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8. Author profile

Dr. Mohamed Fathy Elshahat Ali (M.Phil. from Maastricht School of Management (MSM), Maastricht, The Netherlands and Ph.D. from University of Twente (UT), Enschede, The Netherlands), is an Associate Professor in the department of accounting, Benha University, Egypt. He has taught several courses including financial accounting, managerial accounting, cost accounting, Zakat accounting, tax accounting, governmental accounting, Gas and Oil accounting, and advanced financial accounting. His areas of research include the Balanced Scorecard, lean production, lean accounting, the relationship between contemporary management accounting techniques and strategic planning, activity-based costing, customer profitability analysis (CPA), audit committee, and the contemporary trends in managerial accounting including CSR, RCA, EMA, and Big Data. He has published numerous articles in academic journals including Journal of Accounting & Organizational Change, Humanomics, The Journal of Advancements in Economics, Finance & Accounting (JAEFA), The Egyptian Journal for Commercial Studies, Mansoura University. He has some accepted research papers in a number of international conferences in London (UK), Maastricht (NL), Amersfoort (NL), Valendar (Germany), Florida (USA), Dallas (USA). Recently, he is a reviewer for the Journal of Financial Reporting and Accounting (JFRA), UK.

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The study has some opportunities for future research. First, it would be interesting to apply the relationship between cost stickiness and financial performance in other Egyptian sectors other than mentioned in this study. Second, there is an indispensable necessity to conduct research regarding the cost stickiness and other variables such as managerial motivations and accounting responsibility. Third, there is a significant need for future research on the part of organizational values and beliefs on the appropriation and utilization cost stickiness application. Fourth, there is an opportunity for future research concerning using another research strategy to scrutinize the association between cost stickiness and financial performance such as case study strategy in a specific company in the developing countries. Finally, there is a fundamental need for further research in the statistical and other soft skills that should be attained by managerial accountants in order to effectively deal with the difficulties created from cost stickiness.

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In addition, the results in display that there is an insignificant association between cost stickiness and firm's financial performance in the poultry sector (Coefficient = 9844.045 at t-value = .944, p-value = 0.076, and Beta = 0.584) at the significant level 5%, which proves H3. In addition, the consequences reveal that there is an insignificant relationship between cost stickiness and firm's financial performance in the pharmaceutical sector (Coefficient = 34665.381 at t-value = 2.450, p-value = 0.919, and Beta = -.037-) at the significant level 5%, which proves H3 that proposed the positive relationship between cost stickiness decline and enhancing the firm's financial performance. Besides, the value of Beta (-.037-) is negative which demonstrates the inverse relationship between cost stickiness and financial performance (*this is mainly proves hypothesis 3*).

In the analysis of control variables, the outcomes reinforced that size does not have an enormous effect on augmenting sales revenues and incurring operating costs for the reason that marketing circumstances and approaches could play an indispensable role better than firm size. According to Pleshette (2013), small-sized businesses have ability to attain high sales revenues by focusing on numerous strategies and approaches, which may include; quicker reply time to customer requirements, controlling clients' questions and complaints instantly, capability to offer personal continuing services to customers, sending the experts for a reduced cost, lower overhead costs, and reacting to altering market circumstances. This analysis rejects H4. With respect to pharmaceutical sector, this sector is identical to the mining sector; the fundamental ownership structure is related to the institutions structure, Additionally, the results reveal that there is an insignificant impact of ownership structure on the fundamental research variables in the selected sectors (F value = 0.237, 1.24, and 0.002, respectively, p-value = 0.943, 0.218, and 0.598 respectively) at the significant level 5%.

The study addressed a number of findings regarding the relationship between cost stickiness and firm's financial performance. Firstly, expanding the operating costs in the mining sector is a fundamental issue as they can't inevitably be recovered by firms especially if the minerals and ores discovered can't be efficiently obtained and utilized. Secondly, when sales revenues decreased in particular firms in the poultry sector, the operating costs decreased by a percentage lower than decreasing the sales revenues which mean that firms are sticky in this sector. Now, it is very crucial question; *why most of businesses in the Egyptian poultry sector are sticky*? There are numerous reasons for that: first, the nature of this sector is different from other sectors owing to dealing with poultry. Second, medical and health care is required, and even if sales decline, medical and health care can't be condensed. Third, the Egyptian government has implemented a number of procedures intended to limit the diffusion of diseases (including avian flu) even if the sales are lessened. Thirdly, Revenues and operating costs are very indispensable factors in the pharmaceutical sector due to this sector is encountering challenges concerning the pricing of its products. The pharmaceutical prices are based on a cost-plus formulation controlled by the ministry of health that assures promising returns to the businesses operating in Egypt.

Regarding regression analysis, The outcomes reveal that there is an insignificant relationship between cost stickiness and firm's financial performance in the mining sector (Coefficient = 41701.547 at t-value = 4.259, p-value = 0.785, and Beta = -.099) at the significant level 5%, which proves H3 that suggested the decrease of cost stickiness will positively influence the firm's financial performance. Due to the distinctive features of the mining sector, Subramanian (2017) argued that the mining industry depends profoundly on the existing situation of the market. When the market is upside, firms develop marginal high-cost, low-productivity mineral deposits, bolstered by high commodity prices.

6. Conclusion and summary of directions for future research

This study examined the relationship between cost stickiness and firm's financial performance in the Egyptian business environment. The study presents a proper foundation in regards to previously mentioned recent studies in the area of cost stickiness, its meanings, features, and addressing several aforementioned cost stickiness applications in Egypt. Besides, the study shifts attention to theoretical background and developing the hypotheses related to five various perspectives; (1) cost stickiness and managerial incentives, (2) cost stickiness and cost management, (3) cost stickiness and firm's financial performance, (4) firm size as a control variable, and (5) ownership structure as a second control variable. Moreover, this study is a causal relationship investigation between the degree of cost stickiness and firm's financial performance. The data associated to the business's financial performance have been collected from the published financial reports for 45 businesses from three different sectors in the Egyptian economy for the periods 2015-2017.

This research is aimed to scrutinize the relationship between cost stickiness and firm's financial performance through formulating a model that comprises two core research variables along with a number of control variables in the Egyptian business environment. Also, taking into consideration the nature of deductive approach, this study starts with deducing five hypotheses that already stated in section 3. Accordingly, these hypotheses have been formulated to scrutinize the influence of cost stickiness phenomena on the firm's financial performance in the Egyptian business environment considering various control variables including managerial incentives, cost accounting system, firm size, and ownership structure. This research is planning to inspect the influence of cost stickiness on the firm's financial performance throughout revising and scrutinizing the annual financial reports for a number of Egyptian listed firms in the Egyptian stock exchange

5.4 The Role of Control Variables (Qualitatively)

In this section, the study is attempting to indicate the crucial role of control variables (managerial incentives and cost management) on the basic research theme by a qualitative approach. According to Kama and Weiss (2012), firms are encountering motivations to run into earnings objectives, numerous managers are probably hastening declines of inefficient resources in response to sales drop despite the fact that such drop is not constantly. Hence, these resource reductions will lead to cost shrinkages in the presence of motivations to meet earnings targets than in the absence of such incentives. Accordingly, managerial motivations are possibly diminishing the degree of cost stickiness and sequentially expand the firm's financial performance, which proves H1. Also, Hartlieb and Loy (2018) have pointed out that there is a negative relationship between managerial incentives and cost asymmetry, which also proves H1. More than that, some managerial incentives might encompass anxiety of work loss or terminating acquainted workforces.

Alternatively, cost management could have a vital role in increasing or decreasing the degree of cost stickiness. Abdulhamied and Abulezz (2017) revealed that the presence of fixed costs could lead to cost stickiness, by using simulated data for different cost structures, the firm-specific cost structure could be an indispensable ignored variable in scrutinizing cost stickiness. The ratio of depreciation to cost of goods sold can be used as a measure of the relative extent of fixed costs. As well, Balakrishnan et al (2010) addressed that increasing the proportion of fixed costs will increase the degree of asymmetry in the cost response, so the proportion of fixed costs could be an omitted variable in cross0sectional tests of cost stickiness. Additionally, fixed costs stimulate scale economies by growing the cost over larger volumes. Scale economies can also happen in variable costs. The aforementioned study found out that the effect of fixed costs governs the impact of scale economies, which proves H2.

Table 10: Regression analysis (the impact of ownership structure)

Sectors	Variables	Levene's Test for Equality of Variances		t	df	Sig. (2-tailed)
		F	Sig.			
Mining	Sales Revenues	.237	.640	.073	8	.943
	Operating costs	1.055	.334	-.294	8	.776
Poultry	Sales Revenues	.124	.733	-1.337	8	.218
	Operating costs	.072	.795	-1.556	8	.158
Pharma.	Sales Revenues	.002	.963	.548	8	.598
	Operating costs	2.156	.180	1.870	8	.098

It can be seen from the outcomes in Table 9 that, in the mining sector, the institutions' firms (as an ownership structure) have acquired mean values of sales revenues 7.46 and standard deviations 19.24, which means that the prevailing ownership structure is related to institutions structure in the mining sector. Alternatively, in the poultry sector, the dominant ownership structure is related to the individuals, the mean values of sales revenues 7.02 and standard deviations 17.06. With respect to pharmaceutical sector, this sector is identical to the mining sector; the fundamental ownership structure is related to the institutions structure, the mean values of sales revenues 7.52 and standard deviations 22.45. Additionally, the results, as shown in Table 10, reveal that there is an insignificant impact of ownership structure on the fundamental research variables in the selected sectors (F value = 0.237, 1.24, and 0.002, respectively, p-value = 0.943, 0.218, and 0.598 respectively) at the significant level 5%. Hence, this analysis rejects H5. Nevertheless, the previous findings are inconsistent with the aforementioned literature in this area. For example, Suman et al (2016) pointed out that ownership structure and firm performance are regarded as essential issues in corporate governance. The discussion of agency theory, stewardship theory, transaction cost theory, and principal agent theory addresses the cause and effect of variables such as managerial ownership and the impacts on firm performance. In addition, Wahla et al (2012) indicated that managerial ownership has a significant effect on firm performance, this study has concluded that firm performance vitally depends on managerial ownership. Agency problems rise owing to augment in managerial shareholdings, which eventually influences the firm performance.

Consequently, what stand out in Table 7 is the high mean values for the majority of small-sized firms in the three selected sectors, which established the widespread range of small-sized businesses that can accomplish numerous advantages encompassing; focus on niche markets, can be a selling point, economies of scale are restricted, avoid paying value added taxes, launching new innovative ideas, and preventing principal-agent problem (Pettinger, 2016). Furthermore, the results, as shown in Table 8, indicate that there is an insignificant impact of firm size on the core research variables in the selected sectors (F value = 0.181, 1.55, and 0.128, respectively, p-value = 0.519, 0.286, and 0.968 respectively) at the significant level 5%. These outcomes reinforced that size does not have an enormous effect on augmenting sales revenues and incurring operating costs for the reason that marketing circumstances and approaches could play an indispensable role better than firm size. According to Pleshette (2013), small-sized businesses have ability to attain high sales revenues by focusing on numerous strategies and approaches, which may include; quicker reply time to customer requirements, controlling clients' questions and complaints instantly, ability to offer personal continuing services to customers, sending the experts for a reduced cost, lower overhead costs, and reacting to adjusting market circumstances. This analysis rejects H4.

Table 9: Group Statistics (ownership structure)

Sectors	Variables	Ownership Structure	N	Mean	Std. Deviation
Mining	Sales Revenues	Institutions	8	7.46	19.24
		Individuals	7	7.37	16.12
	Operating costs	Institutions	8	3.82	12.52
		Individuals	7	4.04	8.06
Poultry	Sales Revenues	Institutions	6	5.50	17.8
		Individuals	9	7.02	17.06
	Operating costs	Institutions	6	2.61	10.46
		Individuals	9	3.63	10.35
Pharma.	Sales Revenues	Institutions	10	8.31	20.36
		Individuals	5	7.52	22.45
	Operating costs	Institutions	10	3.76	8.90
		Individuals	5	2.29	16.71

Table 7: Group Statistics (firm size)

Sectors	Variables	Size	N	Mean	Std. Deviation
Mining	Sales Revenues	Big	8	7.04	19.85
		Small	7	7.80	16.78
	Operating costs	Big	8	3.84	13.57
		Small	7	3.98	8.20
Poultry	Sales Revenues	Big	9	5.45	20.96
		Small	6	6.76	15.52
	Operating costs	Big	9	2.66	11.42
		Small	6	3.36	10.31
Pharma.	Sales Revenues	Big	10	8.04	18.28
		Small	5	8.10	23.66
	Operating costs	Big	10	3.08	13.93
		Small	5	3.56	13.67

Table 8: Regression analysis (the impact of firm size)

Sectors	Variables	Levene's Test for Equality of Variances		t	df	Sig. (2-tailed)
		F	Sig.			
Mining	Sales Revenues	.181	.682	-.675	8	.519
	Operating costs	.982	.351	-.192	8	.583
Poultry	Sales Revenues	1.455	.262	-1.143	8	.286
	Operating costs	.108	.750	-1.012	8	.341
Pharma.	Sales Revenues	.128	.730	-.042	8	.968
	Operating costs	.116	.742	-.578	8	.579

It can be noticed from the data in Table 7 that, in the mining sector, the small-sized firms have got mean values of sales revenues and operating costs 7.80 and 3.98 respectively, and standard deviations are 16.78 and 8.20 respectively. Alternatively, in the poultry sector, the small-sized firms have achieved mean values of sales revenues and operating costs 6.76 and 3.63 respectively, and standard deviations are 15.52 and 10.31 respectively. In the pharmaceutical sector, the small-sized firms have achieved mean values of sales revenues and operating costs 8.10 and 3.56 respectively, and standard deviations are 23.66 and 13.67 respectively.

According to Malhotra (2010), the pharmaceutical firms have several targets; increasing profits via invention or marketing of drugs, producing market safe drugs, and reduce environmental impact. Since the firms are able to achieve the targets mentioned above, and incompetence in the product development, marketing, and manufacturing operations become inappropriate as the associated costs are absorbed. With respect to the trend analysis of costs in the pharmaceutical industry, Basu et al (2008) argued that the higher value of cost of goods sold (COGS) as a percentage of sales for generics is a reflection of drop spending on research and development costs and sales. Nevertheless, it is also quite revealing to reorganize that COGS% is considerably lesser for biotech. In Egypt, pharmaceutical companies can straightforwardly manufacture pharmaceuticals for export at competitive prices by intensifying their level of technical sophistication and superior operations (MOH, 2017).

5.3 The Role of Control Variables (Quantitatively)

As revealed in section 3 (background and hypotheses development), there is a growing body of literature that recognizes the importance of firm size and ownership structure in running the causal relationship between cost stickiness and firm's financial performance. Table 7 and Table 8 describe the group statistics attained for the control variables (firm size and ownership structure). On the other hand, Table 9 and Table 10 display the consequences attained after carrying out a regression analysis of the role of firm size and ownership structure (as research control variables) in the main research variables for the three selected sectors in Egypt; mining, poultry, and pharmaceutical. In detail, Table 9 shows the outcomes that are related to the firm size whereas Table 10represents the results concerned with the ownership structure. In each table, the outcomes contain the mean, standard deviation, the significance, T-value, and the degree of freedom (df).

In addition, the Egyptian government could consider encouraging procedures so as to improve the poultry industry and also decrease the operating costs in such sector. These procedures may embrace; developing management practices, feed effectiveness, and the application of new technology to carry out higher productivity, reconstruction of feed plans, and advancing the feed ratios.

5.2.3 Regression analysis (Pharmaceutical sector)

Table 6 shows the outcomes attained after carrying out a regression analysis for the major study variables (cost stickiness and firm's financial performance) in the pharmaceutical sector.

Table 6: Regression analysis (Pharmaceutical sector)

Model	Unstandardized Coefficients		standardized Coefficients	T	Sig
	B	Std. Error	Beta		
Constant	34665.381	14151.485		2.450	.040
Operating costs	-.030-	.284	-.037-	-.105-	.919
R Square	.001				
Adjusted R Square	-.123-				
Standard error of the estimate	13647.15579				

Dependent Variable: Firm's Financial Performance (net profits)

Table 6 points out the coefficients, t-value, and p-value for the fundamental study's variables. In the descriptive statistics' section, it can be affirmed that the businesses in the pharmaceutical sector are sticky and few are not-sticky. The results in Table 6 reveal that there is an insignificant relationship between cost stickiness and firm's financial performance in the pharmaceutical sector (Coefficient = 34665.381 at t-value = 2.450, p-value = 0.919, and Beta = -.037-) at the significant level 5%, which proves H3 that proposed the positive relationship between cost stickiness decline and enhancing the firm's financial performance. Besides, the value of Beta (-.037-) is negative which demonstrates the inverse relationship between cost stickiness and financial performance (*this is mainly proves hypothesis 3*).

management, which proves H2. As well, Subramanian (2017) mentioned to numerous strategies so as to augment the cost management programs in the mining sector comprising; improved management of budgets and risks, better planning of mines, exploit technology to develop efficiency, personnel planning, and elevate operations.

5.2.2 Regression analysis (Poultry sector)

Table 5 reveals the consequences attained after employing a regression analysis for the major study variables (cost stickiness and firm's financial performance) in the poultry sector.

Table 5: Regression analysis (Poultry sector)

Model	Unstandardized Coefficients		standardized Coefficients		
	B	Std. Error	Beta	T	Sig
Constant	9844.045	10428.649		.944	.373
Operating costs	.658	.323	.584	2.036	.076
R Square	0.341				
Adjusted R Square	.259				
Standard error of the estimate	9437.04950				

Dependent Variable: Firm's Financial Performance (net profits)

Table 5 indicates the coefficients, t-value, and p-value for the core study's variables. In the descriptive statistics' part, it can be stated that the companies in the poultry sector are sticky, which means that operating costs in this sector reduce less when sales fall than they increase when sales rise. The results in Table 5 display that there is an insignificant association between cost stickiness and firm's financial performance in the poultry sector (Coefficient = 9844.045 at t-value = .944, p-value = 0.076, and Beta = 0.584) at the significant level 5%, which proves H3. With respect to why most firms in the poultry sector are sticky? Food and Agriculture Organization (FAO, 2011) pointed out that poultry does not need extreme space and labor for production, which means that small-scale farmers have adequate prospects to obtain extra income. Likewise, labor requirements are not too much and housing and other structures necessitated can typically be built using locally obtainable materials.

5.2.1 Regression analysis (Mining sector)

Table 4 displays the outcomes acquired after implementing a regression analysis for the main study variables (cost stickiness and firm's financial performance) in the mining sector.

Table 4: Regression analysis (Mining sector)

Model	Unstandardized Coefficients		standardized Coefficients		
	B	Std. Error	Beta	T	Sig.
Constant	41701.547	9792.021		4.259	.003
Operating costs	-.073-	.259	-.099-	-.282-	.785
R Square	0.010				
Adjusted R Square	-.114-				
Standard error of the estimate	11406.77115				

Dependent Variable: Firm's Financial Performance (net profits)

The regression table explains the coefficients, t-values, and p-value for the core study's variables. In the descriptive statistics' section, it can be observed that the majority of businesses in the mining sector are sticky, which means that operating costs in this sector reduce less when sales fall than they increase when sales rise. The outcomes in Table 4 expose that there is an insignificant relationship between cost stickiness and firm's financial performance in the mining sector (Coefficient = 41701.547 at t-value = 4.259, p-value = 0.785, and Beta = -.099) at the significant level 5%, which proves H3 that suggested the decrease of cost stickiness will positively influence the firm's financial performance. Due to the distinctive features of the mining sector, Subramanian (2017) argued that the mining industry profoundly depends on the existing situation of the market. When the market is upside, firms develop marginal high-cost, low-productivity mineral deposits, bolstered by high commodity prices. Then again, when the market is down, firms react by cutting costs as an ordinary reaction to a changing market cycle. Besides, mining businesses are presently concentrating on lessening operating costs and will have to move from cost-cutting methods and create sustainable programs for cost

periods from 2015-2017. By examining the firms in the pharmaceutical sector between the periods from 2014 to 2017, the analysis showed that the sales revenues have been raised by almost 10%, the operating costs have been increased also but by 15%. Alternatively, when sales revenues reduced in certain firms in this sector, the operating costs decreased by the same amount and other firms by lower amount which means that some firms are sticky and other firms are not-sticky in the pharmaceutical firms. In Egypt, pharmaceutical sector is one of the best performing sectors with a developing population and market, the next few years promise high yields for investment in such sector (MOH, 2017). Revenues and operating costs are very indispensable factors in this sector due to this sector is encountering challenges concerning the pricing of its products. In accordance with MOH (2017), pharmaceutical prices are based on a cost-plus formulation controlled by the ministry of health that assures promising returns to the businesses operating in Egypt. Nonetheless, this sector complains that 90% of its raw materials are imported and the prices of these materials have been boosted after the devaluation. Likewise, the firms in this sector do not have enough cash to pay providers which prompts to holding production and deficiencies in the market.

5.2 Regression Analysis

In this section, the study is attempting to scrutinize the relationship between the main research variables (the cost stickiness as an independent variable and firm's financial performance as a dependent variable, along with two control variables; firm size and ownership structure). Additionally, this section also is trying to prove or refuse the research hypotheses stated previously. This analysis helps predict the future sales and the costs that will be incurred to generate such sales, understand supply and demand, understand inventory levels, and also evaluate the marketing promotion policies.

been increased by almost 5%; the operating costs have been increased also by the same percentage. Also, when sales revenues decreased in particular firms in this sector, the operating costs decreased by a percentage lower than decreasing the sales revenues which mean that firms are sticky in this sector. Now, it is very crucial question; *why most of businesses in the Egyptian poultry sector are sticky*? There are numerous reasons for that: first, the nature of this sector is different from other sectors owing to dealing with poultry. Second, medical and health care is required, and even if sales decline, medical and health care can't be condensed. Third, the Egyptian government has implemented a number of procedures intended to limit the diffusion of diseases (including avian flu) even if the sales are lessened. In addition, according to Mohammed (2017), the spread of sicknesses among poultry farms are attributed to various causes; a deficiency of veterinary supervision, lack of follow-up by the concerned authority, and the lack of the role of agricultural ministry. Moreover, it should be perceived that the total number of poultry farms in Egypt is over than 80 thousand farms, of which only 20 thousand are authorized and certified farms.

5.1.3 Descriptive statistics (Pharmaceutical sector)

Table 3 enlightens the central tendency measures for the pharmaceutical sector, which clarifies sales, operating costs, and profits from the period from 2015 to 2017.

Table 3: Descriptive statistics (Pharmaceutical sector): Amounts in Thousands

Variable	*N. of Firms*	*Mean*	*SD*	*Min.*	*Max.*
Sales	15	8.0	20.29	49.00	1.10
Operating costs	15	4.7	16.39	23.33	69.33
Profits	15	3.3	12.56	8.67	50.00

It can be noted from the data in Table 3 that the mean values of sales revenues and operating costs are 8.0 and 4.7 respectively, and standard deviations are 20.29 and 16.39 respectively. The minimum and maximum values of sales revenues range from 49.00 to 1.10 which indicates that there is a huge increase in sales revenues in the pharmaceutical sector between the

the periods from 2014 to 2017, the analysis implied that the sales revenues have been increased by almost 20%, the operating costs have been increased also by the same percentage. Alternatively, when sales revenues decreased in particular firms in this sector, the operating costs decreased by the same amount which means that some firms are sticky and other firms are not-sticky in the same sector (*but the analysis indicated that the majority firms are sticky*). Likewise, the low standard deviation in operating costs (SD = 14.04) means that the most of operating costs' values are very close to the average. As stated by Raafat (2018), since the mining law of 2014 has collapsed to attract investment into the sector comparing to the government's anticipations, the Egyptian government has taken progressive stages to adjust the mining sector law by transmitting an improved version of the law of 2014 to parliament for approval with the purpose of reacting to the investors' aspirations and requirements. As well, expanding the operating costs in this sector are a fundamental issue as they can't inevitably be recovered by firms especially if the minerals and ores discovered can't be efficiently obtained and utilized.

5.1.2 Descriptive statistics (Poultry sector)

Table 2 describes the central tendency measures for the poultry sector, which explains sales, operating costs, and profits from the period from 2015 to 2017.

Table 2: Descriptive statistics (Poultry sector): Amounts in Thousands

Variable	*N. of Firms*	*Mean*	*SD*	*Min.*	*Max.*
Sales	15	6.1	18.28	38.00	95.33
Operating costs	15	3.0	9.95	13.67	43.00
Profits	15	3.0	10.55	10.33	51.33

What stands out in Table 2 is the high mean value of sales revenues (6.1), the minimum and maximum values of sales revenues range from 38 to 95 which indicate that there is a huge increase in sales revenues in the poultry sector between the periods from 2015-2017. By analyzing the selected firms in the Egyptian poultry sector, it can be observed that the sales revenues have

5. Outcomes and discussion

This section debates the practical research results throughout explaining the outcomes focusing on three major investigations; namely, descriptive statistics, regression analysis, and T-Test analysis for emphasizing the role of control variables on the basic research variables. First, descriptive statistics have been operated in order to illustrate the fundamental characteristics of the collected data through exhibiting plain summaries regarding the sample in a practical structure. Second, regression analysis is carried out to estimate the effect of cost stickiness on the firm's financial performance. Furthermore, this section evaluates the impact of control variables on the main research relationship.

5.1 Descriptive Statistics

This study has selected 45 firms as a research sample, these firms have been selected randomly from three sectors; mining, poultry, and pharmaceutical. Hence, this section examines the central tendency measures comprising mean and standard deviation for the sample in three sectors. Besides, the tables in the following sections display the minimum and the maximum values of the research's variables in the three sectors.

5.1.1 Descriptive statistics (Mining sector)

Table 1 illuminates the central tendency measures for the mining sector, which exposes sales, operating costs, and profits from the period from 2015 to 2017.

Table 1: Descriptive statistics (Mining sector): Amounts in Thousands

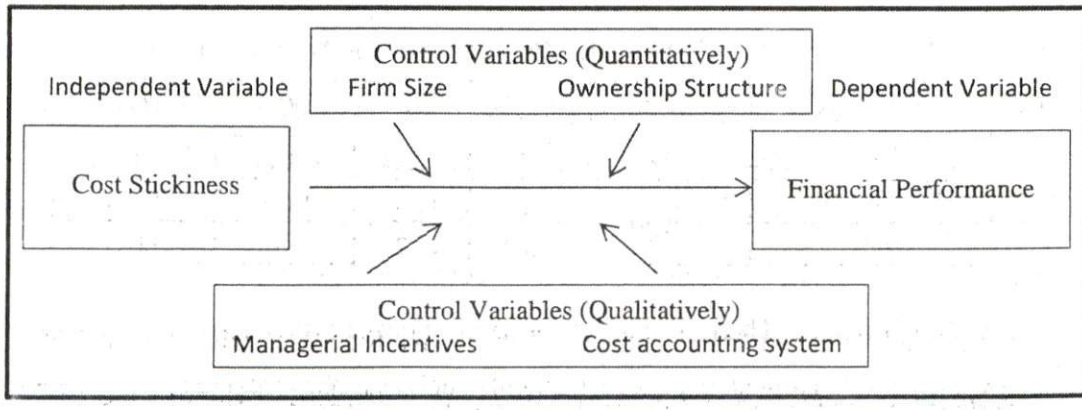
Variable	*N. of Firms*	*Mean*	*SD*	*Min.*	*Max.*
Sales	15	7.4	17.74	43.33	97.33
Operating costs	15	3.5	14.04	18.00	60.67
Profits	15	3.9	10.77	19.67	54.33

It can be noticed from the data in Table 1 that the mean values of sales and operating costs are 7.4 and 3.5 respectively, and standard deviations are 17.74 and 14.04 respectively. By examining the firms in the mining sector between

4.3.3 Research Strategy (longitudinal) and data sources

The research strategy is related to longitudinal study, which examines change and development. In accordance with Saunders et al (2000), longitudinal study is designed so as to observe people and events over a period of time in order to apply a measure of control over scrutinized variables without any influence by the research process itself. Hence, this research is planning to inspect the influence of cost stickiness on the firm's financial performance throughout revising and scrutinizing the annual financial reports for a number of Egyptian listed firms in the Egyptian stock exchange for the period 2015-2017. This analysis addresses three central questions; firstly does cost stickiness phenomena exist in the elected sample? This will be carried out by comparing the sales figures and operating costs' figures for the period of study, secondly if the phenomenon already takes place, does it have any impact on the operating profits? Thirdly, does this impact differ among businesses that have different sizes and different ownership structures? Regarding data sources, this research study depends on the annual financial reports for the selected sample from the Egyptian stock exchange website (http://www.egx.com.eg) and other related sources. Figure 1 illustrates the research model of this study.

Figure 1: Research Model



***Source**: This figure has been designed by the researcher*

4.3 Research method and model

This section introduces four indispensable pillars which expose the major research method of this study. These pillars are; research philosophy, research approach, research strategy, and data collection methods. Moreover, the research model is articulated at the end of this section.

4.3.1 Research Philosophy (positivism)

This research philosophy is related to positivism which is concerned with working with an obvious social authenticity and that the end results in generalization alike to those portrayed by natural researchers, and it is planned on an exceedingly structured methodology with the purpose of simplifying repetition (Saunders et al, 2000). Hence, this research is aimed to scrutinize the relationship between cost stickiness and firm's financial performance through formulating a model that comprises two core research variables along with a number of control variables in the Egyptian business environment.

4.3.2 Research Approach (deductive)

This study is designed to reflect the deductive approach, which is aimed at creating hypotheses based on an existing theory so as to illuminate causal relationship between perceptions and variables, and then constructing a research strategy to examine the hypotheses (research methodology website, 2019). Taking into consideration the nature of deductive approach, this study starts with deducing five hypotheses that already stated above in section 3. Consequently, these hypotheses have been formulated to scrutinize the influence of cost stickiness phenomena on the firm's financial performance in the Egyptian business environment considering various control variables including managerial incentives, cost accounting system, firm size, and ownership structure. Then, in the next section, the operational hypotheses will be experimented using statistical instruments such as SPSS program.

$$FP\ i,t = \beta 0 + \beta 1\ CS + \beta 2\ SIZE + \beta 3\ OWN + R$$

Where:

FP = the firm's financial performance

CS = cost stickiness

SIZE = firm size

OWN = ownership structure

R = the error

The β0 represents the width of the origin word, β1- β3 are angle coefficients that signify the effect of independent variables on the dependent variable; and t, i, reveal the category of business and the number of annual time series remarks.

4.2 Sample selection

This study is predominantly concentrating on the association between cost stickiness and business's financial performance in the Egyptian listed firms on the Egyptian stock exchange. The Egyptian stock exchange and various related resources have been exploited to gather annual firms' financial reports for the periods 2015-2017. The primary sample encompassed 75 listed firms from different sectors and has dissimilar sizes; these sectors comprise mineral oils, mining, food industry, cement industry, carpet industry, poultry, fertilizers, pharmaceutical industry, porcelain industry, and aluminum industry, and financial services. Additionally, the financial and insurance sectors have been excluded from the analysis due to the nature of business in such sectors together with their specific lawful features. In addition, numerous firms have been eradicated from the analysis as a result of missing their data throughout the period from 2015-2017. Lastly, the sample of this study consisted of 45 businesses from three sectors (mining, poultry, and pharmaceutical) over a period of three years with comprehensive data.

H4: *Firm size has an impact on the relationship between "cost stickiness" and "firm's financial performance".*

H5: *Ownership structure has an influence on the relationship between "cost stickiness" and "firm's financial performance".*

4. Research methodology

4.1 Research design

This study is a causal relationship investigation between the degree of cost stickiness and firm's financial performance. The data associated to the business's financial performance have been gathered from the published financial reports for 45 companies from three different sectors in the Egyptian economy for the periods 2015-2017. In accordance with the aforementioned practical investigations in the area of cost stickiness, this study appraises the alterations in profits (as a proxy of firm's financial performance) as shown in the financial statements with respect to the significance of deviations in operational costs (as a proxy of cost stickiness) over the periods 2013-2017 for two different sectors in the Egyptian economy. To test the hypotheses stated above, the following model has been formulated, in which firm's financial performance (FP) is a dependent variable and the cost stickiness (CS) is an independent variable. As well, based on the prior literature review section, there are several control variables that have a great impact on the relationship between two principal research variables; two crucial control variables have been selected; namely firm size (SIZE) and ownership structure (OWN). Hence, in order to examine the research hypotheses, the subsequent regression model is proposed:

decisions in adjusting operational assets in the periods of increase or decrease of activity level. So, the third hypothesis can be structured as follows:

H3: There is a positive relationship between "costs stickiness decline" and "improving firm's financial performance".

3.4 Firm size and ownership structure

Firm size plays an imperative role in the cost behavior which can be observed between the large firms and small firms and in turn has a great influence on the firm value. According to Sepasi and Hassani (2015), firm size is one of the main factors influence the cost stickiness; different size businesses have diverse monetary restrictions, financing in assets, dissimilar modification costs to eradicate committed resources concerning each other. In addition, Chung et al (2018) addressed that costs are more likely to be less sticky for large firms and stickier for smaller firms. This study found that cost stickiness has opposite directions for large versus small firms. Additionally, Kontesa and Brahmana (2018) indicated that there is a substantial and positive association between firm size and firm value; firm size can be evaluated by log of relative assets which means that bigger firm size in the US and UK have larger firm value. With respect to the ownership, Yao (2018) pointed out that the shareholding structure has an essential impact on the behavior and decision of stockholders and managers, which sequentially can influence the level of supervision and the degree of limitation of shareholders to managers, shaping diverse agency costs, and operational performance. Moreover, this study found that the shareholders with more control in the business are straightforward to perform individual motivation to risk strategy, resulting in a decrease in the resource allotment effectiveness of the businesses. In this context, Yao (2018) confirmed that if the firm has a high degree of ownership concentration, the firm will be able to achieve financial power and financial risks. Thus, the subsequent hypotheses can be stated as follows:

an undesirable influence on the company's profitability; thus the companies should embrace a degree of elasticity while manipulating cost structure. In another study in Malaysia, Kontesa and Brahmana (2018) analyzed the association between cost stickiness and firm performance for a sample of 315 registered companies in Malaysia over 2010-2014. The study underlined the significant role of cost stickiness on firm performance verifying the scheme of the agency theory.

The prior study of Kontesa and Brahmana (2018) has adopted the cost stickiness model created by Anderson et al (2003), Calleja et al (2006), and Weiss (2010), the consequences revealed that specific hypothesized structures and practical proof exposed in the industrialized countries may not compulsory operate to developing countries within the framework of this research topic. Moreover, the study used panel data approach that permits for valuing variations in cost stickiness and performance level over time even though no significant alterations in that level over time, and hence providing more trustworthy valuations. Also, Jamkarani and Lalbar (2016) surveyed the connection between forecast error of earnings and sticky cost in Tehran Stock Exchange, the consequences demonstrated that there is an inverse relationship between sticky costs and forecast error of earnings.

Moreover, the outcomes also of the prior study proved that embracing asymmetric behavior of costs in expectation of profits because augmenting in profits forecast precision compared to other models in forecast earnings. In a recent study in Armenia, Haghighatjue (2014) studied the new methods of the relationship between cost stickiness and target profit, this study realized that there is a direct relationship between target profits earned owing to directors' motivations and cost stickiness. Additionally, Haghighatjue (2014) mentioned the central reasons for cost stickiness including; (1) inappropriate adjustment in increase or decrease of operational assets level in periods in which demand and hence sale volume fall or up, (2) the effects of directors voluntary

discrepancy growth rates before assigning changes in anticipated coefficients to intentional short-term activities.

Another contemporary study that has been conducted in Egypt, Abdulhamied and Abulezz (2017) presented empirical evidence on the effect of cost structure and demand uncertainty on the degree of cost stickiness by employing a 55 Egyptian organizations sample embracing the 2001-2007 periods. The major findings of this study are; a moderately robust degree of cost stickiness on average, and the cost structure premise and the demand uncertainty premise are intensely sustained. Moreover, firms in the selected sample are sorted into two focal sets in accordance with the percentage of fixed costs in the cost structure (high and low), the outcomes proved that businesses with high fixed costs module in cost structure are stickier than remaining businesses. Regarding the second factor in this study, the outcomes reveal that when the firm has a high revenue uncertainty, it will show evidence of a high degree of cost stickiness. Hence, the second hypothesis can be portrayed as follows:

H2: Establishing a concrete cost management system has positively an impact of decreasing the degree of costs stickiness, which successively augments the firm value.

3.3 Cost stickiness and firm's financial performance

The cost stickiness has a great impact on the business's profitability together with the entire firm performance (warganegara and Tamara, 2014; Kontesa and Brahmana, 2018; Haghighatjue, 2014; Jamkarani and Lalbar, 2016). A recent study that has been accomplished in Indonesia, warganegara and Tamara (2014) found that the sticky cost behavior does exist in the chosen sample of businesses that registered in the Indonesia Stock Exchange (IDX). Additionally, this study revealed that the stickier the operating expenses, the smaller future profitability of the firms. In view of that, the sticky costs have

no influence on operational costs stickiness. Based on the previous investigated literature, the following hypothesis can formulated as follows:

H1: The managerial motivations have an impact on the degree of cost stickiness, which sequentially reflects on the firm value.

3.2 Cost stickiness and cost management

Understanding cost management is very indispensable in the firms as it concerned with tendering the actual sources in order to formulate decisions, these real resources might embrace; technology, demand, capabilities, and workforces. Consequently, numerous prior studies have inspected the crucial role of cost management and cost behavior and its relation with sticky cost phenomenon (Anderson and Lanen, 2009; Abdulhamied and Abulezz, 2017; Balakrishnan et al, 2010). According to Anderson and Lanen (2009), this study assessed how well and under what conditions deductions about cost behavior that are gained from general empirical examinations and data from the financial accounting system can be used to illustrate notions about how managers cope with costs. Moreover, the study also found out that even though there are various previous studies concerning cost accounting systems and their possibility for enhanced decision-making, there are very rare studies about how managers utilize such systems to oversee and monitor costs. Alternatively, Balakrishnan et al (2010) analyzed the relationship between cost structure and sticky costs; this study has established three ways in which can diminish the impact of cost structure and economic climate in studies of sticky costs. The first way is to focus on businesses within a hardly defined industry because such businesses have similar cost structures and scale economies. A second way is to involve independent variables such as asset intensity and GDP growth to monitor for fixed costs and the economic climate. The final approach is to scale the alterations in costs by sales instead of total costs to oversee for the influences of fixed costs. Besides, the most fundamental outcome of this study is that researchers must take into consideration cost structure along with

involving in income smoothing against individual intentions initiating cost stickiness. This study indicated the imperative role of managerial preference in financial accounting along with cost behavior; the study also settled that income smoothing and cost stickiness are in the negative relationship which is principally based on a trade-off between the relevant managerial motivations.

Dai et al (2018) examined how organizations' asymmetric cost behavior influences managers' decision to issue earnings predicts. This study developed the current literature on suggestions of cost stickiness by verifying the influence of firms' asymmetric cost behavior on voluntary disclosure. As well, cost stickiness is based on managers' intentional decisions and is frequently ignored by corporate outsiders in developing earnings anticipations. Generally, the prior study pointed out the indispensable role of managers in establishing businesses' cost behavior and in manipulating businesses' information environment. To end with, this study also discovered that the more SG&A costs become stickier, the more ability for managers to issue earnings forecasts, and this positive relationship reinforces for long-term predictions. Furthermore, Bradbury and Scott (2014) have inspected cost behavior in the local government and they found proof of cost stickiness. This study has contributed to the literature by displaying that there is an asymmetric relation between costs and revenues in the local government as costs rise even when revenues decline. Likewise, this study pointed out that managers grasp the philosophy of asymmetric cost behavior in the local government and they integrate asymmetric costs into forecasts and predictions. Nassirzadeh et al (2014) have reviewed costs stickiness by emphasis on motivations in a number of firms in Tehran stock exchange, this study has used operational costs to measure costs stickiness. In addition, this study has determined numerous conclusions including; operational costs in the chosen sample are sticky in assurance level of 90%, management optimistic anticipations can augment the operational cost stickiness and management incentives for forestalling loss has

indispensable abandoned variable in sticky cost studies. Furthermore, Abdulhamied and Abulezz (2017) verified the predominance of sticky cost behavior in selling, general, and administrative costs in the Egyptian organizations, the consequences exposed that costs rise owing to premeditated resources commitment decisions created by managers in the existence of modification costs. Consequently, the dominance of sticky cost behavior in general is analyzed then the influences of cost structure and demand uncertainty on cost stickiness are scrutinized, the study discovered that the both factors are considerably significant. In another study, Ibrahim (2018) investigated the relationship between board characteristics and asymmetric cost behavior in some listed-firms in Egypt during 2008-2013. This study scrutinized the impact of board characteristics as a vital factor of corporate governance. The study's outcomes reveal that cost of goods sold behavior is sticky, and smaller boards and chairman/CEO separation might lessen cost stickiness. As well, the previous study pointed out that the institutional ownership as a control variable as found to alleviate cost stickiness degree.

3. Background and hypotheses development

3.1 Cost stickiness and managerial incentives

Numerous contemporary studies have scrutinized the relationship between managerial motivations/ enticements and the extent of cost stickiness and also inspected what is the impact of this association on firm's performance and its future plans (Kama and Weiss, 2012; Hartlieb and Loy, 2018; Dai et al, 2018; Bradbury and Scott, 2014; Nassirzadeh et al, 2014). Consistent with Kama and Weiss (2012), they analyzed how intentional selections, persuaded by agency driven incentives, affect asymmetric cost behavior. The results of this study suggested that any endeavor to imply sources of sticky costs should be made in light of motives essential managers' resource alterations. In a recent study, Hartlieb and Loy (2018) examined the relationship between cost stickiness and income smoothing through assuming that managers' trade off motivations for

2. Preceding cost stickiness studies in Egypt

There are some contemporary studies that have been conducted in Egypt in the subject of sticky cost behavior (Ibrahim and Ezat, 2017; Ibrahim, 2015; Salamah and Abulezz, 2017; Abdulhamied and Abulezz, 2017; Ibrahim, 2018). According to Ibrahim and Ezat (2017), this study used multiple regression analysis to investigate the behavior of selling, general, and administrative costs and cost of goods sold for the period 2004-2011 for Egyptian-listed companies. The consequences show that asymmetric cost behavior is prevalent among Egyptian-listed businesses; the application of the corporate governance code in Egypt was noticed to influence the nature of selling, general, and administrative costs. The behavior of these costs altered from sticky before the code to anti-sticky after the application of the code. Moreover, the prior study scrutinized the stickiness behavior for various sectors in Egypt; stickiness is a feature of particular industries and this asymmetric behavior varies across sectors and costs. To conclude, this study merged the prospects of management and financial accounting that persuades researchers in inspecting numerous research themes.

Ibrahim (2015) investigated whether costs react asymmetrically to demand change, and scrutinized the effect of economic growth on cost stickiness before and after the financial crisis in 2008. The outcomes founded that selling, general, and administrative costs are sticky during the prosperity period, but anti-sticky during the depression period. Cost of goods sold is sticky in both periods even though the extent of cost stickiness is larger in the prosperity period. Alternatively, operating costs are inappropriateness in both periods. Besides, Salamah and Abulezz (2017) inspected the relationship between manager's risk preference and cost stickiness; this study realized that risk-reluctant businesses respond to sales decline by decreasing resources, while risk-taking companies react to sales fall by maintaining resources that give rise to cost stickiness. This study concluded that managers risk preference is an

In addition, Chung et al (2018) revealed that cost stickiness is categorized by an excellent significance of increase in costs when its operations enlarge that the significance of costs decreases when its operations contract by an equal amount. Similarly, Mohammadi and Taherkhani (2017) refer to various reasons that generate cost stickiness phenomenon, these reasons comprise; the presence of adjustment cost, alterations in economic activity amount, anticipations of future sales, and deliberate decisions of management. Moreover, Homburg and Nasev (2008) have distinguished between effectual businesses and ineffective businesses; for the former businesses, cost stickiness has a positive influence on future returns because sales are anticipated to recover. Alternatively, for ineffective companies, cost stickiness has an undesirable influence on future earnings because sales are assessed to fail continually. Moreover, Chen et al (2013) addressed that mass of aforementioned studies on cost stickiness can be categorized into two core wide-ranging dimensions; the first dimension focused on the influence of economic factors on the degree of cost stickiness (*for example*: Anderson et al, 2003; Banker et al, 2012). The second dimension has scrutinized the impact of managerial incentives on cost stickiness (*for example*: Kama and Weiss, 2012).

The paper is structured as follows: section 2 addresses the preceding cost stickiness studies in Egypt. Section 3 introduced the background and hypotheses development. Section 4 draws attention to the research methodology. Section 5 discusses the outcomes and implications. Finally, section 6 concludes the paper with significant recommendations for the future research regarding several arears related to cost stickiness.

1. Introduction

Articulating cost structure is very indispensable task in the business which lets firms carry out their exceptional performance and assist intensify the decision making process. Therefore, Salehi et al (2018) pointed out that the managerial accounting literature has scrutinized the foreseeing role of the cost structure at the firm level; nevertheless the role of cost behavior in expecting the microeconomic indicators at firm level is paid insignificant consideration. Thus, the perception of cost behavior is a standout amongst the most vital issues of cost and management accounting owing to its crucial role in both internal and external decision making. What is more, a central notion in cost accounting is that the relationship between costs and volume is symmetric for volume rises and falls. Quite the opposite of this concept, cost stickiness represents asymmetric cost behavior whereby costs may increase in response to an increase in activity level greater than costs decrease with a decrease in activity level. Cohen et al (2017) argued that sticky cost phenomenon has been examined in numerous aforementioned studies pursuing the original work of Anderson *et al.* (2003).

Consistent with Cohen et al (2017), the commencing idea in the sticky cost structure is that numerous costs rise as a result of an intentional resource obligation decisions formed by managers. Likewise, as stated by Anderson et al (2003), sticky cost behavior may be created because managers do not intentionally lessen resources that are not required to maintain the reduced activity level. Hence, cost stickiness may happen attributable to not only behavioral motives but also economic causes. Additionally, Ibrahim (2015) addressed numerous preceding studies that provided strong practical verification that costs do not permanently respond as assumed by the conventional cost assumption (*for example*: Anderson et al, 2003; He et al, 2010; Subramanian and Weidenmier, 2003; and Calleja et al, 2006).

تحليل آثار لزوجة التكاليف على الأداء المالي للمنشأة بالتطبيق علي مصر

ملخص البحث:

نشأ مصطلح "**لزوجة التكاليف**" **Cost Stickiness** كنتيجة طبيعية لبعض القرارات و الإختيارات الإدارية و هذا المصطلح يعني أن معدل الزيادة في التكاليف كنتيجة لزيادة النشاط و المبيعات أكبر من معدل الإنخفاض في التكاليف كنتيجة لانخفاض النشاط و المبيعات بنفس نسب زيادة النشاط و المبيعات. يتناول هذا البحث أثر لزوجة التكاليف في المنشآت على الأداء المالي و هل هناك علاقة ايجابية أو سلبية بين هذين المتغيرين "لزوجة التكاليف و الأداء المالي للمنشأة" في بيئة الأعمال المصرية. و المنهج المتبع في هذا البحث ذو طبيعة استنتاجية **Deductive** حيث يتم وضع فروض إحصائية بالاعتماد علي الدراسات السابقة التي تناولت لزوجة التكاليف بالتحليل و الدراسة سواء كانت تلك الدراسات في بيئة الأعمال المصرية أو دراسات في بيئات مختلفة سواء اقليمية أو دولية. و قد تنوعت تلك الدراسات السابقة بلزوجة التكاليف من عدة محاور مختلفة: منها على سبيل المثال العلاقة مع المسؤولية الاجتماعية للشركات ، العلاقة مع الحوافز الادارية للمنشآت ، العلاقة مع هيكل التكاليف بالمنشأة ، العلاقة مع التقارير المالية ، العلاقة مع التحفظ المالي المشروط. أما استراتيجية البحث فهي دراسة طولية **Longitudinal Study** حيث سيتم دراسة و فحص القوائم المالية لمجموعة من الشركات المصرية (٤٥ شركة) خلال الفترة من ٢١٠٥ – ٢٠١٧ م في ثلاث قطاعات أساسية هي: قطاع التعدين **Mining Sector** و قطاع الدواجن **Poultry Sector** و قطاع الأدوية **Pharmaceutical Sector** لما لهذه القطاعات الثلاثة من أهمية كبرى و اهتمام بالغ في السنوات الأخيرة. و يهدف البحث للإجابة علي ثلاث تساؤلات هامة: (١) هل يتوفر مفهوم لزوجة التكاليف في عينة البحث المختارة؟ (٢) وإن وجدت هل لها أي تأثير علي أرباح المنشأة التشغيلية؟ (٣) و هل يختلف هذا التأثير بين المنشآت كبيرة الحجم أو صغيرة الحجم و ايضا بين المنشآت التي تختلف فيها شكل الملكية من منشآت فردية أو منشآت مؤسسية؟. و قد خلص البحث إلى عدد من النتائج الأساسية : ***أولا*** : تتميز النسبة الكبرى من منشآت قطاع التعدين بمفهوم لزوجة التكاليف و أيضا في هذا القطاع هناك علاقة غير معنوية بين لزوجة التكاليف و الأداء المالي للمنشأة ، ***ثانيا*** : تتميز منشآت قطاع الدواجن أيضا بلزوجة التكاليف و نفس العلاقة غير المعنوية بين لزوجة التكاليف و الأداء المالي للمنشأة ، ***ثالثا*** : وفي قطاع الأدوية هناك علاقة عكسية بين لزوجة التكاليف و الأداء المالي للمنشأة. أما فيما يتعلق بعلاقة حجم المنشآت وشكل هيكل الملكية على متغيرات البحث الرئيسية ، أوضحت الدراسة أنه ليس هناك تأثير واضح لحجم المنشأة أو شكل هيكل الملكية علي لزوجة التكاليف و علاقتها بالأداء المالي للمنشآت.

الكلمات الإفتتاحية:

لزوجة التكاليف Cost Stickiness– الأداء المالي– قطاع التعدين– قطاع الدواجن– قطاع الأدوية.

An Analysis of Cost Stickiness Effects on Firm's Financial Performance in Egypt

Mohamed Fathy Elshahat Ali[1], Ph.D.
Department of Accounting, College of Commerce
Benha University, Egypt

Abstract:

The term "cost stickiness" has been created as a result of managerial choices and discretion. Cost stickiness refers to the rate of increase in cost in response to a given increase in activity is higher than the rate of decrease in cost in response to an equivalent decrease in activity. This study examines the relationship between cost stickiness and financial performance in the Egyptian business environment. So, this paper aims at empirically analyzing the positive/negative impact of cost stickiness in developing or lessening the firm's financial performance. This research can be depicted as a deductive, which is aimed at creating hypotheses based on an existing theory in order to illuminate causal relationship between perceptions and variables, and then constructing a research strategy to examine the hypotheses. The findings suggest that the majority of businesses in the mining sector are sticky and there is an insignificant relationship between cost stickiness and firm's financial performance in the mining sector. Furthermore, the businesses in the poultry sector are sticky, which means that operating costs in this sector reduce less when sales fall than they increase when sales rise. Likewise, there is an insignificant association between cost stickiness and firm's financial performance in the poultry sector. Finally, in the pharmaceutical sector, there is an inverse relationship between cost stickiness and financial performance.

Key Words: Cost Stickiness – Financial Performance – Mining sector – Poultry Sector – Pharmaceutical Sector.

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[1] mshahat73@gmail.com, Assistant Professor in the Department of Accounting, College of Commerce, Benha University, Egypt.