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Optimism and profit-based incentives in cost stickiness: an experimental study

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Abstract

This study aims to examine whether managerial optimism and profit-based incentives affect cost behavior asymmetry, especially cost stickiness. Differ from previous literature on cost stickiness, the researchers use an experimental 2 × 2 between-within subjects factorial design. This design allows us to use data related to cost management specifically, not just in general term as in studies using archival data from public financial statements. Our study results reaffirm cost stickiness literature. This study focuses on experiments among accounting students who are not knowledgeable about cost behavior asymmetry. Even though our 71 student participants know only the symmetric cost behavior theory, when presented with a scenario related to sales prospects and information on profit-based incentives, the results of this study show otherwise. When participants are more optimistic and profit-based incentives have been achieved, the level of cost stickiness is also higher.

Keywords Asymmetric cost behavior · Cost stickiness · Experiment · Optimism · Profit-based incentives

JEL Classification M40 · M52

1 Introduction

Research on cost stickiness was initiated by Anderson et al. (2003) and was supported by many other researchers (Bugeja et al. 2015; Cheung et al. 2018; Kitching et al. 2016; Uy 2016; Xu and Sim 2017). Even so, until now, cost accounting textbooks discuss only the traditional cost behavior models. Traditional cost behavior

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theory states that cost behavior is symmetrical with the volume of activities. By contrast, the cost stickiness literature states that, in addition to technical problems, cost behavior is also influenced by nontechnical considerations such as regulatory considerations (Banker et al. 2013; Prabowo et al. 2018), institutional constraints (Cohen et al. 2017; Nagasawa 2018), and technological constraints (Anderson and Lanen 2007; Kama and Weiss 2013). Based on the existing sticky cost literature, Guenther et al. (2014) summarized that the causes of sticky costs are legal aspects, social and personnel policies, company policies and operations, psychological reasons, and agency-related issues. Further, (Malik 2012) states that factors influencing the level of cost stickiness are managers' deliberate decisions, managers' optimism, technological constraints, employee intensity, asset and debt intensities, capacity utilization, adjustment costs, agency problems, and GDP growth.

This study uses an experimental design, while previous studies on cost stickiness used archival data. Archival data are generally available in aggregate form for public purposes. The discussion of cost behavior using aggregate data is less precise because it provides limited insight (Anderson et al. 2003; Brüggem and Oliver 2014). The experimental design helps in understanding the cost behavior since the scenario provided uses specific cost data. In addition, archival data usage for managerial accounting research is deemed to be inappropriate because operational constructs (in the archival data) are not in accordance with theoretical concepts (Moers 2007), such as in the use of nominal sales data as a proxy for sales volume. Similarly, Argilés-Bosch et al. (2017) realized the limitations of their studies because they calculated sales expectations based on financial statement data that may not reflect the actual expectations of managers. The experimental design is considered better in explaining the managers' expectations as a trigger for cost stickiness (Brüggem and Oliver 2014).

This study examines the influence of optimism and profit-based incentives on the management of idle resources. More specifically, the study intends to determine whether managers cut resources immediately to alleviate idle capacity situations. Managers who are optimistic about future sales prospects may tend to maintain the idle resource capacity. In previous literature, cost stickiness almost always depends on managers' optimism level. Previous studies found that, using different, high manager optimism triggers asymmetric cost behavior. Conversely, for managers who have not achieved their targeted profits, the desire to reduce idle resource capacity will be greater, which, in turn, decreases the cost stickiness level.

This study uses experiments with a 2×2 between-within subject factorial design. Each factor has two levels of optimism and achievement of profit-based incentives. The dependent variable is cost stickiness proxied by the changes of number of machines leased. We use sales change direction as within-subject so the size of changes to resource adjustments when sales are increasing and decreasing can be compared. When sales increased, the number of leased machines was immediately increased. Conversely, the number of machines leased should be immediately reduced when sales decrease. Smaller changes when sales decrease than when they increase will cause a high degree of cost stickiness. Symmetrical cost behavior theory states that resources will be cut when sales decrease (assuming no inventory), and therefore a too high number of leased machines (smaller

adjustments) indicates cost asymmetry. We designed scenarios to resemble actual practices but uses simple languages to ensure correct understanding by the experiment participants. The participants were 71 undergraduate accounting students in their fifth semester. All participants had taken management accounting courses in the previous semester. Participants were grouped according to the results of a Life Orientation Test-Revision (LOT-R) measurement (Scheier et al. 1994) to assess their optimism. Then, the participants were randomly divided into four groups after carrying out a gender-matching process. Randomization was done by *randomizer.org*. Testing was done using two-way ANOVA. Extraneous variables (gender, age, and understanding of the cost stickiness concept) have been controlled and tested. No effect of extraneous variables on resource management decisions was found.

Consistent with previous cost stickiness literature, this study found statistically significant evidence that interaction of managerial optimism with sales change direction and profit-based incentives with sales change direction affect the level of cost stickiness. Compared to times when sales increased, the amount of resource adjustments when the sales decreased was, in fact, lower for managers with high optimism and also lower when profit-based incentives had been achieved. The higher the manager optimism, the higher is the cost stickiness degree (as in Yasukata and Kajiwara 2011; Namitha and Shijin 2016). Optimism triggers managers' confidence about the future; consequently, they become reluctant to reduce the resource capacity even though activity volumes is currently declining. Conversely, when managers with profit-based incentives have not reached their profit targets, the desire to cut resources tends to be greater when sales decrease. Thus, the cost stickiness degree tends to be lower. When the profit target has not been reached, managers tend to cut resources, even though optimism is high (Kama and Weiss 2013).

This study provides insight into asymmetric cost behavior using an alternative different research design. Our study sought to overcome the weakness of the archival data used in previous literature. The authors designed scenarios using specific cost data and linked them to activity volume. Our study confirms the findings of previous studies that cost behavior is asymmetrical. Our study contributes to the development of management accounting literature related to cost accounting and cost management textbooks. So far, the cost behavior textbooks addresses only the traditional cost behavior, in which costs are either fixed or variable. The concept of cost behavior asymmetry should be included in accounting courses because it is used in discussing other management accounting materials such as cost volume profit analysis and tactical decision-making analysis. In practice, understanding cost behavior asymmetry will help managers to be aware of the decisions taken regarding resource capacity management, such as in determining selling prices.

The remainder of this paper is organized as follows. Section 2 presents the literature review and hypotheses development of the influence of optimism and profit-based incentives on cost stickiness. Section 3 describes the research methodology, and Sect. 4 discusses the results and discussion of the experimental research. Finally, Sect. 5 presents conclusions, limitations of the study, and suggestions for further research.

2 Literature review and hypotheses development

2.1 Cost stickiness

Traditional cost behavior theory classifies costs as fixed and variable costs (Hansen and Mowen 2007; Maher et al. 2008; Horngren et al. 2012; Atkinson et al. 2012). Similarly, costs can also be classified according to resource type, namely, flexible and capacity resources (Atkinson et al. 2012). The flexible resources cost is often referred to as variable cost because the total cost depends on the amount of resources consumed. The capacity resources cost is often called fixed cost because this cost does not depend on the amount of resources used in the short term but rather depend on the capacity of the resources obtained.

Cost behavior researches find results that are contrary to traditional theory. Anderson et al. (2003) concluded that costs have an asymmetrical behavior. The magnitude of the increase in costs, which is associated with increased activity, is greater than the magnitude of the decline associated with a decrease in equivalent activities. This is referred to as sticky cost behavior (Anderson et al. 2003). Previous literature examines sticky cost behavior at various types of costs, such as selling and general administrative costs (Xi et al. 2013; Via and Perego 2014; Uy 2014; Venieris et al. 2015; Namitha and Shijin 2016; Chae and Ryu 2016; Xue and Hong 2016; Cheung et al. 2018; Subramaniam and Watson 2016; Argilés-Bosch et al. 2017), operating cost (Kama and Weiss 2013; Banker et al. 2013; Bugeja et al. 2015; Uy 2016; Kitching et al. 2016; Xu and Sim 2017; Mohammadi and Taherkhani 2017; Li and Zheng 2017), cost of goods sold (Via and Perego 2014; Subramaniam and Watson 2016; Uy 2016), and labor cost (Prabowo et al. 2018).

The previous CS literature stated that managers deliberately maintain unused resources due to adjustment costs or transaction costs that are estimated to be greater than the costs that could be saved if they cut resources. Cost stickiness can be considered a good signal if managers consider their decisions to prevent adjustment costs (Anderson et al. 2003; Banker et al. 2013; Venieris et al. 2015; Sepasi and Hassani 2015; Eltivia et al. 2017; Li and Zheng 2017). The triggers of adjustment cost include asset intensity, worker intensity, legal considerations, social system reasons and worker policies, and company operational policies (Guenther et al. 2014). If the manager has information about future demand on capacity and can predict revenue that might be obtained in the future, then managers will consider this in resource management decisions (Lohmann 2015). To really optimize this decision, it is important to know what kind of adjustment cost occur for an increase or decrease in lease capacity. This adjustment cost will have an impact on the company's performance in the future; for example, its earnings performance. Decision making without considering these costs will cause the company's value to be harmed.

2.2 Optimism and cost stickiness

In practice, it is said that a good leader emits positive energy and is optimistic. They are trying to overcome the negativism gravity.¹ Good leaders display an enthusiastic attitude and try to overcome challenges. Optimism is defined as a trait that results in the belief that positive results will occur in the future (Carver et al. 2010; Gallagher and Lopez 2009; Miceli and Castelfranchi 2010; Trevelyan 2008). Optimism and pessimism directly affect a person's feelings when they face a problem (Carver et al. 2010). Research has shown that someone who views the future positively is able to respond to difficulties in a way that is better than someone who has negative expectations (Bracha and Brown 2012).

Managers' behavior in decision-making regarding managing resource capacity is influenced by their optimism, which in turn influences cost asymmetry (Armanto et al. 2014; Banker et al. 2014a; Chen et al. 2015; Li and Zheng 2017). The level of cost stickiness will increase along with the level of optimism of the manager (Guenther et al. 2014), especially with regard to sales prospects. Recent research on the retail industry shows a declining trend showing that the level of competition is fierce, thus reducing the competitiveness of companies, this triggers managers to increase spending on innovation (Krisnadewi and Soewarno 2020). Managers who are optimistic about future sales prospects use radical innovation strategies that tend to increase innovation spending.

Optimism is a positive view of the future and can help someone understate uncertainty, feel confident about good results in the future, and strive to operate their best in a supportive situation (Hecht 2013; Liang and Dunn 2010). In cost stickiness literature, the proxy for managers' optimism is measured by the increase in sales that occurred two years in a row (Anderson et al. 2003; Banker et al. 2013; Kama and Weiss 2013; Li and Zheng 2017), the GDP level (Anderson et al. 2003), and sales forecast (Argilés-Bosch et al. 2017; Yasukata and Kajiwara 2011). When managers feel optimistic about future sales prospects, they tend to maintain the current unused resource capacity. Conversely, if managers are less optimistic, they tend to cut unused resources, and the cost stickiness degree will consequently decrease.

H1 Managerial optimism positively affects cost stickiness.

2.3 Profit-based incentives and cost stickiness

In companies managed by non-owner, agency theory shows that inconsistencies of interests will emerge between owner(s) and manager(s) (Jensen and Meckling 1976). Managers, as agents, are expected to act in their own interests. To overcome this agency problem, the manager's performance will be evaluated, and the owner will provide some incentives based on the performance (Fama 1980; Fama and

¹ <https://www.newsweek.com/how-be-good-leader-115757> 3 April 2005 How be good leader. Accessed 14/3/2020.

Jensen 1983; Jensen and Meckling 1976). Business owners generally use profit performance measures to motivate agents to make various efforts that benefit the owner. For example, by providing cash or stock plus option compensation incentives based on the company's profit performance (Flor et al. 2014; Rhodes 2016). According to agency theory, incentives for managers are very positively related to company performance, for example measured by shareholder return and sales growth (Baber et al. 1996; Jensen and Meckling 1976; Murphy 1985).

Literature related to earnings management shows that profit is very crucial and is often used by stakeholders in assessing company performance (Roychowdhury 2006; Koo et al. 2015). Profit-based incentives are expected to motivate managers to act in the owner's interests. Providing incentives in accordance with company performance is a compensation strategy to align executive compensation with company success. Incentives related to company performance will motivate managers to work harder and make better decisions for owners² (McClure 2019).

In managing resource capacity, managers must decide whether or not to adjust resource capacity when facing changes in demand. When there is an increase in sales demand, managers tend to want to increase their resource capacity in order to meet the increase. Conversely, when there is a decline in sales, managers tend to want to cut their resource capacity. However, according to agency theory, managers need to consider whether their actions are in line with the wishes of the company owner. Therefore, managers consider their incentives when deciding whether or not to adjust resource capacity. This also includes considering future demand and its effect on resource capacity, which in turn will affect future incentives. Problems with incentives occur when managers pursue company goals based on short-term preferences and tend to ignore owner time preferences (Lohmann 2015).

The trimming of resource capacity when there is a decline in sales is often followed by an increase in the cost of adjustment that may occur in the next period. The cost of this adjustment is likely to be greater than the savings obtained from cutting resource capacity. Therefore, when the profit target has been met, despite a decline in sales, managers tend to maintain their resource capacity, causing cost stickiness. Otherwise, when managers have not reached their profit target, they tend to cut resources then the cost stickiness tends to weaken (Kama and Weiss 2013; Xi et al. 2013; Weijden and van der 2013; Brüggem and Oliver 2014; Bugeja et al. 2015; Xue and Hong 2016; Xu and Sim 2017).

H2 Incentives on profit targets reduce cost stickiness only when profit targets have not been reached, yet.

2.4 Interaction between optimism and profit-based incentives

The cost stickiness literature that measures the influence of optimism and profit-based incentives generally test these variables independently. The use of factorial

² <https://www.investopedia.com/managing-wealth/guide-ceo-compensation/> Accessed 14 March 2020.

design allows us to examine interaction effect between the two variables. An interaction effect occurs when the effect of one independent variable on the dependent variable depends on the level of a second independent variable (Gravetter and Wallnau 2013). In this case, we may find that the influence of the level of optimism on resource adjustment will differ depending on the achievements of manager incentives. Planned behavior theory state that if people feel some significant factors cause them to evaluate something as being positive, then this feeling will lead to a greater intention to undertake an action (Ajzen 1991). When managers evaluate sales prospects as positive (high optimism) and are supported by bonus achievement, they tend to maintain the unused resource capacity, consequently increasing the cost stickiness. Conversely, if the costs incurred because of unused capacity affect the acquisition of bonus incentives accompanied by less convincing sales prospects (low optimism), then the cost stickiness tends to weaken.

In addition to the interaction between optimism and incentives, this study also looks at how changes in sales direction have different effects on cost adjustment decisions. However, the existence of any dilemma between the factors cannot be ascertained. For example, what will happen when there is high optimism but the profit target has not been achieved when there is a decrease in sales? Therefore, because of the lack of clarity on the interaction of achieving profit targets and optimism when there is an increase or decrease in sales in affecting cost stickiness, the researchers do not state the related hypotheses.

3 Method

3.1 Design and manipulation

We used a mixed 2×2 between-within subject factorial design to test the hypotheses. Participants first completed the Life Orientation Test-Revision (LOT-R) measurement (Scheier et al. 1994) to assess their optimism. We calculated the average, to divide them into high optimism and low optimism (first factor: optimism). Each level (high and low optimism) was then divided into two groups, so there were four groups. The same scenario was used for four groups and distinguished between only the statements and data related to manipulation, namely, whether the profit target was achieved. The within-subjects variable is constructed so that all participants have to make two decisions related to sales changes direction: a sales increase and a sales decrease. Participants would receive these sales change treatments in random order. To control recording errors, the participant's responses were recorded by participant's mobile phone. The experiment was carried out using pencil and paper, but they answered the questions using a link to a Google form.

The participants were asked to act as directors of a hypothetical company that produces packaged food. For production, the company was stated to be using 10 machines (both for increasing and decreasing sales situations) and five were leased (decreasing sales only). Every machine was assumed to produce one million units optimally every year. The leased machine contract was stated to be expiring in the current year (2019) and the minimum period of contract for leased machine was five

years. Due to changes direction in sales demand (within-subject), the director had to decide whether to increase (or decrease) the amount of leased machines when there was an increase in sales (decrease in sales) as an absolute number, which is 5 million units (equivalent to 5 machines).

The second manipulation given in our scenario is related to achieving profit targets. The scenario stated that the director bonus incentives will be given if the profit target has been reached (based on return on asset – ROA). The effect of the number of leased machines on profit incentives (ROA) was modified for the current year's conditions (2019). For groups A and B, profit incentives can be achieved by the Director regardless of the number of machines leased, both when there is an increase or decrease in sales. On the other hand, for groups C and D, profit incentives can only be achieved when the Director decides not to add to the number of machines leased. The authors also modified the impact of the decision on the number of machines leased during the year in terms of the subsequent year's performance to show transaction costs or adjustment costs that are likely to occur. When the Director leases an excessive number of machines (or there is a lack of machines), when sales in the subsequent period decrease (increase) and the Director makes adjustments to the number of leased machines in the subsequent year, profit incentives cannot be achieved (see the "Appendix").

To ensure that the scenario was able to measure the manipulation that was provided, the participants were asked about: (1) the number of machines in the company before the participant made the decision to increase/decrease the number of machines leased; (2) what the minimum time period was for leasing machines; (3) whether the rental rate per machine for the current year was the same as for the subsequent year; (4) whether the leasing cost of the machine would be more expensive if fewer machines were leased; and (5) whether the exact profit target could be achieved in 2019 when leasing 1, 2, 3, 4 or 5 machines.

Before conducting this experiment, the researchers designed the scenario in consultation with several practitioners, namely, manufacturing companies' directors and financial managers, to ensure that this scenario resembled the actual practice. We simplified the scenario to make it easy for participants to answer. Several pilot tests were conducted, and the results show a significant variation in the results between groups.

3.2 The participants

This study focuses on experiments among accounting students who are not knowledgeable about cost behavior asymmetry. Reality theory states that people will take decisions based on the existing reality (Al-Shaikh 2003; Dermer et al. 2012; Echterhoff and Schmalbach 2018). According to the shared reality theory (Echterhoff and Schmalbach 2018), shared reality is defined as the similarity experienced based on others' circumstances about an object. The scenario presented will describe shared reality so that the participants can capture the facts presented to form adequate beliefs about the circumstances that occur and enable them to make decisions accordingly.

Table 1 Characteristics of participants

	Group*				Total
	A	B	C	D	
Sex					
Male	4	5	4	5	18 (25.35%)
Female	13	13	14	13	53 (74.65%)
Age					
Mean	19.94	20.11	19.94	20.06	20.01
Total	17	18	18	18	71

*A = high optimism, profit target has been reached

B = low optimism, profit target has been reached

C = high optimism, profit target has not been reached

D = low optimism, profit target has not been reached

The participants in this study are accounting students in their fifth semester.³ Students at this level tend to be ready to enter the workforce and are more mature. To ensure participants' understanding about cost behavior, the researchers asked questions about this subject also. All participants analyzed passed this test. The number of students recruited is 120, and they are from university in Bali. None of the authors of this study have taught at this university, neither during nor before the research was conducted. Recruitment of participants was done voluntarily. We have confirmed that there are no right or wrong answers regarding the scenario, and the students' participation in this study will not affect their performance in studies.

Of the 120 participants that were targeted, only 81 people registered, and six of them resigned due to problems with the time for implementation. The remaining number of participants was 75, and they re-registered while answering questions related to the Life Orientation Test-Revision (LOT-R) measurement (Scheier et al. 1994). Of these 75 participants, four did not pass the manipulation test, so the final number of participants in this experiment was 71. Each participant was provided an incentive worth IDR 50,000. Table 1 presents the characteristics of the participants based on their groups.

The average age of the participants is 20.01 years (minimum 19 and maximum 21). Of the 71 final participants, 18 were male (25.35%), and 53 were female (74.65%). We have confirmed this number and obtained the results that the percentage of male accounting students at this institution is 27%. We also inquired about the participants' work experience, but none of them had prior work experience related to decision-making. We also asked questions to understand their knowledge about cost behavior asymmetry. We found that only 7.04% (five participants) know the cost stickiness concept and that they stated to have obtained this information from journals accessed through the Internet.

³ Participants must have taken management accounting courses (taken in the fourth semester), in which cost behavior and decision-making are both taught.

In this research, there are four subject groups. Group A and C consists of high optimism participants, while B and D are low optimism participants. Group A and B accepts the manipulation that the profit target being reached, while C and D vice versa. To ensure internal validity, the grouping into subject groups was performed using a combination of random assignment and matching by equating participant method. We first matched participants by gender. After that, assignments were randomly made using the application provided on the website *randomizer.org*. For within-subject testing, we provide each participant with a scenario related to random changes direction in sales. There are participants who first receive a scenario related to increased sales, and some are the opposite.

3.3 Measures

The first factor in this research is manager's optimism. We define optimism as the level of one's confidence in solving the problems that they will face in the future. Optimism is measured by using the Life Orientation Test Revision (LOT-R) questionnaire given using a Google form during re-registration. The level of optimism directly affects a person's feelings when they face a problem (Carver et al. 2010) in our research in the form of cases that were accepted by participants. The LOTR questionnaire was distributed before participants knew about the case they had received to measure the level of optimism in terms of personality. After obtaining their cases, participants who had optimistic personalities would view the case they faced positively, and pessimistic participants would view their cases negatively. Someone with an optimistic nature is able to respond to all difficulties in a better way than someone who is pessimistic (Bracha and Brown 2012).

The second factor is the achievement of profit targets. We manipulated this factor by providing a table that shows the achievement of profit targets related to the number of machines leased in the current year (2019) and their impact on the subsequent period (see the scenario in "Appendix"). Because the cost stickiness test is related to the state of increase and decrease in sales, we added this as a within-subject factor.

To test all hypotheses, we used one measure of the dependent variable. All participants were asked to decide on the number of leased machines for the next five-year contract. In this study, the participants could decide to lease from zero to five machines according to their considerations regarding the manipulation given. Cost stickiness occurs if the adjustment of the number of machines leased during a sales decline is lower than when there is an increase in sales.

To ensure that our hypotheses were not interrupted by extraneous variables, namely, age, gender, and understanding of cost stickiness, we carried out ANOVA tests on these variables. The test results show that age, gender, and understanding of cost stickiness do not have a significant difference. Therefore, in further testing, we did not include extraneous variables as covariates.

Table 2 Descriptive statistics

Optimism	Profit-based Incentive	N	Sales Increase			Sales Decrease		
			Mean	S.D	Changes*	Mean	S.D	Changes**
High	Yes	17	4.71	0.47	4.71	4.12	1.05	0.88
	No	18	4.61	0.78	4.61	2.61	1.50	2.39
	Total	35	4.66	0.64	4.66	3.34	1.49	1.66
Low	Yes	18	4.72	0.67	4.72	2.72	1.36	2.28
	No	18	3.67	0.49	3.67	2.22	1.26	2.78
	Total	36	4.19	0.79	4.19	2.47	1.31	2.53
Total	Yes	35	4.71	0.57	4.71	3.40	1.40	1.60
	No	36	4.14	0.80	4.14	2.42	1.38	2.58
	Total	71	4.42	0.75	4.42	2.90	1.47	2.10

Participants are asked to decide on the number of machines to be leased at this time. Given the dependent variable is measured by the change in the number of machines leased, we calculate the change as follows

*For sales increases, it starts from 0 (zero) leased machines (changes = participant answer—0)

**For sales decreases, it starts from 5 (five) leased machines (changes = 5—participant answer)

4 Results and Discussion

We conducted a mixed between-within subjects ANOVA test to observe the differences between subject groups and to investigate the impact for sales change direction, namely sales increase and decrease (within-subject). Levene's test of homogeneity of variance between the groups for sales increase indicated that the equal variance assumption was not violated (Sig. 0.399). Otherwise, for the sales decrease, the significance value was less than .05. However, we still proceeded with the ANOVA test because the size of the groups was reasonably similar ($18/17 = 1.05^4$).

Table 2 presents descriptive statistics to show the main effect of the optimism and profit-based incentives variables on the machines that are leased. Participants are asked to decide on the number of machines to be leased at this time. Given the dependent variable is measured by the change in the number of machines leased, we calculate the change as follows. For sales increases, it starts from zero leased machines. Otherwise, for sales decreases, it starts from five leased machines.

Participants who had high (low) optimism decided to decrease **1.66 (2.53)** machines when sales decreased; and they decided to increase **4.66 (4.19)** machines when sales increased (by an equivalent amount). Participants who had reached (not reached) the incentive decided to decreased **1.60 (2.58)** machines when sales decrease; and increased **4.71 (4.14)** machines when sales increased (by an equivalent amount).

Table 3 shows the mixed between-within subjects ANOVA test. The main focus of this study is the effect of different changes in the direction of sales activities

⁴ This test is reasonably robust to violations of this assumption, provided the size of groups is reasonably similar, e.g. largest/smallest = 1.5 (Pallant 2013, p. 183).

Table 3 Effect of optimism and profit-based incentives on cost stickiness

Source of Variation	Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared*
<i>Within-subjects</i>						
Sales Change Direction (SCD)	195.058	1	195.058	184.323	0.000***	0.733
OPT × SCD	16.314	1	16.314	15.416	0.000***	0.187
INC × SCD	22.098	1	22.098	20.882	0.000***	0.238
OPT × INC × SCD	0.005	1	0.005	0.004	0.947	0.000
Error (SCD)	70.902	67	1.058			

*Partial eta squared effect size statistics indicate the proportion of variance of the dependent variable that is explained by the independent variable (Pallant 2013: 186)

***indicates significant effect $p < 0.01$

The dependent variable is measured by the change in the number of machines to be leased

The between-subject variables consist of levels of optimism (OPT) and profit-based incentives (INC)

The within-subject variable is sales change direction (SCD)

Table 4 Simple main effect from interaction between sales change direction and optimism

Source of Variation	Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared*
<i>Panel A Test of within subjects</i>						
Optimism = High						
SCD	157.500	1	157.500	111.563	0.000***	0.766
Error (SCD)	48.000	34	1.412			
Optimism = Low						
SCD	50.000	1	50.000	38.889	0.000***	0.526
Error (SCD)	45.000	35	1.286			
	Optimism = High			Optimism = Low		
	Mean	S.D	N	Mean	S.D	N

Panel B Size of changes in machine resource capacity

Sales increase	4.66	0.639	35	4.19	0.786	36
Sales decrease	1.66	1.494	35	2.53	1.32	36

*Partial eta squared effect size statistics indicate the proportion of variance of the dependent variable that is explained by the independent variable (Pallant 2013: 186)

*** indicates significant effect $p < 0.01$

The dependent variable is measured by the change in the number of machines to be leased

The between-subject variable is levels of optimism

The within-subject variable is sales change direction (SCD)

on resource management which triggers cost stickiness. Therefore, the results and discussion described below are related to the results of the within-subject analysis. Within-subjects test results show that sales change direction had a significant effect on the amount of leased machine adjustment (p value = 0.000; $\eta^2 = 0.733$). The interaction between optimism with sales change direction was shown to significantly influence participants' decisions in adjusting the amount of leased machine (p value = 0.000; $\eta^2 = 0.187$). Likewise, the interaction between incentive factors with sales change direction (p value = 0.000; $\eta^2 = 0.238$).

Considering the cost stickiness hypothesis is related to a comparison between changes in costs when an increase and decrease in sales, one must see the influence of these two factors as being associated with sales change direction (within-subjects). Table 3 shows that the interaction of each of these factors with the direction of sales change is significant. Therefore, we will see a simple main effect of the interaction of each factor by splitting files at each level of optimism and profit-based incentive factors separately.

First, we will look first at the interaction between optimism and the direction of sales change. Panel A Table 4 shows that the results of split file optimism level indicate significant results, when optimism is both high and low (p value = 0.000). However, when viewed from the partial eta squared, it can be seen that the influence of the direction of sales changes on the adjustment of machine resource capacity looks different among participants who have high and low optimism. When the level of optimism is high, the effect of the direction of sales change on resource capacity adjustment has a higher value ($\eta^2 = 0.766$) than when the level of optimism is low ($\eta^2 = 0.526$). This shows that the influence of the direction of sales changes to the adjustment of machine capacity is more dominant in participants who have a high level of optimism. To see the level of cost stickiness, based on Panel B Table 4 shows that the amount of change in the capacity of the machine's resources during the sales increase is greater than when the sales decrease occurred. Therefore, hypothesis 1 which shows that managerial optimism positively affects cost stickiness is accepted.

The results of our study prove that a high level of optimism reinforces the occurrence of cost stickiness (Hypothesis 1). These results are consistent with the theory of optimism which states that an optimistic person feels more confident about the future and will try harder to overcome existing problems so as to obtain positive results in the future (Bracha and Brown 2012; Carver et al. 2010; Gallagher and Lopez 2009; Hecht 2013; Liang and Dunn 2010; Miceli and Castelfranchi 2010; Trevelyan 2008). When faced with a decline in sales, managers with high optimism will tend to try harder to restore sales in the future. Therefore, they tend to maintain the capacity of existing resources. Even though they adjust their capacity, the adjustments made are not as aggressive as when sales increase. Conversely, managers who have a low level of optimism tend to aggressively adjust resource capacity but in a lower portion compared to sales increases (see Panel B, Table 4).

The results of our study are consistent with previous cost stickiness research which state that resource capacity management decisions when sales decline are affected by the level of manager's optimism, thus affecting the asymmetry of cost behavior (Banker et al. 2014b; Chen et al. 2015; Guenther et al. 2014; Li and Zheng

Table 5 Simple main effect from interaction between sales change direction and profit-based incentive

Source of Variation	Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared*
<i>Panel A Test of within subjects</i>						
Incentive = Yes						
SCD	169.729	1	169.729	152.781	0.000***	0.818
Error (SCD)	37.771	34	1.111			
Incentive = No						
SCD	43.556	1	43.556	30.831	0.000***	0.468
Error (SCD)	49.444	35	1.413			
	Incentive = Yes			Incentive = No		
	Mean	S.D	N	Mean	S.D	N
<i>Panel B Size of changes in machine resource capacity</i>						
Sales increase	4.71	0.572	35	4.14	0.798	36
Sales decrease	1.60	1.397	35	2.58	1.381	36

*Partial eta squared effect size statistics indicate the proportion of variance of the dependent variable that is explained by the independent variable (Pallant 2013: 186)

***indicates significant effect $p < 0.01$

The dependent variable is measured by the change in the number of machines to be leased

The between-subject variable is the level of profit-based incentives

The within-subject variable is sales change direction (SCD)

2017; Shust and Weiss 2014). High optimism manager, which decreases the capacity of the resource when the sales decrease but is not as aggressive as the addition of the capacity when the sales increase, causes the asymmetry of cost behavior towards cost stickiness.

The second hypothesis states that incentives on profit targets reduce cost stickiness when profit targets have not yet been reached. Table 5 shows the results of the split file level of achievement of profit-based incentives interacted with the direction of sales change. Panel A shows that the split file results at a significant level of achievement of profit-based incentives; both when the incentive has been reached (Yes) and not yet achieved (No) (p value = 0.000). If we look at the partial eta squared value, it can be seen that the influence of the direction of sales change on the adjustment of machine resource capacity looks different between participants who have and have not yet reached their target incentives. When the incentive target has been reached, the effect of the direction of sales change on resource capacity adjustment has a higher value ($\eta^2 = 0.818$) compared to when the incentive target has not been reached ($\eta^2 = 0.468$). Therefore, the influence of the direction of sales change on resource capacity adjustment is more dominant in participants whose target incentives have been achieved. Based on Panel B, Table 5 shows that the amount of change in the capacity of engine resources during a sales increase (4.71 when an incentive has been reached; and 4.14 when it has not been reached) is greater than when a sales decrease (1.60 when the incentive has been reached; and 2.58

Table 6 Simple main effect from interaction between sales change direction, optimism and profit-based incentive

Source of Variation	Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared*
<i>Panel A Test of between-subject effect test</i>						
Optimism = High						
INC	8.713	1	8.713	8.697	0.006***	0.209
Error	33.059	33	1.002			
Optimism = Low						
INC	1.389	1	1.389	1.304	0.262	0.037
Error	36.222	34	1.065			
<i>Panel B Test of within-subject contrast</i>						
Optimism = High						
SCD	159.781	1	159.781	143.317	0.000***	0.813
SCD × INC	11.209	1	11.209	10.054	0.003***	0.234
Error	36.791	33	1.003			
Optimism = Low						
SCD	50.000	1	50.000	49.837	0.000***	0.594
SCD × INC	10.889	1	10.889	10.853	0.002***	0.242
Error	34.111	34	1.003			

*Partial eta squared effect size statistics indicate the proportion of variance of the dependent variable that is explained by the independent variable (Pallant 2013: 186)

***indicates significant effect $p < 0.01$

The dependent variable is measured by the change in the number of machines to be leased

The between-subject variable are the level of optimisms (OPT) and profit-based incentives (INC)

The within-subject variable is sales change direction (SCD)

when it has not been reached). Therefore, hypothesis 2 which shows that incentives on profit targets reduce cost stickiness when profit targets have not been reached yet can be accepted. This is consistent with agency theory which states that when an agent is evaluated for performance by the principal, the agent will try to show his best performance. Incentives for managers are positively correlated with firm performance (Baber et al. 1996; Jensen and Meckling 1976; Murphy 1985). When performance-based incentives have not been achieved, managers tend to act more rationally so that they benefit themselves and the owner, at least in the short term (Lohmann 2015).

When manager incentives have been achieved, managers tend to be more flexible in deciding on adjusting the capacity of the unemployed resources. However, given that resource capacity cuts are often followed by adjustment costs, when profit targets are met in a condition of reduced sales, managers tend to maintain their resource capacity. This is what triggers cost stickiness. Conversely, when managers have not reached their profit targets, they tend to cut resources aggressively so that cost stickiness tends to weaken (Kama and Weiss 2013; Xi et al. 2013; Weijden and

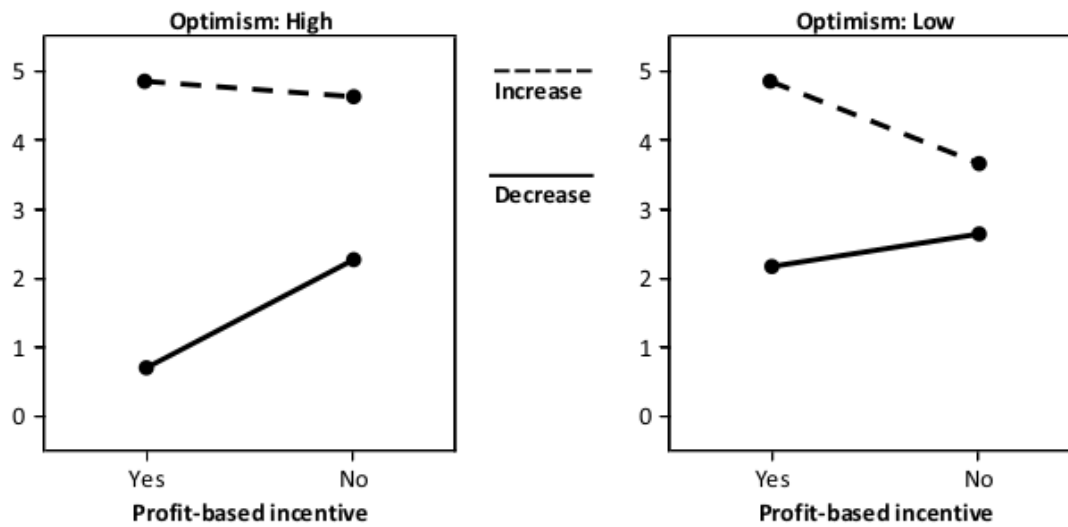


Fig. 1 Estimated Marginal Means of Direction

van der [2013](#); [Brüggen and Oliver 2014](#); [Bugeja et al. 2015](#); [Xue and Hong 2016](#); [Xu and Sim 2017](#)).

Next we will see how the two factors between-subjects interact together with the direction of sales change. Returning to [Table 3](#), it shows that the interaction between the three showed insignificant results (p value = 0.947; $\eta^2 = 0.000$). Even though it is not significant, we try to explore these results by looking for simple main effects. [Table 6](#) shows the results of the simple main effect of split file optimism to see the effect of the interaction of the level of achievement of incentives and the direction of sales changes when participant optimism is high and low. Based on the results of the test of between subjects in [Panel A Table 6](#), it is known that when optimism is high, the effect of profit-based incentives on resource capacity adjustment decisions is significant (p value = 0.006; $\eta^2 = 0.209$). Conversely, the effect of profit-based incentives when optimism is low on resource capacity adjustment decisions is not significant (p value = 0.262; $\eta^2 = 0.037$).

The results of the test of within-subjects contrasts in [Panel B](#) show that the interaction of sales change direction with profit-based incentives is significant, both when optimism is high and low. We trace further to the plot image of the relationship between profit-based incentives and the direction of sales change, both when optimism is high and low ([Fig. 1](#)). Based on [Fig. 1](#), we see the level of slope of the direction of sales change that is in conflict between when optimism is high and low. When optimism is high (left-side), changes in engine capacity when incentives have been reached (Yes) and not yet achieved (No) tend to be flat when there is an increase in sales (dotted line). Conversely, when participant optimism is low (right side), the line that tends to be flat is when there is a decline in sales. This is what causes the interaction between optimism and profit-based incentives with the direction of sales changes to be insignificant.

The results of our study did not prove the interaction between optimism, profit-based incentives and sales change direction. Based on our investigation, the effect of profit-based incentives tends to occur only in participants with high optimism

in conditions of decline in sales and participants with low optimism in conditions of sales increase. When managers with high optimism face a decline in sales, the effect of profit-based incentives on resource adjustment decisions will be more pronounced. Conversely, when managers with high optimism face sales increases, profit-based incentives tend not to affect resource capacity. For participants with low optimism, the opposite is true. When managers with low optimism face an increase in sales, the effect of profit-based incentives on resource adjustment decisions is more pronounced. Conversely, when managers with low optimism face a decline in sales, profit-based incentives tend not to affect resource capacity.

5 Conclusion, limitations, and suggestions for future research

5.1 Conclusions

The aim of this study is to examine whether managerial optimism and profit-based incentives affect cost stickiness. This study uses experiments with a 2×2 between-within subject factorial design. We use the level of optimism and profit-based incentives as between-subject factors; and sales change direction as within-subject factor. The participants in this study are 71 accounting students. The results of our study prove that a high level of optimism reinforces the occurrence of cost stickiness (Hypothesis 1). Therefore it can be concluded that managers who are more optimistic about future sales prospects will increase stickiness costs more than managers who are less optimistic. Managers who are more optimistic about future sales prospects will increase cost stickiness more than managers who are less optimistic. Our study also shows significant results for hypothesis 2. Therefore, it can be concluded that managers who have not reached their profit targets will, in order to obtain bonuses, make decisions that result in lower cost stickiness than managers who have obtained profit-based incentives.

Our study sought to overcome the weakness of the archival data used in previous literature. We used scenarios using specific cost data and linked them to activity volume. Our study contributes to the development of management accounting literature related to cost accounting and management. In practice, understanding cost behavior asymmetry will help managers to be aware of the decisions taken regarding resource capacity management, such as in determining selling prices, budgeting, and other tactical decision-making analysis.

5.2 Limitations and future research

We simplified the scenario to avoid burdening our participants with a “heavy” scenario. Future studies need to consider using practitioners as participants, but must be aware of extraneous variables related to experience. Our research uses an absolute measure for changes in sales volume (up and down by 5,000,000 units). If the change is seen in terms of a percentage, the sales increase that occurred was 50%, while the sales decrease was only 33.33%. This different rate of change is likely to

have a confounding effect on decision making. Therefore, the next researcher needs to consider these two types of size (absolute versus percentage) in their research design. The scenario used does not mention the size of any bonus received by the Director in relation to the size of the ROA level obtained under various conditions. Our scenario uses a single bonus proxy (ROA) for measuring profit-based incentives. Further research may consider, for example, minimum versus maximum bonus. In our scenario, the bonus is given in the same amount when the manager can reach the profit target. In practice, the bonus amount may vary according to the amount of profit earned. The greater the profit beyond the profit target, the greater the amount of bonus that will be obtained. This condition will encourage managers to cut resources to reduce costs. Further research can also consider CEO horizon (Chen et al. 2015) in the scenario. Finally, future research needs to conduct qualitative studies (e.g., in-depth interviews) to determine the relationship between optimism and cost behavior.

Appendix A

Life Orientation Test-Revision (LOT-R) measurement (Scheier et al. 1994)

1

Please be as honest and accurate as you can throughout. Try not to let your response to one statement influence your responses to other statements. There are no “correct” or “incorrect” answers. Answer according to your own feelings, rather than how you think “most people” would answer.

1 = I agree a lot

2 = I agree a little

3 = I disagree a little

4 = I disagree a lot

Questions

1. In uncertain times, I usually expect the best.
2. It's easy for me to relax. (F)
3. If something can go wrong for me, it will. (R)
4. I'm always optimistic about my future.
5. I enjoy my friends a lot. (F)
6. It's important for me to keep busy. (F)
7. I hardly ever expect things to go my way. (R)
8. I don't get upset too easily. (F)
9. I rarely count on good things happening to me. (R)
10. Overall, I expect more good things to happen to me than bad.

Scoring

R = reverse scored (pessimism measure).

F = fillers and should not be scored.

Appendix B

Scenario (translated to English)

You are a Director at PT Sozis. The following is information related to the company.

- PT Sozis produces beef sausages using automatic machines.
- Due to the limited age of the product, the company has a policy to produce sausages according to the number of sales orders (and does not keep a stock-pile).
- To produce beef sausages, the company imports beef as a raw material from Australia as needed. Apart from the production machines, other costs associated with the sustained sausage production process are variable.
- In order to maintain the quality of its products, the company does not always fulfill its orders from its own production of sausages. The company is not willing to pass orders to other companies because they have to maintain product quality.
- As a director, your performance is judged by your ability to achieve the set profit targets. In this case, your performance is seen from the value of Return on Assets (ROA). If you successfully meet this ROA target, then you will get a Bonus.
- The company has sufficient funds to carry out its business.

The following information is related to production machines

- The company uses its own production machines, where the maximum (optimal) capacity per machine is 1,000,000 packages per year.
- When orders exceeds capacity, it is not possible for the company to purchase additional machines, so instead it chooses to lease production machines.
- Regarding the leased machines, the provider offers routine engine maintenance facilities and spare part replacement without additional costs. The lease period is determined by the provider, with a minimum of 5 years. The company cannot cancel the lease of the machines in the middle of the lease period.
- If the company leases a large number of production machines, the price is lower. Likewise with the cost of installing the machines.

Problems (sales decrease in the bracket)

- Currently there are 10 (15) sets of company-owned production machines (10 sets of company-owned, while the remaining 5 sets of machines are leased).
- Since the second quarter of 2019, the government has set up a program to promote meat consumption among school students (Since the end of 2018, import tariffs on beef as a raw material have increased and at the same time there has been a reduction in import tariffs for sausage products so that the PT Sozis products are more expensive than imported sausages).
- If in previous years the company produced 10 million packages, in the middle of this year the Company received an additional order of 5 million sausage products as a result of the government program. You have not yet decided whether to accept all of these orders, or to receive only some of them. (If, in the previous year, the company produced and sold 15,000,000 packages – equivalent to 15 machines, then for the first time, in 2019, the company experienced a decline in sales. At present the number of sales is certain to only be 10 million by December 2019 – equivalent to 10 machines).
- The decision to increase (reduce) the number of machines leased in 2019 would have an impact on your performance this year and also in the future.
- Remember, it is not possible for a company to pass orders to other companies because you must maintain product quality.
- This year – mid-2019 – the leases of the five machines will expire.

Information regarding future sales

- You have heard that the government program to promote meat consumption will continue for the next five years. (You have heard that the import tariff for sausage products has been raised so that the prices of sausages competing with yours [i.e. imports] will automatically increase next year. This will cause your sausage products to be able to compete again with competitors).
- Total sales volume for the next year, 2020, is very dependent on your ability and confidence to obtain orders.
- The volume of sales in the following years, 2021 and beyond, is very dependent on the number of orders that you successfully obtained in 2020.
- If the size of orders – 2020 and so on – you get is more than the number of machines available this year – company machines plus the number of machines you have leased this year – then you cannot fulfill the order. If you lease an additional engine next year, the lease price will be more expensive because the provider has informed you that there is an increase in lease price of 50% next year.

Based on the cost and benefit calculation from the Accounting Department, the following table has been obtained which shows the amount of machine leasing and its impact on achieving profit targets (Return on Assets - ROA). This table

was generated after adjusting sales and costs incurred, including the calculation of machine rental costs.

Profit-based incentive has been reached		Year 2020					Group A and B Sales Increase
Year 2019		Impact if sales increase is equivalent with ... (machines)					
Leased machine	Effect	5	4	3	2	1	
5	RoA Yes	RoA Yes	RoA Yes	RoA Yes	RoA No	RoA No	
4	RoA Yes	RoA No	RoA Yes	RoA Yes	RoA Yes	RoA No	
3	RoA Yes	RoA No	RoA No	RoA Yes	RoA Yes	RoA Yes	
2	RoA Yes	RoA No	RoA No	RoA No	RoA Yes	RoA Yes	
1	RoA Yes	RoA No	RoA No	RoA No	RoA No	RoA Yes	
0	RoA Yes	RoA No	RoA No	RoA No	RoA No	RoA No	

Profit-based incentive has been reached		Year 2020					Group A and B Sales Decrease
Year 2019		Impact if sales increase is equivalent with ... (machines)					
Leased machine	Effect	5	4	3	2	1	
0	RoA Yes	RoA No	RoA No	RoA No	RoA No	RoA No	
1	RoA Yes	RoA No	RoA No	RoA No	RoA No	RoA Yes	
2	RoA Yes	RoA No	RoA No	RoA No	RoA Yes	RoA Yes	
3	RoA Yes	RoA No	RoA No	RoA Yes	RoA Yes	RoA Yes	
4	RoA Yes	RoA No	RoA Yes	RoA Yes	RoA Yes	RoA No	
5	RoA Yes	RoA Yes	RoA Yes	RoA Yes	RoA No	RoA No	

Profit-based incentive has NOT been reached		Year 2020					Group C and D Sales Increase
Year 2019		Impact if sales increase is equivalent with ... (machines)					
Leased machine	Effect	5	4	3	2	1	
5	RoA No	RoA Yes	RoA Yes	RoA Yes	RoA No	RoA No	
4	RoA No	RoA No	RoA Yes	RoA Yes	RoA Yes	RoA No	
3	RoA No	RoA No	RoA No	RoA Yes	RoA Yes	RoA Yes	
2	RoA No	RoA No	RoA No	RoA No	RoA Yes	RoA Yes	
1	RoA No	RoA No	RoA No	RoA No	RoA No	RoA Yes	
0	RoA Yes	RoA No	RoA No	RoA No	RoA No	RoA No	

Profit-based incentive has NOT been reached		Group C and D Sales Decrease				
Year 2019		Year 2020				
Leased machine	Effect	Impact if sales increase is equivalent with (machines)				
		5	4	3	2	1
0	RoA Yes	RoA No	RoA No	RoA No	RoA No	RoA No
1	RoA No	RoA No	RoA No	RoA No	RoA No	RoA Yes
2	RoA No	RoA No	RoA No	RoA No	RoA Yes	RoA Yes
3	RoA No	RoA No	RoA No	RoA Yes	RoA Yes	RoA Yes
4	RoA No	RoA No	RoA Yes	RoA Yes	RoA Yes	RoA No
5	RoA No	RoA Yes	RoA Yes	RoA Yes	RoA No	RoA No

Questions

- How many machines will you lease in 2019? _____ machines.
(Answer choices range from 0 to 5).
- What are your main considerations when deciding this amount? (post-experimental inquiry).

Manipulation test

- How many machines are there in the company at the moment? (before you make your decision) _____ machines.
- Machine leasing can be done for a period of 1 year only. [T/F]
- If you lease a machine in 2020, the cost will be more expensive than the lease in 2019. [T/F]
- The less number of machines you lease, the more expensive the leasing price. [T/F]
- No matter how many machines you lease (1, 2, 3, 4 or 5), your profit target will definitely be fulfilled in 2019. [T/F]

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