy if we use real values like 2016, 2017, and one more year. For even data, the two years in the middle are given a value of 0.5 and -0.5, then each year it becomes -1.5; -2.5. Therefore code numbers are used, so that the X value for 2016 = -0.5 for 2017 = 0.5. Meanwhile, for odd data. N (number of data = 29) the code number is used, namely the middle = 0, then the year after that is added by one and the previous year becomes -1 (Suharyadi and S.K, 2015).

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Table 2. Forecasting Calculations Using The Least Square Method

Period	Operational Expense (Y)	X	XY	X²
2013(Q2)	1.707.404	-14,5	(24.757.358)	210,25
2013(Q3)	2.707.822	-13,5	(36.555.597)	182,25
2013(Q4)	3.503.109	-12,5	(43.788.863)	156,25
2014(Q1)	973.213	-11,5	(11.191.950)	132,25
2014(Q2)	1.933.726	-10,5	(20.304.123)	110,25
2014(Q3)	2.933.202	-9,5	(27.865.419)	90,25
2014(Q4)	3.933.648	-8,5	(33.436.008)	72,25
2015(Q1)	996.429	-7,5	(7.473.218)	56,25
2015(Q2)	2.035.823	-6,5	(13.232.850)	42,25
2015(Q3)	3.238.060	-5,5	(17.809.330)	30,25
2015(Q4)	4.332.898	-4,5	(19.498.041)	20,25
2016(Q1)	1.097.996	-3,5	(3.842.986)	12,25
2016(Q2)	2.310.717	-2,5	(5.776.793)	6,25
2016(Q3)	3.401.576	-1,5	(5.102.364)	2,25
2016(Q4)	4.899.540	-0,5	(2.449.770)	0,25
2017(Q1)	1.252.298	0,5	626.149	0,25
2017(Q2)	2.576.801	1,5	3.865.202	2,25
2017(Q3)	3.959.874	2,5	9.899.685	6,25
2017(Q4)	5.552.197	3,5	19.432.690	12,25
2018(Q1)	1.499.178	4,5	6.746.301	20,25
2018(Q2)	2.961.147	5,5	16.286.309	30,25
2018(Q3)	4.743.048	6,5	30.829.812	42,25
2018(Q4)	6.611.571	7,5	49.586.783	56,25
2019(Q1)	1.474.282	8,5	12.531.397	72,25
2019(Q2)	3.001.331	9,5	28.512.645	90,25
2019(Q3)	5.907.645	10,5	62.030.273	110,25
2019(Q4)	8.556.230	11,5	98.396.645	132,25
2020(Q1)	1.748.161	12,5	21.852.013	156,25
2020(Q2)	3.483.511	13,5	47.027.399	182,25
2020(Q3)	5.308.914	14,5	76.979.253	210,25

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

$\sum Y$ (*Total total actual value of operational expenses*) $= Rp\ 98{,}641{,}351$

$\sum X^2$ (Sum squared X) = 2247.5

$\sum XY$ (*Total multiplication between time and actual value*)

$= Rp\ 211{,}517{,}884.50$

n (Number of rows) = 30

Calculation using the Least Square method:

Y = a + bX

Where:

Y = trend value in an 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.

Calculate (a) of each operating expense:

$a = \Sigma Y / N$

a = Rp 98,641,351 / 30

= Rp 3,288,045.03

Calculate the slope of the trend line (b) of each operating expense:

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

b = Rp 211,517,884.50 /2247.5

= Rp 94,112.51

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

Y= Rp 3,288,045.03 + (Rp 94,112.51) X

From the equation above, it is obtained the forecasting of operational expenses for the next period or quarter 3 of 2021:

Y = Rp 3,288,045.03 + (Rp 94,112.51) X

= Rp 3,288,045.03 + (Rp 94,112.51) (18.5)

= Rp 3,288,045.03 + Rp 1,741,081.58

= Rp 5,029,126.61

So the number of operating expenses in the 3rd quarter of 2021 at PT Bank Tabungan Negara Tbk is predicted to be Rp 5,029,126.61, with a value of Rp 3,288,045.03 and a value of b of Rp 94,112.51 in the equation.

3.2. Error Calculation

Table 4. MAD And MAPE Calculations

Period	Operational Expense (Y)	Forecast Yt	Error Y-Yt	$\lvert Y - Yt \rvert$	$\lvert (Y-Yt)/Y \rvert$
2013(Q2)	1.707.404	1.923.414	(216.010)	216.010	0,13
2013(Q3)	2.707.822	2.017.526	690.296	690.296	0,25
2013(Q4)	3.503.109	2.111.639	1.391.470	1.391.470	0,40
2014(Q1)	973.213	2.205.751	(1.232.538)	1.232.538	1,27
2014(Q2)	1.933.726	2.299.864	(366.138)	366.138	0,19
2014(Q3)	2.933.202	2.393.976	539.226	539.226	0,18
2014(Q4)	3.933.648	2.488.089	1.445.559	1.445.559	0,37
2015(Q1)	996.429	2.582.201	(1.585.772)	1.585.772	1,59
2015(Q2)	2.035.823	2.676.314	(640.491)	640.491	0,31
2015(Q3)	3.238.060	2.770.426	467.634	467.634	0,14
2015(Q4)	4.332.898	2.864.539	1.468.359	1.468.359	0,34
2016(Q1)	1.097.996	2.958.651	(1.860.655)	1.860.655	1,69
2016(Q2)	2.310.717	3.052.764	(742.047)	742.047	0,32
2016(Q3)	3.401.576	3.146.876	254.700	254.700	0,07
2016(Q4)	4.899.540	3.240.989	1.658.551	1.658.551	0,34
2017(Q1)	1.252.298	3.335.101	(2.082.803)	2.082.803	1,66
2017(Q2)	2.576.801	3.429.214	(852.413)	852.413	0,33
2017(Q3)	3.959.874	3.523.326	436.548	436.548	0,11
2017(Q4)	5.552.197	3.617.439	1.934.758	1.934.758	0,35
2018(Q1)	1.499.178	3.711.551	(2.212.373)	2.212.373	1,48
2018(Q2)	2.961.147	3.805.664	(844.517)	844.517	0,29
2018(Q3)	4.743.048	3.899.776	843.272	843.272	0,18
2018(Q4)	6.611.571	3.993.889	2.617.682	2.617.682	0,40
2019(Q1)	1.474.282	4.088.001	(2.613.719)	2.613.719	1,77
2019(Q2)	3.001.331	4.182.114	(1.180.783)	1.180.783	0,39
2019(Q3)	5.907.645	4.276.226	1.631.419	1.631.419	0,28
2019(Q4)	8.556.230	4.370.339	4.185.891	4.185.891	0,49
2020(Q1)	1.748.161	4.464.451	(2.716.290)	2.716.290	1,55
2020(Q2)	3.483.511	4.558.564	(1.075.053)	1.075.053	0,31
2020(Q3)	5.308.914	4.652.676	656.238	656.238	0,12

According to Khair et al. (2017), Then use several indicators (Mean Absolute Deviation, and Mean Absolute Percentage Error) and instructions to verify the following methods:

Mean Absolute Deviation (MAD)

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

MAD = Σ [| Y - Yt |] / n

MAD = Rp 40,443,204 / 30

MAD = Rp 1,348,106

Mean Absolute Percentage Error (MAPE)

It is calculated using the relative error in each period divided by the observed value for that period. Then, average the fixed percentage. This approach is functional when the predictive variable's size is significant in evaluating the prediction's accuracy. MAPE shows how big the error in predicting is compared to the actual value. MAPE is presented in the form of forecast error percentage information.

MAPE = Σ [Y -Yt] / Y x 100%

MAPE = 17.3130 X 100%

MAPE = 57.7%

4. CONCLUSION

Based on the results of research on PT Bank Tabungan Negara Tbk listed on the official web period 2013 to 2020, it can be concluded that Financial Statements for the period 2013-2020 shows the movement of Operational Expenses growth and quite volatile financial ratios, Based on the research selected by sampling as much as 30 periods/quarters using the least square method because, according to the researcher, it is very good at predicting how much operational load in the company in the future. This research's final result is expected to efficiently forecast future operational expenses, minimize errors, and produce accurate and fast forecasts. The prediction error method has three analyses: MAD (mean absolute deviation) and MAPE (mean absolute percentage error). It can be seen that the number of errors from each method is Rp 1,348,106 (MAD), and 57.7% (MAPE). The error is considered significant because the processed data is included in the expenses data, where the nominal amount is enormous. However, it is not a problem because the author intends to flatten the monthly operational expenses each year by forecasting PT Bank Tabungan Negara Tbk's operational expenses.

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