Earnings management incentives, accruals constraints,
and cost stickiness: Empirical evidence from Egypt.

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Abstract

This study investigates the relationship between managerial incentives to earnings management and cost stickiness. I argue that when managers have incentives to earnings management, they tend to increase costs less for an increase in sales and to aggressively cut resources for a decrease in sales and thus cost stickiness decreases. Three proxies are used for management incentives to earnings management; namely management incentive to avoid loss, incentive to avoid earning decrease, and incentive to avoid loss and/ or earning decrease. A sample of 940 firm-year observations of non-financial firms listed in the Egyptian Stock Exchange from 2011 to 2017 is used. The results support my hypotheses and I find that when managers have incentive to manage earnings, costs exhibit an anti-sticky behavior. These results shed light on the role of motivations underlying managerial decisions in affecting firms' cost behavior.

1. Introduction

Costs are resources sacrificed or forgone to achieve a specific objective (Horngren et al., 2006, p. 29).Costs are generally assumed to be either totally unresponsive to changes in cost drivers (fixed costs) or to change proportionally with changes in cost drivers (variable costs) within the relevant range[1] (Balakrishnan and Gruca, 2008). This implies that the extent of a change in costs depends only on the extent of the simultaneous change in activity level and not on the direction of the change.

Consequently, traditional cost models assume that costs change symmetrically with changes in activity levels which means that the relation between costs and volume is mechanistic for volume increases and decreases. Symmetric cost behavior implies that a one percent change in activity level will change (increase and decrease) costs by the same percentage.

However, some research finds that costs increase more for an increase in the activity volume but decrease less for an equivalent decrease in activity volume (Noreen and Soderstrom, 1994; Noreen and Soderstrom, 1997; Anderson et al., 2003; Balakrishnan and Gruca, 2008; Balakrishnan and Soderstrom, 2008; Banker et al., 2011; Banker et al., 2013).Anderson, Banker and Janakiraman (2003) (hereafter ABJ) were the first to thoroughly provide empirical evidence that costs depend not only on the extent of a change in the level of activity, but also on the direction of the change. ABJ find that selling, general and administration costs (SG & A) increase on average by 0.55% per 1% increase in sales

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[1] The relevant range is the level of activity over which the relationship between the level of activity and the cost in question is not altered (Abulezz, 2013).

but decrease only by 0.35% per 1% decrease in sales, a property they refer to as "cost stickiness."

ABJ indicate that "costs are sticky if the magnitude of the increase in costs associated with an increase in volume is greater than the magnitude of the decrease in costs associated with an equivalent decrease in volume" (ABJ, 2003, p.48). In this regard, they identify two major causes of sticky cost behavior, namely adjustment costs andpersonal considerations by self-interested managers.

When demand increases, managers increase resources to theextent necessary to accommodate additional sales. However, when demandfalls, some committed resources will not be utilized and managers will have to take their decision whether to maintain or to adjust the redundant resources. Adjustment costs include monetary costs such as severance payment for dismissed employees and searching for new employees and training them when demand rebounds. Additionally, adjustment costs include non-monetary costs such as loss of moraleamong remaining employees when associates are laid off or erosion of human capital when work teams are disrupted.

Managers must evaluate the likelihood that a drop in demand is temporary. If managers expect a decrease inactivity to be only temporary, the costs of reducing resources and ramping them upsoon afterwards is likely to exceed the costs of temporarily retaining unutilized resources and so managers are more likely to retain unutilized resources rather than to incur adjustment. In this scenario, cost stickiness occurs. However, there are many cases in which the decline in demand is expected to be temporary and managers still decide to adjust firm resources and adapt them to the new lower level of activity.

While there is an extensive literature on the factors that influence the level of adjustment costs (Weidenmier and Subramanian, 2003; Balakrishnan et al., 2004; Calleja et al., 2006; Balakrishnan and Gurca, 2008; Banker et al., 2013; Banker et al., 2014), ABJ identify decisions by self-interested managers as another cause of cost stickiness. The literature has shown that self-interested managers consider not only the value of the firm, but also their personal utility. (e.g. Jensen and Meckling, 1976).

Chen et al. (2012) study the relationship between managerial empire building and cost stickiness and they find a positive relationship between them. Other studies investigate the relationship between managerial incentives to achieve earnings targets and cost stickiness (Kama and Weiss, 2013; Dierynck et al., 2012; Banker et al., 2011). They indicate that when self- interested managers face strong incentives to meet an earnings target in the current period and sales fall, even if they expects the sales drop to be temporary, they will use their managerial discretion to increase earnings of the current period. However, these studies are examined in developed markets. In contrast, to the best of the research's knowledge, this study is the first to investigate the relationship between managerial incentives to achieve earnings targets and cost stickiness in an emerging market like Egypt with a concentration of ownership, weak investor protection, and an emerging capital market.

Zang (2012) provides evidence that managers engage in AEM and REM as substitutes. In other words, the choice between the two types of earnings management depends on the costs of each type. For example, when managers face constraints in their ability to manipulate earnings using accruals, they manipulate earnings more using real activities manipulation and vice versa. Based on this, Yang (2018) hypothesizes and

finds evidence, for a sample of Australian companies, that when demand falls and managers have limited ability to manipulate earnings using AEM, they use RAM extensively and thus cost stickiness decreases. However, Boghdady (2019) indicates that the levels of real activities manipulations are not affected by the levels of accrual earnings management which means that there is no trade-off between both types of earnings management and that they are not sequentially practiced in Egypt. He argues that this contradiction is attributed to poor corporate governance and weak investor protection in Egypt. Kuo et al. (2014) find similar results for a sample of Chinese firms. In this case, I expect the results of Yang (2018) to get reversed.

2. Hypotheses development

Traditional cost models assume that costs change proportionally and symmetrically with changes in the activity levels. This implies that the magnitude of a change in costs depends only on the extent of a change in the level of activity regardless of the direction of the activity change (upward or downward). In contrast, Noreen and Soderstrom (1997) find evidence that costs change more in response to an increase in activity level than in response to a decrease in activity level. ABJ (2003) provide strong empirical evidence about this asymmetric cost behavior. They argue that costs are sticky if the magnitude of the decrease in costs associated with a decrease in volume is lower than the magnitude of the increase in costs associated with an equivalent increase in volume. They introduce an alternative model in which costs do not change mechanically with simultaneous changes in activity, but rather due to deliberate resource adjustment decisions made by managers.

When demand rises, managers raise committed resources in order to meet the additional demand. However, when demand declines, managers have to take the deliberate decision whether to keep or to cut the unutilized resources. In doing so, managers tradeoff the adjustment costs and the retention costs and also assess whether the probability that this decline in demand is temporary or permanent. If the manager decides to keep unnecessary resources instead of incurring the adjustment costs when volume declines, costs will exhibit sticky cost behavior which leads to the first hypothesis:

H_1: Costs are sticky on average (The relative magnitude of an increase in costs for a 1% increase in sales revenue is greater than the relative magnitude of a decrease in costs for a 1% decrease in sales revenue).

ABJ identify two major causes of sticky cost behavior, namely adjustment costs and personal considerations by self-interested managers. With regard to the latter cause mentioned by ABJ, few recent studies identify how these managerial incentives are important drivers of sticky cost behavior. Chen et al. (2012) study one of these managerial incentives that is well-known as "managerial empire building" which is managers' tendencies to grow the firm beyond its optimal size or to maintain unutilized resources with the purpose of increasing personal utility from status, power, compensation, and prestige (Jensen 1986; Hope and Thomas 2008). They argue and find evidence that empire-building managers are more likely to increase costs too rapidly for a sales increase and to decrease costs too slowly for a sales decrease which will lead to greater cost asymmetry. Additionally, they indicate that this positive relationship is more pronounced in firms with weak governance

than in those with strong one. On a global perspective, Banker et al. (2014) find similar results to those of Chen et al. (2012) in 8 countries out of a sample of 19 countries.

Kama and Weiss (2013) study the effect of facing incentives to meet earnings targets (incentives to avoid losses, to avoid earnings decreases, and to meet financial analysts' earnings forecasts) on cost stickiness. Self-interested managers consider not only the value of the firm, but also their personal utility when they adjust resources committed to activities and so they accelerate cuts of slack resources in response to a sales drop even if the drop is expected to be temporary. As a result, they hypothesize that when managers face incentives to meet earnings targets, cost stickiness is diminished. They test subsamples of observations with and without incentives to avoid losses and find that incase of presence of no incentives to avoid losses, costs are sticky. However, costs exhibit a symmetric, non-sticky, pattern when managers are motivated to meet earnings targets.

On the other hand, Banker et al. (2011) find no evidence that incentives to avoid earnings losses reduce cost stickiness in the US but cover the period from 1988 to 2008. More interestingly, when they split the sample before and after 2001, they find similar results to those of Kama and Weiss (2013) for the period before 2001. However, such results get reversed for the period after 2001. In this regard, they argue that this makes sense because after 2001 high-profile scandals (e.g. Enron) drew intense scrutiny to earnings management practices besides the enactment of the Sarbanes-Oxley act in 2002.Such results are consistent with the findings of Cohen et al. (2008) who report a shift from accruals management to real activities manipulation just after the passage of SOX (2002).

Instead of using aggregate proxies for discretionary costs, such as SG & A costs, Dierynck et al. (2012) use labor cost to illustrate whether and how managerial incentives to manipulate earnings affect the degree of labor cost asymmetry in private Belgian firms. In this regard, they argue and find evidence that when managers face incentives to meet or beat the zero earnings targets, they will fire employees in response to activity decreases. Compared to white-collar workers, blue-collar workers receive lower redundancy payments. Consequently, they find that firms that have strong incentives to manipulate earnings are more likely to terminate blue-collar workers since they are the least costly to dismiss.

Additionally, based on a large sample of Australian listed firms from 1990–2010, Bugeja et al. (2015) find similar results to those of Kama and Weiss (2013). Similarly, Xue and Hong (2016) find similar results for a sample of Chinese listed firms. From a global perspective, Banker et al. (2011) re-estimate the model of Kama and Weiss (2013) for their sample of Global Compustat firms. In this concern, the results indicate that the global evidence to support the results of Chen et al. (2012) and those of Kama and Weiss (2013) turn out to be mixed. Accordingly, the following hypotheses are presented as follows:

H2: When managers have incentives to avoid reporting losses, cost stickiness decreases.

H3: When managers have incentives to avoid earnings decrease, cost stickiness decreases.

H4: When managers have incentives to avoid earnings decrease or reporting losses, cost stickiness decreases.

3. Methodology

3.1. Study population and sample

The study population includes all Egyptian firms listed on the Egyptian stock exchange. Banks and other financial firms are excluded due to their special nature. The study depends on a sample of 940firm-year observations of non-financial firms listed in the Egyptian Stock Exchange from 2011 to 2017.

Table 1.The percentage of sample size to the population

Year	2011	2012	2013	2014	2015	2016	2017	Total
Total Egyptian companies listed on Egyptian stock exchange	213	213	212	214	221	222	222	1,517
Number of companies within banking and financial sector	(41)	(38)	(38)	(38)	(43)	(46)	(47)	(291)
Number of non-financial companies (population)	172	175	174	176	178	176	175	1226
Number of companies within the sample	132	135	136	136	134	135	132	940
Percentage of sample companies to population	77%	77%	78%	77%	75%	77%	75%	62%

3.2. Empirical research models

To test the first hypothesis, I use the model developed by ABJ (2003). The basic model is given by equation (1):

$$Log\left(\frac{O.C_{i,t}}{O.C_{i,t-1}}\right) = \beta_0 + \beta_1 log\left(\frac{S_{i,t}}{S_{i,t-1}}\right) + \beta_2 D_{i,t} + \beta_3 D_{i,t} * log\left(\frac{S_{i,t}}{S_{i,t-1}}\right) + \acute{\varepsilon}. \quad (1)$$

Where:

- O. C: refers to operating costs.

- S: refers to sales revenue.

- D: refers to a dummy variable which equals one when sales revenue of the year t is less than that of the year t-1, and 0 otherwise.

- t: refers to the period.

- i: refers to the firm.

- $\acute{\varepsilon}$: refers to random errors.

The use of ratios and log-specifications moderates potential heteroscedasticity in addition to improving comparability across firms. Additionally, log-specifications enable easier interpretation of coefficients as percentage changes in operating costs and sales (Anderson et al., 2003). When sales increase from period t-1 to period t, the dummy variable is set equal to zero and so coefficient β_1 measures the percentage increase in operating costs with respect to a 1% increase in sales revenue. However, when sales decrease, the dummy variable equals one and so the sum of the coefficients $(\beta_1+\beta_3)$ measures the percentage decrease in operating costs for a 1% decrease in revenue. For costs to be sticky, β_1 must be significantly positive, and β_3 must be significantly negative. To correct for inflation, all figures are deflated using the GDP deflator[2].

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[2] GDP and GDP deflator data were obtained from The World Bank website: http://www.worldbank.org/

Table 2.Summary of model (1)

Model 1: to test H$_1$	
$$Log\left(\frac{O.C_{i,t}}{O.C_{i,t-1}}\right) = \beta_0 + \beta_1 log\left(\frac{S_{i,t}}{S_{i,t-1}}\right) + \beta_2 D_{i,t} + \beta_3 D_{i,t} * log\left(\frac{S_{i,t}}{S_{i,t-1}}\right) + \acute{\varepsilon}. \quad (1)$$	
Variables	**Operational definition**
$Log\left(\frac{O.C_{i,t}}{O.C_{i,t-1}}\right)$	**The logarithm of operating cost of the current period divided by operating costs of the previous period.**
$log\left(\frac{S_{i,t}}{S_{i,t-1}}\right)$	**The logarithm of sales revenue of the current period divided by sales revenue of the previous period.**
$D_{i,t}$	**A dummy variable which equals one when sales revenue of the current year is less than that of the previous one.**
Parameter of interest	**Predicted sign**
β_1	+
β_3	-
Hypothesis	**Accepted if**
H$_1$	*B1* **is positive and** *B3* **is negative**

Following this basic regression, I extend the regression to test

H$_2$ – H$_4$ as follows:

$$\text{Log}\left(\frac{O.C_{i,t}}{O.C_{i,t-1}}\right) = \beta_0 + \beta_1 \log\left(\frac{S_{i,t}}{S_{i,t-1}}\right) + \beta_2 D_{i,t} + \beta_3 D_{i,t} * \log\left(\frac{S_{i,t}}{S_{i,t-1}}\right) +$$

$$\beta_4 \log\left(\frac{S_{i,t}}{S_{i,t-1}}\right) * \text{Incentive} + \beta_5 D_{i,t} * \log\left(\frac{S_{i,t}}{S_{i,t-1}}\right) * \text{Incentive}_{i,t}$$

$$+ \beta_6 D * \log\left(\frac{S_{i,t}}{S_{i,t-1}}\right) * \text{FCF}_{i,t} + \beta_7 D * \log\left(\frac{S_{i,t}}{S_{i,t-1}}\right) * \text{Suc.Dec}_{i,t}$$

$$+ \beta_8 D * \log\left(\frac{S_{i,t}}{S_{i,t-1}}\right) * \text{NOA}_{i,t-1} + \beta_9 D_{i,t} * \log\left(\frac{S_{i,t}}{S_{i,t-1}}\right) * \text{Big4}_{i,t}$$

$$+ \beta_{10} D_{i,t} * \log\left(\frac{S_{i,t}}{S_{i,t-1}}\right) * \text{Atenure}_{i,t} + \beta_{11} \text{Incentive}_{i,t} + \beta_{12} \text{FCF}_{i,t}$$

$$+ \beta_{13} \text{Suc.Dec}_{i,t} + \beta_{14} \text{NOA}_{i,t-1} + \beta_{15} \text{Big4}_{i,t} + \beta_{16} \text{Atenure}_{i,t} + \acute{\varepsilon}. \qquad (2)$$

Where:

- **Incentive refers management incentive to:**

    a- avoid reporting loss

    b- avoid reporting decrease

    c-avoid reporting loss and/ or to avoid reporting decrease.

- **FCF: refers to free cash flow.**

- **Suc. Dec: refers to successive decrease.**

- **Big4: refers to big four audit firms.**

- **Atenure: refers to audit tenure.**

- **NOA: refers to net operating assets.**

- **All other variables are as previously defined.**

3.3. Variable Measurement

3.3.1. Incentive

Following prior literature (Kama and Weiss, 2013; Dierynck et al., 2012; Banker et al., 2014), incentive represents management incentive to avoid losses, avoid earnings decrease, and to avoid losses and/ or to avoid earnings decrease. For incentives to avoid losses, a dummy variable

($AVOID_{i,t}$) is set to one if net income scaled by total assets at beginning of the year is greater than or equal to 0 but less than 0.01. On the other hand, for incentives to avoid earning decrease, a dummy variable ($DEC_{i,t}$) is set to one if change in net income scaled by total assets at beginning of the year is greater than or equal to 0 but less than 0.01 (Roychowdhury 2006).

3.3.2. Control Variables

3.3.2.1. Successive Decrease

ABJ report less sticky costs in periods where revenue declined in the preceding period as managers are likely to consider a revenue decline to be permanent when it occurs in a second consecutive period of revenue declines. Successive decrease is a dummy variable that equals 1 if sales decrease in two consecutive years, and 0 otherwise.

3.3.2.2. Free cash flow

Chen et al. (2012) find that when free cash flow is high and demand increases, managers over-invest in operational costs such as SG & A. on the other hand, they delay cutting costs in response to a decrease in demand leading to greater cost stickiness. FCF is calculated by deducting capital expenditures from cash flow from operations.

3.3.2.3. Accruals constraints

Zang (2012) provide evidence that managers trade off the accrual based and real earnings management based on their relative costs. In this regard, she argues that when one activity is more costly, firms engage in more of the other one. With regard to costs of using AEM, Zang (2012) show that using accruals to manipulate earnings has many constraints such as accounting flexibility and auditor's scrutiny (such as audit firm

size, and auditor tenure). Net operating assets would be used as a proxy for accounting flexibility. Net operating assets is measured as shareholders' equity less cash and marketable securities plus total debt at the beginning of the year divided by total assets in the year beginning. Two proxies are used for auditor's scrutiny which are Big 4 and audit tenure. Big4 is a dummy variable that equals (1) if the auditor is one of the big four audit firms and (0) otherwise. Audit tenure is a dummy variable that equals (1) if a firm is audited by the same auditor for four years or more and (0) otherwise.

Table 3.Summary of model (2)

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Model 2: to test H$_2$: H$_4$

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$$\text{Log}\left(\frac{\text{O.C}_{i,t}}{\text{O.C}_{i,t-1}}\right) = \beta_0 + \beta_1 \log\left(\frac{S_{i,t}}{S_{i,t-1}}\right) + \beta_2 D_{i,t} + \beta_3 D_{i,t} * \log\left(\frac{S_{i,t}}{S_{i,t-1}}\right) + \beta_4 \log\left(\frac{S_{i,t}}{S_{i,t-1}}\right) *$$

$$\text{Incentive}_{i,t} + \beta_5 D_{i,t} * \log\left(\frac{S_{i,t}}{S_{i,t-1}}\right) * \text{Incentive}_{i,t} + \beta_6 D_{i,t} * \log\left(\frac{S_{i,t}}{S_{i,t-1}}\right) * \text{FCF}_{i,t}$$

$$+ \beta_7 D_{i,t} * \log\left(\frac{S_{i,t}}{S_{i,t-1}}\right) * \text{Suc.Dec}_{i,t} + \beta_8 D_{i,t} * \log\left(\frac{S_{i,t}}{S_{i,t-1}}\right) * \text{NOA}_{i,t-1} + \beta_9 D_{i,t} *$$

$$\log\left(\frac{S_{i,t}}{S_{i,t-1}}\right) * \text{Big4}_{i,t} + \beta_{10} D_{i,t} * \log\left(\frac{S_{i,t}}{S_{i,t-1}}\right) * \text{Atenure}_{i,t} + \beta_{11} \text{Incentive}_{i,t} +$$

$$\beta_{12} \text{FCF}_{i,t} + \beta_{13} \text{Suc.Dec}_{i,t} + \beta_{14} \text{NOA}_{i,t-1} + \beta_{15} \text{Big4}_{i,t} + \beta_{16} \text{Atenure}_{i,t} + \acute{\varepsilon}. \quad (2)$$

Variables	Operational definition
Incentive	**Incentive refers management incentive to:** **a- avoid reporting loss** **b- avoid reporting decrease** **c- avoid reporting loss and/ or to avoid reporting decrease.**
FCF	**FCF is calculated by deducting capital expenditures from cash flow from operations.**

Suc. Dec	a dummy variable that equals 1 if sales decrease in two consecutive years, and 0 otherwise.
Big4	Big4 is a dummy variable that equals (1) if the auditor is a big four audit firms and (0) otherwise.
Atenure	Audit tenure is a dummy variable that equals (1) if the firm is audited by the same auditor for four years or more and (0) otherwise.
NOA	Shareholders' equity less cash and marketable Securities plus total debt at the beginning of the year divided by total assets in the year beginning.

Parameter of interest	Predicted sign
β_4	-
β_5	+
Hypothesis	Accepted if
H$_{2-4}$	*B5* is positive and significant

4. Empirical results

4.1. Testing H$_1$: The general stickiness behavior

To test the existence of cost stickiness (*H$_1$*), I used the ABJ (2003) basic model of cost stickiness. The explanatory power of the model is good. The adjusted R^2 = 0.70, which means that 70% of the variation in the dependent variable (operating cost)is explained by the independent variables in the right side of the model. The estimated value of $\beta1$is 0.75 (p = 0.000) which indicates that operating expenses increase on average by 0.75% when revenue increases by 1%.On the other hand, when revenues decrease by 1%, operating costs decrease only by 0.45% ($\beta1$ = 0.75 + $\beta3$ = –0.30). $\beta3$ is also highly significant (p = 0.000). This means that *H1* should be accepted and that costs are sticky on average.

In order to test the research hypotheses concerning the relationship between earnings management incentives and cost stickiness, three

empirical regression models are conducted for each independent variable (i.e. Avdloss, Avddec, and Avdboth). To correct for both heteroscedasticity and autocorrelation problems, clustered robust standard errors are used. The results of each of the three models, which are based on three proxies of earnings management incentives, are presented and discussed below. Table 4 reports the results of multiple regression analysis for the three models. The results show a negative relationship between earnings management incentives proxies and cost stickiness.

4.2. Testing H_2: managerial incentives to avoid loss

To support the second hypothesis that when managers have incentive to avoid loss cost stickiness decreases, I expect a negative coefficient on the two-way interaction variable (β_4 <0) and a positive coefficient on the three-way interaction variable (β_5 >0).

Consistently, the coefficient on the Avdloss two- way interaction term is significantly negative at the 5% level (Coefficient = -0.444, P= 0.012) and a significant positive coefficient (at the 1% level) on the three-way interaction variable (Coefficient = 0.621, P= 0.002), which means that as compared to firms that do not have incentive to avoid loss, operating costs increase of firms with such incentive for a 1% increase in sales is 0.44% smaller and operating costs decrease for a 1% decrease in sales is 0.62 % higher. Such results support the second hypothesis that when managers have incentive to avoid loss, costs exhibit an anti-sticky behavior.

To provide further support, I partition the sample into two subsamples (one that have incentives to avoid loss (Avdloss= 1) and the other that do not (Avdloss= 0)).With regard to the subsample with no

incentive (Avdloss= 0), β_3 is significantly negative at 1% (β_3= -0.36, P= 0.001) which means that costs exhibits a sticky cost behavior in the absence of incentive to avoid loss. On the contrary, for the other subsample with managers have incentives to avoid loss, β_3 is significantly positive at 1% (β_3= 0.40 , P= 0.008) which means that operating costs decrease for a decrease in sales is higher than the increase in costs associated with an equivalent increase in sales. Such results support the second hypothesis that when managers have incentive to avoid loss, costs exhibit an anti-sticky behavior.

Additionally, the coefficients of the three-way interaction of the proxies of accruals constraints (Big4 and audit tenure) has a negative sign (β_9 = -.3294 and β_{10}= -.439), in contrast with the results of Zang (2012) and Yang's (2018). Such results assure the results of Boghdady (2019)for a sample of Egyptian firms. He indicates that the levels of real activities manipulations are not affected by the levels of accrual earnings management which means that there is no trade-off between both types of earnings management and that they are not sequentially practiced in Egypt. He illustrates that this is attributed to poor corporate governance and weak investor protection in Egypt. Kuo et al. (2014) find similar results for a sample of Chinese firms.

4.3. Testing H$_3$: managerial incentives to avoid earning decrease

The third hypothesis predicts that when managers have incentive to avoid earning decrease, cost stickiness decreases. To support this hypothesis, I expect a negative coefficient on the two-way interaction variable (β_4<0) and a positive coefficient on the three-way interaction variable (β_5> 0).

The coefficient on the Avddec two- way interaction term is negative but not significant (Coefficient = -0.023., P= 0.335) which means that when sales increase, there is no difference between firms that have incentive to avoid earning decrease and firms that do not. On the other hand, the coefficient on the three-way interaction variable is significantly positive (at the 5% level) (Coefficient = 0.223, P= 0.012), which means that as compared to firms that do not have incentive to avoid earning decrease, operating costs decrease for a 1% decrease in sales is 0.22 % higher. Such results support the second hypothesis that when managers have incentive to avoid loss, costs exhibit an anti-sticky behavior.

In addition, I split the sample into two subsamples (one that have incentives to avoid earning decrease (Avddec=1) and the other that do not (Avddec=0).Concerning the subsample with no incentive (Avddec= 0), β_3 is significantly negative at 1% (β3= -0.17, P= 0.000) which means that costs exhibits a sticky cost behavior in the absence of incentive to avoid earning decrease. On the other hand, the other subsample with managers have incentives to avoid earning decrease, β_3 is insignificant (β3= 0.077, P= 0.589) which means that when managers have incentive to avoid earning decrease, costs exhibit a symmetric behavior. These results support the third hypothesis that when managers have incentive to avoid earning decrease, costs stickiness decreases.

4.4. Testing H$_4$: managerial incentives to avoid loss and/ or earning decrease

To support the fourth hypothesis that when managers have incentive to avoid loss and/ or earning decrease cost stickiness decreases, I expect a negative coefficient on the two-way interaction variable (β_4 <0) and a positive coefficient on the three-way interaction variable (β_5 > 0).

The coefficient on the Avdbothtwo- way interaction term is negativebut not significant (Coefficient = -0.245., P= 0.124). However, there is a significant positive coefficient (at the 5% level) on the three-way interaction variable (Coefficient = 0.396, P= 0.032), which means that as compared to firms that do not have incentive to avoid loss and/ or earning decrease, operating costs decrease for a 1% decrease in sales is 0.40 % higher. Such results support the second hypothesis that when managers have incentive to avoid loss and/ or earning decrease, costs exhibit an anti-sticky behavior.

In addition, I split the sample into two subsamples (one that have incentives to avoid loss and/ or earning decrease (Avdboth= 1) and the other that do not (Avdboth= 0).With regard to the subsample with no incentive (Avdboth= 0), β_3 is significantly negative at 1% (β_3= -0.24, P= 0.003) which means that costs exhibits a sticky cost behavior in the absence of incentive to avoid loss. On the contrary, for the other subsample with managers have incentives to avoid loss and or/ earning decrease, β_3 is significantly positive at 5% (β_3= 0.417, P= 0.023). Again such results support the second hypothesis that when managers have incentive to avoid loss, costs exhibit an anti-sticky behavior.

5. Conclusion

This study investigates the relationship between earnings management incentives and cost stickiness. To measure managerial incentives to earning management, three proxies are used; namely management incentive to avoid loss, incentive to avoid earning decrease, and incentive to avoid loss and/ or earning decrease. Three empirical models are developed in which the independent variable represents the

proxies used for managerial incentive to earnings management. A sample of non-financial companies from 2010 to 2017, with 940 firm-year observations was used.

The results indicate that costs are sticky on average in Egypt which means that costs increase more for an increase in the sales but decrease less foran equivalent decrease in sales. These results stay unchanged when managers face no incentive to earnings management. On the other hand, when managers have incentive to earnings management (to avoid loss, to avoid earning decrease, and to avoid loss and/ or earning decrease), they tend to increase costs less for an increase in sales and to aggressively cut resources for a decrease in sales which makes costs to exhibit an anti-sticky cost behavior.

Overall, this study indicates that costs are not sticky all the time. In addition, these results shed light on the role of motivations underlying managerial decisions in shaping firms' cost structure.

Table 4. The results of multiple regression analysis

Variables	Avoid loss		Avoid decrease		Avoid both	
	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.
$\log\left(\dfrac{S_{i,t}}{S_{i,t-1}}\right)$	.8615	0.000	.9751	0.000	.9126	0.000
D	.0462	0.000	.0306	0.001	.0635	0.000
$D*\log\left(\dfrac{S_{i,t}}{S_{i,t-1}}\right)$	-.0367	0.476	-.0697	0.087	-.0079	0.892
$\log\left(\dfrac{S_{i,t}}{S_{i,t-1}}\right)*$ Incentive	-.4436	0.012	.0227	0.335	-.2447	0.124
$D*\log\left(\dfrac{S_{i,t}}{S_{i,t-1}}\right)*$Incentive	.6205	0.002	.2227	0.012	.3962	0.032
$D*\log\left(\dfrac{S_{i,t}}{S_{i,t-1}}\right)*$ FCF	.4233	0.044	.37889	0.009	.2241	0.348

$\log\left(\dfrac{S_{i,t}}{S_{i,t-1}}\right)$ * sucdec	-.0853	0.096	-.0946	0.146	-.0702	0.304
D* $\log\left(\dfrac{S_{i,t}}{S_{i,t-1}}\right)$ * NOA	.0087	0.422	.0029	0.632	.0062	0.499
D* $\log\left(\dfrac{S_{i,t}}{S_{i,t-1}}\right)$ * Big4	-.3294	0.016	-.0493	0.777	.2746	0.259
D* $\log\left(\dfrac{S_{i,t}}{S_{i,t-1}}\right)$ * Atenure	-.4393	0.000	-.316	0.037	-.3243	0.030
Incentive	.0275	0.275	.0004	0.963	.0175	0.247
FCF	-.0111	0.664	-.0229	0.078	-.0112	0.754
Sucdec	.0021	0.890	-.0023	0.860	.0045	0.775
NOA	.0647	0.042	.0208	0.265	.0763	0.090
Big4	.0437	0.018	.0132	0.408	.0303	0.160
Atenure	-.0003	0.985	.0029	0.807	-.0021	0.919
Constant	-.0827	0.001	-.0319	0.027	-.0803	0.016
Adjusted R^2	81%		84%		83%	
Mean VIF	1.6		1.6		1.6	
Kolmogorov-Smirnov Test	0.170		0.140		0.190	

Future research may study whether costs will be sticky on average during period of COVID-19 pandemic. Another avenue for future research is to compare cost behavior in privately-owned enterprises with that of state-owned enterprises during the period of COVID-19 pandemic. Another interesting avenue for future research is to study the relationship between managerial incentives and cost stickiness in private owned enterprises compared to state owned ones.

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