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The Sensitivity of Break-Even Point Operations for KM Prince Soya

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Abstract: *A company is established to obtain profit from its business activities. This study aims to determine the value of the break-even point in the operation of KM Prince Soya ship and to find out the sensitivity of the change of the value if there is a change in the vessel's operational cost and rate. This research used the quantitative descriptive method by analyzing the ship's income and operational cost during the operation period of 2013. The results revealed that the value of the break-even point of KM Prince Soya in 2013 was IDR 15,762,443,551, which was equal to the value of 53,131 tickets. This value was achieved at the load factor of 29.61%. In case of a change in the ship's operational cost when using non-subsidized fuel, the value of the break-even point will be IDR 26,990,204,611 which is equal to the value of 90.977 tickets. This value is an increase of 71.23% from the previous one, and it can be achieved at the load factor of 50.71%. If the ship uses non-subsidized fuel with a load factor of 29.61%, the ticket price should be raised by 72% to reach the break-even point.*

Keywords: *fuel, load factor, ship operationalcost, income, sales*

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I. Introduction

In essence, every business that is established has hope in the future, for example, expects very rapid development. Basically, business development achieves the achievement of objectives, namely obtaining profits and maintaining business continuity. This has forced employers to be able to work hard in order to compete competitively. The companies that want to succeed must manage, use and allocate funds regularly (Benny, 2009). The measure that is often used to assess the success or failure of a company's management is the profit earned by the company.

Cabotage Principle Empowerment aims to protect national shipping in the transportation of logistics in Indonesian waters so that they can be a host in their own country (Presidential Instruction No.5 Year 2005). Thus, the function of national shipping companies is increasingly vital and strategic in Indonesia's economic development. The main activity of a shipping company is to operate a vessel owned or chartered ship so that the results are as desired by the company for profit.

Break-even analysis or analysis of cost, volume, and profit relationships is a technique for combining, coordinating and interpreting production and distribution data to assist management in making decisions. *Impase* own is interpreted as the state of a business that does not make a profit and does not suffer losses. It can also be said in other words that a business is even if the income equals the total cost (Bambang, 1995).

Break-even point analysis (BEP) is an analysis technique to study the relationship between total costs, expected profits and expected volumes (Kasmir, 2012). Break-even point analysis (BEP) presents management, cost, volume and profit relationship information, making it easier to analyze the factors that influence the achievement of future business profits (Syafaruddin, 1990).

The main components for calculating the break-even point value are ship operating costs and revenues, costs are classified into 2, namely fixed costs and variable costs (Freddy, 2006). This break-even point value is very sensitive to changes in production parameters (Retno Ariyanti, et al. 2014).

The operation of KM Prince Soya may experience changes in ship operating costs and revenue components, which results in a break-even point value also changes, for example, changes in fuel prices. If an increase in fuel prices occurs, the company must anticipate this to maintain profits. Steps were taken for example by raising ticket prices to cover the operational costs of the ship. The amount of the tariff refers to the government regulation KM.58 of 2003 concerning the mechanism for determining and formulating the crossing transport tariff calculation. Thus the purpose of this study is to analyze the effect of changes in ship operating costs and changes in tariffs on the break-even point value and vessel revenue.

II. Research Methods

This research was conducted at the shipping company PT. Lotus Flower on Jalan Nahkoda Samarinda and in KM Prince Soya. This research uses descriptive qualitative and quantitative analysis methods to directly observe the condition of the company/ship, conduct interviews with parties related to the problems faced, and collect written data in the form of supporting documents in the shipping company.

This study uses a quantitative descriptive analysis method by classifying all costs incurred into variable costs (variable costs) and fixed costs (Fixed cost) and break-even point analysis (break-even point / BEP).

$$BEP\ (IDR) = \frac{FC}{\frac{1-VC}{S}}$$

Where;
FC : *Fixed cost*
VC : *Variabel cost*
S : Sales Volume

III. The Results

The tariff structure imposed by PT. Bunga Teratai

At KM Prince Soya, a tariff has been set by the company. The tariff determination is based on the agreement of the people of the cruise ships in Pare-pare and Samarinda under the supervision of INSA. The tariff set by the company is used as a reference in the sale of tickets for passengers and cargo. List of rates as in Table 1.

Table 1. Tariff List for KM Prince Soya

No.	Ticket type	Value
1.	VIP	IDR 325.000
2.	Class	IDR 300.000
3.	Economy	IDR 245.000
4.	Truck Car	IDR 4.500.000
5.	Small Cars/Sedans	IDR 3.100.000
6.	Motorcycle	IDR 300.000

Source: Secondary data, PT. Bunga Teratai

Sales of KM Prince Soya services are based on the tariff structure imposed by PT Bunga Teratai

Receipt of service sales proceeds from the accumulated number of tickets sold according to the tariff structure that was applied for one month in 2013. This calculation uses the number of tickets sold for one month (4 trips) based on the assumption that all tickets were sold according to a price structure set for one month and sold in the same month. The price used in this calculation is the price of ticket sales for one month. Receipts from the sale of services always change from month to month. From the ticket sales results, total sales during 2013 were IDR 25,247,115,000.

The operational costs of KM Prince Soya for one year

Ship Operating Costs are costs incurred in connection with the operation of ships in a voyage, which is grouped on the cost component as long as the ship is at the port and ship costs during conducting shipping activities. The operational costs of KM Prince Soya in 2013 are grouped into 2, namely fixed costs) and variable costs. After going through the analysis and calculation, the total fixed cost of Prince Prince Soya in 2013 was IDR 14,757,600,000, while the total variable cost was IDR 1,609,484,000.

The effect of changes in ship operating costs and tariffs on the break even point value

Table 2 shows that the break-even point for KM Prince Soya for 2013 was IDR 15,762,443,551 (sales mix) or tickets sold for 53,131 (product mix) to reach the break-even. Table 3 shows that when the vessel operates using non-subsidized break-even point fuel oil, a value of IDR 26,990,204,611 will be achieved or 90,977 tickets must be sold.

Table 2. KM Prince Soya's *Sales mix* and *product mix*

Ticket type	Percentage of relative selling points	Sales mix	Product mix
VIP	6.33%	IDR 997,762,677	3.070
Class	35.98%	IDR 5,671,327,190	18.904
Economy	43.17%	IDR 6,804,646,881	27.774

Truck Car	3.25%	IDR 512,279,415	114
Small Car	5.59%	IDR 881,120,595	284
Motorcycle	5.68%	IDR 895,306,794	2.984
Total		**IDR 15,762,443,551**	**53.131**

Source: Analysis Results

Table 3. Sales mix and product mix if using non-subsidized fuel

Ticket type	Percentage of relative selling points	Sales mix	Product mix
VIP	6.33%	IDR 1.708.479.952	5.257
Class	35.98%	IDR 9.711.075.619	32.370
Economy	43.17%	IDR 11.651.671.331	47.558
Truck car	3.25%	IDR 877.181.650	195
Small Car	5.59%	IDR 1.508.752.438	487
Motorcycle	5.68%	IDR 1.533.043.622	5.110
Total		**IDR 26.990.204.611**	**90.977**

Source: Analysis results

The sensitivity of the break-even point value when the normal price of profit is IDR 8,880,031,000, when the ship uses non-subsidized fuel the vessel loses IDR 1, 631,969,000 and when the tariff is raised 72% the ship returns to IDR 867,633,600 profit. It can be seen in Table 4.

Table 4. Break-even point sensitivity

Explanation	Normal Price	Fuel Oil Rises	Value Rises
BEP	IDR 15,762,443,551	IDR 26,990,204,611	IDR 26,210,993,796
Lf	29.61%	50.71%	29.61%
The sales	IDR 25,247,115,000	IDR 25,247,115,000	IDR 27,110,949,600
(-) VC	IDR 1,609,484,000	IDR 1,609,484,000	IDR 973.716.000
Contribution margin	IDR 23,637,631,000	IDR 23,637,631,000	IDR 26,137,233,600
(-) FC	IDR 14,757,600,000	IDR 25,269,600,000	IDR 25,269,600,000
Profit	**IDR 8,880,031,000**	**IDR (-)1,631,969,000**	**IDR 867,633,600**

Source: Analysis results

Figure 1 shows the large percentage increase in ticket prices in order to achieve a break-even point if the load factor is assumed to be 29.61% so that it is obtained that the ticket price must rise by 72% for the ship to reach the break-even point value.

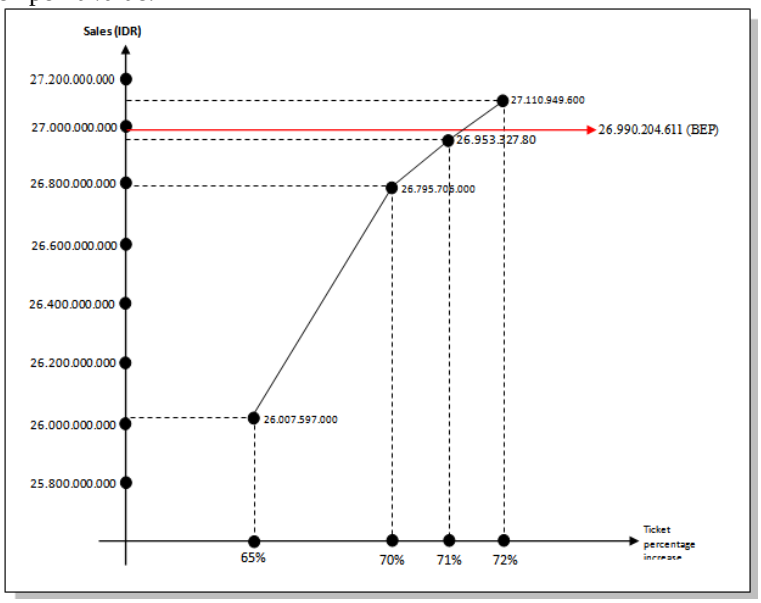

Figure 1. Percentage of ticket price increases

IV. Disucussion

This research shows that the total break-even point for 2013 is IDR 15,762,443,551. This value can be achieved at a load factor of 29.61%, which means that if the company plans to obtain certain benefits through the sale of services, the company must be able to obtain revenue a minimum of IDR 15,762,443,551. for a year. The BEP calculation results for 2013 in rupiah were IDR 15,762,443,551, which means that in 2013, the company was able to cover all operational costs to break even.

Calculating break-even points in rupiah to find out the amount of sales in rupiah at KM Prince Soya can be done as the previous calculation, but calculating break-even points in units cannot be directly carried out using existing formulas, this is because KM Prince Soya does not only sell one Only ticket types but selling 6 types of tickets. If a company produces or sells more than one type of product, the break-even points analysis can be applied to all goods produced or sold by the company (Munawir, 2004). For this purpose, the composition (comparison) between the goods must remain the same in both the product composition and the sale (product mix and sales mix). Sales mix is the ratio of sales between one product to another product, while the product mix is the ratio of the number of products sold between one product to another product.

Sales mix is used to find break-even (in rupiah) for each type of ticket, while the product mix is used to search for individual sales (in units). Sales mix can be calculated based on the percentage of the relative selling points of each ticket type, and the product mix can be calculated based on the sales composition divided by the selling price (tariff) of each ticket. The percentage of potential sales for each type of ticket is VIP 6.33%, Class 35.98%, Economy 43.17%, Truck cars 3.25%, Small cars/sedans 5.59% and Motorcycles 5.68%.

To determine the number of ticket sales and the number of tickets sold for each type of ticket, in order to obtain a break-even rate totaling IDR 15,762,443,551, the break-even rate is determined based on the sales mix composition and the number of ticket mixes (product mix).

Ship Operating Costs are costs incurred in connection with the operation of a ship on a voyage, which is grouped on the cost component while the ship is at the port and the ship's costs while the ship is conducting shipping activities (Kosasih et al. 2007). The fixed cost component that has changed is the cost of fuel consumption. As a result of these changes, an increase in fuel costs that previously IDR 7,920,000,000 increased to IDR 18,432,000,000 or increased by 132.7%. The increase caused the total fixed cost of the ship to rise from IDR 14,757,600,000 to IDR 25,269,600,000 or an increase of 71.23%. The percentage of fuel usage to the total fixed costs also experienced a change, from 53.67% to 72.94%, or an increase of 19.27%.

The total break-even point if it is assumed to use non-subsidized fuel oil is IDR 26,990,204,611, this can be achieved at a load factor of 50.71%, the value of this BEP has increased by IDR 11,227,761,060 or 71.23% when compared with BEP before using non-subsidized fuel oil, which is IDR 15,762,443,551. By looking at the level of break-even point if the assumption of using non-subsidized fuel with KM Prince Soya revenue in 2013 is IDR 25,247,115,000 then the income cannot cover all operational costs or the company suffers losses.

Seeing the results of the ticket sales of KM Prince Soya in 2013 which amounted to IDR 25,247,115,000, compared to the break-even point or sales target that must be achieved if an increase in fuel prices was IDR 26,990,204,613, it was concluded that the sales results were not enough to cover the entire operational cost of the ship, or it is certain that if KM Prince Soya continues to operate by using non-subsidized fuel and the number of passengers not experiencing an increase will incur losses.

One of the objectives of conducting a sensitivity analysis is so that the company can take appropriate action if there is a change in one of the factors affecting the company's profitability. Anticipating this, the management of the company PT. Bunga Teratai as the operator and owner of KM Prince Soya took steps to further increase revenue to offset the increase in fuel prices. Steps were taken for example by raising prices for each type of ticket. The step to increase ticket prices was taken because seeing load factor to reach BEP when ships using non-subsidized fuel reached 50.71%, to achieve a load factor of 50.71% was not easy. A strategy is needed to be able to attract even more potential passengers.

The load factor to reach BEP with a normal rate is 29.61%. When the price of fuel experiences an increase, there is a change in the number of fixed costs, so the BEP value increases and the load factor rises 50.71%. If the company determines an increase in ticket prices, the magnitude of the ticket price increase can be calculated assuming that the load factor (29.61%) is fixed, the cost of ship fuel rises, and the BEP value is IDR 26,990,204,613.

The break-even point value is reached at sales between IDR 26,953,327,800 and IDR 27,110,949,600 or when the ticket price rises between 71% to 72%, so it is certain that tickets must increase by 72% to reach a BEP value of IDR 26,990,204,613. Break the even point for a 72% ticket increase is based on a load factor of 29.61%, assuming the ship uses non-subsidized fuel of IDR 26,210,993,796. From the calculation that has been done, it is seen that there is a change in the level of total break-even point and the load factor before and after

the increase in fuel prices, and there is a change in the value of the BEP after the ticket price is increased by the load factor (29.61%).

V. Conclusion And Reccomendation

Based on the tariff structure imposed in 2013, the total revenue of KM Prince is IDR 25,247,115,000 and a total break-even point of IDR 15,762,443,551, so that revenue has reached the break-even point, this value is achieved at a load factor of 29.61%, or when the sales volume reached IDR 15,762,443,551 and the number of tickets sold was 53,131 tickets. The increase in fuel resulted in the break-even point value rising to IDR 26,990,204,611 or an increase of 71.23% when compared to before the increase in fuel prices. This value will be reached at a load factor of 50.71%. If the ship uses non-subsidized fuel, with a load factor of 29.61%, the ticket must go up by 72% to reach the break-even. To reach the break-even point, the company PT Bunga Teratai must maintain the current situation and still try to spend cost-effectively and efficiently, besides the use of non-subsidized BBM, it must be considered, this is based on government programs that will reduce subsidies from oil and gas sector. To anticipate the increase in fuel prices, the tariff must be changed.

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