Asymmetric Cost Behavior Concept Approach in Analyzing Changes in Sales to Operating Costs
(Research on Manufacturing Companies 2014 – 2019)

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Abstract: This study was conducted to find out the existence of asymmetric cost behavior in this case sticky costs in manufacturing companies on the Indonesia Stock Exchange for the period 2014 – 2019. Andersen, Banker, Janakiraman (2003) stated that sticky costs occur if the increase in costs caused by increased sales is higher than decrease in costs caused by a decrease in sales by the same level. Banker and Byzalov (2014) mention asymmetric cost behavior is a condition where the increase in costs and decrease in costs will be different when there is a change in sales at the same level.

The study used regression analysis to test the hypothesis and succeeded in obtaining evidence of sticky costs. A 1% increase in sales will result in a 0.990% increase in operating costs while a 1% decrease in sales will cause a 0.410% decrease. This is appropriate to support hypothesis 1 which states that there is an effect of changes in sales on operating costs which supports the concept of asymmetric cost behavior. The next test regarding the effect of the cost of adjusting the use of resources on the cost stickiness can also be proven, where the asset intensity which is used as the cost of adjusting the resource gets negative and significant numbers. However, hypothesis 3 regarding the effect of management's expectations on future sales has an effect on cost stickiness cannot be proven.

Keywords: asymmetric cost behavior, sticky cost, cost stickiness

1. Introduction

Management accountants develop information on cost accounting for top management and the management team to use in managing the company and making the company more competitive. This information covers four areas of management functions which include strategic management, planning and decision making, management and operational control, and preparation of financial statements. Of the four areas, strategic management is the most important function (Blocher, Stout, and Cokin 2010). Cost is an important factor in determining the company's performance. Profit is obtained by subtracting revenue from costs, or profit = sales – costs (Banker et al 2018). Understanding the behavior of costs will make it easier for management and users of financial statements to make decisions based on the information presented.

There is an assumption that costs will increase more when there is an increase in the volume of activity compared to a decrease in costs when there is a decrease in the volume of activity (Cooper and Kaplan 1998). The possibility of non-linear and proportional costs to changes in activity is now beginning to be recognized in the literature (Calleja, Steliaros, and Thomas 2006). Anderson, Banker and Janakiraman (2003) call this cost behavior sticky. Costs are categorized as sticky if the magnitude of the change in costs when there is an increase in volume is greater than the change in costs when there is a decrease in volume at the same rate as the increase.

Previous research has documented asymmetric cost behavior in the face of changes in sales (Anderson, Banker, and Janakiraman 2003). The increase in costs will be higher in the face of increased sales than the decrease in costs when there is a decrease in sales. This concept is known as sticky cost and anti-sticky cost or Banker and Byzalov (2014) call it an asymmetric cost behavior. This study will examine whether a similar cost behavior occurs on the Indonesia Stock Exchange (IDX) with the assumption that this study will result in asymmetric cost behavior in the relationship between selling costs and operating costs.
2. Method

The study took a population of companies listed on the IDX in the period 2014 – 2019. The sample companies in the study were companies that were included in the secondary sector group or the processing and manufacturing industries in JASICA. Data collection using purposive sampling method, namely data collection with certain criteria. The criteria set are:

1. The company is included in the secondary processing industry on the Indonesia Stock Exchange, which consists of three sector groups, namely the basic and chemical industry, various industries, and consumer goods for the period 2014 - 2019
2. The company reports financial statements for the period 2014 – 2019
3. Companies with sales value > operating costs in the period 2014 -2019
4. The company has complete data for the period 2014 – 2019

Research uses secondary data, namely data collected from other sources that were available before the research was conducted (Silalahi 2012), or data obtained by reading, studying and understanding through literature or document sources (Sugiyono 2012). The data is obtained from the IDX website and the annual report on the listed company's website

The variables used in this study are

1. Independent variables, namely variables that affect or cause changes or the emergence of other variables. The independent variables in this study are changes in sales, the amount of adjustment costs required, and management expectations
2. The dependent variable, namely the variable that is influenced or becomes a result of the existence of an independent variable. The dependent variable in this study is the change in operating costs

Data analysis using multiple regressions with data processing tools Statistical Product and Service Solution (SPSS) software. The formula used to test the hypothesis is to use the model used by Banker and Byzalov (2014).

\[
\Delta \ln C_{i,t} = \beta_0 + \beta_1 \Delta \ln S_{i,t} + \beta_2 D_{i,t} \Delta \ln S_{i,t} + \epsilon_{i,t} \]

\[
\Delta \ln C_{i,t} = \beta_0 + \beta_1 \Delta \ln S_{i,t} + (\beta_2 + \gamma_1 E_{t}) D_{i,t} \Delta \ln S_{i,t} + \epsilon_{i,t} \]

\[
\Delta \ln C_{i,t} = \beta_0 + \beta_1 \Delta \ln S_{i,t} + (\beta_2 + \gamma_2 SD_{i,t}) D_{i,t} \Delta \ln S_{i,t} + \epsilon_{i,t} \]

\[
C = \text{Cost} \\
S = \text{Sales} \\
D = \text{Decrease dummy is a dummy variable, a value of 1 if there is a decrease in sales between periods } t-1 \text{ and } t \text{ and 0 otherwise} \\
E = \text{Employee Intensity} \\
\gamma_1 = \text{The coefficient that measures the percentage of the influence of employee intensity} \\
SD = \text{Successive Decrease is an interactive Dummy variable for the decrease in sales of the previous two periods, the value is 1 if sales have decreased in the previous 2 consecutive periods and 0 otherwise} \\
\gamma_2 = \text{The coefficient that measures the percentage of the effect of successive decrease} \\
\beta_1 = \text{A coefficient measuring the percentage increase in operating costs when there is a 1% increase in sales} \\
\beta_1 + \beta_2 = \text{A coefficient measuring the percentage decrease in operating costs when there is a 1% decrease in sales} \\
\beta_2 = \text{The coefficient measuring the percentage of sticky costs} \]
3. Result.

Table 3.1 Descriptive Statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change in Operating Cost</td>
<td>275</td>
<td>-0.2686</td>
<td>0.2477</td>
<td>0.029523</td>
<td>0.0517216</td>
</tr>
<tr>
<td>Sales Change</td>
<td>275</td>
<td>-0.2518</td>
<td>0.2565</td>
<td>0.029497</td>
<td>0.0528938</td>
</tr>
<tr>
<td>Decrease Dummy</td>
<td>275</td>
<td>-0.2518</td>
<td>0.0000</td>
<td>-0.008096</td>
<td>0.0247558</td>
</tr>
<tr>
<td>Employee Intensity</td>
<td>275</td>
<td>-0.0347</td>
<td>0.0586</td>
<td>-0.000616</td>
<td>0.0069285</td>
</tr>
<tr>
<td>Successive Decrease</td>
<td>275</td>
<td>-0.0576</td>
<td>0.0000</td>
<td>-0.001102</td>
<td>0.0059001</td>
</tr>
</tbody>
</table>

Table 3.2 Value of Standardize Coefficient Beta

<table>
<thead>
<tr>
<th>No</th>
<th>Variable</th>
<th>Standardized Coefficients Beta</th>
<th>Sig</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sales Change</td>
<td>0.990</td>
<td>0.000</td>
<td>Equation 1</td>
</tr>
<tr>
<td>2</td>
<td>Decrease Dummy</td>
<td>-0.580</td>
<td>0.028</td>
<td>Equation 1</td>
</tr>
<tr>
<td>3</td>
<td>Employee Intensity</td>
<td>-0.410</td>
<td>0.037</td>
<td>Equation 2</td>
</tr>
<tr>
<td>4</td>
<td>Successive Decrease</td>
<td>-0.006</td>
<td>0.771</td>
<td>Equation 3</td>
</tr>
</tbody>
</table>

Asymmetric Cost Behavior

The results of the study in Table 3.2 show that equation 1 which is used to prove hypothesis 1 has a $\beta_1$ value of 0.990 with a significant level of 0.000 and a $\beta_2$ value of -0.580 with a significant level of 0.028. Andersen, Banker, and Janakiraman (2003), Banker and Byzalov (2014) use 1 as a constant that indicates an increase in operating costs when there is a 1% increase in sales, $\beta_2$ indicates the degree of sticky cost, and $\beta_1 + \beta_2$ indicates a decrease in operating costs when a decline occurs 1% sale. Testing on equation 1 shows that operating costs will increase by 0.990% when there is a 1% increase in sales. The value of $\beta_2$ of -0.580 will cause the value of $\beta_1 + \beta_2$ to be 0.410 (0.990 – 0.580), which means that operating costs have decreased by 0.410% when there is a 1% decrease in sales. The significance level of both which get results below 0.05 makes the significance level reached and prove the existence of asymmetric cost behavior. There is an effect of changes in sales on changes in operating costs that support the concept of asymmetric cost behavior in this case sticky costs. The increase in operating costs when there is an increase in sales will be greater than the decrease in operating costs when there is a decrease in sales with the same level of change in sales.

These findings are in accordance with research conducted by Andersen, Banker, and Janakiraman (2003), Calleja, Stelianos, and Thomas (2006), Banker and Byzalov (2014), they found that the increase in costs when there was an increase in sales was higher than the decrease in sales. costs when sales decline. These results are important for accountants or other financial services professionals who evaluate changes in costs to changes in sales. Evaluation of the relationship between the two should also consider the sticky cost factor so that the results issued are more accurate (Andersen, Banker, Janakiraman 2003)

Sticky costs occur because of management decisions to maintain the capacity to use resources when there is a decline in sales. When faced with declining sales, management tends to maintain the use of resources rather than risk incurring additional costs for negotiating contracts or reducing the use of resources (Calleja, Stealianos, and Thomas 2006).

An understanding of asymmetric cost behavior will result in better and more accurate planning and control processes. Careful planning can mitigate asymmetric cost behavior. To minimize the effect of asymmetric cost behavior, management requires the ability to identify and manage unused capacity or resources. This does not
mean simply reducing the use of resources which may or may not be feasible or business-friendly to do. The alternative solution is to focus on the market aspect to increase demand or shift unutilized resources to alternative activities (Calleja, Stealiaros, and Thomas 2006).

The sticky cost coefficient ($\beta_2$) depends on the conditions faced by the management and the company. Banker and Byzalov (2014) state that theoretically the asymmetric cost behavior will be different in each company or in one company at different times, so the sticky cost coefficient will not be the same for all samples. Even this coefficient will vary greatly for each sample.

The difference in asymmetric cost behavior between companies with different environments is in line with the premise of contingency theory which states that there is no universal approach that is suitable for all companies in every condition. Otley (1980) states that a different specific approach is needed which will depend on the conditions faced by the company. Differences in technology, organizational structure and environment faced by each company will make management make different decisions to adjust the use of resources in the face of declining or increasing sales.

Employee Intensity as a Proxy for Resources Adjustment Cost

The company's management will also be faced with a choice whether to immediately reduce the use of resources following the decline in sales or continue to use resources as at the previous level. In addition to considering the savings that can be made by reducing resource use following a decline in sales, management is also faced with the consequences of other costs that may arise along with a decrease in resource use, which are sometimes referred to as resource adjustment costs (Banker and Byzalov, 2014).

Adjusting the use of the number of workers who are bound by contracts or having an agreement with the employee union in the form of severance payments or compensation from premature termination will cause additional costs for the company if the option to reduce labor is carried out to follow the decline in sales. Sometimes the costs that must be incurred can be greater than the cost reduction resulting from the reduction in labor. Another illustration is a long-term contract with a raw material provider which has been agreed by management to provide raw materials in a certain volume which has a penalty clause if there is a reduction below the minimum limit. The decrease in the use of raw materials will cause compensation to be issued by the company.

The results in Table 3.2 show that equation 2 gets $\gamma_1$ of -0.410 with a significant level of 0.047. Employee intensity is a proxy for the amount of resource adjustment costs needed to adjust resource capacity, a negative sign on 1 indicates that the greater the adjustment cost, the more sticky cost behavior will be. This supports statement that the magnitude of the resource adjustment cost will increase the cost stickiness.

Changes in sales can reflect market conditions in the short term or shifts in demand in the long term for a product or service requirement. Management facing declining sales generally waits for complete information before making decisions to reduce resource use. This delay creates a sticky cost because unused resources are maintained in the time lapse between a sales drop occurring and a resource reduction decision being made. In addition, there will also be additional time since the decision to terminate the resource and realization of cost reductions because the contract termination process takes time.

Sticky costs will remain until management decides to reduce resource use, and the contract with the resource provider is terminated. The higher the costs that must be incurred by the company to stop or reduce the use of resources, the more it will encourage sticky costs (Andersen, Banker, and Janakiraman 2003). The use of employee intensity as a proxy for the magnitude of resource adjustment cost proves the magnitude of the resource adjustment cost will increase the cost stickiness.

The costs required to adjust the use of resources will be higher if the company uses more labor. Reducing labor costs a lot. The company must provide severance pay or service pay. In addition, the company will also lose the training costs that have been spent to develop these employees and will again incur costs for recruiting new employees when there is an increase in sales. Another effect that will be felt by employees from staff reduction is the level of productivity that falls because employee morale is down, as well as high employee turnover rates due
to reduced employee loyalty (Anderson, Banker, and Janakiraman 2003).

**Successive Decrease as a Proxy for Management’s Expectation**

The results of the study in Table 3.2 show that equation 3 which is used to prove management’s expectation and asymmetric cost behavior 3 gets $\gamma_2$ of -0.006 with a significant level of 0.771. The successive decrease which is a proxy for management’s expectations or management’s optimism towards future sales is marked – not in accordance with the hypothesis, the decline in sales in the previous two periods will make management less optimistic so that it reduces sticky cost behavior is not proven, a significant level obtained $\gamma_2 > 0.05$ was also considered insignificant. This means statements that management’s expectations of future sales will affect cost stickiness are rejected.

The decline in sales for 2 consecutive periods which generally made management pessimistic and lowered their expectations of sales in the future so as to reduce sticky costs (resulting in a + sign on 1) did not occur. Research conducted by Banker and Byzalov (2014) found that a decrease in sales for 2 consecutive periods will reduce sticky costs. This happens in America, European countries, and some countries in Asia except Malaysia. Meanwhile, research conducted by Armanto, Tiono, and Suthiono (2014) could not prove the existence of sticky costs in companies in Indonesia.

Ghofar and Islam (2015) write that the contingency theory states that the effectiveness of the company will depend on the alignment of the company's characteristics to the contingency that reflects the company’s situation. Contingency is a variable that moderates the company's characteristics on performance, including external and internal factors such as the environment or strategy. Contingency theory tries to explain the factors that affect the effectiveness of the company. Effectiveness is generally related to company performance.

The environment or situation faced by the company is seen as the main contingency factor that will shape the structure and strategy chosen by the company. Companies need strategies to adapt to changes that occur, strategies are used to find the best way to adapt to the business environment and beat competitors. Strategy formulation and implementation will require overall coordination to ensure the company's resources and capabilities are used optimally to support the achievement of company goals (Ghofar and Islam, 2015). This also affects the differences in research results in America and Europe, as well as parts of Asia.

Although the decline in sales for two consecutive years will reduce management's optimism, the decision regarding the use of resources in the next period will largely depend on the choice of the company's strategy in dealing with changing situations. Management's decision again plays an important role in determining whether the decline in sales for two consecutive periods makes it pessimistic in projecting sales for the following year. The pessimistic feeling that arises will make management adjust the use of resources to follow the downward trend in sales and it will result in a decrease in the degree of sticky cost ($\gamma_2 > 0$). On the other hand, if management believes that the decline in sales is only temporary and with the technology and a supportive organizational structure and environment, management decides to continue to use the level of resources as before, the decline in sales for two consecutive periods will not necessarily lead to a decrease in costs as much as a decrease in sales.

**4. Conclusion**

Based on the results of research and discussions that have been carried out regarding the Asymmetric Cost Behavior Concept Approach in Analyzing Sales Changes to Research Operational Costs, it can be concluded as follows:

1. There is an asymmetric cost behavior, in this case sticky costs in the relationship between changes in sales and changes in operating costs
2. The magnitude of resource adjustment costs using employee intensity as a proxy will increase cost stickiness
3. Management's expectations of future sales using a successive decrease for 2 consecutive periods as a proxy cannot reduce sticky costs
References