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## **DO MANAGERS CUT STICKY COSTS TO ALLEVIATE FINANCIAL DISTRESS DURING THE GLOBAL ECONOMIC CRISIS? Evidence from Vietnamese public enterprises**

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### **Abstract**

*Asymmetric cost behavior theory suggests that managerial perceptions about economic conditions may affect cost management decisions. It is expected that managers' interventions during the recession period lead the costs to behave anti-stickiness and to revert to cost stickiness when the economy is recovered. Therefore, this study aims to examine whether costs respond asymmetrically to demand change and examines the influence of economic recession on cost stickiness. This study uses FEM/REM multiple regression models to investigate the behavior of operating costs for the 2008-2016 period from 119 Vietnamese public enterprises. Moreover, this study investigates anti-sticky cost behavior during the global economic crisis period (2008-2010) and during the economic recovery period (2011-2016). The results imply that managers do not have propensity to use the same cost model all the time, as the economic growth fluctuations were found to affect the nature and extent of cost behavior. In particular, sales-down firms exhibit anti-sticky cost behavior during the economic crisis period; that is, costs are cut back more steeply as sales fall than they increase as sales rise. This, in turn, implies that net income may increase, rather than decrease for sales-down firms during an economic downturn.*

**Keywords:** *Asymmetric cost behavior, Cost stickiness, Global economic crisis, Management accounting, Vietnamese public enterprises*

### **Introduction**

Cost behavior refers to the way costs respond to change in activity and decision. Understanding cost behavior is critical for managers and accountants in order to provide and use information to make effective decisions (Maher, Stickney, & Weil, 2008). Traditional cost behavior models distinguish between fixed and variable costs with respect to changes in the level of cost drivers. These models assume that costs behave symmetrically (Ibrahim & Ezat, 2017). Recent studies reveal that costs may behave asymmetrically; that is, costs may respond differently to upward or downward changes in activity. Such costs are called sticky costs – “the costs increase more for a rise in the activity than they decrease for a fall in the activity by an equivalent amount” (Anderson, Banker, & Janakiraman, 2003). However, costs that “increase less when activity rises than



they decrease when activity falls by an equivalent amount are called anti-sticky” (Balakrishnan, Labro, & Soderstrom, 2014; Kama & Weiss, 2010). The literature assumes that the stickiness behavior may be due to the deliberate decision taken by the management when activity declines (Ibrahim & Ezat, 2017). Some managers are hesitant to cut slack resources when demand declines, thereby implying that firms bear the costs of unutilized resources that they should not bear. However, when demand flourishes, managers expand resources normally, and thus the related costs increase normally. Therefore, the costs’ decrease when demand declines will be lower than the costs’ increase when demand increases, resulting in sticky costs.

On the other hand, significant economic events change a firm’s business environment and are very likely to affect many managerial decisions (R. D. Banker, Byzalov, Ciftci, & Mashruwala, 2014). Cost decisions are one of the main managerial decisions that determine the behavior of both concurrent and future earnings. In turn, earnings related performance indicators are primary measures used in studies investigating consequences associated with various economic events (He, Teruya, & Shimizu, 2010). Hence, inferences based simply on earnings without considering the differential impact of significant economic events on managers’ cost decisions for different firms could be biased or even misleading.

The main objective of this paper is to extend prior studies on sticky costs by empirically exploring the stickiness behavior in one of the Asia countries, Vietnam. In this regard, this study examines the cost stickiness for the most actively Vietnamese listed companies during 2008-2016. Nevertheless, no study focuses on the impact of economic fluctuation on cost stickiness. Notably, very few studies, such as Anderson et al. (2003), Ibrahim (2015) added an economic growth variable to the study’s main model – most prefer to add it as a control variable. Therefore, this study extends the existing literature by investigating the influence of economic fluctuation on cost behavior in the global economic crisis and post- crisis 2008 periods.

The remainder of this study is organized as follows. Section 2 presents theoretical framework that reviews the literature and formulates the hypotheses. Section 3 exhibits the model specification. Section 4 presents the study results accompanied by a discussion. The last section provides the conclusions, implications and limitations of this study and suggests future research directions.

## **Literature review and hypotheses development**

A large number of studies provide evidence on asymmetric cost behavior, especially the early study of Noreen and Soderstrom (1994). Asymmetric cost behavior theory suggests that managerial perceptions about economic conditions may affect resource adjustment decisions, i.e. cost management decisions. The effect of the global economic crisis on real GDP and consumer demand are likely to have created unprecedented



managerial pessimism about future sales prospects and economic growth (Fang, 2013). This would be true particularly for managers experiencing a decline in sale. Therefore, downward changes in managerial expectations about future sales and growth prospects should induce managers to make resource adjustment decisions to reduce excess capacity and thus engage in anti-sticky behavior (Warganegara & Tamara, 2014).

The lower growth rate of net revenue in the period of economic crisis and the higher growth rate after the crisis are a good opportunity to examine asymmetric cost behavior during the two contrasting economic growth periods. This approach enables us to speculate on the effect of economic growth fluctuations over the managers' behavioral trend on cost management. For examples, Anderson et al. (2003) argue that during the prosperous times, managers delay the decision on downward resource adjustment and causes more sticky costs. Anderson et al. (2003) find a positive significant relationship between high real GDP rates and the level of sticky costs arised. Moreover, Ibrahim (2015) hypothesizes that firms in a non-crisis period exhibit more sticky costs as managers are optimistic about demand levels compared with crisis period. On the other hand, some authors argue that during weak economic growth periods and crisis periods, cost stickiness is minimized. For instances, Dierynck, Landsman, and Renders (2012) argue that weak economic growth prospects may lead managers to delay hiring new resources and to retire slack resources aggressively when demand decreases. Zuijlen (2012) has already noted an consistency with Dierynck et al. (2012)'s claim that cost stickiness is lower in the economic crisis period for the two reasons. First, the economic crisis forces firms to cut costs to remain the stability of profitability. Second, Zuijlen (2012) argue that during an economic crisis, firms avoid long-term committed contracts. For example, during a crisis period, firms prefer to hire temporary workers and hence find it easy to dismiss those workers as soon as demand declines; hereby, firms will not have large adjustment costs. As a result, cost-cutting strategies and avoiding committed contracts during a crisis period induce managers to minimize cost stickiness. This study agrees with the arguments of Fang (2013) and Ibrahim (2015) that "cost increase as a response to demand increase may be lower than cost decrease as a response to demand decrease during the recession period" as a result of anti-sticky behavior. It is because managers are expected to decrease resources quickly, and in large amounts, if demand declines. Anti-stickiness cost behavior is supported by very few studies. This study expects to observe widespread anti-sticky cost behavior for sales-down firms in late 2008, deceleration in 2009 and 2010 during the global economic crisis (2008 – 2010). This leads to the first hypothesis:

*H<sub>1</sub>: Firms experiencing a sales decline exhibited reduce stickiness during the world economic crisis years from 2008 to 2010, and this is anti-sticky cost behavior.*

Next, this study also tests how anti-stickiness affects earnings during the global economic crisis. Anti-sticky behavior in operating expenses is likely to result in higher



reported contemporaneous earnings for sales-down firms simply because of the algebraic relation linking earnings to operating expenses (Fang, 2013). As a result, the decrease in costs is greater than their increase for a 1 per cent change in demand in the condition of anti-stickiness. Accordingly, the second hypothesis is examined:

*H<sub>2</sub>: Sales-down firms are likely to exhibit an increase in earnings by the anti-stickiness strategy during the global economic crisis period.*

Furthermore, this study also examines the propensity to create sticky costs when the economy has recovered after the crisis period. Actually, during the economic recession, managers are expected to decrease costs quickly and in large amount (Zanella, Oyelere, & Hossain, 2015). However, if demand increases after economic recovery, the question is raised whether or not managers hire new resources to meet demand increase to lead sticky cost behavior. In other words, this study also expects anti-stickiness to be replaced by normal conditions after 2010 as pessimism about future sales began to be replaced with optimism (Dalla Via & Perego, 2014). Although the economy is settled and cost stickiness continues to be applied, managers, when observing a sales drop, take decisions cutting resources. As a consequence, since unused resources are kept during the previous period, managers will take into account a partial decline of cost stickiness in subsequent periods in order to preserve the current financial performance (Shust & Weiss, 2014). Therefore, the study's third hypothesis is as follows:

*H<sub>3</sub>: During the economic recovery period, firms experiencing a sales decrease exhibit sticky cost behavior and in turn a partial decline of cost stickiness in subsequent periods.*

## **Methodology**

### ***Definition of the global economic crisis and the post-crisis period***

Grosse (2010) suggests that the US financial crisis arising from the US sub-prime mortgage crisis during 2007 started to develop into a global financial crisis from 2008. Although the Vietnamese financial market reflected little impact of the US mortgage crisis, in this study, the global economic crisis and the post-crisis period are defined in the Vietnamese context based on the existing literature, the movement of interest rate, foreign currency exchange rate and the fluctuation of the Vietnamese Securities Exchange Index (VN-Index). As evidence of this, in Vietnam, the unemployment rate dramatically began to rise from 2007. The Vietnamese banks' demands on foreign currency successively went up from October 2008 because the capitals were withdrawn by foreign investors when the global economic crisis began to break out. These impacted on the Vietnamese foreign currency market negatively. The loan interest rate at Vietnamese banks began to escalate to 27% in the years of 2008 – 2009 when requiring the State bank to control a fever of interest rate (VnEconomy, 2012). The VN-Index was 753.80 on December 29, 2006. It soared up to 921.80 on December 28, 2007. Thereafter, the index significantly declined to 315.62 during December 2008 and 494.77 during

December 2009 within 2 years of the crisis period. From 20011 to 2014, the VN-index revealed the signal to recover after the crisis period, however, it has not regained as the pre-crisis period, e.g. only 580.35 and 557.19 for December 2013 and 2014, respectively (Vietstock Web, 2015). Based on these arguments, the years 2008 and 2010 are considered as the financial crisis period in Vietnam, whereas the years 2011 onwards are considered as the post-crisis period.

### **Empirical models**

To examine asymmetric cost behavior, this study applies the regression model, namely, that of R. Banker, Basu, Byzalov, and Chen (2012) as follows:

#### Model 1: Operating expenses

$$\text{Opex}_{i,t} = \beta_0 + \beta_1 \text{Rev}_{i,t} + \beta_2 \text{SD}_{i,t} + \beta_3 \text{Year}_{2008} * \text{SD}_{i,t} + \beta_4 \text{Year}_{2009} * \text{SD}_{i,t} + \beta_5 \text{Year}_{2010} * \text{SD}_{i,t} + \beta_6 \text{Year}_{2011} * \text{SD}_{i,t} + \beta_7 \text{Year}_{2012} * \text{SD}_{i,t} + \beta_8 \text{Year}_{2013} * \text{SD}_{i,t} + \beta_9 \text{Year}_{2014} * \text{SD}_{i,t} + \beta_{10} \text{Year}_{2015} * \text{SD}_{i,t} + \beta_{11} \text{AvoidLoss}_{i,t} * \text{SU}_{i,t} + \beta_{12} \text{AvoidLoss}_{i,t} * \text{SD}_{i,t} + \beta_{13} \text{AvoidED}_{i,t} * \text{SU}_{i,t} + \beta_{14} \text{AvoidED}_{i,t} * \text{SD}_{i,t} + \varepsilon_{i,t}$$

#### Model 2: Earnings

$$\text{NetInc}_{i,t} = \beta_0 + \beta_1 \text{Rev}_{i,t} + \beta_2 \text{SD}_{i,t} + \beta_3 \text{Year}_{2008} * \text{SD}_{i,t} + \beta_4 \text{Year}_{2009} * \text{SD}_{i,t} + \beta_5 \text{Year}_{2010} * \text{SD}_{i,t} + \beta_6 \text{Year}_{2011} * \text{SD}_{i,t} + \beta_7 \text{Year}_{2012} * \text{SD}_{i,t} + \beta_8 \text{Year}_{2013} * \text{SD}_{i,t} + \beta_9 \text{Year}_{2014} * \text{SD}_{i,t} + \beta_{10} \text{Year}_{2015} * \text{SD}_{i,t} + \beta_{11} \text{AvoidLoss}_{i,t} * \text{SU}_{i,t} + \beta_{12} \text{AvoidLoss}_{i,t} * \text{SD}_{i,t} + \beta_{13} \text{AvoidED}_{i,t} * \text{SU}_{i,t} + \beta_{14} \text{AvoidED}_{i,t} * \text{SD}_{i,t} + \varepsilon_{i,t}$$

Where:

$\text{Opex}_{i,t}$  = Operating expenses deflated by assets to test  $H_1$  and  $H_3$

$\text{NetInc}_{i,t}$  = Net income deflated by assets to test  $H_2$

$\text{Rev}_{i,t}$  = Reported net revenue

$\text{SD}_{i,t}$  ( $\text{SU}_{i,t}$ ) = are dummy variables set to 1 if the sales of firm  $i$  decrease (increase) from year  $t-1$  to year  $t$ , and 0 otherwise

$\text{AvoidLoss}_{i,t}$  = Avoiding reported loss is a dummy variable set to 1 if earnings deflated by the beginning market value in year  $t$  are between 0 and 0.01, and set to 0 otherwise

$\text{AvoidED}_{i,t}$  = Avoiding earnings decline is a dummy variable set to 1 if the ratio of the change in net income of firm  $i$  in year  $t$  deflated by beginning market value is between 0 and 0.01 and 0 otherwise.

**Table 1.** Summary of the correlations discovered in the prior studies

	Expected sign		Proposed by	Explain the correlations with the dependent variables
	OPEX	NetInc		
Rev	+	+	Anderson et al. (2003), Banker et al.	Revenue is a critical element for R. firms' management to understand cost behavior in response to changes



			(2012)	in the level of activity. This means how will cost react or change when changes on the sales level occur (Anderson et al., 2003).
SD	+	-	Anderson et al. (2003), Fang (2013), Ibrahim (2015), Ibrahim and Ezat (2017)	The coefficient on SD and Opex is positive, showing that costs are sticky during normal economic condition (Ibrahim, 2015). The coefficient on SD and Net income is negative, as sales-down firms engaged in sticky cost behavior in normal periods of managerial optimism (Ibrahim, 2015).
Year <sub>2008</sub> *SD	-	+	Fang (2013), Ibrahim (2015)	The coefficient on Opex (NetInc) is negative (positive), which is indicative of reduced cost stickiness during crisis periods (Fang, 2013). If the absolute value of any of the negative (positive) coefficients is greater than the positive (negative) coefficient on SD, operating expenses (earnings) appear to be anti-sticky in that year (Fang, 2013).
Year <sub>2009</sub> *SD	-	+		
Year <sub>2010</sub> *SD	-	+		
Year <sub>2011</sub> *SD	+	-	Chen (2013),	
Year <sub>2012</sub> *SD	+	-	Fang (2013), Ibrahim and Ezat (2017)	
Year <sub>2013</sub> *SD	+	-		It is expected a return to sticky cost behavior for sales-down firms because it represents the optimal tradeoff between the cost of slack resources and adjustment costs in the new conditions (Ibrahim & Ezat, 2017). Therefore, this study expects a less positive (negative) coefficient on Year <sub>2011</sub> *SD relative to Year <sub>2010</sub> *SD (Fang, 2013).
Year <sub>2014</sub> *SD	+	-		
Year <sub>2015</sub> *SD	+	-		
AvoidLoss*SU	-	+	Kama and Weiss (2010), Dierynck et al. (2012),	The coefficients indicate the impact of incentives to meet earnings targets on resource adjustments



	Fang (2013)		
AvoidLoss*SD	-	+	when sales rise and when sales fall, respectively (Dierynck et al., 2012). In terms of Opex (NetInc), negative (positive) coefficients indicate that managers expedite cost cuts in response to incentives to meet earnings targets and sales fall (Kama & Weiss, 2010). In terms of Opex (NetInc), as for sales rise, negative (positive) coefficients indicate that managers restrain cost increases in response to incentives to meet earnings targets (Kama & Weiss, 2010).
AvoidED*SU	-	+	
AvoidED*SD	-	+	

## Data analysis

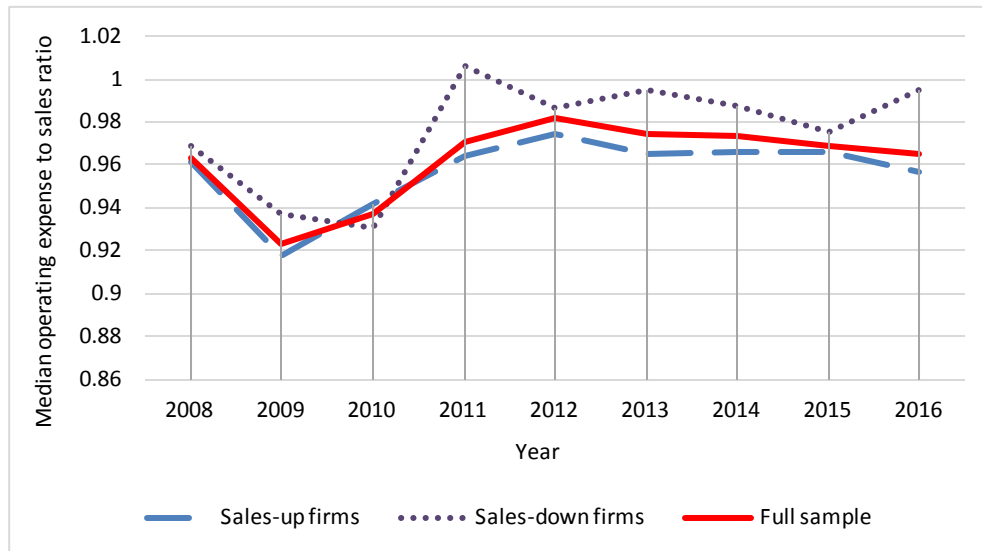
### *Descriptive statistics*

Financial accounting data in financial reports has been collected from the database <http://finance.vietstock.vn/>. The sample period includes 2008 to 2016. The sample consists of 119 selected firms with financial performances from 692 public companies listed in Ho Chi Minh and Hanoi Stock Exchange in Vietnam. The companies in this study are selected from many different industries. The sample consisted of 62 (52.10%) manufacturing firms, 19 (15.97%) trading firms and 38 (31.93%) service firms. In short, the final sample for main study consists of a total of 1,071 firm-year observations. According to Hair, Black, Babin, and Anderson (2010)'s rule of 15 to 20 observations for each predictor variable, the size of 1,071 samples is thus appropriate to make regression with a balanced panel data.

Figure 1 graphically depicts the median values of changes in the operating expenses to sales ratio from 2008 to 2016 for the full sample and for sales-up and sales down partitioning. Consistent with sticky cost theory, the figure shows that sales-down firms report higher operating expenses than sales-up firms on average. Second, during the financial crisis, all firms cut operating expenses by a much larger amount. At the end of crisis period (2010), both sales-up and sales-down firms started to increase operating expenses. Since 2011, the median operating expense to sales ratio has increased for the full sample because of the median operating expense to sales ratio increasing for both sales-up and sales-down firms. The increasing of operating expenses to sales ratio is higher for sales-down firms than for sales-up firms since 2011. The costs increase more rapidly with an activity increase in the post-crisis period than they decrease with an activity decrease in the crisis period. Figure 1 highlights the need to examine sticky cost

behavior after partitioning the full sample into sales-up and sales-down groups to understand which types of firms are most likely to be affected under the predictions of sticky cost theory.

**Figure 1. Operating Expenses by sales change**



#### **4.2. Selection of Appropriate Regression Approach**

All theoretical models are tested with three regression approaches: Pooled OLS, FEM (fixed effects model) and REM (random effects model) according to GLS method for panel data processing models to reduce the issue of heteroskedasticity (Table 2). Although the results from the pooled OLS indicate that the explanatory variables are statistically significant with positive estimated coefficients, it also reveals an existence of autocorrelation. Furthermore, the result of the Likelihood test accepts hypothesis implying that the FEM model is more suitable than the pooled OLS. After rejecting the pooled OLS model, to choose which of the two models that fixed or random effects model is more precise, the Hausman test is employed. The Hausman statistic tests null hypothesis that both random effects model and fixed effects model are appropriated for the particular sample. As shown in the Table 2, the significance level (p-value) of cross-section random in the Hausman test is higher than 10 percent. Therefore, null hypothesis is acceptable. In case both FEM and REM is suitable after Hausman test, following the thumb rule of Gujarati (2009), FEM makes better use of such data because (a) there are dummies as the part of intercepts and (b) there are a large number of cross-sections while the observed period is shorter than 15 years. In addition, Durbin Watson ratios in the FEM within the range of [1.5; 2.5] reveal an acceptable fit to time-series data without the presence of autocorrelation. All conclude that fixed effects model (fixed for cross-section and none for period) is better to conduct all estimations with firm-specific effects.





**Table 2.** Cost stickiness during the crisis and post-crisis period

	Pooled OLS		Fixed Effects		Random Effects	
	Opex	NetInc	Opex	NetInc	Opex	NetInc
<b>Constant</b>	-0.010226	0.008080	-0.028147	0.014281	-0.024429	-0.005437
		**	***	***		
<b>Rev</b>	0.971739	0.018116	0.982037	0.018340	0.976165	0.018167
	***	***	***	***	***	***
<b>SD</b>	0.047713	-0.017029	0.037968	-0.015004	0.055825	-0.003980
	***	**	***	**	**	
<b>Year<sub>2008</sub>*SD</b>	-0.002201	0.005402	0.003977	-0.001434	0.039162	0.004662
	***			**	***	
<b>Year<sub>2009</sub>*SD</b>	0.009948	-0.016630	-0.001271	-0.008209	-0.011773	-0.018314
	***		**	**	**	***
<b>Year<sub>2010</sub>*SD</b>	-0.039750	0.031668	-0.039160	0.022506	-0.044305	0.040643
	***	***	***	***	***	***
<b>Year<sub>2011</sub>*SD</b>	-0.004492	0.011569	-0.003129	0.007876	-0.014804	0.013898
	***		***	*	*	***
<b>Year<sub>2012</sub>*SD</b>	0.010295	-0.014362	0.016477	-0.011789	0.011524	-0.031525
	***	*	***	**		***
<b>Year<sub>2013</sub>*SD</b>	0.008345	0.005332	-0.002167	0.006106	-0.010458	0.038132
	***				**	***
<b>Year<sub>2014</sub>*SD</b>	-0.004955	0.002796	0.000761	0.002127	0.005135	-0.026381
	***		*	*	*	***
<b>Year<sub>2015</sub>*SD</b>	-0.005441	-0.001453	-0.000682	0.005648	0.010123	-0.00002
	***		***	**		
<b>AvoidLoss*SU</b>	-0.012083	0.033161	-0.014905	0.025812	-0.018261	0.050727
	***	***		***		
<b>AvoidLoss*SD</b>	-0.038057	0.034292	-0.025355	0.021303	-0.037090	0.046029
	***	***	***	***	***	***
<b>AvoidED*SU</b>	-0.007264	0.012562	-0.001635	0.005710	0.000498	0.021750
	**	***				
<b>AvoidED*SD</b>	-0.022970	0.017092	-0.022030	0.010782	-0.034855	0.014594
	***	***	***	***	***	
<b>Cross-section</b>	None	None	Fixed	Fixed	Random	Random
<b>Period</b>	None	None	None	None	None	None
<b>Adjusted R<sup>2</sup></b>	0.996804	0.341840	0.998901	0.776681	0.938936	0.002660
<b>Durbin Watson</b>	0.861228	0.911853	1.965428	1.511892	0.836773	1.095949
<b>Likelihood test</b>			31.063873	21.418468		
			***	***		




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<b>Hausman test</b>					12.732103	8.670812
<b>Samples</b>	1,071	1,071	1,071	1,071	1,071	1,071

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**Note:** Significant at: \*10, \*\*5 and \*\*\*1 percent levels

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Source: Calculated by the authors in Eviews 9.0

### ***Empirical results***

#### ***Firms experiencing a sales decline exhibited anti-sticky cost behavior during the global economic crisis years from 2008 to 2010: test of hypothesis 1***

The coefficient on Revenue is positive and significant, suggesting that sales are positively related to operating expenses. The coefficient on SD is 0.037968, positively related to operating expenses at the 1% significance level, which is consistent with the sticky cost theory that firms exhibit cost stickiness in general. The coefficient on Year<sub>2008</sub>\*SD is 0.003977 and invalidated in statistics, suggesting that cost stickiness is slightly increase in 2008 because managers did not immediately act to adjust sticky costs at the beginning of crisis period. The coefficient on Year<sub>2009</sub>\*SD is -0.001271, implying that cost stickiness is gradually reduced in 2009.

Firms started to exhibit significant anti-stickiness in operating expenses in 2010. The coefficient on Year<sub>2010</sub>\*SD is -0.039160 and significant at the 1% level. The sum of the coefficients on SD and Year<sub>2010</sub>\*SD is -0.001192. That is, given the same revenue level, sales-down firms report significantly greater reduction in operating expenses compared to cost increases for sales-up firms, consistent with the prediction that operating expenses show strong anti-stickiness in 2010. The results show that sales-down firms exhibit cost stickiness before the crisis but significantly reduced cost stickiness during the crisis. Anti-stickiness in costs peaked in 2010 and declined in 2011 because the absolute of coefficient on Year<sub>2011</sub>\*SD is less than Year<sub>2010</sub>\*SD. After 2010, since the global economy as well as Vietnamese economy started to recover, cost stickiness is returned.

Interestingly, an examination of AvoidLoss\*SD and AvoidED\*SD reveals that the impact of the economic downturn in 2010 on managers' cost decisions is economically greater than that of managerial incentives to avoid reporting losses and to avoid earnings declines. In addition, this study finds that, for both sales-up and sales-down firms, managerial incentives to avoid losses and earnings declines appear to be economically similar to each other and have similar implications for cost behavior; however, this outcome of sales-down firms is validated in statistics. This suggests that earnings management incentives only apply to reduced stickiness (or increased anti-stickiness) for sales-down firms but may not apply equally to all firms regardless of sales change.

***Sales-down firms are likely to exhibit an increase in earnings by the anti-stickiness strategy during the global economic crisis period: test of hypothesis 2***

Table 2 also present results for models examining the asymmetry in net income with respect to sales change. Given that costs behave asymmetrically with respect to sales increases and decreases, net income will accordingly behave asymmetrically. A decrease in cost stickiness will lead to an increase in net income. Thus, this study again includes the sales-down dummy to allow the asymmetries in net income in terms of the direction of sales changes to vary during the global economic crisis period. In general, sales-down firms reported lower earnings relative to sales-up firms. This is consistent with our prediction or the outcomes of previous studies such as Fang (2013), Warganegara and Tamara (2014), Ibrahim and Ezat (2017). The coefficient on SD in the net income is -0.015004 and significant at the 5% level. In 2008, as the stickiness in operating expenses slightly increased, earnings of sales-down firms were a little lower than those out of the year 2008. The coefficient on Year<sub>2008</sub>\*SD is -0.001434 for the net income model and significant at the 5% level. In 2009, although sales-down firms decreased sticky cost ( $\beta = -0.001271$ ), the sum of the coefficients on SD and Year<sub>2009</sub>\*SD is 0.036697, indicating the remaining of cost stickiness, thereby, earnings of sales-down firms declined more than the other years ( $\beta_{\text{Year}2009*\text{SD}} = |-0.008209| > \beta_{\text{Year}2008*\text{SD}} = |-0.001434|$ ). This implies that the decrease in earnings is due to the existence of sticky cost and the impact of economic recession. In 2010, as the anti-stickiness in operating expenses peaked, the coefficient on Year<sub>2010</sub>\*SD in the net income is the most positive compared with the coefficients on Year<sub>2008</sub>\*SD, Year<sub>2009</sub>\*SD and Year<sub>2011</sub>\*SD. The coefficient on Year<sub>2010</sub>\*SD is 0.022506 for the net income model and significant at the 1% level. The net income of sales-down firms is even higher than those of sales-up firms in 2010, as the sum of the coefficients on SD and Year<sub>2010</sub>\*SD are all positive, indicating without cost stickiness.

***During the economic recovery period, firms experiencing a sales decrease exhibit sticky cost behavior and a partial decline of cost stickiness in subsequent periods: test of hypothesis 3***

The coefficient for Year<sub>2011</sub>\*SD is -0.003129, with significance at the 1% level, and the sum of the two coefficients on SD and Year<sub>2011</sub>\*SD is 0.034839. Sales-down firms show an increase in stickiness in operating expenses, consistent with managers acting to revert to the original resource level as the economy recovered.

From 2012 to 2015, the coefficients on Year\*SD change from negative value to positive value in succession. A significant and positive coefficient on Year<sub>2012</sub>\*SD ( $\beta = 0.016477$ ) indicates that there is an existence of cost stickiness in 2012. These results are consistent with the study's H<sub>3</sub> that in the prosperity period, managers accelerate the hiring of new resources when demand increases because economic prosperity causes managers to expect that demand increase would be permanent and demand decline

temporary. On year later, a significant and negative coefficient on  $\text{Year}_{2013} * \text{SD}$  ( $\beta = -0.002167$ ) confirms the partial reversion of cost stickiness in the subsequent period to fall down sticky cost with the aim of earnings maintenance, since  $|\beta_{\text{Year}_{2013} * \text{SD}}| < \beta_{\text{Year}_{2012} * \text{SD}}$ , which leads to accepting that cost stickiness is cut in subsequent period but it is not cut off a larger amount than the prior-period amount of sticky cost. This trend is similar with the period of 2014 - 2015. There is the situation of cost stickiness in 2014 and the partial decline of cost stickiness in the year later due to  $|\beta_{\text{Year}_{2015} * \text{SD}} = -0.000682| < \beta_{\text{Year}_{2014} * \text{SD}} = 0.000761$ . This result is consistent with our expectation and the previous studies such as De Medeiros and Costa (2004), He et al. (2010).

## Conclusion

This study contributes to the existing literature in two ways. First, to the best of my knowledge, this study is the first to address the impact of economic growth fluctuations during and after a financial crisis on asymmetric cost behavior. Second, this study provides new evidence on asymmetric cost response in an emerging nation and Vietnamese country, which has not been the focus of such research.

Firstly, the findings show that operating costs respond asymmetrically to demand change, where it is sticky or anti-sticky. Secondly, the nature and magnitude of the asymmetric cost behavior differed in contrasting economic conditions; in the prosperity period after the 2008 financial crisis, operating costs were sticky, but anti-sticky in the recession period, i.e. the global economic crisis. Thirdly, the cost stickiness was existed when managers accelerate the hiring of new resources as demand increases in economic recovery; however, the partial reversion of cost stickiness in the subsequent period to decrease sticky cost with the aim of earnings maintenance. According to the literature review, sticky cost has two - side impacts on firm performance. It will be positive in the case of increasing demand and negative otherwise. The findings will contribute some managerial implications. Firstly, managers should evaluate the demand of market annually and make the decision on how to adjust the cost structures. If there is a short-term reduction, the manager may consider the adjustment cost and the loss of cost stickiness before making a decision to change the cost structure. In the circumstance of long term reduction of market demand, managers need to reallocate the resources, contracts should be flexible and adjustable in order to cut off the adjustment cost. Secondly, firms need to build up a flexible cost structure so as to explore market advantages in case of growth and restrain the effect of revenue reduction.

This study suffers from some limitations. Although several internal and external variables were found to affect the extent and nature of asymmetric cost behavior, this study focused only on one variable, economic fluctuation. The data from a single East Asian country, not cross-country examination may be noisy and require caution in terms



of generalizing the results. Despite these shortcomings, the findings provide avenues for research exploring asymmetric cost behavior more comprehensively. Future research on asymmetric cost behavior should use models that differ from those used by Anderson et al. (2003), as those criteria and this model are replicated by many studies, and there is a risk that similar results are hence recognized

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