The Asymmetrical Cost Behavior: Cost Stickiness in Indonesian Listed Manufacturing Companies

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Abstract
The asymmetrical behavior of cost or sticky cost is a condition, where costs increase more when the activity rises compared to the decrease when the activity falls. This research applies the study of Ratnawati & Nugrahanti (2015) by using the phenomenal framework of sticky cost from Anderson, Banker, & Janakiraman (2003) against the previous inconsistent results in Indonesian listed manufacturing companies. This research uses 5 years period from 2011-2015 and 53 Indonesian listed manufacturing companies as sample. Then, net sales revenue and asset intensity are used to capture the stickiness of period costs, namely selling, general, and administrative costs (SG&A) and product costs, namely cost of goods sold (COGS), this measurement is then used in log linear panel data regression analysis. The result shows that the stickiness of selling, general, and administrative costs (SG&A) can't be proven in overall, cost of goods sold (COGS) is found to behave anti-sticky, and asset intensity has no significant effect towards the degree of costs stickiness.

Keywords: Cost Stickiness; Selling, general, and administrative costs (SG&A); Cost of goods sold (COGS), Net sales, Indonesian listed manufacturing companies

I. INTRODUCTION
The firms have complicated business environment needs to understand the role cost of management. It is a critical factor that management needs to have a look in order the company to success in the competitive advantage. An appropriate costs control provides additional value for firms in terms of running the business [1]. Managers encounter the issues in the business activities to ensure the profitability and sustainability of the company’s business performance. Thus, managers expect to have an effective costs control in their business. To have an effective costs control, it is important for the managers to understand cost behavior when net sales increase and decrease. Traditional cost method classifies costs as fixed costs and variable costs depending on the degree of change from the activity levels (Noreen, 1991; Lev & Thiagarajan, 1993). In addition, it explains the relationship between the cost and the activity in the period of time., for instance, when net sales increase 2%, the cost also increase 2% and vice versa ( [2]. However, Anderson, Banker, & Janakiraman (2003) analyze that in contrast to traditional cost method, some costs will increase significantly when the activity rises compared to cost decrease when the activity falls. It is named as “asymmetric cost behavior”, henceforth called “sticky cost.” The focus on accounting literatures for sticky cost thereafter has fundamentally been influenced by them. Anderson, Banker, & Janakiraman (2003) find an indication of sticky cost on period costs, in particular selling, general, and administrative costs (SG&A) toward net sales. They found that from 7,629 firms over 20 years from 1979-1998 that on average there is an increase by 0.55% in selling, general, and administrative costs (SG&A) for 1% increase in net sales. However, for 1% decrease in net sales they find that selling, general, and administrative costs

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(SG&A) respond to the decrease only by 0.35%. Meanwhile, Subramaniam & Weidenmier (2003) also find sticky cost behavior on product costs, in particular cost of goods sold (COGS). Managers must consider the benefit and the risk of cutting unutilized resources against current and future economic condition related to the adjustment costs such as the costs of hiring and training new employees, and buy new fixed assets [3]. Banker & Byzalov (2014) argues that agency problem can affect sticky cost behavior. They find that cost stickiness is high when the firm uses more resources such as labor and this is supported by Anderson, Banker, & Janakiraman (2003) and Banker, Flasher, & Zhang (2013) that the degree of costs stickiness as a result from deliberate managerial decision towards resource adjustments is affected by the firm’s strategic positioning in the business environment. Study sticky cost behavior not only conducted in developed countries, it conducted in developing countries i.e., Indonesia. Armanto, Tiono, & Suthiono (2014) studied the stickiness of selling, general, and administrative costs in the Indonesian listed companies. they find that the costs of selling, general, and administrative in the manufacture industry are behaving more sticky compared to extractive industry and service industry because of business to business relationship that requires high demand of labor in the sales and marketing department. Dezie & Tamara (2014) studied the impact of costs stickiness toward the profitability of Indonesian firms, they found that there is a negative relationship between sticky costs and firm’s performance. Ratnawati & Nugrahanti (2015) find that selling, general, and administrative costs (SG&A) are sticky in Indonesian listed manufacturing companies.

II. BACKGROUND OF THE STUDY

Firms with large assets and resources will have high degree of costs stickiness [3]. In addition, the adjustment of the costs will be high. It has been argued that it is easy to deduct the costs when net sales decrease unless there is long-term contracts exist. The firms have to choose either, they run the business with unutilized resources or they make a high adjustment of the costs that impact to net sales recover shortly, Thus, firms may experience profitability problem if the degree of costs stickiness is high. [3]. Contradict with Dezie & Tamara (2014), that sticky costs negatively affect the future profitability of the firm, instead firms must design their costs structure to overcome volatile sales and be more flexible spend in the operating. The degree of costs stickiness in the company in Indonesia is differs among the industries. A study finds that a high level in the manufacturing industry because of business to business relationship that requires high demand of labor in the sales and marketing department [4]. In addition, The degree of costs stickiness shows an inconsistent result in Indonesia. Kusuma (2012) finds sticky costs in Indonesian listed manufacturing companies but asset intensity has no significant effect towards sticky costs. It is similar vein with Endarwati & Nugroho (2013) that they could not find sticky cost behavior in Indonesian listed manufacturing companies. Hidayatullah, Utami, & Herliansyah (2011) find that there is no indication of sticky cost on cost of goods sold (COGS) but there is an indication of sticky cost on selling, general, and administrative costs (SG&A) in Indonesian listed manufacturing companies. The study about sticky cost behavior itself is interesting and found that inconsistent result of accounting studies on sticky cost behavior in Indonesian listed manufacturing companies needs further analysis. By investigating whether the proportion of SG&A and COGS when net sales increase is greater than the proportion of SG&A and COSG when net sales decrease in Indonesian listed manufacturing companies. In addition, four research questions are arise (1) Is the proportion of increase on selling, general, and administrative costs (SG&A) when net sales increase greater than the proportion of decrease on selling, general, and administrative costs (SG&A) when net sales decrease in Indonesian listed manufacturing companies. (2) Is the proportion of increase on cost of goods sold (COGS) when net sales increase greater than the proportion of decrease on cost of goods sold (COGS) when net sales decrease in Indonesian listed manufacturing companies (3) Does the degree of
selling, general, and administrative costs (SG&A) stickiness increase with the asset intensity of the company
(4) Does the degree of cost of goods sold (COGS) stickiness increase with the asset intensity of the company?

III. METHODOLOGY

The study use quantitative method by using secondary data. There are five main section in this section
(1). Sampling procedure and data collection (2). Research model and measurement (3). Hypothesis development

3.1. Sampling Procedure & Data collection

The population of the study is all Indonesian manufacturing companies listed in Indonesia Stock Exchange (IDX) which consist of 145 listed manufacturing companies in Indonesia Stock Exchange (IDX). The sampling method is purposive sampling. Due to different currency in the financial statement and the company should have positive net income during the period 2011 until 2015. Therefore, only 53 manufacturing companies are selected as sample of the study. Data is collected from manufacturing company that listed in Indonesian Stock Exchange (IDX). IDX provides financial statement and annual report from 2011 until 2015.

3.2. Research model and measurement

There are five latent variable in the study. Net sales revenue is independent variable, dummy variable and asset intensity are control variables and selling, general, and administrative costs (SG&A) and cost of goods sold (COGS) represent are dependent variables. Net sales revenue as the measurement of the variable, it also describes as sales revenue after deduct discount, return and allowance. Asset intensity describes as amount of capital needed per dollar of the revenue. Meanwhile, dummy variable explains as differentiate variable with constant value between one and zero. Dummy variables equals with one if the firm experiences sales decrease in year t, otherwise zero. Selling, general and administrative cost (SG&A) represent the period cost in the financial statement while Cost of Goods Sold (COGS) represent product cost. Furthermore, four research model is developed

3.2.1. The research model 1 for the stickiness of selling, general, and administrative costs (SG&A) :

\[
\log \left( \frac{SG&A_{i},t}{SG&A_{i},t-1} \right) = \beta_0 + \beta_1 \log \left( \frac{Revenue_{i},t}{Revenue_{i},t-1} \right) + \beta_2 \times Decrease\_Dummy_{i,t} \times \log \left( \frac{Revenue_{i},t}{Revenue_{i},t-1} \right) + \epsilon_{i,t}
\]

3.2.2. The research model 2 for the stickiness of cost of goods sold (COGS):

\[
\log \left( \frac{COGS_{i},t}{COGS_{i},t-1} \right) = \beta_0 + \beta_1 \log \left( \frac{Revenue_{i},t}{Revenue_{i},t-1} \right) + \beta_2 \times Decrease\_Dummy_{i,t} \times \log \left( \frac{Revenue_{i},t}{Revenue_{i},t-1} \right) + \epsilon_{i,t}
\]

3.2.3. The research model 3 for the stickiness of selling, general and administration (SG&A) with Asset Intensity:

\[
\log \left( \frac{SG&A_{i},t}{SG&A_{i},t-1} \right) = \beta_0 + \beta_1 \log \left( \frac{Revenue_{i},t}{Revenue_{i},t-1} \right) + \beta_2 \times Decrease\_Dummy_{i,t} \times \log \left( \frac{Revenue_{i},t}{Revenue_{i},t-1} \right) + \beta_3 \times \epsilon_{i,t}
\]
3.2.4. The research model 4 for stickiness of cost of goods sold (COGS) with Asset Intensity:

\[
\log\left(\frac{\text{COGS}_i, t}{\text{COGS}_i, t - 1}\right) = \beta_0 + \beta_1 \log\left(\frac{\text{Revenue}_i, t}{\text{Revenue}_i, t - 1}\right) + \beta_2 \times \text{Decrease Dummy}_i, t \times \log\left(\frac{\text{Revenue}_i, t}{\text{Revenue}_i, t - 1}\right) + \beta_3 \times \text{Decrease Dummy}_i, t \times \log\left(\frac{\text{Revenue}_i, t}{\text{Revenue}_i, t - 1}\right) + \epsilon_i, t
\]

### 3.3. Hypothesis development

Based on measurement variable above, therefore four hypothesis developed namely,

**H1:** The proportion of increase on selling, general, and administrative costs (SG&A) when net sales increase is greater than the proportion of decrease on selling, general, and administrative costs (SG&A) when net sales decrease in Indonesian listed manufacturing companies for the period 2011-2015. Selling, general, and administrations costs (SG&A) are sticky to changes in sales level.

**H2:** The proportion of increase on cost of goods sold (COGS) when net sales increase is greater than the proportion of decrease on cost of goods sold (COGS) when net sales decrease in Indonesian listed manufacturing companies for the period 2011-2015. Cost of goods sold (COGS) is sticky to changes in sales level.

**H3:** The degree of selling, general, and administrative costs (SG&A) stickiness increases with the asset intensity of the company. Asset intensity is associated with selling, general, and administrative costs (SG&A) stickiness.

**H4:** The degree of cost of goods sold (COGS) stickiness increases with the asset intensity of the company. Asset intensity is associated with cost of goods sold (COGS) stickiness.

### 3.4. Descriptive statistic

Descriptive statistic explains average, highest, lowest and deviation value for all the variables from 2011 until 2015. Table 1 shows LogΔSales value is 0.050885 in average with the highest value of 0.352863 coming from PT Wilmar Cahaya Indonesia Tbk in 2013 and lowest value of -0.154283 derived from PT Lionmesh Prima Tbk in 2015. The standard deviation of LogΔSales variable shows 0.059167, bigger than its mean value meaning that the data is highly dispersed. LogΔCogs value is 0.051983 in average from total 265 number of observations. The highest value of LogΔCogs is 0.382707 resulting from PT Wilmar Cahaya Indonesia Tbk in 2013 and lowest value of -0.149916 coming from PT Lionmesh Prima Tbk in 2015. Higher standard deviation value at 0.061936 than mean value indicates that the data are spread out over a large range of values. LogΔSga is 0.051369 from total 265 number of observations. The highest value is 0.593333 resulting from PT Star Petrochem Tbk in 2011, its lowest value derived from PT Nusantara Inti Corpora.
Tbk in 2011 with score -0.340188. A standard deviation value of 0.068474 is bigger than its mean score, indicating that the data is highly diverse. Meanwhile, the highest value of LogAssetIntensity is 0.653810 coming from PT Nusantara Inti Corpora Tbk in 2013, while the lowest value of LogAssetIntensity is -0.459805 resulting from PT Wilmar Cahaya Indonesia Tbk in 2014. A standard deviation of 0.199985 is acquired and is bigger than the mean value. Dummy*LogΔSales*LogAssetIntensity also shows a negative average of -0.000450. The highest value of Dummy*LogΔSales*LogAssetIntensity is 0.017842 coming from PT Lionmesh Prima Tbk in 2015. Then, the lowest value is -0.042413 resulting from PT Nusantara Inti Corpora in 2012. The standard deviation of Dummy*LogΔSales*LogAssetIntensity is 0.004573, higher than its negative mean value.

3.5. Assumption test

The classical assumption test consists of normality test, multicollinearity test and heteroscedasticity test. The classical assumption test aims to ensure that data free from error therefore, avoid misstatement. The results shows that the data does not diverse and it distributes normally. Furthermore, no multicollinearity and heteroscedasticity occur as a results of the testing.

IV. Result analysis

The study uses E-views 9.0 software to test the hypothesis. The hypothesis is tasted in order to find the relationship between the variables of the study. Table 4.1. shows the result of testing hypothesis one which is adjusted R-square 0.366618 and F-test 0.0000. It indicates independent variable i.e., sales revenue and decrease_dum as control variable simultaneously affect the dependent variable i.e., selling, general, and administrative costs (SG&A). Furthermore, the coefficient value of β1 that shows from LogΔSales is 0.426497 and t-value 6.617539 is significant with p-value 0.0000. at the same time, coefficient value β2 is -0.011930 with t-value -0.059504 and -value 0.9526 is not significant. It indicates that decrease_dum as control variable does not significantly affect to SG&A as dependent variable. In addition, the results of combination β1+β2 is 0.414567, it means SG&A decrease 0.414% for every 1% decrease in net sales revenue and net sales revenue increase by 1%, SG&A increase by 0.426%. the results indicates that there is asymmetrical cost behavior on SG&A in Indonesian listed manufacturing companies from period 2011-2015. It occurs when SG&A increase then net sales revenue also increase and vice versa. However, another result shows differently that p-value of β2 does not significant due to its greater than .05, thus the stickiness SG&A cannot be proven. In addition, it is contradicting with framework of Anderson, Banker, & Janakiraman (2003) that SG&A sticky with net sales. The insignificant between the result shows that managers in manufacture companies are able to manage and adjust between SG&A with sales revenue therefore it leads to anti-sticky cost behavior on SG&A in listed manufacture companies in Indonesia. thus, H1 is rejected

| Variables                  | R-Squared   | Adjusted R-squared | F-test   | Prob (F-statistic) |
|----------------------------|-------------|--------------------|----------|--------------------|
| Constant (x)               | 0.496687    | 0.366618           | 3.818662 | 0.000***           |
| LOGΔSALES (β1)             | .029        | .427               | .012     | .952               |
| DUMMY*LOGΔSALES (β2)       |             |                    |          |                    |
Significance level *(0.1) **(0.05) ***(0.01)

The second test is to examine the hypothesis two. Table 4.1 shows that adjusted R-square 0.963939 and F-test 0.0000, it indicates net sales revenue and decrease dummy as control variable affect the COGS simultaneously. The results show coefficient \( \beta_1 \), which is LogΔSales has a positive value of 1.011366. It means COGS increases 1.011% every 1% increase in net sales revenue. In addition, the coefficient \( \beta_1 \) with t-value of 61.27036 is significant with 0.0000 p-value. The results show partially prove that net sales revenue affect to COGS. However, Coefficient \( \beta_2 \) which has p-value 0.78 is bigger than 0.05 and this is not significant. It shows that decrease dummy variable does not significantly affect to COGS. The combination coefficient \( \beta_1 \) and \( \beta_2 \) is 1.027 which means the COGS decrease by 1.027% for every 1% decrease of net sales revenue. In addition, COGS in manufacturing companies in Indonesia behave anti-sticky. It shows that the managers of the companies are pessimistic that COGS would adjust when net sales decrease. Thus, \( H_2 \) is rejected.

| Variables                  | R-Squared 0.964293 | Adjusted R-squared 0.963939 | F-test 2727.538 | Prob (F-statistic) 0.000*** |
|----------------------------|---------------------|----------------------------|----------------|----------------------------|
| Constant (x)               | .000                | .321                       |                |                            |
| LOGΔSALES (\( \beta_1 \)) | 1.01                | ***                        |                |                            |
| DUMMY*LOGΔSALES (\( \beta_2 \)) | .015       | .789                       |                |                            |

The third test is to examine the hypothesis three and the result shows adjusted R-square is 0.3439. model 3 uses assets intensity as control variable. Table 4.3 shows that f-test is 0.0000, Coefficient \( \beta_1 \), which is LogΔSales is 0.414928, t-value 6.395224 which means net sales revenue with assets intensity has partially affect to COGS. On the other hand, Coefficient \( \beta_2 \) which has value of 0.048585, t-value of 0.242401, and p-value of 0.8087 have not significant due to its p-value >0.05. It is similar with \( \beta_3 \) which has p-value is greater than 0.05. the overall of the results shows that assets intensity has not significant affect on the degree of selling, general and administrative (SG&A) stickiness. Based on the result shows, despite focus on asset intensity, the manager company put their attention on the fluctuation on sales revenue due to make adjustment on SG&A. the managers assume that as long as the company could generate high profit, assets intensity either high or low will not be adjusted to SG&A. thus \( H_3 \) is rejected.

| Variables                  | R-Squared 0.481627 | Adjusted R-squared 0.343980 | F-test 3.499003 | Prob (F-statistic) 0.000*** |
|----------------------------|--------------------|----------------------------|----------------|----------------------------|
|                            |                    |                            |                |                            |

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The final result is to examine final hypothesis. Table 4.4 shows adjusted R-square is 0.964310. by adding assets intensity as control variable the result shows that t-test is significant with 0.000. Coefficient $\beta_1$, which is LogΔSales has a p-value 1.01089 and t-value 61.55068. it shows that net sales revenue affects cost of goods sold (COGS). on the other hand, Coefficient $\beta_2$ has a positive value of 0.007823, t-value of 0.133767 and p-value of 0.8937. result of p-value does not significant due to surpass 0.05. Coefficient $\beta_3$ has a positive value of 0.372762, t-value of 1.760648, and p-value of 0.0798. similar with Coefficient $\beta_2$, result of p-value does not significant due to surpass 0.05. based on the result, it would be assume that degree of cost of goods sold (COGS) stickiness increases with the asset intensity of the company, then the coefficient value of $\beta_2$ and $\beta_3$ should be less than zero and significant <0.05. Thus, asset intensity has no effect towards the degree of cost of goods sold (COGS) stickiness. Based on the results, indicates that COGS easy to adjust when net sales increase. The managers do not consider high or low assets intensity to adjust the COGS, instead focusing on fluctuation net sales revenue, thus $H_4$ is rejected.

| Hypothesis | Assumption | Result |
|-------------|------------|--------|
| $H_1$: The proportion of increase on selling, general, and administrative costs (SG&A) when net sales increase is greater than the proportion of decrease on selling, general, and administrative costs (SG&A) when net sales decrease in Indonesian listed manufacturing companies for the period 2011-2015. Selling, general, and administrations costs (SG&A) are sticky to changes in sales level | + | Rejected |
| $H_2$: The proportion of increase on cost of goods sold (COGS) when net sales increase is greater than the proportion of decrease on cost of goods sold (COGS) when net sales decrease in Indonesian listed manufacturing companies for the period 2011-2015. Cost of goods sold (COGS) is sticky to changes in sales level | + | Rejected |
| $H_3$: The degree of selling, general, and administrative costs (SG&A) stickiness increases with the asset intensity of the company. Asset intensity is associated with selling, general, and administrative costs (SG&A) stickiness | + | Rejected |
| $H_4$: The degree of cost of goods sold (COGS) stickiness increases with the asset intensity of the company. Asset intensity is associated with cost of goods sold (COGS) stickiness | + | Rejected |

V. CONCLUSION

The fluctuation on net sales revenue plays important role to capture the asymmetric cost behavior phenomena. Cost is sticky when the proportion of increase on cost when net sales revenue increase is bigger than the proportion of decrease on cost when net sales revenue decrease, if the proportion of decrease on cost when net sales revenue decrease is bigger than the proportion of increase on cost when net sales revenue increase, then it is called anti-sticky. Both sticky and anti-sticky cost behavior is affected by deliberate managerial decision regarding resource adjustment costs and sometimes agency problem. The study finds that SG&A in listed manufacture company in Indonesia are behaved sticky with net sales revenue.
revenue. However, the existence of the stickiness of selling, general, and administrative costs (SG&A) in Indonesian listed manufacturing companies cannot be proven and the difference value is not statistically significant and lead to anti-sticky cost behavior. It also indicates that the management would make the decision in terms of adjusting economic resources when net sales revenue decrease. Meanwhile, COGS in listed manufacturing companies are behaved anti-sticky. This is because it is easy to adjust COGS when net sales revenue be fluctuated compare to adjust SG&A to net sales revenue. Furthermore, asset intensity does not significant play role to the degree of stickiness COGS and SG&A. this is because the behavior of managers to adjust the costs based on the fluctuate of net sales revenue. It gives the signal that pessimistic behavior of the managers which they attend to reduce the firm resources including the costs when net sales revenue of the company reduce.

This study cannot be generalized since the sample of study is manufacture company in Indonesia. The results will be different to others countries especially for developed country which is net sale revenue could be predicted. Furthermore, the result also be different to trading companies which is different components and recognition of SG&A and COGS.

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