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The Effect of Accounting Disclosure on Cost of Equity Capital in Emerging Capital Markets: The Egyptian Case

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Department of Economics

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Chapter 1: Introduction

1.1 An Overview

The main purpose of the study is to analyse the relationship between accounting disclosure and cost of equity capital in Egypt as a developing country with an emerging capital market. The focus on Egypt is motivated by the paucity of research analysing this relationship in emerging markets, especially that of the Middle East and Africa, despite the increased contribution of these markets in the world economy.

Economic theories suggest a negative association between accounting disclosure and cost of equity capital, based on the notion that improved disclosure is one of the most important ways of mitigating information asymmetry problems. The reduced information asymmetry could lead to a lower cost of equity capital through its impact on market liquidity, estimation risk, and misalignment risk. Despite the strong theoretical support for the negative association between the two variables, empirical research has not yet reached a conclusion on its existence. Several empirical studies have been conducted in different markets; however, they yield mixed results, leading to a lack of empirical evidence of such an association. Most previous studies analysed the effect of voluntary disclosure level on the cost of equity in developed markets, mainly the US. Recently, some studies examined the relationship in some emerging markets of Europe, South America, and Asia; however, little is known about this effect in the emerging markets of the Middle East and Africa.

Egypt is one of the Middle Eastern and African countries that play a significant role in this region, and it has been recognized as the leader of the Arab world and Africa (EIU, 1995). The business environment in Egypt has experienced radical economic, financial, legal, cultural, and political improvements, which have had a great influence on the accounting profession and the financial reporting regulations. Egypt has passed through different economic development stages that affected the development of the Egyptian stock market, as well as the Egyptian accounting

systems and practices. The Egyptian stock market dates back to 1883, when the Egyptian exchange was the first stock exchange to be established in the Middle East, and one of the first in the world. Listed companies in Egypt are required to follow the Egyptian accounting standards, or the international accounting standards in matters not covered by the national standards. As a developing country, Egypt is characterized by a weak regulatory environment, in terms of enforcement mechanisms and investor protection levels. This provides an opportunity to examine the association between accounting disclosure and cost of equity capital in an emerging market that applies the international standards and is characterized by a relatively weak regulatory environment.

1.2. Motivation

Among the reasons for choosing Egypt is that the Egyptian stock market is better established than other markets in the Middle East and Africa region, and it has attracted many investors in recent years, resulting in a significant increase in aggregate capitalization and in the market indices (Billmeier and Massa, 2008). In 2016, Egypt was the best performer among emerging markets, according to the Morgan Stanley price index. Additionally, Egypt has undergone significant developments in its business environment during recent years, which have significantly affected the accounting practices and systems, as the Egyptian financial reporting regulations were developed similarly to the international standards (Elbayoumi et al., 2019). This provides an opportunity to examine the association in a developing country that applies the international standards and which has undergone several improvements in its accounting system.

1.3. Research Objectives

The main aim of the research is to analyse the effect of accounting disclosure, both mandatory and voluntary, on the cost of equity capital for a sample of listed companies in the Egyptian exchange. To achieve the main aim of the research, the following objectives are formulated:

1- Measuring the level of mandatory disclosure and the level of voluntary disclosure for listed companies in the Egyptian exchange through constructing two disclosure indices, one to measure mandatory disclosure and the other for measuring voluntary disclosure.

2- Estimating the cost of equity capital for listed companies in the Egyptian exchange using three estimation methods from the current literature, namely the capital asset pricing model (CAPM), Fama-French three factor model, and industrial earnings-price ratio.

3- Analysing the association between mandatory and voluntary disclosure level from one side and the cost of equity capital from the other side, using the suitable statistical techniques.

1.4. Research Methods

To achieve the research objectives, the following research methods are used:

1- A self-constructed disclosure index, based on the latest version of the Egyptian accounting standards, is used to measure the level of mandatory disclosure in Egypt.

2- A self-constructed disclosure index, based on the actual practices and the indices used in previous studies, is used to measure the level of voluntary disclosure in Egypt.

3- Three cost of equity methods from the existing literature are used to estimate the cost of equity capital in Egypt. Two methods, CAPM and Fama-French three factor model, proxy for the ex-post cost of equity, while the third method, industrial earnings-price ratio, proxy for the ex-ante cost of equity.

4- A dynamic panel system of the generalized method of moments (SGMM) is used to analyse the relationship between the variables of the study, taking into consideration the possible endogeneity in the research design. First, each of the three cost of equity methods is regressed, individually, on mandatory and voluntary disclosure level, alternatively, and some controls that are found to affect the relationship between disclosure and cost of equity capital. The control variables used were firm size, leverage, book-to-market ratio, profitability, liquidity, and sales growth. Second, a composite

measure of the three cost of equity methods is used, instead of each method individually, as a robustness check to account for any possible measurement error. Last, the effect of control variables is excluded from the analyses as an additional robustness check.

1.5. Contributions of the Study

Through investigating the previous literature that analysed the association between accounting disclosure and cost of equity capital, it is observed that most prior studies focused on examining the effect of voluntary disclosure on the cost of equity capital in developed markets, mainly the US. Previous studies focused on voluntary disclosure; this is because there is no significant variation between companies regarding mandatory disclosure in developed markets, due to the high investor protection levels and the strong enforcement mechanisms in these markets. However, the situation is different in emerging markets, which are characterized by low investor protection levels and weak enforcement mechanisms; this also results in variations between companies regarding mandatory disclosure. Recently, some studies have examined the association between accounting disclosure and cost of equity capital in emerging markets such as Brazil (Lopes and Alencar, 2010), China (Feng, 2012), Malaysia (Embong et al., 2012), and some emerging European markets (Urquiza et al., 2012; Bagnoli and Mantovani, 2012; Hail, 2002; Petersen and Plenborg, 2006; Orens et al, 2009); however, little is known about the emerging capital markets of the Middle East and Africa, despite these markets' growing contribution to the world economy. This has increased the need to analyse the topic in these markets, which differ from the emerging markets of Europe, South America, and Asia (Euro Money,2007).

The main contribution of the study is that it extends the accounting and finance literature through examining the effect of disclosure level, both mandatory and voluntary, on the cost of equity capital in Egypt, as an emerging market in the Middle East and Africa region. To the best of the author's knowledge, there is only one study that examined the association between voluntary disclosure and cost of equity capital in Egypt (Khlif et al. 2015). Khlif et al. (2015) measured the cost of equity capital using the CAPM only; their sample was 292 firm-year

observations over a four-year period. This study is different in that it additionally examines the effect of mandatory disclosure level using three methods for estimating the cost of equity capital, based on a larger sample size of 657 firm-year observations over a nine-year period.

Apart from this main contribution, the study enhances the existing literature in several ways, as follows. First, the study adds to the existing literature that examines the consequences of improved disclosure in Egypt through measuring the disclosure level based on two self-constructed disclosure indices for mandatory and voluntary disclosure. The mandatory disclosure index is constructed by referring to the latest version of the Egyptian accounting standards issued in 2016, while the voluntary disclosure index is constructed based on a survey of indices used by the previous studies that measured voluntary disclosure in Egypt; in addition, the annual reports of the top 100 companies listed on the Egyptian Exchange are investigated, to observe what is actually disclosed. Researchers interested in measuring the disclosure level in Egypt will be assisted by using these disclosure indices, and/or comparing their results with those of this study.

Second, a very few studies measured the cost of equity capital in emerging markets generally, and in Egypt particularly. To the best of the author's knowledge, there are six studies that measured the cost of equity capital in Egypt: three of them used the capital asset pricing model (CAPM) only (Khlif et al., 2019; Khlif et al., 2015; Omran, 2007), and the remainder additionally used multi-factor asset pricing approaches (Shaker & Abdeldayem,2018; Taha & Elgiziry, 2016; Shaker & Elgiziry, 2014); however, none of these studies used an ex-ante cost of equity approach to measure the cost of equity capital. This study extends the current literature through measuring the cost of equity capital in Egypt using the CAPM and the Fama–French three-factor model, as well as using an ex-ante cost of equity approach, namely the industrial price–earnings ratio. The author believes that this is the first study to measure the cost of equity capital in Egypt using an ex-ante approach.

Last, a significant shortcoming in most prior studies that analysed the relationship between disclosure and cost of equity capital is the failure to address the possible endogeneity in the research design. Ignorance of the dynamic relationship between the two variables, given

this possible endogeneity, could lead to bias in the obtained results. A very few studies considered this issue; however, they used a two-stage instrumental variable approach that employed 2SLS regression, which is demonstrated in the literature to be unsuitable for dealing with such endogeneity (Larcker and Rusticus, 2007). Some of the even fewer studies that controlled for endogeneity used a dynamic panel SGMM, which is suggested as the most suitable methodology to address the endogeneity problem (Kaspereit et al., 2015). This study contributes to the current literature through using a dynamic panel data model (SGMM) to control for the endogeneity problem in analysing the relationship between disclosure and the cost of equity capital. This makes this study one of the very few studies in general, and the first study in Egypt, that controls for the dynamic relationship between the two variables by using an advanced dynamic panel data model (SGMM) in the analyses.

The results of the study may be of interest and benefit to various parties, including researchers, regulators, and investors. It provides a motivation to researchers interested in analysing this association in Egypt and other emerging markets, besides providing these researchers with a suitable data set to measure disclosure and cost of equity capital in Egypt. Regulators could benefit from the results of the study through identifying the shortcomings that need to be overcome to improve the disclosure environment in Egypt. Furthermore, investors could use the results of the study as a data source when making investment decisions in Egypt.

1.6. The Structure of the Study

The remainder of the study is structured into two main parts, theoretical and empirical, as follows. The theoretical part consists of Chapter 2 and Chapter 3. Chapter 2 presents the literature review regarding the relationship between disclosure and cost of equity capital. Through the chapter, the theory behind the association is discussed and the results of the previous studies are analysed, in order to reach a conclusion about the gaps to be filled in this research. Chapter 3 discusses the institutional framework in Egypt, through which it explains the effect of the developments in the Egyptian business environment on the accounting regulations

and practices. The empirical part consists of Chapter 4, in which the relationship between the variables of the study is analysed. Chapter 4 describes the variables measurement process, the statistical techniques used in analysing the relationships among variables, and interprets the results obtained. The conclusion of the study is presented in Chapter 5, where the main results are summarized, and research limitations and recommendations are suggested.

Chapter 2: Literature Review

2.1. Introduction

The cost of equity capital is one of the most critical numbers in finance (Cornell, 1999; Dimson et al., 2002). It represents the required rate of return by investors, in compensation for the expected risk from their investments in the firm's securities. This means that higher expected risk leads to higher required returns by investors, resulting in a higher cost of equity capital. A fundamental determinant of this expected risk is the information environment surrounding firms (Shan-Cun and Wei Ning, 2012): that is, poor information environments have higher information risk. Information asymmetry between managers and investors, or between investors themselves, is considered as the primary source of information risk, resulting in cost of capital differences among companies (Admati, 1985). Therefore, companies can reduce their cost of equity capital through reducing information asymmetry; this will reduce the information risk, resulting in lower required returns by investors (Easley and O'Hara, 2004). One of the most important ways firms can use to mitigate information asymmetry is improving accounting disclosure (e.g. Diamond and Verrecchia, 1991; Healy and Palepu, 2001; Kothari et al., 2009; Lambert et al., 2012). This suggests that the association between accounting disclosure and cost of equity capital is linked to information asymmetry.

Economic theories suggest a negative association between accounting disclosure and cost of equity capital on the basis that improved disclosure lowers information asymmetry, and that reduced information asymmetry results in lower cost of equity capital through its impact on market liquidity, estimation risk, and misalignment risk (Daske, 2006). Despite this strong theoretical support for this relationship, empirical research has not yet been reached a conclusion on its existence. In an attempt to confirm this theoretical support, several empirical studies have been conducted in different markets (e.g. Botosan, 1997; Botosan and Plumlee, 2002; Francis et al., 2005; Hail and Leuz, 2006; Richardson and Welker, 2001; Kothari et al., 2009;

Lang and Lundholm, 1996; Healy et al., 1999; Leuz and Verrecchia, 2000; Dhaliwal, 1979); however, they yield mixed results, leading to a lack of empirical evidence of such an association.

This chapter analyses the literature on the association between accounting disclosure and cost of equity capital, in order to gain a deep understanding of this relation and to reach a conclusion about the reasons for the lack of empirical support. In doing so, the chapter is organized as follows. Section 2 defines the cost of capital and shows its importance in capital markets. Section 3 analyses the effect of information risk on the cost of equity capital; then, section 4 discusses the association between accounting disclosure and cost of equity capital. Section 5 investigates the prior literature on this relation, to identify the reasons for the lack of empirical evidence; and section 6 summarizes the chapter.

2.2. Cost of Capital: Concept and Importance

A firm's capital is usually obtained from two sources: 1) funds from creditors and credit institutions (e.g. bank loans), and 2) investments by inside or outside investors through purchasing the firm's securities. On the one hand, when the capital is obtained from creditors, returns will be required by those creditors, which are commonly the interest provided in debt markets. This required return by creditors, in compensation for providing funds to the firm, is referred to as the cost of debt capital. On the other hand, when the capital is obtained from investors, those investors will require returns which are usually the eventual dividends provided in the equity markets. This required return by investors, in compensation for their investments in the firm's securities, is referred to as the cost of equity capital. Thus, the cost of capital represents the cost firms must pay to obtain funds in the form of either debt or equity (Souissi & Khlif, 2012). In other words, the cost of capital represents the required rate of return by investors and/or creditors in compensation for providing funds to the company. In order for the company to increase its market value and maximize the shareholders' wealth, it should earn a higher rate of return than the cost of capital (Neveu, 1989). The rate of return earned by the company, i.e. return on assets, measures the asset side of the balance sheet; while the required rate of return

by investors and creditors, i.e. cost of capital, measures the long-term liability/equity side of the balance sheet.

Determining the cost of capital helps firms in a wide variety of corporate decisions. It assists them in evaluating investment opportunities, as this cost is compared with the return on assets when deciding on investments (Abdelghany, 2005). Cost of capital is also used in evaluating firms' performance and determining its value, risk management analysis, making capital structure decisions, and budget preparation (Hou et al., 2012; Beneda, 2003; Pagano and Stout, 2004). Determining cost of capital is important for managers, investors, and regulators. Mangers use cost of capital estimations for capital budgeting decisions; investors use it for choosing among investment alternatives; and regulators need it in setting accounting standards (Habib, 2006). Firms should reduce their cost of capital because high capital costs lead to rejecting many potential investments; and this, in turn, negatively affects the firm's future growth (Embong et al., 2012).

As previously stated, there are two components of the cost of capital: cost of debt and cost of equity. Cost of debt capital can be easily determined through taking the interest rate and making appropriate adjustments for any tax benefits (Omran and Pointon, 2001). It is more difficult to determine the cost of equity, which is the focus of this study. Cost of equity capital represents a return that should cover the expected risk by the investor, caused by his/her investments in the firm's securities. These investments are in either risk-free securities or risky securities. Therefore, the required return by the investor includes the risk-free rate from investments in risk-free assets, in addition to a risk premium from investments in risky assets. The risk-free rate can be easily determined through taking the state borrowing rate or treasury bills rate as an example; however, determining the risk premium is one of the most difficult challenges in accounting and finance literature. Equity risk premium is a fundamental determinant of the cost of capital, and is considered one of the most critical numbers in finance (Cornell, 1999; Dimson et al., 2002): it consists of the price for systematic risk and unsystematic risk. The systematic risk cannot be diversified because it is determined according to the assets'

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sensitivity to market returns, and it is common to all risky assets (Kaspereit et al., 2015). Besides the market risk, there is a risk that pertains to individual assets; this can be diversified away, through including a greater number of assets in the portfolio, thereby reducing the risk of each individual asset (Kaspereit et al., 2015). Hence, the systematic risk (non-diversifiable) is common to all securities and is priced, while the unsystematic risk (diversifiable) differs from asset to asset and is not priced. Therefore, the equity risk premium is determined not only according to the risk of an individual asset, but also by its covariance with other assets (Bertomeu and Cheynel, 2016). Overall, higher risk is associated with higher returns being demanded by investors and, accordingly, higher cost of equity capital.

2.3. The Effect of Information Risk on the Cost of Equity Capital

As stated in the previous section, cost of equity is affected by risk, as investors require returns in compensation for the risk of their investments. This risk is affected by many factors such as "the nature and quality of a firm's accounting information, the availability of public information sources about the firm, and the fraction of traders who have better information" (Shan-Cun and Wei-Ning, 2012). . This information risk is a fundamental factor in determining the cost of equity capital. Admati (1985) argued that information asymmetry is the primary source of information risk, resulting in cost of capital differences among companies. Information asymmetry occurs when one group of participants have better information than other groups (Copeland et al., 2005). Information asymmetry leads to two main problems, which are adverse selection and moral hazard (Embong et al., 2012). The adverse selection problem occurs as a result of lack of information given to less informed parties, leading to incorrect investment decisions (Embong et al., 2012). The moral hazard problem occurs when the better-informed parties exploit the less informed ones because they have an information advantage (Embong et al., 2012). The problems of information asymmetry discourage investors from investment in the market, thereby affecting the liquidity and efficiency of the capital market (Akerlof, 1970). Lower liquidity of the firm's shares causes investors to demand higher risk premiums, leading to higher cost of equity capital (Kaspereit et al., 2015).

There are two types of information asymmetry: the first type exists between managers and investors, as managers have an information advantage which they may use against the interest of investors (Lambert, 2001; Healy and Palepu, 2001). The second type is the information asymmetry between investors themselves, when some investors have an information advantage over others. Within this context, Easley and O'Hara (2004) developed a multi-asset rational expectations model in which they investigated the role of information in affecting the firm's cost of equity capital. In their model, the source of information asymmetry is between informed and uninformed investors. The informed investors have access to both public and private information, while the uninformed investors can access public information only. Accordingly, the informed investors have an information advantage which enables them to achieve benefits against the interests of uninformed investors. This leads to increasing the information risk for less informed investors, resulting in higher required returns by those investors in compensation for this additional risk; and, therefore, higher cost of equity capital for the firm. Hence, private information represents a source of information risk for which investors demand higher returns, resulting in higher cost of equity capital. The conclusion from Easley and O'Hara's model is that companies can reduce their cost of equity capital through reducing information asymmetry, as this will reduce the information risk faced by disadvantaged investors, resulting in lower required returns.

In a similar vein, Wang (1993) showed that releasing more public information contributes to reducing the risk faced by less informed investors; however, he argued that the existence of private information is better than no information at all. This private information is partially revealed by the better-informed investors when they trade, which allows less informed investors to benefit from it (Pryor, 2008). Thus, releasing more information has an overall positive effect on the cost of capital, with differential effects of private versus public information (DeBoskey and Gillett, 2013).

In summary, information asymmetry leads to higher information risk for investors, resulting in lower prices and lower liquidity for the firm's shares. Lower liquidity causes higher

required returns by investors and, accordingly, higher cost of equity capital. Therefore, mitigating information asymmetry contributes to reducing the firm's cost of equity capital through reducing the information risk faced by investors (Handa and Linn, 1993).

2.4. The Relationship Between Accounting Disclosure and Cost of Equity Capital

2.4.1. The Economic Consequences of Improving Disclosure

As shown by Easley and O'Hara (2004), higher information symmetry leads to higher cost of equity capital. They concluded that releasing more public information, through increased disclosure, is a major tool used by managers to influence the firm's cost of equity capital. This is because improved disclosure is considered in the accounting literature as one of the most important ways in which firms can mitigate information asymmetry problems (e.g. Diamond and Verrecchia, 1991). For instance, improved disclosure can convert private information into public information, thereby enabling uninformed investors to access information in the same way as informed investors (Verrecchia, 2001). Diamond and Verrecchia (1991) argued that improved disclosure mitigates information asymmetry through narrowing the information gap among market participants. This contributes towards increasing the firm's visibility and reducing the cost of processing firm-specific information, thereby attracting uninformed investors to trade in the firm's securities (Brown and Hillegeist, 2007).

The growing impact and participation of individual investors in the capital markets makes corporate disclosure a critical factor in the functioning of an efficient capital market (Ho and Wong, 2003). This is because the efficiency of any capital market depends on providing investors and other users with the information needed to help them make sound decisions (Ellabbar and Havard, 2005). Since disclosure is concerned with providing accounting information users with all information about events and transactions of the business enterprise, it has a significant impact on investors' behaviour regarding their trading and investment decisions in the financial markets (Ellabbar and Havard, 2005; Kohl and Schaefers, 2012).

Companies disclose their information to outside parties in several ways, the most important of which is the annual report. Information in the annual reports consists of qualitative and quantitative information (Marston and Shrives, 1991): the latter is both financial and nonfinancial (Marston and Shrives, 1991), while the former is presented in the form of illustrations, diagrams, and graphical presentations (Marston and Shrives, 1991). Information disclosure by firms is categorized into mandatory and voluntary disclosure. Mandatory disclosure represents the information that must be disclosed by firms in accordance with the disclosure requirements of laws, accounting standards, and listing rules of the stock exchanges (Hassan, 2006). In this context, companies have to agree with mandatory disclosure requirements, in order to maintain their stock exchange listing and avoid exposing themselves to penalties. The degree of compliance with mandatory disclosure requirements in a country depends on the strength of its regulatory enforcement mechanisms (Marston and Shrives, 1991). However, mandatory disclosure alone may be inefficient in mitigating the problems caused by information asymmetry (Bagnoli and Mantovani, 2012). Therefore, besides mandatory disclosure, firms may provide users with additional voluntary disclosures to achieve the benefits from increased disclosure level. Voluntary disclosure complements mandatory disclosure in influencing the investment decision-making, through disclosing additional information about areas such as the benefits of quality improvements, human resource development programmes, and research and development (Hassan and Melegy, 2014).

An increased disclosure level has many benefits: these include mitigating information asymmetry; lowering the cost of financing; improving the liquidity of a firm's stocks and making it more attractive to investors; increasing the number of analysts following, due to the lower cost of information acquisition; more efficient allocation of resources in an economy; capital market development; lower returns volatility; and increased investor protection levels (Bailey et al., 2006; Healy and Palepu, 2001; Kothari et al., 2009; Verrecchia, 2001; Lambert et al., 2012; Beyer et al., 2010; Hassan and Melegy, 2014). Arthur Levitt (1998), the chairman of the SEC, said, "I firmly believe that the success of capital market is directly dependent on the quality of accounting and disclosure systems. Disclosure systems that are found on high quality standards give

investors confidence in the credibility of financial reporting and without investor confidence, markets can't strive."

Despite the various benefits from increased disclosure, companies decide against maximum disclosure level, because increasing disclosure has costs as well as benefits. Companies provide users with additional voluntary disclosures only if they anticipate that the net benefits from increased disclosure exceed its costs (Marston and Shrives, 1991). In other words, adopting a voluntary disclosure strategy requires a cost–benefit analysis, through which companies conduct a trade-off between its benefits and costs (Bagnoli and Mantovani, 2012). Among the costs of increased disclosure are those of production and dissemination; the costs of placing the company at a competitive disadvantage when the competitors use the disclosed information against the company's interest; and litigation costs, in the case that the company is penalized for disclosing misleading information (Hassan, 2006). Additionally, companies providing additional information without an obligation may cause investors to suspect or misinterpret their intentions for doing so (Hassan et al., 2009).

The previous section showed that increasing the level of disclosure contributes to decreasing information asymmetry, and it is demonstrated that lower information asymmetry is associated with lower cost of equity capital. This suggests that the association between the level of accounting disclosure and cost of equity capital is linked to information asymmetry (Verrecchia, 2001). Understanding the link between accounting disclosure and information asymmetry is an important step towards gaining a deeper understanding of the relationship between accounting disclosure and the cost of equity capital (Brown and Hillegeist, 2007).

2.4.2. Theory Behind the Association Between Accounting Disclosure and Cost of Equity Capital

Beyer et al. (2010) state that "whether disclosure policies and financial reporting affects a firm's cost of capital is one of the most interesting questions in the accounting and finance literature". Economic theories suggest a negative relationship between accounting disclosure and cost of equity capital, on the basis that improved disclosure lowers information asymmetry,

thereby reducing the cost of equity capital. Reduced information asymmetry contributes to reducing the cost of equity capital in three ways: through its impact on market liquidity, estimation risk, and misalignment risk (Daske, 2006). Hence, there are three related research streams explaining the negative association between the level of accounting disclosure and the cost of equity capital.

The first research stream states that reduced information asymmetry, resulting from improved disclosure level, leads to a reduction in the cost of equity capital through reducing the misalignment risk. This research stream is based on the model developed by Easley and O'Hara (2004), which was discussed in detail in the previous section. Easley and O'Hara (2004) have shown that the misalignment risk in the distribution of information among informed and uninformed investors results in greater uncertainty for uninformed investors; this leads to higher required returns being demanded by those investors and, ultimately, higher cost of equity capital. They concluded that increasing public information versus private information, through enhanced disclosure, enables the uninformed investors to make better investment decisions; this results in lower misalignment risk, and lower returns being demanded by those investors, thereby reducing the cost of equity capital (Easley and O'Hara, 2004).

The second research stream argues that improved disclosure leads to higher stock market liquidity, which causes lower cost of equity capital, either through reduced transaction costs or increasing the demand for a firm's securities (e.g. Amihud and Mendelson, 1986; Diamond and Verrecchia, 1991). On the one hand, improved disclosure lowers information asymmetry, thereby reducing the adverse selection component of the bid-ask spreads, resulting in lower transaction costs (Amihud and Mendelson, 1986). Higher transaction costs result from the increased gap in stock prices between buyers and sellers of the firm's stocks (bid-ask spreads). This occurs because investors cannot accurately estimate the stocks' prices (i.e. the adverse selection problem), due to the varying degrees of information they acquire (i.e. the information asymmetry problem) (Verrecchia, 2001). Increased transaction costs result in higher returns being demanded by investors and, accordingly, higher cost of equity capital (Amihud and Mendelson, 1986).

Providing more information to investors, through improved disclosure, contributes to narrowing the bid-ask spreads, leading to lower transaction costs and a resultant lower cost of equity capital (Amihud and Mendelson, 1986). On the other hand, the decreased information asymmetry that results from enhanced disclosure attracts greater demand from investors for the firm's securities, which leads to higher share prices and greater stock market liquidity; this in turn results in lower required returns by investors, and a consequent lower cost of equity capital (Diamond and Verrecchia, 1991). Within the same context of a liquidity-based approach, some studies argue that increasing disclosure lowers the cost of equity capital through increasing information intermediation (Lang and Lundholm, 1996) and reducing informational differences among investors (Easley and O'Hara, 2004). The idea behind this argument is that increased disclosure lowers the cost of information acquisition, and thereby increases the number of analysts following the firm (Lang and Lundholm, 1996). Also, revealing more public information, through improved disclosure, contributes to reducing the informational differences among informed and uninformed investors, thereby increasing shares' liquidity and reducing the required returns by less informed investors (Easley and O'Hara, 2004).

The third research stream suggests that improved disclosure lowers the non-diversifiable estimation risk faced by investors when estimating the future cash flows, leading to lower dividend payouts and, accordingly, lower cost of equity capital (Barry and Brown, 1985; Handa and Linn, 1993; Coles et al., 1995; Clarkson et al., 1996). The rationale is that increased disclosure allows investors to make better estimations regarding the future cash flows; and this, in turn, helps in reducing their uncertainty about securities' return distribution (Barry and Brown, 1985; Clarkson et al., 1996). When the information provided is low, investors make errors in estimating the future cash flows; this represents a source of non-diversifiable estimation risk as investors price this risk and, accordingly, require additional compensations, leading to higher cost of equity capital (Botosan, 1997). Improving disclosure contributes to reducing the degree of error in estimating future cash flows, resulting in lower estimation risk, which leads to lower expected risk premium by investors, thereby reducing the cost of equity capital (Handa and Linn, 1993; Clarkson et al., 1996). Within the same context, Lambert et al. (2007) extends this research

stream by using a model that explicitly allows for multiple firms whose cash flows are correlated. Lambert et al. (2007) argue that improved disclosure reduces the assessed covariance between the firm's cash flows and other firms' cash flows, leading to a lower market risk premium and, ultimately, lower cost of equity capital. The underlying idea is that increased disclosure allows investors to better estimate the future cash flows, and through greater realization of firms' future cash flows, the covariance between firms' cash flows becomes lower (Lambert et al., 2007). Lambert et al. (2007) also show that this effect is part of the non-diversifiable risk, because it is present for all covariance terms with other firms.

In conclusion, the justification for the negative association between the disclosure level and the cost of equity capital is that increased disclosure mitigates the information asymmetry, and that reduced information asymmetry results in lower cost of equity capital through its impact on market liquidity (e.g. Amihud and Mendelson, 1986; Diamond and Verrecchia, 1991), estimation risk (e.g. Barry and Brown, 1985; Handa and Linn, 1993; Clarkson et al., 1996), and misalignment risk (e.g. Easley and O'Hara, 2004).

2.4.3 Previous Studies Examining the Association Between Accounting Disclosure and Cost of Equity Capital

Although there is a strong theoretical support for the negative association between accounting disclosure and cost of equity capital, there is a lack of empirical evidence supporting this association. This is based on the different results obtained by the various previous studies that analysed the relationship between the two variables in different countries. The following part analyzes some of these studies and their results to reach a conclusion about the reasons for the mixed results.

(A): Studies that found a negative relationship in the U.S. market:

Most of the previous studies that examined the relationship between different types of disclosure, from one side, and cost of equity or factors affecting this cost, from the other side,

found a negative relationship. Following are examples of the studies that were conducted in the U.S. market and found a negative relationship between the two variables. Lang and Lundholm (1996) examined the relations between the disclosure practices of firms, the number of analysts following each firm, and the properties of the analysts' earnings forecasts in U.S. They provided support that improved disclosure contributes to increasing investor following, reducing estimation risk, reducing information asymmetry and, accordingly, reducing cost of capital. Welker (1995) examined the relationship between disclosure policy and liquidity in the equity markets in U.S., using bid-ask spreads as a proxy for market liquidity. He finds that a useful disclosure policy reduces information asymmetry and increases liquidity in the equity markets. Healy et al. (1999) analyze the association between voluntary disclosure and capital market factors associated with increases in analyst disclosure ratings in U.S. They find that higher disclosure levels lead to increases in stock liquidity, stock returns, institutional ownership, and analyst following.

Dhaliwal (1979) examine the association between the level of segment disclosure and the cost of equity capital in U.S., through analyzing the impact of the SEC's segmental disclosure requirement. He finds a negative association between the level of segment disclosure and the cost of equity capital post the SEC's regulation. He referred his results to the improvement in the quality of financial disclosure as a result of the regulation. Prodhan and Haris (1989) examined the effect of the level of segment disclosure on the systematic risk in U.S. By analyzing firms' betas, they find that the level of segment disclosure is negatively associated with systematic risk. They suggested that increasing the level of disclosure contributes to reducing uncertainty and result in a lower cost of equity capital. Greenstein and Sami (1994) tested the association between the level of segment disclosure and the size of the relative bid-ask spreads in U.S. They find a significant negative association between the two variables. Bailey et al. (2006) analyze the effect of increased disclosure for non-U.S. firms as a result of their listings in the U.S. market. They find a significant increase in absolute return and volume reactions to earnings announcements after U.S. cross listing. They find also that these increases are greater for firms from countries that do not have strict disclosure requirements. They suggested that firms'

disclosure environment is a significant influential factor in explaining the association between accounting disclosure and cost of equity capital. Eaton et al. (2007) examined the association between disclosure level and cost of equity capital for a sample of foreign firms that cross-list in the NYSE. They find a significant negative association between the two variables, especially for firms with the lowest level of disclosure prior to cross-listing. They suggested that the effect of increased disclosure level on cost of equity capital is more significant in countries with low levels of disclosure.

(B): Studies that found a negative relationship outside the U.S. market:

Other studies found a negative relationship between the two variables in markets other than the U.S. market. Following are examples of these studies. Poshakwale and Courtis (2005) examined the association between voluntary disclosure and cost of equity capital for 135 banks from Europe, North America, and Australia. They find a significant negative association between the two variables, and that the association is more significant in Europe compared to North America and Australia. Lopes and De Alencar (2010) analyzed the association between accounting disclosure and cost of equity capital in Brazil and documented a significant negative association between the two variables. Li and Yang (2013) examine the association between disclosure and the market cost of capital, using S&P 500. They computed the cost of capital for each firm and used their average as a measure of the market cost of capital. They find a negative association between the two variables. Rezaei and Shabani (2015) examine the effect of firm size and quality of disclosure on the cost of capital in Iran. They find a negative association between firm size and cost of capital as well as between disclosure quality and cost of capital.

Among studies conducted in Europe are: Sieber et al. (2014) examined the impact of voluntary strategy disclosure in management reports on the cost of equity capital in Germany and find a significant negative association between the two variables. Grüning (2011) investigates the relationships between annual report disclosure, market liquidity, and cost of capital in Germany. He finds that higher disclosure levels increase market liquidity and reduces cost of equity capital for the sample firms. Kaspereit et al. (2015) investigate the impact of compliance

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of German firms with the German corporate governance code (GCGC) on the implied cost of equity capital. They find that higher level of compliance with the GCGC resulted in a lower cost of capital. They referred this effect to the improved disclosure as a result of applying the code. Orens et al. (2012) examine the association between customer value disclosure and cost of equity capital in four continental European countries (Belgium, Germany, France, and the Netherlands). They find a negative association between the two variables. Orens et al. (2009) examine the impact of web-based intellectual capital reporting on firm's value and its cost of finance in four continental European countries (Belgium, Germany, France, and the Netherlands). They find that greater intellectual capital disclosure is related to lower information asymmetry, lower cost of equity, and lower cost of debt capital. Espinosa and Trombetta (2007) examined the association between accounting disclosure and cost of equity capital in Spain. They find a significant negative association between the two variables. Reverte (2012) examined the association between corporate social responsibility disclosure and the cost of equity in Spain and find a negative relation between the two variables. Petersen and Plenborg (2006) examined the association between the level of voluntary disclosure and information asymmetry levels in Denmark. They find a negative association between the level of voluntary disclosure and proxies for information asymmetry. Hail (2002) investigates the association between disclosure quality and cost of equity capital in Switzerland and finds a highly significant negative association between the two variables. Petrova et al. (2012) find a negative association between disclosure quality and cost of equity capital in Switzerland. Bagnoli and Mantovani (2012) investigate the impact of the strategic choices regarding voluntary disclosure on the cost of capital in Italy. They find a significant negative association between the two variables.

Many studies were conducted in Asian countries such as: Sami and Zhou (2008) investigate the impact of cross listings on information asymmetry risk, cost of capital, and firm value in China. They find that increasing the level of disclosure due to cross-listing resulted in lower information asymmetry risk, lower cost of capital, and higher firm value. Feng (2012) examined the association between information disclosure and cost of equity capital in China. They find a significant negative association between the two variables. Shan-Cun and Wei-Ning

(2012) analyzed the relations among disclosure level, information asymmetry, and cost of capital in China. They find a negative association between disclosure level and information asymmetry, and a positive association between information asymmetry and cost of capital. Ly (2010) examines the relationship between the quality of annual reports disclosure and cost of capital in Japan. Using bid-ask spreads as a proxy for cost of capital, he finds a significant negative association between the two variables.

The following two studies were conducted in Egypt. Khlif et al. (2015) examine the effect of voluntary disclosure, ownership structure attributes and timely disclosure on the cost of equity capital in Egypt. They find a negative association between the level of voluntary disclosure and cost of equity, especially under high ownership dispersion and low government ownership. Hassan et al. (2011) examine the association between corporate voluntary disclosure and systematic risk in Egypt and find a negative relationship between the two variables.

 (C): Studies that found a mixed relationship in the U.S. market:

Some studies found mixed relationships; that is, they found a negative relationship under certain conditions or when using some types of disclosure. However, the relationship was positive or non-significant under other conditions or when using different types of disclosure. Some of these studies were conducted in the U.S. market such as: Botosan (1997) examines the association between accounting disclosure and cost of equity capital in U.S. She finds a negative association only for companies with low analyst following, however, the association is not significant for firms with high analyst following. Botosan and Plumlee (2002) tested the association between cost of equity capital and level of annual report disclosure, timely disclosure, and investor relations activities in U.S. They find a significant negative association between the level of annual report disclosure and the cost of equity capital, however, disclosures based on information from other publications and investor relations has no significant association with cost of equity capital. They also find a positive association between the level of timely disclosure (quarterly reports) and cost of equity capital. In aggregation, the association is not significant. Francis et al. (2008) examined the relations between voluntary disclosure, earnings quality, and

cost of capital in U.S. They find a significant negative association between voluntary disclosure level and cost of capital in unconditional tests, but the association is not significant after conditioning on earnings quality. They suggested that earnings quality may be a correlated omitted variable in studies examining the association between disclosure quality and cost of capital. Gietzmann & Ireland (2005) tested the association between the quality of strategic disclosure and cost of equity capital in U.S. They support a negative association between the two variables only when accounting policies are more aggressive. Kothari et al. (2009) tested the impact of disclosure made by management, analysts, and in print medium on the cost of equity capital in U.S. They find a negative association between favorable disclosures and cost of equity, while the association is positive when disclosure is unfavorable.

(D): Studies that found a mixed relationship outside the U.S. market:

Other studies found mixed results outside the U.S. market such as: Gassen and Sellhorn (2006) tested the effect of voluntary IFRS adoption by publicly traded German firms on information asymmetry level. They used stock return volatility and bid-ask spreads as proxies for information asymmetry. They find a negative association with bid-ask spreads, however, a positive association with stock return volatility. Urquiza et al. (2012) examine the association between disclosure of forward-looking information and cost of capital in Spain. They find that only specific information on actions, programs, decisions, and quantitative financial information are negatively associated with cost of equity capital. Richardson and Welker (2001) investigates the relationships between cost of equity capital, financial disclosure, and social disclosure in Canada. They find a negative association between financial disclosure and cost of equity capital for firms with low analyst following, while they find a positive association between social disclosure and cost of equity capital. Kristandl and Bontis (2007) examined the association between voluntary disclosure of forward oriented information versus historical information and cost of equity capital in Australia, Germany, Sweden, and Denmark. They find a significant negative association between the level of forward oriented information and cost of equity capital, while the association is positive with the level of historical information.

Leuz and Verrecchia (2000) examine the effect of increased disclosure by German firms when they switched from the local to an international reporting regime. They examined whether the cost of equity capital is lower for firms that switched to international accounting standards than those using the German accounting methods. They employ relative bid-ask spreads, share turnover, and stock return volatility as proxies for cost of equity capital. They find that increased disclosure reduces the relative bid-ask spreads and increases the share turnover, however, it increases the share price volatility for firms with an international reporting strategy. Embong et al. (2012) tested the impact of firm size on the association between disclosure level and cost of equity capital in Malaysia. They included firm size as a moderating variable, rather than a control variable, to the relationship between disclosure and cost of equity capital. They find a significant negative association between the two variables for large firms, while the association is not significant for small firms. Cheng et al. (2006) investigate the relationships between cost of equity capital, financial disclosure, and shareholder rights for S&P 500. They find that the relation is negative when intermediated by shareholders' rights. They find that firms with stronger shareholder rights and higher disclosure levels have lower cost of equity capital. They suggested that the effect of improved disclosure on the cost of equity capital depends on the strength of shareholders' rights, and vice versa.

(E): Studies that found a non-significant relationship:

Khlif and Souissi (2009) tested the relation between disclosure of annual reports and cost of equity in U.S. and find the association is not significant. Daske (2006) replicates the study of Leuz and Verrecchia (2000) and finds no significant reduction in the cost of equity capital. Eugster (2019) examine the relationship between voluntary disclosure quality and cost of equity capital in Switzerland. They find a not significant association after controlling for potential endogeneity for the full disclosure score. Cuijpers and Buijink (2005) examines the consequences of voluntary adoption of IFRS in the European Union. They examined the effect of increased disclosure on analyst following, cost of equity capital, and stock return volatility. They find a positive effect on

analyst following, however, a negative effect on stock return volatility and no significant effect on the cost of equity capital.

As it appears from the previous investigation of the of empirical studies about this association, the results are mixed. While most of studies support the negative association, some studies find that the association is negative only under certain circumstances. For example, Botosan (1997) find that the negative association is significant only for firms with low analyst following. Gietzmann and Ireland (2005) find that the negative association is significant only for companies with aggressive accounting strategies. Botosan and Plumlee (2002) find that only annual report disclosure is negatively associated with cost of equity. Also, some studies find a positive association between the two variables, and the rest of studies find no significant association. The results of these studies are summarized in table 2.1. (the studies in the table are arranged in the same sequence of the text).

Table 2.1. Summary of Prior Literature		
Study	**Country**	**Result**
(A): Studies that found a negative relationship in the U.S. market		
Lang & Lundholm (1996)	U.S.	Negative relationship.
Welker (1995)	U.S.	Negative relationship.
Healy et al. (1999)	U.S.	Negative relationship.
Dhaliwal (1979)	U.S.	Negative relationship.
Prodhan & Haris (1989)	U.S.	Negative relationship.
Greenstein & Sami (1994)	U.S.	Negative relationship.
Bailey et al. (2006)	U.S.	Negative relationship.
Eaton et al. (2007)	U.S.	Negative relationship.
(B): Studies that found a negative relationship outside the U.S. market		

Poshakwale & Courits (2005)	Eurpoe, North America, and Australia	Negative relationship.
Lopez & De Alencar (2010)	Brazil	Negative relationship.
Li & Yang (2013)	S&P 500	Negative relationship.
Rezaei & Shabani (2015)	Iran	Negative relationship.
Sieber et al. (2014)	Germany	Negative relationship.
Grüning (2011)	Germany	Negative relationship.
Kaspereit et al. (2015)	Germany	Negative relationship.
Orens et al. (2012)	Belgium, France, Germany, and Netherlands	Negative relationship.
Orens et al. (2009)	Belgium, France, Germany, and Netherlands	Negative relationship.
Espinosa & Trombetta (2007)	Spain	Negative relationship.
Reverte (2012)	Spain	Negative relationship.
Peterson & Plenborg (2006)	Denmark	Negative relationship.
Hail (2002)	Switzerland	Negative relationship.
Petrova et al. (2012)	Switzerland	Negative relationship.
Bagnoli & Mantovani (2012)	Italy	Negative relationship.
Sami & Zhou (2008)	China	Negative relationship.
Feng (2012)	China	Negative relationship.

Shan-Cun & Wei-Ning (2012)	China	Negative relationship.
Ly (2010)	Japan	Negative relationship.
Khlif et al. (2015)	Egypt	Negative relationship.
Hassan et al. (2011)	Egypt	Negative relationship.
(C): Studies that found a mixed relationship in the U.S. market		
Botosan (1997)	U.S.	Significant negative relationship for firms with low analyst following, however, the association is not significant for firms with high analyst following.
Botosan & Plumlee (2002)	U.S.	Significant negative relationship between the level of annual report disclosure and COE, however, disclosure based on information from other publications and investor relations has no significant association with COE. It is found also a positive association between timely disclosure and COE.
Francis et al. (2008)	U.S.	Negative association in unconditional tests, but not significant association after conditioning on earnings quality.
Gietzmann & Ireland (2005)	U.S.	Negative association only for companies with aggressive accounting strategies.
Kothari et al. (2009)	U.S.	Negative association between favorable disclosure and COE, but positive association when disclosure is unfavorable.
(D): Studies that found a mixed relationship outside the U.S. market		
Gassen & Sellhorn (2006)	Germany	Negative association with bid-ask spreads, however, a positive association with stock return volatility.
Urquiza et al. (2012)	Spain	Negative relationship between disclosure of specific information only and COE.
Richardson & Welker (2001)	Canada	Negative association between financial disclosure and COE, but positive association between social disclosure and COE.
Kristandl & Bontis (2007)	Australia, Germany, Sweden, and Denmark	Negative association between the level of forward oriented information and COE, but positive association between the level of historical information and COE.

Leuz & Verrechia (2000)	Germany	Negative association with bid-ask spreads, however, a positive association with the share turnover and the share price volatility.
Embong et al. (2012)	Malysia	Negative association for large firms, but not significant for small ones.
Cheng et al. (2006)	S&P 500	Negative relationship only for firms with strong shareholder rights.
(E): Studies that found a non-significant relationship		
Khlif & Souissi (2009)	U.S.	Non-significant association.
Daske (2006)	Germany	Non-significant relationship.
Eugster (2019)	Switzerland	Non-significant association after controlling for endogeneity.
Cuijpers & Buijink (2005)	E.U.	Non-significant relationship.

2.4.4. Reasons for Mixed Results in Prior Empirical Literature

Some authors provide justifications for the mixed results in empirical studies that analysed the relationship. Among these explanations is the challenge faced by researchers in measuring cost of equity capital, as well as the disclosure level. On the one hand, researchers have followed two approaches in measuring the cost of equity: the direct and the indirect approach. Authors who measured the cost of equity capital directly, using one of the existing measures in the literature, experienced success or failure in documenting its association with disclosure, due to the difficulty of estimating the cost of equity capital directly (Botosan, 2006). Others, who used an indirect approach – i.e. through testing the impact of disclosure on variables that are related to cost of equity capital, in order to avoid the difficulty in estimating the cost of equity capital – could not provide strong evidence of a direct relationship (Botosan, 1997). On the other hand, measuring accounting disclosure represents another challenge faced by researchers. Several proxies are used to measure the disclosure level (e.g. ratings from organizations, self-constructed measures, questionnaires); however, each proxy has its limitations (Healy and Palepu, 2001). Additionally, Leuz and Verrecchia (2000) suggest that different sample sizes may be a reason for the mixed results. They also propose that among the causes is the informational environment: they argue that the association is significantly negative

in poor information environments. Francis et al. (2005) posit that countries' legal environments (investor protection) and their financial systems (bank-based or market-oriented) are important factors in influencing the association between accounting disclosure and cost of equity capital.

Within this context, some empirical studies are conducted to analyze the reasons for the mixed results when analyzing the association between accounting disclosure and cost of equity capital. Souissi and Khlif (2012) analyze the results of 22 empirical studies that examine the association between voluntary disclosure and cost of equity capital. They examined whether differences in results are attributable to effects of disclosure environment, the measurement of disclosure, or the measurement of cost of equity capital. They find that differences in disclosure environments is the main reason for the mixed results in empirical research. Francis et al. (2005) tested the relations between firms' reliance on external financing, their level of disclosure, and their cost of capital outside the U.S., where alternative legal and financial systems could mitigate the effectiveness of such disclosures. Using a sample from 34 countries, they find that firms more reliant on external financing have higher voluntary disclosure levels, and this increased disclosure resulted in a significant decrease in the cost of capital. They provided a support that differences in financial and legal systems of countries affect the association between disclosure level and cost of equity capital. Hail and Leuz (2006) examines international differences in firms' cost of equity capital across 40 countries through analyzing the impact of the effectiveness of a country's legal institutions and securities regulations. They find that firms from countries with more extensive disclosure requirements, stronger securities regulations, and stricter enforcement mechanisms have a significantly lower cost of equity capital. Zhu (2014) examined the impact of firm-level corporate governance on the cost of capital across 22 countries. They find that firms with good corporate governance have lower cost of capital, and that the association is more significant in countries with good disclosure requirements and strong legal systems. Chen et al. (2004) analyzed the association between accounting disclosure and cost of equity capital in an international setting and find a negative association in countries with weak legal protection for investors.

It appears from the previous investigation that differences in disclosure environments and financial systems between countries represent the main reason for the mixed results in empirical research that tested the association between accounting disclosure and cost of equity capital. It is argued that countries with high information environments, such as the US, have more developed capital markets due to the stronger investor protection provided through high-quality enforcement of accounting standards (La Porta et al., 1999). The principle here is that the strong enforcement mechanisms in these countries, as a result of the strong legal systems and securities regulations, contribute to improving disclosure through ensuring compliance with disclosure requirements and regulations (Meser et al., 2015). This provides investors with greater protection because these disclosures are viewed by investors as highly credible, due to the strong legal systems and enforcement mechanisms (La Porta et al., 1999). The greater investor protection provided would give investors greater confidence to provide capital, resulting in a more liquid capital market (La Porta et al., 1999). Meser et al. (2015) argue that improved disclosure as a result of strong enforcement mechanisms helps the market to attract investors because investors choose markets with high protection for their investments. They evidenced that disclosure and enforcement strengthen each other, and that strong enforcement is a precondition for effective disclosure regulation. Francis et al. (2005) suggest that improved disclosure is not likely to achieve its benefits if a country's legal system provides weak protection for investors, because such improved disclosures are viewed by investors as less credible. Hail and Leuz (2006) propose that countries with strong legal systems are expected to have lower cost of equity capital because of the lower demanded returns by investors, as a result of the higher protection provided to them. This suggests that the benefits of improving disclosure for reducing the cost of equity capital depend on the strength of countries' legal systems and enforcement mechanisms.

From a different perspective, some authors argue that increased disclosure's effects on reducing the cost of equity capital may be greater in countries with weak legal systems. For example, Souissi and Khlif (2012) propose that the association between disclosure and cost of equity is not significant in high-disclosure environments because the variability in disclosure

practices across companies is lower. Additionally, investors in high-disclosure environments can access accounting information from various sources; therefore, providing additional information may not significantly affect their investment decision (Souissi and Khlif, 2012). In contrast, investors in low-disclosure environments, characterized by low investor protection laws, are very sensitive to any additional information provided (Souissi and Khlif, 2012).

Another factor related to the strength of a country's legal system is the type of the country's financial system, which is found to be an influential factor in the association between disclosure and cost of equity. La Porta et al. (1997) argue that the legal and institutional factors in a country are related to the financial system, which affects corporate forms and corporate governance mechanisms in that country. Countries' financial systems vary with regard to whether they depend on private banks (bank-based) or public equity markets (market-based) in supplying capital financing (Francis et al., 2005). Countries with bank-based financial systems usually have a legal system with civil- or code-law origins (Kothari et al., 2000). In such settings, the government has a great impact on the accounting regulations and accounting practices (Kothari et al., 2000). In contrast, countries with market-based financial systems often have a legal system with common-law origins, in which the accounting profession is independent from the government (Roberts et al., 2005). It is argued that countries with more market-based financial systems have higher disclosure levels than those with more bank-based financial systems (Francis et al., 2005), as the latter facilitate a credible exchange of private information, which reduces managers' incentives to disclose information publicly (Healy and Palepu, 1993).

In sum, the previous part suggests that differences in legal and financial systems between countries may be an important factor in determining the relationship between accounting disclosure and cost of equity capital, and that this factor could be a main reason for the mixed results when researchers analyzes this relation in different environments.

2.5. Summary of the Chapter

Theory suggests a negative association between accounting disclosure and cost of equity capital. This negative association is explained through three related research streams: the first suggests that improved disclosure contributes to reducing the misalignment risk in the distribution of information among informed and uninformed investors. The second research stream suggests that enhanced disclosure improves the stock market's liquidity through reducing transaction costs and/or increasing the demand for a firm's securities. The third research stream suggests that greater disclosure reduces the estimation risk faced by investors when estimating the companies' future cash flows.

Despite this strong theoretical support, empirical studies that tested the association between the two variables in different markets did not reach similar results. While most of the studies support a negative association, some studies find this negative association to be dependent on certain circumstances; others find a positive association, and the remainder find no significant association between the two variables. Among the provided justifications for these mixed results are the challenges faced by researchers in measuring disclosure as well as cost of equity; and differences in the disclosure environments and financial systems between countries.

Chapter 3: Institutional Framework in Egypt

3.1. Introduction

Egypt, as a developing country with an emerging capital market, differs from developed markets in that it has higher growth potential, higher volatility, lower investor protection, higher information asymmetry, an illiquid stock market, relatively weak corporate governance, a lack of reliable accounting and auditing standards, and lower levels of disclosure (Soliman, 2013; Tower et al., 2011; Chau and Gray, 2010; Gonenc and Aybar, 2006). The high rates of economic growth, and the high expected returns due to high volatility, attracted international corporations' and investors' attention towards emerging markets such as Egypt (Millar et al., 2005; Korkmaz et al., 2010). However, the low disclosure levels and low investor protection might cause investors to stay away from the marketplace, leading to low international capital flow towards these markets (Soliman, 2013). Corporate governance practices in emerging markets like Egypt are characterized by that "most companies are closely held, there is considerable state ownership of privatized companies, the board independence is weak, and disclosure is not a common practice" (Fawzy, 2004). As an emerging market, Egypt needs to improve its corporate governance practices to attract more investments (Reed, 2002). Improving corporate governance helps emerging markets such as Egypt in terms of sustaining growth rates, increasing confidence in the national economy, raising investment rates, enhancing investor protection, encouraging the private sector growth, and securing finance for projects (Samaha et al., 2012).

The different economic development stages that occurred in Egypt affected the Egyptian stock market, as well as the Egyptian accounting systems and practices. The most radical feature of this development was the economic reform programme established in 1991. Implementing this programme reactivated the Egyptian stock market after it had been inactive for about 30 years; the programme also required the development of the accounting regulations, practices, and functions, in order to accommodate the new reforms. The capital market law (CML), issued in 1992, represented a significant development in the Egyptian accounting system through

introducing comprehensive disclosure requirements for listed companies; it required the implementation of the international accounting standards in matters not covered by the law. Imposing the international standards was an important step towards improving the credibility of Egypt's corporate financial reporting; however, the inconsistency of some standards with the Egyptian environment resulted in selective implementation of the international standards. Most standards were formulated in conformity with the international standards, except for some that were unsuitable for the Egyptian environment (e.g. the standard related to financial statements presentation, and the standard related to financial leasing). The improvements in the Egyptian accounting systems and regulations also increased the attention towards corporate governance issues. Accordingly, the Egyptian corporate governance code was issued in 2005, with the purpose of enhancing the financial reporting quality and increasing investors' confidence in the Egyptian capital market.

This chapter discusses the developments in the Egyptian economic and accounting environment, through the following sections. Section 2 describes the different economic development stages that occurred in Egypt, and discusses the development of the Egyptian stock market. Section 3 analyses the developments in the accounting systems and regulations in Egypt; then, section 4 discusses the accounting disclosure practices in Egypt. Section 5 summarizes the chapter.

3.2 Economic Development in Egypt

3.2.1 Stages of Economic Development in Egypt

During the twentieth century, Egypt passed through four different economic stages which are (Abdelsalam & Weetman, 2007): 1)- pre-1952 (large private ownership), 2)- from 1952-1973 (nationalization and socialist era), 3)- from 1974-1991 (open door policy and encouraging foreign investments), 4)- from 1991 up to date (privatization and revitalizing capital market).

Egypt had a capitalist economy until 1952, where most businesses were foreign-owned, and the private sector controlled 76% of Egyptian investment (Carana, 2002). During the period from 1952 to 1974, a shift from a capitalist economy towards a socialist economy took place, when the Egyptian government established a central economic planning model (Dahawy et al., 2002; Hassabelnaby and Mosebach, 2005; Hassan, 2008). During this phase, the government nationalized most private businesses, including banks, thereby increasing the public sector's dominance, to control 90% of the total economy (Hassabelnaby and Mosebach, 2005; Amer, 1969; Hopwood, 1982; Carana, 2002; Dahawy et al., 2002). The governmental bureaucracy almost eliminated the role of different stakeholders, with the result that the business community became totally removed from proper business practices (Youssef, 2003).

In 1974, Egypt started a transformation process from a socialist economy towards a market economy; it began the so-called 'open-door policy', which was based on increasing the role of the private sector and opening up the market to local and foreign investments (Hassan, 2008). The open-door policy involved reducing import controls, reducing the restrictions imposed on the possession and use of foreign currency, and developing the private sector (Hassabelnaby and Mosebach, 2005). Following the introduction of the new policy, the Egyptian government enacted the foreign investment law of 1974, which provided investors with incentives in the form of taxation and customs exemptions, thereby creating an attractive environment for local and foreign investors (Hassabelnaby and Mosebach, 2005; Hassan, 2008). Accordingly, foreign banks were allowed to establish branches in Egypt, and the number of joint stock companies dramatically increased (Zohny, 2000). Although the main aim of the new policy was to increase the role of the private sector, the government's significant role in the economy remained for some time (Hassan, 2008). Also, the significant increase in imports as a result of the new policy resulted in extreme deficits in the balance of payments by the end of 1980s (Oweiss, 1988; Carana, 2002). This improper implementation of the new policy slowed down the Egyptian economy's transition to a market-based economy. As a result, Egypt started a more rapid phase of economic development through initiating extensive economic reforms, including a series of privatization attempts by the late 1980s (Hassabelnaby and Mosebach, 2005).

To guarantee the supply of the required economic resources, the Egyptian government agreed with the International Monetary Fund (IMF) and the World Bank on conducting further economic reforms (Richards, 1991; Hassan, 2008). The World Bank motivated Egypt to increase privatization and strengthen the capital market through linking it to the international capital markets (Hassan, 2008; Zohny, 2000). In 1991, in collaboration with the IMF and the World Bank, Egypt established an economic reform programme which is considered the most radical feature in the Egyptian economy since that time (Omran and Pointon, 2001). The main objective of the programme was to develop the Egyptian stock market and increase the role of the private sector in the economic environment (Elbayoumi et al., 2019; Dahawy et al., 2002). Since that time, Egypt has joined the World Trade Organization, and it also established trade and investment agreements with the US and the European Union (Dey et al., 2007). The application of the new programme was followed by a phenomenal growth in the Egyptian stock market, which was evidenced by a dramatic increase in the market capitalization from LE 55 billion in 1990 to LE 815 billion in 2008 (Afify, 2009). However, many domestic and international shocks, such as the East Asian crisis of 1997, the sharp decline in oil prices in 1998, and the world economic recession of 2001, slowed down these reforms, until the government sustained economic growth again in 2004 (Kamel and Awadallah, 2017; Khorshid et al., 2011). The Egyptian economy also witnessed various economic risks as a result of the Egyptian revolution of 2011, until the political system reached relative stability in 2014 (Kamel and Awadallah, 2017).

3.2.2 The Development of the Egyptian Stock Market

The capital market activity in Egypt dates back to 1883, when Egypt established its first stock exchange in Alexandria, followed by a second in Cairo in 1903. They were both governed by the same board of directors and shared the same trading systems, under the name of the Cairo and Alexandria Stock Exchange (CASE) (Wagdi, 2014). After that, the two exchanges were merged under a new name, the Egyptian Exchange (EGX) (Wagdi, 2014). The EGX is the oldest stock exchange in the Middle East, and one of the first to be established in the world (Hassan, 2006; Shaker and Abdeldayem, 2018; Ragab and Omran, 2006).

The different stages of economic development affected the development of the Egyptian stock market. In the 1940s, the EGX reached its historic peak when it constituted the fifth most active stock exchange worldwide (ACCE, 1995). As a result of the nationalization that took place in various economic sectors during the socialist era in the 1950s, the role of the EGX decreased until it became inactive for about 30 years (Dahawy et al., 2002). During that period, the stocks of the most active listed firms were transferred to governmental bonds at 4% annual interest rate (Ragab and Omran, 2006), and the activities of the EGX were drastically reduced to serve only nine corporations (Zohny, 2000). This resulted in the loss of investors' confidence in the Egyptian economic system, leading them to transfer their investments to other markets (Zohny, 2000).

The adoption of the open-door policy in 1974 involved several reforms to reactivate the stock market (Ragab and Omran, 2006). The Egyptian Capital Market Authority (CMA) was established in 1979, with the main role of regulating the stock market in Egypt. The CMA is responsible for protecting investors' interest and maintaining transparency and fairness of the capital market, with the aim of developing it to be more attractive to local and foreign investments (Ismail and Elshaib, 2012 In 1981, the government enacted two laws to organize the limited liabilities companies and joint stock companies; these allowed tax exemptions for investors, thereby activating the EGX again (Zohny, 2000). However, due to "biases in the tax code against investment in securities, absence of a governing securities law, inadequacy of financial disclosure, lack of protection of small investors, and adverse economic conditions, the EGX remained inactive until the early 1990s" (Ragab and Omran, 2006).

Implementing the economic reform programme of 1991 required revitalizing the Egyptian stock market, by recovering its status and the confidence of investors, in order to facilitate the process of privatization and to attract foreign investments (Ragab and Omran, 2006; Akle, 2011; Mecagni and Sourial, 1999). Accordingly, a new capital market law (CML) was enacted in 1992 to enhance the reliability of the market, following the new reforms. The aims of the new law were to encourage private investments, increase investor protection, and establish mutual funds to enhance the banks' role in stimulating capital markets (Ragab and Omran, 2006). The CML of

1992 instituted several reforms, such as strengthening the regulatory power of the CMA; the issuance of regulations covering all market participants; the reorganization and modernization of the stock market through establishing new trading systems; and an improvement of disclosure rules (Zohny, 2000). Since that time, the EGX started to grow again, until it became one of the best stock exchanges in Africa and the Middle East (Abdeldayem and Sedeek, 2018; Shaker and Abdeldayem, 2018).

In 1996, the CMA signed an agreement with the US Securities and Exchange Commission (SEC) for technical assistance and information exchange, while in the same year, the EGX was deepening and broadening its ties with major international exchanges (Zohny, 2000). In 1997, Egypt and the US agreed to create a free trade agreement, including cooperation in the field of enforcement of security regulations (Zohny, 2000). In the same year, "the EGX started its modernization program through implementing international standards to match global exchanges, to act as a neutral trading platform, assist issuers in raising capital, and ensure integrity, transparency and disclosure in the capital market" (EGX, 2011). Since then, the International Financial Corporation (IFC), Morgan Stanley, and Standard and Poor's have added Egypt to their stock market indices, considering it the world's premier source of information on emerging markets (Ellabbar and Havard, 2005). According to Standard and Poor's global ratings, Egypt is placed at credit rating "B" with a stable outlook in 2020. Today, the EGX is a member of the World Federation of Exchanges (WFE), the African Stock Exchanges Association (ASEA), the Federation of Euro-Asian Stock Exchanges (FEAS), the International Organization of Securities Commissions (IOSCO), and a founding member of the Union of Arab Stock (Wagdi, 2014).

Starting from 2002, the EGX modernized its listing rules, with the aim of enhancing the quality of listed companies and ensuring compliance with disclosure rules and other legal regulations (Otaify, 2016). The new listing rules strengthened the EGX's power to impose penalties, ranging from monetary charges to suspending or de-listing companies, in case of non-compliance with laws and regulations (EGX, 2004). Accordingly, hundreds of companies were de-listed from the stock exchange for non-compliance with the new listing rules (Hossain, 2013).

This suggests that the new listing rules were the main reason for the downtrend in the number of listed companies on the EGX (EGX, 2007). In that regard, Algebaly et al. (2014) stated that 26% of companies were de-listed from the stock exchange as a result of the new listing rules imposed in 2002. Additionally, a new Egyptian tax law was issued in 2005, which lifted some of the tax exemptions that were previously granted to listed companies on the EGX. As a result, many companies requested voluntary de-listing from the stock exchange, leading to a significant drop in the number of listed companies (El Bannan, 2011).

As shown in figure (3.1), the number of listed companies on the Egyptian Exchange has grown from 654 companies in 1997 to 1150 in 2002, when it reached its peak. Following the new listing rules of 2002, it dropped to 795 companies in 2004. Imposing the new tax law in 2005 contributed to an additional drop in the number of listed companies to reach 435 companies in 2006, then decreased to less than 300 companies starting from 2010.

The EGX has witnessed an impressive economic growth starting from 1992, after implementing the economic reform program (see figure 3.2.). As shown in figure 3.2., the economic growth in Egypt boomed from 0.3% in 1992 to 7.5% in 1998, as a result of the major economic reforms undertaken after 1992. However, due to major international shocks (such as the sharpe decline of oil prices in 1998; and the world economic recession of 2001), the Egyptian economic growth plummeted from 7.5% in 1998 to 3.2% in 2003, before beginning to recover thereafter. The economy has grown again from 3.2% in 2003 to 7.2% in 2008, then plummeted after 2008, as a result of the global financial crisis, until it reached 1.8% in 2011 following the revolutionary uprising of January 2011. After the country reached a relative political stability in 2014, the economy started to recover again achieving a growth rate of 5.6% in 2019, however, it plummeted to 3.5% in 2020 because of the Corona Virus Pandemic.

Figure 3.1. Listed Companies in the EGX

Egypt - Listed companies
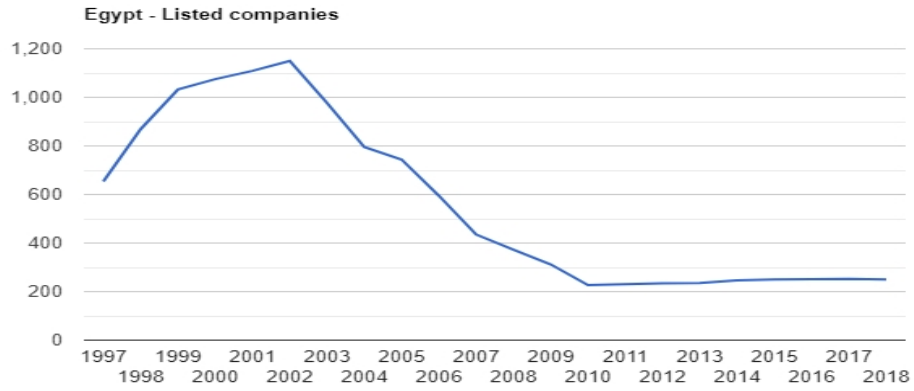
Source: TheGlobalEconomy.com, The World Bank

Figure 3.2. Economic Growth in Egypt
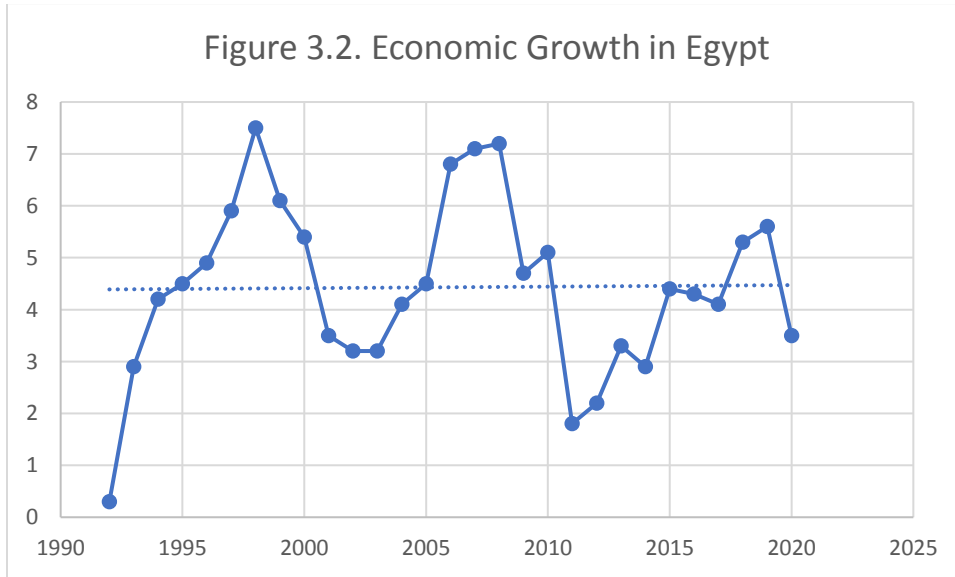
(Source: International Monetary Fund: World Economic Database)

3.3 The Development of the Egyptian Accounting System

3.3.1. The Effect of Economic Development on the Egyptian Accounting Regulations

It is argued in the prior literature that accounting is affected by changes in the business environment, including cultural, social, legal, and economic changes (Radebaugh and Gray, 1997). This is why accounting practices and disclosure differ between countries, and also vary within the same country from one time to another (Saudagaran and Digay, 2000; Chand, 2005). In addition, the different stages of economic development in Egypt affected the accounting systems and practices over time. In general, as the economy in a country develops, the economic activities increase, leading to a higher number of listed companies and investors (Hassabelnaby and Mosebach, 2005; Michas, 2011; Hassabelnaby et al., 2003). However, the case in Egypt was different, as the number of listed companies dropped because of the enforcement of the new listing rules and the imposition of the new tax regulations. Such a situation places more pressure on companies to disclose more information to satisfy the needs of those investors; therefore, the accounting regulations, practices, and functions should develop (Chamisa, 2000; Ashraf and Ghani, 2005; Doupnik and Salter, 1995). The following section discuss the development of the accounting system in Egypt during its different economic development stages.

Egypt had no regulations for organizing accounting practices until the 1960s, when the unified accounting system (UAS) was enacted in 1966 (Elbayoumi et al., 2019). The government passed the UAS as a tool for planning and controlling the economic activities, instead of ensuring consistency with disclosure requirements (Briston and El-Aashker, 1984; Samuels and Oliga, 1982; Hassan, 2008). During that period, known as the socialist era, the government was almost the sole user of accounting information (Mostafa, 2016); the accounting profession had a very limited role in developing Egyptian financial reporting, as the profession was under state control (Hassan, 2008). The role of accountants was mainly to produce the accounting reports required by the government (Amer, 1969), whereas disclosure to the public market participants was not emphasized.

The start of a shift towards a market economy in Egypt occurred in the 1970s; this was based on a tendency towards more privatization, and required a development in accounting practices and regulations. Massoud (1998) stated that a successful transformation to a market economy must be accompanied with a market-oriented accounting and reporting system. This is because the increased privatization works by transferring the ownership of companies from the government to the stockholders; this creates more pressure to increase transparency and professionalism, as the disclosure requirements of stockholders are different and more sophisticated than those of the government (World Bank, 2002; Hassabelnaby et al., 2003). In 1981, the Egyptian government issued the Company Act (CA), which allowed the establishment of different kinds of private companies, and mandated auditing of private companies for the first time (Dahawy et al., 2011; Hassabelnaby et al., 2003; Hassan, 2008). Although the CA imposed new financial reporting requirements for private companies, the public sector companies continued to apply the UAS (Hassan, 2008). The focus of the CA was on typical matters such as the types of reports provided, instead of focusing on technical issues regarding the implemented accounting measures (Hegazy, 1991); this resulted in lower reliability of the financial reporting system.

Undertaking the economic reform programme of 1991 required more developments in the Egyptian accounting system, and it strongly motivated the implementation of International Financial Reporting Standards (IFRS) (Mostafa, 2016). The CML of 1992 was issued by the Egyptian government to create an attractive environment for local and foreign investors, through achieving international comparability in companies' accounting disclosure (Mecagni and Sourial, 1999; Abdelsalam and Weetman, 2007). The CML made significant developments in the Egyptian accounting system through introducing new accounting disclosure requirements for listed companies, to satisfy investors' needs. The law also required companies to apply the international accounting standards in matters not included in the law: this included some international standards being translated into Arabic (the native language), while others were untranslated, which resulted in varying levels of compliance with the international standards (Abdelsalam and Weetman, 2007), (nowadays, however, all international standards are

translated). Imposing the international standards in Egypt was an important step towards improving the credibility of Egypt's corporate financial reporting and facilitating the transition to a market economy (World Bank, 2002). Improving the credibility and fairness of the Egyptian financial reporting, as a result of applying the international standards, helped to attract international investments and encouraged Egyptian participation in the global economy (Samaha and Dahawy, 2011). Additionally, applying the international standards allowed accountants to exercise professional judgment, thereby increasing the importance of accounting as a profession (Dahawy and Conovar, 2007). Another benefit of the international standards in Egypt is that they simplified the process of developing the national accounting standards (Samaha and Dahawy, 2011). It is also argued in the prior literature that applying the international standards in an economy helps to reduce the cost of equity capital through requiring more disclosure than the local standards, and by improving comparability across companies (Ashbaugh and Pincus, 2001; Armstrong et al., 2010). However, the inconsistency of some international standards with the Egyptian environment, as well as the weak enforcement mechanisms and the multiplicity of concurrent regulations during that period, resulted in a degree of resistance, which was reflected in selective implementation of the international standards (Dahawy and Conovar, 2007, Hassan, 2008).

In 1996, the Egyptian government formed a permanent institution, known as the Egyptian Institute of Accounting and Auditing (EIAA), with the purpose of issuing an Egyptian set of accounting and auditing standards (Ragab and Omran, 2006). The EIAA grew in its importance and became a member of the International Federation of Accountants (IFAC) (Abdelsalam and Weetman, 2007; Hassan, 2008). The initial set of Egyptian accounting standards (EASs) were created in 1997 and comprised 19 standards which are mainly based on the international accounting standards with some minor modifications to accommodate with the Egyptian business environment (Hassan, 2008). The EIAA continued to develop the Egyptian accounting standards until a set of 35 standards were issued in 2006 (Hassan, 2008). Recently, in 2016, the Egyptian accounting standards were modified to comprise 38 standards which are in conformity

with the 2013 bound volume of international accounting standards except 8 standards (see table 3.1. about the differences between the Egyptian standards and international ones).

Table 3.1. Differences between EASs and IASs/IFRSs			
EAS	**Name of the standard**	**IAS/IFRS**	**Difference**
EAS 1	Presentation of financial statements	IAS 1	Different (1)
EAS 2	Inventories	IAS 2	No difference
EAS 4	Statement of cash flows	IAS 7	No difference
EAS 5	Accounting policies, changes in accounting estimates and errors	IAS 8	No difference
EAS 7	Events after the reporting period	IAS 10	No difference
EAS 8	Construction contracts	IAS 11	No difference
EAS 10	Fixed assets and its depreciation	IAS 16	Different (2)
EAS 11	Revenue	IAS 18	No difference
EAS 12	Government grants and disclosure of government assistance	IAS 20	No difference
EAS 13	The effect of changes in foreign exchange rates	IAS 21	No difference
EAS 14	Borrowing costs	IAS 23	No difference
EAS 15	Related party disclosures	IAS 24	No difference
EAS 17	Separate financial statements	IAS 27	No difference
EAS 18	Investments in associates	IAS 28	No difference
EAS 20	Accounting rules and standards related to financial leasing	IAS 17	Different (3)
EAS 21	Accounting and reporting by retirement benefit plans	IAS 26	No difference
EAS 22	Earnings per share	IAS 33	Different (4)
EAS 23	Intangible assets	IAS 38	Different (5)
EAS 24	Income taxes	IAS 12	No difference
EAS 25	Financial instruments: presentation	IAS 32	No difference
EAS 26	Financial instruments: recognition and measurement	IAS 39	No difference
EAS 28	Provisions, contingent liabilities and contingent assets	IAS 37	No difference
EAS 29	Business combinations	IFRS 3	No difference
EAS 30	Interim financial reporting	IAS 34	No difference
EAS 31	Impairment of assets	IAS 36	No difference
EAS 32	Non-current assets held for sale and discontinued operations	IFRS 5	No difference
EAS 34	Investment property	IAS 40	Different (6)
EAS 35	Agriculture	IAS 41	No difference
EAS 36	Exploration for and evaluation of mineral assets	IFRS 6	No difference
EAS 37	Insurance contracts	IFRS 4	No difference
EAS 38	Employee benefits	IAS 19	Different (7)
EAS 39	Share-based payments	IFRS 2	No difference
EAS 40	Financial instruments: disclosure	IFRS 7	No difference
EAS 41	Operating segments	IFRS 8	No difference
EAS 42	Consolidated financial statements	IFRS 10	Different (8)

EAS 43	Joint arrangements	IFRS 11	No difference
EAS 44	Disclosure of interests in other entities	IFRS 12	No difference
EAS 45	Fair value measurement	IFRS 13	No difference

As can be seen in table 3.1., most of the Egyptian accounting standards are in conformity with the international standards except for 8 standards which are:

(1)- EAS 1: Presentation of financial statements: the difference is that profit distribution to employees and members of boards of directors are not recorded as expenses in the income statement, instead they are recorded as dividends distribution.

(2)- EAS 10: Fixed assets and its depreciation: the paragraphs (31-42) related to the revaluation model have been modified, as this model can only be used in certain cases, otherwise the entity should use the cost model as provided in paragraph 30 of IAS 16.

(3)- EAS 20: Accounting rules and standards related to financial leasing: this standard is completely different from IAS 17. According to the Egyptian standard, the lessor records the leased asset and the related depreciation, while the lessee records payments of the lease contract as expenses in the period in which they are paid.

(4)- EAS 22: Earnings per share: the only difference is that resulted from the departure of EAS 1.

(5)- EAS 23: Intangible assets: the paragraphs (75-87, 124, 125) related to the revaluation model were omitted as this model is not used and the entity is to use the cost model in paragraph 74.

(6)- EAS 34: Investment property: the paragraphs (31, 33-55, 60-65, 74-79) related to fair value model were omitted as this model is not used and the entity is to use the cost model in paragraphs 56 and 79.

(7)- EAS 38: Employee benefits: the only difference is that resulted from the departure of EAS 1.

(8)- EAS 42: Consolidated financial statements: the paragraphs (27-33) related to exempting investment entities from consolidating financial statements were omitted.

3.3.2. The Development of Corporate Governance in Egypt

Due to the significant improvements made to the Egyptian accounting regulations and practices in the period of implementing the extensive economic reform, increased attention was given to corporate governance issues when various regulations and ideas of corporate governance were formulated (Desoky and Mousa, 2012). This growing concern for corporate governance is important for enhancing economic efficiency, increasing transparency and professionalism, and creating a more attractive environment for local and foreign investments (Desoky and Mousa, 2012; El-diftar et al., 2017). In 2001, the World Bank conducted a study on corporate governance practices by the top 30 listed companies in the Egyptian Exchange. The study reported that the governance regulations in Egypt protected the main shareholders' equity, and that the Egyptian accounting standards were prepared in conformity with the international standards. However, the study participants gave negative comments regarding transparency and disclosure (World Bank, 2001). Among the reported shortcomings in the Egyptian financial reporting were the lack of disclosure regarding ownership structure and management; lack of segment reporting; lack of disclosure regarding related party transactions; inadequate risk disclosure by banks; and a departure from full compliance with the Egyptian accounting standards (World Bank, 2001; Desoky and Mousa, 2012). Accordingly, the CMA issued new listing rules in 2002, including comprehensive disclosure requirements that were designed to activate and enhance corporate governance practices by the Egyptian listed companies (Hassaan, 2013).

In 2004, the World Bank conducted a second study regarding the improvements that were achieved in the Egyptian corporate governance regulations. The study reported that the new listing rules of 2002 resulted in the de-listing of 99 non-compliant companies in 2003 (World Bank, 2004). The study also found that Egypt achieved significant improvements in corporate governance regulations; however, there were still some deficiencies in corporate governance practices, especially transparency and disclosure by the Egyptian listed companies (World Bank, 2004; Desoky and Mousa, 2012). Among these deficiencies were a lack of disclosure of business ethics matters; absence of corporate social responsibility disclosure; and absence of an in-depth

management discussion and analysis section in the annual reports of many listed companies (World Bank, 2004; Desoky and Mousa, 2012).

In response to the World Bank's recommendations of 2004, regarding the need to improve corporate governance practices and to increase transparency and professionalism in the Egyptian companies, the Egyptian Corporate Governance Code (ECGC) was issued in 2005. The ECGC was issued in light of the guidelines of the Organization for Economic Cooperation and Development (OECD), with the purpose of enhancing the financial reporting quality and increasing investors' confidence in the Egyptian capital market (Samaha and Dahawy, 2011). The code focuses on various aspects of corporate governance, such as the responsibilities of the board of directors, avoiding conflicts of interest, improving transparency and disclosure, and guaranteeing the rights of all shareholders (Elbayoumi et al., 2019; Desoky and Mousa, 2012). However, the ECGC was issued on a voluntary basis, with the result that Egypt's corporate governance practices are still suffering from some deficiencies (Ebrahim and Fattah, 2015).

In 2009, the World Bank conducted the third study on corporate governance practices in Egypt, and proposed a number of reforms that were required to build a modern corporate governance framework (Shehata and Dahawy, 2013). The study reported a significant improvement in the quality of financial reporting over the years, as electronic filing systems were developed, and significant institutional reforms were undertaken (World Bank, 2009; Shehata and Dahawy, 2013). However, the study reported some negative aspects, such as a lack of risk management and internal control procedures; decrease in the number of listed companies as a result of applying the new governance rules; and non-compliance with the corporate governance code because it was issued on a voluntary basis (Ebaid, 2011; Shehata and Dahawy, 2013). The study recommended that the corporate governance code be modified and implemented on a 'comply or explain' basis instead (World Bank, 2009).

3.4 Accounting Disclosure in Egypt

3.4.1. Overview

Financial reporting in Egypt is regulated under the CML of 1992, and is controlled by the CMA, which is responsible for enforcing the law and overseeing listed companies' compliance with disclosure rules and regulations (Elbayoumi et al., 2019). The CMA reviews financial reports of listed companies, to ensure timely and full compliance with the disclosure requirements by the CML (Hassan et al., 2009); it is the governmental body responsible for ensuring a secure market for investors, and maintaining transparency and fairness in the capital market (Dahawy and Conover, 2007; Ismail and Elshaib, 2012). In case of disclosure misconduct, the CMA is the corresponding authority to penalize the non-compliant firm, through either monetary penalties or suspending or de-listing its securities (Hassan et al., 2009).

The CML requires listed companies in the EGX to prepare their financial reports in accordance with the Egyptian accounting standards, or the international standards in matters not covered by the local standards. A copy of each report has to be provided to the EGX and the CMA; it must also be published in two daily newspapers, at least one of which must be in Arabic (Hassan et al., 2011; Akle, 2011). The annual report is the main tool of disclosing information to the public; indeed, other complementary sources, such as earnings forecasts and conference calls, are rarely existent in Egypt (Ismail and Elshaib, 2012). The annual report must include a balance sheet, an income statement, a cash flow statement, a statement of changes in equity, a comprehensive income statement, notes to the accounts, a board of directors' report, and a report by the external auditor. Regarding non-financial disclosure, "some are regulated such as share class voting rights, board remuneration, details of board members and information regarding senior management", however, the company can decide about the level of detail in the information disclosed (Hassan et al., 2011).

Through investigating the previous studies that measured disclosure level in Egypt, it is found that there is no full compliance with mandatory disclosure requirements, and that the

voluntary disclosure levels are very low (e.g. Dahawy and Conover, 2007; Desoky and Mousa, 2012; Soliman, 2013; Abdelsalam, 1999; Ellabbar and Havard, 2005; Samaha et al., 2012; Hassaan, 2013). The World Bank (2009) reported that despite the developments undertaken in the Egyptian financial reporting regulations, the non-compliance with disclosure requirements is very apparent. These studies provide several explanations for the low disclosure levels in Egypt, the most important of which are (Hassan et al., 2011): 1) the conflict between the need for increased disclosure and the Egyptian business environment; 2) the weak enforcement mechanisms for non-compliant firms; and 3) the high costs of compliance with disclosure requirements. The following paragraphs discuss these theories in further detail.

3.4.2. The Conflict Between the Need for Increased Disclosure and the Egyptian Business Environment

Gray (1989) argues that accounting practices in an environment are affected by the culture of that environment, and that accounting needs to be analysed in the context of the environment in which it operates. It is generally known that the Egyptian business culture and accounting system is characterized by its secretive and conservative nature (Dahawy et al., 2002). This tendency started during the socialist era, when the annual reports of public enterprises were treated as very sensitive information, and disclosing it to the public might cause economic disturbances (Hegazy, 1991). This secrecy trend in Egypt has continued until today, because managers believe that increased disclosure may be exploited by their competitors, and their companies may face additional tax obligations if they report high profits (Dahawy and Conover, 2007). This preference conflicts with the need to improve disclosure, following several developments in Egypt's accounting regulations (Dahawy et al., 2002). Additionally, this cultural preference may lead to a negative perception among investors when the company discloses more information voluntarily; they may suspect or misinterpret the intentions of the company, resulting in increasing uncertainty about its future prospects (Hassan et al., 2009).

3.4.3. The Weak Enforcement Mechanisms for Non-Compliant Firms

Egypt, as a developing country with an emerging capital market, has a weak regulatory environment that is characterized by low investor protection levels and weak enforcement mechanisms. In weak regulatory environments, high-quality financial reporting standards do not achieve benefits for market participants, because the lack of enforcement mechanisms in these countries results in selective implementation of the standards (Tweedie and Seidenstein, 2005; Ball et al., 2003). Cooke and Wallace (1990) argue that the effectiveness of any country's disclosure regulations is associated with the degree of enforcement in that country. The World Bank (2002) suggested that Egypt's low rate of compliance with disclosure requirements is mainly related to the lack of strong enforcement mechanisms for non-compliant firms. As a result, the cost of non-compliance with disclosure requirements is not significant in Egypt (Hassan et al., 2009).

The non-compliance costs include market pressures from shareholders and other users, and the penalties imposed by regulatory bodies, in the form of either monetary penalties or de-listing from the stock exchange (Abayo et al., 1993; Abdelsalam and Weetman, 2007). In Egypt, most investors are small, so that they cannot form pressure groups like their counterparts in developed markets (Elsadik, 1990). Furthermore, the imposed penalties in Egypt are mostly monetary and are rarely enforced. Additionally, de-listing from the stock exchange is rare in Egypt, because the number of listed companies is seen as a measure of the stock market's success (Hassan et al., 2009).

3.4.4 The High Costs of Compliance with Disclosure Requirements

Although improved disclosure has many benefits, such as increasing stock market liquidity and reducing estimation risk, the size of these benefits is seen as too small, compared to the costs of compliance with disclosure requirements (Amihud and Mendelson, 2000; Botosan, 2000). In Egypt, companies make a trade-off between the costs of compliance and non-compliance, especially when penalties are small, due to the weak regulatory environment. The costs of

disclosure in Egypt include: 1) the high cost of information production, because imposing the international standards requires extensive training for accountants and the updating of information systems (World Bank, 2002; Abdelsalam and Weetman, 2007; Taha and Elgiziri, 2016); 2) the litigation costs incurred when the company is sued because of misleading increased disclosure (Elliott and Jacobson, 1994); and 3) the disclosed information may be exploited by competitors, placing the company at a competitive disadvantage (Hassan et al., 2009). For example, competitors can benefit from the disclosed information about technological and managerial innovation, strategies and plans, and information about operations (Elliott and Jacobson, 1994). The high costs of compliance with disclosure requirements and the low costs of non-compliance in Egypt have led to less than full compliance with mandatory disclosure requirements, and a very low level of voluntary disclosure.

3.5. Summary of the Chapter

The major economic reforms undertaken in Egypt in the 1990s were followed by a substantial growth in the Egyptian stock market. After it became inactive for about 30 years, the Egyptian Exchange started to grow again, until it become one of the best stock exchanges in Africa and the Middle East. These reforms also affected the accounting regulations and practices in Egypt. The most radical regulation was the Capital Market Law (CML) of 1992, which made significant improvements in the Egyptian accounting regulations. The CML introduced comprehensive disclosure requirements for listed companies, and required the implementation of the international accounting standards in matters not covered by the law. Subsequently, the Egyptian accounting standards were formulated in accordance with the international standards, with the exception of minor modifications to accommodate to the Egyptian business environment. Additionally, an Egyptian corporate governance code was issued, with the purpose of enhancing the quality of Egyptian financial reporting and developing the corporate governance structure.

The annual report represents the main tool of disclosure in Egypt; other complementary sources such as earnings forecasts and conference calls are rarely existent. Prior literature measuring accounting disclosure in Egypt reported less than full compliance with disclosure requirements and very low levels of voluntary disclosure. The most important provided justifications for these low disclosure levels are the conflict between the need for increased disclosure and the Egyptian business environment; the weak regulatory environment in Egypt, which resulted in low costs of non-compliance with disclosure requirements; and the high costs of compliance with disclosure requirements.

Chapter 4: Empirical Analyses

4.1. Methodology:

4.1.1. Research hypotheses:

The main objective of the research is to test the association between the level of accounting disclosure of the Egyptian listed companies and their cost of equity capital. More specifically, the research tests the effect of the mandatory disclosure level and that of the voluntary disclosure level on the cost of equity capital which is estimated using three estimation methods. Accordingly, the following research hypotheses are formulated to achieve the research objective of testing the association between the accounting disclosure level and cost of equity capital in the Egyptian capital market:

H1: There is a negative association between the level of mandatory disclosure of the Egyptian listed companies and their cost of equity capital.

H2: There is a negative association between the level of voluntary disclosure of the Egyptian listed companies and their cost of equity capital.

4.1.2. Sample description:

The sample used to test the research hypotheses consists of the top 100 companies listed in the Egyptian Exchange, as measured by EGX 100 price index, in year 2017 for 9 years from 2008 to 2016. The Egyptian Exchange has four equity indices, namely EGX 100, EGX 70, EGX 30, and EGX 20. The EGX 100 index tracks the performance of the top 100 companies, in terms of liquidity and activity, including both the 30 constituent companies of the EGX 30 index and the 70 constituent companies of the EGX 70 index (The Egyptian Exchange website). The EGX 100 index avoids concentration on one industry, and therefore has a good representation of the various industries/sectors in the economy (The Egyptian Exchange website). EGX 100 constituents are reviewed twice a year, whereby constituents are changed (added or deleted) if necessary, based

on their activity and liquidity; this includes the number of executed transactions and the number of trading days (The Egyptian Exchange website). The EGX 100 index was chosen because companies outside those 100 are considered 'rarely traded' companies (not active). Rarely traded companies retain a listing on the Egyptian Exchange primarily to achieve the tax exemption benefits offered to listed companies in Egypt (Abdelsalam & Weetman, 2007). The EGX 100 index, compared to other indices, allows for a greater sample size and, therefore, the possibility of generalizing the results. The nine years from 2008 to 2016 were used, as they were the most recent nine years at the time of conducting the analyses. Firstly, I used 10 years from 2008 to 2017, however, I excluded 2017 from the sample because I could not calculate the cost of equity capital for 2018 due to unavailability of the needed data. Excluding financial companies from the sample, due to differences regarding their disclosure requirements, resulted in a sample of 78 companies each year. After that, I excluded 5 companies from the sample due to unavailability of data. This sample selection procedure is shown in Table 4.1. The final sample includes 657 firm year observations for 73 firms across 11 industries for 9 years from 2008 to 2016. Table 4.2 lists the total number of firms classified by the corresponding industry over the sample years. The sample companies' sectors and codes are shown in Appendix 1.

Table 4.1. Sample Selection Procedure		
Sampling procedure steps	Absolute number	Percent
Listed Firms	100	100%
Less: Financial Companies	(22)	(22%)
Less: Other companies with unavailable data	(5)	(5%)
Number of sample firms	73	73%

Table 4.2. Sample Industry Breakdown											
Industry	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total	Percent
1-Chemicals	6	6	6	6	6	7	7	7	7	58	10%
2-Construction	9	9	9	9	9	9	10	10	10	84	14%
3-Food & Beverage	6	6	7	8	9	9	10	9	10	74	12%
4-Oil & Gas	3	3	3	3	3	3	3	3	3	27	4%
5-Personal & Household	5	5	5	5	5	5	5	5	5	45	7%
6-Real estate	11	11	11	12	12	12	12	12	11	104	17%
7-Basic Resources	4	4	4	4	4	4	4	4	4	36	6%
8-Industrial goods	10	10	10	9	10	10	10	10	10	89	15%
9-Health Care	1	1	1	2	2	2	2	2	2	15	2%
10-Travel & Leisure	4	4	3	4	4	6	5	4	5	39	6%
11-Telecommunications	3	3	3	3	4	4	4	4	4	32	5%
Total	62	62	62	65	68	71	72	70	71	603	100%

4.1.3. Data availability:

On the one hand, the research depends on the data contained in the sample companies' annual reports, in order to measure the level of mandatory and voluntary disclosure. These reports were purchased from the Egyptian company for Information Dissemination (EGID). For more than 10 years, EGID has been the sole aggregator and authorized distributer of the EGX-listed companies' information, and it is responsible for providing researchers and others with information about all listed companies in the EGX. Acquiring the data from this company, compared to other sources, has the advantage that the data will be more organized and more trustworthy. On the other hand, the research depends on data about the Egyptian capital market collected from Thomson Reuters DataStream database to measure the cost of equity capital and control variables.

4.1.4. Variables of the study:

This section summarizes the used variables to test the relationship between accounting disclosure and cost of equity capital. Table 4.3 summarizes the variables of the study, their definitions, the required data to calculate them, and the data sources. As it appears from the table, there are 11 variables used in the study, 5 main variables and 6 control variables that are found to influence the relationship between accounting disclosure and cost of equity capital. The main variables of the study are the accounting disclosure and the cost of equity capital. Accounting disclosure is decomposed into two variables: mandatory disclosure and voluntary disclosure. The cost of equity capital is estimated using 3 methods, therefore, decomposed into 3 variables: industrial earnings-price ratio, capital asset pricing model, and Fama and French 3-factor model. The control variables used in the study are firm size, book-to-market ratio, leverage, liquidity, profitability, and sales growth. Table 4.4 summarizes the process of measuring these variables. The next 3 sections, 4.2, 4.3, and 4.4, describes in detail the variables of the study and their measurement process along with interpreting the measurement results.

Variable	Definition	Required Data	Data Sources
Table 4.3 Variables Definitions			
1- **Ind.EP**	Industrial earnings-price approach-based estimate of cost of equity capital	Market price, net income, number of shares outstanding	Thomson Reuters DataStream Database
2- **CAPM**	Capital asset pricing model estimate of cost of equity capital	3-years treasury bonds, EGX 30 price index return, Beta	Thomson Reuters DataStream Database, EGX website, Central Bank of Egypt website
3- **F.&F.**	Fama & French three factor model-based estimate of cost of equity capital	3-years treasury bonds, EGX 30 price index return, Beta, market capitalization, book-to-market ratio	Thomson Reuters DataStream Database, EGX website, Central Bank of Egypt website
4- **M.Dis.**	Mandatory Disclosure level	Annual Report	Annual Report
5- **V.Dis.**	Voluntary Disclosure level	Annual Report	Annual Report
6- **BM**	Book-to-market ratio	Book value of common equity, closing price, number of shares outstanding	Thomson Reuters DataStream Database
7- **Liquidity**	Liquidity or current ratio	Current assets and current liabilities	Thomson Reuters DataStream Database & Annual report
8- **Leverage**	Leverage	Total liabilities and total assets	Thomson Reuters DataStream Database & Annual report
9- **Size**	Firm Size	Total assets	Thomson Reuters DataStream Database & Annual report
10- **Profitability**	Profitability or return on assets	Net income and total assets	Thomson Reuters DataStream Database & Annual report
11- **Growth**	Sales growth	Net Sales	Thomson Reuters DataStream Database & Annual report

Table 4.4. Measurement of the study variables	
Variable	**Measurement**
1- M.Dis.	The extent of mandatory information disclosed in the annual report.
2- V.Dis.	The extent of voluntary information disclosed in the annual report.
3- Ind.EP	The difference between the earnings/price ratio and the industry median earnings/price ratio.
4- CAPM	Rft + (Rmt – Rft) βit (Rft is the risk-free rate, Rmt is the market return, Rmt-Rft represents the market risk factor, and β is the systematic risk of the firm).
5- F.&F.	Rft + (Rmt – Rft) βit + SMB + HML (SMB is the size risk factor and HML is the value/growth risk factor).
6- BM	The book value of common equity divided by the market value of common equity.
7- Liquidity	The ratio of current assets to current liabilities.
8- Leverage	The ratio of total liabilities to total assets.
9- Size	The natural logarithm of total assets.
10- Profitability	The ratio of net income to total assets.
11- Growth	Net sales for year (t) less net sales for year (t-1), scaled by net sales of year (t-1).

4.2. Cost of Equity Capital:

4.2.1 Cost of Equity Capital Estimation Methods:

Measuring the cost of equity capital is one of the most challenging topics in corporate finance literature, because it is an expected rate of return which cannot be directly observed by the market (Asal, 2015). Most researchers measured the cost of equity capital by using an indirect approach, through measuring variables that are related to this cost, instead of directly measuring it (Botosan, 1997). As previously stated in Chapter 2, the cost of equity capital consists of the risk-free rate, and a risk premium to compensate investors for holding riskier assets. Determining the risk-free rate is not problematic, as it can be directly observed from the market; however, the problem lies in determining the risk premium. The risk premium cannot be directly observed by the market and is affected by many factors such as "earnings manipulation in financial reporting, the accounting quality level adopted by management, and the extent of risk reporting" (Kaspereit et al., 2015). In estimating the risk premium, several alternative approaches are being used by researchers; each has both advantages and limitations. These approaches can be categorized as two main strands. The first research strand estimates the cost of equity capital through inferring it ex-post from realized returns; this is called the 'ex-post cost of equity' approach. The second research strand infers the cost of equity capital ex-ante using the current market price and future

dividends expectations; this is referred to as the 'ex-ante cost of equity' approach. The following paragraphs describe the two approaches in some detail.

4.2.1.1. Ex-Post Cost of Equity Capital Approaches

A wide body of literature estimates the cost of equity capital using the average realized returns. It is argued in the literature that there is a difficulty in relating the realized returns to the market beta, thereby providing a biased estimate of the cost of equity capital (Fama and French, 1992; Botosan, 1997; Gebhardt et al., 2001). Proponents of using realized returns to proxy for expected returns argue that using a large sample could overcome this problem, thus ensuring an unbiased estimate (Reverte, 2012). However, others evidenced that it is difficult to find a relation between realized returns and market beta, even when using a large sample (Botosan and Plumlee, 2005; Elton, 1999; Fama and French, 1992). To incorporate risk into the cost of equity capital, researchers are using the asset pricing models as an alternative, by employing predetermined priced risk factors to estimate the cost of equity capital (Botosan, 2006).

The capital asset pricing model (CAPM), developed by Sharpe (1964) and Lintner (1965), is the earliest and most widely used model, which provides the foundations for estimating the cost of equity capital (Bertomeu and Cheynel, 2016). The idea of the CAPM is that the expected return on a security (i.e. the cost of equity capital), above the risk-free rate, varies with the relative risk (non-diversifiable risk) of that security, and that beta is the most acceptable measure of this relative risk (Gordon and Gordon, 1997). The CAPM established that beta alone is sufficient to explain the variation in the cost of equity capital (Aldaarmi et al., 2015). Moreover, the CAPM provided the basis of the relationship between risk and expected returns and, therefore, is considered one of the most important models in finance (Bilgin and Basti, 2011). Although the CAPM was developed more than five decades ago, it remains the most commonly used model for estimating the cost of equity capital for individual companies (King, 2009). This importance of the CAPM resulted in Sharpe being awarded the Nobel Prize for Economics in 1990 (Oke, 2013).

Despite its popularity in academia and the financial world, the CAPM has been criticized by researchers regarding its ability to estimate the cost of equity capital. The main shortcoming of the CAPM is that it assumes that expected returns varies with a single market risk factor (beta)

(Asal, 2015). Empirical evidence suggests that beta alone is not sufficient to explain variations in expected returns, and that additional risk factors need to be incorporated into the CAPM (Fama and French, 1993; Asal, 2015). This leads to the introduction of multi-factor asset pricing models through adding more risk factors to the single market risk factor used in the CAPM. However, the major problem of the multi-factor models is the lack of theoretical support regarding the additional factors to be included (Asal, 2015). Prior research evidenced that other factors such as size, leverage, book-to-market equity, and price–earnings ratio could be added to the market risk factor in the CAPM, to provide a better explanation of variations in expected returns (Fama and French, 2004). Within this context, several multi-factor models were introduced by researchers, the most acceptable of which is the Fama–French three-factor model.

Fama and French (1993) introduced their model by adding two factors, size and book-to-market ratio, to the market risk factor used in the CAPM. They evidenced that adding size and book-to-market ratio to beta provides a better explanation of variations in the expected returns. It is evidenced in the prior literature that both of these factors can improve the CAPM's ability to estimate the cost of equity capital (Banz, 1981; Stattman, 1980; Rosenberg et al., 1985). Banz (1981) demonstrated that adding the size factor to the CAPM provides a different estimation of the expected returns, compared to that explained by beta alone. Stattman (1980) and Rosenberg et al. (1985) found a significant effect of adding the book-to-market ratio in estimating the cost of equity capital. The Fama and French three-factor model gained popularity, and is still extensively used by researchers and practitioners, in estimating the cost of equity capital in developed and developing countries (Guay et al., 2011). However, the major shortcoming of the Fama–French model, compared to the CAPM, is that it is mainly based on observations from empirical results, rather than on a strong theoretical background (Lee, 2006).

4.2.1.2. Implied (ex-ante) Cost of Equity Capital Approaches

Another line of research estimates the cost of equity using the ex-ante implied cost of equity approach. This method defines the cost of equity capital as the internal rate of return that equates the company's market value of equity to the present value of future relevant attributes such as cash flows, dividends, or book value of assets (Botosan, 2006; Lambert, 2009). This

approach is based on the dividend discount model of Ohlson (1995), which assumes that the current stock price equates to the value of expected dividends receivable, discounted at the cost of equity capital (Embong et al., 2012). These models estimate the cost of equity capital using earnings and/or dividends forecasts, and a terminal value, in the estimation process (Teresa, 2008). These models are mainly based on the following equation (Ohlson, 1995):

$$P_t = \sum_{t=1}^{\infty}(1 + r)^{-t} E_0(dps_t)$$ **Equation (1)**

This equation means that the market price of a firm's stock at time t (P_t) is equal to the sum of expected dividends $(E_0(dps_t))$ discounted at the cost of equity **(r)**.

The ex-ante implied cost of equity capital approach is based on accounting figures rather than market information, and does not need to identify the risk factors that affect the expected returns, as in factor models (Kristandl and Bontis, 2007). Within the context of the ex-ante cost of equity capital approach, researchers are using various models, which can be mainly categorized into two groups based on the same concept. One group, referred to as 'accounting-based valuation models', incorporates abnormal earnings and book values of equity into the dividend discount model of Ohlson (1995), thereby allowing the stream of expected dividends to be replaced by the current book value of equity plus a function of future accounting earnings (Claus and Thomas, 2001). This group of models uses the following formula as the base for estimating the cost of equity capital (Ohlson, 1995):

$$P_t = Y_t + \sum_{t=1}^{\infty}(1 + r)^{-t}E_0(X_{t+T}^a)$$ **Equation (2)**

This equation means that the market price of a firm's stock at time t (P_t) is equal to its book value (Y_t) adjusted for the present value of expected abnormal earnings $(E_0(X_{t+T}^a))$.

The other group, known as 'earnings growth models', converts the dividend discount model of Ohlson (1995) into an earnings-based model through replacing the book values of equity, as used in the first type, with capitalized earnings (Ohlson and Jeuttner-Nauroth, 2005). This type of model uses forecasted dividends and earnings to estimate the cost of equity capital (Claus and Thomas, 2001; Artiach and Clarkson, 2011). To conclude, both groups are using the same basis, the dividend discount model, in the sense that the implied cost of equity is derived

by equating the current stock price to the present value of future relevant attributes (dividends, earnings, and book values).

Although implied cost of equity approaches are considered by many researchers as advantageous to the ex-post cost of equity approaches – in the sense that they do not use realized returns to proxy for expected returns, and they do not need to identify the multiple risk factors affecting the cost of equity – nevertheless, they have some limitations. The major limitation of the implied cost of equity approaches lies in its reliance on analysts' forecasts of earnings, because expected dividends are not publicly observable (Gode and Mohanram, 2003). Using analysts' forecasts has many problems: for instance, they often exhibit systematic errors, leading to a significant bias in the resulting cost of equity estimates, such as the positive bias because of optimistic analysts' forecasts (Easton and Sommers, 2007; Shan-Cun and Wei-Ning, 2012; Kaspereit et al., 2015). Another problem is that reliance on analysts' forecasts results in limited sample sizes in most cases, because these forecasts are only available for large firms with a high analyst following; and this could cause a selection bias in the sample (Kaspereit et al., 2015). Additionally, the analysts' forecasts are only available for few companies in emerging markets such as Egypt, leading to the difficulty of using these models in emerging markets. Another limitation of the implied cost of equity approaches is the lack of consensus among researchers, regarding the horizon lengths for forecasting the valuation relevant attributes (Lambert, 2009).

In summary, measuring cost of equity capital is a challenging issue because it is an estimated rate that is not directly observable from the market. Several models have been developed in the literature, either ex-ante or ex-post, and each has its advantages and limitations, leading to a long debate about the predictive ability of each model. Therefore, the most suitable way of measuring the cost of equity capital is using more than one model and more than one approach for a large sample size.

4.2.2. The Used Methods in this Study for Estimating the Cost of Equity Capital

According to the previous investigation of the cost of equity estimation models and according to the availability of data about the Egyptian market, this research uses two models, CAPM and Fama & French three-factor model, to proxy for the ex-post cost of equity capital. As to the ex-ante cost of equity estimation methods, they all require forecasted data including earnings per share, dividends, and dividends growth rates, which are not provided by financial analysts operating in the Egyptian market. Instead, the research uses the industry-adjusted earnings-price ratio (Ind.EP), described in detail in the following section, as a proxy for the ex-ante cost of equity capital. Like the main models for calculating the ex-ante cost of equity capital, the Ind.EP. ratio method also uses the stock's price and earnings to estimate expected returns. The following three sections describe the methodology followed to estimate the cost of equity capital using the three stated methods.

4.2.2.1. Industry-Adjusted Earnings-Price Ratio

The earnings-to-price ratio is a measure that is widely used by many researchers to estimate the cost of equity capital (Basu, 1977; Noda et al., 2016; Kothari, 2001; Francis et al., 2005; Gray et al., 2009; Liu and Wysochi, 2008). Basu (1977) evidenced that earnings-price ratio provides a good explanation of variations in expected returns of U.S. stocks. Noda et al. (2016) used the price–earnings ratio as a proxy for the ex-ante cost of equity capital in Brazil. The price–earnings ratio models are similar to those of Easton (2004) and Ohlson and Juettner-Nauroth (2005); therefore, assuming that there are no abnormal earnings, it can be used as a good proxy for the ex-ante cost of capital (Noda et al., 2016). Ball (1978) posits that earnings–price ratio is a good proxy for expected returns, based on the idea that current earnings is a proxy for future earnings, and that high-risk stocks will have low prices relative to their earnings. However, this argument works only in the case of positive earnings, as the current negative earnings cannot proxy for future earnings; therefore, negative earnings should not be considered when using this approach to estimate the cost of equity capital. Hence, when measuring using this model, the price–earnings ratio is adjusted based on the industry sector of the companies selected; this is

because companies in the same industry are expected to be similar in terms of risk and earnings growth, which enhances their comparability.

In this research, the following steps were undertaken to calculate the industry-adjusted price–earnings ratio:

1- The 11 industry sectors comprising the research sample were merged to comprise five industry groups. This was due to the limited number of companies in some industry sectors, which did not allow calculation of the median for each industry sector (in some years, there were only one or two companies in some sectors). In doing so, I tried many alternatives based on two factors: the number of companies with available data in each industry sector, and the nature of the industry sector activity. That is, if the industry sector has less than three companies with available data in some years, it is merged with one or more other sectors. Also, in merging the sectors together, I tried to merge the sectors that have some similarities in the nature of their activities. I used two main alternatives in this grouping: the first was to retain those sectors that included enough data without merging, and to merge the small sectors together. This resulted in five sectors without merging, and the other six sectors were merged into one group. The second alternative was to merge each of the big sectors with one or more small sectors, while taking into consideration the similarities in the nature of the merged sectors. This resulted in five industry groups. Finally, to be certain of the logic I used in these alternatives, I calculated the industry median in each alternative, and the results obtained were very similar. This may be due to the similarities that exist in the Egyptian market between sectors in terms of risk and earnings growth. The final grouping used consists of five industry groups: the first comprises the chemicals sector, healthcare sector, and oil and gas sector. The second industry group consists of the construction sector and basic resources sector. The third includes the food and beverage sector and personal and household sector, while the fourth contains the real estate sector and travel and leisure sector. Finally, the fifth group includes the industrial goods sector and telecommunications sector.

2- The price/earnings ratio is calculated as the ratio of the share market price to the earnings per share. Earnings per share equals the net income divided by the number of shares.

3- The earnings/price ratio is then calculated as the inverse of the price/earnings ratio.

4- After that, the industry median is calculated as the median of earnings/price ratios for all companies with positive earnings in each industry group.

5- Finally, the industry-adjusted earnings/price ratio for each company is calculated as the difference between the earnings/price ratio of the company and the median earnings/price ratio for the industry group the company belongs to.

The industry-adjusted earnings/price ratios for the sample companies are shown in Appendix 2.

4.2.2.2. The Capital Asset Pricing Model:

According to this model, the cost of equity capital is calculated using the following formula:

| $E(R_i) = R_{ft} + (R_{mt} - R_{ft})\beta_{it}$ | **Equation (3)** |

- E(Ri) is the expected return on equity, or equivalently the cost of equity capital.
- Rft is the risk-free rate.
- Rmt is the market return.
- Bit is the systematic risk of the firm.
- Rmt – Rft represents the market risk factor.

As a proxy of the risk-free rate, the 3-year treasury bond issued at the end of the year is used as it is a widely used measure for the long-term treasury bonds in the Egyptian market. As to beta, it is extracted from Thomson Reuters DataStream database. Although the sample used in the research is the EGX 100 price index, I used the EGX 30 price index to proxy for the market return in Egypt. The logic behind this is that EGX 30 index is the main price index in Egypt and it is a widely used measure for the Egyptian market performance among academics and

practitioners. It is a free-float market capitalization index (i.e. weighted by market capitalization and adjusted by the free-float) of the 30 most highly capitalized and liquid stocks traded in the EGX. Free-float methodology market capitalization is calculated by taking the equity's price and multiplying it by the number of shares readily available in the market. The EGX 30 index is adjusted for the fact that many Egyptian listed companies are, in fact, rarely traded. The EGX 100 index, on the other hand, measures the changes in the companies' closing prices without being weighted by the market capitalization and it doesn't consider the free float (The Egyptian Exchange website). Additionally, only common shares are included in the EGX 100, however, preferred, convertibles, bonds and mutual funds are excluded (The Egyptian Exchange website). This is also consistent with many studies that used the EGX 30 index to proxy for the market return in Egypt although their sample was the EGX 100 (for example, Taha & Elgiziri, 2016; Shaker & Abdeldayem, 2018; Shaker & Elgiziri, 2014; Hassan et al., 2011; The Central Bank of Egypt, 2012). Hassan et al. (2011), whose sample was the EGX 100, used 3 indices to proxy for the market return, namely, the EGX 30 index, the CMA general index, and the CMA public offering companies' index. They tested the 3 indices and found that EGX 30 index provides a better proxy for the Egyptian market. Also, the Central Bank of Egypt (2012) conducted a study in which the CAPM was calculated using the EGX 30 index to proxy for the market return. The study justified using the EGX 30 index as it is preferable to EGX 70 or EGX 100 because it reflects more stability in the companies included. The study concluded that it is more favourable to rely on EGX 30 index for consistency issues especially when a time series analysis is applied. The comparison method is used to calculate the market return. This method states that the market return can be computed through comparing the price at two different points of time to reach at the change in the price level during a given interval of time. Accordingly, the market return in each year is calculated using the following equation: (Ending price − Beginning price)/Beginning price. For example, the market return in 2008 = (EGX 30 market value in 2009 − EGX 30 market value in 2008)/EGX 30 market value in 2008. The expected return on equities (i.e. the cost of equity capital) calculated based on the CAPM are shown in Appendix 3.

4.2.2.3. Fama and French three-factor model:

According to this model, the cost of equity capital is calculated using the following formula:

$$Ri - Rf = \beta (Rm - Rf) + SMB + HML \quad \textbf{Equation (4)}$$

- Ri is the expected return on equity, or equivalently the cost of equity capital.

- Rf is the risk-free rate.

- Rm is the market return.

- B is the systematic risk of the firm.

- SMB is the size risk factor (small minus big).

- HML is the value/growth risk factor (high minus low).

- Rm – Rf is the market risk factor.

The risk-free rate, market return, and beta are calculated as in the CAPM. In spirit of Fama and French model, the following steps are followed to calculate SMB and HML. Stocks are divided into two size groups, big and small, and three book-to-market groups, high, medium, and low. The firm is categorized as big or small depending on whether it ranges above or below the median sample market capitalization at the end of each year t. Ranking the sample according to book-to-market ratio, the highest 30% is the high (value) portfolio, the intermediate 40% is the medium portfolio, and the lowest 30% is the low (growth) portfolio. Table 4.5 shows the classification of stocks according to size and BM ratio. Accordingly, six portfolios emerge at the intersection of the two risk factors, namely small/high (SH), small/medium (SM), small/low (SL), big/high (BH), big/medium (BM), and big/low (BL). Small/high portfolio, for example, contains the stocks in the small stocks portfolio that are also in the high book-to-market ratio portfolio. Table 4.6 shows the 6 formed portfolios.

Table 4.5. Classification of Stocks		
Criteria	Portfolio	Stocks
Size	S	50% stocks below the median sample market capitalization, i.e. small company stocks
Size	B	50% stocks above the median sample market capitalization, i.e. big company stocks
BM	H	30% stocks with the highest BM ratio (High)
BM	M	40% stocks with the average BM ratio (Medium)
BM	L	30% stocks with the lowest BM ratio (Low)

Table 4.6. Portfolios Formed	
Portfolio	Criteria
SH	Stocks in the small portfolio that are also in the high portfolio
SM	Stocks in the small portfolio that are also in the medium portfolio
SL	Stocks in the small portfolio that are also in the low portfolio
BH	Stocks in the big portfolio that are also in the high portfolio
BM	Stocks in the big portfolio that are also in the medium portfolio
BL	Stocks in the big portfolio that are also in the low portfolio

To ensure that the accounting variables are known before the returns they are used to explain, the accounting data for year $(t-1)$ is matched with the returns of year t. Accordingly, book-to-market ratio used to form portfolios in year (t) is calculated as the ratio of book value of equity in year $(t-1)$ to the market value of equity in year $(t-1)$.

The value weighted return of small over big stocks (SMB) is the difference between the average returns of the 3 portfolios comprising small stocks and the average returns of the 3 portfolios comprising big stocks and captures the size risk factor. Thus, SMB is the difference between the returns on small and big stocks portfolios with about the same weighted average book-to-market ratio. SMB should be largely clean of book-to-market ratio effects, focusing instead on the different return behaviours of small and big stocks.

The value weighted return of value over growth stocks (HML) is the difference between the average returns of the two portfolios comprising high book-to-market ratio stocks and the average returns of the two portfolios comprising low book-to-market ratio stocks and captures

the value/growth risk premium. This procedure yields a size factor that is free from effects driven by growth and vice versa. Thus, the two components of HML are returns on high and low book-to-market ratio portfolios with about the same weighted average size. HML should be largely clean of the size factor in returns, focusing instead on the different return behaviours of high and low book-to-market ratio stocks.

The average returns used to calculate SMB and HML are weighted by the market value and is calculated based on the comparison method through comparing the total market value of all stocks in the portfolio at the end of the period to the total market value of all stocks in the portfolio at the beginning of the period. Therefore, the value weighted return of SMB is the average of the market value of small stocks minus the average of the market value of big stocks in each year. Accordingly, the value weighted return of HML is the average of the market value of high book-to-market ratio stocks minus the average of the market value of low book-to-market ratio stocks in each year. The return is calculated as (total market value at the end – total market value at the beginning)/ total market value at the beginning for each portfolio. Table 4.7 describes the characteristics of the 6 portfolios. Panel (A) in the table shows the number of stocks in each portfolio over the sample period. Panel (B) shows the market value, used to calculate the returns on portfolios, for each portfolio over the sample period. Panel (C) shows the average returns calculated for each portfolio over the sample period.

Table 4.7. Characteristics of Portfolios					
	SL	SM	SH	BL	BM	BH
Year	Panel A: Number of stocks in each portfolio by year					
2008	47	48	50	48	51	45
2009	47	48	48	48	50	50
2010	49	48	49	46	50	46
2011	47	52	48	48	48	47
2012	47	49	49	48	53	46
2013	49	49	48	46	53	48
2014	49	49	50	47	54	47
2015	50	50	51	47	56	47
2016	49	52	50	49	54	49

Year	Panel B: Market value of each portfolio by year (in EGP million)					
2008	73761.77	41619.94	63041.23	154143.2	154582.9	152629.8
2009	78633.52	47695.43	47695.43	179806.5	178214.5	178214.5
2010	71462.75	71884.83	80780.84	194884.5	192497.9	191209.4
2011	40595.21	70112.45	24123	122366.6	121306.8	120374.5
2012	73148.5	62145.14	37906.85	154389.1	153069.7	151277.2
2013	103081.5	67917.85	40470.59	185309.3	183299.8	183107.8
2014	101273.1	75335.59	68560.06	215023.6	213566.2	210197.1
2015	102725.8	55667.84	53227.26	179239.7	173368.3	168294.1
2016	137666.1	127740.3	60836.92	264415	244897.1	242168.4
Year	Panel C: Average return of each portfolio by year					
2008	-0.03436	0.124822	0.441654	0.165997	0.157864	0.159646
2009	0.018319	0.186682	0.186682	0.064766	0.050864	0.050864
2010	-0.41094	-0.34691	-0.36288	-0.37388	-0.37327	-0.37993
2011	0.211554	0.136713	0.495692	0.237474	0.233282	0.260725
2012	0.233351	0.176052	0.27138	0.208126	0.201966	0.20391
2013	0.007698	0.148697	0.379293	0.118674	0.124453	0.122596
2014	-0.24976	-0.24008	-0.33086	-0.28821	-0.29446	-0.29453
2015	0.333702	0.57268	0.38153	0.436863	0.419204	0.432443
2016	0.438707	0.634868	0.748404	0.560718	0.554202	0.561717

The expected return on equities (i.e. cost of equity capital) calculated based on Fama & French three-factor model are shown in Appendix 4.

4.2.3. Cost of equity capital results:

This section summarizes the results of calculating the cost of equity capital using the 3 above mentioned methods. Table 4.8 shows the mean cost of equity capital over the sample period for each company using the 3 calculation methods. Table 4.9 summarizes the descriptive statistics for the 3 cost of equity estimation methods over the sample period and table 4.10 shows the descriptive statistics for the 3 cost of equity estimation methods in total.

Table 4.8. Mean COE for the sample companies			
company	Ind.EP	CAPM	F & F
ABOU KIR FERTILIZERS	0.546	0.144	0.266
ACROW MISR	0.198	0.138	0.261
AJWA FOR FOOD INDS.	0.521	0.144	0.267
ALEXANDRIA MRL.OILS	0.822	0.136	0.259
ARAB CERAMIC	0.581	0.128	0.250
ARAB COTTON GINNING	0.028	0.163	0.286
ARAB POLIVARA SPNG.&WVG.		0.152	0.275
ARAB REAL ESTATE	-0.019		
ARABIAN CEMENT	-0.008		
ASEK COMPANY FOR MINING	-0.061	0.161	0.283
ATLAS LAND & AGRICULTURE	0.040		
CAIRO DEVELOPMENT &	-0.015		
CAIRO OILS & SOAP	0.027		
CAIRO POULTRY	0.117	0.139	0.261
CANAL SHIPPING AGENCIES	-0.051	0.155	0.277
EASTERN TOBACCO	0.008	0.151	0.273
EDITA FOOD INDUSTRIES	-0.020		
EGYP.FOR TOURISM RSTS.	0.029	0.132	0.255
EGYPT ALUMINIUM	-0.069	0.125	0.248
EYPTIAN for developing build. Materials	-0.070	0.151	0.273
EGYPT IRON & STEEL	0.328	0.143	0.265
EGYPTIAN CHEMICAL IND	0.008	0.130	0.252
EGYPTIAN ELECTRIC CABLE	0.006	0.163	0.286
EGYPTIAN FINL.& INDL.	-0.022	0.133	0.255
EGYPTIAN INTL.PHARMS. (EPICO)	-0.012	0.150	0.272
EGYPTIAN STRCH.& GLUCOSE	-0.019		
EGYPTIAN TRAN.	-0.039	0.147	0.269
EGYPTIANS HOUSING DEV.	-0.027	0.202	0.299
EGYPTIANS INVT.AND URD.	0.357	0.140	0.262
EL AHRAM PRINT	-0.026	0.146	0.269
EL EZZ PORCELAIN (GEMMA)	-0.002	0.160	0.282
EL NASR CLOTHES & TEXT. (KABO)	-0.026		
EL NASR TRANSFORMERS	5.386	0.135	0.258
EL SHAMS PYRAMIDS	0.044		
EL WADI CO FO	0.103	0.136	0.259
ELSAEED CONTRACT AND REAL ESTATE	-0.030	0.136	0.259
ELSWEDY ELECTRIC	-0.009	0.129	0.252
EXTRACTED OILS DERIVATRE	-0.095	0.157	0.280
EZZ STEEL	-0.101	0.193	0.316

GB AUTO	0.236	0.154	0.277
GENERAL SILOS & STORAGE	-0.016	0.129	0.251
GIZA GENERAL CONTRACTING	1.223	0.138	0.260
GLOBAL TELECOM	0.137	0.147	0.270
GMC GROUP FOR INDL.COML.	0.128	0.172	0.294
GOLDEN COAST	0.345		
HELIOPOLIS HOUSING	-0.013	0.143	0.265
JUHAYNA FOOD INDS.	-0.016	0.117	0.216
MARIDIVE & OIL SERVICES	-0.007	0.161	0.283
MEDICAL PACKAGING	-0.020	0.183	0.280
MEDINET NASR HOUSING	0.062	0.158	0.280
MENA TOURISM & RLST.INV.	0.061	0.155	0.278
MIDDLE EGYPT FLOUR MILLS	0.022	0.133	0.256
MISR CHEMICAL INDUSTRIES	0.000	0.141	0.263
MISR FERTILIZERS	-0.030		
NAT.CO.FOR MAIZE PRDS.	0.025	0.147	0.269
NTRL.GAS & MNG.PROJECT (EGYPT GAS)	-0.028	0.139	0.261
ORASCOM HOTELS	-0.024	0.124	0.247
ORASCOM TELECOM MEDIA & TECH HLDG	0.446	0.214	0.310
ORIENTAL WEAVERS	0.156	0.139	0.262
PAINT & CHMID.(PACHIN)	-0.021	0.131	0.253
PALM HILLS DEVS.SAE	0.064	0.205	0.328
RAYA HLDG.FOR TECH.& COMMS.	0.024	0.143	0.265
REMCO FOR TOURISTIC	0.028		
SAMAD MISR -EGYFERT	-0.028	0.145	0.267
SHARM DREAMS	0.002		
SIDI KERIR PETROCHEM.	0.018	0.138	0.261
SIX OF OCT.DEV.& INV.	0.029	0.179	0.302
SOUTH VALLEY CEMENT	-0.067	0.133	0.255
SUEZ CEMENT	0.065	0.145	0.268
TMG HOLDING	0.026	0.141	0.264
TELECOM EGYPT	-0.022	0.168	0.290
UNITED ARAB SHIPPING		0.135	0.257
UNITED HOUSING & DEV.	0.014	0.148	0.271

	Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Ind.EP		58	58	54	56	58	56	55	58	55	508
CAPM	**N**	56	56	57	57	60	60	60	60	60	526
Fama&French		56	56	57	57	60	60	60	60	60	526
Ind.EP		0.303	0.139	0.110	0.094	0.092	0.086	0.068	0.040	0.193	0.125
CAPM	**Mean**	0.413	0.130	-0.584	0.388	0.186	0.218	0.000	0.387	0.183	0.148
Fama&French		0.664	0.282	-0.561	0.579	0.226	0.462	-0.025	0.409	0.387	0.269
Ind.EP		1.164	0.374	0.315	0.271	0.262	0.248	0.225	0.127	1.009	0.567
CAPM	**Std.Dev**	0.136	0.006	0.269	0.097	0.027	0.041	0.077	0.123	0.013	0.309
Fama&French		0.136	0.006	0.269	0.097	0.027	0.041	0.077	0.123	0.013	0.365
Ind.EP		-0.110	-0.135	-0.122	-0.127	-0.110	-0.095	-0.062	-0.083	-0.067	-0.135
CAPM	**Min**	0.023	0.115	-1.116	0.145	0.121	0.127	-0.194	0.141	0.161	-1.116
Fama&French		0.274	0.267	-1.093	0.336	0.160	0.371	-0.218	0.163	0.365	-1.093
Ind.EP		8.303	1.680	1.368	1.246	1.127	1.358	1.528	0.574	7.368	8.303
CAPM	**Max**	0.753	0.144	0.140	0.585	0.243	0.310	0.162	0.709	0.214	0.753
Fama&French		1.004	0.296	0.163	0.776	0.282	0.554	0.137	0.730	0.418	1.004

Table 4.9. COE summary statistics by year

Table 4.10. COE summary statistics (total)

	N	Mean	Std.Dev	Min	Max
Ind.Ep	508	0.125	0.567	-0.135	8.303
CAPM	526	0.148	0.309	-1.116	0.753
F.&F.	526	0.269	0.365	-1.093	1.004

As shown from the tables, the number of observations in Ind.Ep ratio method is 508 and in CAPM and Fama & French methods is 526 firm year observations. The expected return in Ind.Ep method ranges from -0.135 to 8.303 with a mean rate of 0.125 and a standard deviation of 0.567. In CAPM method, the expected return ranges from -1.116 to 0.753 with a mean rate of 0.148 and a standard deviation of 0.309. The expected return in Fama & French method ranges from -1.093 to 1.004 with a mean rate of 0.269 and a standard deviation of 0.365.

In summary, the mean cost of equity capital ranges from 0.125 to 0.269, depending on the method of calculation. Figures 4.1, 4.2, and 4.3 show the change in the mean cost of equity capital over the sample period for the 3 estimation methods. As shown from the figures, the change of cost of equity in the 3 methods is not stable over time, it is decreasing in some years and increasing in others. This may be due to several factors including economic, political, and environmental factors that change over time. Since the main objective of the study is to analyse the relation between the cost of equity and accounting disclosure, it is more important to analyse how the change in cost of equity is affected by the change in accounting disclosure. This will be analysed in detail later in this chapter in the statistical analyses section.

Comparing the cost of equity results with other studies conducted in the Egyptian context, I found the following. Omran (2007) used the CAPM method to calculate the cost of equity capital in Egypt. Using a sample of 41 companies in 2001, the study found the mean average return is -0.13. Khlif et al. (2015) used the CAPM method to calculate the cost of equity capital in Egypt. Using a sample of 292 observations for the period 2006 to 2009, the study found the mean cost of equity capital is 0.171. Khlif et al. (2019) used the CAPM method to calculate the cost of equity capital in Egypt. Using a sample of 512 observations for the period 2007 to 2014, the study found the mean cost of equity capital is 0.173. To sum, the results of my study is consistent with Khlif et al. (2015) and Khlif et al. (2019), however, inconsistent with Omran (2007).

Figure 4.1: Mean Ind.EP
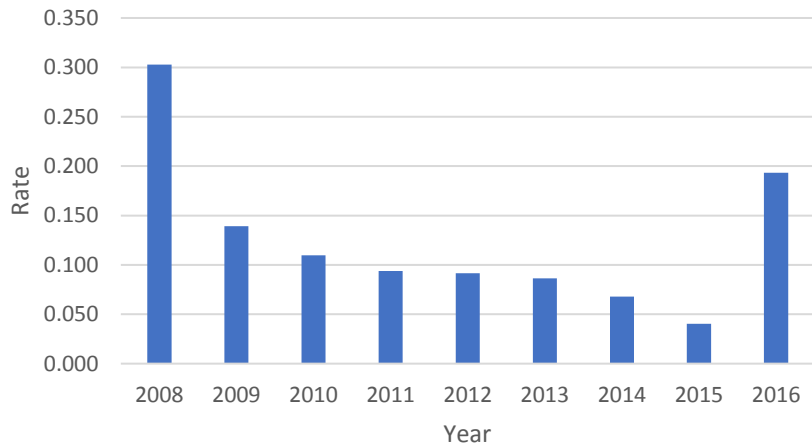
Figure 4.2: Mean CAPM
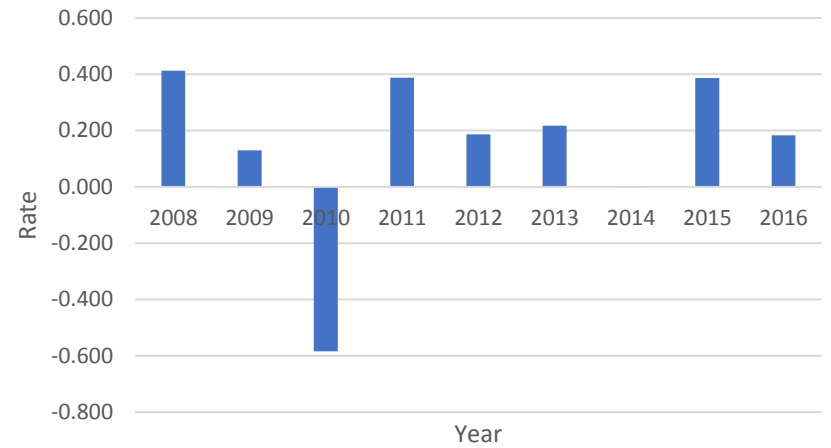
Figure 4.3: Mean Fama & French

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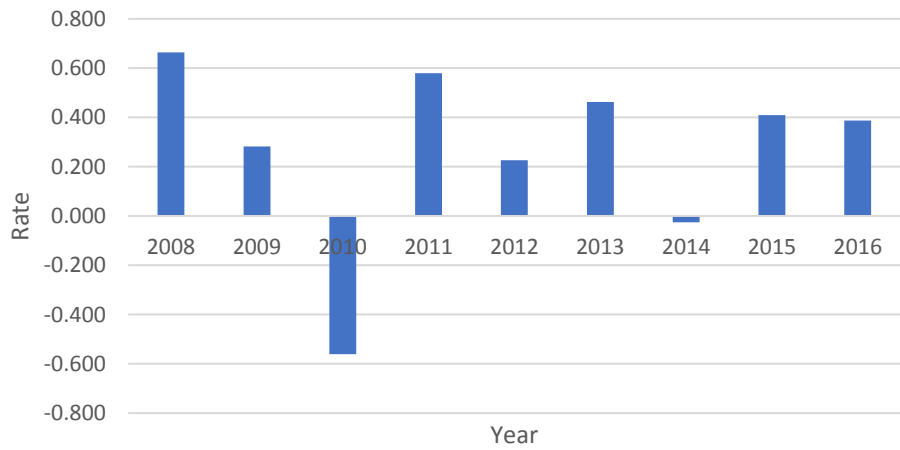
4.3. Accounting Disclosure

4.3.1. Accounting disclosure measurement

Measuring the level of disclosure represents another challenge. Generally, researchers measure disclosure levels using either a questionnaire sent to various individuals at the companies, or an index containing some disclosure items. Questionnaires may not be accurate because results depend on the opinions of participants; hence, disclosure indices are more widely used in measuring the levels of disclosure. Within the context of disclosure indices, two approaches have been used by researchers; each has its advantages as well as limitations. The first type is using scores provided by analysts, such as those published in the Association for Investment Management and Research (AIMR) reports, or Standard and Poor's scores (Lang and Lundhom, 1996; Healy et al., 1999; Botosan and Plumlee, 2002; Artiach and Clarkson, 2011). The main advantage of this approach is that the measures are prepared by analysts who are the primary users of the disclosed information, as they are familiar with the firm (Artiach and Clarkson, 2011); however, analysts' subjectivity could influence the validity of these measures (Urquiza et al., 2009). Lang and Lundhom (1996) argue that the accuracy of analysts' measures is doubtful because these measures reflect their perceptions of disclosure quality. Another limitation of the externally produced ratings is that their data are not available for all companies over all time periods, leading to a self-selection bias (Healy and Palepu, 2001).

The second type involves using a self-constructed disclosure index to measure the level of disclosure (Botosan, 1997; Hail, 2002; Gray et al., 1995). This type has the advantages of its applicability to a large sample (instead of only companies covered by an external agency); the availability of formulating the index to reflect different disclosure types; and the greater validity of the disclosure measures provided (Urquiza et al., 2010; Artiach and Clarkson, 2011). However, the main shortcomings of self-constructed indices are subjectivity on the part of the researcher, and that the index may not fully reflect the views of the relevant user groups, such as analysts and investors (Artiach and Clarkson, 2011). This research uses a self-constructed index that is

based on the information provided by firms in their annual reports, given that these are the main disclosure vehicle in the Egyptian market, whereas other disclosure forms are rare or non-existent. Additionally, Lang and Lundholm (1993) evidenced that annual reports can be used as a good proxy for the amount of disclosure provided by other means.

In selecting the mandatory disclosure items, I prepared a checklist based on the disclosure and transparency requirements by the Egyptian Accounting Standards (EASs). In doing so, I analyzed the disclosure requirements by the last version of EASs, issued in 2016, and selected some items from each group of information that must be disclosed in annual reports. On the other hand, I carefully analyzed some previous studies that measured voluntary disclosure in Egypt to prepare the checklist for items not mandated by EASs and might be disclosed voluntarily by Egyptian companies. After that, the items selected in both indices were refined according to what is actually disclosed by companies in their annual reports. This resulted in a mandatory disclosure index consisting of 91 items and a voluntary disclosure index consisting of 53 items, so the total number of items included in the total disclosure index is 144 items. Appendix 5 and Appendix 6 shows the mandatory and voluntary disclosure indices.

After preparing the final list of mandatory and voluntary items, it is necessary to measure the disclosure level through assigning disclosure scores to the sample companies. In doing so, two approaches are used by researchers. The first approach, weighted disclosure index approach, values the disclosure items based on the relative importance of each item through assigning different values to disclosure items (Botosan, 1997). However, this approach involves more subjectivity in determining the relative importance of disclosure items (Ahmed and Courtis, 1999). Additionally, their relative importance may vary from company to company, industry to industry, and from time to time (Abdelsalam, 1999). The second approach, the unweighted disclosure index approach, assumes equal importance of all disclosure items, through assigning a value of (1) to a disclosed item and (0) for a non-disclosed item; this is the most widely used approach by researchers in measuring the level of disclosure. Therefore, this research uses the second approach, the unweighted index, for assigning disclosure scores to the sample companies. The disclosure scores are computed using the following formula:

Disclosure score $_x = \sum_{n=1}^{n} score_{nx}$	**Equation (5)**

The equation means that the disclosure score for firm X equals the sum of total number of points awarded to the firm for category n across all categories.

Finally, index scores are to be converted into relative scores as certain items of disclosure may exist for some companies but not for others. This can be done through dividing the firm's score by the maximum score available to that firm using the following formula:

Relative disclosure score $_x = \sum_{n=1}^{n} \dfrac{score_{nx}}{maximum\ score_n}$	**Equation (6)**

It is to be noted that there are 3 items in the mandatory disclosure index that were mandated in the last version of the Egyptian accounting standards (EASs), issued in 2016. These items are comprehensive income statement for the period, changes resulted from comprehensive income for each of owners' equity items, and total comprehensive income. Accordingly, in calculating the relative disclosure scores, I removed these items from the maximum score available to the company in years before 2016. In other words, I considered the maximum number of items before 2016 is 141 items and in 2016 is 144 items. The mandatory disclosure scores, voluntary disclosure scores, and total disclosure scores for each company over the sample period are shown in Appendix 7, Appendix 8, and Appendix 9.

4.3.2. Accounting disclosure results:

This section summarizes the results of calculating the mandatory, voluntary, and total disclosure scores. Table 4.11 shows the mean disclosure scores for each company over the sample period. Table 4.12 summarizes the descriptive statistics for disclosure scores over the sample period and table 4.13 shows the descriptive statistics for disclosure scores in total.

Table 4.11. Mean Disclosure Scores			
company	Mandatory	Voluntary	Total
ABOU KIR FERTILIZERS	0.823	0.379	0.656
ACROW MISR	0.824	0.166	0.577
AJWA FOR FOOD INDS.	0.804	0.222	0.586
ALEXANDRIA MRL.OILS	0.862	0.379	0.681
ARAB CERAMIC	0.855	0.164	0.596
ARAB COTTON GINNING	0.808	0.191	0.576
ARAB POLIVARA SPNG.&WVG.	0.801	0.214	0.581
ARAB REAL ESTATE	0.716	0.164	0.509
ARABIAN CEMENT	0.903	0.434	0.728
ASEK COMPANY FOR MINING	0.833	0.218	0.602
ATLAS LAND & AGRICULTURE	0.679	0.147	0.480
CAIRO DEVELOPMENT &	0.807	0.176	0.570
CAIRO OILS & SOAP	0.772	0.161	0.543
CAIRO POULTRY	0.868	0.224	0.627
CANAL SHIPPING AGENCIES	0.757	0.245	0.565
EASTERN TOBACCO	0.866	0.327	0.663
EDITA FOOD INDUSTRIES	0.861	0.459	0.711
EGYP.FOR TOURISM RSTS.	0.796	0.264	0.597
EGYPT ALUMINIUM	0.868	0.249	0.636
EYPTIAN for developing build. Materials	0.722	0.130	0.500
EGYPT IRON & STEEL	0.803	0.197	0.575
EGYPTIAN CHEMICAL IND	0.818	0.220	0.594
EGYPTIAN ELECTRIC CABLE	0.805	0.155	0.561
EGYPTIAN FINL.& INDL.	0.835	0.285	0.629
EGYPTIAN INTL.PHARMS. (EPICO)	0.814	0.145	0.563
EGYPTIAN STRCH.& GLUCOSE	0.845	0.132	0.578
EGYPTIAN TRAN.	0.804	0.512	0.694
EGYPTIANS HOUSING DEV.	0.776	0.187	0.555
EGYPTIANS INVT.AND URD.	0.631	0.126	0.442
EL AHRAM PRINT	0.760	0.172	0.539
EL EZZ PORCELAIN (GEMMA)	0.799	0.319	0.619
EL NASR CLOTHES & TEXT. (KABO)	0.796	0.138	0.550
EL NASR TRANSFORMERS	0.865	0.193	0.613
EL SHAMS PYRAMIDS	0.654	0.164	0.470
EL WADI CO FO	0.729	0.151	0.513
ELSAEED CONTRACT AND REAL ESTATE	0.816	0.195	0.583
ELSWEDY ELECTRIC	0.831	0.237	0.608
EXTRACTED OILS DERIVATRE	0.756	0.174	0.538
EZZ STEEL	0.791	0.283	0.601

GB AUTO	0.918	0.595	0.797
GENERAL SILOS & STORAGE	0.825	0.294	0.626
GIZA GENERAL CONTRACTING	0.820	0.113	0.555
GLOBAL TELECOM	0.803	0.298	0.613
GMC GROUP FOR INDL.COML.	0.548	0.055	0.363
GOLDEN COAST	0.623	0.136	0.441
HELIOPOLIS HOUSING	0.842	0.262	0.624
JUHAYNA FOOD INDS.	0.864	0.380	0.683
MARIDIVE & OIL SERVICES	0.851	0.266	0.632
MEDICAL PACKAGING	0.757	0.119	0.518
MEDINET NASR HOUSING	0.841	0.273	0.628
MENA TOURISM & RLST.INV.	0.800	0.189	0.571
MIDDLE EGYPT FLOUR MILLS	0.753	0.201	0.546
MISR CHEMICAL INDUSTRIES	0.847	0.468	0.705
MISR FERTILIZERS	0.811	0.113	0.550
NAT.CO.FOR MAIZE PRDS.	0.863	0.304	0.653
NTRL.GAS & MNG.PROJECT (EGYPT GAS)	0.840	0.184	0.594
ORASCOM HOTELS	0.792	0.128	0.543
ORASCOM TELECOM MEDIA & TECH HLDG	0.722	0.158	0.511
ORIENTAL WEAVERS	0.838	0.411	0.678
PAINT & CHMID.(PACHIN)	0.819	0.289	0.620
PALM HILLS DEVS.SAE	0.733	0.107	0.498
RAYA HLDG.FOR TECH.& COMMS.	0.780	0.398	0.637
REMCO FOR TOURISTIC	0.781	0.128	0.536
SAMAD MISR -EGYFERT	0.781	0.124	0.535
SHARM DREAMS	0.730	0.172	0.520
SIDI KERIR PETROCHEM.	0.824	0.377	0.656
SIX OF OCT.DEV.& INV.	0.803	0.382	0.645
SOUTH VALLEY CEMENT	0.774	0.153	0.541
SUEZ CEMENT	0.834	0.296	0.632
TMG HOLDING	0.693	0.220	0.516
TELECOM EGYPT	0.864	0.350	0.671
UNITED ARAB SHIPPING	0.785	0.151	0.547
UNITED HOUSING & DEV.	0.764	0.180	0.545

	Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
					Table 4.12: Accounting Disclosure Summary Statistics by year						
Mandatory		63	63	64	66	70	71	73	73	73	616
Voluntary	N*	63	63	64	66	70	71	73	73	73	616
Total		63	63	64	66	70	71	73	73	73	616
Mandatory		0.777	0.783	0.796	0.800	0.798	0.803	0.808	0.807	0.800	0.797
Voluntary	Mean	0.194	0.216	0.229	0.224	0.219	0.234	0.266	0.263	0.260	0.235
Total		0.558	0.570	0.583	0.583	0.580	0.589	0.604	0.603	0.601	0.586
Mandatory		0.071	0.070	0.061	0.065	0.072	0.073	0.068	0.066	0.066	0.068
Voluntary	Std.Dev	0.135	0.139	0.124	0.118	0.131	0.118	0.127	0.124	0.117	0.127
Total		0.080	0.081	0.071	0.074	0.081	0.078	0.078	0.075	0.071	0.078
Mandatory		0.500	0.500	0.511	0.523	0.568	0.568	0.591	0.591	0.549	0.500
Voluntary	Min	0.019	0.019	0.019	0.019	0.019	0.019	0.094	0.094	0.132	0.019
Total		0.319	0.319	0.326	0.333	0.369	0.369	0.411	0.418	0.396	0.319
Mandatory		0.932	0.932	0.920	0.920	0.920	0.920	0.920	0.909	0.890	0.932
Voluntary	Max	0.679	0.642	0.660	0.604	0.566	0.642	0.660	0.585	0.585	0.679
Total		0.809	0.809	0.823	0.801	0.780	0.816	0.794	0.780	0.764	0.823

N denotes to the number of companies that has a disclosure score.

Table 4.13. Accounting Disclosure Summary Statistics					
	N	Mean	Std.Dev	Min	Max
Mandatory	616	0.797	0.068	0.500	0.932
Voluntary	616	0.235	0.127	0.019	0.679
Total	616	0.586	0.078	0.319	0.823

As shown from the tables, the number of observations used to calculate the disclosure scores are 616 firm year observations. The mandatory disclosure score ranges from 0.50 to 0.93 with a mean score of 0.80 and the standard deviation is 0.07. The voluntary disclosure score ranges from 0.02 to 0.68 with a mean score of 0.24 and the standard deviation is 0.13. The total disclosure score ranges from 0.32 to 0.82 with a mean score of 0.59 and the standard deviation is 0.08. The results suggest a departure from full compliance with mandatory disclosure requirements in Egypt, which may be due to the weak enforcement mechanisms. The results also suggest a very low level of voluntary disclosure in Egypt, which may be due to the high costs of disclosure relative to its benefits besides the cultural factors as discussed in detail in chapter 3. It is noted also from the results that there is a high level of variability between companies as the gaps between minimum and maximum values are large, which may be due to differences in companies' sizes.

Figures 4.4, 4.5, and 4.6 show the change in the mean disclosure level over the sample period. It appears from the figures that the disclosure level in Egypt is increasing over time. This may be due to the improvements undertaken in the accounting regulation in Egypt besides the economic developments that took place recently as discussed in detail in chapter 3. However, it is more important in this study to analyze the effect of the change in disclosure level on the cost of equity capital rather than analyzing the change in disclosure level independently. This will be conducted in detail later in the statistical analyses section in this chapter.

Figure 4.4: Mean Total Disclosure
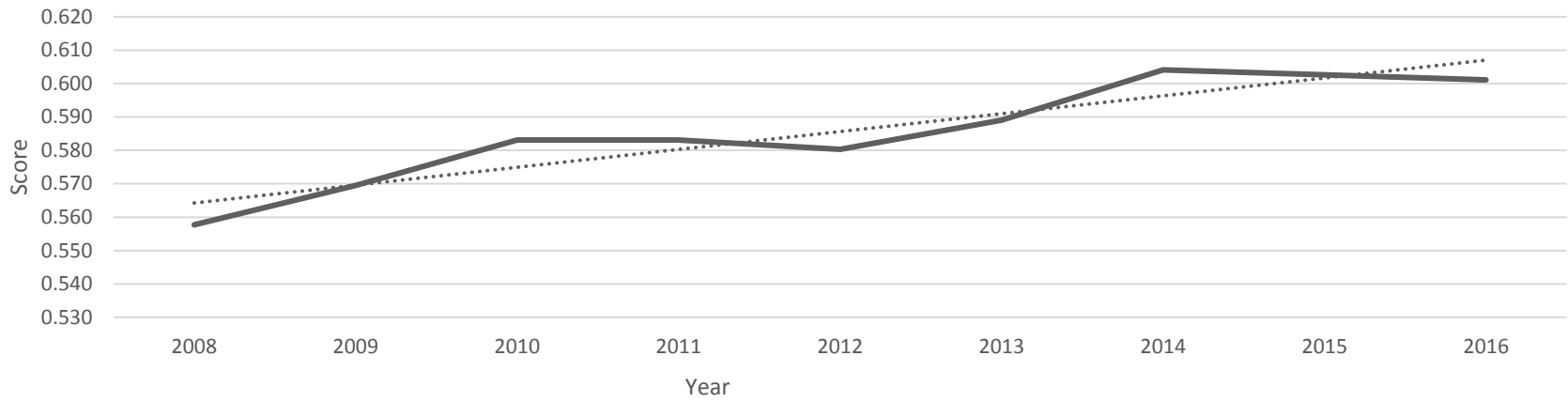
Figure 4.5: Mean Mandatory Disclosure
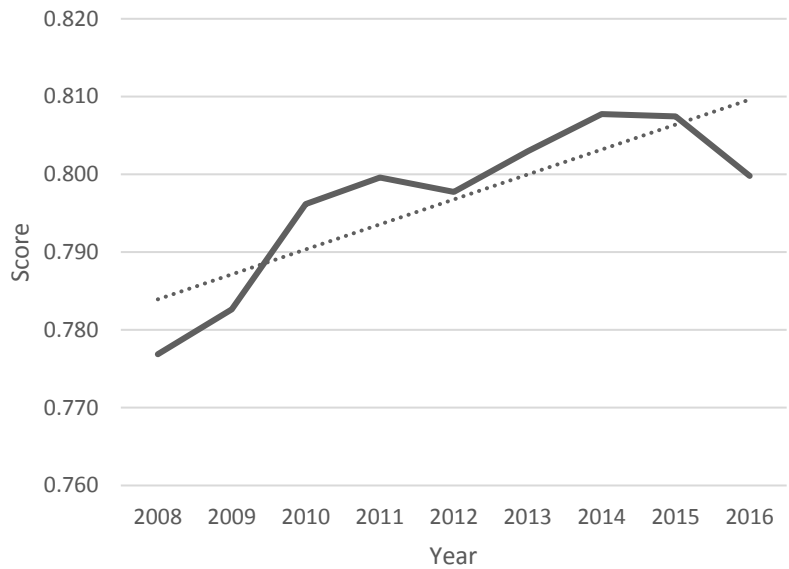
Figure 4.6: Mean Voluntary Disclosure

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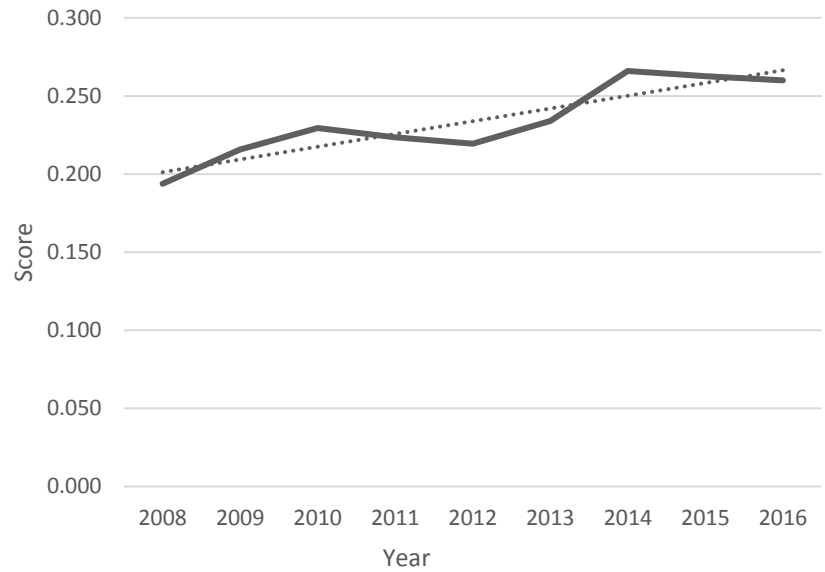
Comparing the accounting disclosure results with other studies conducted in the Egyptian context, I found the following. Dahawy & Conover (2007) used a sample of 15 companies in 2004 and found the average <u>mandatory</u> disclosure level in Egypt is 0.61. Desoky & Mousa (2012) used a sample of 99 companies in 2010 and found the average <u>total</u> disclosure level in Egypt is 0.59. Soliman (2013) used a sample of 50 companies for the period 2007-2010 and found the average <u>voluntary</u> disclosure level in Egypt is 0.32. Abdelsalam (1999) used a sample of 72 companies in 1995 and found the average <u>mandatory</u> disclosure level in Egypt is 0.79. Ellabar& Havard (2005) used a sample of 10 companies in 2002 and found the average <u>total</u> disclosure level in Egypt is 0.79. Samaha et al. (2012) used a sample of 100 companies in 2009 and found the average <u>voluntary</u> disclosure level in Egypt is 0.16. Hassaan (2013) used a sample of 75 companies in 2007 and found the average <u>mandatory</u> disclosure level in Egypt is 0.80. To sum, the results of the study is consistent with Desoky & Mousa (2012), Soliman (2013), Abdelsalam (1999), Samaha et al. (2012), Hassaan(2013), however, the results is inconsistent with Dahawy & Conover (2007) and Ellabar & Havard (2005).

4.4. Control Variables

The study incorporates 6 control variables that are considered in the prior literature to affect the relationship between the accounting disclosure and the cost of equity capital (for example, Botosan, 1997; Francis et al., 2005; Urquiza et al., 2012; Embong et al., 2012; Cheng et al., 2006; Kothari et al., 2009; Marston & Shrives, 1991; Kaspereit et al., 2015; Zimmermann et al., 2015; Orens et al., 2012). These variables are firm size, book-to-market ratio, leverage, liquidity, profitability, and sales growth.

<u>Firm Size:</u>

Firm size is used to control for the firm's informational environment and is measured as the natural logarithm of total assets. Theoretically, the size of firms is negatively associated with the cost of equity capital because larger firms have higher disclosure levels (Ahmed and Courtis, 1999; Eng and Mak, 2003; Ismail and Elshaib, 2012; Uyar et al., 2013; Alhazaimeh et al., 2014;

nugraheni and Annuar, 2014; Meek et al., 1995; Leventis and Weetman, 2004; Alsaeed, 2006). The positive association between disclosure level and firm size results from two factors. First, the availability of information is greater in larger firms, as it is more followed by analysts and institutional investors (Gebhardt et al., 2001; Gode and Mohanram, 2003; Lang and Lundholm, 1993). Second, the disclosure costs of larger firms are lower due to economies of scale, as there is a fixed component in disclosure cost, leading to lower cost per unit of size (Lang and Lundholm, 1993). The higher disclosure level in larger firms results in lower cost of equity capital, because of the reduced information risk resulting from the lower information asymmetry. Additionally, smaller firms have more risk, because of lower solvency (Urquiza et al., 2012; Botosan, 1997; Gebhardt et al., 2001; Poshakwale and Courtis, 2005; Botosan, 2006; Francis et al., 2008) and less diversification of assets and projects (Kothari et al., 2009).

Leverage:

Theoretically, higher leverage is associated with higher cost of equity capital; this is because higher leverage leads to higher risk levels due to the increased proportion of external funds in the firm's capital structure (Botosan, 2006; Fama and French, 1992; Gebhardt et al., 2001; Botosan and plumlee, 2002; Botosan, 1997). However, it is also argued that higher leverage may lead to higher disclosure levels (Jensen and Meckling, 1976; Fama and Jensen, 1983), which may result in lower cost of equity capital. The justification for the positive association between leverage and disclosure level is that highly leveraged companies tend to increase their disclosure to eliminate creditors' suspicions regarding their ability to meet their obligations (Desoky and Mousa, 2012; Haniffa and Cooke, 2002; Jensen and Meckling, 1976; Fama and Jensen, 1983). In this research, leverage is measured as the ratio of total liabilities to total assets.

Book-to-Market (BM) Value

Book-to-market ratio is included to proxy for the growth opportunities of the firm and is measured as the book value of common equity at the end of the year divided by the market value of equity at the end of the year. The market value of equity is calculated as the closing price at

fiscal year-end times the number of shares outstanding at fiscal year-end. Theoretically, the book-to-market ratio is positively associated with the cost of equity capital (Fama and French, 1995; Gebhardt et al., 2001; Botosan and plumlee, 2002; Cheng et al., 2006; Easton, 2004). The principle is that firms with higher uncertainty about their future cash flows have lower market value (i.e. higher book-to-market ratio), and therefore have higher risk level and a resultant higher cost of equity capital (Kothari et al., 2009).

Sales Growth

Sales growth is included as a second proxy for the firm's growth opportunities and is measured as net sales for year (t) less net sales for year (t-1), scaled by net sales of year (t-1). Theoretically, an increase in sales growth leads to a lower cost of equity capital, because the better growth opportunities are interpreted by investors and shareholders as a positive signal of higher dividends in the future (Hassan et al., 2009).

Profitability:

Profitability is included to proxy for the firm's performance and is measured as the ratio of net income to total assets. Theoretically, higher profitability leads to lower cost of equity capital, because firms with higher profits are perceived by investors as higher-valued companies, leading to higher expected dividends in the future (Hassan et al., 2009). Additionally, higher profitability leads to higher disclosure levels (Marston and Polei, 2004; Ghazali and Weetman, 2006; Haniffa and Cooke, 2002; Soliman, 2013); this is theoretically associated with lower cost of equity capital. The justification for the positive association between profitability and disclosure level is that companies with high profits tend to disclose more information, in order to give investors and shareholders an impression of positive performance (Soliman, 2013; Marston and Polei, 2004; Ghazali and Weetman, 2006). However, others argue that lower profitability may also result in higher disclosure levels when the company wants to justify its negative performance, or to avoid the risk of legal liability and loss of its reputation (Skinner, 1994).

Liquidity:

Liquidity is included to proxy for the firm's ability to meet its short-term obligations without the need to liquidate its long-term assets or terminate its operating activities (Leventis and Weetman, 2004; Alsaeed, 2006; Ezat and Almasry, 2008). It is measured as the ratio of current assets to current liabilities. Theoretically, higher liquidity leads to lower cost of equity capital because companies with higher liquidity ratios tend to disclose more, in order to distinguish themselves from lower-liquidity companies, and to increase creditors' trust in their ability to meet their obligations (Cooke, 1989; Abdelsalam, 1999). However, other researchers argue that companies with lower liquidity ratios may also tend to increase disclosure levels in order to mitigate the conflict between shareholders and creditors, and to eliminate creditors' suspicions (Abdelsalam, 1999; Wallace et al., 1994).

4.5. Data Analyses:

This part includes descriptive, univariate, and multivariate analyses. The univariate analyses include a correlation analysis between the dependent variable and independent variables. The multivariate analyses include regression analyses to test the research hypotheses. The mandatory and voluntary disclosure measures are alternatively added as explanatory variables, along with the control variables discussed earlier, while the cost of equity capital measures are included alternatively as the dependent variables.

4.5.1. Descriptive Statistics: in section 4.2 and 4.3, the descriptive statistics for the two main variables, accounting disclosure and cost of equity capital, were analyzed in detail. This section summarizes the descriptive statistics for all variables of the study as shown in table 4.14. The table shows the following as to disclosure scores and cost of equity estimates:

Table 4.14. Descriptive Statistics					
Variable	**Obs**	**Mean**	**Std.Dev.**	**Min**	**Max**
M.Dis.	616	.797	.068	.5	.932
V.Dis.	616	.235	.127	.019	.679
Ind.EP	508	.125	.567	-.135	8.303
CAPM	526	.148	.309	-1.116	.753
F.&F.	526	.269	.365	-1.093	1.004
BM	584	1	1.023	-.969	11.357
Liquidity	607	3.572	13.476	.02	210.3
Leverage	615	.465	.319	.001	4.118
Size	615	6.101	.765	3.961	7.975
Profitability	615	.047	.104	-.855	.508
Growth	614	.334	2.554	-1.508	53.585

1- The average of mandatory disclosure level is 0.797 ranging from 0.5 to 0.932, and the standard deviation is 0.068. The number of observations for the mandatory disclosure is 616 firm-year observations.

2- The average of voluntary disclosure level is 0.235 with a minimum value of 0.019 and a maximum value of 0.679, and the standard deviation is 0.127. The number of observations for the voluntary disclosure is also 616 firm-year observations.

3- The Ind.EP approach-based estimate of cost of equity ranges from -0.135 to 8.303, with a mean of 0.125 and a standard deviation of 0.567. The number of observations for this variable is 508 firm year observations.

4- The average cost of equity estimated using CAPM is 0.148, ranging from -1.116 to 0.753, with a standard deviation of 0.309 and 526 firm year observations.

5- The mean cost of equity estimated using F. & F. is 0.269, with a minimum value of -1.093 and a maximum value of 1.004. The standard deviation of 0.365 and the number of observations is 526 firm year observations.

4.5.2. Univariate Analyses

The correlation matrix for the explanatory and dependent variables is reported in table 4.15. The correlation test is performed to have an insight into the relationship between the research variables, however, one should control for the combined influence of explanatory

variables within a multiple regression model to reach a conclusion about these relationships. In other words, the multiple regression model gives more accurate results about the correlation between variables as it considers the combined effect of explanatory variables.

The result can also give a preliminary indication as to whether there is multicollinearity problem. Multicollinearity means that the independent variables are highly correlated in a way that make it difficult to identify the individual effect of each independent variable. This causes problems in estimating the regression coefficients. If there is such a problem, it should be handled before regression analyses is performed. It is observed from the correlation matrix that the highest correlation between independent variables is 0.451 (below 0.8) between mandatory and voluntary disclosure which means that there is no multicollinearity among variables. Additionally, the Variance Inflation Factor (VIF) statistical measure is used to test for the multicollinearity issue. Regarding the VIF measure, there is no multicollinearity problem if the VIF is below 10 and the tolerance value is below 1 (Basiruddin, 2011; Hair et al., 2012). As shown in table 4.16, the VIF for all independent variables is below 10 and the tolerance value is below 1, meaning there is no multicollinearity problem in the data.

Table 4.15. Spearman correlations										
Variables	**Ind.EP**	**CAPM**	**F.&F.**	**M.Dis.**	**V.Dis.**	**BM**	**Liquidity**	**Leverage**	**Size**	**Profitability**	**Growth**
Ind.EP	1.0000										
CAPM	-0.0874	1.0000									
F.&F.	-0.0735	0.8919	1.0000								
M.Dis.	0.2132	-0.1074	-0.1291	1.0000							
V.Dis.	0.0808	-0.1022	-0.1192	0.4272	1.0000						
BM	-0.1656	0.1382	0.0777	-0.0808	-0.0665	1.0000					
Liquidity	0.1491	-0.0507	-0.0477	-0.1639	-0.1211	-0.0538	1.0000				
Leverage	-0.0506	0.0881	0.0908	0.0808	0.1588	-0.1283	-0.7184	1.0000			
Size	-0.0756	-0.0054	0.0069	0.2404	0.3464	0.1068	-0.2912	0.2757	1.0000		
Profitability	0.3979	-0.0810	-0.0188	0.2335	0.1362	-0.4092	0.4160	-0.3394	-0.1066	1.0000	
Growth	0.1381	0.0875	0.1417	-0.0144	-0.0571	-0.0879	-0.0432	0.1503	-0.0219	0.1224	1.0000

It is to be noted from the correlation matrix that correlations between Ind.Ep from one hand and CAPM and Fama & French from the other hand is too weak. I measured this correlation also using Pearson and Pairwise correlation and I reached similar results for such weak correlation. After that, I found 4 outliers in the Ind.Ep method and I dropped these outliers to ensure about this result, however, the correlation is also weak. I think this weak correlation between the first method (Ind.Ep) and the other 2 methods (CAPM and F.&F.) is due to the significant difference in the distribution of data and the difference in the calculation method. CAPM and Fama & French are highly correlated because they use similar method of calculation and their data, in terms of missing numbers, are identical, however, this is not the situation with the third method (Ind.Ep).

Table 4.16. VIF Test Results		
Variable	**VIF**	**1/VIF**
M.Dis.	1.46	0.685529
V.Dis.	1.44	0.693537
BM	1.24	0.809255
Liquidity	1.17	0.852583
Leverage	1.69	0.591982
Size	1.35	0.739490
Profitability	1.61	0.622121
Growth	1.01	0.992274
Mean VIF	**1.37**	

4.5.3. Multivariate Analyses:

In this section, the relation between the main variables of the study is analysed through incorporating the variables within a multiple regression model. Before running the regression models, some issues that may affect the results should be investigated. In the previous section, I tested the data for existence of the multicollinearity problem through analysing the correlations between independent variables, and found no multicollinearity problem in the data. I also tested the data for the existence of heteroskedasticity and autocorrelation issues; I found that these two problems exist in the data, which should be considered in the analyses. After that, I performed an F-test to determine the suitable type of regression to be used in the analyses; the test result suggests that panel regression is the most appropriate regression model. However, it is also important to determine whether the panel regression model should be a static or a dynamic regression; this depends on the type of relationship between the dependent and independent variables, and on the nature of each variable. I examined the relationship between accounting disclosure and cost of equity capital in two ways: first through analysing what had been done in the previous studies, then through performing statistical tests to confirm these indications. The next sub-section discusses in detail the process of determining whether to use a static or dynamic panel regression model in analysing the relationship between accounting disclosure and cost of equity capital.

4.5.3.1. Addressing Endogeneity:

A major critical issue in research that examines causal relationships between two or more variables is the potential endogeneity of the explanatory variable (accounting disclosure in this research). If the explanatory variable is independently determined and is not caused by any other variable, it is not endogenous. However, sometimes the explanatory variable is reversely caused by the dependent variable (cost of equity capital in this research), or related to a third variable that may affect the dependent variable (Jean et al., 2015). In this case, the explanatory variable is correlated with the error term in the regression equation, meaning that it is not independently determined, and is considered to be an endogenous variable (Wooldridge, 2003; Jean et al., 2015).

The main sources of endogeneity are (Kaspereit et al., 2015; Jean et al., 2015; Schultz et al., 2010): measurement error in variables; omitted variables or unobserved heterogeneity; simultaneity or reverse causality; and dynamic endogeneity. First, measurement error in variables is expected in this research, especially in relation to the cost of equity capital; this is because it is not directly observable and is estimated using various models, due to a lack of consensus. This problem is handled by researchers through using more than one method of estimation. Additionally, a composite measure of more than one method could help in decreasing the measurement error involved when using any method independently (Kaspereit et al., 2015). In this research, I calculated the cost of equity using three independent methods; I then used a composite measure of the three methods as a robustness check, to mitigate the problem of the expected measurement error. Second, unobserved heterogeneity occurs when there are variables that may affect the analysed relation but are not observed or are difficult to identify and measure (Wooldridge, 2003; Jean et al., 2015; Schultz et al., 2010). Researchers deal with this issue through including control variables as explanatory variables in the regression model; however, failure to include all variables means that the variations caused by the omitted variables will be explained by the error term instead (Wooldridge, 2010). Third, simultaneity occurs when the relation between the explanatory variable and the dependent variable is reversed; that is,

the explanatory variable is partly determined by variation in the dependent variable, instead of being independently determined (Jean et al., 2015; Eugster, 2019). In this research, simultaneity is expected because the firm's disclosure practices are likely to be affected by the past values of the cost of equity capital (Dhaliwal et al., 2011). In other words, the companies may enhance their disclosure level to achieve the benefits of lower cost of equity capital (Kaspereit et al., 2015). Thus, a suitable statistical technique is required that takes this simultaneous effect into consideration. Last, dynamic endogeneity occurs when the past value of the variable affects its current value (e.g. the cost of equity in year 2010 is affected by that of 2009). Researchers address this issue through including lagged independent and/or dependent variables as instruments in the regression model (Jean et al., 2015). Overall, the existence of any type of endogeneity in the research design could lead to biased and inconsistent results; therefore, the design of the research should firstly test for the existence of endogeneity in variables and then control for it, if it exists, using the appropriate technique.

In testing for the existence of endogeneity in the research variables, I conducted the Hausman test (Hausman, 1978), which compares fixed with random effects under the null hypothesis that individual effects are uncorrelated with the other regressors in the model. The results of the Hausman test show that the explanatory variable, accounting disclosure, is endogenous. This means that the analysed relationship in this research is of a dynamic nature, suggesting that a dynamic panel regression model should be used in the analysis. Using a static panel regression in the existence of endogeneity could lead to inconsistent estimates and wrong conclusions (Wooldridge, 2003).

4.5.3.2. The Used Model:

In applying a dynamic panel regression model to control for endogeneity in the variables, several statistical techniques are used by researchers. Most employ instrumental variables techniques (i.e. variables that are correlated with the explanatory variable but uncorrelated with the model error term), as these can address nearly all types of endogeneity issues (Jean et al., 2015). Within this context, most researchers use the two-stage least squares method (2SLS) to

control for endogeneity in the research design. However, it is evidenced that using 2SLS, in the existence of endogeneity, could lead to biased and inconsistent results (Hail, 2002; Larcker and Rusticus, 2010). Hail (2002) demonstrated that using the 2SLS approach to control for endogeneity could lead to statistically unsound estimates. Furthermore, Larcker and Rusticus (2010) evidenced that using the 2SLS model with the commonly used instruments in the disclosure literature could lead to a more biased estimate than the ordinary least squares (OLS) model. The challenge in using 2SLS is to find a relevant and valid instrument that has a correlation with the explanatory variable that is substantially larger than its correlation with the model error term (Kaspereit et al., 2015; Chenhall and Moers, 2007; Gassen, 2014).

Some researchers use lagged independent and dependent variables as instruments to control for endogeneity (Arellano and Bond, 1991; Boulding and Christen, 2003; Qiu, 2014). Using lagged variables as instruments is very effective in addressing endogeneity, especially in the existence of simultaneity between the dependent and explanatory variables (Jean et al., 2015). Within this context, Blundell and Bond (1998) proposed a new dynamic panel system of the generalized method of moments (SGMM), which is suggested to be the most suitable model to control for endogeneity in the research design (Wintoki et al., 2012). The SGMM is a system of two simultaneous equations, one in differences and the other in levels, that allows both lagged levels and lagged first differences as instruments in the model (Blundell and Bond, 1998; Gebauer, 2018). The lagged values of the explanatory variables (lagged levels) are used as instruments in the first difference equation, and the differences of the dependent variable (lagged first differences) as instruments in the level equation (Gebauer, 2018; Kaspereit et al., 2015; Khemiri, 2019). The use of lagged values of the dependent and explanatory variables as instruments, instead of external instruments in the 2SLS, allows the SGMM to mitigate almost all types of endogeneity. Based on this investigation of the most suitable statistical technique to be used in the research design, the SGMM is used in this research to control for the existent endogeneity in variables. The SGMM can also mitigate the estimation problems of heteroskedasticity and autocorrelation, which also exist in this research.

A major challenging issue in applying the SGMM is determining the time span of lagging, a matter that lacks a strong theoretical or statistical foundation. In determining how many lags of the independent and dependent variables are to be used in the model, I analysed a number of studies that applied the SGMM in a similar research scenario to mine (Kaspereit et al., 2015; Coricelli et al., 2012; Eugster, 2019; Saini and Singhania, 2017; Schultz et al., 2010; Gebauer et al., 2018). All the analysed studies in this context included one period lag of the dependent variable; however, various numbers of lags of the explanatory variable were used by these researchers. Accordingly, the used model includes one period lag of the cost of equity capital to account for any possible dynamic endogeneity. Regarding the disclosure level, I included two period lags, following Coricelli et al. (2012). In doing so, I measured the correlation between the one- and two-year lag of the disclosure score, and found a high coefficient (0.93). Then I measured the correlation between the two-year lag of the disclosure score and the error term, and found a low value (0.07). Thus, in this case, using two period lags of the regressors is a suitable instrument (Coricelli et al., 2012).

For the SGMM estimates to be consistent, two basic assumptions must be satisfied. First, there is no serial correlation in the level equation as the SGMM requires first order but not second order serial correlation (Blundell and Bond, 1998). The AR (2) test is used to test for the existence of second order serial correlation, under the null hypothesis of no serial correlation. The existence of second order serial correlation could lead to a specification error and a potential omitted variable bias. As will be shown in the next section, AR (2) did not reject the null hypothesis of no serial correlation in all specifications. Second, the used instruments are valid to explain the model in that they should be correlated with the explanatory variables and not correlated to the model error term (Blundell and Bond, 1998). The Hansen test of over-identification is used to test for the validity of instruments, under the null hypothesis of no correlation with the error term (Hansen, 1982). As will be shown in the next section, the Hansen test did not reject the null hypothesis in all specifications.

4.5.3.3. The regression analyses:

This section analyses the relationship between variables using the dynamic panel SGMM model. I used several models to analyze the effect of mandatory disclosure level and voluntary disclosure level on each of the cost of equity capital estimation methods, through regressing each method independently on mandatory and voluntary disclosure level, alternatively, and the 6 identified control variables. I conducted the F-test in all regression models to test the predictive ability of the models, under the null hypothesis that the model has no predictive ability. The results of F-test in all models show highly significant F-statistics at the 0.01 level, meaning that the null hypothesis is rejected and that all regression models have high predictive ability.

Model (1): Ind.EP and M.Dis.

This model is to test the effect of mandatory disclosure on the Ind.EP approach-based estimate of cost of equity capital. The regression model used is formulated as follows:

$Ind.EP_{it} = \alpha + \beta_1 Ind.EP_{it-1} + \beta_2 M.Dis._{it} + \beta_3 BM_{it} + \beta_4 Lev._{it} + \beta_5 Liq_{it} + \beta_6 Size_{it} + \beta_7 Prof._{it} + \beta_8 Growth_{it} + \varepsilon_{it}$	**Equation.7**

Table 4.17 shows the regression results for model (1). It appears that there is a positive association between the Ind.EP estimate of cost of equity capital and mandatory disclosure level, and the association is found to be statistically significant at the 0.01 level. Among control variables, it appears that profitability coefficient is positive, however, other control variables have negative coefficients. All controls are proved to be significantly related to Ind.EP. To sum, this model suggests that there is a significant positive relationship between Ind.EP estimate of cost of equity capital and mandatory disclosure level.

Table 4.17. Ind.Ep & M.Dis	
VARIABLE	Ind.EP
L.Ind.EP	0.345***
	(0.004)
M.Dis	0.439***
	(0.043)
BM	-0.002***
	(0.000)
Liquidity	-0.001**
	(0.000)
Leverage	-0.211***
	(0.030)
Size	-0.025***
	(0.006)
Profitability	0.116***
	(0.039)
Growth	-0.006***
	(0.001)
Constant	-0.069
	(0.053)
Observations	367
Number of n	66
AR (2)	0.064
Hansen test	0.988

Standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

Model (2): Ind.EP and V.Dis.

This model is to test the effect of voluntary disclosure on the Ind.Ep approach-based estimate of cost of equity capital. The regression model used is formulated as follows:

$$Ind.EP_{it}=\alpha + \beta_1 Ind.EP_{it-1}+\beta_2 V.Dis._{it} +\beta_3 BM_{it}+\beta_4 Lev._{it} +\beta_5 Liq_{it}+\beta_6 Size_{it}+\beta_7 Prof._{it} +\beta_8 Growth_{it} + \varepsilon_{it}$$ **Equation.8**

Table 4.18 shows the regression results for model (2). It appears that there is a negative association between the Ind.EP estimate of cost of equity capital and voluntary disclosure level, and the association is found to be statistically significant at the 0.01 level. Among control

variables, it appears that profitability coefficient is positive, however, other control variables have negative coefficients. All controls are proved to be significantly related to Ind.EP. To sum, this model suggests that there is a significant negative relationship between Ind.EP estimate of cost of equity capital and voluntary disclosure level.

Table 4.18. Ind.EP & V.Dis.	
VARIABLE	Ind.EP
L.Ind.EP	0.277***
	(0.009)
V.Dis	-0.125***
	(0.016)
BM	-0.007***
	(0.001)
Liquidity	-0.002***
	(0.000)
Leverage	-0.136***
	(0.031)
Size	-0.063***
	(0.008)
Profitability	0.272***
	(0.048)
Growth	-0.008***
	(0.001)
Constant	0.523***
	(0.055)
Observations	367
Number of n	66
AR (2)	0.067
Hansen test	0.976

Standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

Model (3): CAPM and M.Dis.

This model is to test the effect of mandatory disclosure on the CAPM estimate of cost of equity capital. The regression model used is formulated as follows:

$CAPM_{it} = \alpha + \beta_1 CAPM_{it-1} + \beta_2 M.Dis._{it} + \beta_3 BM_{it} + \beta_4 Lev._{it} + \beta_5 Liq_{it} + \beta_6 Size_{it} + \beta_7 Prof._{it} + \beta_8 Growth_{it} + \varepsilon_{it}$	**Equation.9**

Table 4.19 shows the regression results for model (3). It appears that there is a positive association between the CAPM estimate of cost of equity capital and mandatory disclosure level, and the association is found to be statistically significant at the 0.01 level. Among control variables, it appears that profitability and growth coefficients are negative, however, other control variables have positive coefficients. All controls except growth are proved to be significantly related to CAPM. To sum, this model suggests that there is a significant positive relationship between CAPM estimate of cost of equity capital and mandatory disclosure level.

Table 4.19. CAPM & M.Dis	
VARIABLE	CAPM
L.CAPM	-0.292***
	(0.005)
M.Dis	0.228***
	(0.083)
BM	0.160***
	(0.003)
Liquidity	0.002***
	(0.000)
Leverage	0.259***
	(0.009)
Size	0.072***
	(0.010)
Profitability	-0.280***
	(0.028)
Growth	-0.006
	(0.009)
Constant	-0.730***
	(0.072)
Observations	443
Number of n	59
AR (2)	0.000
Hansen test	0.989

Standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

Model (4): CAPM and V.Dis.

This model is to test the effect of voluntary disclosure on the CAPM estimate of cost of equity capital. The regression model used is formulated as follows:

$$CAPM_{it}=\alpha + \beta_1 CAPM_{it-1}+\beta_2 V.Dis._{it} +\beta_3 BM_{it}+\beta_4 Lev._{it} +\beta_5 Liq_{it}+\beta_6 Size_{it}+\beta_7 Prof._{it} +\beta_8 Growth_{it} + \varepsilon_{it}$$

Equation.10

Table 4.20. CAPM & V.Dis.	
VARIABLE	CAPM
L.CAPM	-0.298***
	(0.005)
V.Dis	-0.338***
	(0.061)
BM	0.154***
	(0.004)
Liquidity	0.002***
	(0.000)
Leverage	0.282***
	(0.011)
Size	0.090***
	(0.012)
Profitability	-0.210***
	(0.037)
Growth	-0.008
	(0.010)
Constant	-0.575***
	(0.067)
Observations	443
Number of n	59
AR (2)	0.000
Hansen test	0.988

Standard errors in brackets

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 4.20 shows the regression results for model (4). It appears that there is a negative association between the CAPM estimate of cost of equity capital and voluntary disclosure level, and the association is found to be statistically significant at the 0.01 level. Among control variables, it appears that profitability and growth coefficients are negative, however, other

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control variables have positive coefficients. All controls except growth are proved to be significantly related to CAPM. To sum, this model suggests that there is a significant negative relationship between CAPM estimate of cost of equity capital and voluntary disclosure level.

Model (5): F.&F. and M.Dis.

This model is to test the effect of mandatory disclosure on the F.&F. estimate of cost of equity capital. The regression model used is formulated as follows:

$$F.\&F._{\cdot it}=\alpha + \beta_1 F.\&F._{\cdot it-1} +\beta_2 M.Dis._{\cdot it} +\beta_3 BM_{it}+\beta_4 Lev._{\cdot it} +\beta_5 Liq_{it}+\beta_6 Size_{it}+\beta_7 Prof._{\cdot it} +\beta_8 Growth_{it} + \varepsilon_{it}$$ **Equation.11**

Table 4.21. F.&F. & M.Dis.	
VARIABLE	F.&F.
L.F.&F.	-0.333***
	(0.005)
M.Dis	-0.434***
	(0.131)
BM	0.173***
	(0.008)
Liquidity	0.001***
	(0.000)
Leverage	0.334***
	(0.013)
Size	0.097***
	(0.014)
Profitability	-0.036
	(0.060)
Growth	-0.007
	(0.013)
Constant	-0.263***
	(0.058)
Observations	443
Number of n	59
AR (2)	0.183
Hansen test	0.988

Standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

Table 4.21 shows the regression results for model (5). It appears that there is a significant negative association, at the 0.01 level, between the F.&F. estimate of cost of equity capital and mandatory disclosure level. Among control variables, it appears that profitability and growth coefficients are negative, however, other control variables have positive coefficients. All controls except profitability and growth are proved to be significantly related to F.&F. To sum, this model suggests that there is a significant negative relationship between F.&F. estimate of cost of equity capital and mandatory disclosure level.

Model (6): F.&F. and V.Dis.

This model is to test the effect of voluntary disclosure on the F.&F. estimate of cost of equity capital. The regression model used is formulated as follows:

$F.\&F._{\cdot it} = \alpha + \beta_1 F.\&F._{\cdot it-1} + \beta_2 V.Dis._{it} + \beta_3 BM_{it} + \beta_4 Lev._{it} + \beta_5 Liq_{it} + \beta_6 Size_{it} + \beta_7 Prof._{it} + \beta_8 Growth_{it} + \varepsilon_{it}$	**Equation.12**

Table 4.22 shows the regression results for model (6). It appears that there is a negative association between the F.&F. estimate of cost of equity capital and voluntary disclosure level, and the association is found to be statistically significant at the 0.01 level. Among control variables, it appears that growth coefficient is negative, however, other control variables have positive coefficients. All controls except profitability and growth are proved to be significantly related to F.&F. To sum, this model suggests that there is a significant negative relationship between F.&F. estimate of cost of equity capital and voluntary disclosure level.

Table 4.22. F.&F. & V.Dis.	
VARIABLE	F.&F.
L.F.&F.	-0.334***
	(0.006)
V.Dis	-0.480***
	(0.058)
BM	0.166***
	(0.008)
Liquidity	0.002***
	(0.000)
Leverage	0.361***
	(0.015)
Size	0.103***
	(0.019)
Profitability	0.053
	(0.062)
Growth	-0.009
	(0.014)
Constant	-0.535***
	(0.119)
Observations	443
Number of n	59
AR (2)	0.300
Hansen test	0.989

Standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

4.6. Robustness Check:

In this section, several additional sensitivity analyses are performed to confirm the previous results. I performed two main sensitivity analyses: first, a composite measure of the cost of equity capital is used instead of using each method independently, second, the effect of control variables is excluded from the analyses.

Using a composite measure of cost of equity:

Using a composite measure of cost of equity capital is expected to exhibit lower measurement error than of the three individual measures, therefore, contributing to mitigating

endogeneity. The composite measure of cost of equity is calculated using the principal component analysis (PCA), which is a statistical technique that is used for data reduction. It helps in reducing the number of variables in an analysis by describing a series of uncorrelated linear combinations of the variables that contain most of the variance (Stata Website). It converts a set of observations of possibly correlated variables into a set of values of linearly uncorrelated variables called principal components. Model (7) and Model (8) are used to analyze the effect of mandatory and voluntary disclosure level on the composite measure of cost of equity capital.

Model (7): COE and M.Dis.

This model is to test the effect of mandatory disclosure on the composite measure of the cost of equity capital. The regression model used is formulated as follows:

$COE._{it} = \alpha + \beta_1 COE_{it-1} + \beta_2 M.Dis._{it} + \beta_3 BM_{it} + \beta_4 Lev._{it} + \beta_5 Liq_{it} + \beta_6 Size_{it} + \beta_7 Prof._{it} + \beta_8 Growth_{it} + \varepsilon_{it}$	**Equation.13**

Table 4.23 shows the regression results for model (7). It appears that there is a positive association between the cost of equity capital and mandatory disclosure level, and the association is found to be statistically significant at the 0.01 level. Among control variables, it appears that profitability coefficient is negative, however, other control variables have positive coefficients. All controls are proved to be significantly related to COE. To sum, this model suggests that there is a significant positive relationship between cost of equity capital and mandatory disclosure level.

Table 4.23. COE & M.Dis.	
VARIABLE	COE
L.COE	-0.281***
	(0.003)
M.Dis	3.247***
	(0.445)
BM	0.902***
	(0.033)
Liquidity	0.014***
	(0.001)
Leverage	2.180***
	(0.285)
Size	0.249***
	(0.061)
Profitability	-1.085*
	(0.545)
Growth	0.099***
	(0.032)
Constant	-6.132***
	(0.498)
Observations	318
Number of n	52
AR (2)	0.856
Hansen test	0.996

Standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

Model (8): COE and V.Dis.

This model is to test the effect of voluntary disclosure on the composite measure of the cost of equity capital. The regression model used is formulated as follows:

$COE._{it} = \alpha + \beta_1 COE_{it-1} + \beta_2 V.Dis._{it} + \beta_3 BM_{it} + \beta_4 Lev._{it} + \beta_5 Liq_{it} + \beta_6 Size_{it} + \beta_7 Prof._{it} + \beta_8 Growth_{it} + \varepsilon_{it}$	**Equation.14**

Table 4.24 shows the regression results for model (8). It appears that there is a negative association between the cost of equity capital and voluntary disclosure level, and the association is found to be statistically significant at the 0.01 level. Among control variables, it appears that profitability coefficient is negative, however, other control variables have positive coefficients. All controls are proved to be significantly related to COE. To sum, this model suggests that there is a significant negative relationship between cost of equity capital and voluntary disclosure level.

Table 4.24. COE & V.Dis.	
VARIABLE	COE
L.COE	-0.296***
	(0.005)
V.Dis	-2.242***
	(0.333)
BM	0.797***
	(0.040)
Liquidity	0.005***
	(0.001)
Leverage	2.154***
	(0.341)
Size	0.292***
	(0.072)
Profitability	-2.762***
	(0.482)
Growth	0.066*
	(0.034)
Constant	-2.893***
	(0.488)
Observations	318
Number of n	52
AR (2)	0.463
Hansen test	0.980

Standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

Excluding the control variables:

In this part, I repeated all the previous regression models after excluding the control variables from the analyses. Table 4.25 shows the results of the regression analyses without taking the control variables into account. In the table, each column corresponds to the same regression model previously conducted with including the control variables. For example, column (1) represents the results of model (1), Ind.Ep & M.Dis, after excluding control variables. As shown in the table, the same results obtained as to the direction of the relationship and the significance level with the exception of model (5), F.&F. and M.Dis., which resulted in a change in the direction of the relationship after excluding the control variables.

Variable	Ind.EP (1)	Ind.EP (2)	CAPM (3)	CAPM (4)	F. & F. (5)	F. & F. (6)	COE (7)	COE (8)
Table 4.25. Regression Results excluding Control Variavles								
L.Ind.EP	0.358***	0.360***						
	(0.004)	(0.000)						
L.CAPM			-0.455***	-0.373***				
			(0.002)	(0.001)				
L.Fama&French					-0.391***	-0.476***		
					(0.002)	(0.001)		
L.COE							-0.342***	-0.362***
							(0.002)	(0.002)
M.Dis.	0.112***		1.117***		0.900***		6.424***	
	(0.011)		(0.034)		(0.043)		(0.209)	
V.Dis.		-0.112***		-0.133***		-0.488***		-2.717***
		(0.011)		(0.017)		(0.023)		(0.171)
Constant	-0.047***	0.061***	-0.718***	0.202***	-0.403***	0.464***	-5.426***	0.501***
	(0.009)	(0.007)	(0.027)	(0.004)	(0.035)	(0.005)	(0.173)	(0.041)
Observations	392	392	466	466	466	466	329	329
Number of n	69	69	60	60	60	60	54	54
AR (2)	0.059	0.066	0.000	0.000	0.000	0.000	0.000	0.000
Hansen Test	0.618	0.613	0.625	0.664	0.667	0.677	0.746	0.687

Standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

4.7. Summary of Results

Model	Compare between	Significance Level	Relatioship
	Table 4.26. Summary of Results		
1	Ind.EP & M.Dis (Control variables included).	0.01	Positive
	Ind.EP & M.Dis (Control variables excluded).	0.01	Positive
2	Ind.EP & V.Dis (Control variables included).	0.01	Negative
	Ind.EP & V.Dis (Control variables excluded).	0.01	Negative
3	CAPM & M.Dis (Control variables included).	0.01	Positive
	CAPM & M.Dis (Control variables excluded).	0.01	Positive
4	CAPM & V.Dis (Control variables included).	0.01	Negative
	CAPM & V.Dis (Control variables excluded).	0.01	Negative
5	F.F. & M.Dis (Control variables included).	0.01	Negative
	F.F. & M.Dis (Control variables excluded).	0.01	Positive
6	F.F. & V.Dis (Control variables included).	0.01	Negative
	F.F. & V.Dis (Control variables excluded).	0.01	Negative
7	COE & M.Dis (Control variables included).	0.01	Positive
	COE & M.Dis (Control variables excluded).	0.01	Positive
8	COE & V.Dis (Control variables included).	0.01	Negative
	COE & V.Dis (Control variables excluded).	0.01	Negative

Table 4.26 summarizes the results of the regression analyses performed. As shown in the table, the following results were obtained:

1- There is a significant positive association at the 0.01 level between mandatory disclosure and the composite measure of COE, either with control variables or without control variables.

2- There is a significant negative association at the 0.01 level between voluntary disclosure and the composite measure of COE, either with control variables or without control variables.

3- There is a significant positive association at the 0.01 level between mandatory disclosure and the Ind.Ep cost of equity estimate, either with control variables or without control variables.

4- There is a significant negative association at the 0.01 level between voluntary disclosure and the Ind.Ep cost of equity estimate, either with control variables or without control variables.

5- There is a significant positive association at the 0.01 level between mandatory disclosure and the CAPM cost of equity estimate, either with control variables or without control variables.

6- There is a significant negative association at the 0.01 level between voluntary disclosure and the CAPM cost of equity estimate, either with control variables or without control variables.

7- There is a significant positive association at the 0.01 level between mandatory disclosure and the F.&F. cost of equity estimate when excluding control variables, however, the association is negative at 0.01 significance level when including the control variables.

8- There is a significant negative association at the 0.01 level between voluntary disclosure and the F.&F. cost of equity estimate, either with control variables or without control variables.

In sum, the results of the study suggest rejecting H (1) that there is a negative association between mandatory disclosure level and cost of equity capital in Egypt and accepting H (2) that there is a negative association between voluntary disclosure level and cost of equity capital in Egypt.

Chapter 5: Findings and the Resulting Conclusions

5.1. General Summary

This chapter presents the conclusions, recommendations, and limitations of the research. The chapter starts with a restatement of the research objective and research hypotheses, and the methodologies used to achieve this objective. The chapter then discusses the sample and data collection, then presents the main findings of the research and its relation to previous research in the same field. Based on the research findings, the limitations of the study and recommendations for further research are presented.

To achieve the main aim of the research, which is to analyse the effect of accounting disclosure on the cost of equity capital for a sample of listed companies in the Egyptian Exchange, the study was organized in four chapters, as follows. Chapter 1 contains the introduction of the thesis, including the background of the study, the focus of the study, the value and main contributions, and the main aim of the research and the research objectives. Chapter 2 investigated the literature review, the theoretical background for the association between accounting disclosure and cost of equity capital, and determined the gaps to be filled in the study. Chapter 3 analysed the institutional framework in Egypt, including the developments in the Egyptian accounting system, the developments in the Egyptian capital market, and the accounting practices in Egypt. Chapter 4 analysed the relationship between the variables of the study using the most suitable measurement methods and statistical techniques, and included a discussion of the results of the study.

The study tested the effect of accounting disclosure on the cost of equity capital in Egypt, through the following steps. First, the mandatory and voluntary disclosure levels were measured using two self-constructed disclosure indices. The mandatory disclosure index was constructed based on the last version of the Egyptian accounting standards, issued in 2016. The voluntary disclosure index was constructed based on a survey of the indices used in the previous studies

that measured voluntary disclosure in Egypt. Second, the cost of equity capital was estimated using three methods, namely the CAPM, the Fama–French three-factor model, and the industrial price–earnings ratio. Last, the relation between the two variables was tested through regressing each of the three cost of equity methods independently on both mandatory and voluntary disclosure scores, and using six control variables that were found in the literature to affect the relationship between the disclosure level and the cost of equity capital. The control variables used were firm size, book-to-market ratio, leverage, liquidity, profitability, and sales growth. As a robustness check, a composite measure of the three cost of equity capital methods was used instead, and the effect of the control variables was excluded from the analyses.

5.2. Summary of the Main Results

The sample of the study included 657 firm year observations for 73 companies across 11 industrial sector for 9 years from 2008 to 2016. The data was collected from the Egyptian company for information dissemination (EGID) and Thomson Reuters Datastream database. The main results of the study can be summarized as follows. The mean cost of equity capital ranges from 0.125 to 0.269, depending on the method used in estimation. This result is consistent with Khlif et al. (2015) and Khlif et al. (2018) who found the mean cost of equity capital in Egypt is 0.171 and 0.173, respectively. The mean mandatory disclosure score is 0.80, the mean voluntary disclosure score is 0.24, and the mean total disclosure score is 0.59. The results of the disclosure scores suggests a departure from full compliance with mandatory disclosure requirements and a very low level of voluntary disclosure in Egypt. This is consistent with Desoky and Mousa (2012), Soliman (2013), Abdelsalam (1999), Samaha et al. (2012), and Hassaan (2013), who found similar disclosure scores in Egypt.

The main hypotheses of the study are:

H1: There is a negative association between the level of mandatory disclosure of the Egyptian listed companies and their cost of equity capital.

H2: There is a negative association between the level of voluntary disclosure of the Egyptian listed companies and their cost of equity capital.

The study found a positive association between mandatory disclosure and cost of equity capital, suggesting the rejection of the first hypothesis. This is consistent with Richardson and Welker (2001), Botosan and Plumlee (2002), Kristandl and Bontis (2007), and Kothari et al. (2009). However, the study found a negative association between voluntary disclosure and cost of equity capital, suggesting the non-rejection of the second hypothesis. This is consistent with Botosan (1997), Francis et al. (2008), Eaton et al. (2007), Hail (2002), Francis et al. (2005), and Chen et al. (2004). These results are found when each of the cost of equity methods was used independently and also when using the composite measure of the three methods combined. The study also tested for the existence of endogeneity in the research design and it is found that the explanatory variable, accounting disclosure, is endogenous. This suggests that the relationship between accounting disclosure and cost of equity capital is of a dynamic nature, therefore, a dynamic panel regression model (SGMM) was used in the analyses.

The negative association between voluntary disclosure level and cost of equity capital is consistent with the theory regarding the association between the two variables, and also consistent with most empirical studies conducted (e.g. Botosan, 1997; Francis et al., 2008; Eaton et al., 2007; Hail, 2002; Francis et al., 2005; and Chen et al., 2004). However, the positive association between mandatory disclosure and cost of equity capital is contrary to theory, but consistent with some empirical studies (e.g. Richardson and Welker, 2001; Botosan and Plumlee, 2002; Kristandl and Bontis, 2007; and Kothari et al., 2009). The possible justifications for this unexpected positive association are as follows. First, Kim and Verrecchia (1994) argue that increasing public disclosure may lead to higher information asymmetry and a corresponding higher cost of equity capital. The rationale is that in case of the unavailability of private information, the increase of public disclosure could be better processed by institutional investors than individual investors, thereby creating information differences across investors (Kim and Verrecchia, 1994). In other words, institutional investors could benefit more from increased

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public disclosure because they have better ability to judge the company's performance, and they incur a low cost for processing the public information (Kristandl and Bontis, 2007). Second, it is argued that the relation between disclosure and cost of equity capital is affected by the content of the disclosed information, i.e. good or bad information (Richardson and Welker,2001; Kothari et al.,2009). That is, disclosure of favourable information is related to lower cost of equity capital, while unfavourable disclosures could lead to higher cost of equity capital (Kothari et al.,2009). The mandatory and voluntary disclosure scores in this research do not reflect whether the information disclosed is favourable or not. In a business environment characterized by secrecy, such as Egypt, a company might not disclose unfavourable information voluntarily; however, it must disclose the unfavourable information that is mandated by the law. In other words, mandatory disclosure may produce more unfavourable information than voluntary disclosure. Last, the costs of compliance with disclosure requirements are high in Egypt; especially when compared with the low costs of non-compliance, because of the weak enforcement mechanisms.

5.3. The Research Limitations

Given that all research studies have a number of limitations, the limitations of this study are:

1- The study was primarily concerned with the effect of accounting disclosure on cost of equity capital in the Egyptian context. This suggests that the findings of this study are restricted to the role of accounting disclosure in affecting the cost of equity capital; however, other variables (such as ownership structure and earnings quality) that may affect this relationship were not included in the analyses.

2- In choosing the sample of the study, financial institutions such as banks and insurance companies were excluded from the sample because of the different disclosure requirements for these institutions. Accordingly, the findings of the study are restricted to non-financial companies.

3- The sample of the study is restricted to the top 100 companies in Egypt, meaning that the relevance of the findings may be restricted to large and publicly traded companies. This does not guarantee the generalizability of these findings to small and medium-sized companies.

4- The study did not test the effect of accounting disclosure on the other component of the cost of capital, which is the cost of debt capital.

5- In measuring the accounting disclosure levels, the research method was limited to using disclosure indices, whereas other methods such as interviews and questionnaires were not used in this study.

6- The indices used to measure disclosure levels were primarily focused on the general information; they did not focus on information such as corporate governance and management, or discussion.

7- The data needed to measure the disclosure levels were collected from one source, the Egyptian company for information dissemination; thus, the reliability of the data depends only on that source.

8- In estimating the cost of equity capital, the study could not use any of the implied cost of equity approaches, because they require data about expected earnings and dividends, which were not available in the Egyptian market.

9- Although the study has used three models to estimate the cost of equity capital, there is no guarantee that the results are totally free from measurement error, given the ongoing debate in the literature about the predictive ability of all cost of equity estimation models.

10- In using the industrial price–earnings ratio method to estimate the cost of equity capital, the sample of the study did not allow the calculation of the median for each industry sector; instead, sectors had to be merged together to calculate the industry median.

11- The study used only six control variables; many other controls (such as market volatility, analyst forecast errors, stock return volatility, earnings variability, and analysts following) that affect the relationship could not be used in this study because of the unavailability of data.

5.4. The Research Recommendations

In view of the limitations of the research, the following recommendations can be made for future research:

1- A similar study can be conducted using a more recent and larger sample, to include all listed companies on the EGX, instead of the top 100 companies only. This would allow greater generalization of the results.

2- It would also be helpful to conduct a similar study by adding companies from other countries in the Middle East and Africa region, so that the results could be generalized to the emerging markets of this region.

3- Considering that the cost of equity figures in the year 2011 could be affected by the January 2011 revolution in Egypt, it may be important to explore the effect of this event on the relationship between accounting disclosure and cost of equity capital. Further research might compare, for example, the period before 2011 with the following years.

4- Future research could include financial institutions in the sample, and test the effect of disclosure by these institutions on the cost of equity capital, in order to determine if any difference arises in the results.

5- The author suggests including more variables in the analysis, such as ownership structure and earnings quality, to test if this affects the results. It would also be helpful to include more control variables.

6- It is advisable to use additional cost of equity estimation models, especially implied cost of equity models. This might be done through using statistical techniques to generate the needed data in case of data unavailability.

7- One avenue for further research would be to test the predictive ability of different cost of equity models in emerging markets.

8- Further studies might additionally analyse the effect of disclosure on the cost of debt capital.

9- It would be helpful to use further techniques, such as interviews and questionnaires, to measure disclosure levels.

10- Disclosure indices could be extended to concentrate more on particular information, such as corporate governance; and management and discussion.

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Appendices

Appendix 1: Sample Companies Codes and Sectors		
company	code	sector
1. ABOU KIR FERTILIZERS	EG:AKF	chemicals
2. ACROW MISR	EG:ACR	construction
3. AJWA FOR FOOD INDS.	EG:AJW	food & beverage
4. ALEXANDRIA MRL.OILS	EG:AMN	oil & gas
5. ARAB CERAMIC	EG:ARC	construction
6. ARAB COTTON GINNING	EG:COT	personal & houshold
7. ARAB POLIVARA SPNG.&WVG.	EG:APV	personal & houshold
8. ARAB REAL ESTATE	EG:ARI	real estate
9. ARABIAN CEMENT	EG:RCC	construction
10. ASEK COMPANY FOR MINING	EG:ASM	basic resources
11. ATLAS LAND & AGRICULTURE	EG:LRA	food & beverage
12. CAIRO DEVELOPMENT &	EG:CDI	real estate
13. CAIRO OILS & SOAP	EG:COS	food & beverage
14. CAIRO POULTRY	EG:CAP	food & beverage
15. CANAL SHIPPING AGENCIES	EG:CAS	industrial goods
16. EASTERN TOBACCO	EG:EAS	personal & houshold
17. EDITA FOOD INDUSTRIES	EG:FID	food & beverage
18. EGYP.FOR TOURISM RSTS.	EG:ERS	travel & leisure
19. EGYPT ALUMINIUM	EG:MAL	basic resources
20. EGYPT IRON & STEEL	EG:EIS	basic resources
21. EGYPTIAN CHEMICAL IND	EG:EGI	chemicals
22. EGYPTIAN ELECTRIC CABLE	EG:EEC	industrial goods
23. EGYPTIAN FINL.& INDL.	EG:EFI	chemicals
24. EGYPTIAN INTL.PHARMS. (EPICO)	EG:EGL	healthcare & pharm.
25. EGYPTIAN STRCH.& GLUCOSE	EG:EFS	food & beverage
26. EGYPTIAN TRAN.	EG:EYP	industrial goods
27. EGYPTIANS HOUSING DEV.	EG:EHD	real estate
28. EGYPTIANS INVT.AND URD.	EG:EIU	real estate
29. EL AHRAM PRINT	EG:ERP	industrial goods
30. EL EZZ PORCELAIN (GEMMA)	EG:ECP	construction
31. EL NASR CLOTHES & TEXT. (KABO)	EG:ELG	personal & houshold
32. EL NASR TRANSFORMERS	EG:ENT	industrial goods
33. EL SHAMS PYRAMIDS	EG:EHT	real estate
34. EL WADI CO FO	EG:ELD	travel & leisure
35. ELSAEED CONTRACT AND REAL ESTATE	EG:UEG	construction
36. ELSWEDY ELECTRIC	EG:SWD	industrial goods
37. EXTRACTED OILS DERIVATRE	EG:EOD	food & beverage

38. EYPTIAN for developing build. Materials	EG:DBM	construction
39. EZZ STEEL	EG:EZS	basic resources
40. GB AUTO	EG:GCT	industrial goods
41. GENERAL SILOS & STORAGE	EG:GSS	industrial goods
42. GIZA GENERAL CONTRACTING	EG:GGC	construction
43. GLOBAL TELECOM	EG:GTH	telecommunications
44. GMC GROUP FOR INDL.COML.	EG:GMC	oil & gas or financial
45. GOLDEN COAST	EG:GOL	travel & leisure
46. HELIOPOLIS HOUSING	EG:HEL	real estate
47. JUHAYNA FOOD INDS.	EG:JFO	food & beverage
48. MARIDIVE & OIL SERVICES	EG:MPS	industrial goods
49. MEDICAL PACKAGING	EG:EME	healthcare & pharm.
50. MEDINET NASR HOUSING	EG:CHO	real estate
51. MENA TOURISM & RLST.INV.	EG:MEN	real estate
52. MIDDLE EGYPT FLOUR MILLS	EG:MIM	food & beverage
53. MISR CHEMICAL INDUSTRIES	EG:MCI	chemicals
54. MISR FERTILIZERS	EG:FPC	chemicals
55. NAT.CO.FOR MAIZE PRDS.	EG:NMP	food & beverage
56. NTRL.GAS & MNG.PROJECT (EGYPT GAS)	EG:EGG	oil & gas
57. ORASCOM HOTELS	EG:ORP	travel & leisure
58. ORASCOM TELECOM MEDIA & TECH HLDG	EG:OTM	telecommunications
59. ORIENTAL WEAVERS	EG:ORW	personal & houshold
60. PAINT & CHMID.(PACHIN)	EG:PAI	construction
61. PALM HILLS DEVS.SAE	EG:PAL	real estate
62. RAYA HLDG.FOR TECH.& COMMS.	EG:RAY	telecommunications
63. REMCO FOR TOURISTIC	EG:RTV	travel & leisure
64. SAMAD MISR -EGYFERT	EG:MFE	chemicals
65. SHARM DREAMS	EG:SDR	travel & leisure
66. SIDI KERIR PETROCHEM.	EG:SID	chemicals
67. SIX OF OCT.DEV.& INV.	EG:SOD	real estate
68. SOUTH VALLEY CEMENT	EG:SVC	construction
69. SUEZ CEMENT	EG:SUE	construction
70. TMG HOLDING	EG:TMG	real estate
71. TELECOM EGYPT	EG:TEL	telecommunications
72. UNITED ARAB SHIPPING	EG:AUS	industrial goods
73. UNITED HOUSING & DEV.	EG:UHD	real estate

Appendix 2: Ind.EP ratio									
Year	2009	2010	2011	2012	2013	2014	2015	2016	2017
company									
ABOU KIR FERTILIZERS	0.575	0.719	0.679	0.407	0.503	0.516	0.325	0.376	0.812
ACROW MISR	0.140	0.049	0.024	0.027	0.176	0.201	0.291	0.574	0.300
AJWA FOR FOOD INDS.	1.450	0.138						-0.025	
ALEXANDRIA MRL.OILS	0.477	0.548	1.215	1.246	0.940	0.829	0.380	0.501	1.264
ARAB CERAMIC	0.961	1.286	0.709	0.729	1.059	0.532	-0.010	0.004	-0.041
ARAB COTTON GINNING	-0.009	0.101	0.094		0.016	-0.021	-0.029	-0.013	0.081
ARAB POLIVARA SPNG.&WVG.									
ARAB REAL ESTATE	0.008	0.004		-0.017	-0.002	-0.045	-0.028	-0.051	
ARABIAN CEMENT			-0.075	0.009	0.034	0.004	0.012	0.000	-0.042
ASEK COMPANY FOR MINING	-0.016	-0.106							
ATLAS LAND & AGRICULTURE			-0.001	0.027	0.004	0.294	-0.041		-0.045
CAIRO DEVELOPMENT &	-0.080	-0.056	-0.021	0.037	0.072	0.071	-0.039	-0.069	-0.051
CAIRO OILS & SOAP	-0.011	-0.029	-0.024					0.171	
CAIRO POULTRY	0.230	0.240	0.106	0.028	0.144	0.068	0.139	0.050	0.045
CANAL SHIPPING AGENCIES	-0.110	-0.109	-0.039	-0.027	-0.037	-0.029	-0.041	-0.070	0.000
EASTERN TOBACCO	0.043	0.000	-0.012	-0.006	0.000	0.000	-0.001	0.031	0.017
EDITA FOOD INDUSTRIES				-0.020	-0.011	-0.016	-0.020	-0.005	-0.048
EGYP.FOR TOURISM RSTS.							0.082	-0.025	
EGYPT ALUMINIUM	-0.055	-0.119	-0.066	-0.115	-0.110	-0.095	-0.062	-0.074	0.079
EGYPT IRON & STEEL	-0.030	-0.135	-0.046						
EGYPTIAN CHEMICAL IND	0.839	1.033	1.071	0.006	0.024	0.004	-0.006	0.001	-0.015
EGYPTIAN ELECTRIC CABLE	0.016	0.035	0.036	-0.036	-0.031	0.058	0.006		-0.018
EGYPTIAN FINL.& INDL.	-0.064		-0.022	0.005	0.017	0.029	0.027	0.055	0.003
EGYPTIAN INTL.PHARMS. (EPICO)	-0.055	-0.028	-0.035	-0.024	-0.029	-0.017	0.000	0.012	-0.021
EGYPTIAN STRCH.& GLUCOSE	-0.025	-0.026			-0.031	0.009	0.006	0.002	-0.017
EGYPTIAN TRAN.	-0.093	-0.107	-0.034		0.000	-0.019	-0.034	0.037	0.099

EGYPTIANS HOUSING DEV.	-0.059	-0.057	-0.031	-0.007	-0.041	-0.061	-0.017	-0.034	-0.039
EGYPTIANS INVT.AND URD.		-0.045	-0.006	-0.007	-0.026	-0.049	-0.027	-0.015	-0.038
EL AHRAM PRINT	0.550	0.423	0.367	0.388	0.652	0.446	0.186	0.064	0.133
EL EZZ PORCELAIN (GEMMA)	-0.069			-0.103	-0.046	-0.004	0.000	0.020	0.022
EL NASR CLOTHES & TEXT. (KABO)									-0.002
EL NASR TRANSFORMERS	-0.077	-0.075	-0.036	-0.007	-0.009	0.000	-0.031	-0.049	0.051
EL SHAMS PYRAMIDS	8.303	0.487							7.368
EL WADI CO FO			0.044	0.076	0.063	0.051	0.020	-0.015	0.070
ELSAEED CONTRACT AND REAL ESTATE	0.150	0.079	0.082	0.090	0.132	0.146	0.151	0.116	-0.022
ELSWEDY ELECTRIC	-0.098	-0.089	-0.037	-0.037	-0.046	-0.030	-0.020	0.021	0.064
EXTRACTED OILS DERIVATRE	0.000	0.000	0.001	-0.015	-0.020	-0.032			0.002
EYPTIAN for developing build. Materials					-0.107			-0.083	
EZZ STEEL	-0.064	-0.126	-0.116	-0.127	-0.100			-0.071	
GB AUTO	0.183	0.271	0.239	0.297	0.130	0.228	0.305		
GENERAL SILOS & STORAGE	-0.042	-0.077	-0.021	0.000		-0.014	-0.006	0.037	-0.004
GIZA GENERAL CONTRACTING	2.674	1.680	1.368	0.990	1.127	1.358	1.528	0.197	0.086
GLOBAL TELECOM	0.121	0.557						-0.075	-0.053
GMC GROUP FOR INDL.COML.	1.210	-0.052	-0.052	-0.040	-0.045		0.019	-0.013	0.000
GOLDEN COAST			0.309	0.442	0.459	0.444	0.187	0.274	0.301
HELIOPOLIS HOUSING	-0.052	-0.014	0.000	0.000	-0.014	-0.019	0.001	0.029	-0.048
JUHAYNA FOOD INDS.	-0.011	-0.018	-0.021	0.006	0.010	-0.017	-0.023	-0.027	-0.040
MARIDIVE & OIL SERVICES	0.068	0.007	0.014	-0.004	-0.045	-0.028		-0.035	-0.028
MEDICAL PACKAGING		-0.023	0.038	-0.048	-0.048				
MEDINET NASR HOUSING	-0.003	-0.004	0.014	0.036	0.088	0.070	0.056	0.200	0.098
MENA TOURISM & RLST.INV.					0.080		0.125	0.090	-0.052
MIDDLE EGYPT FLOUR MILLS	0.000	-0.023	-0.027	-0.019	0.000	0.019	0.018	0.062	0.169
MISR CHEMICAL INDUSTRIES	0.027	0.022	-0.009	0.007	0.020	-0.004	0.000	-0.003	-0.064
MISR FERTILIZERS				-0.045	-0.031	-0.045	-0.022	-0.001	-0.036
NAT.CO.FOR MAIZE PRDS.	0.051	0.026	0.009	0.026	0.040	0.029	0.006	-0.022	0.059

NTRL.GAS & MNG.PROJECT (EGYPT GAS)	-0.028	-0.006	-0.028	-0.005	-0.017	-0.045	-0.033	-0.020	-0.067
ORASCOM HOTELS	-0.043	0.014				-0.050	-0.015		
ORASCOM TELECOM MEDIA & TECH HLDG	0.036	1.272	0.222	0.868	0.142			0.137	
ORIENTAL WEAVERS	0.222	0.220	0.098	0.155	0.209	0.217	0.198	0.035	0.054
PAINT & CHMID.(PACHIN)	0.015	0.000	0.000	-0.042	-0.022	-0.062	-0.041	-0.011	-0.030
PALM HILLS DEVS.SAE	0.184	0.129			0.012	0.005	0.154	0.006	-0.042
RAYA HLDG.FOR TECH.& COMMS.	-0.077	-0.074	-0.014	0.020	0.015	0.005	0.032	-0.009	0.315
REMCO FOR TOURISTIC	0.055	0.044		-0.020		0.000	-0.001		0.088
SAMAD MISR -EGYFERT	-0.038		0.000	-0.023	-0.055			-0.023	
SHARM DREAMS	0.032	0.036	0.000	0.000		-0.057			
SIDI KERIR PETROCHEM.	-0.027	0.000	0.002	0.012	0.039	0.028	0.028	0.076	0.007
SIX OF OCT.DEV.& INV.		0.095		0.118		0.018	-0.002	-0.006	-0.046
SOUTH VALLEY CEMENT	-0.015	-0.127	-0.122	-0.087	-0.058	-0.066	-0.055	-0.003	
SUEZ CEMENT	0.225	0.133	0.013	0.000	0.022	-0.004			
TELECOM EGYPT	0.000	0.000	0.052	0.054	0.081	0.025	0.055	0.000	-0.035
TMG HOLDING	-0.033	-0.024	-0.002	0.000	-0.019	-0.031	-0.012	-0.031	-0.047
UNITED ARAB SHIPPING									
UNITED HOUSING & DEV.	0.003	-0.020	0.021	0.028	0.000	0.000	0.018	0.037	0.038

Year	2009	2010	2011	2012	2013	2014	2015	2016	2017
company									
ABOU KIR FERTILIZERS	0.346	0.124	-0.275	0.284	0.151	0.161	0.087	0.253	0.164
ACROW MISR	0.388	0.130	-0.627	0.409	0.189	0.211	0.013	0.351	0.180
AJWA FOR FOOD INDS.	0.164	0.120	-0.095	0.293	0.149	0.163	0.089	0.256	0.161
ALEXANDRIA MRL.OILS	0.296	0.124	-0.245	0.231	0.150	0.163	0.096	0.240	0.172
ARAB CERAMIC	0.296	0.126	-0.431	0.322	0.160	0.173	0.091	0.245	0.170
ARAB COTTON GINNING	0.588	0.136	-0.746	0.423	0.208	0.243	-0.058	0.480	0.196
ARAB POLIVARA SPNG.&WVG.	0.559	0.138	-0.947	0.499	0.224	0.268	-0.075	0.505	0.198
ARAB REAL ESTATE									
ARABIAN CEMENT									
ASEK COMPANY FOR MINING	0.432	0.131	-0.709	0.499	0.207	0.254	-0.071	0.501	0.203
ATLAS LAND & AGRICULTURE									
CAIRO DEVELOPMENT &									
CAIRO OILS & SOAP									
CAIRO POULTRY	0.282	0.124	-0.388	0.354	0.171	0.194	0.035	0.305	0.173
CANAL SHIPPING AGENCIES	0.531	0.135	-0.833	0.493	0.207	0.248	-0.054	0.476	0.190
EASTERN TOBACCO	0.309	0.124	-0.210	0.292	0.154	0.175	0.076	0.272	0.163
EDITA FOOD INDUSTRIES									
EGYP.FOR TOURISM RSTS.	0.405	0.133	-0.859	0.443	0.208	0.254	-0.064	0.479	0.193
EGYPT ALUMINIUM	0.362	0.128	-0.542	0.321	0.167	0.180	0.080	0.256	0.174
EGYPT IRON & STEEL	0.586	0.136	-0.941	0.450	0.220	0.263	-0.086	0.524	0.205
EGYPTIAN CHEMICAL IND	0.309	0.126	-0.511	0.371	0.188	0.227	-0.028	0.407	0.193
EGYPTIAN ELECTRIC CABLE	0.432	0.132	-0.620	0.319	0.173	0.196	0.048	0.308	0.177
EGYPTIAN FINL.& INDL.	0.457	0.131	-0.638	0.467	0.205	0.241	-0.052	0.470	0.187
EGYPTIAN INTL.PHARMS. (EPICO)	0.333	0.126	-0.281	0.232	0.141	0.154	0.118	0.208	0.163
EGYPTIAN STRCH.& GLUCOSE	0.227	0.124	-0.441	0.427	0.197	0.236	-0.028	0.419	0.185
EGYPTIAN TRAN.									

EGYPTIANS HOUSING DEV.	0.319	0.131	-0.825	0.585	0.225	0.269	-0.074	0.497	0.194
EGYPTIANS INVT.AND URD.					0.175	0.218	-0.026	0.451	0.191
EL AHRAM PRINT	0.523	0.131	-0.639	0.353	0.171	0.197	0.045	0.305	0.173
EL EZZ PORCELAIN (GEMMA)	0.561	0.136	-0.877	0.457	0.202	0.247	-0.041	0.448	0.185
EL NASR CLOTHES & TEXT. (KABO)	0.430	0.131	-0.559	0.401	0.200	0.237	-0.041	0.452	0.189
EL NASR TRANSFORMERS									
EL SHAMS PYRAMIDS	0.104	0.116	0.140	0.145	0.121	0.127	0.162	0.141	0.161
EL WADI CO FO									
ELSAEED CONTRACT AND REAL ESTATE	0.326	0.130	-0.620	0.430	0.187	0.220	0.012	0.361	0.180
ELSWEDY ELECTRIC	0.372	0.130	-0.562	0.357	0.177	0.203	0.042	0.326	0.180
EXTRACTED OILS DERIVATRE	0.416	0.131	-0.746	0.380	0.192	0.227	-0.002	0.382	0.184
EYPTIAN for developing build. Materials	0.181	0.121	-0.419	0.477	0.208	0.259	-0.091	0.493	0.189
EZZ STEEL	0.559	0.134	-0.763	0.531	0.243	0.310	-0.194	0.709	0.212
GB AUTO	0.580	0.138	-0.851	0.498	0.199	0.230	-0.004	0.414	0.183
GENERAL SILOS & STORAGE	0.432	0.132	-0.588	0.357	0.165	0.172	0.106	0.218	0.164
GIZA GENERAL CONTRACTING	0.437	0.134	-0.894	0.504	0.218	0.262	-0.070	0.463	0.186
GLOBAL TELECOM	0.431	0.132	-0.688	0.345	0.210	0.257	-0.058	0.484	0.214
GMC GROUP FOR INDL.COML.	0.537	0.124	-0.458	0.394	0.181	0.211	-0.028	0.404	0.180
GOLDEN COAST									
HELIOPOLIS HOUSING	0.520	0.135	-0.864	0.462	0.202	0.241	-0.043	0.444	0.188
JUHAYNA FOOD INDS.			-0.355	0.262	0.161	0.191	0.033	0.345	0.180
MARIDIVE & OIL SERVICES	0.523	0.130	-0.594	0.397	0.190	0.224	-0.023	0.415	0.189
MEDICAL PACKAGING					0.176	0.195	0.030	0.352	0.163
MEDINET NASR HOUSING	0.527	0.135	-0.792	0.448	0.206	0.258	-0.077	0.520	0.194
MENA TOURISM & RLST.INV.	0.458	0.134	-0.732	0.459	0.210	0.253	-0.054	0.474	0.195
MIDDLE EGYPT FLOUR MILLS	0.427	0.132	-0.644	0.385	0.180	0.198	0.050	0.298	0.172
MISR CHEMICAL INDUSTRIES	0.494	0.134	-0.743	0.421	0.189	0.219	0.007	0.369	0.180
MISR FERTILIZERS									
NAT.CO.FOR MAIZE PRDS.	0.023	0.115	0.132	0.212	0.149	0.176	0.067	0.279	0.169

NTRL.GAS & MNG.PROJECT (EGYPT GAS)	0.350	0.125	-0.335	0.294	0.155	0.161	0.103	0.225	0.168
ORASCOM HOTELS	0.580	0.136	-0.727	0.339	0.157	0.159	0.145	0.165	0.163
ORASCOM TELECOM MEDIA & TECH HLDG					0.189	0.226	-0.038	0.496	0.195
ORIENTAL WEAVERS	0.335	0.125	-0.291	0.244	0.155	0.170	0.082	0.260	0.173
PAINT & CHMID.(PACHIN)	0.351	0.126	-0.412	0.297	0.155	0.165	0.096	0.232	0.165
PALM HILLS DEVS.SAE	0.569	0.131	-0.637	0.526	0.237	0.298	-0.186	0.699	0.210
RAYA HLDG.FOR TECH.& COMMS.	0.420	0.131	-0.654	0.411	0.191	0.224	-0.001	0.386	0.178
REMCO FOR TOURISTIC									
SAMAD MISR -EGYFERT	0.473	0.133	-0.768	0.449	0.202	0.236	-0.032	0.423	0.187
SHARM DREAMS									
SIDI KERIR PETROCHEM.	0.333	0.126	-0.391	0.299	0.166	0.186	0.057	0.293	0.175
SIX OF OCT.DEV.& INV.	0.753	0.144	-1.049	0.553	0.237	0.290	-0.140	0.627	0.200
SOUTH VALLEY CEMENT	0.460	0.136	-0.836	0.421	0.200	0.223	-0.011	0.411	0.190
SUEZ CEMENT	0.374	0.126	-0.326	0.287	0.158	0.171	0.073	0.275	0.171
TELECOM EGYPT	0.213	0.122	-0.169	0.240	0.153	0.180	0.070	0.284	0.179
TMG HOLDING	0.349	0.129	-0.476	0.410	0.204	0.246	-0.070	0.521	0.195
UNITED ARAB SHIPPING	0.535	0.139	-1.116	0.554	0.221	0.270	-0.069	0.487	0.191
UNITED HOUSING & DEV.	0.556	0.135	-0.809	0.414	0.204	0.240	-0.053	0.451	0.195

Appendix 4: Fama & French 3 factor ratio									
Year	2009	2010	2011	2012	2013	2014	2015	2016	2017
company									
ABOU KIR FERTILIZERS	0.597	0.276	-0.251	0.476	0.190	0.405	0.062	0.275	0.368
ACROW MISR	0.639	0.282	-0.604	0.600	0.228	0.456	-0.012	0.373	0.384
AJWA FOR FOOD INDS.	0.415	0.272	-0.072	0.484	0.188	0.407	0.064	0.278	0.365
ALEXANDRIA MRL.OILS	0.547	0.276	-0.221	0.422	0.189	0.407	0.072	0.261	0.376
ARAB CERAMIC	0.547	0.279	-0.408	0.513	0.199	0.417	0.066	0.266	0.374
ARAB COTTON GINNING	0.839	0.288	-0.723	0.614	0.247	0.487	-0.083	0.501	0.400
ARAB POLIVARA SPNG.&WVG.	0.810	0.290	-0.924	0.691	0.263	0.513	-0.100	0.527	0.402
ARAB REAL ESTATE									
ARABIAN CEMENT									
ASEK COMPANY FOR MINING	0.683	0.284	-0.686	0.690	0.246	0.499	-0.096	0.522	0.407
ATLAS LAND & AGRICULTURE									
CAIRO DEVELOPMENT &									
CAIRO OILS & SOAP									
CAIRO POULTRY	0.533	0.277	-0.364	0.545	0.210	0.439	0.010	0.326	0.377
CANAL SHIPPING AGENCIES	0.782	0.287	-0.810	0.685	0.246	0.493	-0.079	0.498	0.394
EASTERN TOBACCO	0.560	0.277	-0.186	0.483	0.193	0.419	0.051	0.294	0.367
EDITA FOOD INDUSTRIES									
EGYP.FOR TOURISM RSTS.	0.656	0.285	-0.836	0.635	0.247	0.498	-0.089	0.500	0.396
EGYPT ALUMINIUM	0.613	0.280	-0.519	0.512	0.206	0.424	0.055	0.277	0.378
EGYPT IRON & STEEL	0.837	0.288	-0.918	0.641	0.259	0.508	-0.111	0.546	0.409
EGYPTIAN CHEMICAL IND	0.560	0.278	-0.487	0.562	0.227	0.472	-0.052	0.429	0.397
EGYPTIAN ELECTRIC CABLE	0.683	0.284	-0.597	0.511	0.213	0.441	0.024	0.329	0.381
EGYPTIAN FINL.& INDL.	0.708	0.284	-0.615	0.658	0.245	0.486	-0.077	0.491	0.391
EGYPTIAN INTL.PHARMS. (EPICO)	0.584	0.278	-0.258	0.423	0.180	0.398	0.093	0.229	0.367
EGYPTIAN STRCH.& GLUCOSE	0.478	0.277	-0.418	0.618	0.236	0.481	-0.053	0.440	0.389
EGYPTIAN TRAN.									

EGYPTIANS HOUSING DEV.	0.570	0.283	-0.802	0.776	0.264	0.514	-0.099	0.519	0.397
EGYPTIANS INVT.AND URD.					0.214	0.462	-0.051	0.472	0.395
EL AHRAM PRINT	0.774	0.283	-0.616	0.545	0.210	0.442	0.020	0.326	0.377
EL EZZ PORCELAIN (GEMMA)	0.812	0.289	-0.854	0.648	0.241	0.491	-0.066	0.470	0.389
EL NASR CLOTHES & TEXT. (KABO)	0.681	0.283	-0.536	0.592	0.239	0.482	-0.066	0.473	0.392
EL NASR TRANSFORMERS									
EL SHAMS PYRAMIDS	0.356	0.268	0.163	0.336	0.160	0.371	0.137	0.163	0.365
EL WADI CO FO									
ELSAEED CONTRACT AND REAL ESTATE	0.577	0.282	-0.597	0.621	0.227	0.465	-0.013	0.383	0.384
ELSWEDY ELECTRIC	0.623	0.282	-0.539	0.548	0.216	0.447	0.017	0.348	0.384
EXTRACTED OILS DERIVATRE	0.667	0.284	-0.723	0.571	0.231	0.472	-0.027	0.404	0.388
EYPTIAN for developing build. Materials	0.432	0.273	-0.396	0.668	0.247	0.504	-0.116	0.514	0.392
EZZ STEEL	0.810	0.286	-0.740	0.723	0.282	0.554	-0.218	0.730	0.415
GB AUTO	0.831	0.290	-0.827	0.690	0.238	0.475	-0.029	0.436	0.387
GENERAL SILOS & STORAGE	0.683	0.285	-0.565	0.548	0.204	0.417	0.081	0.239	0.368
GIZA GENERAL CONTRACTING	0.688	0.287	-0.871	0.695	0.257	0.507	-0.094	0.484	0.390
GLOBAL TELECOM	0.682	0.284	-0.664	0.537	0.249	0.502	-0.083	0.505	0.418
GMC GROUP FOR INDL.COML.	0.788	0.277	-0.435	0.586	0.220	0.456	-0.053	0.426	0.384
GOLDEN COAST									
HELIOPOLIS HOUSING	0.771	0.287	-0.841	0.653	0.242	0.486	-0.068	0.465	0.392
JUHAYNA FOOD INDS.			-0.332	0.453	0.200	0.436	0.008	0.367	0.384
MARIDIVE & OIL SERVICES	0.774	0.282	-0.571	0.588	0.229	0.469	-0.048	0.437	0.392
MEDICAL PACKAGING					0.215	0.439	0.005	0.373	0.367
MEDINET NASR HOUSING	0.778	0.287	-0.769	0.639	0.246	0.502	-0.102	0.542	0.398
MENA TOURISM & RLST.INV.	0.709	0.286	-0.709	0.651	0.249	0.497	-0.079	0.496	0.398
MIDDLE EGYPT FLOUR MILLS	0.678	0.284	-0.621	0.577	0.219	0.442	0.025	0.320	0.376
MISR CHEMICAL INDUSTRIES	0.745	0.286	-0.720	0.612	0.228	0.464	-0.018	0.390	0.384
MISR FERTILIZERS									
NAT.CO.FOR MAIZE PRDS.	0.274	0.267	0.155	0.403	0.188	0.421	0.042	0.301	0.373

NTRL.GAS & MNG.PROJECT (EGYPT GAS)	0.601	0.278	-0.312	0.485	0.195	0.405	0.078	0.247	0.372
ORASCOM HOTELS	0.831	0.288	-0.704	0.530	0.196	0.404	0.120	0.187	0.367
ORASCOM TELECOM MEDIA & TECH HLDG					0.228	0.471	-0.063	0.517	0.399
ORIENTAL WEAVERS	0.586	0.278	-0.268	0.435	0.195	0.415	0.057	0.281	0.377
PAINT & CHMID.(PACHIN)	0.602	0.278	-0.388	0.489	0.194	0.409	0.072	0.254	0.369
PALM HILLS DEVS.SAE	0.820	0.284	-0.613	0.717	0.276	0.543	-0.211	0.721	0.414
RAYA HLDG.FOR TECH.& COMMS.	0.671	0.283	-0.631	0.603	0.230	0.468	-0.026	0.408	0.382
REMCO FOR TOURISTIC									
SAMAD MISR -EGYFERT	0.724	0.285	-0.745	0.640	0.241	0.481	-0.057	0.445	0.391
SHARM DREAMS									
SIDI KERIR PETROCHEM.	0.584	0.278	-0.368	0.491	0.205	0.431	0.032	0.315	0.379
SIX OF OCT.DEV.& INV.	1.004	0.296	-1.026	0.744	0.276	0.534	-0.165	0.649	0.404
SOUTH VALLEY CEMENT	0.711	0.288	-0.813	0.612	0.239	0.468	-0.036	0.433	0.393
SUEZ CEMENT	0.625	0.278	-0.303	0.478	0.197	0.415	0.049	0.297	0.375
TELECOM EGYPT	0.464	0.274	-0.146	0.431	0.192	0.424	0.046	0.305	0.383
TMG HOLDING	0.600	0.281	-0.453	0.602	0.243	0.491	-0.095	0.542	0.399
UNITED ARAB SHIPPING	0.786	0.291	-1.093	0.745	0.260	0.515	-0.094	0.508	0.395
UNITED HOUSING & DEV.	0.807	0.287	-0.786	0.605	0.243	0.485	-0.077	0.473	0.399

Appendix 5: Mandatory disclosure index
1. Company profile (a brief history of the company)
2. Company Name
3. Company address
4. Company legal status
5. Establishment country
6. Main activities and nature of the company's operations
7. Board of director's report
8. Authorized Capital
9. Number of issued shares
10. Par value of share or that the share has no par value
11. The paid amount of capital
12. Date of financial statements issuance
13. End of Period Date or the Period Covered by Financial Statements and Notes
14. Auditor's Report
15. Balance Sheet at the end of the Period
16. Separation of current assets from long term assets
17. Investments in subsidiaries and associated companies
18. Inventory
19. Accounts receivables & other receivables
20. Intangible Assets
21. Cash and cash equivalents
22. Separation of current liabilities from non-current liabilities
23. Accounts Payable and other payables
24. Installments of loans payable
25. Separation of reserves and retained earnings
26. Income Statement for the Period
27. Comprehensive Income Statement for the Period
28. Sales or turnover
29. Cost of goods sold
30. Selling, general, and administrative expenses
31. Tax expenses
32. Credit interests
33. Non-operating revenues
34. Operating income
35. Interest expenses
36. Total comprehensive income
37. Statement for Changes in Owners' Equity for the Period
38. Changes resulted from profits (losses) for each of OE items
39. Changes resulted from comprehensive income for each of OE items

40. Cash Flow Statement for the Period
41. Cash flows from operations activities
42. Cash flows from investment activities
43. Cash flows from finance activities
44. Cash flows from interests and dividends
45. Cash flows from income tax
46. Components of cash and cash equivalents
47. Earnings distribution statement
48. Total dividends
49. Dividends to owners
50. Comparative Financial Statements
51. Currency Used in Financial Statements Presentation
52. The Approximation Level used in Presenting Amounts (thousands or millions)
53. Notes to the Accounts
54. Relating items in financial statements with that in notes to accounts
55. A summary of the most important accounting policies followed
56. A statement that shows commitment to EASs
57. Accounting policies used to recognize revenues
58. Basis of used measurements to determine book value of fixed assets
59. Methods used to determine the level of completion for transactions involved rendering services
60. Treasury shares
61. Basis of preparing financial statements
62. The value of each fixed asset and its accumulated depreciation
63. Methods of depreciation for fixed assets
64. Estimated useful life of fixed assets
65. Book value and accumulated depreciation for fixed assets at the beginning and end of the period
66. Accounting policies followed in measuring inventory
67. Total inventory book value and book value for each item of inventory
68. Any reduction in inventory that was recognized as an expense
69. Methods used to determine the level of completion for contracts under construction
70. Total costs incurred, and profits achieved for contracts under construction at the end of the period
71. Total advance payments collected for contracts under construction
72. Amounts retained from customers for contracts under construction
73. Due dates for financial assets (AR, NR, other receivables)
74. Due dates for financial liabilities (AP, NP, other payables)
75. The policy applied to determine cash and cash equivalents
76. Classification of provisions
77. Book value of each provision at the beginning and end of the period
78. Used amounts (occurred and charged to the provision) during the period
79. Unused amounts of each provision which returned during the period

80. A brief description of the nature of the liability for each provision	
81. The estimated time for outflows for each provision	
82. A reference to uncertainty about the amount or time of outflows for each provision	
83. Description of the nature and purpose of each reserve included in OE	
84. Potential liabilities not included in financial statements	
85. Company objectives and policies with relation to financial risks management	
86. EPS	
87. Amounts used as a numerator to calculate EPS	
88. The weighted average number of shares used as a denominator to calculate EPS	
89. Adjustment for the number of shares at the beginning and end of the period	
90. Qualitative information about objectives, policies, and techniques of capital management	
91. Quantitative information about objectives, policies, and techniques of capital management	

Appendix 6: Voluntary disclosure index
1. List of board members
2. Organizational Structure
3. Principal markets
4. Number of employees
5. Business segment
6. Identification of principal products /services
7. Specific characteristics of these products/services
8. Proposal of new products /services
9. Changes in production/services methods
10. Disclosure of marketing strategy
11. Disclosure of sales strategy
12. Disclosure of distribution channels
13. Disclosure of sales and marketing costs
14. General presentation of the company's strategy
15. Corporate vision and mission
16. Main corporate goals
17. Main actions taken to achieve corporate goals
18. Deadline to achieve each corporate goal
19. Foreign exchange gains or losses
20. Restrictions on ownership of assets
21. Dividends per share
22. Profitability ratios
23. Gearing ratios
24. Liquidity ratios
25. Cash flow ratios
26. Return on equity

27. Cash flow forecast
28. Capital expenditure forecast
29. R&D expenditure forecast
30. Sales forecast
31. Profit forecast
32. Information on analysts of forecasts
33. Forecast of market growth
34. Information on production forecasts
35. Current and movement of share prices
36. Information on transfer pricing
37. Environmental protection programs
38. Value added statement
39. Product safety
40. Statement of internal control
41. Safety and health policies to employees
42. Company's strategies for employee recruitment and training
43. Description of remuneration /compensation system
44. Strategies to measure human capital
45. Calendar for future events or press release
46. Business ethics/code
47. Market capitalization
48. Disclosure of customer satisfaction level
49. Productivity indicators
50. Effects of interest rates on results
51. Effects of interest rates on future operation
52. Effects of foreign currency fluctuations on current results
53. Effects of foreign currency fluctuations on future results

Year company	2008	2009	2010	2011	2012	2013	2014	2015	2016
ABOU KIR FERTILIZERS	0.852	0.830	0.818	0.830	0.818	0.807	0.830	0.807	0.813
ACROW MISR	0.750	0.727	0.807	0.830	0.830	0.864	0.864	0.864	0.879
AJWA FOR FOOD INDS.	0.807	0.795	0.795	0.795	0.807	0.807	0.807	0.807	0.813
ALEXANDRIA MRL.OILS	0.841	0.830	0.864	0.864	0.864	0.886	0.898	0.875	0.835
ARAB CERAMIC	0.841	0.841	0.841	0.852	0.841	0.864	0.875	0.875	0.868
ARAB COTTON GINNING	0.852	0.852	0.818	0.830	0.841	0.761	0.784	0.784	0.747
ARAB POLIVARA SPNG.&WVG.	0.818	0.795	0.784	0.818	0.807	0.830	0.818	0.761	0.780
ARAB REAL ESTATE	0.682	0.682	0.682	0.705	0.716	0.727	0.739	0.739	0.769
ARABIAN CEMENT							0.920	0.909	0.879
ASEK COMPANY FOR MINING	0.807	0.818	0.818	0.818	0.841	0.852	0.852	0.841	0.846
ATLAS LAND & AGRICULTURE					0.625	0.648	0.682	0.716	0.725
CAIRO DEVELOPMENT &	0.841	0.841	0.795	0.841	0.841	0.852	0.773	0.761	0.714
CAIRO OILS & SOAP	0.807	0.795	0.795	0.761	0.761	0.750	0.773	0.773	0.736
CAIRO POULTRY	0.830	0.886	0.864	0.864	0.875	0.864	0.875	0.898	0.857
CANAL SHIPPING AGENCIES	0.727	0.761	0.761	0.750	0.761	0.761	0.761	0.773	0.758
EASTERN TOBACCO	0.841	0.852	0.864	0.875	0.875	0.875	0.886	0.886	0.835
EDITA FOOD INDUSTRIES							0.852	0.852	0.879
EGYP.FOR TOURISM RSTS.	0.807	0.807	0.818	0.773	0.773	0.784	0.784	0.807	0.813
EGYPT ALUMINIUM	0.852	0.852	0.875	0.875	0.909	0.886	0.920	0.852	0.791
EYPTIAN for developing build. Materials	0.614	0.636	0.739	0.727	0.750	0.773	0.727	0.761	0.769
EGYPT IRON & STEEL	0.795	0.807	0.784	0.818	0.807	0.807	0.807	0.807	0.791
EGYPTIAN CHEMICAL IND	0.830	0.818	0.784	0.784	0.830	0.852	0.830	0.852	0.780
EGYPTIAN ELECTRIC CABLE	0.716	0.750	0.750	0.841	0.841	0.864	0.864	0.818	0.802
EGYPTIAN FINL.& INDL.	0.818	0.761	0.795	0.818	0.852	0.875	0.852	0.864	0.879
EGYPTIAN INTL.PHARMS. (EPICO)	0.739	0.716	0.830	0.830	0.841	0.841	0.841	0.841	0.846
EGYPTIAN STRCH.& GLUCOSE	0.807	0.795	0.852	0.841	0.852	0.841	0.864	0.864	0.890
EGYPTIAN TRAN.	0.795	0.773	0.807	0.818	0.818	0.807	0.807	0.807	0.802

EGYPTIANS HOUSING DEV.	0.761	0.739	0.784	0.773	0.761	0.784	0.784	0.784	0.813
EGYPTIANS INVT.AND URD.				0.625	0.625	0.636	0.625	0.636	0.637
EL AHRAM PRINT	0.750	0.750	0.773	0.773	0.773	0.773	0.761	0.761	0.725
EL EZZ PORCELAIN (GEMMA)	0.784	0.784	0.784	0.784	0.739	0.818	0.807	0.841	0.846
EL NASR CLOTHES & TEXT. (KABO)	0.795	0.795	0.784	0.784	0.841	0.795	0.807	0.807	0.758
EL NASR TRANSFORMERS	0.750	0.830	0.875	0.875	0.886	0.898	0.898	0.898	0.879
EL SHAMS PYRAMIDS	0.568	0.602	0.693	0.682	0.659	0.670	0.670	0.670	0.670
EL WADI CO FO					0.693	0.693	0.750	0.750	0.758
ELSAEED CONTRACT AND REAL ESTATE	0.795	0.841	0.841	0.818	0.841	0.818	0.830	0.784	0.780
ELSWEDY ELECTRIC	0.773	0.830	0.841	0.841	0.841	0.864	0.795	0.841	0.857
EXTRACTED OILS DERIVATRE	0.727	0.693	0.773	0.784	0.773	0.773	0.784	0.761	0.736
EZZ STEEL	0.761	0.773	0.773	0.784	0.784	0.784	0.818	0.841	0.802
GB AUTO	0.932	0.932	0.920	0.920	0.920	0.920	0.920	0.909	0.890
GENERAL SILOS & STORAGE	0.739	0.716	0.716	0.852	0.852	0.875	0.898	0.898	0.879
GIZA GENERAL CONTRACTING	0.773	0.784	0.795	0.818	0.852	0.818	0.864	0.830	0.846
GLOBAL TELECOM	0.807	0.807	0.830	0.830	0.818	0.841	0.773	0.761	0.758
GMC GROUP FOR INDL.COML.	0.500	0.500	0.511	0.523	0.591	0.580	0.591	0.591	0.549
GOLDEN COAST					0.568	0.568	0.670	0.648	0.659
HELIOPOLIS HOUSING	0.818	0.818	0.807	0.864	0.852	0.875	0.875	0.852	0.813
JUHAYNA FOOD INDS.			0.864	0.864	0.864	0.875	0.875	0.852	0.857
MARIDIVE & OIL SERVICES	0.773	0.818	0.864	0.852	0.852	0.886	0.852	0.886	0.879
MEDICAL PACKAGING				0.727	0.750	0.761	0.761	0.761	0.780
MEDINET NASR HOUSING	0.852	0.852	0.841	0.830	0.841	0.830	0.841	0.841	0.846
MENA TOURISM & RLST.INV.	0.795	0.795	0.795	0.807	0.807	0.795	0.807	0.795	0.802
MIDDLE EGYPT FLOUR MILLS	0.636	0.636	0.716	0.773	0.818	0.784	0.807	0.818	0.791
MISR CHEMICAL INDUSTRIES	0.795	0.852	0.852	0.852	0.852	0.852	0.852	0.864	0.846
MISR FERTILIZERS						0.773	0.784	0.830	0.857
NAT.CO.FOR MAIZE PRDS.	0.852	0.852	0.852	0.852	0.852	0.864	0.875	0.886	0.879
NTRL.GAS & MNG.PROJECT (EGYPT GAS)	0.807	0.818	0.818	0.818	0.841	0.864	0.864	0.864	0.868
ORASCOM HOTELS	0.773	0.807	0.795	0.795	0.784	0.773	0.773	0.773	0.857
ORASCOM TELECOM MEDIA & TECH HLDG					0.716	0.727	0.716	0.716	0.736

ORIENTAL WEAVERS	0.841	0.830	0.830	0.841	0.830	0.841	0.841	0.841	0.846
PAINT & CHMID.(PACHIN)	0.807	0.807	0.818	0.818	0.795	0.818	0.830	0.852	0.824
PALM HILLS DEVS.SAE	0.727	0.750	0.750	0.750	0.739	0.716	0.716	0.716	0.736
RAYA HLDG.FOR TECH.& COMMS.	0.693	0.773	0.773	0.795	0.807	0.807	0.784	0.784	0.802
REMCO FOR TOURISTIC	0.784	0.773	0.784	0.761	0.784	0.784	0.784	0.784	0.791
SAMAD MISR -EGYFERT	0.795	0.795	0.784	0.807	0.807	0.784	0.750	0.750	0.758
SHARM DREAMS	0.705	0.716	0.716	0.716	0.727	0.750	0.750	0.750	0.736
SIDI KERIR PETROCHEM.	0.773	0.773	0.784	0.818	0.830	0.864	0.875	0.875	0.824
SIX OF OCT.DEV.& INV.	0.807	0.784	0.807	0.795	0.818	0.807	0.807	0.807	0.791
SOUTH VALLEY CEMENT	0.761	0.761	0.761	0.761	0.761	0.773	0.784	0.807	0.791
SUEZ CEMENT	0.761	0.807	0.841	0.864	0.864	0.864	0.841	0.841	0.824
TMG HOLDING	0.739	0.739	0.682	0.659	0.659	0.670	0.693	0.693	0.703
TELECOM EGYPT	0.864	0.864	0.864	0.841	0.841	0.875	0.875	0.875	0.879
UNITED ARAB SHIPPING	0.784	0.784	0.784	0.784	0.784	0.784	0.795	0.795	0.769
UNITED HOUSING & DEV.	0.716	0.705	0.739	0.705	0.773	0.830	0.830	0.830	0.747

Year company	2008	2009	2010	2011	2012	2013	2014	2015	2016
ABOU KIR FERTILIZERS	0.377	0.377	0.377	0.358	0.358	0.396	0.415	0.377	0.377
ACROW MISR	0.151	0.151	0.151	0.132	0.113	0.189	0.170	0.208	0.226
AJWA FOR FOOD INDS.	0.113	0.132	0.226	0.208	0.264	0.264	0.264	0.264	0.264
ALEXANDRIA MRL.OILS	0.434	0.434	0.415	0.396	0.396	0.396	0.434	0.245	0.264
ARAB CERAMIC	0.151	0.113	0.132	0.151	0.189	0.151	0.226	0.170	0.189
ARAB COTTON GINNING	0.226	0.189	0.208	0.208	0.170	0.151	0.189	0.189	0.189
ARAB POLIVARA SPNG.&WVG.	0.264	0.189	0.189	0.189	0.189	0.264	0.264	0.170	0.208
ARAB REAL ESTATE	0.132	0.132	0.132	0.151	0.132	0.170	0.208	0.208	0.208
ARABIAN CEMENT							0.566	0.509	0.226
ASEK COMPANY FOR MINING	0.132	0.208	0.226	0.208	0.226	0.208	0.245	0.245	0.264
ATLAS LAND & AGRICULTURE					0.113	0.094	0.094	0.226	0.208
CAIRO DEVELOPMENT &	0.132	0.151	0.151	0.170	0.132	0.245	0.208	0.208	0.189
CAIRO OILS & SOAP	0.151	0.170	0.151	0.132	0.132	0.132	0.208	0.208	0.170
CAIRO POULTRY	0.113	0.189	0.189	0.208	0.396	0.189	0.245	0.245	0.245
CANAL SHIPPING AGENCIES	0.245	0.340	0.245	0.283	0.283	0.245	0.189	0.189	0.189
EASTERN TOBACCO	0.113	0.208	0.208	0.208	0.528	0.226	0.509	0.472	0.472
EDITA FOOD INDUSTRIES							0.245	0.566	0.566
EGYP.FOR TOURISM RSTS.	0.321	0.132	0.189	0.189	0.189	0.340	0.340	0.340	0.340
EGYPT ALUMINIUM	0.170	0.151	0.208	0.226	0.226	0.264	0.302	0.358	0.340
EYPTIAN for developing build. Materials	0.057	0.075	0.113	0.094	0.094	0.189	0.170	0.189	0.189
EGYPT IRON & STEEL	0.189	0.189	0.189	0.189	0.189	0.189	0.245	0.208	0.189
EGYPTIAN CHEMICAL IND	0.245	0.094	0.226	0.208	0.226	0.208	0.208	0.283	0.283
EGYPTIAN ELECTRIC CABLE	0.113	0.151	0.151	0.151	0.075	0.151	0.226	0.151	0.226
EGYPTIAN FINL.& INDL.	0.283	0.283	0.321	0.358	0.245	0.358	0.245	0.245	0.226
EGYPTIAN INTL.PHARMS. (EPICO)	0.094	0.075	0.151	0.170	0.113	0.113	0.170	0.208	0.208
EGYPTIAN STRCH.& GLUCOSE	0.075	0.075	0.132	0.132	0.132	0.132	0.170	0.170	0.170
EGYPTIAN TRAN.	0.679	0.642	0.094	0.585	0.566	0.283	0.585	0.585	0.585

EGYPTIANS HOUSING DEV.	0.132	0.132	0.170	0.170	0.170	0.226	0.226	0.226	0.226
EGYPTIANS INVT.AND URD.				0.075	0.075	0.151	0.151	0.151	0.151
EL AHRAM PRINT	0.151	0.151	0.151	0.189	0.189	0.189	0.208	0.151	0.170
EL EZZ PORCELAIN (GEMMA)	0.264	0.264	0.264	0.264	0.340	0.340	0.377	0.377	0.377
EL NASR CLOTHES & TEXT. (KABO)	0.132	0.132	0.132	0.132	0.132	0.132	0.151	0.151	0.151
EL NASR TRANSFORMERS	0.151	0.151	0.189	0.151	0.189	0.189	0.245	0.226	0.245
EL SHAMS PYRAMIDS	0.189	0.189	0.189	0.189	0.189	0.132	0.132	0.132	0.132
EL WADI CO FO					0.094	0.151	0.170	0.170	0.170
ELSAEED CONTRACT AND REAL ESTATE	0.132	0.264	0.226	0.208	0.132	0.189	0.189	0.208	0.208
ELSWEDY ELECTRIC	0.151	0.264	0.264	0.189	0.208	0.245	0.283	0.283	0.245
EXTRACTED OILS DERIVATRE	0.075	0.113	0.170	0.189	0.189	0.189	0.245	0.245	0.151
EZZ STEEL	0.113	0.113	0.321	0.321	0.283	0.321	0.321	0.377	0.377
GB AUTO	0.604	0.604	0.660	0.604	0.547	0.642	0.585	0.566	0.547
GENERAL SILOS & STORAGE	0.094	0.264	0.264	0.302	0.340	0.358	0.358	0.358	0.302
GIZA GENERAL CONTRACTING	0.094	0.094	0.094	0.094	0.113	0.094	0.151	0.132	0.151
GLOBAL TELECOM	0.340	0.321	0.340	0.340	0.302	0.340	0.321	0.189	0.189
GMC GROUP FOR INDL.COML.	0.019	0.019	0.019	0.019	0.019	0.019	0.113	0.132	0.132
GOLDEN COAST					0.038	0.132	0.170	0.170	0.170
HELIOPOLIS HOUSING	0.283	0.208	0.283	0.302	0.283	0.302	0.340	0.170	0.189
JUHAYNA FOOD INDS.			0.151	0.377	0.415	0.415	0.434	0.434	0.434
MARIDIVE & OIL SERVICES	0.189	0.283	0.264	0.226	0.226	0.302	0.302	0.302	0.302
MEDICAL PACKAGING				0.094	0.094	0.132	0.132	0.132	0.132
MEDINET NASR HOUSING	0.264	0.264	0.264	0.264	0.283	0.302	0.283	0.264	0.264
MENA TOURISM & RLST.INV.	0.151	0.151	0.151	0.151	0.151	0.226	0.226	0.226	0.264
MIDDLE EGYPT FLOUR MILLS	0.075	0.075	0.321	0.377	0.226	0.226	0.245	0.132	0.132
MISR CHEMICAL INDUSTRIES	0.472	0.472	0.472	0.472	0.472	0.509	0.528	0.472	0.340
MISR FERTILIZERS						0.094	0.094	0.094	0.170
NAT.CO.FOR MAIZE PRDS.	0.245	0.283	0.283	0.283	0.245	0.377	0.358	0.340	0.321
NTRL.GAS & MNG.PROJECT (EGYPT GAS)	0.094	0.302	0.302	0.302	0.132	0.132	0.132	0.132	0.132
ORASCOM HOTELS	0.094	0.113	0.094	0.094	0.094	0.132	0.151	0.151	0.226
ORASCOM TELECOM MEDIA & TECH HLDG					0.094	0.132	0.170	0.170	0.226

ORIENTAL WEAVERS	0.094	0.528	0.528	0.509	0.547	0.208	0.208	0.491	0.585
PAINT & CHMID.(PACHIN)	0.075	0.075	0.340	0.340	0.340	0.321	0.377	0.377	0.358
PALM HILLS DEVS.SAE	0.057	0.094	0.094	0.075	0.075	0.075	0.151	0.170	0.170
RAYA HLDG.FOR TECH.& COMMS.	0.189	0.434	0.491	0.208	0.472	0.453	0.434	0.434	0.472
REMCO FOR TOURISTIC	0.094	0.075	0.113	0.075	0.075	0.094	0.208	0.208	0.208
SAMAD MISR -EGYFERT	0.094	0.094	0.094	0.113	0.113	0.151	0.151	0.151	0.151
SHARM DREAMS	0.151	0.151	0.151	0.189	0.151	0.189	0.189	0.189	0.189
SIDI KERIR PETROCHEM.	0.396	0.396	0.396	0.358	0.358	0.377	0.377	0.377	0.358
SIX OF OCT.DEV.& INV.	0.283	0.283	0.208	0.189	0.189	0.528	0.660	0.547	0.547
SOUTH VALLEY CEMENT	0.094	0.151	0.113	0.113	0.113	0.189	0.189	0.189	0.226
SUEZ CEMENT	0.094	0.094	0.226	0.226	0.340	0.396	0.453	0.434	0.396
TMG HOLDING	0.283	0.283	0.226	0.132	0.132	0.132	0.264	0.264	0.264
TELECOM EGYPT	0.547	0.566	0.566	0.208	0.208	0.264	0.264	0.264	0.264
UNITED ARAB SHIPPING	0.132	0.132	0.151	0.170	0.132	0.170	0.151	0.170	0.151
UNITED HOUSING & DEV.	0.151	0.151	0.170	0.170	0.170	0.189	0.208	0.208	0.208

Year company	2008	2009	2010	2011	2012	2013	2014	2015	2016
ABOU KIR FERTILIZERS	0.674	0.660	0.652	0.652	0.645	0.652	0.674	0.645	0.653
ACROW MISR	0.525	0.511	0.560	0.567	0.560	0.610	0.603	0.617	0.639
AJWA FOR FOOD INDS.	0.546	0.546	0.582	0.574	0.603	0.603	0.603	0.603	0.611
ALEXANDRIA MRL.OILS	0.688	0.681	0.695	0.688	0.688	0.702	0.723	0.638	0.625
ARAB CERAMIC	0.582	0.567	0.574	0.589	0.596	0.596	0.631	0.610	0.618
ARAB COTTON GINNING	0.617	0.603	0.589	0.596	0.589	0.532	0.560	0.560	0.542
ARAB POLIVARA SPNG.&WVG.	0.610	0.567	0.560	0.582	0.574	0.617	0.610	0.539	0.569
ARAB REAL ESTATE	0.475	0.475	0.475	0.496	0.496	0.518	0.539	0.539	0.563
ARABIAN CEMENT							0.787	0.759	0.639
ASEK COMPANY FOR MINING	0.553	0.589	0.596	0.589	0.610	0.610	0.624	0.617	0.632
ATLAS LAND & AGRICULTURE					0.433	0.440	0.461	0.532	0.535
CAIRO DEVELOPMENT &	0.574	0.582	0.553	0.589	0.574	0.624	0.560	0.553	0.521
CAIRO OILS & SOAP	0.560	0.560	0.553	0.525	0.525	0.518	0.560	0.560	0.528
CAIRO POULTRY	0.560	0.624	0.610	0.617	0.695	0.610	0.638	0.652	0.632
CANAL SHIPPING AGENCIES	0.546	0.603	0.567	0.574	0.582	0.567	0.546	0.553	0.549
EASTERN TOBACCO	0.567	0.610	0.617	0.624	0.745	0.631	0.745	0.730	0.701
EDITA FOOD INDUSTRIES							0.624	0.745	0.764
EGYP.FOR TOURISM RSTS.	0.624	0.553	0.582	0.553	0.553	0.617	0.617	0.631	0.639
EGYPT ALUMINIUM	0.596	0.589	0.624	0.631	0.652	0.652	0.688	0.667	0.625
EYPTIAN for developing build. Materials	0.404	0.426	0.504	0.489	0.504	0.553	0.518	0.546	0.556
EGYPT IRON & STEEL	0.567	0.574	0.560	0.582	0.574	0.574	0.596	0.582	0.569
EGYPTIAN CHEMICAL IND	0.610	0.546	0.574	0.567	0.603	0.610	0.596	0.638	0.597
EGYPTIAN ELECTRIC CABLE	0.489	0.525	0.525	0.582	0.553	0.596	0.624	0.567	0.590
EGYPTIAN FINL.& INDL.	0.617	0.582	0.617	0.645	0.624	0.681	0.624	0.631	0.639
EGYPTIAN INTL.PHARMS. (EPICO)	0.496	0.475	0.574	0.582	0.567	0.567	0.589	0.603	0.611
EGYPTIAN STRCH.& GLUCOSE	0.532	0.525	0.582	0.574	0.582	0.574	0.603	0.603	0.625
EGYPTIAN TRAN.	0.752	0.723	0.539	0.730	0.723	0.610	0.723	0.723	0.722

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EGYPTIANS HOUSING DEV.	0.525	0.511	0.553	0.546	0.539	0.574	0.574	0.574	0.597
EGYPTIANS INVT.AND URD.				0.418	0.418	0.454	0.447	0.454	0.458
EL AHRAM PRINT	0.525	0.525	0.539	0.553	0.553	0.553	0.553	0.532	0.521
EL EZZ PORCELAIN (GEMMA)	0.589	0.589	0.589	0.589	0.589	0.638	0.645	0.667	0.674
EL NASR CLOTHES & TEXT. (KABO)	0.546	0.546	0.539	0.539	0.574	0.546	0.560	0.560	0.535
EL NASR TRANSFORMERS	0.525	0.574	0.617	0.603	0.624	0.631	0.652	0.645	0.646
EL SHAMS PYRAMIDS	0.426	0.447	0.504	0.496	0.482	0.468	0.468	0.468	0.472
EL WADI CO FO					0.468	0.489	0.532	0.532	0.542
ELSAEED CONTRACT AND REAL ESTATE	0.546	0.624	0.610	0.589	0.574	0.582	0.589	0.567	0.569
ELSWEDY ELECTRIC	0.539	0.617	0.624	0.596	0.603	0.631	0.603	0.631	0.632
EXTRACTED OILS DERIVATRE	0.482	0.475	0.546	0.560	0.553	0.553	0.582	0.567	0.521
EZZ STEEL	0.518	0.525	0.603	0.610	0.596	0.610	0.631	0.667	0.646
GB AUTO	0.809	0.809	0.823	0.801	0.780	0.816	0.794	0.780	0.764
GENERAL SILOS & STORAGE	0.496	0.546	0.546	0.645	0.660	0.681	0.695	0.695	0.667
GIZA GENERAL CONTRACTING	0.518	0.525	0.532	0.546	0.574	0.546	0.596	0.567	0.590
GLOBAL TELECOM	0.631	0.624	0.645	0.645	0.624	0.652	0.603	0.546	0.549
GMC GROUP FOR INDL.COML.	0.319	0.319	0.326	0.333	0.376	0.369	0.411	0.418	0.396
GOLDEN COAST					0.369	0.404	0.482	0.468	0.479
HELIOPOLIS HOUSING	0.617	0.589	0.610	0.652	0.638	0.660	0.674	0.596	0.583
JUHAYNA FOOD INDS.			0.596	0.681	0.695	0.702	0.709	0.695	0.701
MARIDIVE & OIL SERVICES	0.553	0.617	0.638	0.617	0.617	0.667	0.645	0.667	0.667
MEDICAL PACKAGING				0.489	0.504	0.525	0.525	0.525	0.542
MEDINET NASR HOUSING	0.631	0.631	0.624	0.617	0.631	0.631	0.631	0.624	0.632
MENA TOURISM & RLST.INV.	0.553	0.553	0.553	0.560	0.560	0.582	0.589	0.582	0.604
MIDDLE EGYPT FLOUR MILLS	0.426	0.426	0.567	0.624	0.596	0.574	0.596	0.560	0.549
MISR CHEMICAL INDUSTRIES	0.674	0.709	0.709	0.709	0.709	0.723	0.730	0.716	0.660
MISR FERTILIZERS						0.518	0.525	0.553	0.604
NAT.CO.FOR MAIZE PRDS.	0.624	0.638	0.638	0.638	0.624	0.681	0.681	0.681	0.674
NTRL.GAS & MNG.PROJECT (EGYPT GAS)	0.539	0.624	0.624	0.624	0.574	0.589	0.589	0.589	0.597
ORASCOM HOTELS	0.518	0.546	0.532	0.532	0.525	0.532	0.539	0.539	0.625
ORASCOM TELECOM MEDIA & TECH HLDG					0.482	0.504	0.511	0.511	0.549

ORIENTAL WEAVERS	0.560	0.716	0.716	0.716	0.723	0.603	0.603	0.709	0.750
PAINT & CHMID.(PACHIN)	0.532	0.532	0.638	0.638	0.624	0.631	0.660	0.674	0.653
PALM HILLS DEVS.SAE	0.475	0.504	0.504	0.496	0.489	0.475	0.504	0.511	0.528
RAYA HLDG.FOR TECH.& COMMS.	0.504	0.645	0.667	0.574	0.681	0.674	0.652	0.652	0.681
REMCO FOR TOURISTIC	0.525	0.511	0.532	0.504	0.518	0.525	0.567	0.567	0.576
SAMAD MISR -EGYFERT	0.532	0.532	0.525	0.546	0.546	0.546	0.525	0.525	0.535
SHARM DREAMS	0.496	0.504	0.504	0.518	0.511	0.539	0.539	0.539	0.535
SIDI KERIR PETROCHEM.	0.631	0.631	0.638	0.645	0.652	0.681	0.688	0.688	0.653
SIX OF OCT.DEV.& INV.	0.610	0.596	0.582	0.567	0.582	0.702	0.752	0.709	0.701
SOUTH VALLEY CEMENT	0.511	0.532	0.518	0.518	0.518	0.553	0.560	0.574	0.583
SUEZ CEMENT	0.511	0.539	0.610	0.624	0.667	0.688	0.695	0.688	0.667
TMG HOLDING	0.567	0.567	0.511	0.461	0.461	0.468	0.532	0.532	0.542
TELECOM EGYPT	0.745	0.752	0.752	0.603	0.603	0.645	0.645	0.645	0.653
UNITED ARAB SHIPPING	0.539	0.539	0.546	0.553	0.539	0.553	0.553	0.560	0.542
UNITED HOUSING & DEV.	0.504	0.496	0.525	0.504	0.546	0.589	0.596	0.596	0.549

Statutory Declaration

I herewith formally declare that I have written this dissertation independently without recourse to any unauthorized aids. I used only such sources and aids as are included in the references and I made due reference to all the works either quoted or used as the basis for ideas. I am aware that the violation of this regulation will lead to failure of the dissertation.

Eidesstattliche Erklärung

Hiermit erkläre ich offiziell, dass ich diese Dissertation unabhängig verfasst habe, ohne auf nicht autorisierte Hilfsmittel zurückgreifen zu müssen. Ich habe nur solche Quellen und Hilfsmittel verwendet, die in den Referenzen enthalten sind, und ich habe alle Werke, die entweder zitiert oder als Grundlage für Ideen verwendet wurden, gebührend erwähnt. Mir ist bekannt, dass der Verstoß gegen diese Regelung zum Scheitern der Dissertation führen wird.

Student's name: Sameh Othman Mohamed Yassen   **Matriculation Number**   **Place, Date**

Signature *Sameh Yassen*   3059455   Bremen, 15.02.2021

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