The Effect of Financial Structure and Audit Quality on Operating Cash Flow (OCF) Management Behavior and Its Effect on OCF Predictive Ability: Evidence from Egypt

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Abstract:

This study develops a model for measuring operating cash flow (OCF) management, and investigates the effect of financial structure and audit quality (OCF) management behavior in the Egyptian market. In addition it investigates the effect of OCF management on the predictive ability of OCF. To capture the OCF management, I developed two models depending on both direct and indirect approaches of preparing cash flow statement. The results of the study provide evidence that heavy dependence on loans as a financing source (higher leverage ratio) leads to more OCF management. In addition, the results support the proposition that audit quality decreases OCF management. Moreover, the study provides evidence ~~on~~ regarding the negative effect of OCF management on the predictive ability of OCF.

Keywords: OCF management, operating cash flow, audit quality, financial structure, OCF predictive ability, manipulation.

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1- Introduction

Recently, the accounting literature has paid increasing attention on cash flow manipulation. For many years cash flow was viewed as a reliable figure that was difficult to be manipulated. However, recent evidence shows that cash flow is subject to manipulation just as earnings (Shawn et al.,2016). Some recent studies have shed some lights on practical cases of firms that actually manipulated cash flow from operations (OCF) like Enron, Dynegy, Lantian Co., Guangxia Industry Co. and Prairie Xingfa Company. In addition, many studies provided evidence of cash flow management (e.g. Call, 2007; Geile, 2007; Zhang, 2008; Zhang 2009; Lee, 2012; Lightstone et al., 2012; Manesh et al. 2013; Guo et al. 2013; Nagar and Sen 2013; Frankel et al., 2014; Khurana et al., 2014).

Many studies have provided models to measure the abnormal (managed) cash flow from operations. The majority of these models relied on the model developed by Dechow et al. (1998) hereafter (DKW), which is improved by Roychawdhury (2006).However, DKW model was originally developed to predict OCF from earnings under some assumptions. This model, under some assumptions, implies that earnings predict future OCF better than current OCF. Nevertheless, many other studies provided evidence that OCF is a good predictor of future OCF (Waldron and Jordan, 2010; Ebaid, 2010). This may require more attempts in order to improve that model to match the purpose of measuring OCF management.

OCF management has been investigated from different aspects. From one hand, some studies have investigated the motivations behind OCF management (e.g. Call, 2007; Zhang, 2008; Lee, 2012, Manesh et al. 2013; Nagar and Sen, 2013; Guo et al. 2013; Frankel and Frankel et al.,, 2014). From the other hand, some studies have focused on the effect of OCF management (e.g.Geilie 2007; Khurana et al., 2014; Paryabi and Fazlzadeh, 2012).

Regarding the motivations of OCF, the researcher found mixed evidence about the effect of the financial structure on OCF management. Although Manesh et al. (2013) have provided evidence on the negative relation between debts value and OCF management, Guo et al. (2013) found a positive relation between the debt ratio and both the absolute value of abnormal OCF and the positive value of abnormal OCF. In addition, Gue et al., (2013), found negative relation between debt ratio and negative abnormal OCF. These results of Guo et al. (2013) show that the increase of debt ratio resulted in an increase of OCF management in general in order to increase OCF, which contradicts with the results of Manesh et al. (2013). Thus, there is a need for more research to explore the effect of financial structure on OCF management.

Another factor that may affect COF management is audit quality. However, there is no study, up to my knowledge, investigated the effect of audit quality on COF management. Nevertheless, Gue et al., (2013) used the audit quality as a control variable and the results showed that audit quality increased OCF management. Research in the area of the audit quality effect on real earnings management presented mixed evidences and different explanations (Gue et al., 2013; Chi et al., 2011; Shawn et al., 2016; Lyu et al., 2014). Real earnings management through managing real activities may be also a tool to manage OCF, then it is expected that the effect of audit quality on OCF is similar to its effect on real earnings management. Therefore, there is a need to investigate the effect of audit quality on OCF management, which may be positive or negative according to the previous literature.

Regarding the effects of OCF, prior studies have focused on: the effect on cost of debts (Geile 2007; Paryabi and Fazlzadeh 2012), bond rating quality (Khurana et al., 2014) and future operating performance of the firm (Zhang 2008). However, the researcher didn't find a study that investigated the effect of OCF management on the predictive ability ofOCF, which is considered one of the main objectives of accounting information. Consequently, there is a need to

investigate the effect of such behavior on the predictive ability of OCF.

It is obvious that more attempts are needed to develop special models to measure OCF management instead of depending on the models developed to measure real earnings management. In addition, more research is needed to fill the gap regarding the effect of both financial structure and audit quality effect on OCF management. Moreover, more investigation is required in the area of the effect of OCF management especially regarding the effect of OCF management on the predictive ability of OCF.

This study aims at developing a model for measuring OCF management and investigating the effect of financial structure and audit quality on OCF management behavior. In addition, the study investigates the effect of OCF management on the predictive ability of OCF using an empirical study on a sample of the listed companies in the Egyptian stock exchange market.

The results of the study indicated that high levels of leverage provide more incentives to managers to manipulate OCF. However, the audit quality decreases the ability of managers to manage OCF. Moreover, OCF management has negative effect on the predictive ability of OCF to predict future OCF.

This study may contribute to several streams of extant literature. First, I developed and empirically tested two models to measure OCF management depending on the direct and indirect approaches of preparing the cash flow statement. These models are empirically tested versus Roychawdhury model, the results showed a better predictive ability of the developed models. This issue is important for the academics as they can depend on the developed models in the future research to capture OCF management.

Second, I add to the literature of the factors affecting OCF management by investigating the effect of both financial structure and audit quality on OCF management. The importance of this issue is that

empirically investigating factors affecting the desire and ability of managers to manipulate OCF can set conditions of the probability of increasing or restricting OCF management. This is important for both creditors and investors. Creditors give OCF more attention when they take crediting decisions; also investors give OCF increasing attention as a performance measure. Therefore, testing the conditions of OCF management may help creditors and investors to value OCF management and then improve their decisions.

Third, this research gives insight to the effect of OCF behavior on the accounting information quality by investigating the effect of OCF management on the predictive power of OCF. This is very important for both standards setters and users of financial statements. Standards setters (IASB and FASB) emphasize on the importance of financial information in predicting future cash flow, so investigating the issue of the OCF management effect on the predictive ability is important for these bodies to take corrective actions. In addition, poor quality of OCF may limit users' ability to evaluate a firm's performance and predict future cash flow and investment risk. In effect, all these factors may lead to incorrect decisions.

Finally, and most importantly, I apply the empirical research in one of the emerging markets; Egyptian capital stock market, where OCF management has not been tested up to my knowledge. This helps in enhancing the understanding of OCF management through the application in a different environment.

2. Prior Literature and Hypotheses Development:

Prior literature has paid more attention to earnings management arguing that, unlike OCF; earnings measurement is subject to discretions and requires more personal judgment (Khurana et al., 2014; Shuang et al., 2008; Zhang 2009). These studies mentioned that earnings management motivations come from the importance of earnings numbers to the users of the financial statements, which creates pressure on managers to manipulate the earnings figure.

Recently, cash flows have been attracting increasing attention of the users of financial statements (Shuang et al., 2008; Zhang 2008).This may create the same pressure on management to manipulate OCF in order to provide better image of the financial performance of the firm (Manesh and Shahveisi, 2013). Therefore, a new stream of research provides evidence that OCF could be manipulated, just as earnings (Lee, 2012; Khurana et al., 2014; Geile, 2007; Zhang 2008; Zhang 2009; Manesh and Shahveisi, 2013; Frankel et al., 2014; Lightstone et al., 2012; Shuang et al., 2008).

Moreover, some studies have provided anecdotal evidence of OCF management. For example, Lightstone et al.(2012) mentioned that Enron company manipulated its OCF to present fraudulent financial reports in one of the most famous cases of financial reporting deception. In addition, Lee (2012) showed that Dynegy company used complicated procedures using special purpose entity to report financing loans of $300 million as cash inflow from operating activities. Also, Shuang et al. (2008) referred to some cases in which companies manipulated OCF like Lantian Co. Ltd, Guangxia (Yinchuan) Industry Co. and Prairie Xingfa Co. Ltd.

All of these facts open the door for the researchers to investigate OCF management. One research stream developed models to measure OCF management; other stream investigated the factors affecting OCF management; third stream investigated the effects of OCF management.

Several models have been developed and used to measure OCF management like; DKW and successive studies, Gue et al (2013) model, Shuang et al. (2008), Zhang (2009), Lightstone et al. (2012) and Frankel et al., (2014). These models will be highlighted in section 3.Prior studies have investigated factors affecting OCF management. These factors include financial structure, achieve or beat predicted OCF, state-owned or non-state owned ownership, financial stress and credit rating (Call, 2007; Zhang, 2008; Lee, 2012; Manesh et al., 2013; Guo et al., 2013; Frankel et al., 2014).

The researcher found that the evidence about financial structure was mixed (Manesh et al., 2013; Guo et al., 2013). That is, Manesh et al. (2013) provided evidence of a negative effect of the value of debts on OCF management. However, Guo et al. (2013) concluded that the increase in debt ratio leads to an increase in OCF management in general, which contradicts the result of (Manesh et al. 2013).

Referring to earnings management literature, there are two reasonable explanations of the effect of financial structure on OCF management. First, according to the positive accounting theory, managers choose accounting policies that increase the reported earnings to lower the probabilities of violating debts covenants (Watts and Zimmerman 1990). Therefore, for decreasing the cost of debts, managers have the motivations to manipulate the value of reported income (Zhaoguo and Xiaoxia, 2009). From the researcher's point of view, this can be applicable also for OCF. This argument is supported by the results of Guo et al. (2013) which concluded that companies that depend on banking finance try artificially to enhance its OCF in order to provide a positive signal of its solvency and then decrease the cost of debts. In addition, Paryabi and Fazlzadeh(2012) found a negative relation between OCF components and the cost of debt which may encourage companies to manipulate and overstate OCF in order to decrease cost of debts.

Second, strict debt contracts may improve the efficiency of corporate governance; therefore it may constrain earnings management (Zhaoguo and Xiaoxia, 2009) which might be applicable for OCF. In addition, debt holders have the incentives to investigate cash flow information carefully which may limit the management motivations to manipulate OCF (Geile 2007).

In Egypt, bankers pay more attention to OCF when they take credit decisions and also to evaluate and follow their debtors. Therefore, I expect that increasing debt ratio may create a motivation

to the managers to manipulate OCF because the benefits from this behavior are expected to exceed the cost of discovering it. Accordingly, the first hypothesis can be formulatedas follows:

H_1: The financial structure of the firm has significant effect on OCF management behavior.

Gue et al., (2013) used audit quality as a control variable in their study and found that it increases OCF management. However, studies in the area of real earnings management have provided evidence on the effect of audit quality on decreasing real earnings management (Chi et al., 2011).

Theoretically, there are two explanations for the audit quality effect on real earnings management, which has common characteristics with OCF management. The first explanation is that audit quality restricts management's desire to manipulate earnings figures whether using real earnings management or accrual earnings management. Shawn et al., (2016) provided an empirical evidence for this explanation and concluded that audit quality leads to a decrease in real earnings management, provided that more audit effort and time are spent by the auditor.

The second explanation is that audit quality leads to a decrease in accruals earnings management, therefore, when the company has high incentive to manage earnings, managers may be forced to conduct real earnings management. Chi et al., (2011) provided empirical evidence that supported this explanation. Also the results of Lyu et al., (2014) supported this, as they found that the application of international financial reporting standards in China leads to an increase in real earnings management. The reason behind this is that, good accounting practices restricts the ability of managers to conduct accruals earnings management, therefore management may be forced to conduct real earnings management. This implies that audit quality may lead to increase real earnings management.

In Egypt, the auditing process could be conducted by a private audit firms or through a public control authority which is Accountability State Authority (ASA). The auditors of ASA have wide experiences and make good efforts and take more than enough time in their work. Moreover, the ASA auditors are governmental employees so they have high degree of independency to perform their audit. In addition they have the full authority by the power of law to reach any needed information and to investigate any managerial decision, so they conduct financial audit and have the right to conduct any managerial investigation. Therefore, it is expected that ASA auditors can provide high quality audit. Also, the big four audit firms in Egypt have high experienced members, and they do their best to keep their repetition through continuous training and spending enough effort and time in the audit process because of the internal quality control procedures that applied in these firms. In addition big four firm have high degree of independency comparing with non-big four. Under these conditions I expect that the audit quality will limit the OCF management, especially for the audits conducted by ASA and big four firms.

From the managers side, Psychological pressure resulted from being audited by experienced auditor may limit the desire to manipulate OCF.

Accordingly, the second hypothesis can be formulated, as follows:

H_2: Audit quality has significant effect on OCF management behavior.

Another stream of research related to OCF management focuses on the effect of OCF management (Geile 2007; Zhang 2008; Paryabi and Fazlzadeh 2012; Khurana et al., 2014). However, up to my knowledge, no study examined the effect of OCF management on the predictive power of OCF. Studies that investigated the predictive ability of OCF showed that OCF can be a good predictor of future OCF (e.g. Waldron and Jordan 2010; Farshadfar and Monem 2012). However, OCF

manipulation can deviate OCF from the normal levels and may lead to more fluctuation in its values over the accounting periods. This may lead to a decrease in the predictive ability of OCF. Therefore, the third hypothesis is formulated as following:

H_3: OCF management has a negative effect on OCF predictive ability.

3. The model:

In this section, I briefly discuss the models that have been used in the previous studies in order to develop the model that I will use to capture OCF management.

3-1 Discussion of previous models:

3-1-1 **Roychawdhury model and consequent models:**

Roychawdhury (2006) developed an empirical method to detect real activities manipulation in order to manage earnings by examining abnormal OCF, abnormal production costs, and abnormal discretionary expenses. He estimated these three variables depending on DKW model. For estimating the abnormal level of OCF first estimated the normal OCF using the following regression:

$$OCF/TA_{t-1} = \alpha_0 + \alpha_1(1/TA_{t-1}) + \beta_1 (Sales/TA_{t-1}) + \beta_2 (\Delta Sales_{t-1}/TA_{t-1}) + \epsilon_t$$

Where; variables are explained in table (1).

Then, the abnormal OCF can be calculated by the difference between the actual OCF and the normal part (which is computed for each firm-year by applying the estimated coefficients from the previous regression to the actual data of the firm).

After Roychawdhury, many studies (e.g. Geilie 2007; Call 2007; Zhang 2008; Lee 2012; Paryabi and Fazlzadeh 2012; Manesh et al. 2013; Nagar and Sen 2013; Gue et al. 2013; Khurana et al., 2014) have followed his model to measure abnormal OCF as a measure of

OCF management and have applied different applications in the area of OCF management.

Obviously, this model depends on DKW model which based on some simplifying assumptions[1] which together infers that OCF is only a function of both sales and change in sales. However, there are some important issues that need more discussion about applying that model to OCF management measurement:

First, this model focuses only on the accruals related to gross profit items and neglects other accruals related to other operating expenses and revenues. Many of these other accruals, that are convertible into cash, are important for expecting OCF because these accruals are reflected into cash (expected cash). In addition, this model ignores fixed costs for simplifications. Therefore, the inclusion of these fixed costs in the model may lead to better prediction of OCF. For that reason, and for more analysis, DKW developed the model including fixed costs, and they found that predicted cash from the improved model is much closer to the actual cash.

Second, DKM model basically depends on the thought that earnings are a better predictor of future OCF in comparison with current OCF. However, many studies have provided evidence that OCF has predictive ability to predict future OCF (Waldron and Jordan, 2010; Ebaid, 2010). Therefore, I can develop a model in which OCF is a function of both previous period OCF and change in accruals, in addition to operating revenues and expenses.

Third, it does not take into consideration OCF management through offering more cash discount to accelerate collection from

[1] The assumptions of DKW include: (1) Sales are subject to a random walk assumption, (2) there is no fixed cost, (3) accounts receivable and accounts payable are the only accruals, (4) the profit is a constant percentage of sales, (5) the variable expenses are the value of the cost of goods sold, (6) the target inventory at the end of the year is a constant percentage of the expected cost of goods sold of the next year. According to this model, account receivable is a constant percentage of annual sales and accounts payable is a constant percentage of purchase (=βP) (as purchase (P) = Cost of goods sold + ending inventory – beginning inventory).

customers or by delaying payment to suppliers and losing cash discount offered from them. This is consistent with the objective of Roychawdhury as he focused only on such transactions that have effect on earnings. This way is consistent with the nature of earnings management studies; however, it is an incomplete measure when we test OCF management.

3-1-2 **Gue et al. (2013**)

This study has developed a model to measure the expected OCF depending on the direct method of cash flow. It added the following variables to Roychawdhury model: Net cash flow from receiving and paying taxes, net cash paid to employees and net cash flow from receiving and paying other cash relating to operating activities.

This model is the first one that takes into consideration the importance of OCF components for predicting OCF. However, it measures sales revenue according to accrual basis instead of cash receipts from selling goods; this could be recognized by adding the change in AR to the regression model or most widely adding change in working capital out of cash to the model in order to consider the differences between cash basis and accrual basis regarding all variables in that model.

3-1-3 **Zhang (2009)**

Zahang developed a model to measure OCF management. Following (Burgstahler and Dichev, 1997 and Degeorge et al. 1999; as sited in Zhang 2009) Zhang examined discontinuity of OCF around the thresholds to examine OCF management. To apply this method of estimating abnormal OCF, the data about analysts' forecasts of OCF should be available. However, this data is rarely being available in Egypt

3-1-4 **Shuang et al. (2008)**

This study developed a model to measure OCF management based on an assumption that, any significant differences between

OCF across quarters are due to either seasonality of activities or OCF management. Accordingly, the comparison with the industry can be accomplished to get abnormal OCF (Dif) according to the following function:

$$Dif_i = \left[\frac{Inflow_{nt}}{Inflow_t} - \frac{Inflow_{nT}}{Inflow_T}\right] - \left[\frac{Outflow_{nt}}{Outflow_t} - \frac{Outflow_{nT}}{Outflow_T}\right]$$

Where; inflow: cash inflow from operations; outflow: cash out flow from operations;

n: a quarter; t: a company; T: the industry.

This model requires the direct approach for preparing cash flow statement to capture cash inflow and cash out flow. However in Egypt, it is not easy to get a sufficient sample with four quarterly financial statement for each year-firm, using direct cash flow approach.

3-1-5 **Frankel et al. (2014)**

Frankel et al. have developed a model to measure OCF management depending on measuring the unexpected changes in working capital. The main idea here is that, significant unexpected deduction in working capital at the fourth quarter, which is not due to accruals or seasonal changes, might give an indicator to OCF management if it is reflected in the first quarter of the following year.

Although this model can capture OCF management from any changes in working capital that are resulted from timing manipulation, it can't capture OCF management through classification manipulation. Therefore, we can't say that this is a complete measure for OCF management.

3-2 Toward a Developed model:

According to the previous discussion, there are two approaches could be used to predict OCF:

First Approach: Following the direct approach, OCF is a function of all operating revenues and expenses and change in working

capital to cover the difference between cash basis and accrual basis, in addition to, OCF of previous year. So the improved model to estimate normal OCF will be as following:

$$OCF_{it}/TA_{it} = \beta_0 + \beta_1 1/TA_{it} + \beta_2(Sales_{it}/TA_{it}) + \beta_3(\Delta Sales_{it}/TA_{it}) + \beta_4(Purch_{it}/TA_{it}) + \beta_5(\Delta Purch_{it}/TA_{it}) + \beta_6(OPPEXP_{it}/TA_{it}) + \beta_7(\Delta OPREXP_{it}/TA_{it}) + \beta_8(OCF_{it-1}/TA_{it}) + \beta_9 Accrual_{it} + \epsilon_{it}$$

Where;

OCF_{it}: is cash flow from operations for company (i) for the year (t);
$TA_{(it)}$: total assets of company (i) at the end of period (t);
$Sales_{it}$: Sales revenue for company (i) at the year (t);
$\Delta Sales_{it}$: Sales in period (t) – sales in period (t-1);
$Purch_{it}$: purchase for company (i) at the year (t)[1];
$\Delta Purch_{it}$: purchase in period (t) – purchase in period (t-1);
$OPREXP_{it}$: other operating costs for company (i) for the year (t);
$\Delta OPREXP_{it:}$ other operating costs in period (t) - other operating costs in period (t-1);
$Accrual_{it}$: change in working capital that (after excluding accruals that are not reflected in cash and change in cash).

I add to Roychawdhury model the following variables based on the previous models discussion:

a- **Purchases:** DKW focused only in their analytical model on sales, that is, they based on some assumptions, as it is mentioned previously, for simplifying the model and avoid complications. However, as I develop a model to be used empirically, so there is no need for such assumptions that may limit the predictive power of the model.

b- **Operating expenses** including fixed cost: The majority of studies that depended on DKW model didn't take the fixed cost or other operating expenses into consideration, and they focused only on

[1]This variable also represents cost of production regarding manufacturing activities. And it is computed as follows: cost of goods sold + change in Inventory

the relation between sales and OCF. However, DKW arrived to better result when they added fixed cost to their model.

c- **Previous period OCF:** There are two reasons behind that: First, some studies provided evidence that OCF is a good predictor with future OCF. Therefore, inserting OCF_{t-1} may lead to better prediction with the normal levels of OCF_t. Second, inserting OCF_{t-1} may capture the real activities that may be used to manipulate the value cash flow without affecting profit figure like accelerating the collections from customers, delaying the payments to suppliers and delaying the payment for some expenses without delaying the activity itself.

d- **Operating accruals**: This variable is used to reconcile the differences between cash basis and accrual basis regarding OCF components that are captured from the income statement.

Second Approach: Following the indirect approach, OCF is a function of operating income and changes in working capital. This model simply aggregates sales and purchases and operating expenses in one line item which is operating income.

So the improved model to estimate abnormal OCF will be as following:

$$OCF_{it}/TA_{it} = \beta_0 + \beta_1 1/TA_{it} + \beta_2(OPRINC_{it}/TA_{it}) + \beta_3(\Delta OPRINC_{it}/TA_{it}) + \beta_4 ACCRUAL_{it}/TA_{it} + \epsilon_{it}$$

Where;

OCF_{it}: is cash flow from operations for company (i) for the year (t);

TA_{it}: total assets for company (i) at the end of period (t);

$OPRINC_{it}$: operating income for company (i) at the year (t);

$\Delta OPRINC_{it}$: change in operating income;

$Accrual_{it}$: change in working capital that will be reflected in cash.

This model in equation (2) implies that operating cash flow is a function of operating income adjusted by changes in working capital, which theoretically makes sense.

The managed OCF is computed, following Roychawdhury (2006), by the difference between the actual OCF and the predicted value resulted from the developed model.

4- Research Methodology and variables measurement:

4-1 Methodology:

The main objective of this research is to investigate the effect of financial structure and audit quality on OCF management, and then to investigate the effect of OCF management on the predictive ability of OCF. That can be explained by the following figure:

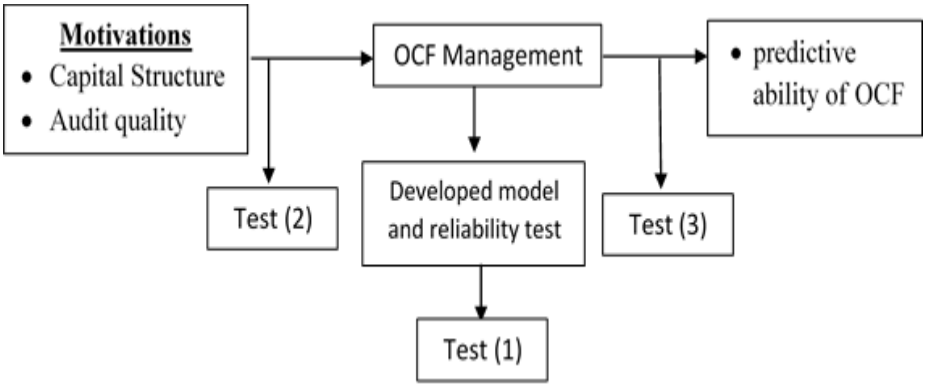

Figure (1) research tests and methodology

First: To test the robustness of the developed model versus Roychawdhury model, I use two tests. First, I get the difference between the two models residuals means. Second, following Dechow et al. (1998), I compute the correlation between the predicted OCF_t and actual OCF and OCF_{t+1}.

Second: To test the effect of both financial structure (LEV) and audit quality (AUDIT) on OCF management (test 2). The following regression is used:

$$OCF_{it} = \propto_0 + \propto_1 Leverage_{it} + \propto_2 Audit_{it} + \epsilon_{it} \ldots\ldots\ldots\ldots\ldots (3)$$

Where:

UOCF: is abnormal OCF

Leverage: Debt to total assets ratio and debt to assets ratio.

Audit: The audit quality is measured through the following dummy variables according to the auditing firm.

Third: To test the effect of OCF management on OCF predictive power (test 3), I run the following regression:

$$CF_{it+1} = \mu_0 + \mu_1 OCF_{it} + \mu_2 UOCF_{it} + \mu_3 OCF_{it} * UOCF_{it} + \epsilon_t \ldots\ldots\ldots\ldots (4)$$

Controlling variables

The industry nature:

In order to study OCF, the industry should be taken into consideration. Lightstone et al. (2012) mentioned that the accounting treatments at firms from the same industry usually are matched. For that reason the majority of the previous studies have taken the industry factor into consideration when they tried to measure OCF management.

To consider the industry nature into consideration I conduct two tests; (1) use time-serious analysis to estimate the model parameters for each company separately, (2) use the cross-sectional analysis for each industry-year.

Real Earnings management:

Some actions taken by many firms to manipulate earnings have effects on OCF. For example, capitalization of certain expenses and postponing some discretionary expenses (like maintenance, advertising, R&D) lead to increase earnings and OCF. Therefore,

when depending on earnings to predict OCF, the model should take the effect of real earnings management into consideration.

Lyu et al., (2014) found that real earnings management basically held through overproduction cost. Therefore, following Khurana et al. (2014), and based on Roychawdhury (2006), I will repeat the regression analysis after inserting a variable for overproduction to capture Real earnings management. By inserting this earnings management variable, we can see if this insertion affect the relation between OCF management and the dependent variable or not.

Other variables:

Following previous studies (like; Roychoudhuy, 2006; Guo et al. 2013; Zhang, 2008; Shuang et al., 2008), I will control for firm size using Log. assets (Log TA) and firm profitability using return on assets (ROA). Some studies used another controlling variable which is "meet or beat the analysts' forecasts", however these forecasts are not available in Egypt for most of companies for the research period. Therefore I will not use it because of data availability considerations. Instead I will conduct additional robustness test to control for avoiding negative change in OCF.

4-2 Variables measurement

OCF management: it is measured as the residuals of applying equation (1) and equation (2), for each firm. Then it will be recomputed using cross sectional regression for each industry-year as robustness test.

Leverage: ratio of debts to total assets.

Audit quality: It is most commonly used in the audit quality literature to use the big audit firms as a surrogate to audit quality. However in Egypt, there is the Accountability State Authority (ASA). The auditors of ASA have wide experiences and spend good efforts and take more than enough time in their work. Moreover, the ASA auditors

are governmental employees so they have high degree of independency to perform their audit. Therefore, it is expected to provide high quality audit. It is common in Egypt for a firm to be audited by more than one auditor, however; it may be ***Joint audit*** or ***Double audit***. The joint audit exists when the big-4 and non-big audit firms jointly audit a firm because they issue one audit report and have joint responsibility. The double audit exists when a firm is audited by ASA along with Big-4 or Non-big-4 firm, because the ASA has to conduct the audit and issue a report separately of the other audit firm.

Accordingly, I classify the audit quality into six classes. Then I measure this variable through dummy variables as explained in (table 1).

Table (1)
Variables definition

Variable	
SALES	Sales revenue*
OCF	Operating cash flow*
TA	Total Assets at the end of the accounting period
Δ SALES	sales year (t) – sales year(t-1)*
PURCH	Purchase*
ΔPURCH	purchase in year (t) – purchase in year (t-1)*.
OPREXP	Operating expenses*
Δ OPREXP	operating expenses in year (t) – year (t-1)*
ACCRUALS	Change in working capital that will be reflecting in cash after excluding accruals that are not reflected in cash and change in cash)* =[(working capital (t) – working capital(t-1)) – change in cash]
OPRINC	Operating income*.
ΔOPRINC	Operating income in year (t) - year (t-1)*.
UOCF	Abnormal operating cash flow which represents OCF management.
UOCF1	Positive UOCF, which means managing

	operating cash flow upward.
UOCF2	Negative UOCF, which means managing operating cash flow downward.
Big_4	Dummy variable for a Big four audit firm. It takes (1) if the auditing firm is a big-four firm and (0) otherwise.
ASA	Dummy variable for Central Accountability Authority. It takes (1) if the firm is audited by ASA and (0) otherwise.
NON-BIG	Dummy variable for a Non-Big-4 audit firm. It takes (1) if the auditing firm is a non-big-four firms and (0) otherwise.
DA1	Dummy variable for the double audit by both Big-4 firm and ASA. It takes (1) if the firm is audited by both big-4 firm and ASA and (0) otherwise.
DA2	Dummy variable for the double audit by both a Non-Big-4 firm and ASA. It takes (1) if the firm is audited by both big-4 firm and ASA and (0) otherwise.
JA	Dummy variable for the Joint audit by both Big-4 and non-big-4 firms. It takes (1) if the firm is audited by both big-4 and non-big-4 firms and (0) otherwise.
LEV	Leverage as a measure of financial structure. It is measured as debts to assets ratio
AB-PROD	Overproduction variable. It is computed as abnormal production as a surrogate to real earnings management*
ROA	Return on assets (net income divided by total assets)
SIZE	Firm size measure by the Logarithm of total assets at the year end.
POSITIVE_ΔCOF	Dummy variable equal (1) if the change in OCF is not negative and (0) otherwise.
Audit	Audit quality measured by six dummy variables.

* Variables deflated by total assets.

4-3 Sample size

The researcher has collected all available financial statements after excluding financial institutions and banks for the period 1999-

2014. To include a firm in the final sample, its full annual financial statements should be available for at least continuous 14 years. So the final period that could be used in the statistical tests is 13 years to be limited to only 12 years in some tests. The final sample that satisfied these conditions contains 38 firms which present 8 sectors (table 2).

Table (2)
The Research Sample

Sector	Number of firms	Number of observations
Chemicals	5	70
Materials	12	168
Medicine	1	14
Foods and Drinks	7	98
Construction	5	70
Clothes and textiles	3	42
Tourism	3	42
Other industries	2	28
Total	38	532

This sample declined by 38 observations for some variables that need a previous one year to be computed like purchase, and declined by 76 observations for some variables that need 2 preceding years to be computes like change in purchase.

5- Statistical Tests

5-1 Using direct approach-developed model (equation 1)

First I used the developed model in equation (1) according to direct approach. I tested the reliability of the model to estimate OCF, and then I tested the research hypotheses.

5-1-1 Testing the model

The following model has been run to estimate the coefficients

$$OCF_{it} = \beta_0 + \beta_1 1/TA_{it} + \beta_2 Sales_{it}/TAi_t + \beta_3 \Delta Sales_{it}/TA_{it} + \beta_4 Purch_{it}/TA_{it} + \beta_5 \Delta Purch_{it}/TA_{it} + \beta_6 OC_{it}/TA_{it} + \beta_7 \Delta OC_{it}/TA_{it} + \beta_8 OCF_{it-1}/TA_{it} + \beta_9 Accrul_{it}/TA_{it} + \epsilon_{it}$$

The results show multi-collinearity between independent variables. So that, by excluding the purchase variable from the model the multi-collinearity has been revoked. Therefore, the following developed model is used:

$$OCF_{it} = \beta_0 + \beta_1 1/TA_{it} + \beta_2 Sales_{it}/_{TAit} + \beta_3 \Delta Sales_{it}/TA_{it} + \beta_4 \Delta Purch_{it}/TA_{it} + \beta_5 OC_{it}/TA_{it} + \beta_6 \Delta OC_{it}/TA_{it} + \beta_7 OCF_{it-1}/TA_{it} + \beta_8 Accrul_{it}/TA_{it} + \epsilon_{it} \quad \text{.....(5)}$$

I tested the predictive ability of this model versus Roychawdhury's model by two ways. First, I got the difference between the two models residuals means. The result (table 2) shows that the developed model has lower prediction error than Roychawdhury's model. Therefore, the developed model significantly has a higher predictive power comparing Roychawdhury's model.

Table (3)

T-test of the differences between residuals of developed model v.s. Roychawdhury's Model

	Mean	N	Std. Dev.	t	Sig. (2-tailed)
Developed Model 1	.0192	460	.02537	-9.697	.000
Roychawdhury's Model	.0607	460	.09526		

Second, following Dechow et al. (1998), I compute the correlation between the predicted OCF_t and both actual OCF_t and OCF_{t+1} (Dechow et al. 1998). The test results, as shown in table (4) imply that; in both Roychawdhury's model and developed model (1), the predicted OCF is strongly correlated with the actual OCF_t and OCF_{t+1}. However, the developed model has stronger correlation with OCF_t (97%) compared with Roychawdhury's model (67%). Also it

has stronger correlation with OCF_{t+1} (76%) compared with Roychawdhury's Model (66%). According to Dechow et al. (1998) this implies that the developed model has a good ability to predict normal OCF and then to capture the managed part of OCF.

Table (4)
Correlation between predicted OCF and actual OCF according to Roychawdhury's model V.S. developed model (1) and Developed model (2)

		Predicted OCF Developed Model (1)	Predicted OCF Roychawdhury's Model	Predicted OCF Developed Model (2)
OCF_t	Pearson Correlation	.978**	.667**	.968**
	N	460	462	456
OCF_{t+1}	Correlation Coefficient	.760**	.666**	.727**
	N	422	424	418

** Represent significance at 1 percent.

To control for real earnings management, I have followed Roychawdhury's model to estimate the abnormal production cost, and then I have inserted this variable into the regression. Real earnings management doesn't change the relation between OCF and independent variables (Appendix B).

5-1-2 Hypotheses Tests and results:

5-1-2-1 First and second hypotheses

For testing the first and second research hypotheses, I run the developed regression model to estimate the coefficients of predicting variables for each company, and then I used the estimated coefficients to compute the expected OCF. After that I have estimated the Unexpected OCF (UOCF) as a difference between actual OCF in the period (t) and the expected OCF for the same period. Thereafter, I could test the first and second research hypotheses by using the regression in (Equation 3). The results (table 5) show that both audit quality and leverage have significant effect on OCF management

Table (5)

Regressions for testing the first and second hypotheses

Model (1): $UOCF_{it} = \beta_0 + \beta_1 BIG_{it} + \beta_2 ASA_{it} + \beta_3 DA1_{it} + \beta_4 DA2_{it} + \beta_5 JA_{it} + \beta_7 LEV_{it} + \varepsilon_{it}$

Dependent Variable	Developed M1 (Direct Approach)	Developed M2 (Indirect approach)	Roychawdhury's Model
(Constant)	.028*** (8.024)	.092*** (10.210)	.095*** (10.463)
BIG	-.016*** (-4.453)	-.046*** (-3.728)	-.046*** (-3.808)
ASA	-.015*** (-3.549)	-.030** (-2.652)	-.202*** (-3.667)
DA1	-.020*** (-4.149)	-.048*** (-2.652)	-.052*** (-3.260)
DA2	-.017*** (-3.968)	-.059*** (-3.946)	-.048*** (-2.993)
JA	-.015*** (-2.814)	-.046** (-2.268)	-.065*** (-3.194)
LEV	.038*** (2.680)	.049** (2.403)	.062** (2.505)
N	460	456	461
Adj. R^2	40%	48%	36%

*, **, *** Represent significance at 10 percent, 5 percent, and 1 percent, respectively. T-statistics are presented between the brackets.

The results show that Big-4 audit, ASA, double audit by Big-4 and ASA, double audit by ASA and non-Big-4 audit, and joint audit between Big-4 and Non-Big-4 lead to decrease OCF management comparing Non_Big-4 audit.

To get more understanding about the effect of the different types of audit, I used the regression by comparing each pair of audit types after excluding all other cases. So I used 12 different subsamples to accomplish this test. The results were as follows:

Table (6)

Regressions for testing the effect of different audit types on OCF management by matching the effect of each pair of audits $UOCF_{it} = \beta_0 + \beta_1 AUDIT_{it} + \beta_2 LEV_{it} + \varepsilon_{it}$

Audit type		Variable Measurement	β_1	n	Adj. R^2
BIG	V.S. NON-BIG	1= BIG 0 = NON-BIG	-.197*** (-3.070)	253	4.1%
ASA	V.S. NON-BIG	1= ASA 0 = NON-BIG	-.170*** (-2.680)	237	2.9%
DA1	V.S. NON-BIG	1= DA1 0 = NON-BIG	-.250*** (-3.207)	172	9.4%
DA1	V.S. BIG	1= DA1 0 = BIG	-.180** (-2.265)	163	5%
DA1	V.S. ASA	1= DA1 0 = ASA	-.196** (-2.147)	147	3.1%
BIG	V.S. ASA	1= BIG 0 = ASA	-.078 (-1.099)	228	1.4%
JA	V.S. Non-BIG	1= JA 0 = NON-BIG	-.283*** (-2.682)	160	2.6%
JA	V.S. ASA	1= JA 0 = ASA	-.172* (-1.874)	135	7.5%
JA	V.S. BIG	1= JA 0 = BIG	-.156 (-1.628)	151	1.2%
DA2	V.S. NON-BIG	1= DA2 0 = NON-BIG	-.192*** (-2.630)	196	3.5%
DA2	V.S. BIG	1= DA2 0 = BIG	-.068 (-1.461)	187	.9%
DA2	V.S. ASA	1= DA2 0 = ASA	-.034 (-.394)	171	7.3%

*, **, *** Represent significance at 10 percent, 5 percent, and 1 percent, respectively. T-statistics are presented between the parentheses.

The results (table 6) imply that both big-4 and ASA audit lead to a decrease in OCF management comparing with non-big-4, however; no significant difference between ASA and big-4 audit. In addition, double audit by both ASA and Big-4 firms lead to enhance the audit ability to decrease OCF management comparing with any other audit type. Moreover, joint audit between big-4 and non-big-4 firms leads to an increase in audit ability to limit OCF management

only comparing with non-big-4 audits[1]. Finally, double audit by both ASA and non-big-4 firms has no significant effect comparing with ASA audit or big-4 audit.

The results (Table 5) Show that, in general, high leverage level leads to an increase in OCF management. However, to determine the effect of leverage on OCF management up and down, I have decomposed the sample into two sub-samples according to the sign of UOCF, the first has positive UOCF, which means managing OCF up, and the second has negative UOCF, which means OCF down (Goe et al., 2013). The regression results show that (table 7), leverage leads to an increase in OCF management up and has no significant effect on OCF management down.

Table (7)

Testing hypothesis under the two sub-samples (+ UOCF and – UOCF)

	Developed Model (1)		Developed Model (2)	
	$UOCF_1$ (+ UOCF)	$UOCF_2$ (- UOCF)	$UOCF_1$ (+ UOCF)	$UOCF_2$ (- UOCF)
(Constant)	.028*** (7.345)	- .029*** (-9.752)	.104*** (6.461)	-.084*** (-8.533)
BIG	-.011** (-2.096)	-.013* (-1.880)	- .063*** (-2.960)	-.036* (-1.921)
ASA	-.010* (-1.907)	.005 (1.254)	-.040* (-1.814)	.024* (1.697)
DA1	-.016** (-2.079)	-.020** (-2.516)	-.067** (-2.163)	.036* (1.825)
DA2	-.014** (-2.403)	-.013** (2.604)	-.067* (-2.597)	-.053 (1.417)
JA	-.010* (-1.883)	-.018** (-2.020)	-.060* (-1.736)	-.039* (-1.703)
LEV	.011*** (3.505)	.001 (.825)	. 087*** (2.681)	.059 (1.546)

*, **, *** Represent significance at 10 percent, 5 percent, and 1 percent, respectively. T-statistics are presented between the parentheses

[1] I accept significance level of 5%.

5-1-2-2 controlling real earnings management, return on assets and firm size:

By inserting the three variables to the model, the results (table 8) were robust regarding to both leverage and audit quality effects on OCF management.

Table (8)

Regressions for testing the first and second hypotheses after controlling firm size and return on assets $UOCF_{it} = \beta_0 + \beta_1 BIG_{it} + \beta_2 ASA_{it} + \beta_3 DA1_{it} + \beta_4 DA2_{it} + \beta_5 JA_{it} + \beta_6 AB\text{-}PROD_{it} + \beta_7 ROA_{it} + \beta_8 SIZE_{it} + \varepsilon_{it}$

Dependent Variable	Developed M1	Developed M2	Roychoudhuy's Model
(Constant)	.078***	.064	.274***
	(5.624)	(.947)	(8.813)
BIG	-.011***	-.017**	-.031**
	(-3.037)	(-2.085)	(-2.170)
ASA	-.012**	-.045***	-.044**
	(-2.505)	(-2.367)	(-2.157)
Double Big and ASA	-.013***	-.090***	-.015***
	(-2.630)	(-3.088)	(-3.878)
Double Non-Big and ASA	-.012**	-096***	-047**
	(-2.630)	(-3.285)	(-2.285)
Joint Big and Non-Big	-.011**	-.068***	-.044**
	(-2.043)	(-2.998)	(-2.173)
Leverage	.032***	.037**	.014**
	(2.919)	(2.085)	(2.341)
SIZE	-.004***	-.446***	-.016***
	(-3.778)	(-6.679)	(-4.204)
AB-PROD	-.001	.003	.023
	(-.165)	(.127)	(1.012)
ROA	.008	-.003*	-.018
	(.592)	(-.1.694))	(-.393)
N	460	456	461
Adj. R^2	6.7%	12.1%	6.8%

*, **, *** Represent significance at 10 percent, 5 percent, and 1 percent, respectively. T-statistics are presented between the brackets.

5-1-2-Third hypothesis

For testing the third hypotheses, I run the regression in (equation 4). The results show that the coefficient of the variable (OCF*UOCF) is significant and negative, which implies that increasing UOCF leads to decreasing the predictive ability of the current OCF, which is support the third hypothesis (table 9- M1).

Table (9)

Regressions for testing the Results of testing third hypothesis

$OCF_{it+1} = \mu_0 + \mu_1 OCF_{it} + \mu_2 UOCF_{it} + \mu_3 OCF_{it} * UOCF_{it} + \epsilon_{it}$

Dependent Variable	Developed M1	Developed M2	Roychoudhuy's Model
(Constant)	.061***	.066***	.065***
	(5.713)	(5.967)	(5.758)
UOCF	.044	-.091	-.116
	(.155)	(-.829)	(-.977)
OCF	. .358***	.337***	.365***
	(5.312)	(5.508)	(6.000)
OCF*UOCF	-.03.88***	-.256**	-.261**
	(-3.351)	(-2.470)	(-2.539)
N	417	417	423
Adj. R^2	5.8%	7.3%	8.3%

*, **, *** Represent significance at 10 percent, 5 percent, and 1 percent, respectively. T-statistics are presented between the brackets.

The results of testing the third hypothesis were robust after controlling real earnings management, return on assets and firm size as shown in table (10 – M1)

Table (10)
Regressions for testing the Results of testing third hypothesis after controlling real earnings management, return on assets and firm size
$OCF_{it+1} = \mu_0 + \mu_1 OCF_{it} + \mu_2 UOCF_{it} + \mu_3 OCF_{it} * UOCF_{it} + \mu_4 AB\text{-}PROD_{it} + \mu_2 SIZE_{it} + \mu_6 ROA_{it} + \epsilon_{it}$

Dependent Variable	Developed M1	Developed M2	Roychoudhuy's Model
(Constant)	.059***	.060***	.066***
	(5.319)	(6.095)	(5.696)
UOCF	.092	2.586E-8	-.106
	(.321)	(.350)	(-966)
OCF	.352***	.350***	.365***
	(5.845)	(5.868)	(5.981)
OCF*UOCF	-.321***	-.317***	-.262**
	(-4.239)	(-4.250)	(-2.527)
AB-PROD	-.009	-.008	-.001
	(-.186)	(.855)	(-.032)
SIZE	.008	.009	.005
	(1.492)	(1.350)	(.952)
ROA	.360***	.298***	.291***
	(4.885)	(3.845)	(3.748)
N	417	417	423
Adj. R2	9%	11.5%	12.2%

*, **, *** Represent significance at 10 percent, 5 percent, and 1 percent, respectively. T-statistics are presented between the brackets.

In the direct approach developed model as well as Roychawdhury's model some variables were insignificant as it is shown in appendix (A). In addition, the multi-collinearity between purchase and sales enforced the researcher to eliminate the purchase from the direct model (1). Therefore, the indirect approach can deal with these problems as will be discussed in the next point.

5-2 Using indirect approach developed model (equation 2):

The indirect method model implies that OCF is a function in operating income adjusted by accruals, which theoretically makes sense.

5-2-1 Testing the model

Table (11)

Regressions for testing the Results of testing third hypothesis

$OCF_{it}/TA_{it} = \beta_0 + \beta_1 OPRINC_{it}/TA_{it} + \beta_2 \Delta OPRINC_{it}/TA_{it} + \beta_3 ACCRUAL_{it}/TA_{it} + \beta_4 1/TA_{it} + \epsilon_{it}$

Dependent Variable	Test (1)	Test (2)
(Constant)	.082***	.009
	(10.919)	(1.414)
OPRINC	.899***	.911***
	(51.865)	(48.746)
ΔOPRINC	-.132***	-.136***
	(-4.876)	(-5.036)
ACCRUAL	-.089***	-.090***
	(-4.007)	(-4.044)
1/TA	-.143***	-.114**
	(-2.988)	(-2.367)
AB-PROD		-.038
		(-1.605)
N	455	455
Adj. R^2	51.2%	51.8%

*, **, *** Represent significance at 10 percent, 5 percent, and 1 percent, respectively. T-statistics are presented between the brackets.

All variables in this model are significant with no multi-collinearity between them. Also, operating income have positive sign which means a positive relation between operating income and OCF, however; change in operating income and non-cash change in working capital (ACCRUAL) have negative relation with OCF (table 10 Test (1)). This implies that OCF is a function of income while accruals are function of change in income, so the increase in non-cash working capital leads to decrease in OCF and vice versa. This notion can be easily noticed from the indirect cash flow statement calculations.

I have inserted abnormal production (AB_PROD) as a measurement of real earnings management. No effect have been found of this variable on the relation between OCF and the predictors of my model (table 10-Test (2))

To examine the ability of this model to predict OCF, I have computed the correlation between the predicted OCF_t and both actual

OCF_t and OCF_{t+1} (Dechow et al. 1998). The test results (table 4) imply that the predicted OCF is strongly correlated with the actual OCF_t and OCF_{t+1}. However, the developed model has stronger correlation with OCF_t (96.8%) compared with Roychawdhury's model (90%). Also, it has stronger correlation with OCF_{t+1} (72%) compared with Roychawdhury's Model (68%). According to Dechow et al. (1998) this implies that the adjusted developed model has a good ability to predict normal OCF and then to capture the managed part of OCF.

These results refer to the reliability of this model to predict OCF and capture unexpected or managed OCF. Therefore, I have reexamined hypotheses using this indirect approach-developed model.

5-2-2 Hypotheses tests and results

5-2-2-1 First and second hypotheses:

*, **, *** Represent significance at 10 percent, 5 percent, and 1 percent, respectively. T-statistics are presented between the brackets.

The results (table 5 (M2)) support the results of the first developed model, where; Big-4 audit, ASA, double audit by Big-4 and ASA, double audit by ASA and non-Big-4 audit, and joint audit between Big-4 and Non-Big-4 lead to decrease OCF management comparing with Non_Big-4 audit. These results are still robust after controlling AB_PROD, firm size and profitability (table 8).

To get more understanding about the effect of the different types of audit, I used the regression by comparing each pair of audit types after excluding all other cases. So I used 12 different subsamples to accomplish this test. The results (table 11) imply that both big-4 and ASA audit lead to decrease OCF management comparing with non-big-4, however; no significant difference between ASA and big-4 audit. In addition, double audit by both ASA and Big-4 firms lead to enhance the audit ability to decrease OCF management comparing with any other audit type. Moreover, joint audit between big-4 and non-big-4 firms leads to increase the audit ability to limit OCF management only comparing with non-big-4 audits. Finally, double

audit by both ASA and non-big-4 firms has no significant effect comparing with ASA audit or big-4 audit. All these results support the results of the developed model (1).

Table (12)

Regressions for testing the effect of different audit types on OCF management by matching the effect of each pair of audits

$UOCF_{it} = \beta_0 + \beta_1 AUDIT_{it} + \beta_2 LEV_{it} + \varepsilon_{it}$

Audit type	Variable Measurement	β_1	n	Adj. R^2
BIG V.S. NON-BIG	1= Big-4 0 = Non-Big-4	-.210*** (-3.089)	253	8.2%
ASA V.S. NON-BIG	1= ASA 0 = Non-Big-4	-.256*** (-3.910)	237	6.8%
DA1 V.S. NON-BIG	1= double Audit 0 = Non-Big-4	-.565*** (-8.409)	172	30.6%
DA1 V.S. BIG	1= double Audit 0 = Big-4	-.288*** (-3.342)	163	18%
DA1 V.S. ASA	1= double Audit 0 = ASA	-.163** (-2.072)	147	8.6%
BIG V.S. ASA	1= Big-4 0 = ASA	-.083 (-1.095)	228	3.7%
JA V.S. NON-BIG	1= Joint Audit 0 = Non-Big-4	-.239*** (-2.630)	160	6.9%
JA V.S. ASA	1= Joint Audit 0 = ASA	-.164 (-1.524)	135	4.2%
JA V.S. BIG	1= Joint Audit 0 = Big-4	-.033 (-.343)	151	1.5%
DA2 V.S. NON-BIG	1= double Audit 0 = Non-Big-4	-.506*** (-9.228)	196	3.3%
DA2 V.S. BIG	1= double Audit 0 = Big-4	-.168* (-1.863)	187	7.3%
DA2 V.S. ASA	1= double Audit 0 = ASA	-.159 (-1.458)	171	5.5%

*, **, *** Represent significance at 10 percent, 5 percent, and 1 percent, respectively. T-statistics are presented between the brackets.

To determine the effect of leverage on OCF management up and down, I have decomposed the sample into two sub-samples according to the sign of UOCF, the first has positive UOCF, which means managing OCF up and the second has negative UOCF, which

means OCF down. The regression results (table 7) show that leverage leads to increase in OCF management up and has no significant effect on OCF management down.

5-2-2-2 Testing third hypothesis

To test the third hypothesis, I have run regression in equation 4. Table (9-M2) shows that the Coefficient of UOCF*OCF is significant and negative, these results support the third hypothesis, that is, an increase in OCF management leads to a decrease in the predictive ability of the OCF to predict the next year's OCF.

The results of testing the third hypothesis are robust after controlling real earnings management, return on assets and firm size (table 10- M2).

5-3 Additional Robustness tests

I have conducted additional robustness tests to reexamine the research hypotheses as follows:

a- Applying Roychawdhury's Model

I tested the research hypotheses using Roychawdhury's model, the results also were robust where; Big-4 audit, ASA, double audit by Big-4 and ASA, double audit by ASA and non-Big-4 audit, and joint audit between Big-4 and Non-Big-4 lead to decrease in OCF management comparing with Non_Big-4 audit (table 5).The results were also robust after controlling AB-PROD as a measure for earnings management, return on assets and firm size (table 8).

I also re-tested the third hypothesis under Roychawdhury's Model, and the results were robust (table 9). Moreover, the results were not significantly affected after controlling real earnings management, firm size and return on assets (table 10).

b- Cross Sectional analysis

Following Zahang (2008) and Roychowdhury (2006), I have reexamined the research hypotheses using cross-sectional analysis for industry-year level. In this analysis the OCF management is measured

by the difference between expected OCF and actual OCF for a firm belongs to the industry at year (t). The predicted OCF is computed by estimating the parameters of the estimation model for each industry for a year (t), then compensating by these parameters in the regression model for all firms belong to the industry for a year (t).

The industries that will be used in this analysis should contain at least five companies[1]. Table (12) reported the results of the cross-sectional analysis. The results support the effect of both audit quality and leverage on OCF management.

Table (13)

Regressions for testing the first and second hypotheses after controlling firm size and return on assets

$UOCF_{it} = \beta_0 + \beta_1 BIG_{it} + \beta_2 ASA_{it} + \beta_3 DA1_{it} + \beta_4 DA2_{it} + \beta_5 JA_{it} + \beta_6 AB\text{-}PROD_{it} + \beta_7 ROA_{it} + \beta_8 SIZE_{it} + \varepsilon_{it}$

Dependent Variable	Developed M1	Developed M2	Roychoudhuy's Model
(Constant)	.029***	.093***	.095***
	(12.598)	(6.519)	(6.149)
BIG	-.011**	-.050***	-.046***
	(-2.011)	(-4.011)	(-2.993))
ASA	-.007***	-.032**	-.046***
	(-3.318)	(-2.503)	(-3.191)
Double Big and ASA	-.016***	-.054***	-.052***
	(-3.384)	(-3.038)	(-3.080)
Double Non-Big and ASA	-.014***	-.049**	-.048***
	(-3.498)	(-2.403)	(-3.194)
Joint Big and Non-Big	-.013**	-.060***	-.065***
	(-2.366)	(-4.011)	(-3.260)
Leverage	.023***	.014***	.045**
	(2.679)	(3.442)	(2.531)
SIZE	-.004***	-.024***	-.016***
	(-3.596)	(-3.636)	(-4.204)
ROA	.017	.000	-.018
	(1.447)	(.011)	(-.694)

[1] Five observations in each industry annually is not sufficient number of observation to be used in estimating the parameters necessary to predict OCF, therefor the result of this analysis should be taken carefully within this limitation.

AB-PROD	-.005	-.006	.023
	(-.888)	(-.274)	(1.012)
N	459	455	461
Adj. R^2	7.6%	11.9%	7.1%

*, **, *** Represent significance at 10 percent, 5 percent, and 1 percent, respectively. T-statistics are presented between the brackets.

The cross-sectional analysis also supports the result of the previous tests regarding the third hypothesis as shown in table (13)

Table (14)

Testing the third hypothesis after controlling real earnings management, return on assets and firm size

$$OCF_{it+1} = \mu_0 + \mu_1 OCF_{it} + \mu_2 UOCF_{it} + \mu_3 OCF_{it} * UOCF_{it} + \mu_4 AB\text{-}PROD_{it} + \mu_5 SIZE_{it} + \mu_6 ROA_{it} + \epsilon_{it}$$

Dependent Variable	Developed M1	Developed M2	Roychoudhury's Model
(Constant)	-.058	-.013	-.015
	(-.780)	(.870)	(-.203)
UOCF	.200***	-.108	-.116
	(2.671)	(-.935)	(-.952)
OCF	.032	.198***	.230***
	(.110)	(2.870)	(3.328)
OCF*UOCF	-2.065**	-.198***	-.218***
	(-2.377)	(2.870)	(-3.260)
AB-PROD	-.026	-.028	-.021
	(-.574)	(-.615)	(-.471)
SIZE	.008	.005	.005
	(1.451)	(.881)	(.342)
ROA	.321***	.309***	.291***
	(4.167)	(3.942)	(3.748)
N	421	411	423
Adj. R2	9.6%	10.4%	11%

*, **, *** Represent significance at 10 percent, 5 percent, and 1 percent, respectively. T-statistics are presented between the brackets.

c- Moving Time serious

I used another way to test hypotheses. In this test, following Lee (2012), I estimated the coefficients of estimation model through a moving 10-year time serious period for each firm. In this case I have used the first 10 years to predict OCF of the eleventh year, and the

next 10 years to predict the twelfth year OCF, and finally, the third ten years to predict the thirteenth year OCF. Therefore, I have gotten 3-year predictions for 38 firms with total predicted cases of 114 firm-year observations. Then, I estimated OCF management by the difference between predicted OCF and actual OCF for the firm (i) of year (t). After that I have run regression (equation 3) to test first and second hypotheses and regression (equation 4) to test the third hypothesis. The results were robust, even by inserting the control variables. Therefore, the effects of the audit quality and leverage on OCF management were supported, and the negative effect of OCF management on the predictive ability of COF also is supported.

d- Controlling "avoiding negative change in OCF"

I run the regression again with inserting a dummy variable "POSITIVE_ΔCOF" the results showed that audit still significant at level 5%, nevertheless, the leverage becomes insignificant at level 5%. However, by decomposing the sample into positive UOCF and negative UOCF, leverage leads to significant effect of OCF management and has no significant effect on OCF management down, which is consistent with the original results.

5-4 Results Discussion and implications:

The results of tests, in general, found significant positive effect of leverage on the OCF management. This suggests that heavy dependence on debts as a financing source encourages the management to manage its OCF. More specifically, leverage increases managing OCF up, however it has no effect on managing OCF down. This is consistent with the results of Guo et al. (2013), and contradicts with the results of Manesh et al. (2013). These results supported the argument that positive accounting theory can be applicable also for OCF. The application of this theory in the context of OCF management is that; managers have the incentives to increase the reported OCF to lower the cost of debts.

The results also support the ability of the audit quality to decrease OCF management. This result contradicts with Guo et al.

(2013) who reported a positive effect of audit quality, as a control variable, on OCF management. However, it is consistent with Shawn et al., (2016) who provided empirical evidence that; spending more audit effort and time by the auditor leads to a decrease in real earnings management, which in part has common characteristics with OCF management. Shawn et al., (2016) provided an empirical evidence for this explanation and concluded that audit quality leads to a decrease in real earnings management, provided that more audit effort and time are spent by the auditor. Therefore, we can conclude that audit quality restricts management's desire to manipulate OCF.

The results show that OCF management has negative effect on the predictive ability of OCF_t in predicting OCF_{t+1}. This implies that OCF manipulation can deviate OCF from the normal levels and may lead to more fluctuation in its values over the accounting periods. This may lead to a decrease in the predictive ability of OCF.

The results were robustness after controlling real earnings management, firm size, profitability and avoiding achieve negative change in OCF.

These results have its importance and applications for investors, creditors, standards setters. From one hand, setting the conditions that affect managers' desire and ability to manage OCF is very important to both creditors and investors. Creditors give OCF more attention when they take the crediting decisions; also investors give OCF increasing attention as a performance measure. Therefore, testing the conditions of OCF management may help creditors and investors to value OCF management and then improve their decisions which in return have an important effect on the resources allocation in the economy.

From the other hand, standards setters (IASB and FASB) emphasize on the importance of the quality of the financial information and its ability to predict future cash flow. Therefore, investigating the issue of the OCF management effect on the predictive ability is important for these parties to take corrective

actions. In addition, poor quality of OCF may limit users' ability to evaluate a firm's performance and predict future cash flow and investment risk. In effect, all these factors may lead to incorrect decisions and then inefficient allocation of resources at the economic level.

Moreover, developing and empirically testing reliable models to measure OCF management depending on direct and indirect approaches of preparing cash flow statements could be beneficial for academics, as they can depend on the developed models in the future research to capture OCF management. In addition providing new evidence from one of the emerging markets can help in enhancing the understandability of OCF management through the application in a different environment.

6- Conclusion

This research aims at testing the OCF management in Egypt and the effect of audit quality and financial structure on this behavior. In addition, the research aims at investigating the effect of OCF management on the predictive ability of OCF. The researcher developed two models to capture OCF management depending on a basic idea of generating cash flow either using direct method or indirect method. The direct method requires inserting the variables that generate cash from operations in the estimation model. However the indirect method requires figuring out a sort of linkage between the profits variables and OCF.

The research depends on sample of non-financial listed firms in the stock exchange market of Egypt for the period from 1999 to 2014 for 38 firms. To get insight to the factors that may affect OCF management, two factors have been tested, audit quality and financial structure. The theoretical foundation and literature show that there are two explanations regarding the effect of financial structure and audit quality on OCF management, one of them supports a positive relation between both finance by debts and audit quality and OCF management. The other explanation supports the negative relation.

However, the theoretical foundation supports a negative relation between OCF management and predictive ability of OCF to predict next year OCF.

OCF management has been computed by the difference between the estimated OCF and the actual OCF for the year (t) of each firm. The estimated OCF is predicted using the developed model. The audit quality is measured according to the audit firm, so I have assumed 6 cases, the audit firm is from: non-big-4 firm, big-4 firm, Accountability State Authority (ASA), double audit by big-4 and ASA, double audit by non-big and ASA and joint audit between a big-4 and non-big firms. The financial structure is measured by the rate of debts to total assets ratio.

The results of tests, in general, found positive significant effect of leverage on the OCF management. This suggests that heavy dependence on debts as a financing source encourages the management to manage its OCF. Additional analyses show that leverage increases managing OCF up, however it has no effect on managing OCF down. The result also documented that audit quality leads to a decrease in OCF management. Finally, the results show that OCF management has negative effect on the predictive ability of OCF_t in predicting OCF_{t+1}.

I controlled for real earnings management by inserting the abnormal production to the models, also controlled for firm size and profitability. In addition I controlled for avoiding achieve negative change in OCF. The results were robustness and there were no significant effect.

For more robustness tests, the researcher reexamined hypotheses using Roychawdhury's model, cross-sectional analysis, and a 10-year moving time-serious analysis. That required re-estimating the OCF management accordingly, and then re-examining the research hypotheses. The results strongly supported the results related to the Leverage effect and audit effect on OCF management. Moreover, the results support the negative effect on OCF management on the predictive ability of OCF.

These findings should be taken within the limitations of the research and its sample. The sample of this research doesn't include financial institutions and banks. In Addition, the sample size is somehow small compared with other studies applied in USA because of difficulties to get long time serious for large numbers of companies. In addition, this issue needs more researches with different methodologies especially because of the low R^2.

This research opens the wide scope of researches that could be conducted in Egypt. For example, a research can test the same hypotheses in banks and financial institutions. Another research can examine other factors that can affect OCF management. In addition, many researches may be needed to examine the effects of OCF management, while others may test the motivations of OCF management.

Appendix A

The direct-approach-developed Model v.s. Roychawdhury's model

a- The direct approach-developed mode

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	.068	.011		6.258	.000		
Sales/TA	.035	.010	.195	3.468	.001	.654	1.529
Δsales/TA	-.003	.012	-.015	-.296	.767	.773	1.294
Δpurchase/TA	.005	.015	.017	.353	.724	.883	1.133
OPREXP/TA	.166	.114	.081	1.458	.145	.672	1.488
ΔOPREXP/TA	.047	.114	.022	.410	.682	.703	1.422
OCF_{t-1}/TA	.143	.048	.140	2.988	.003	.937	1.067
ACCRUAL	-.020	.008	-.139	-2.557	.011	.698	1.432
1/TA	-3464.763	1200.399	-.168	-2.886	.004	.608	1.645

b- Roychawdhury's Model

Coefficients[a]

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.071	.010		6.948	.000
Sales/TA	-2011.672	956.262	-.103	-2.104	.036
Δsales/TA	.032	.010	.180	3.375	.001
def_Δsales	.001	.011	.004	.079	.937

Appendix B

The direct approach-developed Model after inserting AB-PROD

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	.068	.011		6.194	.000		
Sales/TA	.036	.010	.197	3.497	.001	.649	1.541
Δsales/TA	-.004	.012	-.016	-.309	.758	.773	1.294
Δpurchase/TA	.005	.015	.017	.338	.735	.854	1.171
OPREXP/TA	.167	.114	.081	1.464	.144	.671	1.490
ΔOPREXP/TA	.047	.114	.022	.414	.679	.703	1.422
OCF_{-1}/TA	.144	.048	.141	3.004	.003	.936	1.069
ACCRUAL	-.020	.008	-.141	-2.605	.009	.701	1.428
1/TA	-3558.535	1193.153	-.173	-2.982	.003	.611	1.636
AB_PRODUCTION	-.002	.036	-.003	-.057	.955	.957	1.045

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