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**Financial Reporting Quality<sup>1</sup> as  
a determinant of the Relationship  
between Financial Constraints and  
Investment Efficiency  
An Applied Study on Nonfinancial Firms  
Listed in the Egyptian Stock Exchange**

**Abstract**

This paper is based on the perspective of firm's agency conflicts to examine the relationship between financial constraints on one hand measured by a composite score that encompasses the firm's cash balance scaled by total assets and the firm's negative capital structure and investment efficiency on the other. To reduce measurement errors, financial reporting quality which serves as the moderating factor in this relationship is measured by several proxies as there is no single well defined measure for this variable. A sample of 234 nonfinancial firms listed in the Egyptian stock market during the period 2013–2016 is used to test the empirical models through regression analysis. Results agreed with previous studies regarding the effect of financial reporting quality on investment efficiency and study was able to provide empirical evidence regarding the positive effect of financial reporting quality on the efficiency of investment. However, with respect to the effect of financial constraints and the interactive effect of financial constraints and financial reporting quality on the efficiency of investments, results ran counter to the researcher's predictions as a significant negative effect was found between these two variables and the dependent variable which is the efficiency of investment which raises several questions concerning earnings management practices by management of firms listed in Egyptian stock Exchange showing no concern with financial reporting quality. Such a relationship appeared to be more obvious for overinvesting firms compared to their underinvesting counterparts even though the number of underinvesting firms in the sample was much more greater than their overinvesting counterparts which emphasizes these results and shows that as long as management finds the internal funds available, they are not concerned with improving the quality of their financial reports. This paper extends the accounting literature concerning financial reporting quality and investment efficiency to the emerging capital markets in the world. Moreover, this is the first study that examines the interaction effect between financial reporting quality and financial constraints, taking financial constraints as an independent variable on listed companies in Egypt.

**Keywords** Financial reporting quality; financial constraints, investment efficiency, underinvestment, overinvestment, leverage

<sup>1</sup> The term "financial reporting quality" has been used throughout this research paper interchangeably with the term "financial information quality".

## جودة التقارير المالية كمحدد للعلاقة بين القيود المالية وكفاءة الاستثمارات

دراسة تجريبية علي الشركات غير المالية المقيدة في سوق الأوراق المالية المصري

### ملخص البحث

يتناول هذا البحث منظور التكاليف الخاصة بالوكالة لاختبار أثر القيود المالية الخاصة بالشركة من ناحية مقاسة من خلال مؤشر مركب يتضمن كلا من النقدية الخاصة بالشركة مقسوما علي اجمالي الأصول مضروبا في سالب الهيكل التمويلي علي كفاءة الاستثمارات لهذه الشركة من ناحية أخرى. وللد من أخطاء القياس بقدر الإمكان المتعلقة بالمتغير الوسيط المفترض تأثيره علي هذه العلاقة وهو جودة التقارير المالية، استخدم الباحث أكثر من طريقة لقياس المتغير وذلك نظرا لعدم وجود طريقة واحدة متفق عليها. ومن خلال عينة تتكون من ٢٣٤ شركة مسجلة في سوق الأوراق المالية المصري خلال الفترة من ٢٠١٣ إلي ٢٠١٦، تم اجراء تحليل الإنحدار لإختبار العلاقة. وقد اتفقت نتائج التحليل الإحصائي مع نتائج الدراسات السابقة فيما يتعلق بالتأثير الإيجابي لجودة التقارير المالية علي كفاءة الأستثمارات. أما من حيث تأثير المتغير المستقل الرئيسي وهو القيود المالية والتفاعل بين هذا المتغير وجودة التقارير المالية، فقد جاءت النتائج عكس التوقعات المبينة علي الدراسات السابقة حيث أوضحت نتائج التحليل الإحصائي وجود تأثير عكسي جوهرى لهاذين المتغيرين معا علي المتغير المستقل وهو كفاءة الاستثمارات مما يطرح العديد من التساؤلات حول ممارسات ادارة الأرباح في الشركات المصرية وتجاهل الإدارة إلي أهمية جودة التقارير المالية. وقد اتضح تأثير هذه العلاقة بشكل أكبر في تلك الشركات التي كانت تستثمر أكثر من اللازم مقارنة بنظيراتها التي تستثمر بقدر أقل من الازم علي الرغم من أن عدد الشركات التي تستثمر اقل من اللازم يفوق كثيرا نظيراتها من تلك الشركات التي تستثمر أكثر من اللازم في العينة محل الدراسة ولكن للمجموعة الأخيرة تأثير أقوى علي النتائج وقد يرجع ذلك إلي أنه طالما توافرت للإدارة امكانية التمويل الذاتي وكان لديها القدر الكافي من المرونة في توفير السيولة الكافية لتمويل الاستثمارات، تجاهلت الإدارة أهمية تحسين جودة المعلومات في التقارير المالية. ويعتبر هذا البحث امتدادا للبحوث السابقة في مجال تكاليف الوكالة والقيود المالية المتعلقة بها وتأثيرها علي كفاءة الاستثمارات مع دراسة أثر جودة معلومات التقارير المالية علي تلك العلاقة.

**الكلمات المفتاحية:** جودة معلومات التقارير المالية، القيود المالية، كفاءة الاستثمارات، الرفع

المالي، الاستثمار أكثر من اللازم، الإستثمار بأقل من اللازم، التحفظ

## Introduction

Investment is one of the most important determinants of growth for firms and the economy as a whole. Projects made by different companies constitute investments which provide job opportunities and in turn greatly contribute to the welfare of the country. In addition, firms can contribute in capital market development through capital investments which benefits the economy as a whole (Rad et al 2016). However, firms should not only be concerned with the quantity of investment projects but also with the quality of investment represented by investment efficiency (Rad et al 2016). Biddle et al (2009) defined the firm as investing efficiently if it undertakes projects with positive net present value (NPV) under the scenario of no market frictions such as adverse selection or agency costs for better future growth and expansion. In contrast, under-investment means passing up investment opportunities that would have positive net present value in the absence of adverse selection.

Right investment decisions needs adequate information, especially financial information that needs to be relevant and with high quality (Rad et al 2016). Facilitating the efficient allocation of capital in the economy is one of the most important objectives of financial reporting (Li and Wang 2010). An important aspect of this role is to improve firms' investment decisions. Studies such as Biddle et al., 2009 and Chen, Hope, Li, & Wang, 2011) provided evidence that higher quality financial reporting improves investment efficiency on the basis that increased financial reporting quality may reduce information asymmetry between firms and capital providers, and/or decrease agency costs (Healy and Palepu 2001) by reducing managerial opportunities for expropriating shareholders' wealth. One objective of financial reporting information is to facilitate the efficient allocation of capital in the economy. Bushman and Smith (2001) argued in this respect that the governance role of financial accounting information can also affect firm's investments and performance by facilitating the monitoring of management's decisions and hence help in improving the allocation of firm's resources. Even in the absence of agency problems, Lambert et al (2007) show that if accounting quality leads to decreases in cost of capital, this will change the investments viewed as optimal by the firm.

**Research Problem:** Although several recent empirical papers supported the existence of a relationship between the quality of financial reporting and investment efficiency (Biddle and Hilary, 2006; Hope and Thomas, 2008; McNichols and Stubben, 2008; Biddle et al., 2009; Francis et al., 2009), this evidence, however, has been mostly limited to large, publicly traded firms in the USA (Li and Wang 2010). In addition, most of these studies had focused on the direct effect of financial reporting quality on investment efficiency; however, there is little research that examines the interactive effect between financial reporting quality and financial constraints on the efficiency of investment taking financial constraints as the main independent variable of the study given the unique nature of capital markets in emerging economies as Egypt regarding its inefficiencies and high earnings management practices. Accordingly, this study aims to answer the following question?

Can the improvement in financial reporting quality mitigate the adverse effects resulting from the financial constraints specific to the firm and hence help in improving the firm's investment efficiency?

**Objective of the study:** The main objective of this study is to investigate the moderating role of financial reporting quality to mitigate the negative effect of financial constraints whether resulting from cash flows and leverage on the firm's investment efficiency in order to examine the usefulness of financial information to firms in context of emerging markets. Past studies show that most of firms in emerging markets suffer high agency problems and low demand for an improvement in financial reporting quality (e.g. Claessens & Fan, 2002; Ball et al., 2003). This, theoretically, determines the association between financial information quality and investment efficiency which needs to be empirically examined in these markets. This study contributes to prior literature in financial accounting by evaluating the mitigating role of financial information quality on investment efficiency using observations from listed firms in Egypt. The primary reason for choosing Egypt is that the country is one of the main business and financial centers in the Middle East. In addition to the economic developments that happened in the recent years, little attention

has been paid to understanding the evolutionary development process of these countries' financial reporting quality.

**Research Plan:** The study is organized as follows. It starts by a literature review that provides an overview of those studies discussing the definition of financial reporting quality and investment efficiency and inefficiency and how management's investment's decisions are adversely affected by financial constraints. This section ends by the formulation of research hypotheses. The next section explains the empirical study to explore the research hypotheses; it provides information about the sample, variables definition, measurement, the statistical model used to study the research hypotheses and the statistical analysis and discussion of the results.

## Literature Review and Hypotheses development

There are several definitions for financial reporting quality, as it can be defined as the precision with which financial reporting presents information about the firm's operations, especially cash flows expected to be provided by the firm that could be of value to equity investors (Biddle et al 2009). This definition is consistent with the Financial Accounting Standards Board Statement of Financial Accounting Concepts No. 1 (1978), which states that one objective of financial reporting is to inform present and potential investors in making rational investment decisions and in assessing the expected firm cash flows (Biddle et al 2009 and Jaballah et al 2014). King 1996, Chaplinsky et al 2010; Jaballah et al 2016 also defined disclosure quality as the degree of self interested bias in the disclosure. Hopkins (1996) also defined the quality of reports by the extent of transparency in information provided by these reports.

An efficient investment policy can be defined as a policy in which all positive net present value (NPV) investments projects are identified, funded and implemented, while all negative NPV projects are rejected (Chen et al 2017). According to the investment opportunities theory, managers are able to maximize the market value of the firm by undertaking positive net present value projects (Miller & Modigliani, 1958). Accordingly, firms invest efficiently by pursuing capital investment opportunities when the marginal  $q > 1$  (Chen et al 2017).

However, information asymmetries between managers and providers of capital and agency costs may result in deviations from optimal investment levels, in the form of overinvestment or underinvestment.

This phenomenon is explained by the classical agency theory which argues that managers have superior information about the expected profitability and timing of the payoff of projects and investments undertaken by the firm's (Lambert 2001) compared to outside shareholders. Accordingly, this might result in adverse selection problems through which managers can use this information to make investments or take operating decisions that are against the interests of capital providers (Jensen and Meckling 1976). The agency model predicts that while managers may be well informed about the existence of profitable investment opportunities with positive net present values, they might not always be motivated to grasp them because of (1) moral hazard problems that accuse management of the expropriation of firm cash flows, being short sighted biases and inefficient selection of investment opportunities (Jensen and Meckling 1976 and Jensen 1986); and (2) lack of available funding derived from high cost of external financing. This high cost of equity capital cannot be only attributed to the firm capital structure, which might cause the overall return to investment to deviate from the return accrued to shareholders; but it can be also at least partly attributable to investors perceiving firm's accounting information to be of low quality, which increases information asymmetries and complicates the estimation of firm's future cash flows.

This conflict also extends between actual and potential shareholders due to information asymmetry between both of the regarding investment projects and existing assets, which might cause the company to reject projects with current positive net value due to the presence of this asymmetry concerning the outlook for firm's future investment that give them the feeling that that they are losing from funding these projects compared to not investing at all. (Lyandres and Zhdanov, 2005).

Accordingly, Healy and Palepu (2001) argued in this respect that increasing disclosure and the quality of financial reports can mitigate information asymmetry and agency costs. Even if the agency problem

is not significant in the firm, increasing the quality of financial reports may reduce the cost of capital which will have an effect over the investments that managers view as profitable (Lambert et al 2007). This derives us to a central question in accounting research which is whether financial accounting information can affect the real value generating process of the firm, and if so, how (Lara et al 2009).

Bushman and Smith (2001) and Lambert et al. (2007) suggest that financial accounting information can increase firm value by improving firm investment decisions. Several studies provided direct evidence on the casual relationship between financial reporting quality and efficiency of investments. For example, studies such as Leuz and Verecchia (2000) and Bushman and Smith (2001) argued that higher quality financial reporting can improve investment efficiency by limiting information asymmetries that cause economic frictions such as moral hazard and adverse selection problems. They attributed their findings to the fact that financial reporting information can be used by shareholders of the firm to monitor the effect of the decisions taken by management on the firm. If the quality of this information is increased, shareholders will be much more able to monitor managers' decisions and by turn will reduce moral hazard and investment efficiency (Biddle et al 2009).

Taking the same research avenue, Biddle and Hilary (2006), McNichols and Stubben (2008), Biddle et al. (2008) and Hope and Thomas (2008) asserted that firms with higher quality accounting information and better levels of disclosure are more able to invest in more efficient projects. Biddle and Hilary (2006) for example accepted their study hypothesis that higher quality accounting enhances investment efficiency by reducing information asymmetry between managers and outside suppliers of capital. Verdi (2006) showed when examining the relationship between financial reporting quality and investment efficiency, that there is a strong relationship between financial reporting quality and under-investment in firms with financing constraints and dispersed ownership. However, he found mixed evidence for the effect on under-investment for firms facing financing constraints. He also shows that the relation is stronger for firms with low analyst following and high bid-ask spread. Biddle et al. (2008) find that better quality earnings as measured by accruals quality are associated to

lower over- and under-investment. Taken in another way, McNichols and Stubben (2008) showed that firms that manipulate their reported earnings make suboptimal investment decisions during the misreporting period. This agrees with (Levine 1997) study that reducing information asymmetry through high-quality information disclosure will lower costs of financing, reduce market inefficiency and facilitate financing especially for long-term high-return projects (Levine, 1997).

Cheng et. al (2013) provided more direct evidence on the causal relationship between the quality of financial reporting and investment efficiency through examining the investment behavior of sampled firms that disclose the weaknesses of their internal control system in compliance with Sarbanes Oxley Act. They found that prior to disclosure of such weaknesses, these firms underinvest (overinvest) when they are financially constrained (unconstrained). However, after disclosure, the investment efficiency of the sampled firms improved significantly. Lara et al (2009) found a negative association between conditional conservatism and measures of over and underinvestment in addition to a positive association between conservatism as a measure of financial reporting quality and firm's future profitability. Their results added to the growing stream of financial accounting literature suggesting that eliminating conservatism from accounting regulatory frameworks might lead to undesirable economic consequences. Gormiz and Juan (2014) examined the role of financial reporting quality and debt maturity in investment efficiency. They provided evidence that financial reporting quality can mitigate the investment problem and that the both financial reporting quality and debt maturity can substitute each other to a certain extent in enhancing firm's investment efficiency, that is firms making more use of short-term debts, suffer lower financial reporting quality effect on investment efficiency and in contrast, firms with less use of short term loans enjoy a stronger effect of financial reporting quality on investment efficiency.

To sum up, the study hypothesize that high quality financial reporting increases investment efficiency both by lowering managerial selection of ex ante negative NPV projects and by enhancing the process of early abandonment of ex post poorly performing projects (thereby reducing over investment). Additionally, improving the quality of financial reports is expected to increase investment efficiency by facili-



tating firm's access to external financing and lowering the cost of raising funds for new investments, which facilitates investment in positive NPV projects (thereby reducing underinvestment). My main hypothesis predicts that high-financial reporting quality is negatively associated with both under- and overinvestment of the listed corporations which in turn improves firm's investment's efficiency.

***H1: For firms prone to inefficient investments, the improvement of the accounting information quality can weaken the tendency of under-investment or over-investment caused by the financial constrains or excess cash flow.***

***H1a: For firms prone to under-investment, the improvement of the accounting information quality can weak the tendency of the firm to under invest caused by the financial constrains or free cash flow.***

***H1b: For firms prone to over-investment, the improvement of the accounting information quality can weak the tendency of the firm to over invest caused by the financial constrains or free cash flow.***

## **Research Methodology**

### **Population and Sample Data**

The study examines public Companies listed in the Egyptian Stock Exchange during the period from 2013 to 2016 from all sectors of the economy according to the capital Market Authority Classification which reached a total of 254 firms for the two years 2014 and 2015 as each firm year observations needs a total of three years to be included in the model. Accordingly, any firm with missing data for any specific year was excluded from the sample. Banks and other financial institutions were not included in the sample due to comparability issues due to differences in asset and capital structure; variables included in the models are not appropriate for banks, finance companies and other similar companies (Gunathilaka 2014). Firms with values reported in financial statements in dollar amounts were excluded to avoid confusion with share prices reported in Egyptian pounds to end up with a total of 234 firm year observations. The data used were extracted from the financial statements of the sampled firms.

**Table (1): Description of the firms used in the sample by sectors**

| <b>Sector Name</b>                           | <b>No. of Co.</b> |
|--|-------------------|
| Chemicals                                    | 12                |
| Travel and Leisure                           | 18                |
| Personal and Household Products              | 14                |
| Food and Beverages                           | 44                |
| Health Care and pharmaceuticals              | 28                |
| Industrial Goods and Services and Automobile | 29                |
| Construction and Materials Sector            | 36                |
| Real Estate sector                           | 53                |
| <b>Total</b>                                 | <b>234</b>        |

## **7.2. Description and Measurement of Variables used in the study:**

This section is concerned with describing the variables used in the study; independent variable, dependent variable and control variables

### **Variables of the study**

**Investment Efficiency:** This is the dependent variable of this study. It is measured as deviations from expected investment using a model that predicts investment as a function of growth opportunities. The firm is considered to be investing efficiently if it is involved in investments with positive net present values. Therefore, both overinvestment (positive deviations from expected investment) and underinvestment (negative deviations from expected investment) are considered inefficient investments. (Biddle et al 2009, Chen et al 2011, Rad et al 2014.)

Accordingly, the following model is used to estimate expected investment as a function of revenue growth. The model is described as follow:

$$Invest_{i,t+1} = \alpha_{i,t} + \beta_1 Rev Growth_{i,t} + \epsilon_{I,t+1} \quad (1)$$

**Where:**

**Invest** = total investment, calculated as the sum of fixed assets expenditure, capital expenditures less cash receipts from sale of fixed assets multiplied by 100 and scaled by lagged total assets (Ren 2016) ;

**Rev Growth** = revenue growth and defined as percentage change in revenue from year  $t - 1$  to  $t$ .

The negative (positive) residuals from the regression model (1) indicate under investment (over investment). If investment in the future year is greater than sales growth, the residual from the above model will be positive and it means that the firm is overinvesting. In contrast, if future year investment is less than the sales rate, the residuals in the model will be negative indicating that the firm is underinvesting (Tariverdi and Keivanfar 2017). In the analyses, the absolute value of residuals is used as a proxy for investment efficiency. I then multiplied the absolute values of residuals by  $-1$ . Thus, higher values of residuals represent higher investment efficiency (Verdi, 2006; Biddle et al., 2009; Chen et al., 2011).

**Financial Constraints:** This is the independent variable of the study (Tariverdi and Keivanfar 2017) measured by a composite score constructed from two variables specific to the firm and encompasses the factors that could constrain the firm or increasingly affect its tendency to overinvest or under invest. The first variable is the firm's cash balance computed by dividing the firm's ending cash balance by total assets. This variable is selected based on the justification that firms with no cash balance are more likely to be financially constrained and are more subject to under investment and firms with large cash balance are more subject to agency problems and they have higher probabilities to over invest (Biddle et al 2009). The other variable used as indicator of financial constraints is leverage which is based on the argument that highly leveraged firms have more limited access to funds that will force them to under invest and low leveraged firms can generate funds easier which can motivate them to overinvest. To compute this measure, firms are first ranked into deciles based on their cash balance and their leverage (leverage is multiplied first by  $-1$  before ranking to get a negative capital structure to be consistent with cash) so that increasing values of negative capital structure are associated with settings in which the firm is likely to over-invest (Lara et al 2016) . Finally, A principal component analysis and factor analysis is performed where by a composite rank variable is created that combines the constraining effect resulting from the two variables (cash and leverage). A composite measure with an Eigen value of 1.201 is created denoted "FC", which is the average of the two ranked values

of the two variables (Cash and Negative capital structure) that ranges from 0 to 1 to facilitate the interpretation of the coefficients of regression where 0 (or low realizations) indicate under-investment whereas 1 (or high realizations) indicate over-investment.

**Table 2: Extraction Method: Principal Component Analysis**

| Component                  | Initial Eigenvalues |               |              | Extraction Sums of Squared Loadings |               |              |
|----------------------------|---------------------|---------------|--------------|-------------------------------------|---------------|--------------|
|                            | Total               | % of Variance | Cumulative % | Total                               | % of Variance | Cumulative % |
| Cash                       | 1.201               | 60.045        | 60.045       | 1.201                               | 60.045        | 60.045       |
| Negative capital structure | .799                | 39.955        | 100.000      |                                     |               |              |

**Financial Reporting Information Quality:** This is the moderating variable of the study that interacts with the independent variable (financial constraints) to produce an interactive variable (financial constraints\*financial information quality).

Financial reporting information quality is measured by several proxies in order to be able to generalize the findings of the study and reduce measurement errors as there is no single accepted measure for this variable (Dechow, Ge, & Schrand, 2010; Chen et al., 2011). Specifically, I use (1) discretionary accruals measure suggested by Ball and Shivakumar (2006); (2) the revenue based discretionary measure suggested by McNichols and Stubben (2008); (3) Kothari et al (2005) matched performance measure as applied by Boone et al (2012); (4) Dechow Dichev measure applied by (Biddle et al 2016) and (4) a summary statistic formed by aggregating several measures (Rad et al (2016) and Xia et al (2014)

**First Measure of Financial information Quality (INFQ1):**

The first measurement is discretionary accruals is developed by Ball and Shivakumar (2006).

$$TACCR_{it} = \alpha_{i,t} + \beta_1 (\Delta Rev - \Delta Rec) + \beta_2 PPE_{it} + \beta_3 (CF_{it}) + \beta_4 DCF_{it} + \beta_5 CF * DCF_{it} + \epsilon_{it} \tag{2}$$

**where:**

*TACCR* = Total Accruals equal to earnings before extraordinary items minus cash flow from operation scaled by lagged total assets;

$\Delta Rev$  = change in revenues from year  $t$  to  $t-1$  scaled by lagged total assets;

$\Delta Rec$  = change in account receivable from year  $t$  to  $t-1$  scaled by lagged total assets;

$PPE$  = net property, plant and equipment scaled by lagged total assets;

$CF$  = cash flow from operations scaled by lagged total assets; and

$DCF$  = binary variable equal to 1 if cash flow from operations is negative and 0 otherwise.

The residuals ( $\epsilon_{it}$ ) from the regression equation (2) are discretionary accruals. Higher discretionary accruals indicate lower quality of financial reporting of listed companies (Ren 2016). The absolute values of discretionary accruals is obtained and then multiplied by  $-1$  as a proxy for financial information quality (hereafter INFQ (1). Therefore, higher values of INFQ (1) represent higher financial information quality.

## Second information quality Measure (INFQ2)

The second measure of information quality is based on discretionary revenues that have been used by McNichols and Stubben (2008). As presented by the following equation:

$$\Delta Rec_{it} = \alpha_{i,t} + \beta_1 \Delta Rev_{it} + \epsilon_{it} \quad (3)$$

**where:**

$\Delta Rec$  = the annual change in account receivable scaled by lagged total assets; and

$\Delta Rev$  = the annual change in revenues scaled by lagged total assets.

Discretionary revenues are the residuals from equation (3), which is estimated separately for each firm.

As done in computing INFQ1, the absolute values of discretionary revenues is calculated and then multiplied by  $-1$  as a proxy for financial information quality (INFQ (2). Consequently, higher values of INFQ (2) represent higher financial information quality.

## Third measure of Information Quality (INFQ3)

To calculate the third measurement, performance matched Kothari et al. (2005) measure is used as implemented by Boone et al. (2012). Specifically, model (4) is estimated for each firm as follows:

$$TACCR_{i,t} = \alpha_{i,t} + \beta_1 (\Delta Rev - \Delta Rec) + \beta_2 PPE_{i,t} + \beta_3 ROA_{i,t-1} + \beta_4 DCF_{i,t} + \epsilon_{it} \quad (4)$$

**where:**

$TACCR_{i,t}$  = total accruals equal to earnings before extraordinary items minus cash flow from operation scaled by lagged total assets;

$\Delta Rev$  = change in revenues from year t to t-1 scaled by lagged total assets;

$\Delta Rec$  = change in account receivable from year t to t-1 scaled by lagged total assets;

$PPE_{i,t}$  = net property, plant and equipment scaled by lagged total assets; and

$ROA_{i,t-1}$  = return on assets for the year t-1.

As done in the previous two measures (equations 2 and 3), the residuals from the regression Equation (4) represents discretionary accruals. To compute the proxy for financial reporting quality, the absolute values of discretionary accruals is calculated, and then multiplied by  $-1$  to obtain the third proxy (hereafter INFQ (3a). Therefore, higher values of INFQ (3a) represent higher financial information quality.

Biddle et al (2009) used accruals to measure the quality of financial reporting, they used the discretionary accruals (equation 2) and discretionary revenues (equation 3) but instead of using a performance matched Kothari measure, they used Dechow and Dichev measure which has been extensively used in prior literature based on the idea that accruals improve the information power of earnings by smoothing out any seasonal fluctuations in cash flows

$$TA_{i,t} = \alpha_{i,t} + \beta_1 CF_{i,t-1} + \beta_2 CF_{i,t} + \beta_3 CF_{i,t+1} + \beta_4 \Delta Rev_{it} + \beta_5 PPE_{i,t} + \epsilon_{i,t} \quad (5)$$

**Where**

$CF_{i,t-1}$  : Are cash flows for the year t-1 scaled by lagged total assets

$CF_{i,t}$  : Are cash flows for the year t scaled by lagged total assets

$CF_{i,t+1}$  : Are cash flows for the year t+1 scaled by lagged total assets

$\Delta Rev$  : the annual change in revenues from t-1 to t scaled by lagged total assets.

$PPE_{i,t}$ : net property, plant and equipment scaled by lagged total assets

The residuals from Equation (5) represent the estimation errors in the current accruals that are not associated with operating cash flows and that cannot be explained by the change in revenue and the level of PPE. As in the previous two models, the absolute values of discretionary accruals obtained from equation (5) is multiplied by  $-1$  as a proxy for financial information quality (hereafter INFQ (3b))

### Fourth measure of Information Quality (INFQ4)

To alleviate probable measurement error in the individual financial information quality proxies and to provide evidence based on an overall financial information quality metrics, the three previously mentioned measures are combined into one aggregate score. All proxies are normalized first, and then the average of the three measures is calculated as a summary financial information quality statistic referred to as INFQ 4a, which is the average of INFQ1, 2 and 3a (Rad et al 2016) and INFQ4b, which is the average of INFQ 1, 2 and 3b (Xia et al (2016) model for measuring the independent variable (information quality)

### Model Specification

To test the first hypothesis (H1) on whether financial information quality in year  $t$  can help in mitigating the effect that financial constraints in year  $t$  can have on the efficiency of investment in year  $t + 1$ , the following model is used to estimate the least square regression (Lara et al 2009 and Ren 2016).

$$Inv\ Eff_{i,t+1} = \alpha_{i,t} + \beta_1 FC_{it} + \beta_2 INFQ_{it} * FC_{it} + \beta_3 INFQ_{it} + \beta_4 Control\ Variables_{it} + \epsilon_{it} \quad (6)$$

where,

**InvEff<sub>i,t+1</sub>** Is a measure of investment inefficiency measured by the absolute value of residuals obtained from regression Model (1) above and then multiplied by  $-1$  so that increasing absolute residual values means higher investment efficiency (Biddle et al., 2009; Chen et al., 2011).

**FC<sub>it</sub>**: Is a measure of financial constraints affecting the firm constituted from the firm's cash balance and leverage after being multiplied by  $-1$  to obtain the firm's negative capital structure (Biddle et al 2009 and Lara et al 2016)

**INFQ<sub>it</sub>** is financial information quality measured by one of the previously mentioned financial quality measures: INFQ (1) introduced by Ball and Shivakumar (2006), INFQ (2) developed by McNichols and Stubben (2008), INFQ (3a) developed by Kothari et al. (2005), INFQ (3b) developed by Dechow-Dichev and INFQ (4a) which is the average of standardized measures INFQ 1, 2 and 3a (Rad et al 2016) and INFQ (4b) which is developed by obtaining the average of INFQ 1, 2 and 3b (Xia et al 2014). To the extent that higher level of financial information quality enhances the level of investment efficiency,  $\beta_3$  is expected to be positive.

**FC<sub>it</sub> \* INFQ<sub>it</sub>**: This variable measures the interactive effect between the independent variable which is information quality and the composite measure that captures the firm's liquidity and leverage effects. (Lara et al 2016). To the extent that the improvement in financial reporting quality should weaken the firm's tendency to overinvest or underinvest,  $\beta_1$  and  $\beta_2$  are expected to be significantly positive for the study hypothesis to be accepted (Biddle et al 2009 and Ren 2016)

### Control variables

**Size of the firm:** Is measured by the natural logarithm of total assets. The larger the size of the firm, the lower the value of the deviations from optimal investment levels and accordingly, a direct effect is expected on the efficiency of investment (Biddle et al 2009, Mohammadi 2017)

**Firm age:** Is measured by natural log of firm years (Chen et al 2017). Firms older in age are expected to experience less deviations from optimal levels of investment (direct association is expected) (Biddle et al 2009)

**ROA:** Is computed by dividing net income for the year by total assets (Biddle et al 2009, Rad et al 2016, Mohammadi 2017) . It is a measure for assessing the financial health of the company and is highly considered by investors when taking investment decisions. Higher profits realized by the company attract more investors as the return on their invested funds will be greater and this would give the company the opportunity to place its funds in more efficient projects. Accordingly, a positive effect is expected (Wiyadi et al 2015)



**AQ** is included, which could have an effect on investment efficiency. This study predicts that Big4 has a positive association with investment efficiency. Big4 is a binary variable that takes the value 1 if the company is audited by at least one Big4 audit firm and 0 otherwise (Biddle et al 2009, Rad et al 2016)

**MTB:** This variable is used to proxy for the firm's growth opportunities (Chen et al 2017). It is computed by dividing the market value of equity which equals the number of common shares outstanding on the financial statement date multiplied by the market value per share on the same date by the book value of equity at end of the year (Biddle et al 2009, Rad et al 2016)

### Empirical Results:

To investigate study hypotheses, a descriptive statistics was first performed on variables of the study as shown in table (3)

**Table (3) Descriptive statistics of variables used in the study**

|                   | OBS | Mean    | Median  | Mode                | Std. Deviation | Skewness | Kurtosis | Minimum | Maximum |
|-------------------|-----|---------|---------|---------------------|----------------|----------|----------|---------|---------|
| FC                | 234 | .4893   | .5048   | .08 <sup>a</sup>    | .24919         | -.057-   | -.884-   | .00     | 1.00    |
| FC.INFQ2          | 234 | -.0530- | -.0211- | -.85 <sup>-a</sup>  | .12049         | -4.486-  | 21.532   | -.85-   | .00     |
| FC. INFQ1         | 233 | -.0504- | -.0213- | -1.63 <sup>-a</sup> | .13229         | -8.510-  | 90.697   | -1.63-  | .00     |
| FC. INFQ3a        | 233 | -.0543- | -.0207- | -1.64 <sup>-a</sup> | .13676         | -7.849-  | 80.453   | -1.64-  | .00     |
| FC. INFQ3b        | 229 | -.0490- | -.0219- | -.01 <sup>-a</sup>  | .13171         | -8.658-  | 93.097   | -1.62-  | .00     |
| FC.INFQ4a         | 234 | -.0524- | -.0245- | -1.09 <sup>-a</sup> | .10043         | -6.043-  | 51.366   | -1.09-  | .00     |
| FC. INFQ4b        | 234 | -.0505- | -.0229- | -1.08 <sup>-a</sup> | .09963         | -6.300-  | 53.933   | -1.08-  | .00     |
| Inv Eff           | 234 | -.0483- | -.0320- | -.04 <sup>-a</sup>  | .08967         | -6.558-  | 53.350   | -.94-   | .00     |
| INFQ1             | 233 | -.0956- | -.0546- | -2.14 <sup>-a</sup> | .20798         | -7.039-  | 56.784   | -2.14-  | .00     |
| INFQ2             | 234 | -.1048- | -.0482- | -1.29 <sup>-a</sup> | .20369         | -3.857-  | 14.957   | -1.29-  | .00     |
| INFQ3a            | 233 | -.0999- | -.0451- | -2.15 <sup>-a</sup> | .21127         | -6.566-  | 52.366   | -2.15-  | .00     |
| AINFQ3b           | 229 | -.0943- | -.0511- | -.19 <sup>-a</sup>  | .20730         | -7.081-  | 57.563   | -2.13-  | .00     |
| INFQ4a            | 234 | -.0999- | -.0540- | -1.43 <sup>-a</sup> | .15640         | -5.124-  | 33.144   | -1.43-  | .00     |
| INFQ4b            | 234 | -.0977- | -.0537- | -1.42 <sup>-a</sup> | .15784         | -5.306-  | 34.197   | -1.42-  | .00     |
| Size of the firm  | 234 | 20.0415 | 20.0111 | 17.74 <sup>a</sup>  | 1.53336        | .293     | -.348-   | 16.75   | 23.78   |
| Age               | 234 | 3.3264  | 3.3673  | 3.09                | .83007         | .604     | 8.429    | .00     | 7.61    |
| ROA               | 233 | .0708   | .0384   | .01 <sup>a</sup>    | .23406         | 5.509    | 41.541   | -.48-   | 2.16    |
| Audit quality     | 234 | .3761   | .0000   | .00                 | .48544         | .515     | -1.750-  | .00     | 1.00    |
| MTB               | 231 | 1.3485  | .9307   | .00                 | 2.66224        | -.094-   | 14.600   | -13.74- | 14.52   |
| Cash/Total Assets | 234 | .8129   | .0638   | .00 <sup>a</sup>    | 10.28978       | 15.287   | 233.800  | .00     | 157.51  |
| Leverage          | 230 | 2.3367  | .6665   | .25 <sup>a</sup>    | 14.08965       | 12.610   | 169.865  | -3.85-  | 198.73  |

As previously explained, the value of the composite score referring to financial constraint ranges between 0 and 1 with a mean (median) of 0.4893 (0.5048). As for the financial reporting quality proxies (INFC<sub>i,t</sub>) calculated as residuals from models 2,3,and 4, the mean (median) values are nearly close to each other ranging from -0.0943 to -0.1048. With respect to the interactive variable FC<sub>it</sub>\* INFQ<sub>it</sub> mean values are also taking values that are close to each other for all financial reporting proxies. The mean value of the variable investment efficiency is calculated from by obtaining the absolute value of residuals from model (1) after being multiplied by -1is -0.0483.

**Table (4) Correlation Matrix between study variables**

|           | Size  | Age   | ROA   | AQ    | MTB   | INFC 1 | INFC 2 | INFC 3a | INFC 3b | INFC 4a | INFC 4b | InvEff | FC    | FC*INF Q2 | FC*INF Q1 | FC*IN FQ3a | FC*IN FQ3b | FC*IN FQ4a | FC*IN FQ4b |  |
|-----------|-------|-------|-------|-------|-------|--------|--------|---------|---------|---------|---------|--------|-------|-----------|-----------|------------|------------|------------|------------|--|
| Size      | 1     |       |       |       |       |        |        |         |         |         |         |        |       |           |           |            |            |            |            |  |
| Age       | .122  | 1     |       |       |       |        |        |         |         |         |         |        |       |           |           |            |            |            |            |  |
| ROA       | .163  | .043  | 1     |       |       |        |        |         |         |         |         |        |       |           |           |            |            |            |            |  |
| AQ        | .403  | -.036 | .159  | 1     |       |        |        |         |         |         |         |        |       |           |           |            |            |            |            |  |
| MTB       | .108  | -.065 | .172  | .070  | 1     |        |        |         |         |         |         |        |       |           |           |            |            |            |            |  |
| INFC1     | -.041 | -.025 | .777  | .153  | -.008 | 1      |        |         |         |         |         |        |       |           |           |            |            |            |            |  |
| INFC2     | -.117 | .019  | .006  | -.028 | -.072 | .063   | 1      |         |         |         |         |        |       |           |           |            |            |            |            |  |
| INFC3a    | -.049 | .007  | .797  | .162  | -.062 | .940   | -.040  | 1       |         |         |         |        |       |           |           |            |            |            |            |  |
| INFC3b    | -.044 | -.010 | .777  | .181  | -.002 | .989   | -.093  | .940    | 1       |         |         |        |       |           |           |            |            |            |            |  |
| INFC4a    | -.090 | .000  | .699  | .151  | -.054 | .893   | .480   | .883    | .901    | 1       |         |        |       |           |           |            |            |            |            |  |
| INFC4b    | -.082 | -.008 | .675  | .152  | -.025 | .894   | .499   | .837    | .907    | .988    | 1       |        |       |           |           |            |            |            |            |  |
| InvEff    | .168  | .051  | .090  | -.096 | -.035 | -.027  | .239   | -.033   | .050    | .077    | .113    | 1      |       |           |           |            |            |            |            |  |
| FC        | .627  | .218  | .118  | .229  | .072  | -.067  | -.035  | -.101   | -.055   | -.091   | -.068   | .179   | 1     |           |           |            |            |            |            |  |
| FC*INFQ2  | -.312 | -.039 | -.025 | -.059 | -.092 | .073   | .848   | .052    | .064    | .424    | .425    | -.018  | -.274 | 1         |           |            |            |            |            |  |
| FC*INFQ1  | -.130 | -.023 | .766  | .169  | -.011 | .947   | .060   | .901    | .937    | .850    | .847    | -.057  | -.227 | -.100     | 1         |            |            |            |            |  |
| FC*INFQ3a | -.155 | -.010 | .760  | .167  | -.055 | .880   | .034   | .938    | .879    | .826    | .782    | -.066  | -.260 | -.085     | .947      | 1          |            |            |            |  |
| FC*INFQ3b | -.145 | -.019 | .770  | .187  | -.015 | .941   | .055   | .904    | .942    | .847    | .845    | -.045  | -.226 | -.090     | .995      | .952       | 1          |            |            |  |
| FC*INFQ4a | -.250 | -.031 | .690  | .171  | -.061 | .843   | .381   | .841    | .835    | .916    | .896    | -.062  | -.328 | -.483     | .908      | .903       | .904       | 1          |            |  |
| FC*INFQ4b | -.239 | -.035 | .684  | .175  | -.043 | .858   | .393   | .814    | .851    | .916    | .915    | -.051  | -.308 | -.488     | .917      | .868       | .913       | .990       | 1          |  |

\*. Correlation is significant at the 0.05 level (2-tailed).\*\*. Correlation is significant at the 0.01 level (2-tailed).

Concerning the correlation between the study variables, table (4) presents a correlation matrix between the study variables. Looking at the table reveals that each of the variables “financial constraints” and “financial reporting quality” is positively correlated with investment efficiency however, for the interactive variable “FC\*INFQ”, the results showed a negative correlation between this variable and the efficiency of investments. Results also show a significant positive correlation between the composite score “FC” and each of size (0.627) and age (0.218) of the firm while, the interactive variable “FC\*INFQ” showed a positive significant correlation between this variable and ROA and audit quality at 1% significance level while this variable showed a negative significant correlation with size at 5% significance

level. For the sample as a whole, Pearson correlation coefficients between variables are low, therefore no multicollinearity exist in the selected sample.

Concerning the regression analysis of Equation (6), tables (5) and (6) present results of regression analyses iterations of the study main model where each model is performed with one of the previously discussed financial reporting quality proxies

**Table (5): Results of regression analysis**

**INFQ 1:**  $TACCR_{it} = \alpha_{i,t} + \beta_1 (\Delta Rev - \Delta Rec) + \beta_2 PPE_{it} + \beta_3 (CF_{it}) + \beta_4 DCF_{it} + \beta_5 CF * DCF_{it} + \epsilon_i$

| R     | R <sup>2</sup> | Adjusted R <sup>2</sup> | Standard Error of Estimate | F change |
|-------|----------------|-------------------------|----------------------------|----------|
| 0.283 | 0.080          | 0.046                   | 0.08747                    | 0.014    |

**INFQ 2:**  $\Delta Rec_{it} = \alpha_{i,t} + \beta_1 \Delta Rev_{it} + \epsilon_{it}$

| R     | R <sup>2</sup> | Adjusted R <sup>2</sup> | Standard Error of Estimate | F change (Sig) |
|-------|----------------|-------------------------|----------------------------|----------------|
| 0.529 | 0.280          | 0.254                   | 0.07719                    | 38.645*        |

**INFQ 3a:**  $TACCR_{i,t} = \alpha_{i,t} + \beta_1 (\Delta Rev - \Delta Rec) + \beta_2 PPE_{i,t} + \beta_3 ROA_{i,t-1} + \beta_4 DCF_{i,t} + \epsilon_{it}$

| R     | R <sup>2</sup> | Adjusted R <sup>2</sup> | Standard Error of Estimate | F change |
|-------|----------------|-------------------------|----------------------------|----------|
| 0.282 | 0.079          | 0.046                   | 0.08749                    | 0.006    |

**INFQ3b:**  $TA_{i,t} = \alpha_{i,t} + \beta_1 CF_{i,t-1} + \beta_2 CF_{i,t} + \beta_3 CF_{i,t+1} + \beta_4 \Delta Rev_{it} + \beta_5 PPE_{i,t} + \epsilon_{i,t}$

| R     | R <sup>2</sup> | Adjusted R <sup>2</sup> | Standard Error of Estimate | F change |
|-------|----------------|-------------------------|----------------------------|----------|
| 0.370 | 0.137          | 0.105                   | 0.08544                    | 7.399*   |
| R     | R <sup>2</sup> | Adjusted R <sup>2</sup> | Standard Error of Estimate | F change |
| 0.411 | 0.169          | 0.139                   | 0.08 92                    | 13.804*  |
| R     | R <sup>2</sup> | Adjusted R <sup>2</sup> | Standard Error of Estimate | F change |
| 0.464 | 0.215          | 0.187                   | 0.08059                    | 22.995*  |

Predictors: Financial Reporting Quality, Financial Reporting Quality\*Financial Constraints, Financial constraints, Control variables

Independent Variable: Investment Efficiency

\*Results are significant at 5%

The following table shows results of the regression analysis where each cell shows the beta coefficients and t- statistics for each variable at 5% significance level

**Table (6): Results of regression analysis for all sampled firms**

| Predictors  | Financial Reporting Quality Proxy |                     |                     |                     |                     |                     |
|---|-----------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
|   | INFQ1                             | INFQ2               | INFQ3a              | INFQ3b              | INFQ4a              | INFQ4b              |
| <b>FC<sub>it</sub></b>  | 0.040<br>(1.139)                  | -0.028<br>(-1.008)  | 0.041<br>(1.196)    | 0.000<br>(-0.12)    | -0.026<br>(4.832)*  | -0.046<br>(-1.425)  |
| <b>Interaction<br/>INFQ<sub>it</sub>*FC<sub>it</sub></b>  | 0.019<br>(0.117)                  | -0.673<br>(-6.216)* | 0.011<br>(0.079)    | -0.418<br>(-2.720)* | -0.670<br>(-3.715)* | -0.848<br>(-4.795)* |
| <b>INFQ<sub>it</sub></b>  | 0.028<br>(0.279)                  | 0.422<br>(7.833)*   | 0.031<br>(0.327)    | 0.360<br>(3.698)*   | 0.521<br>(0.775)    | 0.624<br>(6.110)*   |
| <b>Size of the<br/>firm</b>   | 0.010<br>(1.812)                  | 0.008<br>(1.655)    | 0.010<br>(1.787)    | 0.008<br>1.529)     | 0.008<br>(1.70)     | 0.009<br>(1.855)    |
| <b>Age</b>  | -0.001<br>(0.071)                 | -0.002<br>(-0.252)  | -0.001<br>(-1.09)   | 0.001<br>(0.182)    | 0.001<br>(0.160)    | 0.002<br>(0.329)    |
| <b>ROA</b>  | 0.066<br>(1.566)                  | 0.033<br>(1.462)*   | 0.065<br>(1.513)    | 0.110<br>(2.659)*   | 0.090<br>(2.551)*   | 0.084<br>(2.490)*   |
| <b>AQ</b>   | -0.034<br>(-2.544)*               | -0.025<br>(-2.141)* | -0.034<br>(-2.544)* | -0.027<br>(-2.067)* | -0.027<br>(-2.125)* | -0.025<br>(-2.051)* |
| <b>MTB</b>  | -0.003<br>(-1.154)                | -0.002<br>(-0.905)  | -0.002<br>(-1.084)  | -0.003<br>(-1.478)  | -0.002<br>(-1.129)  | -0.003<br>(-1.324)  |
| <b>Constant</b>   | -0.245<br>(-2.460)*               | -0.163<br>(-1.871)  | 0.031<br>(-2.408)   | -0.198<br>(-1.947)  | -0.183<br>(-0.969)  | 0.185<br>(-2.056)   |
| <b>Adjusted R<sup>2</sup></b>   | 0.046                             | 0.254*              | 0.046               | 0.105*              | 0.139*              | 0.187*              |
| <b>F value</b>  | 2.385*                            | 10.752*             | 2.373*              | 4.283*              | 5.628*              | 7.578*              |
| <b>N</b>  | 223                               | 223                 | 223                 | 223                 | 223                 |                     |
| $Inv\ Eff_{i,t+1} = \alpha_{i,t} + \beta_1 FC_{it} + \beta_2 INFQ_{it} * FC_{it} + \beta_3 INFQ_{it} + Control\ Variables_{it} + \epsilon_{it}$ <p>Predictors: Financial Reporting Quality, Financial Reporting Quality*Financial Constraints, Financial constraints, Control variables<br/>Independent Variable: Investment Efficiency</p> |                                   |                     |                     |                     |                     |                     |

As shown from tables (5) and (6) presenting results of regression analysis of the effect of financial reporting quality as a moderating value between the effect of firm's financial constraints and investment efficiency showed that all the models were significant (p-value of the F- statistic was less than 5%). Financial constraints (FC) which is the main independent variable of the study did not show a significant effect whether positive or negative on investment efficiency for all the models.

Concerning the interaction between financial reporting quality and financial constraints which is represented by the variable “ $INFQ_{it} * FC_{it}$ ,” results of the regression analysis showed a negative and significant effect for most of the models (INFQ 2: t-stat= -6.216, p-value< 5%, INFQ3b: t-stat 2.720, p-value<5%, INFQ 4b: t-stat 6,110, p-value< 5%). Adding the beta coefficients of the variable  $FC_{it}$  and  $INFQ_{it} * FC_{it}$  for models that provided significant results showed a negative relationship between these two variables and the efficiency of investment (INFQ2;  $\beta_1 + \beta_2 = -0.673$ , INFQ3b;  $\beta_1 + \beta_2 = 0.418$ , INFQ4a;  $\beta_1 + \beta_2 = -0.696$  and INFQ 4b;  $\beta_1 + \beta_2 = -0.848$ ) which means that the improvement in financial reporting quality did not serve in reducing the firm’s tendency to inefficiently invest its funds in the presence of financial constraints which result in **accepting the null hypothesis and rejecting the alternate hypothesis (H1)** and this contradicts with the results of most the previous studies as Biddle and Hillary 2006 and McNichols and Stubben 2008. This could be explained by the fact that most of these studies were performed in more developed countries with more organized capital markets where capital is more efficiently allocated based on the quality of financial reports not on management incentives.

With respect to the effect of financial reporting quality being a control variable measured by the absolute values of accruals on investment efficiency; financial reporting quality proxies INFQ: 2, 3b and 4b) showed a significant positive effect on the efficiency of investment [(INFQ2: t-stat: 7.833, p-value<5%), (INFQ 3b: t-stat 0.360, p-value< 5%), and INFQ 4b which is the average of INFQ 1, 2 and 3b; INFQ3b: t-stat 6.110, p-value <5%). Concerning proxy INFQ 3a (Kothari matched performance measure) did not show a significant effect (t-stat: 0.279 >5%) and this is also reflected in proxy (INFQ4a) which represents the average of INFQ1, INFQ 2 and INFQ 3a (Rad 2016) which showed an insignificant effect on investment efficiency (t-stat: 0.775>5%).

Results also show that the coefficients of Firm size, age and MTB are insignificant for all financial reporting quality proxies ,the coefficient of ROA is significantly positive, indicating that the higher level of profitability of listed companies on their total assets, the more likely over-investment problem, which reflects the scale of investment is

heavily dependent on its internal cash flow and justifies the previous results that the increasing the profitability of those firms allows them to rely on their internal financing and invest in inefficient projects (Ren 2016). The coefficients of audit quality are statistically significant but unexpectedly negative coefficient with investment efficiency (negative beta coefficients for all financial reporting quality proxies) which can be attributed either to the relatively lower litigation risk environment for audit firms in emerging economies as Egypt compared to the higher litigious environments in developed countries as in the USA or due to the quality of the proxy used to measure audit quality which is the size of the audit firm as being Big 4 or non Big 4 compared to other measures of audit quality as the type of audit report, length of auditor client relationship, specialization of the audit firm, audit tenure ..etc (Piot and Janin 2005)

To test hypothesis H1a and H1b, residuals obtained from model (1), used as measures of firm-specific deviation from optimal levels of investment are classified into two groups as followed by Biddle et al. (2008) where firms with negative residuals are classified as underinvesting and firms with positive residuals are classified as over investing in order to better specify whether financial reporting quality is better able to limit over or underinvestment behaviors by management in the presence of the previously described financial constraints. Accordingly, from the total sample: 169 observations are classified as under investing firms and 64 observations belong to overinvesting firms (Ren 2016).

The following table (7) shows results of the regression analysis needed to test hypothesis H1a concerning the ability of financial reporting quality to affect the relationship between financial constraints specific to the firm and the efficiency of investment in order to weaken the firm's tendency to underinvest

**Table (7) Results of Regression Analysis for underinvesting firms**

| <b>Financial Reporting Quality Proxies</b>  |                    |                    |                    |                     |                    |                    |
|---|--------------------|--------------------|--------------------|---------------------|--------------------|--------------------|
| <b>Predictors</b>   | <b>INFQ1</b>       | <b>INFQ2</b>       | <b>INFQ3a</b>      | <b>INFQ3b</b>       | <b>INFQ4a</b>      | <b>INFQ4b</b>      |
| <b>FC</b>   | 0.220<br>(1.732)   | 0.044<br>(2.104)*  | 0.070<br>(3.153)*  | -0.228<br>(-1.407)  | 0.063<br>(2.547)*  | 0.046<br>(1.791)   |
| <b>INFQ<sub>it</sub></b>  | -1.508<br>(-0.302) | -0.012<br>(-0.125) | 0.257<br>(1.815)   | (-0.238)<br>(1.669) | 0.185<br>(1.006)   | 0.000<br>(0.524)   |
| <b>*FC<sub>it</sub></b>   | 0.409<br>(0.904)   | 0.005<br>(0.094)   | -0.116<br>(-1.140) | 0.238<br>(1.669)    | -0.052<br>(0.462)  | 0.063<br>(0.524)   |
| <b>Constant</b>   | 0.015<br>(0.219)   | -0.014<br>(-0.215) | -0.002<br>(-0.032) | 0.020<br>(0.293)    | -0.011<br>(-0.162) | 0.005<br>(0.085)   |
| <b>Size</b>   | -0.002<br>(-0.658) | -0.001<br>(-0.352) | -0.002<br>(-0.626) | -0.002<br>(-0.619)  | -0.002<br>(-0.450) | -0.001<br>(-0.412) |
| <b>Age</b>  | -0.007<br>(-1.379) | -0.006<br>(-1.313) | -0.008<br>(-1.579) | -0.006<br>(-1.261)  | -0.007<br>(-1.512) | -0.007<br>(-1.372) |
| <b>ROA</b>  | 0.079<br>(1.919)   | 0.024<br>(1.154)   | 0.086<br>(2.309)*  | 0.072<br>(1.717)    | 0.071<br>(2.044)*  | 0.058<br>(1.597)   |
| <b>AQ</b>   | 0.001<br>(0.532)   | 0.006<br>(0.615)   | 0.005<br>(0.545)   | 0.005<br>(1.199)    | 0.004<br>(0.423)   | 0.004<br>(0.463)   |
| <b>MTB</b>  | 0.045<br>(0.679)   | 0.002<br>(1.304)   | 0.001<br>(0.689)   | 0.001<br>(0.667)    | 0.001<br>(0.947)   | 0.001<br>(0.997)   |
| <b>No.</b>  | 169                | 169                | 169                | 169                 | 169                | 169                |
| <b>Adjusted R<sup>2</sup></b>   | 0.073              | 0.044              | 0.076              | 0.090               | 0.060              | 0.059              |
| <b>F-statistic</b>  | 2.624*             | 1.952              | 2.716*             | 3.015*              | 2.337*             | 2.319*             |
| $\text{Under Invest}_{i,t+1} = \alpha_{it} + \beta_1 \text{FC}_{it} + \beta_2 \text{INFQ}_{it} * \text{FC}_{it} + \beta_3 \text{INFQ}_{it} + \text{Control Variables}_{it} + \epsilon_{it}$ (Li and Wang 2010)<br>Predictors: Financial Reporting Quality, Financial Reporting Quality*Financial Constraints, Financial constraints, Control variables<br>Independent Variable: Investment Efficiency: <i>Absolute value of negative residuals from model (1) multiplied by -1</i><br>(*) Results are significant at 5% |                    |                    |                    |                     |                    |                    |

Looking at the above table, results showed for firms prone to under investment (low cash balances and high leverage), second model for INFQ 2 was insignificant and so is excluded from this analysis (F-statistic = 1.952, p-value > 5%) the independent variable “financial constraint” by itself showed a positive and significant effect for model (INFQ 3a and INFQ 4a) where the beta coefficients of the variable is positive and less than 5% ) **(REF)** and did not show such any significant effect by the other three models (INFQ1, INFQ3b and INFQ 4b) (REF). No significant effects are noticed for the interaction effect and the financial reporting quality proxies which could result in *partially accepting hypothesis H1a indicating that the presence of financial*

*constraints could adversely affect the efficiency of the firm's investments and increase the tendency of the firm to underinvest*

With respect to the positive residuals, the following table (8) shows results of the regression analysis needed to test hypothesis H1b concerning the ability of financial reporting quality to affect the relationship between financial constraints specific to the firm and the efficiency of investment in order to weaken the firm's tendency to overinvest.

**Table (8) Results of Regression Analysis for overinvesting firms**

|   | Financial Reporting Quality Proxies |                     |                     |                     |                     |                     |
|---|-------------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| Predictors  | INFQ1                               | INFQ2               | INFQ3a              | INFQ3b              | INFQ4a              | INFQ4b              |
| <b>FC</b>   | 0.076<br>(0.50)                     | -0.118<br>(-1.381)  | -0.021<br>(-0.151)  | -0.225<br>(-1.779)  | -0.246<br>(-2.332)* | -0.224<br>(-2.304)  |
| <b>INFQit<br/>*FCit</b>   | 1.500<br>(1.132)                    | -1.396<br>(-5.322)  | -0.085<br>(-0.097)  | -3.537<br>(-3.960)* | -3.957<br>(-5.662)* | -3.692<br>(-6.212)* |
| <b>INFQit</b>   | -0.738<br>(-1.268)                  | 0.750<br>(8.305)*   | -0.053<br>(0.134)   | 1.547<br>(4.041)*   | 1.819<br>(6.211)*   | 1.720<br>(7.091)*   |
| <b>Constant</b>   | -0.847<br>(-2.507)*                 | -0.377<br>(-1.616)  | -0.792<br>(-2.285)* | -0.379<br>(-1.216)  | -0.173<br>(-0.641)  | -0.193<br>(-0.768)  |
| <b>Size</b>   | 0.037<br>(1.962)                    | 0.022<br>(1.699)    | 0.037<br>(1.959)    | 0.025<br>(1.474)    | 0.016<br>(1.113)    | 0.016<br>(1.208)    |
| <b>Age</b>  | 0.016<br>(0.607)                    | 0.012<br>(-0.692)   | 0.009<br>(0.351)    | -0.017<br>(0.464)   | -0.027<br>(-1.329)  | -0.024<br>(-1.280)  |
| <b>ROA</b>  | -0.010<br>(-0.111)                  | 0.058<br>(0.138)    | 0.002<br>(0.017)    | 0.117<br>(1.418)    | 0.134<br>(2.109)    | 0.137<br>(2.343)*   |
| <b>AQ</b>   | -0.128<br>(-3.089)*                 | -0.075<br>(-2.198)* | -0.125<br>(-2.885)* | -0.075<br>(-1.947)  | -0.057<br>(-1.733)  | -0.061<br>(-1.985)  |
| <b>MTB</b>  | -0.006<br>(-0.668)                  | -0.005<br>(-0.821)  | -0.009<br>(-0.942)  | -0.013<br>(-1.566)  | -0.009<br>(-1.283)  | -0.009<br>(0.175)   |
| <b>No.</b>  | 64                                  | 64                  | 64                  | 64                  | 64                  | 64                  |
| <b>Adjusted R2</b>  | 0.172                               | 0.645*              | 0.152               | 0.348*              | 0.504*              | 0.561               |
| <b>F-statistic</b>  | 2.586*                              | 14.867*             | 2.365*              | 4.997*              | 8.735*              | 10.756*             |
| $Over\ Invest_{i,t+1} = \alpha_{i,t} + \beta_1 FC_{it} + \beta_2 INFQ_{it} * FC_{it} + \beta_3 INFQ_{it} + Control\ Variables_{it} + \epsilon_{it}$<br>(Li and Wang 2010)<br>Predictors: Financial Reporting Quality, Financial Reporting Quality*Financial Constraints, Financial constraints, Control variables<br>Independent Variable: Investment Efficiency: positive residuals from model (1) multiplied by -1<br>Results are significant at 5% level |                                     |                     |                     |                     |                     |                     |

Concerning firms that are more prone to overinvestment (large cash balances and low leverage), the beta coefficients of the independent variable “financial constraints” did not show a significant effect on the efficiency of investment by its own for most of the models (p-value>0) except for proxy INFQ4a that showed a negative significant effect meaning that the presence of large cash balances and low lever-



age could result in investment inefficiencies that confirms with prior studies as Verdi (2006). Regarding the effect of financial reporting quality on investment efficiency, most financial reporting quality proxies showed significant positive effect for this variable as shown by their beta coefficients (INFQ2:  $\beta_3 = 0.750$ , t-static=8.305. INFQ3b:  $\beta_3 = 1.547$ , t-statistic = 4.041. INFQ 4a  $\beta_3 = 1.819$ , t-statistic = 6.211. INFQ4b:  $\beta_3 = 1.720$  and t-statistic =7.091; p-value for all coefficients were significant and less than 5%). With respect to the interaction effect, results showed a negative significant effect for most of the models resulting in a total negative significant effect for the variables FC and FC\*INFQ on the dependent variable (efficiency of investment) [INFQ3b;  $\beta_1 + \beta_2 = -3.537$ , INFQ 4a:  $\beta_1 + \beta_2 = -4.203$ , INFQ4b;  $\beta_1 + \beta_2 = -6.212$ ; p-value < 0] **resulting in accepting the null hypothesis H0b and rejecting H1b providing that in the presence of high agency costs in the form of large cash balances and low leverage ratios, management's tendency to overinvest was not affected by the improvement in financial reporting information quality.** This could be attributed to management being satisfied with their internal cash and their flexibility to generate funds easily given the firm's ability to generate funds more easily given the firm's low levels of leverage which enables them to ignore improving the quality of their financial reports to help in more efficiently allocating the firm's capital. Even though the studies performed in emerging markets that studied the interactive effect between financial constraints and the quality of financial reporting used the magnitude of investments as an indicator of the efficiency of investments without and they did not depend on the residuals of their regression model as indicators of investment's inefficiency (Lara et al 2009, Wang et al 2015)

## Conclusions and Implications for future research

This paper is based on the perspective of firm's agency conflicts to examine the relationship between financial constraints on one hand measured by a composite score that encompasses the firm's cash balance scaled by total assets and the firm's negative capital structure and investment efficiency on the other. Results agreed with previous studies regarding the effect of financial reporting quality on investment efficiency and provided empirical evidence regarding the positive effect of financial reporting quality on the efficiency of investment. However, with respect to the effect of financial constraints and the in-

teractive effect of financial constraints and financial reporting quality on the efficiency of investments, results ran counter to the researcher's predictions as a significant negative effect was found between these two variables and the dependent variable which is the efficiency of investment which raises several questions concerning earnings management practices in Egyptian firms management being not concerned with the quality of financial reporting information. Such a relationship appeared to be more obvious for overinvesting firms compared to their underinvesting counterparts even though the number of underinvesting firms in the sample was much more greater than their overinvesting counterparts which emphasizes these results and shows that as long as management finds the internal funds available, they are not concerned with improving the quality of their financial reports.

One of the most important limitations of the study is the size of the sample which could be overcome by future research studies that could also replicate the study with other measures of agency costs and their related financial constraints. Future research studies could also use other proxies for the quality of financial reporting information quality that includes other dimensions as accounting conservatism, the value relevance of earnings and income smoothing practices, issues that need to be explored in our emerging economies.

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