Universidade do Minho

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The influence of CFO characteristics on the firm financial decisions: the case of Egypt

Tese de Doutoramento
em Ciências Empresariais

Trabalho efetuado sob a orientação da

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January of 2023

DECLARATION

ACKNOWLEDGMENT

I deeply praise and thank God for this accomplishment, and I am grateful for being granted the knowledge and strength to finish my thesis

"Family is the anchor during rough waters"

I stand here today because of my family, and I gain my strength from them. I am thankful to all my family members and especially my mother Agharid El Barkouky, she is my backbone and without her I will be lost, and my father Wahid Raafat, his trust in me makes me move forward. I reached this stage in life because of you and I am grateful for all the effort exerted by both of you. A sincere thank you goes to my brother Seif El Din who is always proud of me. To my second parents, my aunt Sahar El Barkouky and my uncle Fouad Ragab, I am grateful for your support throughout my life. Thank you all for tolerating my breakdowns and thank you for helping me to stand still, I hope I made you all proud and I promise to always push myself forward to keep you proud of me.

"Anything is possible when you have the right people there to support you"

A sincere thank you goes to my dear professors *Prof.Dr. Manuel J. Rocha Armada* and *Prof.Dr. Cristiana Cerqueira Leal.* Both professors have been supporting and motivating me throughout the whole PhD journey. I thank them for adding to my knowledge. Their help and guidance are deeply appreciated, and I am certainly lucky being their student.

"Good friends help you find important things when you have lost them, things like your smile, your hope and your courage"

I want to thank my work colleagues, whom are friends not just colleagues, for every prayer, every advice, and every encouragement. The list will not end if I started mentioning names, but you all know yourselves and you can sense my appreciation. I remember each and every motivating word and advice and I deeply appreciate them all. And a very special thank you is dedicated to Rabab Khamis for her support at any point of time, she is always there.

STATEMENT OF INTEGRITY

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I hereby declare having conducted this academic work with integrity. I confirm that I have not used plagiarism or any form of undue use of information or falsification of results along the process leading to its elaboration.

I further declare that I have fully acknowledged the Code of Ethical Conduct of the University of Minho.

A influência das características do CFO nas decisões financeiras: Caso do Egito

RESUMO

Esta tese tem como objetivo estudar diferentes fatores que podem influenciar as decisões financeiras dentro da empresa, explorando as características comportamentais e não comportamentais dos CFOs egípcios, juntamente com seus traços de personalidade e nível de literacia financeira, além das características tradicionais de suas empresas. O objetivo é, portanto, identificar esses fatores e analisar a influência de tais fatores em três decisões financeiras inter-relacionadas, a saber: a estrutura de capital, o custo de capital e a decisão de investimento. Além disso, este estudo modera a participação do CFO no Conselho de Administração para testar se o comportamento do CFO muda em relação à tomada de decisões, quando este faz parte do Conselho. Um questionário é distribuído aos CFOs das empresas não financeiras listadas na EGX e a amostra final é de 96 empresas. Os dados primários são coletados para medir as características comportamentais e não comportamentais de gestão, além disso, os dados secundários são coletados para medir variáveis como as características da empresa, as decisões financeiras e a participação no Conselho de Administração do CFO. A análise inclui uma regressão hierárquica, análise de componentes principais e regressão *stepwise*. Os resultados da regressão hierárquica mostram que os modelos com preditores tradicionais e demográficos explicam melhor a variação nas três decisões financeiras do que o modelo que inclui fatores comportamentais. No entanto, a inclusão do moderador da participação do CFO no Conselho de Administração no modelo revelou um impacto na decisão de estrutura de capital e alguns fatores comportamentais revelam impacto significativo na decisão de custo de capital. A análise de componentes principais mostra a importância dos fatores da empresa apenas para explicar a variação nas decisões financeiras, enquanto a análise stepwise demonstra que as variáveis em estudo estão impactando as decisões financeiras, incluindo fatores comportamentais e não comportamentais. Assim, a evidência deste estudo revela a importância de incluir características comportamentais e outros nos modelos corporativos, ao invés de depender apenas dos determinantes tradicionais e isso sustenta a teoria de finanças comportamentais. Este estudo contribui para a literatura ao explorar características pouco estudadas em um contexto de finanças corporativas, além de focar nos CFOs de um mercado em desenvolvimento como o Egito.

Palavras-chave: Estrutura de capital, Custo de capital, Decisão de investimento, Características do CFO, Membros do conselho.

The influence of CFO characteristics on the firm financial decisions: the case of Egypt

ABSTRACT

This thesis aims to study different factors that might be impacting financial decisions within the firm by exploring behavioral and non-behavioral characteristics of Egyptian CFOs along with their personality traits and financial literacy level, in addition to the traditional characteristics of the firms. The objective is therefore to identify these factors and to then analyze the influence of such factors on three interrelated financial decisions namely: the capital structure, the cost of capital and the investment decision. In addition, this study moderates for the CFO board membership to test if the CFO´s behavior changes towards taking decisions, when on board. A questionnaire is distributed to the CFOs of the non-financial firms listed on the EGX and the final sample accounts for 96 firms. Primary data is collected to measure managerial behavioral and non-behavioral characteristics, moreover, secondary data is gathered to measure variables such as the firm characteristics, the financial decisions, and the CFO board membership. The analysis includes a hierarchical regression, principal component analysis and stepwise regression. The results of a hierarchical regression show that the models with traditional and demographic predictors explain the variation in the three financial decisions better than the model that includes behavioral factors. However, including the moderator in the model revealed an impact on the capital structure decision and few behavioral factors report significant impact on the cost of capital decision. The principal component analysis reveals the importance of firm factors only in explaining the variation in financial decisions, while the stepwise analysis reveals that the variables under study are impacting the financial decisions, including behavioral and non-behavioral factors. Thus, the findings of this study reveal the importance of including behavioral characteristics and other determinants to the corporate models, rather than just depending on traditional determinants and this supports the behavioral finance theory. This study contributes to the literature by exploring characteristics that are understudied in a corporate finance context, in addition to focusing on the CFOs of a developing market such as Egypt.

Keywords: Capital structure, Cost of capital, Investment decision, CFO characteristics, Board membership.

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LIST OF ABBREVIATIONS

AIC	Akaike Information Criteria
BAPM	Behavioral Asset Pricing Model
BIC	Bayesian Information Criterion
BV	Book Value
CAPEX	Capital Expenditure
CAPM	Capital Asset Pricing Model
CEO	Chief Executive Officer
CFO	Chief Financial Officer
CMA	Capital Market Authority
EGID	Egyptian Company for Information Dissemination
EGX	Egyptian Stock Exchange
EWI	Equally Weighted Index
FCF	Free Cash Flow
IMF	International Monetary Fund
NPV	Net Present Value
OCF	Operating Cash Flow
PCA	Principal Component Analysis
PPE	Property Plant and Equipment
RC	Rotated Components
TDR	Total Debt Ratio
VIF	Variance Inflation Factor
WACC	Weighted Average Cost of Capital

Chapter 1: Introduction

1.1. Research background

Finance theory has been evolving in several blocks as standard finance is no longer filling the gap between theory and practice, subsequently, the focus of this thesis is to study finance from a behavioral point of view by focusing on behavioral finance in corporations.

Prior literature refers to the shift from the standard finance to the behavioral finance, and Statman (2020) in a recent issue explains the first and second generations of behavioral finance. Early 1980s was the start of the first behavioral finance generation which described individuals as irrational as they are led by their cognitive and emotional errors, further, individuals were described as normal in the second generation of behavioral finance. The work of Statman highlights that individuals' normal wants contribute to answering important questions related to finance such as savings and investment.

Thus, behavioral finance focuses on the psychology and cognitive sciences to examine the transition from full rationality while taking decisions (Hirshleifer, 2015), and therefore, it is built on the framework of standard finance but with the modification of considering the human behavior. Theoretical and empirical literature shows that individual behavioral characteristics play an important role in explaining different decisions proving a deviation from the neoclassical paradigm.

In standard finance, full rationality is the key assumption, agents in corporations and capital markets are supposed to take unbiased rational decisions by dealing with the capital market as being efficient, with prices reflecting the available information, thus the assumptions are built mainly on the efficient portfolio theory by (Markowitz, 1952), the theory of arbitrage by (Modigliani and Miller, 1958), and the Capital asset pricing model, by (Sharpe, 1964 and Lintner, 1965).

While on the other hand, behavioral finance is an area of financial research that explores how individuals effectively act, acknowledging the psychological factors affecting various financial decisions in capital markets as well as corporations and the existence of limitedly rational decision makers, and thus, when it comes to practice, decision makers fail to apply the efficient market hypotheses and instead they apply normal human behavior, replacing standard finance with behavioral finance.

The field of behavioral finance is now narrowed down to focus on behavioral corporate finance which provides some explanations for the corporate finance puzzles as it links psychology to the behavior of different parties in the society. This area identifies different biased behavior, and it focuses on individuals, other than individual investors and consumers, such as analysts and top-level managers, clarifying that biases are considered differently based on the type of individuals and the situation given, in addition dealing with the bias is different among individuals of different type (Malmendier, 2018).

Therefore, since prior research is enormously focused on individual investors and consumers, more attention should be given to behavioral finance in corporations exploring different parties.

Few of the well-known studies that focus on the characteristics of decision-makers in corporations are referred to as cited in (Malmendier, 2018); Studying the urge to merge and linking to managerial overconfidence (Malmendier and Tate, 2008); debt aversion and its link to past lifetime experiences of the CEO (Malmendier et al. 2011; Benmelech and Frydman, 2015; Schoar and Zuo, 2017); leverage choices and their link to CEOs' personal leverage choices in home purchases (Cronqvist et al. 2012); or firm performance and its link to behavioral characteristics of CEOs (Kaplan et al. 2012). Further, the most tackled behavioral characteristics are overconfidence and optimism which are linked in prior research to different financial decisions and few examples follow: Managerial optimism and its link to the capital structure decision (Hackbarth, 2008; Azouzi and Jarboui, 2012); managerial overconfidence and its link to the capital structure decision (Učkar, 2012; Azouzi and Jarboui, 2012; Tomak, 2013; Abdeldayem and Sedeek, 2018). Moreover, CEO overconfidence is linked to the cost of capital (Hirshleifer et al.2012; Aghazadeh et al. 2018); managerial optimism and overconfidence is further linked to the firm's investment level and efficiency (Chen and Lin, 2013; Ben-David et al. 2013; Iyer et al. 2017; Kang et al. 2018).

Baker and Nofsinger (2010), argue that studying behavioral finance in the context of corporations is more important as the assumed effect of arbitrageurs does not exist in corporations as corporate decisions are controlled by one or few managers which leads their biases to significantly impact the decisions, without being corrected.

To sum up, the behavioral finance theory is at the core of this study as it explains how decision makers can impact the financial situation of the firm by testing how the CFO's behavioral characteristics, among others, affect a financial decision within the firm, namely: the capital structure, cost of capital and the investment decisions.

1.2. Research Gap and motivation

This section highlights few existing gaps that motivated this study. Literature in the context of behavioral corporate finance exists, however some research gaps are found and presented below:

1. The behavior phenomena in corporations is still under investigation and not fully developed, in addition, results are inconsistent.

2. The three main financial decisions of capital structure, cost of capital and investment) are not linked thoroughly with the factors under study.

3. Few managerial behavioral characteristics are referred to in prior literature, namely:

overconfidence and optimism while others are studied more in the context of financial markets. Same applies for the personality traits; the most tackled trait that is linked to firm financial decisions is the extraversion trait.

4. Focusing on the CFOs is also limited as more attention is given to the behavioral characteristics of individual investors or CEOs. In addition, research on multiple CFO characteristics with their influence on different financial decisions is still not fully developed.

5. Behavioral corporate finance studies that are applied on a developing middle eastern market are limited as prior literature focuses on other markets.

Therefore, this study is motivated to fill these gaps by studying the three financial decisions that act as the dependent variables and these are: the capital structure, the cost of capital and the investment decision. Such decisions are at the core of any corporation.

The cost of capital decision is crucial where mistakes are extremely costly and thus, to take a decision that is in the best interest for those who are involved, the firm should accept projects with a positive net present value to ensure that the return is higher than the cost of the investment, thus the investment decision determines which investment projects maximizes the shareholders' value. Moreover, the cost of capital is at the core of the capital structure decision because the firm must raise fund from different sources in a way that optimizes risk and cost factors.

Furthermore, this study is motivated to explore different determinants for the three financial decisions and such determinants act as the independent variables and are grouped into categories: (1) the traditional variables (firm characteristics and managerial demographics); (2) behavioral bias (optimism, overconfidence, illusion of control, loss aversion, herding and anchoring); (3) personality traits (extraversion, conscientiousness, agreeableness, emotional stability, and openness); (4) level of financial literacy. In addition, the study includes a moderating variable which is the CFO board membership, and it is interacted with the six behavioral characteristics to capture any joint effect.

Several behavioral characteristics exist in literature, however, this study does not include them in the research model as some are very similar to the chosen characteristics in terms of meaning and definition, and therefore, to avoid confusion or collinearity problems, they are excluded from this study. For example: the Status quo bias and endowment are an implication of loss aversion phenomenon; confirmation bias leads to overconfidence; Disposition effect is a precedent of mental accounting. Moreover, some of the excluded characteristics use measuring tools that are not much familiar to the respondents in the Egyptian market (such as scenarios related to gambling), in addition, data for other characteristics are not available or not easily obtained, such as data for narcissism and personal

leverage. Therefore, this study opts to select the CFO behavioral characteristics that are most relevant to the corporate decisions.

Furthermore, research on the CFO personality traits and their influence on the three financial decisions is understudied, and as an attempt to study such link, (Adebambo et al., 2018) links one of the traits, that is extraversion, with the cost of equity decision and they focused on CEOs.

Moving to another determinant, the level of financial literacy has been examined among students, investors, and households. An example for famous studies in literature, linking the financial literacy level of individuals with different financial decisions after retirement, explain that being financially literate helps you plan better for your retirement which consequently ensures higher wealth and more funds to be invested and lower borrowing costs, (Lusardi and Mitchell, 2007 and Lusardi and Tufano, 2009).

Remund (2010) and (Huston, 2010), refer that the financial literacy level reflects how individuals are competent to manage a certain amount of money, and that that financial decisions are based on financial education and knowledge.

This study is applied on CFOs as they are the ones responsible for the finance and accounting duties of the firm. They are responsible for financial reporting, determining how to invest corporate funds while considering the capital structure of the firm, in addition to having strategic and technical expertise, Liu et al. (2021). Thus, studying the CFO characteristics is vital.

In addition, it is stated in the work of (Malmendier, 2018) that the behavior might differ if the individual is in a managerial position. Prior research covers thoroughly the CEO power and their presence on the board, however the focus on other executives is not thoroughly studied especially when linking corporate board with behavioral characteristics of the manager, and therefore, that is another motivation to use the CFO board membership as a moderating variable between the CFO behavioral characteristics and the corporate financial decisions, to test whether the CFO behavioral characteristics impact the financial decisions in the case of the CFO being a board member.

CFOs as inside directors lead to better financial reporting quality (Bedard et al. 2014) and better financial flexibility, (Mobbs, 2018). Studies in Egypt focus mainly on CEOs being on board (Elsayed, 2007, Khlif and Samaha, 2019, and Hemdan et al. 2021), among others, thus research on CFO board membership in Egypt is still under development.

The choice of the Egyptian market is also motivated as prior studies prove the inefficiency of the Egyptian Stock Market which is impacted by the availability of information, (ElAnsary and Attuea,2012, Arshad et al. 2016, El Ansary and Mohssen, 2017). Thus, the lack of information is partially caused

by behavioral factors and therefore, biases are more likely to occur in developing markets leading to the importance of incorporating them in this study.

According to (Kim and Nofsinger, 2008) people are not always rational and therefore, their financial decisions may be driven by behavioral factors. Furthermore, theories that call for full rationality in decision making can no longer represent the practical reality as clarified by (Shiller, 1999). Thus, this thesis is motivated to study behavioral corporate finance in Egypt, and to fill all the mentioned gaps.

1.3. Research aims and objectives

The aim of this thesis is to explore a broad set of factors that might be impacting the firm financial decisions under study. The study explores behavioral and non-behavioral characteristics of the Egyptian CFOs along with the traditional characteristics of the firm aiming to explain the firm decisions concerning capital structure, cost of capital and investment. To achieve this aim, the following specific objectives have been defined:

1. Exploring different CFO behavioral and non-behavioral characteristics that are adhered by the Egyptian CFOs to understand their common behavioral pattern.

2. Reaching the set of factors that might be impacting the three financial decisions under study (capital structure, cost of capital and investment) and analyzing their influence.

3. Moderating for the CFO board membership to capture the joint effect as it moderates the relation between the CFO behavioral characteristics and the three financial decisions.

To reach this thesis objectives, a questionnaire is distributed to the CFOs of the non-financial firms listed on the EGX, having 96 firms with CFOs constituting the final sample. Primary data is collected to measure managerial behavioral and non-behavioral characteristics, additionally, secondary data is gathered to measure variables such as the firm characteristics, the financial decisions, and the CFO board membership.

The analysis includes a hierarchical regression, principal component analysis and stepwise regression. The hierarchical regression aims to test for the impact of traditional firm factors and demographics and then including other CFO characteristics to the model arguing that behavioral factors should be included in traditional models, so this type of regression will help capture the effect of the behavioral characteristic's inclusion.

Since regressions are not free from statistical problems, this study applies other types of analyses as a robustness check, and these are the principal component analysis and the stepwise analysis.

Principal component analysis is usually used in a regression for two main reasons: (1) when there are many independent variables relative to the number of observations (2) when the independent variables

are highly correlated (Rencher,2005), and this justifies its use in this study. Further, the stepwise analysis is additionally used to purely predict or reveal relations between the variables as it picks out the relevant predictors from several possible ones based on a criterion.

1.4. Research contribution

To the best of our knowledge, this study is the first to explore a broad set of CFO characteristics and to test for their influence on different corporate financial decisions, in addition to considering the CFO's membership on board. Results of this study contribute to the literature by the following:

1. Focusing on behavioral finance within the context of corporations, which is not fully documented, by presenting the influence of CFO behavioral characteristics on the corporate financial decisions. This differs from prior studies in the context of corporations which focus more on traditional factors.

2. Studying several behavioral characteristics that are not fully studied in the context of corporations, as the focus is mainly on overconfidence and optimism.

3. This study examines the impact of CFOs´ behavioral characteristics on different financial decisions while moderating for their board membership and therefore, the results provide an exploration of a joint effect. Focusing on other executives such as the CFO, especially concerning the decisions under study which are at the core specialization and job description of the CFO.

4. This study contributes by identifying several determinants not only behavioral such as: CFO's demographics, CFO's personality traits, CFO's level of financial literacy, and firm characteristics. This provides a comprehensive study that explores different determinants of financial decisions.

5. Choosing the Egyptian market contributes to the existing literature as behavioral corporate finance studies, focusing on the Middle Eastern countries and especially Egypt, are limited and not sharing the same aim as this study.

1.5. Thesis structure

This thesis has five remaining chapters which are organized as follows:

Chapter 2: Literature Review presents prior theoretical and empirical work, referring to different contexts, decisions, and characteristics.

Chapter 3: Methodology presents the conceptual framework, research questions and hypotheses as well as the main variables under study and the research model. This chapter also describes the methodologies and tests used.

Chapter 4: Data provides information regarding the universe, sample, and data collection process. Validity and reliability checks are presented along with the descriptive statistics of the data.

Chapter 5: Empirical Results and Discussion reports the findings of the inferential statistics. This chapter applies the techniques mentioned in the methodology chapter and conducts tests and analyses, in addition, it provides a discussion for the findings and compares them to prior research.

Chapter 6: Conclusion the thesis is concluded by summarizing the main findings, presenting the main contributions, limitations, as well as recommendations.

Chapter 2: Literature Review

2.1. Introduction

This chapter provides a theoretical background for the standard/traditional finance versus behavioral finance in corporations. Further, prior empirical work is presented which helps in highlighting the research gap.

As mentioned earlier in the introduction chapter, behavioral finance, is a two phased system. At first, decision makers were described as irrational due to their cognitive and emotional errors when seeking their rational wants. Then, as the human behavior is better understood and studied, the so-called errors become normal and thus decision makers are normal rather than irrational. This understanding causes cognitive and emotional errors to decrease and leads to better decision making (Statman, 2018).

The growing literature on human psychology and behavior shows that most individuals are subject to limits in their cognitive processes and tend to develop behavioral biases that can significantly influence their decisions, (Azouzi and Jarboui, 2012).

This study explores different behavioral characteristics namely: optimism, overconfidence, illusion of control, loss aversion, herding and anchoring. The study then tests for their impact on different financial decisions while including other predictors such as: the personality traits, the financial literacy, the CFO board membership as a moderator and few traditional variables (firm characteristics and managerial demographics).

The coming section (2.2) provide a brief overview of the development of behavioral finance paradigm in corporations. Followed by two sections (sections 2.3 and 2.4) that present the theoretical background highlighting the main theories, that are linked to financial decisions, in standard/traditional finance and behavioral finance. Section (2.5) present the independent variables of the study and section (2.6) present the main financial decisions under study, within standard and behavioral contexts, these are: the capital structure decision, the cost of capital decision, and the investment decision. Finally, section (2.7) concludes this chapter.

2.2. Standard versus Behavioral Finance in corporations

Jensen and Smith (1984), in their historical overview of the theory of corporate finance, state that the main concerns of the field of corporate finance are: optimal investment, financing, and dividend policies.

Damodaran (2010), states that any decision that affects the business finances is considered a corporate finance decision. The focus of corporate finance is to maximize the value of the firm by

focusing on three decisions, these are: (1) The Investment Decision; (2) The Financing Decision; and (3) The Dividend Decision, as mentioned by (Jensen and Smith, 1984).

Having value maximization as the main focus will help a firm to choose the right investment, decide on the best capital structure that suits the firm and it will also help to decide on the best dividends policy for the firm.

Malmendier (2018) explain that when a firm seeks external finance, the challenge of the information asymmetry problem arises, creating two problems which are the adverse selection problem which is known to be a pre transaction problem and the moral hazard which is known to be a post transaction problem. In addition to the third parties' challenge as activities and regulations of these parties affect the company´s choice and cost of financing.

Based on standard neoclassical economics, managerial decisions assume rational payoff maximization and any failure to maximize the shareholders´ value are attributed to a conflict of interest or uncertainty. On the other hand, behavioral corporate finance interferes and attributes any failure in following the rational assumption to what is called managerial biases (Guenzel and Malmendier, 2020).

Behavioral corporate finance has become one of the most active areas of research in the finance literature, however more focused on investors' biases and so research that focus on managers and their biases is limited which motivates this study.

2.3. Traditional theories

Finance for corporations is when managers and investors interact with the aim of maximizing the firm value. Different theories exist to explain the relation between the two parties, assuming that managers are unbiased, rational and markets are efficient with fairly priced securities. The coming paragraphs present briefly the main traditional corporate finance theories.

Starting with the agency theory that is almost grounding every research in corporate finance, it is defined by (Jensen and Meckling, 1976) as the theory that addresses the relationship between the principal who hires another person called the agent to perform some services on their behalf. As explained by (Eisenhardt, 1989) agency problem occurs when the objectives of the principal and agent contradict, and it is difficult and costly for the principal to detect what the agent is doing. In other words, different interests that are not easily matched cause conflicts to arise, especially in corporations due to separation of ownership.

Prior empirical work reveals that agency problems within firms are mainly due to either excess level of free cash flow or the problem of overinvestment. A positive relationship between these two is

reported as firms with high level of free cash flows tend to overinvest and might lead to the agency problem (Richardson, 2006). Overinvestment means that the managers invest in negative net present value projects which results in higher implied cost of capital due to the increased level of risk (Wu et al, 2016).

Empirical work links the agency problem with different financial decisions, for example (Albuquerue and Wang, 2008) suggest that overinvestment is reduced when shareholders have more rights and therefore reducing the implied cost of capital. Further, when overinvestment decreases, cost of capital decreases and the level of free cash flow is increased.

Reducing the agency costs could be through debt as managers´ efficiency increases due to interest payment obligation which in turn enhance firm performance (Jensen and Meckling, 1976 and Buferna et al. 2005), thus the theory proposes the use of debt financing as a way of monitoring managers of the firm to focus on overall objective of the organization apart from their own interests. On the other hand, the theory adds that more debt might involve more cost, that is the bankruptcy cost. Therefore, any firm should try to reach the optimal capital structure by balancing the cost of debt with its benefits (Jensen, 1986).

Further, providing managers with stock-based compensation will motivate them to work for the interest of the shareholders to maximize the firm value by reducing the cost of capital. And this also indicates reducing the overinvestment problem and increasing the level of free cash flows (Wu et al. 2016).

The second theory is Modigliani and Miller theory which proposes that a firm's capital structure can be financed in various ways, ranging from debt financing only to equity issues only. The main assumption is that firm´s value is independent of the underlying capital structure and subsequently the capital structure has no effect on the firm´s weighted average cost of capital. However, this assumption is true only in efficient markets with no taxes, information asymmetries and bankruptcy costs (Modigliani and Miller, 1958).

Therefore, heading to a more realistic theory comes the tradeoff theory by (Modigliani and Miller, 1963) suggesting that an optimal capital structure is reached when tax benefit of the debt financing outweighs the costs associated with financial distress and bankruptcy, and that's when the debt could create value to the firm.

Leary and Roberts (2005) clarify that debt benefits include tax shield, the disciplinary role of debt, and less informational costs requirement as compared to equity, while its costs include bankruptcy costs and financial distress. Miller (1988) confirms that using debt increases the risk of bankruptcy which is composed of direct and indirect costs. Bradley et al. (1984) explains that direct cost of bankruptcy

includes legal and administrative cost, while indirect cost is when the trust between the firm and its stakeholders is lost.

Myers (1977) clarifies that firms have a target debt ratio and attempt to move toward this target ratio which is reached when the deductible tax benefit equals the cost for financial distress. In other words, the theory proposes that firms should continue borrowing funds until the marginal tax advantage of additional debt is offset by the marginal expected costs of financial distress (Myers, 1984).

Another common theory proposed by (Myers and Majluf, 1984) is the Pecking order theory that shows the order of financial managers preferences in raising capital as they tend to use internal source of finance then debts and leaving equity as a last resort which is issued only when the capacity of debt is fully used.

The theory has a basic assumption of information asymmetry, as managers know more about the firm compared to external parties leading to preferring internal source of finance over external sources (Harrison and Widjaja, 2014). However, when firms need external finance, they prefer debt to equity due to lower information costs associated with debt (Frank and Goyal, 2003).

The pecking order theory is challenged by its modified model which follows a different financing hierarchy namely: retained earnings followed by equity and then resorting to debt as a final choice (Delcoure, 2007). The first attempt to empirically test the modified pecking order theory is by (Myers, 1984) under the concept of combining both, the tradeoff theory, and the pecking order theory to better explain the financing decisions of a firm.

The trade-off theory and the pecking order theory were the two main competing theories till the appearance of the market timing theory that caused a challenge where the market-to-book ratio is used to assess the market timing opportunities.

The idea is that managers base their decisions on the surrounding market conditions, thus they time their use of debt or equity based on which is more valuable for the firm at that point of time (Baker and Wurgler, 2002). Kayhan and Titman (2007) clarify that the firm's financing decision is a cumulative outcome of previous attempts to time the stock market through different acts of issuances, repurchases or retirements.

Lucas and McDonald (1990) explain that information asymmetry causes managers to decide on the best time to issue equity which is best when stock price goes up. If a firm's stock price is undervalued due to informational asymmetry, the issuance is postponed till good news are released and prices increase, so the stock price performance is a factor that affects the decision of issuing equity. In addition, (Baker and Wurgler, 2000) predict a direct relation between equity and the business cycle,

clarifying that when the economy is in good condition, equity issues by firms are increased and vice versa.

On the other hand, issuing debt can be timed as well. Firms tend to issue debt when they view market interest rates to be low. Also, financial managers tend to depend on short-term debt when they view their rates to be lower than the rates of long-term debts (Graham and Harvey, 2001).

The final traditional theory is the signaling theory, Spence (1973) proposes the signal equilibrium theory explaining that firms use signals to convey information to outsiders and specifically good firms use signal to declare their type. Ross (1977) explains that issuing debt is a costly signal and is thus used by good firms as in this case bad firms are not able to mimic good ones due to the high cost. Only in this case is the signal credible and good firms are distinguished from bad ones.

Under the asymmetric information, managers know the true distribution of firm returns, while the investors do not. Therefore, using debt is a signal for a good quality firm and long-term value maximization (Ravid and Sarig, 1991), adding that good quality firms are highly leveraged and pay higher dividends compared to the bad quality firms.

Summing up the traditional theories, each of the previously mentioned theories is supported with empirical work that prove its validity, however there is no single theory on capital structure which incorporates all important factors and predictions, and thus capital structure remains a puzzle.

Such theories show that different financial decisions might create or reduce the agency problem and might affect firm's value and reputation, and therefore, CFOs who are responsible for the financing decisions have a vital role within the firm to work for the best interest of the shareholders.

Further (Graham and Harvey, 2001) declared that in real-life, firms do not follow guidelines from conventional financial textbook when making financial decisions, and this is when behavioral corporate finance emerges.

Therefore, this thesis aims to explore the CFO's behavior and characteristics and tests for their influence on different vital corporate financial decision. Thus, in the coming section, this study tries to reflect the reality by exploring the main grounding theories for behavioral corporate finance.

2.4. Behavioral theories

The idea of the existence of an efficient market no longer holds and other behavioral theories that have a psychological base, are needed to explain the roused anomalies (Ritter, 2003). Therefore, rising research in behavioral finance started threatening the validity of the neoclassical theory by providing explanations on how decisions are made and how financial behavior is shaped.

Following the behavioral finance evolution which first described individuals as irrational and then

describing them as normal, and since this study focuses on the CFO who is responsible for taking vital financial decisions for the firm, it is logical to study the theories grounding the behavioral finance. Different theories, that call for the important role of human behavior in the decision-making process, could be summed up to a general theory which is the behavioral finance theory.

The studies of (Kahneman and Tversky, 1974) are among the studies that set the main concepts of such discipline as they developed the prospect theory which is discussed below. Thaler (1993) explains that what gives the behavioral finance theories an edge is that the theories are based on several aspects by applying several sciences such as mathematical calculus, psychological and social sciences, among others.

The following subsections present the main guiding theories in the field of behavioral finance, as the theories explain the functionality of human brain as to take decisions and show how the decision making evolved. This is explained through the main behavioral theories which are: the bounded rationality theory and the Keynesian theory, the prospect theory, the behavioral consistency theory and finally the heuristics theory.

2.4.1. Bounded rationality theory and Keynesian theory

Simon (1957) introduced the idea of bounded rationality explaining that humans are rationally bounded due to limited information, ability, and time. Based on that, human beings tend to reduce uncertainty using heuristic methods rather than formal ones to decrease complexity and to have few pieces of information to deal with. Keynes (1973) explain that the future is unknown and that decision makers are forced to act based on their instincts, conscious or other social practice, to create expectations to be able to decide.

Adding up to this idea (Gordon, 1992), explains the Keynesian theory that highlights the role of preferences while taking a decision. For example: how one reacts to uncertainty reflects the individual's risk preference, in addition individuals may react differently to different consequences resulting from the same risk. Therefore, the decision is taken based on how each human perceives the risk (Eeckhoudt and Hammitt, 2004).

With the fact that the future is unknown, acting rational is not easy to maintain, (Shah, 2013) explains that the reason behind the limited rationality behavior are psychological factors that lead to the distortion of the efficient market assumptions regarding the decision maker and the prices behavior.

In an attempt for clarification and differentiation, the neoclassical theory assumes the following: (1) markets are efficient; (2) main aim is to maximize the wealth of the shareholders and work for their interests; (3) assumes that agents can assign probabilities to all possible future outcomes that leads

to knowledge. On the other hand, the post-Keynesian theory is based on different assumptions, these are (1) assumes that managers work for their own goals; (2) aim to maximize the probability firm survival and job security; (3) Dividends are a constraint same as interest payments. Thus, the post-Keynesian theory is based on uncertainty, rather than the neoclassical knowledge (Vasiliou and Daskalakis, 2009).

2.4.2. Prospect theory

On the contrary to the risk aversion assumption of the efficient market, Prospect theory is introduced, as an alternative, as it focuses on loss aversion instead of risk aversion, that is dealing with gains and losses instead of risk and return.

The theory is introduced by the psychologists (Kahnemann and Tversky, 1979) and defined as a mathematically formulated theory that is an alternative to the theory of expected utility maximization, defining utility as a change or a departure from the reference point.

Therefore, the prospect theory replaces the utility function of the expected utility theory by the value function. In other words, the main concept of the theory is referred to as coding, hence, individuals use a reference point where results above are gains while results below are losses, however, the reference point and the coding of outcomes as gains or losses, are affected by the decision maker expectations.

Nwogugu (2005) mentions that the prospect theory fails to explain the decision making under uncertainty as it has several errors that make the theory less reliable. And so, the prospect theory has been criticized for the following; (1) it is not clear whether the individual-level can be applied to organization-level decision making (Nwogugu, 2005); (2) the survey used to prove the theory is criticized by being biased due to non-random sample chosen and sizes of the gains and losses were relatively small amounts (Birnbaum, 1999); (3) the surveys were not real-life situations, so people responded differently from the way they do in real life (Nwogugu, 2005); (4) the study did not analyze group decision making (Chernyshenko et al. (2003); last but not least (5) the study ignored some situations that can impact the decision making process such as negotiations (Ballestro, 2002), cross-cultural interactions (Wallsten and Gu, 2003) and situations of repetitive decision making with same issues, but with varying conditions (McNamara and Bromily, 1997).

However, Prospect theory remains a key theory for basing decisions of corporate finance and is at the core of behavioral finance as it describes some anomalies that drive the decisions of individuals such as regret aversion, Loss aversion and mental accounting (Waweru et al. 2008), in addition to other anomalies.

2.4.3. Behavioral consistency theory

Behavioral consistency is the extent to which an individual exhibits a behavior in one situation that is predictable from the extent to which the individual exhibits the behavior in another situation (Cronqvist et al. 2012). In other words, it is when individuals behave consistently across situations.

The behavioral consistency theory is strongly linked to the anchoring phenomenon, as studies report that managers tend to anchor by applying their personal behavior in corporations that they manage, and this provides evidence that firms' policies can be predicted from observing their managers ´personal behavior.

Three examples for such link are: the study by (Cronqvist et al. 2012) reporting a direct relation between the CEO´s personal leverage and the firm´s leverage; (Hutton et al. 2014) focus on the political views explaining that managers who prefer a democratic regime tend to be conservative in their corporate decisions; and as a final example (Cain and McKeon, 2016 and Sunder et al. 2017) alter a personal behavior that leads the managers to take risky corporate decisions. They argue that CEOs who hold aircraft pilot licenses are innovative, adventurous and have high degree of risk tolerance which leads them to take risky decisions in their corporations.

Furthermore, (Malmendier and Tate, 2005) find that CEOs who are overconfident in their personal portfolios are overconfident also in corporate investment decisions. Hong and Kostovetsky (2012) find that portfolio managers who make personal campaign contributions to Democrats invest relatively less of the portfolios they manage in firms deemed socially irresponsible. In addition, (Chyz, 2010) finds that executives who are personally more tax aggressive manage firms with more tax avoidance activities.

2.4.4. Heuristics Theory

Stein (1996) and (Rieskamp and Otto, 2006) refer that the human mind adapts to the surrounding environment enabling it to make heuristic-based decisions that are fast and with minimum loss. Heuristics is defined by (Gigerenzer and Gaissmaier, 2011) as efficient cognitive processes, conscious or unconscious, that ignores part of the information to save effort and time aiming for sufficient satisfaction rather than reaching optimal utility.

The heuristics phenomenon is useful when individuals face uncertain and complex situations with a limited time to decide (Ritter, 2003 and Waweru et al. 2008). The decision is thus made easier by reducing complexity of predictions; however, this might lead individuals to be biased. Tversky and Kahneman (1974) were among the first researchers to introduce some heuristics factors by introducing the availability bias, representative bias, and anchoring. Waweru et al. (2008) refer to

another two factors which are the overconfidence and the gambler´s fallacy.

Concluding this section, behavioral finance aims to provide better understandings for financial decisions made by individuals and therefore, behavioral finance theories should replace traditional theories.

The coming section (2.5) includes different subsections that present the factors under study (behavioral characteristics, personality traits, financial literacy, CFO board membership and managerial demographics), following section (2.6) presents the three financial decisions that this study is concerned with, which are: the capital structure decision, the cost of capital decision and the investment decision, linking them with the factors under study.

2.5. Managerial characteristics

2.5.1. Behavioral characteristics

Following the behavioral paradigm, what interferes with financial decisions are biases, heuristics, and psychological factors. This study is concerned with six CFO behavioral characteristics which are: optimism, overconfidence, illusion of control, loss aversion, herding and anchoring. And they are discussed next by presenting prior empirical work that link such behavioral characteristics with different financial decisions.

2.5.1.1.   Optimism

Weinstein and Klein (1996) define optimistic bias as the phenomenon when decision makers are less likely to be victims of bad future events. Heaton (2002) talks about an underinvestment overinvestment tradeoff regarding the free cash flow in corporations with an optimistic manager. An external feature is that optimistic managers often believe that the market is undervaluing their firm´s risky securities and might cause the value of their projects with positive net present value to decline which must be financed by external funds. On the other hand, internally, optimistic managers tend to overvalue their firm´s projects and they are willing to invest in a negative net present value projects thinking they are working for the best interest of the shareholders.

Although overconfidence and optimism are not exactly the same, some authors like (Barros and Da Silveira, 2007), believe that they are cognitive biases that are closely related. These authors take a sample of non-financial Brazilian firms and found that firms managed by optimistic/overconfident managers tend to have higher leverage ratio. On the contrary (Graham et al. 2013) report in their study a positive relationship between optimism and the manager preference of internal financing then debt.

Is there an interior optimum level of managerial optimism that maximizes firm value? This is the question raised by (Campbell et al. 2011) and the results of their study answered this question with a yes. The authors used a large sample of turnovers of CEOs stating that an optimistic risk averse CEO will choose an investment that maximizes the shareholders´ value.

Meier and Esmatyar (2016) on the influence of managerial optimism on company's financing policy and cost of capital, they state that behavioral heuristics might bias the financial decisions and consequently affect the risk and the value of the firm, directly or indirectly. They also report that firms with optimistic managers tend to have a significantly lower costs of capital, although the debt ratio among the sample was found high, as this was insignificant.

2.5.1.2. Overconfidence

This behavioral phenomenon is when the decision makers tend to overestimate their capabilities and knowledge. So, it's the difference between real knowledge of people and the knowledge which they think that they know (Dobelli, 2014). This phenomenon is the most tackled behavioral factor in corporate finance and is addressed in several prior studies. Overconfidence is also defined as a false belief of an individual to be more intelligent with better knowledge (Kübilay and Bayrakdaroğlu, 2016). Malmendier and Tate (2005) argue that managerial overconfidence can cause investment distortions for the corporations and this happens due to managerial overestimation for the projects returns and that they prefer depending on internal funds as external sources of finance are viewed as overly expensive. Based on that, if a firm has excess internal funds, an overconfident manager tends to overinvest. Confirming this argument is the study (Malmendier et al. 2011) and they add other characteristics to test for their impact on capital structure decision, mentioning that CEOs who grew up during the Great Depression tend to depend on internal funds. However, CEOs with military experience are more aggressive and therefore prefer depending on debt.

Oliver (2005), taking a sample of US firms, investigated how managerial confidence, measured by the consumer sentiment index, impacts capital structure decisions. The results reflect a significant positive relation between managerial confidence and firm´s debt level as management confidence was highly significant in explaining firm financing choices. Ben-David et al. (2007) survey US CFOs to test for the same hypothesis as (Oliver, 2005) and find that overconfident CFOs invest more and have higher debt leverage, relying more on long-term debt.

Linking overconfidence with cost of capital and value is a logical development for the literature, after investigating the effect of behavioral characteristics on the financing decision. Oliver and Mefteh (2010) report that overconfident managers tend to prefer debt financing, and this might increase the

probability of bankruptcy and therefore high cost of capital. Their study also finds that investor confidence component dominates manager confidence, causing an overall negative effect of industry sentiment with leverage, and this is explained by the probability of existence of higher levels of block holders´ control or a weak business environment in the country under study.

Being overconfident doesn't mean that you are sure or aware of the consequences, an example for this is the study by (Cordell et al. 2011) mentioning that less skilled financial planners are more confident than the more skilled. In addition, overconfident individuals tend to take more risk, but they are not necessarily risk-seeking, on the contrary they are less aware of the risk.

2.5.1.3. Illusion of control

Optimism and illusion of control are related to each other in prior literature as individuals tend to be optimistic in situations that are believed by them to be controllable. Heaton (2002) reports that optimistic managers tend overestimate the value of the corporation and their investments and thus, having a high sensitivity to cash flow and this means that people tend to be more optimistic when they believe that they can predict and control the outcome which in turn might cause them to overinvest and increase the risks, and this can be identified as illusion of control.

Hsu and Chen (2017) test for the impact of managerial illusion of control on the sensitivity of investment cash flow taking a sample of listed firms in Taiwan. As the company's operating risk increases, managers are more willing to invest, reflecting managerial confidence and optimism to control future outcomes.

Meissner and Wulf (2017) investigate the role of cognitive diversity in strategic decision making and its impact on decision maker's illusion of control. The results report a positive influence of high cognitive diversity for reducing judgmental bias.

2.5.1.4. Loss aversion

Kahneman and Tversky (2013) defines loss aversion as the anomaly that indicates the asymmetry of values, and this happens when the disutility of giving up an object is greater than the utility associated with acquiring it. Tversky and Kahneman (1991) in a study on risky choices, reach two main conclusions: the first is that risky choices are explained by assuming that the significant carriers of utility are changes relative to a reference point and not changes in wealth; secondly, changes that cause losses are greater than changes that cause gains. Therefore, a risky choice is evaluated as gains and losses relative to a reference point and this explain the idea of loss aversion. Evidence exists showing that people are more distressed at the prospect of losses than they are pleased by equivalent gains (Barberis and Thaler, 2003).

Data uncertainty is the main cause behind the loss aversion phenomenon and leads managers to be more conservative and avoid any decision that might put their status quo at risks. A negative impact for this behavior is that CEOs will not try to improve the skills of their subordinates nor benefit from opportunities that could improve performance (Cettolin and Riedl, 2010).

Schütte and Wichardt (2013), report that loss averse managers try to secure their position thus they provide no incentives for their subordinates to take risky decisions, which could lead to the increase of agency costs and might reduce the performance.

Choudhary and Ahuja (2021) refer that investors are loss averse as they hate losses more than the equal amount of gain and they are more motivated to take risks, to avoid losses.

2.5.1.5. Herding

Herding has been a topic that is thoroughly discussed in the literature and specifically in financial markets considering investors´ herd behavior. Nofsinger and Sias (1999) define herd effect as the behavior when a group of investors trade in the same direction for a time. In such process, individuals who are ignorant, illiterate, and emotional are grouped in the same category.

Shiller (1995), in the corporate context, classifies herding behavior into rational and irrational. The former explains that rational decision makers herd due to information inefficiency/cascades or reputational reasons. While on the other hand, the later alters the instinct of the individuals as, by human nature, individuals tend to behave in a similar way when in groups in an irrational manner.

Devenow and Welch (1996) explain that information cascade is a justification for decision makers following their peers in capital structure decision, when there is no optimal level of financing. The literature state that informational cascades is the most common justification for the herd behavior, which is the process of acquiring information after observing others´ actions and thus ignoring the existing information (Hirshleifer and Hong Teoh, 2003).

The other possible reasoning for herd behavior could be the reputation. Managers can some time ignore their own information and prefer to mimic other managers to protect their reputation and to avoid individual blame. In the mutual fund industry, managers sometimes herd to protect their reputation and career.

Massa and Patgiri (2007) test whether managerial incentives affect their herd behavior and how is this linked to their reputation. Managers might choose to be in a certain category where they can protect their reputation, or they can act like their competitors. The authors explain that family affiliations don't tend to herd and therefore, there is no need for high incentive contracts.

Scharfstein and Stein (1990) explain that herd behavior is totally rational from the managers

perspective while it is considered otherwise from a social perspective. Safety is in groups, thus (Patel et al. 1991), describe herd migration behavior stating that financial decision makers migrate in herds and the decision to follow or leave the group depends on a cost benefit analysis, cost of not following the industry and benefit of reaching an optimal capital structure.

But what is the optimal ratio? And what is the possibility that decision makers will not free ride? This created what is called following the leader as firms assume that others have more information that they don't have. As mentioned, it is a cost benefit analysis.

Defining the optimal level of capital structure or any other financial decision is not easy, and it is time and money consuming, therefore, firms tend to follow an industry successful leader in their financing decisions. However, following the leader is not always good as firms are not alike and what works for one might not work for the other. Thus, following the leader to decide on the capital structure decision is not considered rational (Filbeck et al.1996).

It is with no doubt that a financial decision is linked to the conditions in the capital market as the financing decision should not be concerned about the cost benefit analysis only, but rather should consider changes in the capital market, and this gives one justification for why managers tend to herd when taking a financing decision (Hovakimian et al. 2001).

Furthermore (Boyson, 2010) show that CEOs who stray away from the herd have the tendency to fail. Song et al. (2012), clarifies that the personalities of the people affect their herd behavior, and they provided evidence that investors who herd tend to have a low self-confidence.

Camara (2017), tested the herd behavior in capital structure, taking 4 US industries these are manufacturing, construction, services, and wholesale industries. The study tests the relation between the industry's average capital structure and the capital structure of the industry leader and results report evidence of herd behavior in different markets based on the market state whether its boom or recession and the reasons for herding include reputational protection, free riders, among others.

2.5.1.6.   Anchoring

Anchoring is a behavioral bias as managers tend to place excessive weight on numerical values that are based on subjective estimate. It occurs when decision makers are overwhelmed with information, so they tend to decide based on single information as it is hard to make enough research due to the numerous amounts of data. This is a normal human bias where some important information is ignored during the process, thus people tend to use heuristics to handle complexity and uncertainty (Tversky and Kahneman, 1974).

Tversky and Kahneman (1974), provide an example for anchoring, that is asking "what fraction of

African countries were members of the United Nations?". People guess it is 25% when asked if it is more or less than 10% and they guess it is 45% when asked if it more or less than 65%. This explains the concept of anchoring, as beliefs are formed by adjusting from a random starting point and biased toward such anchor (starting point).

Sewell (2007) explain that when an anchor is available, decision makers start thinking at that anchor and provide a decision based on it after making few adjustments, in different ways, however such adjustments are insufficient. And (Kübilay and Bayrakdaroglu, 2016) reexplain that uncertainty is a major reason for anchoring, as decision makers lack data and thus, they are uncertain about the best choice, and this leads them to anchor to decrease uncertainty and settle their minds.

On linking anchoring with the capital structure decision (Soufani et al. 2012) refer to the argument of whether the managers decide on the capital structure of the firm based on their perception about the firm value measured by the stock price. Referring to (Ikenberry et al. 1995), the idea is that managers tend to repurchase the stocks when they are perceived to be undervalued and due to anchoring behavior, managers prefer to issue debt instead of new equity.

Latham et al (2008) in behavioral decision-making literature mention that managerial anchoring can influence investment decision making under uncertainty. As mentioned before, managers make some adjustments to the anchor and end up with a biased decision.

Finance literature link anchoring phenomenon with other decisions, such as the cost of debt decision. A study by (Dougal et al. 2015) report that borrowers and lenders use past terms as anchors, and they base their current cost of capital on the historical costs.

Li et al. (2017) conducted a study testing whether CEOs anchor when arriving at financing decisions, and the findings report that CEOs who personally anchor will also anchor in their firm decisions and such bias is reported to be an essential determinant in the financing decision of the firm.

Costa et al (2017) refer to prior literature and confirms the importance of studying the anchoring bias, because decision makers make insufficient estimates based on an initial value and this might destroy a decision within a firm.

This study focuses only on the six behavioral biases mentioned in the prior section, however, it is vital to refer to other heuristics/biases existing in the literature which have been studied mainly in developed markets within different contexts.

Such biases are not included in the research model of this study due to the inability to gather data for measurement as most of them require data that is not available or not possible to acquire in the Egyptian market. In addition, some of the biases are very similar to the chosen variables in terms of

meaning and definition, and therefore, to avoid confusion or collinearity problems, such biases are excluded from this study. Furthermore, this study selects the biases that are most relevant to the corporate financial decisions.

However, it is worth to mention the existing biases with few examples, and therefore, they are presented below:

Mental accounting: A pure application for the prospect theory is the mental accounting which is the phenomenon of giving a base for decision makers to set their reference points to determine gains and losses. The core idea is that decision makers separate different types of gambles into various counts (decision units) and then use prospect theory for each account.

Prior work uses the concept of mental accounting to explain some taxation behavior. Chambers and Spencer (2008) found that monthly tax refunds are usually spent on monthly expenditures, while yearly lump sum tax refund is more likely to be saved or used to pay off debts.

Disposition effect: The idea is a precedent of mental accounting and prospect theory, which is that individuals are more likely to realize gains than losses and therefore they avoid selling at a loss, even though there will be a tax benefit.

Leal et al. (2010) explain the disposition effect by referring to the prospect theory and the mental accounting theory. Under the prospect theory, when results are far away from the reference point, they become insignificant and that's why individuals prefer to realize gains than losses as when in loss area, investors are more sensitive to price recoveries than to additional losses and vice versa in gain area. Under the mental accounting theory, each stock is a separate account that investors deal differently with, as each stock is an account with its own reference point which is the acquisition price.

Endowment: It is the tendency of individuals to demand more amount to sell an object than they would be willing to pay to buy it, thus the owner of an object gives it more value than the one who doesn't own it. Thaler et al. (1990) report that mug owners required a higher amount of money to sell and give up their ownership, more than what the buyers are willing to pay.

Clark and Lisowski (2017) test the relation between endowment effect and the decision of whether to migrate or not. The results confirm the role of the endowment effect, as individuals who are risk-averse start to do a cost benefit analysis and they start comparing between advantages and disadvantages of moving as they want to minimize the losses that could result from such decision. This explains the loss aversion phenomenon and refers to the prospect theory.

Status quo bias: Status quo is an implication of loss aversion phenomenon because the disadvantages of changing outweigh the advantages. Committing to status que is a result of decision-maker´s

preference and knowledge. The former show that decision makers value the current situation and believe that any change would cause a loss, while the later explains that commitment to the status quo could be a result of lack of knowledge about the existence of other alternatives. Hambrick et al. (1993), explain that status quo is to commit to a certain condition as there is no tendency to change.

Confirmation bias: The confirmation bias indicates that when decision makers process information, they often ignore disconfirming evidence and select evidence that confirms their beliefs (Russo et al. 1996).

Confirmation bias leads to overconfidence as people stick to their belief even after receiving information that should change their decision limiting them from learning about the actual existing facts and thus this show they are confident about their beliefs (Rabin and Schrag, 1999).

Regret: Regret aversion is to avoid negative emotional consequence of a decision and instead seek a positive emotion such as joy and satisfaction (Loomes and Sugden,1982). Exploring regret phenomenon in the capital market (Eaton and Douglas, 2000) state that regret aversion in stock trading is the process of keeping stocks which are decreasing in value during a long time, even if there are no expectations.

The fear of regret might cause a delay in financial decisions and thus, with no doubt, it plays a strong role in investment decisions (Kübilay and Bayrakdaroğlu, 2016) focus on the individual investors trading in Istanbul stock market, and results show that investors always want to realize profits and postpone losses, thus, they want to avoid the regret feeling by not admitting their investment mistakes.

Sunk cost bias: Thaler (1980) defines sunk cost effect as the amount of money that is already spent and how it affects decisions. Garland (1990) reports a positive relation between proceeding in an ongoing project and the already spent money, which defines the sunk-cost effect as the tendency to proceed in a chosen decision once an investment in money, effort or time is made. Heath (1995) note that spent money can't be recovered therefore it should not have an impact on ongoing decisions.

Fennema and Perkins (2008) point out for the importance of education and academic training to decide whether to proceed in a project (real estate project) or not when sunk costs exist, reporting that trained individuals are the ones who made better decisions. A recent study by (Ang, 2018) on entrepreneurial firms show that such type of firms is affected by several behavioral factors such as believing in the idea of hot hands and thus increase financing after a successful venture, the tendency to herd other ventures, or even increase financing for a non-promising venture due to loss aversion phenomenon or sunk cost effect.

Narcissism: Narcissistic executives are somehow considered overconfident as they tend to

overestimate their performance compared to actual performance (Brunzel, 2021). Different conclusions are reached in the literature, for example (Zhang et al. 2017) mention that CEOs who are narcissistic tend to be more inspiring and successful when the firm needs innovation, while (Buyl et al. 2019) mention that narcissistic CEOs might create problems for their firms.

Power: Nanda et al. (2013) address the argument on whether CEO power is good or bad for firm performance as it requires a cost-benefit analysis. Considering the agency theory, CEOs power has a negative impact if it caused them to be entrenched. In addition, CEO power can cause the decision-making process to be inefficient. Another downside is that powerful CEOs may not receive honest advice from their managers, or they might be less willing to accept the advice of others.

However, being a powerful CEO means you are knowledgeable, experienced, and confident, this is proposed by (Koo, 2015) believing that CEO power is one of the most important managerial characteristics that have a strong impact on the firm value. Adams and Ferreira (2010) point out to the good side of a sole decision-making process, stating that a collective decision-making power creates moderate decisions due to social dynamics.

Personal leverage: Studies in corporate finance started working on the link between corporations and the CEOs personal characteristics, the reason is that corporate leverage has several determinants and studies find that similar firms in terms of firm characteristics could have different level of leverage and thus researchers started thinking that maybe there are some personal characteristics that determine the level of corporate leverage.

In line with the behavioral consistency theory, CEOs personal characteristics have a role in predicting the financial behavior of the corporation which they manage. An example is a study linking personal and corporate leverage by analyzing CEO´s home shopping and results show a positive significant relation, and thus CEO´s personal behavior has a strong impact on the corporate behavior (Cronqvist et al. 2012).

Conservatism and risk tolerance: One of the core factors affecting the financial decision is the risk factor. Risk tolerance is defined as the degree of willingness to take decisions under a high level of uncertainty (Prabhakaran and Karthika, 2011).

Duong et al. (2021) report that firms with conservative CEOs engage more in safer investments and prefer less risky policies, they also prefer holding more cash.

Concluding this subsection, different behavioral characteristics are proved to impact managerial decisions, thus the financial decisions within firms will be influenced by the normal behavior of the CFO who is responsible for such decisions.

The following Sections proceed with presenting the remaining characteristics under study.

2.5.2. Personality traits

What distinguishes an individual from another is his/her personality which exists by nature and grows during life. There are five main personality traits that (Goldberg, 1971) call the Big Five. Those big five traits are: Openness to Experience, Conscientiousness, Extraversion, Agreeableness and Neuroticism. McCrae (2009) state that the five factors model is one of the most used in trait research. Peterson et al (2003) test if the CEO personality affects a group of top management team and if this has an impact on firm´s performance. Results reflect the interaction between different teams and level to impact performance and it shows that psychological factors drive individual´s personality, which subsequently impacts their decision making.

Hofmann and Jones (2005) define Openness to Experience as the tendency to be imaginative, creative, unique, and independent. In their research there is an association between openness and leadership. Nadkarni and Herrmann (2010) report that CEOs who have high level of Openness, have the tendency to adapt to any changes. Thus, such CEOs, tend to value innovation, speed and are considered risk takers. The second trait is the Conscientiousness, defined as the tendency to control impulses and pursue goals. Individuals with high level of Conscientiousness tend to be cautious, follow the rules and avoid mistakes.

Third is Agreeableness, individuals with high level of agreeableness tend to be modest, cooperative, concerned with others´ feelings and willing to compromise (Peterson et al. 2003). Fourth, individuals with high Neuroticism are involved in less collaborative environments as (Judge et al. 2002) report that Neuroticism is negatively related to leader emergence. Finally, they also define the Extraversion trait as the tendency to be optimistic, energetic, and sociable.

Few papers study the economic consequences of personality traits using the big five traits. One of the altered areas is the relation between personality traits and risk aversion. Borghans et al. (2009) report a positive relation between neuroticism and risk aversion and a negative relation between disagreeableness and risk aversion. However (Dohmen et al. 2010) find no association between personality traits and risk aversion. Another area of focus has been optimism and overconfidence. Schaefer et al. (2004) state that extraversion is the strongest predictor of overconfidence. Sharpe et al. (2011) report that Neuroticism and introversion tend to be negatively related to optimism.

Studying personality traits of the managers has a role in determining the culture of organizations, thus (O'Reilly et al. 2014) try to link managerial personality to organizational culture and subsequently to firm performance. Respondents of high technology firms show that there is a relation between

personality traits and firm's culture and that culture is subsequently related to firm's financial performance.

Adebambo et al. (2018) conducted a recent study on the relation between extraversion and cost of capital (equity). They examine whether CEO extraversion affects firm's expected cost of capital and report a strong positive relation between them. Their explanation is that extraverted CEOs tend to take risks.

2.5.3. Financial literacy

Mandell (2008) defines financial literacy as the ability of consumers to make financial decisions in their own best interests. So, financial literacy tests how individuals are capable to manage a certain amount of money (Remund, 2010).

Huston (2010) explains that financial decisions are based on financial education and knowledge. Financial literacy could include several aspects such as having the basic knowledge of financial concepts and mathematical skills, having knowledge about the different types of financial products and services, in addition to be involved in different financial decisions.

However (Fernandes et al. 2014) find that financial literacy attempts to explain the outcome variation of financial decisions by only 0.1%, as the effect is witnessed only at the time of educational intervention but vanishes later. The authors therefore suggest a just in time financial educational system when a specific financial decision is needed to be made.

Using a national US survey (Tokar Asaad, 2015) report that an important characteristic with financial literacy is to have financial confidence to take better decisions. However, if such confidence of financial knowledge is not actual, decision makers are prone to high costs and risks, thus a moderate level of confidence should be maintained.

Prior empirical work report different relations between financial literacy and the final decision or behavior. Some studies suggest a positive relation stating that financial education affect the total savings and wealth of an individual, and that studying certain courses in high school such as economics helps students to have a secured career (Grimes et al. 2010). On the other hand, other studies reject such positive relation stating that there is no significant relation, and that individuals with and without high school courses in financial literacy are alike (Mandell and Klein, 2009).

Moreover, being financially literate helps you plan better for your retirement which consequently ensures higher wealth and more funds to be invested and lower borrowing costs (Lusardi and Mitchell, 2007 and Lusardi and Tufano, 2009).

In a recent work (Ramadan et al. 2017) present a model to test for the impact of family ties on the

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level of investment in financial literacy and how does this affect financial decisions. Results report a significant negative relation between a strong level of family ties and financial literacy investment, a positive relation between current financial literacy and savings, investment and wealth in addition, a higher level of financial literacy reduces the debt level of individuals.

After discussing the six main behavioral and psychological factors under study along with the personality traits and financial literacy factors, the coming subsection covers another factor in the study which is considering the CFO´s membership in the board and having this as a moderating variable.

2.5.4. CFO Board Membership

The CFO is the key leader who is responsible for the finance and accounting duties of the firm and is also involved in the strategic planning and decisions of the firm, CFOs are also able to interact easily with the board members and the CEO due to acquiring sufficient financial and strategic knowledge (Baxter and Chua, 2008 and Huang and Kisgen, 2013).

Hoitash et al. (2016) refer that CFOs come in the second place in importance only to CEOs in terms of hierarchy and therefore, the CFOs work closely with CEOs and the board of directors. Fama and Jensen (1983) suggest having inside directors as it enhances the efficiency of the decisions taken by the board, however this is due to having inside directors who are knowledgeable and aware of the firm's activities.

CFO's board membership provides them with power to vote on important matters which result in a greater authority in the firm decision-making, in addition to the opportunities to communicate and interact better with other board members (Mobbs, 2011).

Prior corporate research propose that a board seat gives greater influence to executives as it increases information flow between the firm's managers and the outside directors (Adams and Ferreira, 2007). In addition, it increases the willingness of executives to propose projects and to become more active managers. Based on this, the CFO´s presence on the board will strengthen their influence and strengthens the importance of firm financial management in board decision making. This positive impact follows the friendly board theory which claims that insiders can contribute to a board's effectiveness by collaboration, and the appointment of the firm's CFO on the board might impact firm outcomes positively (Adams and Ferreira, 2007 and Bedard et al. 2014).

An alternative opinion following the agency theory argues that adding insiders to the board lowers its effectiveness, as CFO´s presence on the board could have a negative impact by lowering the quality of financial reporting as they could use their increased power to infuse more bias into the financial

reporting process (Finkelstein, 1992 and Klein, 2002).

Prior research covers thoroughly the CEO power and their presence on the board, however the focus on other executives is not thoroughly studied especially when linking corporate board with behavioral characteristics of the manager. Therefore, this study aims to use the CFO board membership as a moderating variable between the CFO behavioral characteristics and the corporate financial decisions, to test whether the CFO behavioral characteristics impact the financial decisions in the case of the CFO being a board member.

The behavioral theory of the firm provides some guidelines for the decision making on the board that explain how decision makers take decisions, and these are: bounded rationality, satisficing behavior and problematic search, the routinization of decision making, and the dominant coalition (Argote and Greve, 2007 and Van Ees et al. 2009).

These guidelines/concepts for decision making are based on several ideas which are: (1) decision makers experience limits in their ability to process information and solve complex problems which leads to the rise of cognitive biases; (2) decision makers tend to solve problems by searching for solutions that are satisfactory; (3) decisions rely on routines and heuristics that provide decision makers with readily available solutions to take organizational decisions; (4) negotiation and bargaining among coalition members is a common practice as the coalition partners may have distinct preferences and objectives and this affects organizational decisions, goals, and problem-solving processes.

2.5.5. Demographic factors

This study includes some demographic characteristics for the manager including the CFOs´ age, gender, general educational level, and their marital status.

These characteristics are almost fully covered in the prior literature and studied within different contexts and are well documented in the literature to have an impact on different decisions especially capital structure. Thus, empirical work exists with contradictory results, however still the link between such characteristics and cost of capital and investment decisions is not fully covered, and this paves the way for this study to work on filling the gap and to explore new relations if found.

Prior work uses different variables, for example (Zouari et al. 2012) study how CEO characteristics affects earnings management by taking CEO Reputation, CEO duality and CEO Expertise. In addition (Xiong, 2016) takes gender, tenure, age, and education as chairman characteristics. Liu and Ravichandran (2007) state that managerial characteristics such as age, experience, and education can help to predict the strategic outcome of financial decisions. And adding to this (Sebaa et al. 2009)

explain that the alignment of several managerial demographic factors with strategic orientations results in a better usage of the available capital.

A lot of demographics can be studied, however some of them might correlate with some of the behavioral variables under study, in terms of their definition or measurement, which might lead to some statistical problems. In addition to applying the study to CFOs and therefore some demographics that are related to CEOs only cannot be applied here. Therefore, this study selects certain few managerial demographics these are: age, gender, general educational level and marital status.

The age of a manager will have an impact on several aspects such as how the manager work and behave in different situations, deal with others and willingness to take risks. Prior literature mainly reports that older managers tend to prefer more conservative capital structure strategies, compared to younger managers who are considered more aggressive in their decisions (Tibor et al., 2012; McGuinness, 2020).

The gender of the manager as well has an impact on the firm´s success and literature report that female managers can sometimes outperform male managers (Peni, 2014). Prior studies report that female executives are more conservative in their decision-making, and they prefer to rely on secure loans to fund projects, in addition, females prefer a lower leveraged capital structure rather than achieving an optimal one (Bellucci et al. 2010; Adusei and Obeng, 2019; and Schopohl et al. 2021). Moreover, the managerial level of education can have a significant impact on the firm´s performance through the taken decisions. Siraji (2019) reports that CFO´s level of education, among other characteristics, have a significant impact on the capital structure decision. In, addition, the marital status of the manager has an impact on the decision making as for example married managers tend to take more risky decisions than single ones (Bertocchi et al. 2008).

2.6. Financial decisions

This study focuses on three long term financial decisions that are crucial to the firm's success. The three decisions are linked having the cost of capital decision playing a vital central role as it determines the firm's investments and helps in deciding the source of fund that is most optimal for the firm. Each decision is now presented in the coming subsections.

2.6.1. Capital structure decision

Capital Structure is defined as the combination of debt, equity, or internal funds that a firm chooses to finance its operations (Huang and Song, 2006). The previously mentioned traditional theories are mainly referred to as capital structure theories and they are supported in empirical studies with varying explanations and this confirms the fact that there is no one specific theory of capital structure that is

universal, as stated by (Frank and Goyal, 2004).

The coming subsections present some of the most common traditional and behavioral factors that impact the capital structure decision.

2.6.1.1. Traditional factors explaining capital structure

Several managerial and nonmanagerial characteristics influence the capital structure decision. The managerial characteristics are the demographic characteristics such as age, education, gender, among others. While the non-managerial are the firm characteristics including firm size and growth rate, among others. This subsection presents some of the prior work that relates traditional variables to the capital structure decision. Hambrick and Mason (1984) find that the organization reflects the demographic characteristic traits of its top management and argued the importance of matching these with capital structure decision and firm performance.

Referring to the conflict of interest between the management and the shareholders, in modern times some financial decisions are influenced by such conflicts which means that managerial characteristics play a role in determining some financial decisions in the firm (Harkbarth, 2008 and Johl et al. 2015). Siraji (2019) tests for the Impact of some CFO's Managerial Characteristics such as age, level of education, tenure, and functional track on firm Performance while taking the capital structure decision as a mediator and the results reported a significant impact of such characteristics on capital structure. Regarding the nonmanagerial capital structure determinants (Rajan and Zingales, 1995) taking a sample of French firms, report that tangibility of assets, market-to-book, size, and profitability are significant determinants of capital structure.

Frank and Goyal (2003) test for the pecking order theory of capital structure in the US market, by taking four independent variables which are the tangibility of assets, firm´s growth, firm´s size, firm´s profitability and controlling for the financial deficit variable, also (Frank and Goyal, 2009) studying the median industry leverage, tangibility ratio, firm size, market-to-book assets ratio, profitability ratio and the expected inflation Other similar studies are those by: (Allini et al. 2018) on an emerging market taking the Egyptian firms as their case study, they highlight the importance of four conventional factors in impacting the capital structure decision, and these factors are: profitability, tangibility, size, and growth (Chen et al. 2013) on the publicly traded Taiwanese firms; another study on the Chinese listed companies by (Chen, 2004), in addition to two studies that adopt same variables but adding to the model other macroeconomic variables and country specific variables, and these are a study on the developing countries by (Booth et al. 2001) and the other is an international study by (De Jong et al. 2008).

Frank and Goyal (2004), using a sample of US firms, test for 36 variables as determinants of leverage. Results report that only seven variables explain 32% of the change in leverage while the remaining variables explain only 4% of the change in leverage. This shows that only seven variables are considered significant determinants of leverage and these variables are the average industry leverage, the market to book ratio, the dividend payment, the collateral, firm profit, firm size and finally, inflation expectations. Such variables remained the most used ones till the introduction of the human factor and the emerging assumptions of behavioral finance that replace the traditional assumptions. And focusing on the context of corporate finance, several research clarify that managers have behavioral biases that have an influence on the financing decisions of the firm. The coming subsection focuses on behavioral factors as determinants of the capital structure decision.

2.6.1.2.   Behavioral factors explaining capital structure

Pior studies shed light on the significant impact of managerial behavioral characteristics on the capital structure decision and the most tackled behavioral bias in the literature is overconfidence. A study by (Hackbarth, 2008) works on creating a theoretical model to test for the impact of managerial confidence on financing decisions, and it shows that an optimistic / overconfident manager tends to choose higher leverage compared to other less confident managers and this is confirmed by other studies as well (Malmendier and Tate, 2005; Barros and Silveira, 2007; Malmendier et al., 2011).

Učkar (2012) confirms that managerial overconfidence leads to excessive use of debt, and thus a high probability of financial distress. However, (Tomak, 2013) taking 115 Turkish manufacturing firms listed on the Istanbul Stock Exchange, finds that there isn't enough evidence for the hypothesis that overconfident managers tend to use more debt level. In addition, Abdeldayem and Sedeek (2018) find that the impact of the managerial overconfidence on the debt ratio is not significant in the Egyptian market.

Further work on managerial biases, (Azouzi and Jarboui, 2012) believe that the main cause for the choice of capital structure is what is called emotional bias that includes optimism, loss aversion and overconfidence. The authors distribute a questionnaire on 100 Tunisian executives to examine this relation, and the results show that CEOs who have such biases follow the pecking order theory in their capital structure decisions.

Another bias is herding, which is a behavior that is first studied in the US market by (Patel et al.1991). Results report that in over half of the sectors used in the study, a considerable percentage of firms followed the capital structure of the sector, that is following the herd. Some managers are convinced that other firms know more about optimal capital structure and thus, they follow the financing behavior

of these firms, ignoring whether such herding behavior is good for their firms or not (Filbeck et al.1996). Demirer and Kutan (2006) state that the herd behavior is more likely to occur in developing countries due to several factors such as loose standards, weak reporting requirements and costly information acquisition. Moreover (Leary and Roberts, 2014) add that firms' capital structure depends on peer firms´ financing behavior and characteristics. This is called peer effect in capital structure, and this reflects the herd behavior.

Capital structure decisions are better explained by the behavioral finance theories than the traditional capital structure theories, this idea is supported by the results of a survey conducted on the Greek firms by (Vasiliou and Daskalakis, 2009) about managerial opinion regarding firm´s financing, as decisions are not based on traditional finance assumptions, confirming the importance of behavioral theory.

2.6.2. Cost of capital decision

Cost of Capital is defined as the opportunity cost of using funds to finance assets. Each component of the capital structure, including debt, equity and internal sources of fund, has a cost that is determined by the market value of the component (Almir and Dejan, 2013).

The cost of capital decision is crucial where mistakes are extremely costly and thus, to take a decision that is in the best interest for those who are involved, the firm should accept projects with a positive net present value to ensure that the return is higher than the cost of the investment. Thus, this decision is considered at the core of capital structure and capital budgeting decisions.

For the capital structure, cost of capital is important because the firm must raise fund from different sources in a way that optimizes risk and cost factors. It is also important in capital budgeting decisions because it forms the very basis of financial appraisal for new capital expenditure proposals as it is used as a discount rate when calculating the NPV (net present value) of a project (Amardeep,2013).

Cost of capital can be determined using WACC (weighted average cost of capital) that is the mix between cost of debt and cost of equity, which is the average rate of return that the firm pays to its lenders (Alihodžic and Eric, 2013). Cost of debt is the interest rate paid by the firm to the lenders and it is considered a cheaper source of finance than equity due to the tax advantage of the debt, however it is riskier due to the payment obligation (Amardeep, 2013). While cost of equity is more expensive, however a main advantage is that repayments are not obligatory (Alihodžic and Eric, 2013).

The traditional concept assumes that there is no effect on the WACC. However, further research show that there is an optimal capital structure and WACC decreases only for a certain level when debt increases, but any additional increase in debt causes WACC to increase (Yapa Abeywardhana, 2017).

Jensen (1986) argues that using debt helps reduce the agency problem within a firm, and this is due to several benefits of debt financing such as controlling the management by restricting them with some payment obligations to the creditors, it also helps decrease the information asymmetry problem as managers are required to reveal important information (Grigore and Stefan-Duicu,1976).

Even though using debt has some benefits and helps reduce the cost of capital, it has some disadvantages such as financial distress which is stress due to payment obligation due to the excess use of debt, which causes cash flows of the firm to decrease on the long run. Ultimately firm might go bankrupt if it couldn't meet its obligations, and this is referred to as bankruptcy cost (Canarella and Miller, 2019). Therefore, using debt as a source of finance reduces the Cost of Capital, but to a certain extent as excessive use of debt is costly.

Moving to the cost of equity on the other hand. An advantage for using equity as a source of finance is that it helps firms raise fund without any obligation for paying interests as equity represents ownership. However, equity is more costly for the firm as it has high arrangement costs, subject to double taxation, in addition, the cost on the firms increases when firms use debt as shareholders perceive high risk which leads for the demand of higher return.

An efficient market where CAPM holds and information traders exist, needs no behavioral theory. Risk in such market is determined based on the market beta only as returns are defined based on market portfolio. However, (Shefrin and Statman, 1994) argues that the paradigms of market efficiency and the CAPM fail because they ignore the actions of noise traders. And thus, proposes the behavioral theory of capital asset prices which considers two types of traders which are information traders and the noise traders.

The coming subsections present some of the empirical work from prior literature that identify the factors that impact the cost of capital decision.

2.6.2.1. Traditional factors explaining cost of capital

Referring to some prior work, (Li, 2010) hypothesized that firms in countries with a high conservative financial reporting system tends to have a low cost of capital, as a conservative reporting system allows for a low cost of debt as a sort of reward for the borrowers and further allows for a low cost of equity as the systematic risk is lowered.

Brotherson et al. (2013) clarify that when a firm uses capital it creates an opportunity cost for investors and such uses must be benchmarked against the alternatives that are available for the investors in the market, thus, for the firm to create value for the investors, it must earn above its cost of capital. Among the factors impacting the cost of capital are the board characteristics and the control factor.

A study taking a sample of Standard and poor 500 report that the cost of debt is inversely related to board independence and board size as larger boards may increase the level of managerial monitoring, in addition, fully independent audit committees is also inversely related to cost of debt (Anderson et al. 2004).

Gebhardt et al (2001) propose an alternative technique for estimating the cost of equity capital by using a discounted residual income model to generate a market implied cost-of-capital, and they test for firm characteristics that are related to this estimate of cost-of-capital. Their study shows that a firm's implied cost-of-capital is a function of its industry membership, B/M ratio, forecasted long-term growth rate, and the dispersion in analyst earnings forecasts.

The finance theory sets some guidelines for using the WACC, as costs and weights should not be historical, meaning that current market values should be used and that firms must calculate the cost of debt after deducting corporate taxes. However, in real life, practitioners cannot maintain these assumptions, specifically due to the calculation of equity costs as data is not readily available like in the case of debt. This leads practitioners to depart a little from the theory and depend on other methodologies to calculate the cost of equity.

The aim in this study is to test whether the behavioral characteristics play a role on the cost of capital decision. As suggested by (Mitroi and Oproiu, 2014), this could be done by considering some individual perceptions, emotions and behavior when taking a financial decision. Black (1986), mentions that external information, or what he calls (noise) must be considered while taking a financial decision. Therefore, the coming subsection presents some of the prior work of cost of capital while focusing on behavioral determinants.

2.6.2.2. Behavioral factors explaining cost of capital

Regarding the impact of behavioral factors on the value creation process, through firm´s cost of capital (Shefrin, 2001) explains that behavioral factors could impact the firm value negatively due to the idea of behavioral costs, that is caused due to managerial errors such as managerial cognitive errors and the agency cost.

Shefrin (2001) adds that one way to minimize the agency cost and thus maximizing the value, is through managerial incentives, however that alone, is not enough to create value. In addition to this internal error, behavioral errors that are caused by individuals outside the firm, such as investors and analysts, could have a negative impact on the created value as well, as an example: the issue of pricing that mostly deviate from the fundamental value and do not follow the CAPM principles.

Moreover, the way a managerial personal characteristic affects the cost of capital is based on how

individuals perceive risks. For example, some propose that an overconfident CEO will be more aggressive and tends to manipulate reports and thus information and business risks will increase leading to an increase in cost of capital, while on the other hand some perceive managerial overconfidence as an effort to increase the firm value and more tendency for better disclosure and thus outsiders perceive a low business risk and information risk leading to a decrease in cost of equity capital (Hirshleifer et al. 2012 and Aghazadeh et al. 2018), adding that an optimal relation is reached when the level of CEO confidence is moderate.

Statman et al. (2008) in a further investigation in the behavioral WACC, and specifically behavioral cost of equity, shows that the affect factor plays a role in behavioral asset-pricing models, and it is defined as a sentiment which is a feeling that often occurs without consciousness, and (Kahneman, 2002) considers the affect heuristic as a strong contribution in the study of judgment heuristics and plays a role in the pricing models.

Zajonc (1980), who is an early proponent of the importance of affect in decision making, explains that people choose the alternative that is attractive for them and then they justify their choice by several reasons. Some studies report that a market with high expected return will have a low level of risk and such risk is subjective risk caused by the affect heuristic, Slovic et al. (2002).

Referring to the other side of the coin, affect plays no role in the pricing models under traditional finance. The CAPM measures risk by beta only and in the three-factor model by (Fama and French,1992), risk is measured by the market capitalization and book-to-market ratio, thus heuristics do not play a role in such models. Thus, traditional asset-pricing models are based entirely on objective risk and assumes a positive relation between such objective risk and expected returns.

One of the main arguments of this study is that the cost of capital used in practice may depart from the cost of capital used and defined by traditional finance, due to the assumption that CFOs exhibit behavioral characteristics, which are not included in the traditional finance estimate. And of course, the lack of research in such context provides a motivation to further investigate this research problem.

2.6.3. Investment decision

The investment decision is defined as a decision made by the company in spending its funds in the form of certain assets aiming to get future profits (Suroto, 2015).

Tobin (1969) established the Q-theory which is a core investment theory that is used to measure the firm´s future investment opportunities. Using a ratio (Q= capital stock value divided by the replacement value), the theory states that when Q is greater than one, the profits generated from the investment are exceeding the cost of the firm's assets and therefore the firm is motivated to invest

more, while when Q is less than one, the firm will tend not to do additional investments and will be better off selling its assets.

The investment decision is a vital decision made by financial managers that determines which investment projects maximizes the shareholders' value. It is proxied by the capital expenditure, has an impact on the firm level as it affects the firm´s performance and on the economy level as it impacts the growth level of the economy.

Prior literature proves that in real life, the markets are not efficient and therefore achieving an optimal investment level is not possible and this leads to underinvestment or overinvestment. The inefficiency of Capital markets restricts the capital expenditure and firms tend to use internal sources to finance their investments and avoid external financing due to their existing costs caused by uncertainty.

This uncertainty of market conditions and information imperfection in financial markets might impact the investment decision negatively. However, the Egyptian government issued a new investment law no. 72/2017 which aims to improve the ease of doing business, increase transparency for foreign investors and helps attract funds to be invested in mega projects that boosts the economy.

2.6.3.1.   Traditional factors explaining investment

Prior literature covers thoroughly the impact of different financial determinants on the investment decision, such as the firm liquidity, payout ratio and capital structure. Another common determinant of capital expenditure is the free cash flow. Becker and Sivadasan (2010) report no linkage between free cash flows and capital expenditure, but on the other hand, (Dalbor and Jiang, 2013) reported the existence of a relation between them.

Furthermore, prior studies show that age, gender, and income are among the most vital determinants for the investment decision. Grable and Lytton (1999) found that the income variable impacts the investment decision. Kulkarni (2014) studies the difference in the investment decision making based on age, gender, and marital status and found differences among different group of investors in terms of the demographics under study.

Additionally, (Ghazali and Othman, 2004) divide their sample into two groups of investors and test for eight demographics along with other factors and they report that the main significant demographic factors are age, gender, occupation, and income.

2.6.3.2.   Behavioral factors explaining investment

Focusing on the managerial behavioral characteristics that are linked to the investment decision, some studies exist that tackle such relation, such as (Chen and Lin, 2013) reporting that firms with optimistic managers tend to impact the firms´ investment efficiency, and (Ben-David et al.2013)

reporting that CFOs are on average optimistic in their forecasts of stock returns and tend to invest more.

Moreover, a study by (Iyer et al.2017) tries to investigate the difference between a rational CEO and an overconfident one regarding their investment decision linked with the financing decision, and results show that an overconfident CEO has the incentive to overinvest more than a rational CEO when there is a risky debt outstanding. This overinvestment is controlled by the governance of external investors. However, when external debt finance is not risky, the overconfident manager is not provoked and still overinvests but following the pecking order theory.

Kang et al. (2018) examine whether managerial overconfidence adds value to shareholders when the level of economic uncertainty is high and find that during periods of crisis, firms managed by overconfident CEOs tend to have higher investment and firm value by investing more in positive net present value projects. The idea is that uncertainty leads to an increase in the level of volatility and a decrease in value and prices thus, risk averse overconfident managers invest more in risky projects as they are confident about the expected level of return, and this increases the firm´s investment level and value.

Učkar (2012) shows that if the manager is overconfident then he believes that firm shares are undervalued, and this allows for the mispricing problem. And since the cost of capital is not properly defined, errors in investment decisions may occur. In a sense that confident managers accept projects with negative present value by mistakenly believing them to be with positive values. Moreover, overconfident managers tend to invest in more innovative projects and might ignore negative signals regarding their investment decisions, which leads them to overinvest, especially in a negative net present value project (Malmendier and Tate,2005).

Furthermore, (Waweru et al.2008) studies the herd behavior and report that the investor´s buying and selling decision is significantly influenced by other´s decisions and (Agarwal et al.2011) report the existence of herd behavior in brokerage firms. Risk aversion is another determinant for the investment decision, and risk averse investors do not prefer risky investments (Shum and Faig, 2006).

2.7. Conclusion

Prior literature justified the need for considering the human behavior in addition focusing on individuals, other than individual investors and consumers, such as analysts and top-level managers is important as corporate decisions are controlled by one or few managers which leads their biases to significantly impact the decisions, without being corrected.

This study focuses on three financial decisions as a corporate finance practice which might be affected

by a broad set of managerial characteristics as well as firm characteristics that are mentioned earlier. Most of the prior work of corporate finance is focusing on the capital structure as a financial decision and very limited studies concentrate on the cost of capital from a behavioral perspective. Therefore, this study sheds light on the cost of capital decision because it is at the core of other major financial decisions that contribute to the wealth of the economy, in addition to the investment decision.

Subsequently, the aim of this study is to test for the theory and practice gap through identifying the managerial observable and non-observable factors that managers in the Egyptian market might incorporate and to highlight different determinants of the firm´s financial decisions. This is done with consideration for the CFO power which is proxied by their board membership.

The next chapter is the methodology chapter that presents the research questions and hypotheses based on this literature chapter and provides the tools and methodologies that will help answer this study´s research question.

Chapter 3: Methodology

3.1. Introduction

This study aims to test for the behavioral characteristics that the CFOs are prone to, and to test for their impact, among other factors, on the firm´s financial decisions. In addition, the study includes a moderating variable which is the CFO board membership, and it is interacted with the six behavioral characteristics to capture any joint effect.

Previous work provide evidence for the need of including behavioral factors in traditional models, such as the work of the famous researchers (Hirshleifer, 2001 and Barberis and Thaler, 2003) who explore various types of behavioral biases that affect the decision-making process and provide empirical evidence regarding the need for including behavioral factors in asset pricing models.

Behavioral finance papers are mainly focused on investors and on the data of stocks that do not match well with the theories of market efficiency and asset pricing models, showing that individual investors are affected by different behavioral biases, Kim and Nofsinger (2008).

On the other hand, in the context of behavioral corporate finance that focuses on managers, prior literature covers the developed markets while studies that focus on developing markets, precisely the middle east markets, are limited and different areas are still under investigation and not fully developed.

The study of a developing market such as the Egyptian market is further justified as prior studies applied on financial markets prove the need for studying the human behavior and thus it is vital to study the human behavior in other contexts such as corporations.

The coming sections include the conceptual framework, section (3.2) which has subsections presenting the main concepts and theories that the study is built on, along with presenting the research questions and hypotheses; section (3.3) highlights the study and data type; section (3.4) presents the measurement tools, consisting of subsections that present all the variables used in this study with their proxies; section (3.5) presents the research model and methods of estimation, and at last section (3.6) concludes this chapter.

3.2. Conceptual framework

As mentioned earlier, studies testing for the impact of behavioral factors on financial decision making in the context of corporate finance are limited specially in the middle east markets and very few behavioral factors are tested.

Therefore, this study aims to test for the impact of behavioral factors along with traditional factors on major financial decisions in the Egyptian market and these decisions are the capital structure, the cost

of capital decision and the investment decision. The three decisions are interlinked having the cost of capital decision playing a vital central role as it determines the firm's investments and helps in deciding the source of fund that is most optimal for the firm.

Such decisions are linked as they impact the firm's value and performance. The cost of capital decision for example is vital as the firm should accept projects with a positive net present value to ensure that the return is higher than the cost of the investment, therefore, the investment decision determines which investment projects maximizes the shareholders' value. Moreover, the cost of capital is at the core of the capital structure decision as the firm must raise funds in an optimal way.

Focusing the study on managerial characteristics is vital as well, as managers are a main cornerstone in any organizational structure and their character is influencing the strategic construction of the firm and further influencing the firm´s financial decisions (Liu and Ravichandran,2007). The main focus is on the CFOs as the finance and accounting duties are their main responsibility and they also take part in the strategic planning and decisions of the firm.

The first choice for the sample was the CEOs but then the survey is directed to CFOs to have a better reach and to have more reliable responses as the CFOs are more closely related to the financial decisions as compared to the CEO and this was the main feedback received when the survey was distributed to CEOs at first.

The following subsections briefly present the research background that this study is built on (subsection 3.2.1), the research questions (subsection 3.2.2) and the research hypotheses are presented in (subsection 3.2.3).

3.2.1. A brief background and theories

Shiller (2002) argues that the theories that call for rationality in decision making can no longer represent the world around us, as proponents of behavioral finance argue about the existence of psychological factors that interfere with traditional finance and changing its assumptions. Accordingly, the behavioral finance theory guides this study. And therefore, considering human behavior, emotions and perceptions is essential when studying different decisions (Mitroi and Oproiu, 2014).

Prior work, that this study is based on, includes, but not limited to the following studies: A study by (Frank and Goyal, 2009) referring to the most reliable factors that explain variations in the capital structure decision and these factors include: median industry leverage, tangibility ratio, firm size, market-to-book assets ratio, profitability ratio and the expected inflation. Another study by (Allini et al.2018) applied on the Egyptian firms highlighting the importance of four factors in impacting the capital structure decision, and these factors are: profitability, tangibility, size, and growth.

Furthermore, different managerial demographics are referred to in prior work, however, focusing on the four used demographics in this study (age, gender, educational level and marital status), prior work (ex: Barker and Mueller,2002; Jalbert et al. 2013; Peni, 2014; Xiong, 2016; Li et al. 2017; and Hegde and Mishra, 2019) refer to such demographics linking them with different decisions such as the capital structure, the earning management, firm performance and risk taking.

Moving to the behavioral characteristics and personality traits, (Hackbarth, 2008) test for the impact of managerial traits on corporate financial policy and firm value reflecting that such traits work in favor of the firm as biased managers (Optimistic/overconfident) prefer higher debt levels which helps in restraining them from diverting funds thus reducing agency problem. Abdeldayem and Sedeek (2018) report insignificant relation between managerial overconfidence and det ratio in the Egyptian market however optimism and risk tolerance are significantly impacting the firm's leverage.

Graham et al. (2013) refers that CEOs with high risk tolerance level are more willing to be involved in mergers and acquisitions projects. Leary and Roberts (2014) show that firms' capital structure depends on peer firms' financing behavior and characteristics. Moreover, (Iyer et al.2017) shows that an overconfident CEO has the incentive to invest more and (Kang et al.2018) confirms that, especially during periods of crisis.

Adebambo et al. (2018) study how CEO extraversion can impact the cost of equity, and report a strong positive relation between them, clarifying that extraverted CEOs have tendency to take risks. In addition, (Lartey et al.2020) study how CEO extraversion can impact the capital structure of the firm and report that extraverted CEOs use higher level of leverage.

Among the top researchers regarding financial literacy, (Lusardi and Mitchell, 2007and Lusardi and Tufano,2009) state that being financially literate contributes to your retirement which ensures higher wealth and more funds to be invested and consequently lower borrowing costs.

Upon such, this thesis aims to empirically test for important factors that are understudied in the behavioral corporate finance context and to explore additional links and factors to contribute to the literature.

3.2.2. Research questions

Based on the aim of this study, which is studying different factors that might be impacting financial decisions within the firm by exploring different characteristics of Egyptian CFOs along with traditional characteristics of the firms, six research questions are proposed and presented below:

1. What is the impact of traditional variables on the firm´s financial decisions?

2. Are behavioral characteristics identified among Egyptian CFOs?

3. Are the CFO´s behavioral characteristics impacting the firm´s financial decisions?

4. Are the CFO´s behavioral characteristics impacting the firm´s financial decisions, if the CFO is a board member?

5. Are the CFO´s personality traits impacting the firm´s financial decisions?

6. Is the CFO´s level of financial literacy impacting the firm´s financial decisions?

Question (1) is proposed to test for the impact of traditional variables and then question (2) aims to identify the behavioral characteristics that the CFOs might be prone to. Following, the study aims to test whether the main behavioral variables under study are impacting traditional financial decisions, and this is question (3).

Question (4) proceeds by moderating for the power effect by asking whether being a powerful CFO (that is being a board member) will impact the relation between the behavioral factors and financial decisions differently or not. The final research questions (5 and 6) are concerned with other factors that might have an impact on the financial decisions of the firm and these factors are the personality traits of the CFO and the level of financial literacy.

3.2.3. Research hypotheses

On a general base there is usually a debate in the literature on the relationship between the managerial behavioral characteristics and different financial decisions. Upon such, the research hypotheses are presented as follows:

H1: The firm´s traditional factors have a significant impact on the firm´s financial decisions.

H2: The CFO´s demographic characteristics have a significant impact on the firm´s financial decisions.

H3: The CFO´s behavioral characteristics have a significant impact on the firm´s financial decisions.

H4: The CFO´s membership on board has a significant impact on the firm´s financial decisions.

H5: The identified CFO´s behavioral characteristics have a significant impact on the firm´s financial decisions, only when the CFO is a board member.

H6: The CFO´s personality traits have a significant impact on the firm´s financial decisions.

H7: The CFO´s level of financial literacy has a significant impact on the firm´s financial decisions.

3.3 Study and data type

This study is a quantitative study that gathers primary data through a questionnaire which provides a numeric output. Primary data is the data collected for a specific purpose which complement secondary data. The used questionnaire is self-administered that is e-mailed to be completed by the respondents, it is one of the most common methods of quantitative research as respondents answer questions by

completing the questionnaire themselves.

A questionnaire is needed for this study for the purpose of examining the Egyptian CFOs in terms of their managerial observable and non-observable characteristics. A main motive for the use of questionnaire in this study is the type of study which tests for behavior and biases, and this needs a questionnaire to have questions that capture the human behavior and attributes. In addition, the Egyptian market have a limited access/availability of behavioral data on databases and therefore, primary data is a main tool for gathering the needed information.

There are opposing views about questionnaire-based research in literature, some of the criticisms are: the low response rate and the incorrect or missing answers in questionnaires that may influence the data quality. On the other hand, a well-administered questionnaire can be an excellent method to obtain quantitative data about individual´s attitudes, values, and behavior in a short time.

In general, using questionnaires as a data gathering technique has several advantages, as mentioned by (Bryman and Bell,2007), such as: (1) providing standardized data, which is easily processed and analyzed; (2) it has almost zero cost to conduct; (3) in addition, it saves time as hundreds of questionnaires can be sent out in one batch and respondents can fill it out whenever they are free. However, respondents for this study were CFOs so receiving responses was not as fast as expected.

Dillman (2007) explains that questionnaires can be used to measure three different types of data, these are: opinions, behaviors, and attributes. The Opinion variables record respondents´ feeling and belief about something, while behaviors record what respondents did, do and will do and the attributes variables record data about the respondents' characteristics such as age, gender, marital status, education, and others. Such explanation supports the use of questionnaire as a tool to gather data for this study.

The questions included aim to gather information related to the CFO demographics in addition to investigating the behavioral characteristics and personality traits exhibited by the CFOs, along with some questions to reflect the level of their financial literacy.

Data in this study is collected at a specific point of time, that is year 2020, and therefore cross-section analysis is used as to collect data related to a specific unit of analysis as defined by (Levin,2006). A cross-sectional study is usually used when the study is using a questionnaire to describe a certain sample out of the population with respect to some factors. The main advantages of a cross sectional study are its allowance to test as many factors as possible in addition to; being time and cost saving. However, giving information at a certain point of time only might not provide a full picture as time certainly can have an impact on some factors.

The final version of the questionnaire constitutes four sections: Section A collects some CFO demographic data (age, gender, general educational level and marital status); Section B is constituted of 5 points Likert scale questions that aim to test for six behavioral characteristics that CFOs might incorporate along with a question to test for the five personality traits; Section C presents the so called big 5 questions to test for the CFO financial literacy and at last Section D aims to gather additional information such as how firms take their financial decisions and what are the measuring techniques used.

Sections A, B and C are discussed under the variables measurement section which is section (3.4) in this chapter, while section D is now presented.

The questions in section D aim to understand more how managers take certain decisions in terms of the methodologies and techniques they use. This helps in exploring how firms take decisions in practice. This section has mainly seven questions and they are presented as follows:

1. What factors affect your decision on the appropriate amount of debt for your firm?
2. What factors affect your firm's decisions about issuing foreign debt?
3. What factors affect your firm's decisions about issuing common stock?
4. Do you use data from comparable companies in estimating the cost of capital?
5. For the firm´s cost of capital, how do you estimate the WACC?
6. How do you estimate the firm´s cost of equity? Which model/method is used?
7. Have financial market conditions (specifically the COVID-19) caused you to change the way you estimate and use the cost of capital? If so, how?

The first three questions are concerned with the factors that affect the firm´s choice of capital which in turn reflects how the managers decide in practice, following three questions concerned with the cost of capital decision and finally, question seven aims to test for the impact of Covid-19 pandemic on the firms.

3.4. Variables measurement

This section includes subsections for presenting the measuring tools for all the variables under study. Starting with the dependent variables, followed by the independent variables, and presenting the moderating variable as well. Primary and secondary data sources are used, and the below table (3.1) summarizes all the variables with their measuring tools, followed by subsections explaining each measuring tool.

Table (3.1) Variables Measurement

Variables	Measuring tool
Capital structure	TDR (Total debt/Total assets)
Cost of capital	Traditional WACC equation
Investment	CAPEX /PPE
Tangibility ratio	Fixed assets/Total assets
Profitability ratio	Return on Equity (Net Income/Shareholder´s Equity)
Firm size	Natural Logarithm of sales
Growth ratio	Market to book ratio (MV of Assets/ BV of Assets) Where: MV of Assets= BV of assets + (MV of equity-BV of equity)
Age	Survey
Gender	Survey
Educational level	Survey
Marital status	Survey
Optimism	Survey (6 Questions), Q.4 is removed after validity check
Overconfidence	Survey (4 Questions)
Illusion of control	Survey (3 Questions)
Loss aversion	Survey (5 Questions)
Herding	Survey (5 Questions), Q.1 & 4 are removed after validity check
Anchoring	Survey (4 Questions)
Personality traits	Survey (Ten items inventory)
Financial Literacy	Survey (Big 5 Questions)
Board Membership	Dummy variable 1 for members, 0 for non-members

3.4.1. Dependent Variables

The main dependent variables that of concern in this study are the capital structure, the cost of capital and the investment decisions. The following subsections present the measuring tools that exist in the literature for such decisions, and the chosen proxy for this study is referred to in each subsection.

3.4.1.1. Capital Structure decision

The capital structure decision is simply concerned about the mix of debt and equity as a source of fund for the firm and the mixture should aim to maximize the value of the firm. This decision is one of the most crucial decisions in a company as increasing firm value is the main task for the management and achieving this usually needs capital which can be a mix of debt and equity (Al-Matari et al. 2012).

Taebi Noghondari and Taebi Noghondari (2017) refer to this decision as one of the most difficult decisions that face the financial manager because the increase in the debt ratio might cause financial risks to increase and leads to the increase of capital cost. And therefore, this decision should be taken wisely.

The common measures for the capital structure are the leverage ratio which is measured as the percentage of debt to the firm´s total assets (Total Debt/ Total Assets) and the debt-to- equity ratio which is the percentage of debt to the firm´s equity (Total Debts/Total Equity).

Example for a study that use the debt ratio which is a percentage of assets are: (Nguyen, 2020) studying the impact of human capital, capital structure choice and firm profitability of Vietnamese firms. Another study that uses the debt-to-equity ratio is the one by (Al-Slehat et al. 2020) on the Jordanian market studying the Impact of Financial Leverage, Size and Assets Structure on Firm Value. Thus, most of the prior literature refer to these two ratios as the common proxies for firm´s leverage (capital structure) such as the work of (Akpinar, 2016; Senol et al.2017; and Chikalipah, 2019), among others.

Based on prior literature, this study uses the classical debt ratio as a measuring tool for the firm´s capital structure, that is the firm´s total debt divided by the firm´s total assets.

3.4.1.2. Cost of Capital decision

At the heart of capital budgeting decision as well as the capital structure decision is the cost of capital, as based on it the manager´s decision will be efficient or not. In addition, the weighted average cost of capital is used to define a firm's value by discounting future cash flows (Ezirim et al, 2017). However, most studies show that a long-standing problem in finance is how to calculate the cost of capital, and practitioners don't agree on a single measurement for the cost of capital.

WACC is defined as the opportunity cost corresponding to the expected return an investor can earn for a comparable investment with similar systematic risk (Jagannathan et al.2017). The reason why a weighted average is used, is due to the existence of several sources to fund the firm´s operations and investments. And how funds are used, determine the firm´s cost of capital.

According to the standard finance theory, a standard measurement for the cost of capital is the WACC equation, which is simply a composition of two sources of fund which are debt and equity, and it is presented in the following form:

$$WACC = W*debt*(1-tc) + W*equity \qquad (1)$$

Where: **WACC** is the Weighted Average Cost of Capital. **W** is the weight of each component as percent of total capital. **tc** is marginal corporate tax rate.

Following, in the coming subsections (a) and (b), is a detailed description on how the cost of debt and cost of equity forming the WACC are calculated and evolved throughout the literature.

a. Cost of debt

Great care should be given to the calculation of cost of debt as the interest rate a firm pays on its debt may not be reflecting its current borrowing costs, as they vary due to changes in the economic conditions or firm's characteristics. Mello and Parsons (1992) state that debt imposes constraints on the firm through covenants, and not meeting debt obligations might cause financial distress.

A very common measure for the cost of debt is the interest rate paid on debts which is calculated by dividing the interest expense by average of total short- and long-term debt during the year, so to measure the cost of debt, an accounting measure is used and this proxy is adhered in many prior work such as (Pittman and Fortin, 2004; Carmo et al. 2016 and Eliwa et al. 2019).

Another measure for the cost of debt is to use the firm´s debt rating, as firm rating is linked to the payment obligation, where firms with good rating have low interest rates and firms that default have a rate below BBB (S&P, 1986 and Altman, 1992).

In application to the Egyptian market, the later measure is not convenient due to lack of data availability for firms´ credit ratings and in addition, the percentage of corporate bonds in Egypt, on which the credit ratings are based on, is low compared to the stock's listings. There are only 23 listed corporate bonds on the Egyptian stock exchange and so the credit rating is not available for the sample of this study. Thus, to use secondary data, the accounting ratio for interest rate paid is used as a measure for the cost of debt in the Egyptian firms.

b. Cost of Equity

The most complicated component of WACC is the estimation of cost of equity as data or information

needed is not available. And for that, several techniques and methods evolved aiming to estimate the cost of equity as accurately as possible. The following paragraphs explain how the measures of cost of equity evolved.

Famous measures for the cost of equity include; the simple asset pricing model by (Sharpe, 1964) to measure the risk and return of a stock which is the CAPM, Jensen´s alpha model in (1968), (Fama and French, 1992) three factor model that improves the CAPM. And based on these, (Carhart, 1997) created the Four factor model, capturing the momentum anomaly factor. Moreover, (Fama and French, 2015) introduced a five factors model and (Shefrin and Statman, 1994) propose the behavioral CAPM. Sharpe (1964) provides a simple model of return which is the CAPM presented in the following equation:

$$E(R_i) = R_f + \beta_i (E(R_m) - R_f) \qquad (2)$$

Explaining that the expected return for asset i ($E(R_i)$) changes directly with the change in risk factor which is measured by beta (β_i). R_f is the risk-free interest rate and $E(R_m)$ is the expected return for the market. ($E(R_m) - R_f$) is the market risk premium which must be positive because otherwise investors will not invest in risky assets. The CAPM provides a measure of risk of a security which is the beta (β) and each asset has its own beta while the market beta is 1.0 and the beta of the risk-free asset is zero.

Following Sharpe's model is the Jensen's alpha (1968), which uses the CAPM to measure an asset´s outperformance which is the difference between the return on the mutual fund and the return on the single-factor benchmark. That is:

$$R_{it} - R_{ft} = \alpha_i + \beta_i (R_{mt} - R_{ft}) + \varepsilon_{it} \qquad (3)$$

Where: $R_{it} - R_{ft}$ is the excess return for a certain asset in time t; α_i is the performance measure of an asset; β_i is the beta of the asset; $R_{mt} - R_{ft}$ is the excess market return; ε_{it} is the error term.

However, this single factor model assumes a linear relation between market risk and return and it also assumes a static beta, in addition it uses market benchmark which is not easily identified. Therefore, the CAPM has been criticized as being unable to explain the cross-section variation in return, and that a single factor model is not sufficient due to its unrealistic assumptions as anomalies exist that have a power to explain the return and due to time effect, that causes risk and return to vary over time.

Therefore, most studies use an extended version of the CAPM. One of which is the conditional (Carhart, 1997) four-factor model which is itself an extension of the (Fama and French, 1992) three-factor model. The Carhart Model adds the momentum factor to the three factors model.

$$R_{it} - R_{ft} = \alpha_i + \beta_{1i} (R_{mt} - R_{ft}) + \beta_{2i} (SMB_t) + \beta_{3i} (HML_t) + \beta_{4i} (MOM) + \varepsilon_{it} \qquad (4)$$

Where: $R_{it} - R_{ft}$ is the excess return for a certain asset in time t, α_i is the performance measure of an asset; $R_{mt} - R_{ft}$ is the excess market return; **SMBt** (small minus big) is the difference in return between a small cap stock and large cap stock; **HMLt** (high minus low) is the difference in return between a high B-M stock and a low B-M stock; **MOM** (momentum) is the difference in return between past 1-year winners and past 1-year losers; **ß** is the factor coefficients; ε_{it} is the error term.

However, (Fama and French, 2015) introduced a five-factor model that captures size, value, profitability, and investment patterns in average stock returns, along with the market factor, and they report that it performs better than the three-factor model. In addition, adding profitability and investment factors cause the value factor of the three-factor model to become redundant.

$$R_{it} - R_{ft} = \alpha_i + \beta_{1i} (R_{mt} - R_{ft}) + \beta_{2i}(SMB_t) + \beta_{3i} (HML_t) + \beta_{4i} (RMW) + \beta_{5i} (CMA) + \varepsilon_{it} \quad (5)$$

Where: **RMWt** is the difference in return between stocks with robust and weak profitability, and **CMAt** is the difference in return between stocks of low (conservative) and high (aggressive) investment firms.

On a general base, prior empirical work agree that a multi- factor model is better in explaining variation in return than a single factor model, even though there is yet no agreement on the number of factors or what factors that best explain the cross-section variation in return.

Shefrin and Statman (1994) propose the behavioral capital asset pricing model as an alternative to the CAPM. This behavioral model assumes that beta is not a sufficient measure of risk and argues that there are other factors than the risk factor, as shown in the below equation, that determine the return. The BAPM recognizes that other factors affect pricing and is expressed as:

$$E (R_i) = f (\text{risk factors, affect, social responsibility, status, etc.}) \quad (6)$$

Building on the idea of behavioral CAPM, several models evolved that use psychological factors that reflect the variations in stock returns, one of which is the investor´s sentiment. Brown and Cliff (2004) define sentiment as the expectations of market participants relative to a norm such as the true fundamental value of the underlying asset. Moreover, (Baker and Wurgler, 2007) define the investor sentiment as a belief about future cash flows and investment risks that cannot be explained by the facts at hand.

The behavioral finance theory suggests that investor sentiment has a significant effect on the cross-section of stock prices, (Baker and Wurgler, 2006). And this motivates the existence of other studies to use investor sentiment in explaining the anomalies challenging standard finance theories.

Summing up the cost of equity measures, different models exist as presented however for the purpose of this study the traditional CAPM will be used to measure the cost of equity as the aim is to test for the impact of certain independent variables on the traditional financial decisions.

3.4.1.3. Investment decision

Investment decisions are the center of all financial analysis that will eventually influence the accomplishment of the organization objectives, thus the investment made by the company certainly aims to prosper shareholders, both now and in the future.

Several proxies exist for measuring the investment decision. Adam and Goyal (2008) refer to some measurements which are: (1) The Market-to-Book Assets Ratio; (2) Market-to-Book Equity Ratio; (3) Earnings-Price Ratio; and (4) Capital expenditures to net PPE Ratio. The first ratio of the market value of assets to the book value of assets (Tobin's q) is a common proxy for investment opportunities, the book value of assets is a proxy for assets in place and the market value of assets is a proxy for both assets in place and investment opportunities.

However, this proxy reported some empirical limitations one of which is requiring an estimation of the market value of debt to get the market value of assets and debt is often not publicly traded, which is the case for this study as the Egyptian market is mainly trading equities. In addition, this ratio is usually used in the literature as a proxy for other variables such as corporate performance, intangibles, the quality of management, among others.

The second proxy is the market value of equity divided by the book value of equity and is used by several researchers such as: (Chung and Charoenwong,1991and Graham and Rogers2002), among others. The market value of equity measures the present value of all future cash flows to equity holders, from assets in place and future investment opportunities, and the book value of equity represents the accumulated value generated from existing assets only. Similar to the prior proxy, the market to book equity ratio is used in the literature as a proxy for other variables as well, such as the firm performance.

The third proxy is the earnings-price ratio or its inverse. The current earnings proxy for cash flows received from assets in place, whereas a firm's market value of equity reflects the present value of all future cash flows. A higher ratio indicates that a larger proportion of equity is attributable to assets relative to growth opportunities (Chung and Charoenwong, 1991). This proxy has few disadvantages as well, one of which is that ratio is not meaningful if firms report zero or negative earnings. It is also used as a proxy for indicating earnings growth.

The fourth proxy is the capital expenditure scaled to the PPE ratio. Capital expenditures lead to the acquisition of new investment opportunities. Prior literature models the investment decision by relating capital expenditures to investment opportunities. In addition, these models control for investment opportunities using Tobin's Q and cash from operations.

The investment decision in this study is proxied by the capital expenditures normalized by the property plant and equipment at the beginning of the year, following (Adam and Goyal, 2008; McNichols and Stubben, 2008; Soliman, 2020 and Elgebeily et al.2021).

3.4.2. Independent Variables

The right-hand side of the regression model consists of different groups of variables that are generally referred to as independent variables. The first main group includes the six behavioral characteristics under study, in addition the second group includes the personality traits and thirdly, the financial literacy variable. In addition, there are the traditional factors that include the firm characteristics and the CFO demographics. Finally, this study, includes a moderating variable which is interacted with the six main behavioral characteristics under study. The following subsections will present each of the variables with their measuring tools.

3.4.2.1. Behavioral variables

After extensive research for the behavioral characteristics that a decision maker can incorporate, this study aims to identify the behavioral characteristics that the Egyptian CFOs might incorporate by testing for six characteristics, these are: optimism, overconfidence, illusion of control, loss aversion, herding and anchoring.

Section A in the questionnaire has questions (1 to 4) aiming to measure the decision maker´s observable managerial demographics which will be discussed later in subsection (3.4.2.4).

Moving to the variables that constitute the rest of the questionnaire (the non-observable CFO characteristics) the coming questions are in Section B in the questionnaire, using a 5-point Likert scale as a measurement to test for the managers´ behavior and attitude. The 5 points in the scale are respectively from 1, Strongly disagree, to 5, strongly agree.

Section B starts with questions to test for the CFO Optimism these are questions (5 to 10), presented below in table (3.2). Optimism is defined by (Heaton, 2002) as the manager´s over estimation of good performance and under estimation of bad performance. This study refers to the questions used in a study by (Graham et al.2013) that tests how managerial attitudes relate to corporate actions, taking optimism and managerial risk aversion as behavioral traits.

Thus, six questions, as shown in the table, are used to measure whether the CFO taking this survey is optimistic or not. High values indicate optimism; therefore, questions (5, 6 and 7) are numerically coded with a 5 if the respondent answers ''strongly agree'' while Questions (8, 9, and 10) are reversed and therefore, coded as 5 if the respondent answers ''strongly disagree''.

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Table (3.2) Six questions testing for optimism

5.	In uncertain times, I usually expect the best.
6.	I'm always optimistic about my future.
7.	Overall, I expect more good things to happen to me than bad.
8.	If something can go wrong for me, it will.
9.	I hardly ever expect things to go my way.
10.	I rarely count on good things happening to me.

Secondly, questions 11 to 14 in table (3.3) measure the Confidence variable. Overconfidence is remarkably similar to optimism as the person is overestimating, however the overconfidence bias is overestimating your own capabilities and knowledge (Dobelli, 2014). This study refers to the work of (Prosad et al.2015) as they test for the behavioral biases of Indian investors by taking overconfidence along with few other biases and show that overconfidence is the most important bias in the Indian context. Presented below, four questions aiming to test whether the Egyptian CFO is overestimating his/her personal skills or not.

Table (3.3) Four questions testing for overconfidence

11. I have sufficient knowledge of the Egyptian stock market
12. I am confident of my ability to take better financial decisions than others
13. I take full control and responsibility of my performance and financial decisions.
14. My past financial decisions successes are attributed to my own skills and understanding

Other studies test for the presence of overconfidence bias such as the study by (Souissi et al.2016) who test for the emotional biases of the banks´ CEOs in Tunisia, they report that bank CEOs opting for incentive mechanisms are highly devoted to their proper skillful evaluation (optimism and overconfidence).

Ben-David et al (2007) considering managerial overconfidence in making future forecasts about financial decisions, discovered that firms with overconfident CFOs have less flexible capital structure reporting that debt leverage were higher in firms with overconfident CFOs. Usually, an overconfident manager issues higher level of debt than a rational manager due to undervaluing debt more than equity (Učkar, 2012).

Moreover, Baker et al (2018) study how financial literacy and demographic variables affect behavioral biases, and the results proves the presence of different behavioral biases including overconfidence along with other biases.

Prior work shows that optimism and illusion of control are linked traits because individuals tend to be optimistic in situations that are believed by them to be controllable. Illusion of control is a third overestimation trait as individuals tend to overestimate their ability to control events/outcome (Ly et al. 2019), and specifically those that occur by chance (Langer, 1975).

Langer and Roth (1975) developed a three-item scale to measure the illusion of control phenomena and the main aim for such scale is to test how the business founders feel about their business predictions. Table (3.4) below presents the three questions that this study uses to measure the illusion of control variable, questions (15 to 17).

Table (3.4) Three questions testing for illusion of control

15. I can accurately forecast the total demand for my firm
16. I can accurately forecast when larger competitors will enter the market
17. I can make my firm a success, even though other firms like mine may fail

To capture the illusion of control, questions (15 and 16) are proposed by (Langer and Roth, 1975) asking the respondents about their ability to predict certain uncontrollable outcomes and question (17) is proposed by (Cooper et al. 1988) and implies that respondents believe their skills are greater than those of others.

Several authors adhered to such scale in measuring the illusion of control, such as (Keh et al. 2002) who aim to study the variables that might affect the evaluation of business opportunities in Singapore, they take illusion of control among other variables and use the three-item scale as a proxy. Also, (Simon et al. 2000), who study cognitive biases and their effect on risk perception, use three questions to test for the illusion of control bias.

De carolis et al (2009) who were interested to study the factors that impact the progress of new ventures in the United States, illusion of control is proven in their study to directly impact the ventures´ progress. Also (Carr and Blattner, 2010) conducting their study on a sample of small firms in the United States to test for the impact of quality decision-making on the firm´s success and survival by testing for some variables that affect the quality of a decision, one of such variables in their study is the illusion of control.

Another emotional bias is the loss aversion. This study refers to five questions inspired from a questionnaire conducted by solidarity funds of the Quebec workers' federation. In addition, several authors used these questions in their surveys to test for the loss aversion bias, among other biases in their work. Souissi and Jarboui (2018) and (Souissi et al. 2020) use such questions to measure the managerial loss aversion phenomena and their work is inspired from the work of others.

Azouzi and Jarboui (2012) test for the relation between the CEO´s emotional biases and the capital structure choice, reporting that CEOs who are loss averse follow the pecking order in their financing decision. In addition to the work of (Baccar et al. 2016) who study the managerial psychology and the rationality of corporate investment in Tunisia, taking loss aversion among the studied managerial variables.

Kahneman and Tversky (2013) define loss aversion as when the disutility of giving up an object is greater than the utility associated with acquiring it. And thus, the questions below (18 to 22) aim to test whether the Egyptian CFO acquires such trait or not and to specifically evidence the prospect theory. Noting that question (18) is a reversed question.

Table (3.5) Five questions testing for loss aversion

18. Even in those cases when success is not taken for granted, I would make an attempt to achieve it
19. My decisions are always taken with great care and precision
20. In financial contexts, the word RISK signifies DANGER
21. I would take challenging decisions once I feel sure of the targeted results
22. I usually try to predict the negative results likely to result from my acts

Waweru et al. (2008) refer to the work of (Koening, 1999) mentioning that Loss aversion may encourage individuals´ herding behavior. And therefore, herd behavior is another variable to be studied. Prior work mainly focuses on herd behavior from an investment decision aspect, focusing on the financial markets. And this leaves the door open to test for such behavior in the context of corporations.

When it comes to the measurement, this study adopts questions from several work, however, the questions are modified to fit the purpose and the sample of this study. In a financial market context (Ngoc, 2013) uses four-items in a questionnaire to test for the Behavior Pattern of Individual Investors in one of the largest Stock Markets in Vietnam and these items are inspired from the proposition of (Waweru et al. 2008) who identify four items that cause institutional investors in Nairobi Stock Exchange to follow other investors in their investment decisions, these are: buying and selling, choice of stock, volume of stock, and speed of herding. Waweru et al. (2008) conclude that different type of decision makers, herd differently.

Qasim et al (2019), on the market of Pakistan, aim to capture the impact of herding behavior and overconfidence biases on the investors' decision-making and the herding bias is measured by adopting four-item questionnaire of (Waweru et al. 2008 and Ngoc, 2013). These items can also support the

idea of peer effect that was explored by (Leary and Roberts, 2014), specifically peer effect in capital structure. They mention that firms´ financial decisions, including the capital structure decision, are impacted by the decisions of their peers.

The table below presents questions (23 to 27) that aim to test for the herding behavior, referring to a survey used by (Baker et al. 2018), in their study that relate financial literacy to some behavioral biases, one of which is the herd behavior. Noting that question (26) is a reversed question.

Table (3.6) Five questions testing for herding

23. Other industry Peers' financial decisions have an impact on my financial decisions
24. I usually react quickly to the changes of other industry peers´ decisions and follow their reactions to the market
25. I follow social blogs/ forums before taking financial decisions
26. I rarely consult others before making stock purchases or sales
27. I consult others (family, friends, or colleagues) before making stock purchase.

Moving to the anchoring behavior (Kübilay and Bayrakdaroglu,2016) explain that uncertainty is a major reason for anchoring, as decision makers lack data and thus, they are uncertain about the best choice, and this leads them to anchor to decrease uncertainty and settle their minds. Linking anchoring to the cost of debt decision, (Dougal et al.2015) report that borrowers and lenders use past terms as anchors, and they base their current cost of capital on the historical costs. Questions (28 to 31) are adopted from (Baker et al.2018) study who aim to examine how financial literacy and demographic variables in India are related to behavioral biases (one of which is anchoring). The questions aim to test whether individuals anchor in their personal investment decisions to be able to test if they acquire the anchoring bias or not.

Table (3.7) Four questions testing for anchoring

28. I am unlikely to buy a stock that was more expensive than last year
29. I compare the current stock price with their recent 52-week high and low price to justify my stock purchase.
30. When I decide to sell a stock, I keep its purchase price in mind.
31. In a falling market, I hold a losing stock till its price returns to its purchase level.

3.4.2.2. Personality traits

The final question in Section B is question (32) which aims to test for the personality traits of the CFO using inventory index technique invented by (Gosling et al. 2003), referring to the work of

(Goldberg,1992 and John and Srivastavas,1999). Personality is a naturally existing trait that distinguishes an individual from another. This study tests for the big five main personality traits that are proposed by (Goldberg,1971) and these traits are: Extraversion, Conscientiousness, Agreeableness, Emotional stability, and Openness to Experience. The variable uses a bipolar measurement that summarizes specific personality traits, as participants are required to rate themselves using a Likert scale manner as they choose how do they see themselves. Table (3.8) below presents the 10 items.

Table (3.8) Ten items for personality traits

32. I see myself as:
Extraverted, enthusiastic
Reserved, quiet
Dependable, self-disciplined
Disorganized, careless
Sympathetic, warm
Critical, quarrelsome
Calm, emotionally stable
Anxious, easily upset
Open to new experiences, complex
Conventional, uncreative

Each of the Big Five personality dimensions has two polar traits and therefore the ten items are: (1) Extraverted, enthusiastic and (2) Reserved, quiet, *for extraversion*; (3) Dependable, self-disciplined and (4) Disorganized, careless, *for conscientiousness*; (5) Sympathetic, warm and (6) Critical, quarrelsome, *for agreeableness*; (7) Calm, emotionally stable and (8) Anxious, easily upset, *for emotional stability/ Neuroticism*; (9) Open to new experiences, complex and (10) Conventional, uncreative , *for openness*. Noting that the second item of each trait is a reverse-scored item, (Gosling et al. 2003 and Rammstedt and John, 2007).

3.4.2.3. Financial Literacy

Section C in the questionnaire is composed of multiple-choice questions (questions 33 to 37) that aims to test for the level of financial literacy for the Egyptian CFOs. Mandell (2008) defines financial literacy as the ability of individuals to make financial decisions in their own best interests.

Van Rooij et al (2011) who aimed to measure financial literacy and study its relationship to stock

market participation, report that financial literacy affects the financial decision-making.

A commonly used measure in the prior literature are the questions referred to as the big five to test for literacy, asking about the decision maker´s financial knowledge about: interest, inflation, risk, mortgage, and bonds. This study adopts the big five as a measure for financial literacy that test for basic concepts of finance and the questions are presented in table (3.9), correct answers are in italic.

Table (3.9) Big Five Financial Literacy Questions

<u>Questions</u>	<u>Choices</u>
33. Suppose you had $100 in a savings account and the interest rate was 2% per year. After 5 years how much do you think you would have in the account if you left the money to grow?	○ *More than 102$* ○ Exactly 102$ ○ Less than 102$ ○ Do not know ○ Decline answer
34. Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, how much would you be able to buy with the money in this account?	○ More than today ○ Exactly the same ○ *Less than today* ○ Do not know ○ Decline answer
35. Buying a single company's stock usually provides a safer return than a stock mutual fund.	○ True ○ *False* ○ Do not know ○ Decline answer
36. A 15-year mortgage typically requires higher monthly payments than a 30-year mortgage, but the total interest paid over the life of the loan will be less.	○ *True* ○ False ○ Do not know ○ Decline answer
37. If interest rates rise, what will typically happen to bond prices?	○ *Will fall* ○ Will rise ○ Will stay the same ○ No relation ○ Do not know ○ Decline answer

These big five questions are designed in different studies by (Lusardi and Mitchell, 2011 & 2014) and are also used in other several studies such as (the health and retirement Study, 2004); National Financial Capability Studies, 2009 & 2012; Hastings et al. 2013; and Tokar Asaad, 2015).

Question (33) tests for the understanding of the compounding concept, question (34) asks about inflation and its relation to interest rates, question (35) checks for the concept of risk and diversification, question (36) tests for the time value of money concept and finally question (37) asks about the bonds and the relation between prices and interest. A binary system is used giving a value of 1 for correct answers and 0 for an incorrect one, a Do not Know, or a decline to answer.

3.4.2.4. Demographic factors

The demographic factors include the CFO´s age, gender, general educational level, and marital status. Following are few examples of the prior work regarding the four demographic variables and their measurement.

Taking the Age variable as a start, manager´s age is measured in years, and this of course is the common measure in prior literature. Barker and Mueller (2002) use the CEO age as one of the CEO characteristics to test their impact on the R&D spending of the firm. Peni (2014) suggests a relationship between executive age and firm performance, reporting a negative relationship which corresponds to some prior literature explaining that older executives tend to focus on their personal goals, thus affecting the firm performance negatively.

Li et al (2017) study how real investment decisions of CEOs of different age, are affected by their career concerns, and report that younger CEOs tend to be involved in bolder investment activities.

Siraji (2019) tests of the impact of CFO's managerial characteristics on firm performance: while taking the capital structure decision as a mediator and age is one of the characteristics used in the study among others and reported a significant impact for the age and three other characteristics on the capital structure decision and the firm performance.

Secondly, prior literature on gender-based differences and corporate governance suggests that female managers may have some superior skills, as they can communicate and listen better (Dallas, 2001). Jalbert et al (2013), study the relationship between CEO gender, financial performance and financial management stating that comparing the performance of different genders of CEOs is possible due to the significant increase in the number of females acting as CEOs. They use a binary factor to measure the gender variable giving 1 if the CEO is a female and 0 otherwise.

Francis et al (2013) report that banks tend to recognize the role of female CFOs in providing more reliable accounting information ex ante and reducing default risk ex post and grant firms with female

CFOs lower loan prices and more favorable contract terms and this is because female CFOs are more risk-averse than male CFOs when making various decisions, based on prior literature.

Peni (2014) proposes that gender-based differences may affect the CEO's/Chairperson's success, suggesting that firms with female CEOs tend to outperform firms with male executives, using a binary factor as gender proxy. Moreover (Liu et al. 2016) studying the CFO gender and earnings management report that female CFOs engage in less earnings management as they are more conservative in financial reporting than their male counterparts.

The third characteristic is the manager´s educational level. Barker and Mueller (2002) use the CEO educational level to test its impact on the R&D spending of the firm. The study uses a 4-points scale giving 0 to no college degree, 1 to undergraduate degree, 2 to master's degree and 3 to PhD degree. Moreover (Xiong, 2016) tests for the impact of Chairman characteristics on earnings management and uses general education level as one of the variables measured by a 5-points scale giving one if education is equal or less than senior middle school, giving two to Junior College Degree, giving three to bachelor's degree, and finally giving four to master's degrees and five to PhD. The study results show that firms with more educated Chairman have lower absolute discretionary accruals and lower real earnings management.

The fourth and last demographic characteristic is the marital status of the manager. Yao and Hanna (2005) study the effect of gender and marital status on financial risk tolerance and report that risk tolerance level is highest for single males, followed by married males, then unmarried females, then married females and this shows that the marital status has an impact on risk tolerance level and thus might consequently impact some financial decisions.

Bertocchi et al (2008) study the impact of gender and marital status on financial decisions and report that male and married individuals are more likely to invest in risky assets than female and single ones, respectively. Furthermore (Hedge and Mishra, 2019) in their paper titled ´Married CEOs and corporate social responsibility´ report that CEO marital status is an important driver of socially responsible corporate decision making and they refer to the work of (Roussanov and Savor, 2014) who construct a dummy variable that takes a value of 1 if the CEO is married and 0 if unmarried.

In this study primary data is collected to control for the managerial demographics, which are manager´s observable characteristics by asking four questions in section A, these are questions (1 to 4) in the questionnaire, presented in table (3.10).

Question (1) measures the age variable which is the number of the years from the decision maker´s birth year to the sample year, Barker and Mueller (2002), Peni (2014) and Li et al., (2017). The

variable takes a value of one, two, three or four based on the range of age that the respondent falls in. Question (2) asks about the gender and is measured by a dummy variable taking the value of one if the decision maker is a female and zero otherwise, Jalbert et al., (2013) and Peni (2014).

Question (3) asks for the general education level that reflects the highest educational level the manager has reached. When the decision maker has no studies or primary studies the variable takes the value one, it is equal to two when the decision maker has a high school degree, it is equal to three when there is a bachelor degree and takes the value four for a master degree and five for a PhD Degree, Barker and Mueller (2002) and Xiong (2016). Finally, question (4) asks about the CFO´s marital status and takes the value of one if the CFO is married and zero if unmarried/single, Hedge and Mishra (2019).

Table (3.10) Managerial Demographics

Age	o 25-34
	o 35-44
	o 45-64
	o 65 or above
Gender	o Male
	o Female
General education level	o No studies /Primary studies
	o High school
	o Bachelor degree
	o Master Degree
	o PhD Degree
Marital status	o Married
	o Unmarried/single

Noting that most of the prior literature obtained such data from different data bases, such as Compact Disclosure Discs, Audit Analytics database, Business week corporate elite issues and others. However, annual reports of the Egyptian firms and databases might not have complete information about the managerial characteristics for the Egyptian CFOs and therefore, in this study, primary data is collected for such variables using the questionnaire.

3.4.2.5.   Traditional firm variables

The firm factors include its size, growth, tangibility, and profitability. Several studies exist in the literature, including the famous study as mentioned earlier by (Frank and Goyal, 2003) using a model

that includes the firm´s size, tangibility, growth, and profitability as firm factors, in addition to controlling for the firm´s financial deficit.

Other studies that use the same model, with slight differences, are those by (Chen, 2004), on Chinese listed companies, along with two studies that adopt same variables but adding to the model other macroeconomic variables and country specific variables these are: a study on the developing countries by (Booth et al. 2001) that supports the pecking order theory and reporting that highly profitable firms have a lower debt ratio, and the other is an international study by (De Jong et al. 2008).

Tomak (2013), studying the Impact of Overconfidence on Capital Structure in Turkey, considers some firm determinants like firm size and profitability and reports a direct relation between firm size and leverage while firm profitability has an inverse relation with the firm´s leverage.

This study aims to consider the most used variables in the literature, as traditional determinants and they are commonly used in studies applied on the Egyptian market, and these are four variables that were mentioned earlier (size, growth, tangibility, and profitability).

Secondary accounting data type is used to get figures and ratios that act as their proxies, using DataStream as a data source.

In this study, the firm size is measured by the natural logarithm of sales while the tangibility ratio is measured using the ratio of fixed assets to total assets, moreover the firm growth rate is measured using the market to book ratio and the firm's profitability is measured using the return on equity ratio. Such measures follow prior researchers such as (Frank and Goyal, 2003; Lemmon et al. 2008; Embong et al. 2012; and Allini et al. 2018).

3.4.2.6. Moderating Variable

This study focuses on the CFO as a key financial decision maker as defined by (Baxter and Chua, 2008) that the CFO is the key leader who is responsible for the finance and accounting duties of the firm. The aim is to use the CFO board membership as a moderating variable to test whether the CFO being powerful (Board member) will cause them to have an impact on the corporate financial decisions or not. This moderating variable will take the value of one if the CFO is a board member and zero otherwise, following (Bedard et al. 2014; Mobbs, 2018; and Baker et al. 2018).

Furthermore, the interception of the moderator with the six behavioral characteristics, aims to test if the behavioral factors come into act when the CFO is on board, or whether being on board or not does not differ, testing if it influences the financial decisions differently.

3.5. Research model and methods of estimation

As mentioned earlier that data in this study is analyzed at a specific point of time, that is year 2020,

from different individuals therefore this study has a cross sectional data type which also justifies using a questionnaire. This section further presents the research model along with the different methodologies applied to test for the hypotheses.

3.5.1. Research model

For the sake of hypotheses testing, this study presents below the research model (figure 3.1). The left-hand side of the figure list the independent factors under study while the right-hand side resembles the dependent variables which are the three financial decisions. In addition, the CFO board membership variable is included in the model as a moderator.

Figure (3.1) Research Model
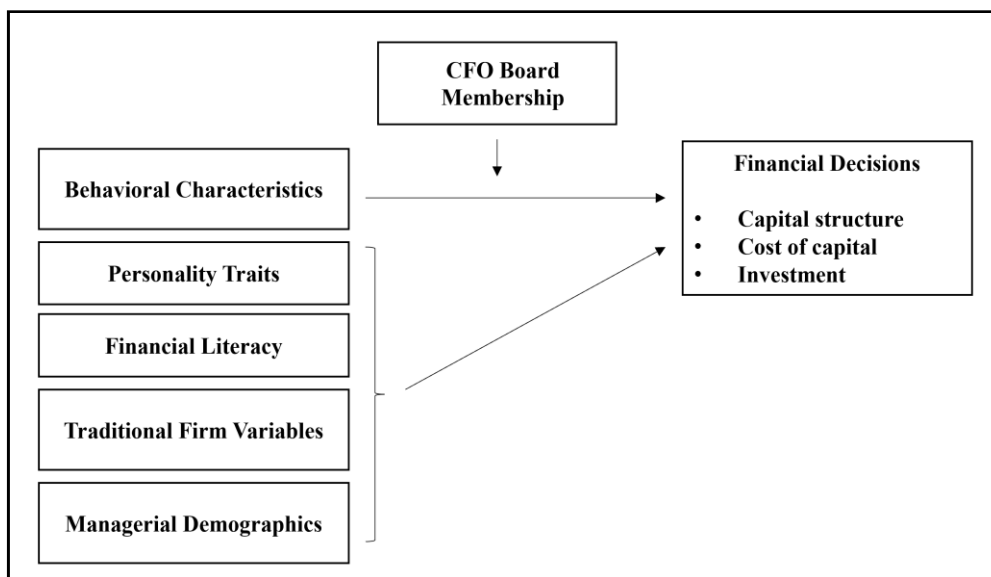
3.5.2. Research Methods

Following are the main regression models that aim to examine and test for the impact of multiple independent variables on the dependent variables under study. The study tests for the impact of traditional firm factors and demographics and then including behavioral and other factors to the model in response to the argument that factors other than the traditional ones should be included in traditional models. Accordingly, this study follows a hierarchical regression starting by a model that includes few traditional firm factors only (equation 7) and then a few managerial demographics are included in the model (equation 8).

$$DEC_i = \beta0 + \beta1\ FIRM + \varepsilon \qquad (7)$$

$$DEC_i = \beta0 + \beta1\ FIRM + \beta2\ DEMO + \varepsilon \qquad (8)$$

Where: **DEC**: are the main financial decisions under study, **FIRM**: the four firm traditional factors, **DEMO**: the four demographic factors, and the **ε** is the error term.

Other variables are then added to the prior regression to test for the impact of including variables other than the traditional ones, equation (9)

$$DEC_i = \beta0 + \beta1\ FIRM + \beta2\ DEMO + \beta3\ BEH + \beta4\ TRAITS + \beta5\ LIT + \varepsilon \qquad (9)$$

Where: **BEH**: the six behavioral characteristics, **TRAITS**: the five personality traits, **LIT**: is the financial literacy variable.

And finally, to proceed on the research questions, the next regression model (equation 10) includes all the variables under study and uses a moderator that intercepts with the main variables under study which are the behavioral characteristics.

$$DEC_i = \beta0 + \beta1\ FIRM + \beta2\ DEMO + \beta3\ BEH + \beta4\ TRAITS + \beta5\ LIT + \beta6\ CFOBM + \beta7\ CFOBM*BEH +$$
$$\varepsilon \qquad\qquad (10)$$

Where: **CFOBM**: is a dummy variable for the CFO board membership; **CFOBM*BEH**: is the interception of the moderator with the behavioral characteristics.

In the aim of further analysis, and to overcome any statistical problems of the traditional multivariate regression, this study applies the principal components analysis and the stepwise analysis. Gorsuch (1990) defines components analysis as a data reduction technique that became acknowledged when computers were slow and expensive to use, as component analysis was a quicker and less costly alternative to factor analysis.

In other words, principal component analysis is the process of reducing the independent variables into smaller number of principal components to generate a more stable estimates of the regression coefficients. The principal components are usually used in a regression for two main reasons: (1) when there are many independent variables relative to the number of observations (2) when the independent variables are highly correlated (Rencher,2005).

This type of analysis follows a series of steps, first running the principal component command to get the components and their eigen values, next evaluate the principal components that have an eigen value greater than (1) and the final step is choosing a rotational method.

A commonly used rotation is the varimax rotation which works by maximizing the sum of the variance of the squared loadings, and this usually produces high factor loadings for a smaller number of variables and low factor loadings for the rest (Stevens,1996). The varimax rotation is one of the orthogonal rotations where there is no intercorrelations between components as factors independence is preserved. And so, the orthogonal rotation is known to have the greatest scientific utility, consistency, and meaning (Gannon Cook,2010).

On the other hand, the stepwise analysis is additionally used in this study as a technique to purely

predict or reveal relations between the variables. The stepwise analysis picks out the relevant predictors from several possible ones by allowing a computer program to select a small set of predictors from a larger set based on a certain criterion such as: Akaike information criterion (AIC), Bayesian information criterion (BIC), or increase in R squared.

Yu et al. (2014) Refer to three main approaches for the stepwise analysis which are: the forward selection, backward elimination, and bidirectional elimination. The forward selection starts with an empty equation and variables with the highest F statistic or lowest P value are added in each step until there are none left. The second approach is the backward elimination which starts with the full model and eliminates the least significant variables until all remaining variables are statistically significant. The third approach is the Bidirectional elimination which is a mixture of the forward and backward approaches by testing for the variables to be included or excluded at each step.

The Stepwise determines which independent variables to include in the model as it excludes statistically insignificant variables. In this study, the backward elimination approach is applied, and the final regression reports the best group of variables that explain the variation in the dependent variables.

3.6. Conclusion

To conclude this chapter, this study is cross sectional that uses a questionnaire to gather primary data, in addition, secondary data is also gathered to measure accounting ratios. The questionnaire aims to explore behavioral characteristics of the CFOs in the Egyptian market and to test for their impact, among other factors, on different financial decisions in the firm.

Furthermore, the study runs a multivariate hierarchical regression to test for the hypotheses under study, in addition, other types of analyses are used such as the principal component analysis and the stepwise analysis.

The next chapter presents a full description for the unit of analysis and for the data gathered to provide clear view for the sample under study.

Chapter 4: Data

4.1. Data and sampling

This section helps clarify the sample selection. The unit of analysis in this research has a population of the non-financial firms listed on the EGX and this accounts for 173 firm for the year 2020 and this study is left with a sample of 146 firm out of the 173 after excluding firms that had no secondary data in the year of study. The final count of the received responses is 96 and therefore, this is the final sample leaving the study with 96 observations as the study is conducted on year 2020 only.

Prior studies prove the inefficiency of the Egyptian Stock Market due to information asymmetry and the existence of noise and speculative traders; thus, the Egyptian market deserves an investigation from a behavioral perspective. The Egyptian stock exchange website is used to identify the unit of analysis and a questionnaire was distributed to the sample. Secondary data is used to get market data for measuring the firm´s characteristics and the firm´s financial decisions and is gathered using DataStream-Thomson Reuters database. Moreover, data concerning CFO board membership is obtained from the board of directors' reports and financial statements, purchased from the Egyptian Company for Information Dissemination (EGID).

Table (4.1), presented below, provides an overview of the market as it shows the total number of the Egyptian listed firms with their market shares. The market consists of 18 industries, with a total of 224 firms listed on the EGX in year 2020. The table shows that the first five industries are dominating the market as they account for more than 50 percent of the market with the non-bank financial services industry having the highest share of approximately 17 percent followed by the real estate, food & beverage, health care & pharmaceuticals and the basic resources industry. The remaining 13 industries constitute the remaining share of the market.

Following is table (4.2), reflecting the sample of the study after excluding the financial sector and firms with missing data, and accordingly the sample became 146 Non-financial listed firms (presented in column 2), In addition, the table reflects the market share for each industry in the sample (column 3), as well as the number of CFOs who responded from each industry with their response rates as compared to the number of firms in each industry (columns 4 & 5).

The market share of the industries that constitute more than half of the market remained with the same order after the exclusion of the financial sector and firms with missing data, as the top industries having the highest market share that account for more than half of the market are the real estate, food & beverage, health care & pharmaceuticals and the basic resources industry. However, as seen in table (4.2) the highest response rates come from other industries which are seven industries, these

are: Building & material, industrial good & services, paper & packaging, shipping & transportation, education services, energy & support services, and utilities industries. These responses account for approximately 30 percent of the total responses, the following highest responses are received from the basic resources and health care industries, which alone account for almost 30 percent of the responses as well.

Table (4.1) All Listed firms and their market share in year 2020

Industry	No. of firms	Market share
Non-bank financial services	37	16.52%
Real Estate	35	15.63%
Food, Beverages, and Tobacco	28	12.50%
Health Care & Pharmaceuticals	17	7.59%
Basic resources	16	7.14%
Travel & Leisure	15	6.70%
Banks	14	6.25%
Building materials	11	4.91%
Contracting & Construction Engineering	11	4.91%
Textile & Durables	9	4.02%
Industrial Goods, Services and Automobiles	6	2.68%
IT, Media & Communication Services	5	2.23%
Paper & Packaging	5	2.23%
Shipping & Transportation Services	4	1.79%
Trade & Distributors	4	1.79%
Education Services	3	1.34%
Energy & Support Services	3	1.34%
Utilities	1	0.45%
Total	**224**	**100.00%**

Table (4.2) The sample and the CFOs´ response rates

Industry	N.	Market share	No. of responses	% of responses
Food, Beverages, and Tobacco	26	17.81%	16	61.54%
Basic resources	16	10.96%	15	93.75%
Health Care & Pharmaceuticals	16	10.96%	13	81.25%
Building materials	10	6.85%	10	100.00%
Travel & Leisure	8	5.48%	6	75.00%
Textile & Durables	9	6.16%	6	66.67%
Industrial Goods, Services and Automobiles	5	3.42%	5	100.00%
Contracting & Construction Engineering	6	4.11%	4	66.67%
IT, Media & Communication Services	5	3.42%	4	80.00%
Paper & Packaging	4	2.74%	4	100.00%
Shipping & Transportation Services	4	2.74%	4	100.00%
Trade & Distributors	4	2.74%	3	75.00%
Education Services	2	1.37%	2	100.00%
Energy & Support Services	2	1.37%	2	100.00%
Real Estate	28	19.18%	1	3.57%
Utilities	1	0.68%	1	100.00%
Total	**146**	100%	**96**	

4.2. Egyptian stock market Background

The development of the Egyptian stock market goes back to 1888 when stocks were listed in the Alexandria stock exchange and followed by their listing in Cairo stock exchange which was established in 1903 and was considered one of the most active stock exchange markets. In the 1970s the CMA (Egyptian Capital Market Authority) was established to govern the stock market. However, rules were not perfectly applied, and several policies existed that drove the market into a resting state until the beginnings of the 1990s, new laws were introduced that caused the market to recover (Ragab and Omran, 2006). The Egyptian Regulatory Authority strives to protect investors and regulate the market through having a legal framework and laws such as: the Capital Market Law no. 95 of 1992, the Board of Directors Decisions, Central Depository and Registry Law no. 93 of 2000, listing, continuous listing, and delisting rules, membership rules at the Egyptian Exchange, and other rules regulating the market.

In addition to more legislations related to the Capital Market that include Companies' Law, Anti-money Laundering Law, Tax Law, and their Executive Regulations.

On providing a brief description for the main laws, the capital market law (Law 95/1992) provides the main regulatory framework for the activities of the stock market by recognizing primary and secondary markets; the central depository law (Law 93/2000) aims to provide the legal framework for the central depository in Egypt by identifying shareholders' rights and their legal ownership (Egyptians and foreigners); the companies law (Law 159/1981) provides the framework for the establishment and operation of companies within the Arab Republic of Egypt, the law covers the main establishment procedures, responsibilities, and all other aspects that a company may encounter during its business.

Furthermore, the Egyptian stock exchange includes several indices presented as follows; the EGX 30 index which includes the top 30 companies in terms of liquidity and activity, the index value is calculated in local currency terms and denominated in US dollars since 1998, EGX started publishing its dollar denominated index in 2009. The Index is weighted by market capitalization and adjusted by the free float. Adjusted Market capitalization of a listed company is the number of its listed shares multiplied by the closing price of that company multiplied by the percent of freely floated shares.

Additionally, the EGX has launched the EGX 30 TR Index in 2019 to measure the performance of the market and to meet the needs of wide variety of investors. EGX 30 TR includes top 30 companies in terms of liquidity and activity and weighted by the adjusted free floated market capitalization, the index avoids concentration on one industry/sector and therefore has a good representation of various industries/sectors in the economy.

Moreover, the Egyptian Exchange has launched the EGX30 Capped Index on February 3, 2019. The index is designed to measure the performance of the most traded companies in accordance with the rules set for mutual funds, the law stipulates that "any fund shall not invest more than 15% in the securities of a single company, nor exceed 20% of the securities issued by such company". This index is designed to capture the performance of the most active 30 companies in terms of traded value and liquidity, while capping the weight of any constituent to a maximum of 15%.

Another index is the equally weighted index EGX50 EWI, which started in 2013, including top 50 companies in terms of liquidity and activity, EGX50 EWI avoids concentration on one industry and therefore has a good representation of various industries/sectors in the economy; Subsequently, the equally weighted index EGX 70 EWI was launched in February 2020 to replace the EGX 70 index. The new index measures the performance of the best 70 companies in terms of liquidity and activity;

following, in May 2020, the equally weighted index EGX 100 EWI was launched to replace the EGX 100 index. The index covers the top 100 companies in terms of liquidity and activity including EGX 30 and EGX 70 EWI constituent companies.

As of January 2020, the Egyptian Exchange has launched new sectoral indices for the companies listed on the EGX aiming to develop and raise the efficiency of the Egyptian capital market. A recently launched index is the Tamayuz Index launched in 2021 aiming to increase the liquidity of small and medium enterprises to achieve a promising Egyptian Capital Market. Tamayuz index targets companies that have strategic plans for expansion and continuous growth. Moreover, EGX officially launched Treasury Bond Index on 3 August 2021. The index will provide investors with a reliable tool with which to measure and track the performance of the Egyptian Bond Markets.

In the aim of supporting small and medium-sized companies (SMEs), NILEX is an Egyptian stock exchange established within the Egyptian Exchange and it is the first market in the Middle East and North Africa region for the listing and trading of the SMEs. The aim of this market is to provide opportunities for promising entrepreneurs and business. And finally, for the aim of raising awareness to sustainability, the environment, social and governance (ESG) index for Egypt has been created under the guidance of Standard & Poor's and Crisil, and with the assistance of the Egyptian Stock Exchange (EGX).

4.3. The Egyptian Market and the Covid-19 Pandemic

This section sheds light on the nature of an emerging/ developing market such as the Egyptian market to better understand the market under study, in addition to presenting a brief outlay for the situation of the Egyptian market during the Covid-19 pandemic, as this study is conducted in year 2020. Emerging markets are defined as those having low or middle income and having a stock market that is promising (Solnik,2000). Odier et al. (1995) state that emerging markets are promising due to their relative high volatility compared to the developed markets and this was proven in studies on portfolio diversification, as including Emerging Markets into the investment portfolio result higher returns for the same level of risk.

Egypt witnessed a turning point in 2016 by launching a vital reform program to improve its stability and to enhance its economic conditions, after suffering in prior years from instability. The adopted reforms had a positive economic impact as they caused a higher growth rate, less deficits, and assisted in resolving the foreign currency shortages that were paralyzing the economy. Examples of such reforms are: (1) liberalizing exchange rates; (2) road infrastructure development; and (3) legislative framework improvements.

However, the COVID-19 pandemic created challenges and slowed down the intended impact behind the created reforms. Few of the negative impacts of the pandemic are: (1) the increased spending on health and social protection; (2) the instability of firms´ supply and demand which impacted their financial statements negatively and some were facing bankruptcy risk; (3) the drop in vital sources of foreign currency (such as: tourism, Suez Canal revenues, and payments from the oil-exporting countries); and last but not least (4) the unemployment rate was impacted.

Despite the challenges caused by the pandemic and to ease the pandemic´s negative effect, the Egyptian government reacted by putting several measures into action to reach the country´s development goals. Such measures include: (1) developing local supply chains for health equipment (2) Creating cash transfer programs Takaful and Karama to reach remote villages and other vulnerable groups, which aims to provide food as well as medical and sanitation supplies; (3) providing more care and attention to the information and communication technology services due to its vital role in maintaining essential services such as: governmental services, education and several businesses operations; (4) deferring tax payments for the affected sectors; (5) removing trade barriers especially in agriculture business and improving food standards to help the country be more food secure.

Furthermore, because of the economic slowdown, the banking system witnessed some risks regarding the loan portfolios, cost of capital and profitability, however the system was able to maintain its stability as it was proven to be profitable, liquid and well capitalized during the crisis, (IMF report 2020).

The World Bank Enterprise Surveys conducted in Egypt between the end of 2019 and mid-2020, report that all firms, regardless of their size, adjusted their attitudes such that they all perceived the access to finance as a minor or moderate obstacle, which reflects that the government facilitated their access to financing sources through facilitating over drafting. Most of the firms did not apply for new loans and reasoned this by their lack of need for a loan.

Based on the world bank, the latest value from 2020 for Egyptian households' consumption is 85.83 percent, noting that the world average in 2020 based on 150 countries is 63.69 percent, and this reflects a high consumption percentage within the Egyptian market.

All the mentioned facts clarify that the Egyptian market is a promising market, and the African development bank group confirms this by quoting: ´´Egypt's economic growth has been strong and resilient since the economic reforms initiated in 2016. It is one of the few African countries expected to record a growth in 2020, at 3.6%, despite the adverse impact of the COVID–19 pandemic. The economy grew at a slower rate than in 2019 (5.6%) but did not enter a recession, thanks to high domestic consumption´´.

Furthermore, market inefficiency is impacted by the availability of information and the lack of information is partially caused by behavioral factors. And therefore, studying inefficient markets requires incorporating behavioral factors. Prior studies prove the inefficiency of the Egyptian Stock Market and the existence of noise and speculative traders; thus, the Egyptian market deserves an investigation from a behavioral perspective.

Mecagni and Sourial (1999) suggest that the Egyptian market is vulnerable to behavioral factors as they examine the stock returns and found nonnormality in their distribution as well as high volatility and thus, stating that prices deviate from the efficient paradigm. In addition (ElAnsary and Attuea,2012) analyze the informational arrival pattern within the Egyptian Stock Exchange and findings show a positive correlation between trading volume and return, indicating that the Egyptian Stock Market is informationally inefficient and that noise traders exist.

On the other hand, some studies exist that suspect the existence of noise traders. For example (Girard and Omran,2009) aim to test for the Egyptian Stock market trading behavior by examining the interaction of volatility and volume in listed companies, results report that information size and direction have an insignificant effect on conditional volatility and thus, the presence of noise trading and speculative bubbles is suspected.

As shown in the literature chapter, most behavioral studies are focused on financial markets studying the investor´s behavior and few studies exist that approach behavioral finance in corporations of the Egyptian market and those few are different from what this study aims to explore. Thus, one of the pillars acting as a motivation for this study is the market choice. The lack of behavioral studies in the Egyptian stock market in the context of corporate finance, motivates this study to choose the CFOs in the Egyptian market as the unit of analysis. In addition, compared to the existing studies, this study is different in the sense that it tackles different characteristics that have not been yet studied in the Egyptian market and as well, the focus on the cost of capital is not fully studied in a behavioral context in the chosen market.

Furthermore, most of the behavioral studies concerned with the decision making are based largely in the US and developed countries which have a different nature and therefore, their results cannot be certainly applied on a developing country and that provides another reasoning to conduct this study to explore different type of markets.

4.4. Validity and Reliability check

Most of the questions used in the constructed questionnaire are adjusted to match the sample and the type of respondents and therefore, validity and reliability checks are needed. On one hand, Validity

is defined by (Ledbetter et al. 1991) as the degree which the researcher has measured what he/she has set out to measure, in other words, it is the extent by which an empirical measure reflects the real meaning of the concept under study. Saunders et al (2009) in their book mention that Internal validity in relation to questionnaires refers to the ability of the questionnaire to measure what you intend it to measure.

Cooper and Schindler (2008) state that validity usually comes in three types, these are: content validity, criterion-related validity, and construct validity. Content validity refers to the extent to which the questions in the questionnaire provide adequate coverage of the investigative questions; criterion-related validity, refers to the ability of questions to make accurate predictions and at last; construct validity refers to the extent to which the questions measure the presence of those hypotheses you intended them to measure.

Validity and reliability can be checked through a pilot study which is a small-sample quantitative study that is designed to guide a larger scale future study. Thus, the purposes of the pilot study include testing the adequacy of research instruments, assessing the feasibility of a full study, and collecting preliminary data (Connelly,2008).

On the other hand, reliability is defined by (Smith et al. 2008) as the extent to which the data collection technique will generate consistent findings. However, (Robson, 2002) mentions several scenarios when reliability test is not effective and one of which is the subjectivity or the bias of the participants, which might be an obstacle in this study, since the aim is to test for behavioral characteristics. Reliability involves correlating the responses to each question in the questionnaire with those to other questions in the questionnaire. Therefore, it measures the consistency of responses across the questions. Several methods for calculating reliability exist, however one of the most common measures is Cronbach's alpha which is most used with multiple Likert scale questions to determine the scale reliability (Saunders et al. 2009).

A very good Cronbach's alpha should score (0.8 or greater), however an alpha of (0.6-0.7) is still an acceptable level of reliability (Hulin et al. 2001) and Shelby (2011). Nunnally (1978) suggests that Cronbach's alpha value should be at least (0.7) to make sure that the measurements are reliable. It is also referred by (Ahdika, 2017) that a score of (above 0.4 to 0.6) is quite reliable. Cronbach's alpha is usually used in social and behavioral research. And so, the Cronbach's alpha is suitable for this study as the questionnaire consists of Likert scale questions in addition for the study being in the area of behavioral finance.

It is vital to refine the questionnaire so that respondents will have no problem in answering the

questions and to smoothly record the data. This is done through conducting a pilot study, in addition to identifying the questions' validity and the likely reliability of the data that is collected and analyzed, as suggested by (Saunders et al. 2009).

This survey was distributed at first to CEOs and so a pilot study, as a validity technique, is conducted and the questionnaire is distributed on few CEOs and the feedback received is summarized in table (4.3) below.

Table (4.3) Summary of the Pilot study Feedback

Main Objection	Reasoning /Feedback
The power variable questions	The questions included were following prior literature, such as the % of ownership and is the position inherited or not, one of the CEOs was not convinced with these questions and considered them too personal.
The anchoring variable questions	The anchoring questions used are the ones from Baker and they are related to the CEOs personal investment decision to reflect the anchor behavior, one of the CEOs sees these questions as personal too and not applicable to the Egyptian market.
The financial literacy questions	The questions seemed inappropriate as the CEOs felt they are being tested, and they thought they should be directed to the CFO or members of the finance team instead. In addition, this study used initially 5 basic financial knowledge questions and 9 advanced questions, and this seemed to be too many questions for the respondents.
Financial decisions questions	Couple of feedback were that CEOs will not fill these types of questions and will not have time for that. Better be filled by CFOs.
Length of the questionnaire	Too long and CEOs will not fill such long questionnaires.

Based on the feedback, this study conducts some adjustments to have better validity. First, it seems that directing the questionnaire to CFOs is better than CEOs as most of the questions seem more relevant to CFOs instead of CEOs, in addition to following the research aim, that is to focus on other managers than the CEOs. Second, by directing the questionnaire to CFOs the power variable questions were removed as they are related to CEOs only and this help reduce the number of questions. Furthermore, in the aim of reducing the length of the questionnaire, this study will only use the 5 basic questions for financial literacy and from the answers received for the 5 questions, the answers somehow vary, so this means that the 5 questions are an effective reflection for the literacy variable. Third, directing the questionnaire to CFOs will also help have better responses for the financial decision questions as suggested by some CEOs and as suggested by some prior literature. The adjusted questionnaire is then checked for construct validity using Pearson's correlation. The survey questions are grouped into three main categories to check for construct validity, the three categories are the behavioral questions, personality traits questions and the financial literacy questions.

For the financial literacy category, results reported are significant and the obtained Pearson correlation values are greater than the critical value which reflect the validity of the questions. The personality traits category reports significant values as well, except for agreeableness trait as one of the 2 polar questions is not significant (that is: *Sympathetic, warm*) and one of the reasons could be that few CFOs exhibit this trait, and this is reflected in the description section as CFOs who acquire this trait account for 45 percent which is less than 50 percent. However, this question is not removed as it's a two polar type of question. Noting that the 1 tail significance reflects validity for all questions.

Moreover, checking for the construct validity for the behavioral characteristics, all questions reported valid values except for three questions reported insignificant results with a Pearson correlation value lower than the critical value, one of these questions is related to the optimism variable (*If something can go wrong for me, it will*), while the other two are related to the herding variable (*Other industry Peers' financial decisions have an impact on my financial decisions*, and *I rarely consult others before making stock purchases or sales*).

Therefore, these three questions are removed as to have more reliable questionnaire. Correlation results are reported in the appendix, (tables 1-3).

Moving to the reliability check for the scales, Cronbach's alpha is used for each scale. Cronbach's Alpha ranges between (0 and 1), with higher values indicating more reliability. The total reported scale reliability coefficient for the questionnaire used in this study is (0.8154) which is a very good and acceptable scale reflecting that the questionnaire used is reliable.

As a further check, the questionnaire is categorized into three categories, the behavioral questions category that report an alpha of (0.8037) which is very good and acceptable value and reflect reliability of the questions, following category is the personality traits reporting a relatively low alpha of a value (0.4302) and the reason of this low value might be due to the type of scale used which is the ten item inventory, that has only two items testing for each trait, however its considered a fairly reliable score. And finally, the last category is the financial literacy questions reporting an alpha of (0.5587) which is almost 0.6 and so considered an acceptable value, as referred by (Ahdika, 2017).

4.5. Descriptive Statistics

The descriptive statistics is used to describe the data under study by showing the mean, median, minimum, and maximum values, and the standard deviation. Also, graphs and charts are used to describe the data virtually. The results are reflecting the data for the year 2020, for the sample which comprises 96 CFOs for the non-financial firms listed in the Egyptian market.

As mentioned earlier, the independent variables in this study are divided into several sets: (1) the Behavioral characteristics; (2) personality traits; and (3) the financial literacy variable. Moreover, there are two sets of traditional variables: (1) the traditional firm characteristics; (2) the managerial demographics. All in addition to considering the CFO board membership to moderate the relation between the six behavioral characteristics and the financial decisions. While the dependent variables are the interrelated financial decisions, these are: (1) the capital structure, proxied by the TDR, (2) the cost of capital, proxied by the WACC, and (3) the investment decision, proxied by CAPEX.

Moving forward, the coming subsections will present a description for the variables. In addition, responses to the questions in section D are presented.

4.5.1. Dependent Variables

Due to the existence of outliers among the data, winsorizing variables was applied as a way to ease the effect of outliers (Dixon,1960 and Rottger et al.2019). Therefore, the following results are after replacing the extreme values for the dependent variables. Table (4) in the Appendix presents the descriptive statistics for the dependent variables before data winsorizing and table (4.4) below presents descriptive statistics after winsorizing the variables, which presents more logical figures to describe the data.

Table (4.4) shows that the sample under study has a total debt ratio averaging (0.21), with a minimum ratio (0) and a maximum ratio (0.704), reflecting that the average of the firms depends more on equity rather than debt. The capital structure variable has a standard deviation of about (0.22) which is relatively a low value indicating that the data values are close to the average. Moving to the second

dependent variable which is the cost of capital, results report an average value of (-0.872) with a minimum value (-2.194) and a maximum value (0.213) and a (0.617) variation from the mean value. The third dependent variable which is the investment decision, results report an average value of (0.127), with a minimum value of almost (0) and a maximum value (0.537) and a (0.1507) variation from the mean value.

Table (4.4) Descriptive statistics for the Dependent variables

Variable	N	Mean	Std. Dev.	Min.	Max.
TDR	96	.2149682	.2226023	0	.7045404
WACC	96	-.8726194	.6172406	-2.194837	.2137974
CAPEX	96	.1273108	.1507649	.0005951	.5370475

In addition, normality check was conducted before and after winsorizing to check for skewness and kurtosis of the data. Results before winsorizing are reported in the appendix in table (5) and histograms are also presented in the appendix, figures (1 to 6). Comparison of the test results before and after winsorizing reflects improvement as before winsorizing the P values were perfectly significant.

Normality check after winsorizing is reported below in table (4.5) presenting the P values reflecting non normality as values are less than (0.05), except for the cost of capital data. However, detailed summarization of the variables reported a positive skewness for the TDR with a value of (0.8056) and a kurtosis value of (2.521), while data for the WACC reported a negative skewness with a value of (-0.2097) and a kurtosis value of (2.7255). Moreover, data for the CAPEX reported a positive skewness with a value of (1.6207) and a kurtosis value of (4.697).

Table (4.5) Skewness and kurtosis tests for normality

Variable	N.	Pr (Skewness)	Pr (kurtosis)	Joint test	
				Adjchi2(2)	Prob>chi2
TDR	96	0.0019	0.3290	9.18	0.0101
WACC	96	0.3750	0.7297	0.93	0.6296
CAPEX	96	0.0000	0.0102	25.46	0.0000

The skewness and kurtosis values do not reflect perfect normality however the values are acceptable as they are very close to the ideal values, as for the skewness, the values are close to (0) while for kurtosis the values are close to (3). Sattar et al. (2020) mentions that data is considered normal when all the values lie between +3 and -3.

Next, the coming subsections describe the sample´s characteristics by presenting some firm

characteristics for the firms under study in addition to some observable managerial characteristics that describe the survey respondents and further other characteristics are presented such as the behavioral characteristics, personality traits and their level of financial literacy.

4.5.2. Traditional Firm Characteristics

The traditional firm characteristics used are Asset´s tangibility, profitability, size and growth. Table (4.6) below presents the descriptive statistics of the firm characteristics and table (6) in the appendix presents the descriptive statistics for the traditional firm characteristics before data winsorizing.

Table (4.6) Descriptive statistics for the traditional firm characteristics

Variable	N.	Mean	Std. Dev.	Min.	Max.
Tangibility	96	0.430431	0.244249	0.009832	0.984422
Profitability	96	-0.12887	1.346308	-12.1071	0.4762
Size	96	13.26686	1.932454	9.224441	16.46153
Growth	96	0.530994	0.289428	0.082191	1.210472

Results, for the year 2020 for a sample size of 96 firms, show that the average firm tangibility of assets is (0.437) and has a standard deviation of (0.244) with a very low minimum value of (0.009) and a maximum value of (0.984). Profitability ratio, proxied by return on equity, averages (-0.128) with a minimum value (-12.107), and a maximum profit achieved within the sample of (0.476) and a standard deviation (1.346).

The third variable is the firm size winsorized, averaging (13) as measured by the natural logarithm of sales, with a minimum value of (9.22) and a maximum of (16.46) and a standard deviation of (1.93). The fourth variable is the firm growth after being winsorized which is measured by the market to book ratio, averaging (0.530) with a minimum value of (0.082) and a maximum of (1.210) and a standard deviation of (0.289).

4.5.3. Managerial Demographics

The four main demographics under study are the manager´s age, gender, general educational level and marital status, these are the observable managerial characteristics. Table (4.7) below tabulates the four demographic variables.

Starting with the Age, which is a categorical variable, as (1) represents age (25-34) and only 10 CFO´s in the sample fall in this category, (2) represents the second age category which ranges (35-44) and this category accounts for approximately 34 percent of the sample, while the third category of age is between (45 to 64) years old and the majority of the sample fall in this age category accounting for almost 48 percent. The last category of age is for the CFOs aging (65 or above) and only 7 CFOs of

the sample fall in this category. The second demographic is the manager´s gender which is a binary variable and results show that most of the sample are male as they account for almost 86 percent of the sample and the rest are females showing that the males are dominant.

The general education level is the third demographic and it´s a categorical variable as well, given (1) representing no studies/primary studies; (2) represents high school; (3) represents a bachelor degree; and (4 and 5) represent master and PhD degrees. As shown in table (4.7), none of the CFOs fall in the first category, meaning that all of them have achieved more than the primary school level and only 1 of the CFOs have a high school degree as a maximum educational level achieved. More than half of the CFOs have a bachelor degree and this accounts for 59 percent of the sample; and following that, 33 percent of the CFOs have a master degree. Finally, only 6 CFOs have a PhD degree.

The last demographic variable under study is the CFO´s marital status measured by a binary system having 1 given to married CFOs and 0 to unmarried/single ones and results show that the majority of the sample are married accounting for 85 percent of the sample.

Table (4.7) Tabulating Managerial Demographics

	Variable	Freq	%	Cum.
Age	Age 25-34 (1)	10	10.42	10.42
	Age 35-44 (2)	33	34.38	44.79
	Age 45-64 (3)	46	47.92	92.71
	Age 65 or above (4)	7	7.29	100.00
Gender	Male (0)	83	86.46	86.46
	Female (1)	13	13.54	100.00
Education	No studies/Primary studies (1)	0	0	0
	High school (2)	1	1.04	1.04
	Bachelor degree (3)	57	59.38	60.42
	Master degree (4)	32	33.33	93.75
	PhD degree (5)	6	6.25	100.00
Marital Status	Un Married /Single (0)	14	14.58	14.58
	Married (1)	82	85.42	100.00

4.5.4. Behavioral Characteristics

Moving to the main independent variables, this study focuses on six behavioral characteristics which are optimism, overconfidence, illusion of control, loss aversion, herding and anchoring. The six

variables are measured using a 5 points Likert scale and table (4.8) below describes the variables using means, medians, and standard deviations to describe the scale.

Table (4.8) Descriptive Statistics for Managerial Behavioral Characteristics

Variable	N.	Mean	Med	Std. Dev	Min	Max
Optimism	96	3.6479	3.6	.6908	1.8	5
Overconfidence	96	3.8125	3.75	.6619	2	5
Illusion of control	96	3.5731	3.67	.6867	1.67	5
Loss aversion	96	3.4187	3.4	.4625	1.4	4.2
Herding	96	3.25	3	.7254	1.67	5
Anchoring	96	3.2526	3.25	.7951	1	5

Descriptive statistics report that the six behavioral characteristics under study average above (3) which means that the respondents answer mostly *agree* and *strongly agree* and therefore, on average, the CFOs tend to acquire these behavioral characteristics as their averages are above the mean value of the Likert scale. Moreover, the median values are all above (3) except for the herding characteristic which has a median score of (3). The minimum values range from (1 to 2) and the maximum values range from (4.2 to 5).

Tabulating each characteristic separately, CFOs tend to be optimistic as only 22 percent of the sample score (3 or below) on average on the Likert scale and the rest which are the majority score (above 3), having the highest percentages scoring on average (3.6, 3.8 and 4.00). Same applies for the overconfidence characteristic as only 12.5 percent of the sample score (3 or below) on average and the rest score (above 3) having the highest percentages scoring on average between (3.50 and 4.50). The illusion of control variable is scoring slightly higher for the scores (3 and below), however it´s 29 percent which is still less than half of the sample and the remaining score (above 3) with the highest percentage scoring (4.00) on average and this reflects that most of the sample acquire such behavior. The loss aversion phenomenon scores close to the optimism as 23 percent of the sample scored on average (3 or below) while the remaining scored (above 3) with the majority scoring on average (3.40 and 3.60).

Moving to the herd behavior, 53 percent of the respondents scored (3 or below) which means that the majority of the sample tend not to herd as almost 47 percent on average score (above 3) however, the percentage is close to 50 percent. Finally, 42 percent of the sample score on average (3 or below) for the anchoring bias which is a high percentage but still less than half of the sample and the

remaining score (above 3) on average, reflecting that most of the CFOs tend to anchor. Figure (4.1) is a bar chart that visualizes the response rates for each characteristic in terms of percentages of those who scored above the average of the Likert scale which is (3), and those who scored (3) or below.

Figure (4.1) Response rates to behavioral questions
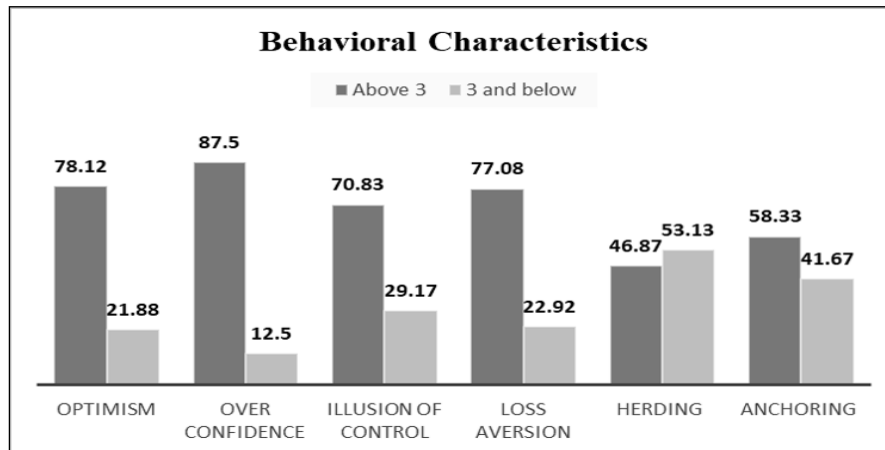
4.5.5. Personality Traits

Another independent variable under study is the personality traits of the manager. The personality traits used are the big five traits, measured by the 10 items inventory scale having 2 polars for each trait. Based on table (4.9) the average minimum values range from (1 to 2) and the average maximum values are (5). The five personality traits average (above 3) which means that on average, the CFOs tend to acquire these traits as their averages are above the mean value of the Likert scale. However, looking at the median values, two of the traits score (3) which reflects the existence of the trait however the probability of falling above or below is equal among the sample of the study.

Table (4.9) Descriptive Statistics for Managerial Personality traits

Variable	N.	Mean	Med.	Std. Dev.	Min	Max
Extraversion	96	3.1953	3	.8608	1	5
Conscientiousness	96	4.2291	4.5	.7323	2	5
Agreeableness	96	3.2968	3	.7311	1.5	5
Emotional Stability	96	3.5677	3.5	.8291	1.5	5
Openness	96	3.9375	4	.7548	1.5	5

Figure (4.2) tabulates each trait separately, most of the CFOs tend to be open to new experiences, emotionally stable and dependable and self-disciplined as the percentage of the sample scoring (above

80

3) for these traits are ranging on average from 70 to 90 percent and the remaining scored (3 and below). However, more than half of the sample report that they are reserved and critical, scoring (below 3) on average for extraversion and agreeableness traits.

Figure (4.2) Response rates to personality questions
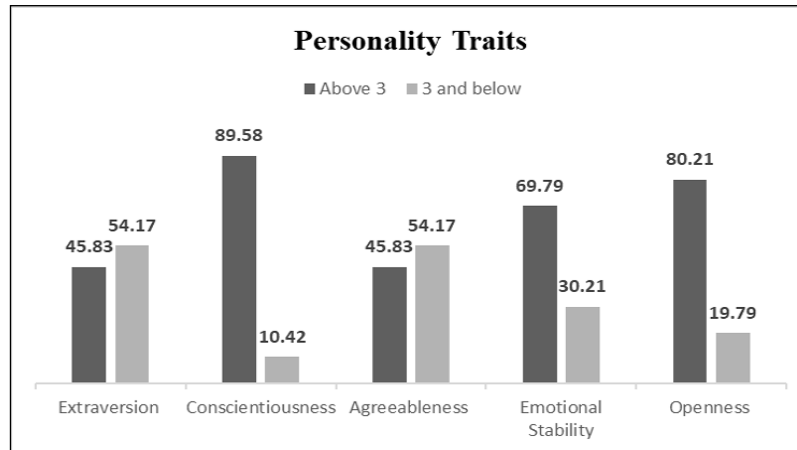
4.5.6. Financial Literacy

The study aims to test for the CFOs´ level of financial literacy by asking the big five questions for basic financial knowledge and the variable takes the value of one if the question is answered correctly and zero otherwise. Table (4.10) shows the minimum and maximum values which are (0 and 1) as it is proxied by a binary system, along with a standard deviation of (0.26), and the average value reported is (0.6) meaning that on average, the sample answered three questions correct out of the five questions.

Table (4.10) Descriptive Statistics for Financial Literacy

Variable	N.	Mean	Std. Dev.	Min.	Max.
Financial Literacy	96	. 675	. 2631	0	1

Looking closely at the five questions, the financial literacy variable is measured as an average of scores of the five questions asking about interest, inflation, diversification, mortgage, and bond. Figure (4.3) presents a bar chart that describes the data visually by reporting the response percentages for each of the five questions whether answered correctly or otherwise.

Almost 88 percent of the sample answered the question about interest rates correctly and 78 percent answered the inflation question correctly and this is very similar to the percentage who answered the diversification question correctly which is 76 percent of the sample. The mortgage question is answered correctly by only 56 percent of the sample, while the last question regarding the relation between interest rates and bond prices seems to be confusing for many respondents as less than half

of the sample, that is 40 percent only, answered it correctly.

Figure (4.3) Response rates to financial literacy questions
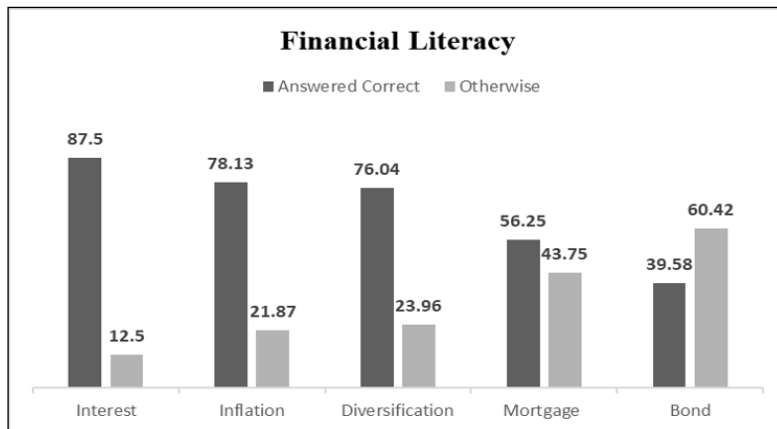
4.5.7. CFO Board Membership

This study aims to moderate for the CFO board membership to test whether being in a powerful position will have an impact on financial decisions. A binary system is used giving a value of one if the CFO is a member on the board and zero otherwise. Results reported that 11 out of the 96 CFOs are board members while the remaining 85 CFOs are not members on their firm's board, figure (4.4) below visualizes the result.

Figure (4.4) CFO Board Membership
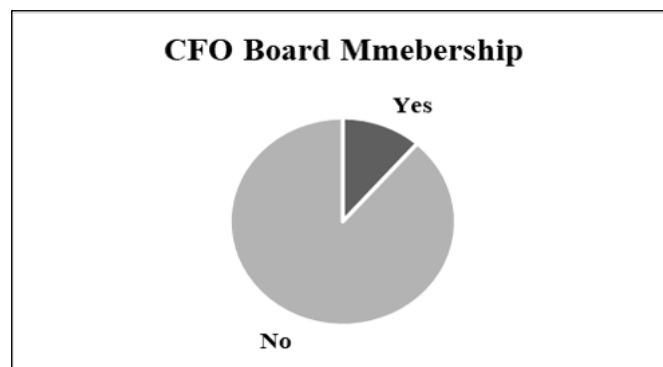
Moreover, the moderator variable is intercepted with the six behavioral characteristics, and table (4.11) below report the percentage of CFOs who are responding (above 3) for the Likert scale behavioral questions.

The percentages generally show that all CFOs whether on board or not exhibit behavioral characteristics however, when on board, almost all the CFOs exhibit all the behavioral characteristics. While the Non board members CFOs exhibit the behavioral characteristics with high percentages too, however low percentage exhibit the herd behavior and same applies when testing for the whole sample of CFOs.

Table (4.11) Percentage of CFOs exhibiting behavioral characteristics

Characteristic	% Of BM exhibiting biases	% Of Non-BM exhibiting biases	% Of all CFOs exhibiting biases
Optimism	90%	76%	78%
Overconfidence	90%	87%	88%
Illusion of control	64%	72%	71%
Loss aversion	90%	75%	77%
Herding	64%	46%	47%
Anchoring	55%	58%	58%
Number of CFOs	**11 on board**	**85 off board**	**96 total CFOs**

The coming subsection (4.5.8) divides the sample into levered and unlevered firms to explore the differences among them.

4.5.8. Debt Free versus Debt Firms

The unlevered firms in the sample are (23) firms as they are debt free in the study year, while the remaining (73) are debt firms. Table (4.12) differentiates between the average values for the variables along with some other ratios to differentiate between the debt free firms and the debt firms, in addition to the P-values to test for the difference significance.

The leverage decision is impacted by several determinants and Stiglitz and Weiss (1981) clarify that the determinants are grouped into two categories, the demand side versus the supply side, and both should be considered to understand the variation in leverage. This study explores the determinants from both sides to provide an explanation for the firms that went debt free in 2020. Firstly, exploring the constraints that might have existed in year 2020, it is generally witnessed that the Egyptian banking system facilitated the access to financing by setting several regulations, such as: (1) interest rates declined in 2020, from an average of 16.1% in 2019 to an average of 11.4% in 2020; (2) most of the firms did not apply for new loans, and reasoned this by their lack of need for a loan; (3) based on a survey by the world bank, firms perceived the access to finance as a minor or moderate obstacle; (4) The tax rate has been stable since 2016 till the time being; (5) the government allowed for deferring tax payments for the affected sectors during the pandemic.

This shows that from the supply side, the 23 debt free firms were probably not constrained to use debt as a source of finance, and therefore, the reason is mostly from the demand side. Hence, some ratios in addition to the main variables in this study are explored to reason such leverage decision.

Table (4.12) Debt vs Debt Free firms for the year 2020

	Debt Free	Debt	P-value
Tangibility	0.440433	0.42728	0.8232
Profitability	0.165117	-0.22149	0.2317
Size	12.36235	13.55185	**0.0093**
Growth	0.307825	0.601308	**0.0000**
Age	61% (45-64)	43% (45-64)	0.9950
Gender	91% (Male)	85% (Male)	0.4413
Educational level	61% (Bachelor)	59% (Bachelor)	0.7928
Marital status	87% (Married)	85% (Married)	0.8128
Optimism	3.530435	3.684931	0.3524
Overconfidence	3.782609	3.821918	0.8054
Illusion of control	3.493043	3.598356	0.5242
Loss aversion	3.46087	3.405479	0.6191
Herding	3.26087	3.246575	0.6928
Anchoring	3.043478	3.318493	0.1490
Extraversion	3.021739	3.25	0.2697
Conscientiousness	4.217391	4.232877	0.9301
Agreeableness	3.391304	3.267123	0.4804
Emotional stability	3.5	3.589041	0.6557
Openness	3.847826	3.965753	0.5164
Financial literacy	0.669565	0.676712	0.9103
TDR	0	0.412256	**0.0413**
WACC	-0.7505	-0.90903	0.2900
CAPEX	0.1268016	0.1274713	0.9853
OCF ratio	0.06403	0.005633	0.2369
FCF ratio	0.035836	-0.03078	0.1719
NI-FCF	-0.00764	0.067196	0.1438
Cash holding ratio	0.230606	0.118148	**0.0025**
Payout ratio	0.0742886	0.0209036	**0.0001**
Non debt tax shield	0.01746	0.02945	**0.0148**

Starting with the firm characteristics, debt free firms report a slightly higher average tangibility ratio than the debt firms with a ratio of (0. 4404) compared to (0. 4272). The average profitability ratio for the debt firm is a loss of (-0.2215) while the average profitability for the debt free firms is (0.165). Debt firms are slightly bigger in size than debt free firm in addition, they are reporting higher growth rate than the debt free firms having a growth ratio of (0.6013) as compared to (0.3078). Two of the firm characteristics have a significant difference between the two types of firms reporting a P-value of (0.0093) for the firms´ size and a P-value of (0.0000) for the firms´ growth rate.

Small firms are usually constrained to borrow as they are in a growing stage with no strong borrowing history and therefore, lenders might not be motivated to lend them. And therefore, such firms prefer equity to finance their activities and tend to become debt free, (Diamond, 1991). While the growth ratio tends to be negatively related to leverage, (Hadi and Suryanto, 2016). However, the Egyptian firms tend to have the opposite as the debt firms report a higher average growth ratio which could reflect their tendency to rely on external financing to achieve more growth.

Regarding the managerial demographics, the majority of the managers of the debt free firms exhibit the same demographics as the majority of the managers of the debt firms, as they all fall in the age category of 45-64, married, males and have a bachelor degree as their highest educational level. Therefore, both groups acquire the same managerial demographics, due to such similarities, the P-values reported are insignificant.

The average values of behavioral characteristics and personality traits are very similar in both groups, reflecting that all CFOs, despite the fact that the firm is debt free or not, exhibit the behavioral characteristics and personality traits under study. In addition, managers in debt firms and in debt free firms, have on average the same financial literacy level. And therefore, their P-values are insignificant. The main financial decisions as proxied by (TDR, WACC and CAPEX) report higher values for the debt firms, presenting a higher debt ratio and slightly higher investment ratio, however the average cost of capital for the debt free firms is slightly higher. The t test reported a significant difference for the TDR however, the WACCC and CAPEX are not significantly different among the two groups.

Following are some ratios for further exploration for the difference between the debt free and the debt firms, referenced from (Byoun and Xu, 2013), and these are: (1) the OCF ratio (operating cash flow ratio) and the FCF ratio (free cash flow), both ratios report a higher value for the debt free firms with values of (0.06 and 0.035) as compared to (0.005 and -0.0307), however the t-test reported insignificant P-value; (2) the cash flow deficit which is also insignificant; (3) the cash holding ratio, which is also higher in debt free firms (0.2306) as compared to (0.1181) and this difference is

statistically significant reporting P-value (0.0025); (4) the dividends payout ratio which shows that debt free firms pay more dividends than the debt firms, (0.39) compared to (0.26) and is also significant with a P-value (0.0001); (5) the last variable for comparison is the non-debt tax shield ratio which reported a significant P-value of (0.0148), reporting a higher average value for the debt firms (0.02945) as compared to debt free firms (0.01746).

Debt free firms are considered more constrained than debt firms and therefore tend to hold more cash as a precautionary saving technique to be protected from any future financial distress (Calomiris et al. 1995 and Almeida et al. 2011).

Firms usually control for the free cash flow by using debt or paying dividends, and especially firms with large profits as they tend to solve for the agency problem by paying out large amounts of dividends instead of using debt and therefore, going debt free (Fama and French, 2002 and DeAngelo and DeAngelo, 2007). In addition, paying large amounts of dividends helps the debt free firms to keep accessibility to the equity market. Debt firms report on average a higher non debt tax shield ratio and this could reflect that they have opportunity to raise debt to finance their investments (Dawood and Otaify, 2021).

Table (4.13) below, reflects the financing activity in the years before the debt free year (2020) to see the overall pattern by checking for the debt and equity ratios. The values reported show that the debt free firms tend to reduce their debt in the years prior to becoming debt free, and the debt ratio is very low along the years as compared to debt firms. In turn the debt free firms issue significantly more equity before the debt-free year, as compared to the debt firms that issue less equity and more debt.

Table (4.13) Financing Ratios

Source of financing		2019	2018	2019	**2020**	2021
Debt ratio	Debt free	0.006247	0.004766	0.003931	**0**	0.002215
	Debt	0.2835	0.31858	0.338562	**0.412256**	0.413449
Equity ratio	Debt free	0.678413	0.676015	0.68003	**0.700997**	0.665667
	Debt	0.380868	0.345805	0.318951	**0.228773**	0.237322

4.5.9. Other factors influencing financial decisions

This section provides a brief discussion for the responses received regarding the questions in Section D in the survey. The seven questions as presented in the prior chapter (section 3.3) and detailed response rates are reported in the appendix (tables 7-10).

For the first question (factors affecting the appropriate amount of debt), the most chosen factors are: Financial flexibility; The volatility of the firm´s earnings and cash flows; Firm´s credit rating; and the transactions costs and fees for issuing debt. The second question (factors affecting the decision of issuing foreign debt), the most chosen factors are: Foreign interest rates may be lower than domestic interest rates; N/A; and Natural hedge. This reflects that the firms mainly don't issue foreign debt however the main reason for issuing it would be to avoid risk and lower costs. The third question concerned with the financing decision (factors affecting the decision of issuing common stocks), reports that the common chosen factors are: Maintaining target debt-to-equity ratio; Cheapest source; Inability to obtain funds using other sources; and it gives investors a better impression.

Next, three other questions are concerned with the cost of capital decision, and responses show that managers in practice tend to depend on the traditional WACC in measuring the firms' cost of capital, and the majority use the CAPM for estimating the cost of equity. In addition, results report that the managers use data from comparable companies to estimate their cost of capital, figures (4.5-4.7).

Figure (4.5) WACC estimation
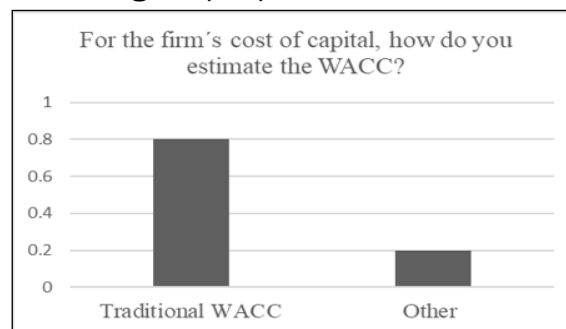
Figure (4.6) Cost of equity estimation   **Figure (4.7) Sign of herding**
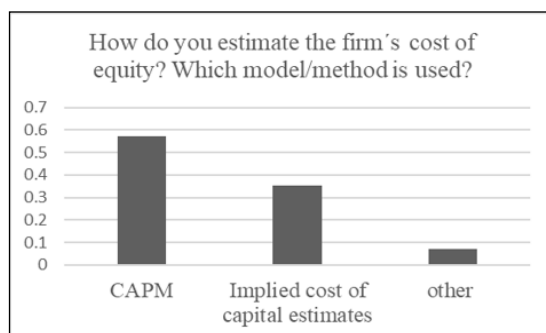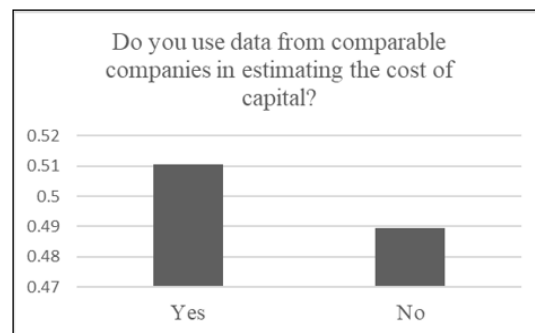
A final question was concerned with the impact of the pandemic on the firms, since the study is conducted in year 2020, the question was (Have financial market conditions (specifically the COVID-19) caused you to change the way you estimate and use the cost of capital? If so, how?) And responses show that the majority responded no, however those who responded yes, had several reasonings that are reported in table (10) in the appendix.

4.6. Conclusion

The primary objective of this research is to identify the behavioral characteristics that the CFO might incorporate and to examine the impact of such characteristics among other factors on different financial decisions, namely: the capital structure, the cost of capital and the investment decision. In addition to exploring the joint effect of the CFO board membership. Table (4.14) reported at the end of this section, summarizes the descriptive statistics of this study.

Conducting a survey in the context of behavioral corporate finance in a middle eastern market such as the Egyptian market is a rare thing, and this provides an edge for this study. The questionnaire used was first distributed to few CEOs and feedback was received upon which few adjustments were made such as the type of questions and the questionnaire length, aiming to have better validity and reliability. As a final version, the questionnaire is divided into four sections; section A collects some CFO demographic data; section B constituted of 5 points Likert scale questions that aim to test for the behavioral characteristics that CFOs might incorporate along with personality traits questions; section C presents the big 5 questions to test for the CFO's financial literacy and at last section (D) aims to gather few additional information such as how firms take their financial decisions and what are the measuring techniques used.

A main limitation that exists in this study is the inability to access all the needed managerial data for the Egyptian market due to non-availability of such data on databases and therefore, a primary data source is needed using a questionnaire. Thus, using a questionnaire presented some challenges in this study: (1) The chosen sample; Requiring managers (CEOs or CFOs) to respond to surveys is not easy as they are not always free and they are not easy to reach; (2) the survey responses are not anonymous as secondary data are needed to be linked with the primary data collected from each firm to further analyze assumptions and relationships, and that is sometimes a limitation as some firms might refuse to answer specially that the questionnaire has some questions related to the firm´s decisions that some managers might view as confidential information; (3) The length of the survey; the survey used for this study has four sections and therefore, time is needed to answer the overall questionnaire.

Therefore, using a questionnaire in the context of this study creates a limitation because despite having a good response rate, the final number of observations is low as the study is applied on one year only, and this is considered a statistical constrain, thus, it would have been better if the response rate was higher. The coming chapter is the results and discussion chapter which presents the main findings of the study and provides an interpretation to the findings reached.

Table (4.14) Summary of the descriptive statistics

Variable	Description
Capital Structure	21.5% (Average DR for the sample)
Cost of capital	-87% (Average WACC for the sample)
Investment	12.7% (Average CAPEX for the sample)
Tangibility ratio	42% of the sample are above the mean
Profitability ratio	84% of the sample are above the mean
Size	56% of the sample are above the mean
Growth ratio	50% of the sample are above the mean
Age	45-64 (48% of the sample)
Gender	Male (86% of the sample)
General education level	Bachelor degree (59% of the sample)
Marital status	Married (85% of the sample)
Optimism	78.12% score above 3
Overconfidence	87.5% score above 3
Illusion of control	70.8% score above 3
Loss aversion	77.08% score above 3
Herding	46.87% score above 3
Anchoring	58.33% score above 3
Extraversion	45.83% score above 3
Conscientiousness	89.58% score above 3
Agreeableness	45.83% score above 3
Emotional stability	69.79% score above 3
Openness	80.21% score above 3
Financial Literacy	Average achieved result is 0.6
CFO BM	Non board member (88% of the sample)
CFO BM*Optimism	90% of CFOs on board score above 3
CFO BM*Overconfidence	90% of CFOs on board score above 3
CFO BM*Illusion of control	64% of CFOs on board score above 3
CFO BM*Loss aversion	90% of CFOs on board score above 3
CFO BM*Herding	64% of CFOs on board score above 3
CFO BM*Anchoring	55% of CFOs on board score above

Chapter 5: Empirical Results and discussion

This chapter presents the findings of the study. The inferential statistics results are presented including correlation and regression. The aim in this section is to test for the research hypotheses to be able to answer the research questions. Thus, the study reports the findings of inferential statistics with its interpretation in section (5.1) including subsections and section (5.2) concludes this chapter.

This study follows the psychological and behavioral studies that consider the human errors and biases as normal acts. Thus, the main aim is to add to the existing literature by testing how biases could impact financial decisions in corporations, as studies in the context of corporate finance are limited and especially in a middle eastern country such as Egypt.

In the aim of achieving the purpose of this study, few research questions are proposed which are: *(1)* What is the impact of traditional variables on the firm´s financial decisions?; *(2)*Are behavioral characteristics identified among Egyptian CFOs?; *(3)* Are the CFO´s behavioral characteristics impacting the firm´s financial decisions?; *(4)* Are the CFO´s behavioral characteristics impacting the firm´s financial decisions, if the CFO is a board member; *(5)* Are the CFO´s personality traits impacting the firm´s financial decisions?; and finally *(6)* Is the CFO´s level of financial literacy impacting the firm´s financial decisions?.

5.1. Inferential Statistics

This study checks for the correlation among variables and then runs different regression models in the aim of revealing relationships to test for the hypotheses. The study has three main models as there are three dependent variables reflecting the main financial decisions under study which are: the capital structure decision (proxied by TDR), the cost of capital decision (proxied by WACC) and the investment decision (proxied by CAPEX). Further the study runs other types of analyses as robustness checks to mitigate for any statistical problems that may exist in the traditional regression model.

The following subsections are presented as follows: subsection (5.1.1) presents the correlation analysis; subsection (5.1.2) includes the regression results for the hierarchical regression; following are subsections (5.1.3 and 5.1.4) reporting the results for several other types of analyses for better exploration.

5.1.1. Correlation Analysis

The correlation analysis aims to address the multicollinearity problem through checking the relationship between dependent and independent variables as well as the independent variables among each other. In other words, it measures strength and direction between variables with a value range of -1 (perfect negative relation) to +1 (perfect positive relation), a value of zero indicates no

relationship between two variables. Pearson's correlation matrix is used, and it shows the degree of correlation between the independent variables which should not exceed (0.8) to prove that there is no multicollinearity problem among the variables (Bryman and Cramer, 1997and Soliman,2013).

In this study the correlation analysis results, table (5.1) below, reflect no multicollinearity problem as the correlation between all the variables is lower than (0.8) with the maximum positive correlation of (0.6312) between growth and capital structure (proxied by total debt ratio), which is still an acceptable value that indicates no correlation among the variables that are included in the model.

However, the moderator variable is highly correlated with its interception terms which is logic and expected. This means that the full model in the hierarchical regression faces multicollinearity problem while other models report no multicollinearity problem.

5.1.2. Regression results

As clarified before, this study has several independent variables which are: the six main behavioral characteristics; the personality traits and the financial literacy variable, moreover, the model also includes traditional predictors which are the firm characteristics and the managerial demographics. In addition, there is a moderator variable which is the CFO board membership, this variable moderates the relation between the behavioral characteristics and the financial decisions arguing that when CFOs have some power (proxied by being a member on board), their behavioral characteristics might come in act and impact the decisions taken.

Since 24 percent of the sample are debt free firms, Subsection (4.5.8) in chapter 4 presented the test of means to check for the statistical differences between the debt and the debt free firms. Although there is a difference in the firm characteristics and in other financial ratios, statistically only few factors presented a significant difference between the two types of firms and these are (firm size and growth, cash holding ratio, dividends payout ratio and the non-debt tax shield), noting that only the firm size and growth are among the main variables in this study, while the other ratios are additional factors to test for the difference between the debt firms and the debt free firms.

Clearly there are some differences between the debt free firms (23) and the debt firms (73), however, the significant differences are very few and the reported regression results in the appendix for the two groups, show that the determinants impacting the financial decisions are very similar for the two types of firms. In addition, the reported descriptive statistics for the 73 debt firms reflect similar percentages as compared to the 96 firms and most CFOs are not on board as well. However, the average of few variables changed after the exclusion, and these are: the TDR which increased on average by 0.2; the average profitability ratio which increased by 0.1; and the average growth ratio that increased by 0.07..

Table (5.1) Correlation analysis for all variables

	TDR	WACC	CAPEX	Tangibility	Profitability	Size	Growth	Age	Gender	Education level	Marital status	Optimism	Overconfidence	Illusion of control	Loss aversion	Herding	Anchoring	Extraversion	Conscientiousness	Agreeableness	Emotional stability	Openness	Financial literacy	CFO membership	CFOBM*Optimism	CFOBM*Overconfidence	CFOBM*Illusion of control	CFOBM*Loss aversion	CFOBM*Herding	CFOBM*Anchoring
TDR	1																													
WACC	0.1428	1																												
CAPEX	-0.032	-0.1625	1																											
Tangibility	0.0904	0.1833	-0.2549	1																										
Profitability	-0.3345	-0.2965	0.1706	-0.1597	1																									
Size	0.1257	-0.1012	0.1159	-0.2858	-0.103	1																								
Growth	0.6312	0.131	-0.1911	-0.211	-0.3052	0.249	1																							
Age	0.0116	0.0498	-0.1099	0.0484	-0.0517	0.1318	0.0271	1																						
Gender	0.077	-0.0701	-0.049	0.098	-0.0105	-0.0811	-0.0341	-0.422	1																					
Education level	-0.0383	-0.0711	-0.0112	-0.1863	0.0987	-0.0494	0.0043	-0.0085	-0.0885	1																				
Marital status	-0.1508	0.0432	-0.1398	-0.0096	0.0004	0.0778	0.02	0.4669	-0.5265	-0.0343	1																			
Optimism	0.0067	-0.1366	-0.0162	-0.1837	-0.0086	-0.0979	0.0921	0.0391	0.1053	-0.016	0.0116	1																		
Overconfidence	0.1522	-0.1488	0.0523	-0.2092	-0.0216	0.0265	0.0665	0.196	-0.1069	0.2413	0.1177	0.2247	1																	
Illusion of control	0.0896	-0.0611	0.031	-0.0163	-0.0405	-0.084	-0.0548	0.0134	-0.0638	0.0518	0.1734	0.2367	0.53	1																
Loss aversion	0.1316	0.0874	-0.1192	0.1397	-0.1416	-0.0335	0.1026	0.0717	-0.0161	-0.0869	-0.0216	0.2488	0.1577	0.1222	1															
Herding	0.128	-0.0508	-0.0193	0.1628	-0.2196	-0.1133	0.081	0.0063	0.0083	0.0239	-0.075	0.1929	0.3799	0.1787	0.2368	1														
Anchoring	0.1379	0.0414	0.0571	-0.1065	-0.0767	0.0387	0.2665	0.1289	-0.108	-0.0368	0.104	0.2441	0.1747	0.0343	0.2117	0.2346	1													
Extraversion	0.1827	0.236	-0.0981	-0.1191	-0.122	0.0431	-0.0294	0.2216	-0.1454	0.0375	0.0895	0.2818	0.0234	0.0817	0.0819	-0.1408	-0.144	1												
Conscientiousness	0.0244	-0.035	-0.0366	-0.0523	-0.0376	-0.0007	0.0549	0.0305	0.0687	-0.0061	-0.0951	-0.0201	0.4831	0.2206	0.2482	0.208	0.1097	0.091	1											
Agreeableness	-0.0735	-0.0395	-0.131	-0.0462	-0.0376	-0.0007	0.0549	0.0305	0.0687	-0.0061	-0.0951	-0.0201	-0.1747	-0.1322	-0.0073	-0.0124	-0.205	-0.1663	0.0485	1										
Emotional stability	-0.0692	0.024	-0.1427	-0.228	-0.0239	0.0424	0.0525	0.1156	0.0229	0.1025	0.1055	0.2332	0.2487	0.2976	0.136	0.1466	0.0456	-0.1902	0.4075	-0.0292	1									
Openness	0.0092	-0.1731	-0.0783	-0.1543	-0.0288	-0.0923	-0.0585	0.1629	-0.109	0.192	0.0246	0.1471	0.2976	0.2696	0.136	0.0352	0.1274	-0.0033	0.3546	-0.0471	0.909	1								
Financial literacy	-0.1069	0.0555	0.1413	-0.1685	-0.0034	-0.0476	-0.0165	0.023	-0.0669	0.0365	0.0733	0.1028	0.3505	0.2723	-0.067	0.0184	0.0072	-0.0212	0.1829	0.0581	-0.0187	0.2464	1							
CFO membership	0.0574	-0.1424	-0.061	-0.1229	0.0578	0.0802	0.0858	-0.1149	-0.0468	0.1081	0.056	0.0701	0.0528	-0.0304	0.0991	0.0717	0.0362	-0.1584	-0.0234	0.1229	0.1291	0.0735	-0.0531	1						
CFOBM*Optimism	0.049	-0.1635	-0.0634	-0.1685	0.0578	0.0997	0.089	-0.1398	-0.0259	0.1254	0.0648	0.0979	0.0397	-0.0371	0.1018	0.0666	0.0413	-0.1265	-0.0239	0.128	0.1184	0.0754	-0.0695	0.9919	1					
CFOBM*Overconfidence	0.0706	-0.1376	-0.0683	-0.1229	0.0557	0.0743	0.0748	-0.1053	-0.0561	0.1317	0.0473	0.0576	0.0981	0.0066	0.1095	0.105	0.0401	-0.1896	0.0002	0.1262	0.1449	0.097	-0.0529	0.9879	0.9734	1				
CFOBM*Illusion of control	0.0777	-0.1304	-0.066	-0.114	0.0534	0.0821	0.0805	-0.0838	-0.0595	0.1262	0.0766	0.0612	0.0935	0.0396	0.0966	0.1026	0.0401	-0.1672	0.008	0.1319	0.1478	0.1163	-0.0731	0.9791	0.967	0.9891	1			
CFOBM*Loss aversion	0.0546	-0.1535	-0.0671	-0.1513	0.0588	0.0874	0.0856	-0.1195	-0.0398	0.1074	0.0439	0.0723	0.0615	-0.0305	0.1195	0.0821	0.0435	-0.1707	-0.0118	0.341	0.1332	0.0849	-0.0465	0.9958	0.9891	0.9984	0.9748	1		
CFOBM*Herding	0.0908	-0.1423	-0.0649	-0.1244	0.0574	0.0868	0.0808	-0.1305	-0.0565	0.1292	0.0296	0.0631	0.0941	0.0056	0.1138	0.1419	0.0494	-0.1936	0.0036	0.1326	0.1327	0.0814	-0.0527	0.9763	0.9654	0.9867	0.9769	0.9791	1	
CFOBM*Anchoring	0.0441	-0.1363	-0.0713	-0.1255	0.0589	0.0645	0.0711	-0.111	-0.049	0.1167	0.0511	0.0648	0.0546	-0.0292	0.1046	0.0826	0.0632	-0.1819	-0.0089	0.1329	0.1457	0.0781	-0.0243	0.9913	0.9807	0.9805	0.9712	0.9897	0.9753	1

Table (5.1) Correlation analysis for all variables

Due to the similarities, the analysis is carried on the full sample (96 firms) as the reported significant differences are very few, however the regression results using two samples (23 debt free firms versus 73 debt firms) are reported in the appendix, tables (11-16).

Table (11) in the appendix presents the logit regression and results show that the model presents goodness of fit as the P value reported is (0.9276) which is greater than. (0.05), and few variables reported significance, which are (firm growth, size, overconfidence, illusion of control and the interaction of CFO BM with overconfidence and anchoring).

Table (12) presents the logit regression using the factors that reported significance in the test of mean that is presented in subsection (4.5.8) and these factors are (size, growth, cash holding, non-debt tax shield and dividends payout ratio), result of the logit regression report three significant variables, two of which are already in the main model of the study which are firm size and growth, while the third significant factor is the non-debt tax shield. The reported P value is (0.4134) which presents the model´s goodness of fit.

Tables (13 and 14) present the hierarchical regression using the WACC as the dependent variable, applied for the debt free firms and for the debt firms separately and results show that generally, different variables under study impacts the cost of capital decision and common factors are significant whether the firm is debt free or debt.

While tables (15 and 16) present the hierarchical regression using the CAPEX as the dependent variable, applied for the debt free firms and for the debt firms separately and results show that only three variables from the group of determinants are impacting the investment decision, the growth variable is a common factor between the debt free and debt firms.

Moving to the results of the main sample (96), the hierarchical regression includes four regressions for each decision, models 1A-4A use the capital structure as the dependent variable while models 1B-4B are a replication for the models but using the cost of capital as the dependent variable and finally, models 1C-4C use the investment as the dependent variable. Robust standard errors are reported to control for the heteroskedasticity problem. The hierarchical multiple regression is considered a framework for model comparison, and it controls for how the predictors are added to the regression model (Abdeldayem and Sedeek, 2018). The aim of such type of regression is to run multiple regression models in an orderly manner by adding variables in each step for comparison, to be able to test for the impact of the added variables to the model.

This type of regression matches the aim of this study as the intention is to test for the traditional model separately and then adding other variables that are argued to have an impact on the financial decisions

to test their explanatory power. Results of the hierarchical regression, using the three dependent variables, are reported in tables (5.2, 5.3 and 5.4).

In this study, the hierarchical regression tests at first for the traditional variables only, secondly other predictors are added to test for their relative contribution. The first and second models in each regression include the traditional factors only that are commonly used as financial decision determinants, and studies on the Egyptian market have shown the importance of such determinants, and this includes the four firm characteristics (tangibility, profitability, size, and growth) in addition to the four managerial observable demographics (age, gender, general education level and marital status).

Following, the results from the survey show that CFOs exhibit behavioral characteristics and therefore, they are included in the next step by including them along with other factors (behavioral characteristics, personality traits, financial literacy, and CFO board membership with its interceptions with the behavioral characteristics), and these additions are shown in the third and fourth models.

The hierarchical regression results are now presented in subsections (5.1.2.1, 5.1.2.2 and 5.1.2.3), for the three financial decisions under study for the full sample.

5.1.2.1. Capital Structure Decision

Table (5.2) reported below presents the results of the hierarchical regression model using capital structure as the dependent variable. The firm characteristics are first included in the model, presented in the first column (model 1A) and following are the managerial demographics included in the second column (model 2A), these two models test for the impact of traditional factors on the firm´s capital structure decision.

Regressing on the firm characteristics only report an R squared of 46 percent. Moreover, adding the managerial demographics to the model raised the R squared slightly to 49 percent, which means that the traditional variables (firm characteristics and managerial demographics) explain the variation in the capital structure by 49 percent which is considered a good explanatory power compared to other studies such as those by (Frank and Goyal, 2009 and Allini et al. 2018), however more variables could be added and explored and this is what is done in the hierarchical regression.

For the data set under study, results show that three of the firm characteristics have a significant impact on the firm´s capital structure, these are: tangibility, profitability, and growth, while only one managerial demographic is significant and that is the marital status of the respondents.

Table (5.2) Models (1A-4A) Hierarchical regression using TDR

Robust standard errors in parentheses

VARIABLES	Model 1A	Model 2A	Model 3A	Model 4A
Tangibility	0.195***	0.193**	0.179**	0.192**
	(0.0726)	(0.0735)	(0.0826)	(0.0946)
Profitability	-0.0170**	-0.0164**	-0.0139**	-0.0139*
	(0.00785)	(0.00762)	(0.00633)	(0.00697)
Size	0.00192	0.00261	0.00390	0.00256
	(0.00878)	(0.00874)	(0.00874)	(0.00948)
Growth	0.493***	0.494***	0.505***	0.494***
	(0.0871)	(0.0846)	(0.0874)	(0.0930)
Age		0.0194	0.0200	0.0306
		(0.0248)	(0.0277)	(0.0305)
Gender		0.00487	0.0153	0.0408
		(0.0411)	(0.0505)	(0.0558)
Education level		0.00137	-0.0109	-0.0101
		(0.0326)	(0.0316)	(0.0339)
Marital status		-0.120**	-0.129**	-0.127*
		(0.0513)	(0.0615)	(0.0739)
Optimism			-0.0201	-0.0235
			(0.0311)	(0.0343)
Overconfidence			0.0413	0.0341
			(0.0419)	(0.0471)
Illusion of control			0.0340	0.0354
			(0.0346)	(0.0390)
Loss aversion			-0.0253	-0.0218
			(0.0405)	(0.0436)
Herding			0.0334	0.0224
			(0.0291)	(0.0314)
Anchoring			0.0101	0.0135
			(0.0244)	(0.0268)

Extraversion			0.00506	0.00945
			(0.0253)	(0.0273)
Conscientiousness			0.0117	0.0160
			(0.0354)	(0.0383)
Agreeableness			-0.0196	-0.0199
			(0.0253)	(0.0290)
Emotional stability			-0.0353	-0.0323
			(0.0251)	(0.0273)
Openness			0.00816	0.00954
			(0.0252)	(0.0287)
Financial literacy			-0.102	-0.0778
			(0.0709)	(0.0857)
CFO BM				**1.022***
				(0.605)
CFO BM*Optimism				-0.0383
				(0.100)
CFO BM*Overconfidence				-0.0536
				(0.0915)
CFO BM*Illusion of control				-0.0413
				(0.0768)
CFO BM*Loss aversion				**-0.163***
				(0.0886)
CFO BM*Herding				**0.163****
				(0.0671)
CFO BM*Anchoring				-0.130
				(0.0867)
Constant	-0.158	-0.119	-0.188	-0.227
	(0.130)	(0.174)	(0.287)	(0.337)
Observations	96	96	96	96
R-squared	**0.460**	**0.490**	**0.571**	**0.595**

Starting with the firm characteristics (model 1A), the Firm tangibility level is significant at a P-value of (0.01) and it is positively related to the firm´s leverage with a coefficient of (0.195), reflecting that the total debt ratio will increase by (0.195) for every one-unit increase in the firm´s tangibility. The positive relation between tangibility and capital structure implies that tangible assets are important in the Egyptian context, as they can be used as collateral to help to overcome information problems and attract debt financing. This positive result is consistent with (Booth et al. 2001; Baker and Wurgler, 2002; Frank and Goyal, 2003; Chen, 2004; De Jong et al. 2008 and Aliini et al.2018) among others. The profitability variable is also significant, at a P-value of (0.05); however, it reports a negative relation with a coefficient value (-0.0170) reflecting that when a firm´s Profitability ratio increases the firm`s debt ratio decreases. The negative relation is to avoid the cost of external financing and so profitable firms might tend to resort less to external financing as explained by (Donaldson, 1963 and Higgins, 1977), cited in (Pao, 2008). The result is in conformity with (Booth et al. 2001; Baker and Wurgler, 2002; Frank and Goyal, 2003; De Jong et al. 2008 and Aliini et al. 2018). The consistency of the results with prior studies strengthens the importance of the chosen characteristics.

The third highly significant firm characteristic at a P-value of (0.01) is the firm´s growth reporting a positive relation indicating that when growth rate increases, the reliance on debt increases with a coefficient of (0.493). The positive relation reflects that a growing firm will tend to use debt to finance any project, and this goes in conformity with the pecking order theory and the result is consistent with the work of (Omet and Mashharawe, 2002; Chen, 2004; and Sakr and Bedeir, 2019). Other studies exist that oppose this result stating that firms with potential growth tend to be risky and thus raising fund is not easy leading to a negative relation between growth and debt (Myers, 1977 and Eriotis et al. 2007).

Moving to the managerial demographics, only the marital status variable reports a significant relation at a P-value of (0.05) with a coefficient of (-0.120) meaning that a married CFO tends to rely less on debt than the nonmarried/single CFOs. This result opposes the opinion of (Bertocchi et al. 2008) which states that married managers tend to take riskier decisions than single ones, however it is in conformity with (Roussanov and Savor, 2014) who provide explanations for why single managers may be aggressive in their decisions by stating that single managers can tolerate risk more than married managers at the same age group, and this reflects that marital status impacts the risk-taking behavior of an individual.

The other variables (Firm size and CFO´s Age, gender, and education) reported statistically insignificant results with a direct relation with firm´s leverage.

Following, in the aim of testing behavioral theories and to add to the traditional models, the analysis starts including some behavioral factors along with other variables in a hierarchical order, arguing that behavioral determinants are important to explain the variation in the financial decisions, and the results are presented in models (3A and 4A).

Model (3A) adds the behavioral characteristics to the regression model along with the personality traits and the financial literacy variable, and none of these added variables resulted in a significant relation with the capital structure decision. However, model (4A) supports one of the assumptions of this study that the behavioral characteristics can impact the decision, only when the CFO is in a controlling position.

Results report a positive coefficient for the CFO board membership (1.022) at a P-value (0.1) and two of the behavioral characteristics are significantly impacting the capital structure decision when intercepted with the CFO board membership variable and these are: the loss aversion and herding behaviors. The positive coefficient reflects that the CFO being on board affects the debt choice strongly, and this positive relation means that a CFO who is a board member tends to increase the usage of debt. This result could be supported by the idea of lowering the cash holding level through using debt. This is consistent with (Mobbs, 2018) who finds that firms that have CFOs as board members tend to have lower cash holdings, and further using debt is one of the decisions taken to reduce the free cash available (Fama and French, 2002 and DeAngelo and DeAngelo, 2007).

The two behavioral characteristics report significant coefficients, with a low significance level for the loss aversion interception with a P value (0.1) while the interception with the herd behavior has a moderate significance level with a P value of (0.05). The interception with loss aversion reports a negative coefficient (-0.163) which means that a CFO who is loss averse and a member on board will tend to depend less on debt. This finding is consistent with (Kim and Nguyen, 2022) who find that firms with managers who have greater loss aversion level are less likely to use debt financing.

This is supported in prior literature as loss averse managers tend to be conservative by avoiding any risky decision that threats their status quo and therefore, the negative coefficient is supported as CFOs in the sample who are board members and acquire the loss aversion trait will tend to avoid risks by depending less on external financing such as debt. Schütte and Wichardt (2013), report that loss averse managers try to secure their position thus they provide no incentives for their subordinates to take risky decisions. However, other study by (Graham et al. 2013) reports a positive relation, stating that loss-averse executives tend to incur higher debt levels to keep projects alive that would otherwise become obsolete.

While on the other hand, the herding interception with CFO membership reports a positive coefficient (0.163) meaning that a CFO who is on board and acquires the herding behavior will tend to depend more on debt. This finding could be supported by the results of a study by (Ahmed et al. 2022), that herding bias has a direct association with risk perception, and (Metawa et al. 2018) add that herd behavior may encourage investors to take excessive risks. And this reflects that risk is assumed when others are taking a similar decision.

One of the justifications for the herd behavior is the information cascade, managers can some time ignore existing information and prefer to mimic other managers to protect their reputation, career and to avoid individual blame, (Devenow and Welch, 1996 and Hirshleifer and Hong Teoh, 2003). Another reason to herd might be the immaturity of the Egyptian market where there is no information reliability and therefore, decision makers tend to consider others as their reference (Le Luong and Thi Thu Ha, 2011), and this is also confirmed given the situation in year 2020 as uncertainty level was high due to the covid-19 pandemic. In addition, the same traditional factors (tangibility, profitability, growth, and marital status) are reported in models (3A and 4A) with very similar coefficients and with slight differences in the significance level.

5.1.2.2. Cost of Capital Decision

Next, this subsection replicates the same regression model but this time using the second dependent variable which is the cost of capital, proxied by WACC. Model (1B) in table (5.3) below, reports that only one of the firm characteristics have a significant impact on the firm´s cost of capital, that is the firm profitability, reporting a negative coefficient (-0.116) at a P-value (0.01), meaning that when profitability increases by one unit, the cost of capital decreases by (0.116). This goes in accordance with the capital structure result confirming what is explained by (Donaldson, 1963 and Higgins,1977) that a profitable firm will tend to depend less on external sources of finance to avoid costs and so the cost of capital will decrease.

Adding the managerial demographics in model (2B) reports no significant impact and the profitability variable remains the only significant variable with almost the same coefficient and significance. The R-squared value of the first model is (0.126) and it increased to (0.136) and this reflects that the variation in the cost of capital is explained by the variation of the traditional factors under study by only 13.6 percent. Following, model (3B) includes other factors and results reflect that some of the added factors do have an impact on the cost of capital decision, and these include: two behavioral characteristics, two personality traits and the financial literacy variable. This addition increased the R squared to 30.5 percent reflecting the importance of the added factors. The behavioral characteristics

reflect that both optimism and overconfidence negatively impacting the cost of capital with coefficients (-0.169) and (-0.247) at a low P-value of (0.1). While the extraversion trait reported a positive coefficient of (0.193) and the openness trait reported a negative coefficient of (-0.177), both at a P-value (0.05). And the financial literacy variable is significant at a P-value (0.05) with a positive coefficient of (0.540).

The negative coefficient of optimism reflect that optimistic managers tend to lower their firms cost of capital. As Optimistic CFOs tend to lower their firm's cost of capital by avoiding external long-term sources of finance, another opinion confirming the negative relation is that optimistic managers are granted a loan more easily, with better conditions, cited in (Meier and Esmatyar, 2016). Furthermore, the negative overconfidence coefficient reflects that managerial overconfidence is considered as an effort to increase the firm value and more tendency for better disclosure and thus outsiders perceive a low business risk and information risk leading to a decrease in cost of equity capital (Hirshleifer et al. 2012 and Aghazadeh et al. 2018).

Openness to experience trait reports a negative coefficient which reflects that Egyptian CFOs who are open to experiences will tend to lower the firm´s cost of capital. This result opposes the explanation provided by (Daskalakis et al. 2011) who state that CEOs who are open to new experiences tend to issue new equity whenever the stock price is relatively high, and this might lead to higher cost of capital. The positive extraversion coefficient reflects that a firm with an extraverted CFO will tend to have a high cost of capital, following (Adebambo et al. 2018) the positive coefficient between extraversion and the cost of capital is justified by the tendency of extraverted CFOs to take risks and have lower credit rating and therefore, the cost of capital increases. Other opinion exists, that contradicts this positive relation, arguing that extraverted managers are social and intend to enhance the information environment of the firm through the engagement with their firm´s stakeholders and therefore, increasing awareness, this results in an efficient risk sharing which consequently lowers the cost of equity (Merton, 1987, cited in Adebambo et al. 2018).

Financial literacy reported a high positive coefficient reflecting that financially literate CFOs in the Egyptian market, tend to increase the firm´s cost of capital. This result is opposing to what is reported by (Lusardi and Mitchell, 2007 and Lusardi and Tufano, 2009), who state that financial literate individuals plan better and have more funds for investment and tend to borrow at lower costs.

To moderate for the CFO board membership, model (4B) includes the moderator variable with its interceptions however none of the added variables reported significant coefficients and only three variables in the full model report a significant impact on the cost of capital decision and these are the

firm profitability, the extraversion trait, and the financial literacy variable.

Table (5.3) Models (1B-4B) Hierarchical regression using WACC

Robust standard errors in parentheses

VARIABLES	Model 1B	Model 2B	Model 3B	Model 4B
Tangibility	0.337	0.336	0.215	0.163
	(0.242)	(0.252)	(0.332)	(0.373)
Profitability	**-0.116***	**-0.115***	**-0.115***	**-0.116***
	(0.0371)	(0.0389)	(0.0275)	(0.0281)
Size	-0.0375	-0.0406	-0.0451	-0.0341
	(0.0245)	(0.0254)	(0.0273)	(0.0320)
Growth	0.242	0.241	0.0917	0.0431
	(0.278)	(0.281)	(0.279)	(0.281)
Age		0.00355	0.0650	0.00449
		(0.0816)	(0.0756)	(0.0925)
Gender		-0.168	-0.155	-0.0976
		(0.244)	(0.234)	(0.246)
Education level		-0.0358	0.0404	0.0640
		(0.104)	(0.0936)	(0.113)
Marital status		-0.00099	-0.139	-0.0367
		(0.247)	(0.249)	(0.285)
Optimism			**-0.169***	-0.118
			(0.0984)	(0.105)
Overconfidence			**-0.247***	-0.248
			(0.142)	(0.158)
Illusion of control			0.0591	-0.0109
			(0.119)	(0.129)
Loss aversion			0.139	0.188
			(0.120)	(0.137)
Herding			0.0370	0.0257
			(0.0870)	(0.0999)
Anchoring			0.0337	0.0317

			(0.108)	(0.114)
Extraversion			**0.193****	**0.212****
			(0.0866)	(0.102)
Conscientiousness			-0.0178	-0.0230
			(0.136)	(0.144)
Agreeableness			-0.0408	-0.0278
			(0.0962)	(0.105)
Emotional stability			0.150	0.137
			(0.102)	(0.110)
Openness			**-0.177****	-0.169
			(0.0881)	(0.103)
Financial literacy			**0.540****	**0.568***
			(0.242)	(0.300)
CFO BM				2.386
				(2.104)
CFO BM*Optimism				-0.568
				(0.388)
CFO BM*Overconfidence				0.0341
				(0.275)
CFO BM*Illusion of control				0.287
				(0.289)
CFO BM*Loss aversion				-0.328
				(0.318)
CFO BM*Herding				0.0376
				(0.269)
CFO BM*Anchoring				-0.136
				(0.299)
Constant	-0.664	-0.483	-0.558	-0.814
	(0.407)	(0.689)	(1.003)	(1.303)
Observations	96	96	96	96
R-squared	**0.126**	**0.136**	**0.305**	**0.339**

5.1.2.2. Investment Decision

The third decision under study is the investment decision and the regression results are reported in table (5.4) below. Following the same sequence, model (1C) includes the firm characteristics only and results report that only two of the firm characteristics have a significant impact on the firm´s investments, these are the firm´s tangibility and growth, reporting negative coefficients (-0.165) and (-0.134) at a P-value (0.01), meaning that when tangibility and growth ratios of the firm increase by one unit, the investment level decreases.

Almeida and Campello (2007) find that for financially constrained firms, asset tangibility increases borrowing from external sources and thus increasing investment, however this opposes the results reached by this study as firms with high tangibility tend to reduce investment and this could reflect the no tendency to invest during the year of study, in addition that the average debt ratio reported is low. Hackbarth (2008) refer that firms with growth perception perceive external financing to be expensive, thus depending on internal sources and this might lower the investment level.

Adding the managerial demographics in model (2C) reports that the marital status is negatively significant at a low P-value (0.1) with a coefficient (-0.0851), reflecting that a married CFO will invest less which is consistent with the findings of Roussanov and Savor (2014). While the firm´s tangibility and growth remain significant too. R-squared value of the first model is (0.14) and it increased to (0.186), meaning that the variation in the investment is explained by the variation of the traditional factors under study by only 18.6 percent.

Following are models (3C and 4C), none of the added factors report a significant relation with the investment decision. However, the profitability ratio is positively significant with the investment decision, in the third and fourth models in the hierarchical regression. Profitable firms tend to have higher levels of investments, and this justifies the reported positive coefficient, as suggested by Pacheco (2017). In addition, in the full model, the gender reported a negative significant coefficient of (-0.0816) at a low P-value (0.1), reflecting that female CFOs tend to invest less as well, as they are more risk averse than males, leading them to choose more conservative investments as female investors tend to display less confidence in their investment decisions (Arti et al. 2011 and Phan, 2021).

This reflects that under the hierarchical regression, only the traditional factors seem to have an impact on the investment decision.

Table (5.4) Models (1C-4C) Hierarchical regression using CAPEX

Robust standard errors in parentheses

VARIABLES	Model 1C	Model 2C	Model 3C	Model 4C
Tangibility	**-0.165***	**-0.161***	**-0.185***	**-0.181**
	(0.0583)	(0.0581)	(0.0670)	(0.0769)
Profitability	0.00681	0.00735	**0.0106***	**0.0112***
	(0.00421)	(0.00452)	(0.00597)	(0.00662)
Size	0.00853	0.00938	0.00887	0.00801
	(0.00595)	(0.00595)	(0.00659)	(0.00865)
Growth	**-0.134***	**-0.133***	**-0.121**	**-0.121**
	(0.0435)	(0.0424)	(0.0498)	(0.0535)
Age		-0.0157	-0.000281	-0.00331
		(0.0261)	(0.0252)	(0.0323)
Gender		-0.0739	-0.0659	**-0.0816***
		(0.0446)	(0.0461)	(0.0466)
Education level		-0.0195	-0.0161	-0.0160
		(0.0215)	(0.0247)	(0.0301)
Marital status		**-0.0851***	**-0.111**	**-0.127**
		(0.0499)	(0.0519)	(0.0582)
Optimism			-0.00639	-0.00798
			(0.0243)	(0.0286)
Overconfidence			0.000355	0.00481
			(0.0396)	(0.0414)
Illusion of control			0.0168	0.00594
			(0.0338)	(0.0376)
Loss aversion			-0.0178	-0.00555
			(0.0405)	(0.0424)
Herding			-0.0116	-0.0110
			(0.0302)	(0.0348)
Anchoring			0.0363	0.0373
			(0.0264)	(0.0284)

Extraversion			-0.0127	-0.0197
			(0.0227)	(0.0246)
Conscientiousness			0.00978	0.00854
			(0.0385)	(0.0400)
Agreeableness			-0.0265	-0.0274
			(0.0259)	(0.0275)
Emotional stability			-0.0214	-0.0192
			(0.0199)	(0.0213)
Openness			-0.0305	-0.0360
			(0.0217)	(0.0240)
Financial literacy			0.0445	0.0774
			(0.0723)	(0.0811)
CFO BM				0.139
				(0.739)
CFO BM*Optimism				0.0396
				(0.111)
CFO BM*Overconfidence				-0.0704
				(0.103)
CFO BM*Illusion of control				0.121
				(0.0967)
CFO BM*Loss aversion				-0.0345
				(0.111)
CFO BM*Herding				-0.0232
				(0.0621)
CFO BM*Anchoring				-0.0789
				(0.0972)
Constant	0.157	0.333**	0.510**	0.549*
	(0.0982)	(0.150)	(0.243)	(0.309)
Observations	96	96	96	96
R-squared	**0.140**	**0.186**	**0.276**	**0.301**

Concluding the results, despite the different significance levels of some variables only few of the added variables to the models show significant impact on the firm´s financial decisions. However, the R squared increases as each group of variables is added and this reflects that the added variables add to the explanatory power of the model showing that they could explain the change in the dependent variable, even though most of them are insignificant. Additionally, results reflect that traditional determinants are not enough to explain the variation in financial decisions, especially the capital structure and the cost of capital decisions.

Table (5.5) below reports the R squared and the change in R squared for the models reported, and the values show that the added variables add to the explanatory power of the model, which reflects that the variables included have a degree of importance and should be considered.

Table (5.5) Changes in R squared

Dependent Variable	Model	R2	Change in R2
Capital structure	1A	0.4603	
	2A	0.4904	0.0301
	3A	0.5707	0.0803
	4A	0.5954	0.0247
Cost of capital	1B	0.1263	
	2B	0.1360	0.0097
	3B	0.3045	0.1685
	4B	0.3392	0.0347
Investment	1B	0.1403	
	2B	0.1864	0.0461
	3B	0.2758	0.0893
	4B	0.3013	0.0256

For the capital structure decision, the traditional factors reported an explanatory power of 49 percent, while having a full model that includes all the variables under study, reported an explanatory power of approximately 60 percent. While the cost of capital decision is explained by only 13.6 percent when considering the traditional factors, however the explanatory power increases to approximately 34 percent when other factors are considered. And same applies for the investment decision as the traditional factors report an explanatory power of 14 percent only, however the R squared rises to 30 percent when other factors are included.

After running the regression, an additional check for the multicollinearity problem is conducted, which is the variance inflation factor (VIF), table (5.6).

Table (5.6) VIF result for all the variables

Variable	VIF	1/VIF
Overconfidence	2.73	0.366066
Conscientiousness	2.03	0.492264
Marital status	1.84	0.544753
Illusion of control	1.83	0.5455
Age	1.72	0.583051
Gender	1.67	0.599222
Tangibility	1.65	0.60467
Emotional stability	1.56	0.642926
Anchoring	1.51	0.660971
Extraversion	1.49	0.67234
Optimism	1.48	0.67388
Growth	1.45	0.68948
Herding	1.4	0.713539
Openness	1.39	0.718012
Financial literacy	1.37	0.729068
Agreeableness	1.35	0.738722
Size	1.33	0.753624
Loss aversion	1.31	0.765737
Profitability	1.29	0.777999
General education	1.23	0.81377
CFO board membership	1.21	0.824271
Mean VIF	**1.56**	

Based on Gujarati (1995) if the VIF is less than (10) then there is no multicollinearity problem and the lower the value the better. The average VIF reported is (1.56) and the VIF values for the variables range from (1.21) to (2.73), all the values are far from (10) confirming that there is no multicollinearity problem. However, this of course excludes the interception terms which are highly correlated with the CFO board membership variable and with each other.

As reported in the hierarchical regression results, few of the added variables, have a significant impact on the financial decisions under study. And since, no statistical technique is free from problems, the coming subsections intend to solve for some problems that exist in the conducted traditional regression.

The two main problems existing that might be impacting the results are: (1) multicollinearity problem, due to the existence of a moderator; (2) the large number of predictors under study, given the number of observations. Therefore, the coming subsections report the results of other statistical analyses that are used in the aim of metigating the problems of the traditional hierarchical regression and to help further explore any hidden relations. Thus, Subsection (5.1.3) starts with the principal component analysis (PCA) which is then followed by the step wise analysis in subsection (5.1.4).

5.1.3. Principal Component Analysis

Since this study contains a large set of variables, one of the dimensionality reduction techniques used is the principal component analysis (PCA) which aims to minimize the large data set of correlated variables by grouping the variables and providing scores aiming to identify the most influential ones. Therefore, The PCA is conducted to explore any hidden relations between the variables, that might not be reported due to the large number of variables existing in the model.

The newly created variables are known as principal components and are fewer than the original set, but providing the same information (Larose, 2006 and Hand, 2007).

Following the rule of thumb, the PCA conducted report that only components 1 and 2 have an eigen values greater than (1) and thus two components only will be included in the regression to represent each of the following group of variables: the firm variables; the managerial demographics; the behavioral variables; and the personality traits. Regarding the interception of behavioral characteristics with the moderator, only one component is included as this is the only component that had an eigen value greater than one.

Table (17) in the appendix reflects the reported eigenvalues above one and based on the values, the number of components is chosen and table (5.7) above reports the weights between the variables and the chosen components after rotation, while table (18) in the appendix report the eigenvectors without rotation, the highest weights are in bold by setting a cut off value of (0.4), and the values with and without rotation are very similar, with minor differences. To understand the values reported, a cut off value is set and variables with a weight above this cut off are loading high on the component, meaning that the component is mostly affected by such variables. Figures (7 to 15) in the appendix report the scree plots and loading plots.

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Table (5.7) Eigenvectors/Weights - After rotation

	Variable	Comp1	Comp2
Firm characteristics	Tangibility	**-0.7064**	0.2164
	Size	**0.596**	0.1531
	Profitability	0.1673	**-0.7839**
	Growth	0.3433	**0.5615**
Managerial demographics	Marital status	**0.5986**	-0.083
	Gender	**-0.5773**	-0.1456
	Age	**0.5554**	-0.0594
	Education level	-0.0014	**0.9841**
Behavioral characteristics	Illusion of control	**0.6959**	-0.112
	Overconfidence	**0.6441**	0.0604
	Anchoring	-0.1419	**0.6103**
	Loss aversion	-0.0426	**0.5403**
	Optimism	0.1362	**0.4303**
	Herding	0.2456	0.3665
Personality traits	Conscientiousness	**0.6757**	0.0566
	Emotional stability	**0.532**	-0.2937
	Openness	**0.5078**	0.1832
	Extraversion	-0.0051	**0.7378**
	Agreeableness	-0.0499	**-0.5768**
Interceptions	CFO MB*Loss aversion	**0.41**	
	CFO BM*Overconfidence	**0.4098**	
	CFO BM*Anchoring	**0.4084**	
	CFO BM*Herding	**0.4074**	
	CFO BM*Illusion of control	**0.4071**	
	CFO BM*Optimism	**0.4068**	

Firstly, the firm characteristics variables that load high on the first component are tangibility with a negative loading value of (-0.7064) and size with a positive loading of (0.596), while the other two variables load high on the second component as profitability load negatively with a value of (-0.7839) and growth load positively with a loading value of (0.5615).

Secondly, the set of demographics, three of which load high on the first component having the marital status loading positively (0.5986) followed by the gender with a negative loading value (-0.5773) and finally the age with a positive load of (0.5554). The fourth demographic characteristic is the general education level, and it loads high on the second component with a positive value of (0.9841). The behavioral characteristics are the third set that contains six variables, two of which load high on the first component with positive values of (0.6959) for illusion of control and (0.6441) for overconfidence. The second component has three variables that load positively high with values of (0.6103) for anchoring, (0.5403) for loss aversion and (0.4303) for optimism.

The personality traits are the fourth set that contains five variables, three of which load high on the first component with high positive values of (0.6757) for conscientiousness, (0.532) for emotional stability and (0.5078) for openness. The second component has the remaining two variables loading high with a positive value for extraversion (0.7378) and a negative value of (-0.5768) for agreeableness. The final set of variables is the interception terms, the loading values are almost the same for all the values which is a moderate positive loading value of approximately (0.41) for all the variables. This reflects that all the interception terms load almost equally on the first component and so they are all representing the same degree of importance.

The final step in this analysis reports regression results and the independent variables included in the regression are the RCs for firm variables; RCs for demographics; RCs for behavioral variables; RCs for personality traits; the PC of the interceptions and finally including the financial literacy and the CFO membership variables, where RC refers to the rotated components which are the principal components after rotation. Table (5.8) present the results of the regression that includes the principal components (PCs) after applying varimax rotation for the components. The varimax rotation is applied and the goal of rotation is to simplify and clarify the data structure by highlighting a small number of important variables and this makes results interpretation easier (Bryant and Yarnold, 1995).

Results in Column (1) regresses the capital structure on the components, and it reports that the second firm component is the only significant predictor with a highly positive coefficient. While column (2) regresses the cost of capital on the predictors and results report two significant components: the first firm component that has a negative coefficient with a low significance level, and the second firm component is positively significant at a high significance level. Column (3) regresses the investment variable on the components and reports results similar to the cost of capital model as two components are significant: the first firm component and the second firm component however with opposite signs and different significance levels.

Table (5.8) Regression results using RCs

Robust standard errors in parentheses

VARIABLES	(1) TDR	(2) WACC	(3) CAPEX
Firm component 1	0.0157	-0.0832*	0.0242**
	(0.0145)	(0.0456)	(0.0108)
Firm component 2	**0.106***	**0.162***	**-0.0351**
	(0.0306)	(0.0464)	(0.0161)
Demographics component 1	-0.0214	0.0296	-0.00794
	(0.0154)	(0.0392)	(0.0109)
Demographics component 2	-0.00315	0.00856	-0.00169
	(0.0191)	(0.0642)	(0.0140)
Behavioral component 1	0.0303	-0.0795	0.00204
	(0.0185)	(0.0501)	(0.0123)
Behavioral component 2	0.00841	-0.00594	0.00905
	(0.0160)	(0.0530)	(0.0144)
Personality traits component 1	-0.0148	-0.0253	-0.0149
	(0.0151)	(0.0552)	(0.0156)
Personality traits component 2	0.0307	0.0678	0.00177
	(0.0195)	(0.0619)	(0.0152)
Financial Literacy	-0.0969	0.331	0.0706
	(0.0734)	(0.232)	(0.0629)
CFO membership	-0.466	-0.554	0.116
	(0.663)	(1.350)	(0.441)
Interception component	0.0683	0.0550	-0.0208
	(0.0853)	(0.178)	(0.0581)
Constant	0.334***	-0.166	0.0690
	(0.0810)	(0.136)	(0.0572)
Observations	96	96	96
R-squared	**0.414**	**0.173**	**0.136**

Looking on the results in more details, the Results of regressing the capital structure on the new set of variables report that the second firm component is the only positively significant predictor with a coefficient of (0.106), and the loading values reflect that profitability and growth are the two variables

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that highly load on the component.

For further explanation, the profitability ratio is negatively related to the firm component, and this reflects that an increase in profitability will decrease the component, following the component is positively related to the TDR at a high significance of P value (0.01) which means that profitable firms tend to rely less on debt, to avoid any costs accompanied by external sources of finance. While on the other hand, the growth variable is positively related to the firm component and this reflects that an increase in growth will increase the component, following the component is positively related to the TDR which means that firms with high growth ratio tend to rely more on debt, to finance any potential projects.

The other regression is using the cost of capital as the dependent variable and results report the significance of two components which are the first and second firm components. The first firm component is negatively significant with a coefficient (-0.0832) while the second firm component is positively significant with a coefficient of (0.162). Tangibility and size load high on the first component while profitability and growth load high on the second component.

The tangibility ratio is negatively related to the firm component and this reflects that an increase in tangibility will decrease the component and consequently the WACC is increased, while on the other hand, the size variable is positively related to the firm component and this reflects that an increase in size will increase the component and consequently the WACC is decreased, as firm size increases, the risk position of the firm improves, and this lowers the rate of return required by investors.

The profitability ratio is negatively related to the firm component, and this reflects that an increase in profitability will decrease the component and consequently the WACC is decreased, while on the other hand, the growth variable is positively related to the firm component, and this reflects that an increase in growth will increase the component and consequently the WACC is increased.

The third regression is using the investment as the dependent variable and results report the significance of the two firm components. The first firm component is positively significant with a coefficient (0.0242) while the second firm component is negatively significant with a coefficient of (-0.0351). Tangibility and size load high on the first component while profitability and growth load high on the second component. The tangibility ratio is negatively related to the firm component, and this reflects that an increase in tangibility will decrease the component and consequently the CAPEX is decreased, while on the other hand, the size variable is positively related to the firm component, and this reflects that an increase in size will increase the component and consequently the CAPEX is increased.

Moreover, the profitability ratio is negatively related to the firm component, and this reflects that an increase in profitability will decrease the component and consequently the CAPEX is increased, while on the other hand, the growth variable is positively related to the firm component, and this reflects that an increase in growth will increase the component and consequently the CAPEX is decreased.

For multicollinearity check, Pearson's correlation reports no multicollinearity except for the CFO board membership with the intercept component which reports a high correlation of (0.9957), table (5.9) below.

Table (5.9) Correlation analysis for all variables using RCs

	Firm comp.1	Firm comp.2	Demo comp.1	Demo comp.2	Beh comp.1	Beh comp.2	Trait comp.1	Trait comp.2	Intercept comp	CFO board membership	Financial literacy
Firm comp.1	1										
Firm comp.2	0.1096	1									
Demo comp.1	0.0542	0.0373	1								
Demo comp.2	0.1356	-0.1032	0.0196	1							
Beh comp.1	0.0756	-0.0368	0.1169	0.1262	1						
Beh comp.2	-0.1568	0.1504	-0.0046	-0.019	0.311	1					
Trait comp.1	0.0032	0.0343	0.1849	0.1321	0.4126	0.3167	1				
Trait comp.2	0.0316	0.0845	0.1441	-0.0095	0.1345	0.0169	-0.0294	1			
Intercept comp	0.1611	-0.0119	-0.0037	0.1303	0.0503	0.1238	0.0871	-0.2075	1		
CFO board membership	0.1725	-0.0135	-0.0025	0.1144	0.0233	0.1105	0.0674	-0.194	0.9957	1	
Financial literacy	0.0851	-0.0577	0.0683	0.0379	0.3263	0.0555	0.1874	0.0107	-0.0536	-0.0531	1

Table (5.10) VIF result

Variable	VIF	1/VIF
Behavioral comp.1	1.45	0.69122
Trait comp.1	1.34	0.746179
Behavioral comp.2	1.29	0.776147
Financial literacy	1.15	0.871915
Firm comp.1	1.13	0.883018
Intercept comp.	1.13	0.88422
Trait comp.2	1.11	0.898444
Firm comp.2	1.08	0.92295
Demo comp.2	1.07	0.933222
Demo comp.1	1.07	0.93431
Mean VIF	**1.18**	

Multicollinearity problem could be solved by removing one of the variables that is reporting high correlation and thus, the CFO board membership variable could be removed as the role of the variable is already captured in the interception term, and this helps solve for the collinearity problem and VIF

values are reported in the above table (5.10), reflecting no multicollinearity if the CFO board membership is removed.

To conclude, the PCA aims to minimize the number of predictors by converting them into components that represent the original predictors and results reflect that the firm components are the main predictors impacting the financial decisions. Multicollinearity check revealed the existence of multicollinearity but among the board membership and its interceptions only and this problem is resolved when the board membership variable is removed (moderator variable). The existence of such problem justifies the need for trying other statistical methodologies as to minimize statistical problems and to have more robust and reliable results.

5.1.4. Stepwise regression analysis

This regression is applied as to control for one of the problems existing in the main regression model, which is reducing the number of predictors given the number of observations and the aim of this type of analysis is to choose the best set of variables. Further, the PCA reveals a multicollinearity problem and therefore, applying other type of analysis such as the stepwise, is needed here.

Results following the backward elimination procedure eliminate variables with the weakest significance, leaving the model with variables that have the highest significance. Tables (5.11, 5.12 and 5.13) report the result for the analysis using the three dependent variables.

5.1.4.1. Capital Structure Decision

In table (5.11) the backward elimination process left the model with 9 significant variables that impact the capital structure decision. Three of the firm characteristics and one of the demographics reported a significant coefficient.

The three firm characteristics are the tangibility, profitability, and growth, while the marital status is the fourth variable. All the reported firm variables and demographics are significant and report similar results to the prior regressions, in terms of significance and the direction of the relation with the dependent variable.

Moreover, one behavioral characteristic is significant which is overconfidence having a positive coefficient, concluding that an overconfident manager tends to invest more and prefer debt as a source of finance and this result is also reached by (Oliver, 2005; Ben-David et al. 2007; Barros and Silveira, 2007; Hackbarth, 2008 and Oliver and Mefteh, 2010). In addition, three of the behavioral characteristics have a significant impact on the capital structure when interacted with the CFO membership and these are: the anchoring and loss aversion behaviors having negative coefficients

while the herding behavior has a positive coefficient. Consequently, the CFO membership variable is significant with a positive coefficient.

Table (5.11) Stepwise analysis using TDR as dependent variable

VARIABLES	TDR
Tangibility	**0.235***
	(0.0659)
Profitability	**-0.0163****
	(0.00713)
CFO membership* Anchoring	**-0.144****
	(0.0722)
Growth	**0.492***
	(0.0810)
CFO membership* Loss aversion	**-0.210****
	(0.0871)
CFO membership* Herding	**0.132***
	(0.0338)
CFO membership	**0.820****
	(0.410)
Marital status	**-0.109****
	(0.0430)
Emotional stability	-0.0323
	(0.0194)
Overconfidence	**0.0644****
	(0.0258)
Constant	-0.192
	(0.137)
Observations	96
R-squared	**0.562**

The remaining significant variables are the CFO membership and few of the interception terms. The CFO board membership is positively related to the debt choice reflecting that CFOs who are on board are willing to take more debt. In addition, three of the behavioral characteristics have a significant

impact on the capital structure when interacted with the CFO membership and these are: the anchoring and loss aversion behaviors having negative coefficients while the herding behavior has a positive coefficient.

The CFO BM and its intersection with loss aversion and herding, report the same relation as reported in the hierarchical regression. However, the CFO BM intersection with anchoring is now significant in the stepwise regression, reporting a negative coefficient which means that a CFO who is a board member and acquires anchoring behavior will tend to rely less on debt. This negative relation is consistent with (Karaa, 2011) who mentions that managers who anchor prefer internal financing instead of debt, and (Soufani et al. 2012) for some proxies used for the anchoring, also (Bank et al. 2020) report that the anchoring bias is the most influential managerial behavioral bias among the studied ones, as a non-traditional capital structure determinant.

5.1.4.2. Cost of Capital Decision

Moving to table (5.12), the cost of capital is regressed on all the variables, and the stepwise analysis leaves the model with 10 significant variables. Two of the firm characteristics have significant coefficients and these are the profitability ratio and size, both having a negative coefficient. Three of the personality traits are significantly impacting the cost of capital decision and these are emotional stability and extraversion traits with a positive coefficient and the openness trait with a negative coefficient.

The positive emotional stability coefficient reflects that an emotionally stable CFO will tend to have a high cost of capital, and this is justified by the tendency of the emotionally stable manager to remain calm in stressful situation and their tendency to be unthreatened by arising challenges and this makes them risk takers, (McCrae and Costa,1997; Peterson et al. 2003; and Nadkarni and Herrmann, 2010). Furthermore, (Daskalakis et al. 2011) elaborate that an emotionally stable manager will not prefer issuing debentures which could reflect the preference for equity which might raise the overall cost of capital.

The size variable shows significance, reporting a negative coefficient indicating that an increase in firm size will reduce the cost of capital. The negative relation between size and cost of capital is consistent with (Banz,1981; Agustini, 2016; Bhojraj and Sengupta, 2003; Khurana and Raman, 2003; and Embong et al. 2012), and such relation is based on the ability of investors to access information in larger firms and therefore prefer investing there, which consequently leads to these companies to offer lower return and therefore lower cost. Furthermore, large firms usually have high bond rating which reflects low risk and therefore low return to investors (low cost for the firm).

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Table (5.12) Stepwise analysis using WACC as dependent variable

VARIABLES	WACC
Emotional stability	0.129*
	(0.0757)
Profitability	-0.124***
	(0.0222)
Size	-0.0454*
	(0.0231)
CFO membership* Optimism	-0.425***
	(0.130)
CFO membership* Illusion of control	0.425***
	(0.139)
Openness	-0.177**
	(0.0771)
Extraversion	0.208***
	(0.0724)
Loss aversion	0.189
	(0.116)
Optimism	-0.137*
	(0.0777)
Overconfidence	-0.226**
	(0.0955)
Financial literacy	0.516**
	(0.220)
Constant	-0.335
	(0.603)
Observations	96
R-squared	**0.320**

Moreover, optimism and overconfidence are negatively related to the dependent variable which is similar to what is reported under the main regression. In addition, two of the interaction terms are significant which are the interaction between CFO membership and optimism reflecting a negative

coefficient, and the other interaction is between CFO membership and illusion of control reflecting a positive coefficient. Reflecting that an optimistic CFO who is a board member will tend to reduce the cost of capital more than would an optimistic manager who is not a board member and this reflects that the negative relation reported between optimism and cost of capital is magnified when the CFO is on board.

While on the other hand a CFO who is a board member and acquire the illusion of control bias will tend to increase the firm´s cost of capital, reflecting that the illusion of control bias comes into act when the CFO is a board member, and it causes an increase in the firm's weighted average cost of capital.

The last significant variable is the financial literacy variable reporting a positive coefficient.

5.1.4.3. Investment Decision

Furthermore, the stepwise results in table (5.13) using the third decision under study revealed that 9 variables are significant. Four of which are the firm characteristics where tangibility and growth report negative coefficients and have high significance levels while size and profitability report positive coefficients, having low significance. The marital status and gender are negatively related to investment decision, reporting moderate and low significance levels.

The findings regarding tangibility, profitability, growth, gender, and marital status are as reported in the hierarchical regression, while the size factor reported positive significance in the stepwise regression. The positive size coefficient means that large firms tend to invest more as small firms depend more on internal sources of finance as they have limited access to external markets due to the existence of information asymmetry, and this leads that the cost of external finance to small firms is high, which by turn lowers their investment level and vice versa for large firms (Kadapakkam et al. 1998 and Nguyen and Dong, 2016).

The positive result is opposing to that of (Gala and Julio, 2016) who find a negative relation that is explained as the tendency of small firms to have higher values of Tobin's Q compared to large firms and therefore tend to have higher investment rates according to the Q-theory. In addition, small sized firms tend to grow faster than large firms and thus, more investments are needed (Pacheco, 2017).

Moreover, one of the personality traits is negatively related which is the openness trait, reflecting that the Egyptian CFO who is open to experience, tends to lower the firm´s investment level, which opposes what is predicted by (Gow et al. 2016). Further, the anchoring bias is positively related to CAPEX while its interception with CFO board membership is negatively related, reflecting that such bias/behavior changed when the CFO is in a powerful position.

Table (5.13) Stepwise analysis using CAPEX as dependent variable

VARIABLES	CAPEX
Tangibility	-0.190***
	(0.0585)
Profitability	0.0112*
	(0.00664)
Size	0.00986*
	(0.00579)
Growth	-0.147***
	(0.0438)
CFO membership*Anchoring	-0.0680*
	(0.0407)
Gender	-0.0764*
	(0.0389)
Anchoring	0.0433**
	(0.0212)
Marital status	-0.112**
	(0.0445)
CFO membership*illusion of control	0.0520
	(0.0379)
Openness	-0.0288*
	(0.0152)
Constant	0.241*
	(0.128)
Observations	96
R-squared	**0.242**

The positive relationship between anchoring and investment decision is consistent with the results of (Aziz and Khan, 2016 and Madaan and Singh, 2019). While the relation becomes negative when the CFO is on board and this could be attributed to what (Karaa, 2011) reports, that CFOs who anchor and on board prefer internal financing instead of debt which might subsequently lead to lower investments.

Robin and Angelina (2020) explain that anchoring bias is usually adhered in uncertain times or when there is information asymmetry, and so depending on existing information is the way to have an overview of what should be expected to be the outcome. Czerwonka (2017) adds that when information is limited and money decision is involved, investors start comparing future investments with past investments and this provides a guideline for what to do or expect, roughly.

Concluding this subsection, the results of the stepwise analysis reflect the variables that mostly impact the financial decisions under study as the regression eliminated the non-significant variables and is left with the mentioned ones to explain the variation in the financial decisions, furthermore it solved for one of the existing problems which is having a model with too many variables.

In addition, multicollinearity check revealed that in the regressions using cost of capital and investment decisions, no multicollinearity problem exist among the variables, and this is shown in tables (5.14 and 5.15) below as the VIF values are below 10.

Table (5.14) VIF result (WACC)

Variable	VIF	1/VIF
CFO BM*Illusion of control	18.16	0.055074
CFO BM*Optimism	17.79	0.056206
Overconfidence	1.43	0.700881
Financial literacy	1.26	0.795768
Optimism	1.24	0.804724
Emotional stability	1.2	0.832049
Openness	1.19	0.841379
Loss aversion	1.15	0.869671
Extraversion	1.12	0.892673
Size	1.06	0.9394
Profitability	1.05	0.955648
Mean VIF	**4.24**	

However, for the model using capital structure as the dependent variable, multicollinearity problem existed, however when CFO board membership variable is excluded, the problem is solved, leading to only 8 significant variables to exist in the model (the interception of CFO board membership with anchoring loses its significance).

Table (5.15) VIF result (CAPEX)

Variable	VIF	1/VIF
CFO BM*Illusion of control	19.03	0.052558
CFO BM*Anchoring	18.89	0.05294
Marital status	1.44	0.69372
Gender	1.43	0.699987
Tangibility	1.25	0.799764
Growth	1.25	0.800489
Profitability	1.23	0.810716
Size	1.19	0.839186
Anchoring	1.15	0.86582
Openness	1.11	0.9033
Mean VIF	**4.8**	

Tables (5.16 and 5.17) report the VIF values before and after solving the multicollinearity problem by the removal of the board membership variable. The coming section (5.2) concludes the main findings of this chapter, and the coming chapter (chapter 6) provides a conclusion for the whole thesis.

Table (5.16) VIF result (TDR) -Before

Variable	VIF	1/VIF
CFO BM	155.21	0.006443
CFO BM*Loss aversion	138.59	0.007215
CFO BM*Anchoring	67.61	0.014791
CFO BM*Herding	27.03	0.036991
Tangibility	1.25	0.798841
Growth	1.21	0.828082
Overconfidence	1.2	0.83309
Profitability	1.18	0.846757
Emotional stability	1.11	0.897285
Marital status	1.06	0.946185
Mean VIF	**39.55**	

Table (5.17) VIF result (TDR) -After

Variable	VIF	1/VIF
CFO BM*Loss aversion	25.97	0.038508
CFO BM*Herding	25.88	0.038647
Overconfidence	1.33	0.752169
Tangibility	1.25	0.799414
Financial literacy	1.22	0.821304
Growth	1.21	0.826022
Profitability	1.18	0.84554
Emotional stability	1.1	0.905153
Marital status	1.03	0.968902
Mean VIF	**6.69**	

5.2. Conclusions

To summarize the results chapter, the aim was to report the results of the inferential statistics to be able to test for the hypotheses under study and to answer the main research questions. Different types of analyses were conducted to test for the research hypotheses. The survey took approximately six months to receive responses which totaled 96 responses representing a very satisfactory response rate of about 66%, compared favorably to other similar survey studies conducted on different markets, (Scott and Johnson, 1982; Graham and Harvey, 2001; Bancel and Mittoo, 2004; Brav et al. 2008 and Graham et al. 2013). Such studies have response rates ranging from 5.3 to 21.2 percent, noting that the sample size of these studies was much bigger than the sample size of this study.

Table (5.18) summarizes the main findings of the regressions by generally presenting the variables that had a significant coefficient under each model for the 96 respondents. Starting with the hierarchical traditional regression, firm characteristics are commonly impacting the financial decisions, behavioral characteristics did not have an impact on the investment decision, and it impacted the capital structure but indirectly when the moderator variable is included, however the behavioral factors reported a direct impact on the cost of capital decision.

The hierarchical regression is not statistically free of problems, one of which is the multicollinearity problem due to the existence of the moderator with its interception terms and these are highly correlated with each other, in addition the large number of predictors might be impacting the robustness of the results. Therefore, other analyses are conducted to mitigate such problems, one of which is the PCA and results report that the main component that is significantly impacting the three

financial decisions is the firm component, however multicollinearity problem still exists and solved only when the CFO board membership variable is removed. The final type of analysis is the stepwise analysis which reduces the number of predictors by keeping only the significant predictors. Results reveal that the variables under study, which include firm factors; CFO demographics; CFO behavioral characteristics; CFO personality traits and CFO financial literacy along with the moderator, do impact the financial decisions under study, with variations in significance and types of variables.

Table (5.18) Summary of the findings

Analysis	Dep. Var	Significant variables
Hierarchical regression	TDR	Tangibility, Profitability, Growth, Marital status, CFO BM, CFO BM*Loss aversion, CFO BM*Herding
	WACC	Profitability, Optimism, Overconfidence, Extraversion, Openness, Financial literacy
	CAPEX	Tangibility, Growth, Profitability, Marital status, Gender.
PCA	TDR	Firm component
	WACC	Firm component
	CAPEX	Firm component
Stepwise	TDR	Tangibility, Profitability, Growth, Marital status, Overconfidence, CFO BM, CFO*Anchoring, CFO*Loss aversion, CFO*Herding.
	WACC	Profit, Size, Financial literacy, Emotional stability, Openness, Extraversion, Optimism, Overconfidence, CFO*Illusion of control, CFO*Optimism.
	CAPEX	Tangibility, Growth, Profitability, Size, Marital status, Gender, Openness, Anchoring, CFO*Anchoring

Coming next is chapter 6 which concludes the thesis and presents the main contributions, limitations, as well as recommendations.

Chapter 6: Conclusion

Research has highlighted lately the importance of behavioral finance in corporations, which is built on assumptions deviating from those of the neoclassical paradigm and assumes normality in behavior as it considers the human factor when taking corporate decisions. Prior work supporting this new paradigm are: (Shefrin,2001; Vasiliou and Daskalakis,2009; and Baker and Nofsinger,2010) among others.

Following the behavioral finance and psychological literature, this study includes different behavioral factors to test for their role in the decision-making process by incorporating the CFO´s behavioral characteristics and personality traits among other predictors into a regression model that includes traditional variables, to assess the impact of the behavioral factors and their relationship with the firm financial decisions.

In addition, such exploration is in the context of behavioral corporate finance which is an area that is not fully developed in the literature specially in developing markets such as the Egyptian market.

Furthermore, on the effect of Covid 19 pandemic on the firm's financial decisions, (Ke,2022) report that COVID-19 affects firm´s cost of equity in US firms. Another study on the Egyptian market by (Golubeva,2021), shows that equity can be preferred over debt due to the bankruptcy costs raised under the Covid-19 pandemic. And this conclusion could be applied to this study too as the average debt ratio is very low, reflecting the reliance on equity in year 2020.

This section includes subsections that: summarize the main findings of the study; highlight the main contributions; present the limitations faced; and provide a few recommendations for future research.

6.1. Summary of the main findings

To achieve the objectives of this study, CFOs of the non-financial firms listed in the EGX were surveyed and responses were analyzed which totaled 96. The survey reported a Cronbach's Alpha of (0.8154) which reflects its reliability, and this supports that behavioral finance can be explored in the Egyptian market.

After analyzing the responses, the findings answer the research questions of the study, and the main findings are presented as follows:

1. What is the impact of traditional variables on the firm´s financial decisions?

This question is answered by running the multiple regression that includes only the traditional variables which are the firm characteristics and the managerial demographics. Results report that the asset´s tangibility, profitability, and growth ratios along with the marital status are significantly impacting the firm´s capital structure. The firm´s cost of capital is significantly impacted by the profitability ratio

only, while the investment decision is impacted by the tangibility, profitability, and growth ratios along with the gender and marital status demographics.

Running other analyses (PCA and stepwise) reflect the crucial role of traditional variables especially the firm characteristics, which reflect their important role in determining the variation in the financial decisions under study.

2. Are behavioral characteristics identified among Egyptian CFOs?

As reported, for all the studied behavioral characteristics, most of the CFOs respond above the average value for the behavioral questions and therefore they acquire such behavioral characteristics which answers this research question, with a yes. And this provided a motivation to further explore the impact of such factors, among others, on the decisions under study.

3. Are the CFO´s behavioral characteristics impacting the firm´s financial decisions?

Based on prior literature, it is expected that behavioral factors will be identified, and this leads to one of the arguments that the traditional factors are not enough and that other factors such as the behavioral factors should be considered to explore their impact on financial decisions.

Therefore, in this study, the regression is applied to test at first for the impact of using the traditional variables only and then other variables are added to the model following the assumption that the financial decisions are expected to be influenced by other variables than the traditional ones. In addition, the R squared reported by the traditional models were approximately 49 percent (for the capital structure) and 13.6 percent (for the cost of capital) and 18.6 percent (for the investment decision) which motivated to add other variables to the model to increase its explanatory power.

The added six behavioral characteristics (optimism, overconfidence, illusion of control, loss aversion, herding and anchoring) under the hierarchical regression did not report any direct significant relation with two of the financial decisions which are the capital structure and investment decisions, however few of the characteristics are significantly impacting the cost of capital decision.

The PCA did not reveal any relation between the behavioral components and the financial decisions, however the stepwise regression revealed that the behavioral characteristics do play a role in the process of financial decision making.

4. Are the CFO´s behavioral characteristics impacting the firm´s financial decisions, if the CFO is a board member?

This study aims to explore whether a board seat gives greater authority to the CFO and to test if the behavioral characteristics will come in act when the CFO is a board member. Results of the hierarchical regression that includes a full model consider the joint effect of having a moderator

variable and this revealed that some behavioral characteristics (loss aversion and herding) come into act when the CFO is in a controlling position such as being a board member and will impact the capital structure decision. However, this variable with its interception did not report any significant relation with the cost of capital and investment decisions. The PCA revealed that the CFO board membership variable and its interception component are not impacting any of the financial decisions, however, the stepwise confirmed the role of CFO membership in impacting the capital structure decision, like the result of the hierarchical regression. In addition, different behavioral characteristics when intercepted with the CFO board membership are reported to be significantly impacting the financial decisions under study.

5. Are the CFO´s personality traits impacting the firm´s financial decisions?

Under the hierarchical regression, none of the five personality traits report a significant impact on the capital structure and investment decisions while only two traits are significantly impacting the cost of capital decision.

The PCA report that the personality traits are not impacting the financial decisions, however the stepwise reported that few personality traits are significantly impacting the cost of capital and investment decisions.

6. Is the CFO´s level of financial literacy impacting the firm´s financial decisions?

Results report that the financial literacy level of CFOs does not have a significant impact on the financial decisions under all the types of regression analyses except for the cost of capital decision which is significantly impacted by the financial literacy of the CFOs.

To sum up, results from the different regression analysis support the importance of studying the human behavior and characteristics within corporations and the relation between behavioral characteristics and personality traits seem to explain the variation in the financial decisions under study and this goes in line with the behavioral finance theories.

Comparing the R squared of the traditional model and the model that includes all the variables, shows an increase by 13.51 percent (for the capital structure) and 21.29 percent (for the cost of capital) and 16.1 percent (for the investment) reflecting that the added variables add to the explanatory power of the model, and this reveals their vital role to be considered.

The coming subsection presents the hypotheses that are supported by the reached results and the following subsections present: contribution of the study, limitations faced and recommendations for future research.

6.2. Research Hypotheses

Table (6.1) below summarizes the hypotheses testing that helps in answering the research questions of this study. The table lists the hypotheses that are supported by the results reached under the stepwise regression analysis as it is the type of regression with the least reported statistical problems and fits the conditions of the research model.

The findings suggest that all the hypotheses are partially supported as different factors are impacting the financial decisions differently thus the proposed hypotheses are not rejected.

Table (6.1) Supported Hypotheses

H1: The firm´s traditional factors have a significant impact on the firm´s traditional financial decisions.	**Not rejected**
H2: The CFO´s demographic characteristics have a significant impact on the firm´s traditional financial decisions.	**Not rejected**
H3: The CFO´s behavioral characteristics have a significant impact on the firm´s traditional financial decisions.	**Not rejected**
H4: The CFO´s membership on board has a significant impact on the firm´s traditional financial decisions.	**Not rejected**
H5: The identified CFO´s behavioral characteristics have a significant impact on the firm´s traditional financial decisions, only when the CFO is a board member.	**Not rejected**
H6: The CFO´s personality traits have a significant impact on the firm´s traditional financial decisions.	**Not rejected**
H7: The CFO´s level of financial literacy has a significant impact on the firm´s traditional financial decisions.	**Not rejected**

6.3. Contribution of the study

The study presents an overall picture of the impact of different behavioral factors on vital financial decisions which are: the capital structure, the cost of capital and the investment decisions, and therefore, adding to the behavioral finance literature by providing different contributions, summarized as follows:

1. Context: Extensive research exist in support of behavioral finance in the context of financial markets, however the impact of psychological/behavioral factors on the financial decisions in the context of corporations is not fully documented and this represents the starting point of this study.

2. Variables: The study follows the behavioral finance approach, and this differs from prior studies

in the context of corporations which focus more on traditional factors. Additionally, the choice of the behavioral variables contributes to the literature as most of the variables adhered in this study have not been studied before in relation to the financial decisions under study especially the cost of capital decision.

Prior studies in the corporate finance context consider the impact of limited behavioral factors, most commonly overconfidence and optimism.

3. Type of manager: this study aims to address the behavior of the CFOs as there are a limited number of studies investigating how CFO-related factors affect financial decisions in an Egyptian market. Extensive research exists focusing on the CEO or investors.

4. Joint effect: this study examines the impact of CFOs´ behavioral characteristics on different financial decisions while moderating for their board membership and therefore, the results provide an exploration of a joint effect.

5. Type of market: choosing the Egyptian market contributes to the existing literature as behavioral corporate finance studies are conducted rarely on the Middle Eastern countries and especially Egypt as a developing market. Results of this study contributes to the understanding of the CFO factors that impact the financial decisions in a developing market, particularly Egypt.

On a broader view, the results of this study could benefit different individuals by providing them with several insights. Results for instance raise the awareness of academics by referring to different factors that impact the traditional financial decisions in a developing market in addition they could benefit from the primary data tool which could be applied in other studies.

On the other hand, different type of practitioners could benefit as well, for example: investors looking at the firm´s financial statements and annual reports would now realize that the decisions taken by managers could be impacted by their behavior, realizing this could affect their investment decision in a particular firm if they decided to understand the pattern and behavior of the manger. Additionally, the board of directors as well would be interested in the results of this study and in the results of behavioral studies generally in the context of corporations, as it is crucial to consider the human behavior of the managers when hiring them, aiming to hire managers (ex: CFOs) who will take decisions that have a positive impact on the firm.

6.4. Limitations of the study

Like any research, this study has few limitations that are summarized in the following points:

1. Data accessibility: A main limitation that exists in this study is the inability to access all the needed managerial data for the Egyptian market due to non-availability of such data on databases and

therefore, a primary data source is needed using a questionnaire.

2. Sample size: Another limitation is the number of responses which is 96 only. The percentage of responses is considered acceptable as compared to similar studies, however this might have a misleading result from a statistical point of view especially that the study is conducted for one year only so this leads to a small number of observations, given the large set of variables used in the study.

3. Survey length: the questionnaire used is somehow lengthy and this impacted the response rate, a shorter survey might have encouraged more responses.

4. Year of study: Conducting the study during year 2020 (Covid 19 pandemic) disabled the conduction of interviews which would have helped in providing more insights.

6.5. Recommendations for future research

This study succeeded in answering the main research questions under concern, however the findings open avenues for further research and thus, few recommendations are suggested below:

1. This study concludes that behavioral factors do impact the decisions under study, however few of them proved a significant impact when moderated by another variable. Therefore, it is recommended to explore further the variables that could moderate such relation (such as: the Culture).

2. Another recommendation is to replicate this study on a larger sample size to minimize statistical problems that may arise. A larger sample size will also allow for a comparison across industries.

3. Conducting a comparative study between the CEOs and CFOs of the Egyptian firms, to test if the decisions under study will be impacted differently. Using interviews as a data gathering tool will help to have more extensive information and to understand better the managerial behavior of each.

4. Furthermore, in this study behavioral factors were successfully identified, and this leads to a vital argument that the traditional model for the cost of capital might not be a complete model since it does not incorporate any behavioral factor. Thus, if behavioral factors in terms of decision making are identified, this is prime evidence that the classical model (WACC) might not be the complete or exact estimate and therefore, we need a more precise WACC or a more precise estimate for the cost of capital, that will be able to capture the identified behavioral factors.

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Appendix

Table (1) Validity check for the financial literacy questions

		Interest	Inflation	Diversification	Mortgage	Bond	Total
Interest	Pearson Correlation	1	.333**	.231*	.111	.048	.493**
	Sig. (2-tailed)		.001	.024	.281	.640	.000
	N	96	96	96	96	96	96
Inflation	Pearson Correlation	.333**	1	.175	.295**	.222*	.652**
	Sig. (2-tailed)	.001		.088	.003	.030	.000
	N	96	96	96	96	96	96
Diversification	Pearson Correlation	.231*	.175	1	.145	.155	.552**
	Sig. (2-tailed)	.024	.088		.160	.132	.000
	N	96	96	96	96	96	96
Mortgage	Pearson Correlation	.111	.295**	.145	1	.327**	.670**
	Sig. (2-tailed)	.281	.003	.160		.001	.000
	N	96	96	96	96	96	96
Bond	Pearson Correlation	.048	.222*	.155	.327**	1	.631**
	Sig. (2-tailed)	.640	.030	.132	.001		.000
	N	96	96	96	96	96	96
Total	Pearson Correlation	.493**	.652**	.552**	.670**	.631**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	
	N	96	96	96	96	96	96

Table (2) Validity check for the personality traits questions

		Extraverted Enthusiastic	Reserved Quiet	Dependable Selfdisciplined	Disorganized Careless	Sympathetic Warm	Critical Quarrelsome	Calm Emotionally stable	Anxious Easily upset	Open to new experiences Complex	Conventional Uncreative	Total
Extraverted Enthusiastic	Pearson Correlation	1	.441**	.254*	.125	.044	-.220*	.015	-.106	-.061	.256*	.422**
	Sig. (2-tailed)		.000	.013	.227	.670	.031	.881	.305	.554	.012	.000
	N	96	96	96	96	96	96	96	96	96	96	96
Reserved Quiet	Pearson Correlation	.441**	1	.011	-.077	-.087	-.049	-.163	-.164	-.035	-.106	.213*
	Sig. (2-tailed)	.000		.914	.456	.399	.632	.114	.111	.733	.304	.037
	N	96	96	96	96	96	96	96	96	96	96	96
Dependable Self disciplined	Pearson Correlation	.254*	.011	1	.352**	.015	.018	.303**	.087	.095	.405**	.619**
	Sig. (2-tailed)	.013	.914		.000	.887	.858	.003	.401	.358	.000	.000
	N	96	96	96	96	96	96	96	96	96	96	96
Disorganized Careless	Pearson Correlation	.125	-.077	.352**	1	-.057	.171	.411**	.312**	-.014	.456**	.633**
	Sig. (2-tailed)	.227	.456	.000		.580	.096	.000	.002	.892	.000	.000
	N	96	96	96	96	96	96	96	96	96	96	96
Sympathetic warm	Pearson Correlation	.044	-.087	.015	-.057	1	.007	.006	-.253*	.112	-.053	.188
	Sig. (2-tailed)	.670	.399	.887	.580		.948	.955	.013	.276	.606	.066
	N	96	96	96	96	96	96	96	96	96	96	96
Critical Quarrelsome	Pearson Correlation	-.220*	-.049	.018	.171	.007	1	.071	.137	-.116	-.059	.256*
	Sig. (2-tailed)	.031	.632	.858	.096	.948		.494	.182	.260	.568	.012
	N	96	96	96	96	96	96	96	96	96	96	96
Calm Emotionally stable	Pearson Correlation	.015	-.163	.303**	.411**	.006	.071	1	.215*	-.070	.200	.483**
	Sig. (2-tailed)	.881	.114	.003	.000	.955	.494		.035	.497	.051	.000
	N	96	96	96	96	96	96	96	96	96	96	96
Anxious Easily upset	Pearson Correlation	-.106	-.164	.087	.312**	-.253*	.137	.215*	1	-.031	.157	.359**
	Sig. (2-tailed)	.305	.111	.401	.002	.013	.182	.035		.764	.126	.000
	N	96	96	96	96	96	96	96	96	96	96	96
Open to new experiences Complex	Pearson Correlation	-.061	-.035	.095	-.014	.112	-.116	-.070	-.031	1	.067	.276**
	Sig. (2-tailed)	.554	.733	.358	.892	.276	.260	.497	.764		.518	.007
	N	96	96	96	96	96	96	96	96	96	96	96
Conventional Uncreative	Pearson Correlation	.256*	-.106	.405**	.456**	-.053	-.059	.200	.157	.067	1	.545**
	Sig. (2-tailed)	.012	.304	.000	.000	.606	.568	.051	.126	.518		.000
	N	96	96	96	96	96	96	96	96	96	96	96
Total	Pearson Correlation	.422**	.213*	.619**	.633**	.188	.256*	.483**	.359**	.276**	.545**	1
	Sig. (2-tailed)	.000	.037	.000	.000	.066	.012	.000	.000	.007	.000	
	N	96	96	96	96	96	96	96	96	96	96	96

Table (3) Validity check for the behavioral characteristics' questions

Correlations

		opt1	opt2	opt3	opt4	opt5	opt6	conf1	conf2	conf3	conf4	ill1	ill2	ill3	loss1	loss2	loss3	loss4	loss5	herd1	herd2	herd3	herd4	herd5	anch1	anch2	anch3	anch4	Total
opt1	Pearson Correlation	1	.555**	.485**	-.002	.124	.137	-.060	.186	-.001	.122	.246*	.185	.109	.115	.100	-.034	.023	-.011	.029	-.061	.115	.036	-.013	.021	.179	.007	.208*	.387**
	Sig. (2-tailed)		.000	.000	.985	.230	.182	.559	.070	.991	.234	.016	.071	.288	.263	.330	.741	.826	.916	.776	.552	.263	.725	.903	.840	.081	.948	.042	.000
	N	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96
opt2	Pearson Correlation	.555**	1	.750**	-.069	.126	.135	.045	.230*	.166	.043	.196	.114	.275**	-.148	.302**	.171	.244*	.233*	.030	.089	.214*	.086	-.130	-.025	.004	.143	.045	.478**
	Sig. (2-tailed)	.000		.000	.501	.222	.190	.666	.024	.107	.677	.056	.270	.007	.151	.003	.097	.016	.022	.768	.391	.036	.406	.207	.812	.970	.166	.662	.000
	N	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96
opt3	Pearson Correlation	.485**	.750**	1	-.035	.186	.269**	.104	.397**	.168	.204*	.232*	.178	.279**	-.090	.250*	.058	.198	.147	.105	.177	.215*	.172	-.040	-.054	.063	.032	.013	.549**
	Sig. (2-tailed)	.000	.000		.738	.070	.008	.313	.000	.101	.046	.023	.083	.006	.385	.014	.572	.053	.152	.308	.085	.035	.093	.698	.602	.541	.754	.901	.000
	N	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96
opt4	Pearson Correlation	-.002	-.069	-.035	1	.137	.066	.143	.089	-.023	-.007	-.117	-.087	-.122	.031	-.035	-.095	-.245*	-.179	-.018	.045	.063	.003	-.073	-.078	.060	-.164	.024	.057
	Sig. (2-tailed)	.985	.501	.738		.182	.521	.164	.388	.824	.946	.254	.400	.236	.763	.733	.356	.016	.081	.862	.667	.540	.980	.482	.453	.564	.111	.813	.582
	N	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96
opt5	Pearson Correlation	.124	.126	.186	.137	1	.370**	.189	.177	.208*	.308**	.029	.062	.060	-.294**	.191	.099	.157	.164	-.241*	.020	.023	-.064	.203*	.032	.242*	.202*	.250*	.415**
	Sig. (2-tailed)	.230	.222	.070	.182		.000	.064	.085	.042	.002	.778	.551	.564	.004	.062	.339	.128	.109	.018	.849	.826	.535	.047	.759	.017	.048	.014	.000
	N	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96
opt6	Pearson Correlation	.137	.135	.269**	.066	.370**	1	-.062	.080	.092	.003	.005	.039	-.002	-.088	.081	.097	-.137	.024	-.121	.078	.047	-.043	.241*	.102	.041	.227*	.196	.363**
	Sig. (2-tailed)	.182	.190	.008	.521	.000		.547	.439	.372	.978	.961	.702	.986	.394	.434	.347	.184	.813	.240	.450	.647	.677	.018	.323	.689	.026	.055	.000
	N	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96
conf1	Pearson Correlation	-.060	.045	.104	.143	.189	-.062	1	.363**	.262**	.308**	.208*	.245*	.246*	-.345**	.220*	.062	-.091	-.084	.022	.136	.250*	-.337**	.065	.126	.167	.180	.047	.364**
	Sig. (2-tailed)	.559	.666	.313	.164	.064	.547		.000	.010	.002	.042	.016	.016	.001	.031	.548	.377	.418	.830	.185	.014	.001	.529	.222	.104	.079	.651	.000
	N	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96
conf2	Pearson Correlation	.186	.230*	.397**	.089	.177	.080	.363**	1	.346**	.512**	.377**	.404**	.302**	-.258*	.435**	.115	.178	.136	-.010	.410**	.233*	-.095	-.025	.049	.204*	.196	.041	.604**
	Sig. (2-tailed)	.070	.024	.000	.388	.085	.439	.000		.001	.000	.000	.000	.003	.011	.000	.263	.083	.185	.926	.000	.022	.357	.813	.633	.046	.056	.688	.000
	N	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96
conf3	Pearson Correlation	-.001	.166	.168	-.023	.208*	.092	.262**	.346**	1	.386**	.217*	.268**	.360**	-.483**	.354**	.014	.349**	.280**	.032	.506**	.088	.053	.020	-.003	.134	.193	-.094	.475**
	Sig. (2-tailed)	.991	.107	.101	.824	.042	.372	.010	.001		.000	.034	.008	.000	.000	.000	.893	.000	.006	.754	.000	.392	.607	.846	.973	.193	.059	.364	.000
	N	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96
conf4	Pearson Correlation	.122	.043	.204*	-.007	.047	.003	.308**	.512**	.386**	1	.271**	.314**	.473**	-.285**	.352**	.011	.077	.024	.044	.332**	.145	-.120	.137	.072	.230*	.193	.113	.493**
	Sig. (2-tailed)	.234	.677	.046	.946	.652	.978	.002	.000	.000		.008	.002	.000	.005	.000	.913	.458	.814	.673	.001	.158	.245	.183	.486	.024	.060	.272	.000
	N	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96

Correlation table (Pearson Correlation, Sig. (2-tailed), N = 96). ** Correlation is significant at the 0.01 level (2-tailed). * Correlation is significant at the 0.05 level (2-tailed).

Variable	Statistic																												
ill1	Pearson Correlation	.246*	.196	.232*	-.117	.029	.005	.208*	.377**	.217*	.271**	1	.673**	.295**	-.190	.168	-.044	.154	.133	.138	.072	.124	-.111	-.040	-.012	.125	.086	.075	.411**
	Sig. (2-tailed)	.016	.056	.023	.254	.778	.961	.042	.000	.034	.008		.000	.004	.064	.102	.671	.133	.196	.179	.487	.229	.282	.702	.904	.224	.403	.469	.000
	N	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96
ill2	Pearson Correlation	.185	.114	.178	-.087	.062	.039	.245*	.404**	.268**	.314**	.673**	1	.327**	-.243	.228	-.087	.110	.201*	.185	.165	.144	-.080	-.012	-.049	.162	.065	.130	.451**
	Sig. (2-tailed)	.071	.270	.083	.400	.551	.702	.016	.000	.002	.002	.000		.001	.017	.025	.397	.284	.049	.071	.107	.162	.436	.907	.635	.114	.527	.205	.000
	N	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96
ill3	Pearson Correlation	.109	.275**	.279**	-.122	.060	-.002	.246*	.302**	.360**	.473**	.295**	.327**	1	-.514**	.353**	-.027	.275**	.145	.177	.327**	.148	-.169	-.037	-.052	.079	.037	-.057	.403**
	Sig. (2-tailed)	.288	.007	.006	.236	.564	.986	.016	.003	.000	.000	.004	.001		.000	.000	.793	.007	.158	.084	.001	.151	.099	.721	.617	.446	.722	.581	.000
	N	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96
loss1	Pearson Correlation	.115	-.148	-.031	-.294**	-.088	-.345**	-.258*	-.285**	-.190	-.243	-.514**	1	.469**	-.042	-.299**	-.214*	-.052	-.279**	-.137	.076	.042	-.117	-.141	-.356**	-.302**	-.115		-.453**
	Sig. (2-tailed)	.263	.151	.763	.004	.394	.001	.011	.005			.000	.017	.000	.686	.003	.036	.682	.006	.182	.463	.682	.255	.172	.000	.003	.265		.000
	N	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96
loss2	Pearson Correlation	.100	.302**	.250*	-.035	.191	.081	.220*	.435**	.354**	.352**	.168	.228	.353**	.469**	1	.267**	-.042	.242*	.074	.459**	.076	.064	-.062	-.115	.181	.239*	.187	.545**
	Sig. (2-tailed)	.330	.003	.014	.733	.062	.434	.031	.000	.000	.000	.102	.025	.000	.009		.009	.686	.018	.474	.000	.463	.534	.550	.264	.078	.019	.068	.000
	N	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96
loss3	Pearson Correlation	-.034	.171	.058	-.095	.099	.097	.062	.115	.014	.011	-.044	-.087	-.027	-.042	.267**	1	.264*	.001	.064	.064	.147	.061	.103	.061	.178	.234*	.328**	.316**
	Sig. (2-tailed)	.741	.097	.572	.356	.339	.347	.548	.263	.893	.913	.671	.397	.793	.686	.009		.009	.994	.539	.539	.147	.554	.316	.556	.178	.022	.001	.002
	N	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96
loss4	Pearson Correlation	.023	.244*	.198	-.245*	.157	.137	-.091	.178	.349**	.077	.133	.110	.145	-.214*	.242*	.264*	.446**	1	.263**	.049	.142	.207*	.074	.061	.243*	.151	.049	.463**
	Sig. (2-tailed)	.826	.016	.053	.016	.128	.184	.377	.083	.000	.458	.133	.284	.158	.003	.001	.009	.001		.010	.634	.168	.043	.475	.061	.017	.141	.636	.000
	N	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96
loss5	Pearson Correlation	-.011	.233*	.147	-.179	.164	.024	-.084	.136	.280*	.024	.133	.201*	.145	-.214*	.242*	.184	.306**	.446**	1	.187	.058	-.094	.006	.002	.112	.180	-.048	.324**
	Sig. (2-tailed)	.916	.022	.152	.081	.109	.813	.418	.185	.006	.814	.196	.049	.158	.036	.018	.072	.002	.001		.072	.572	.360	.951	.984	.279	.079	.639	.001
	N	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96

Correlation matrix (SPSS output, rotated 90° on the printed page). N = 96 for every cell. Significance markers as printed: * = sig. at the .05 level (2‑tailed); ** = sig. at the .01 level (2‑tailed). Columns C1–C18 are the individual item variables; the final block (herd1…Total) are the sub‑scale/total scores.

		C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16	C17	C18	herd1	herd2	herd3	herd4	herd5	anch1	anch2	anch3	anch4	v	Total
herd 1	Pearson Correlation	.029	.030	.105	-.018	-.241*	-.121	.022	-.010	.032	.044	.138	.185	.177	-.052	.074	-.211*	.187	.184	1	.216*	.071	.066	.081	-.088	.029	-.182	-.112	-.112	.152
	Sig. (2-tailed)	.776	.768	.308	.862	.018	.240	.830	.926	.754	.673	.179	.071	.084	.616	.474	.039	.068	.072		.034	.493	.520	.434	.395	.779	.076	.275	.275	.141
	N	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96
herd 2	Pearson Correlation	-.061	.089	.177	.045	.020	.078	.136	.410**	.506**	.332**	.072	.165	.327**	-.279**	.459**	.064	.263**	.306**	.216*	1	.247*	.067	-.081	-.075	.095	.023	-.090	-.090	.438**
	Sig. (2-tailed)	.552	.391	.085	.667	.849	.450	.185	.000	.000	.001	.487	.107	.001	.006	.000	.539	.010	.002	.034		.015	.515	.432	.468	.358	.825	.382	.382	.000
	N	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96
herd 3	Pearson Correlation	.115	.214*	.035	.063	.023	.047	.250*	.233*	.088	.145	.124	.144	.148	-.137	.076	.147	.049	.058	.071	.247*	1	-.137	-.036	.078	.179	.137	.059	.137	.417**
	Sig. (2-tailed)	.263	.036	.540	.540	.826	.647	.014	.022	.392	.158	.229	.162	.151	.182	.463	.152	.634	.572	.493	.015		.184	.141	.448	.179	.184	.566	.184	.000
	N	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96
herd 4	Pearson Correlation	.036	.086	.172	.003	-.064	-.043	-.337**	-.095	.053	-.120	-.111	-.080	-.169	.042	.064	.061	.142	-.094	.066	.067	-.137	1	-.036	.064	.106	-.064	-.171	-.228*	.024
	Sig. (2-tailed)	.725	.406	.093	.980	.535	.677	.001	.357	.607	.245	.282	.436	.099	.682	.534	.554	.168	.360	.520	.515	.184		.731	.537	.303	.537	.097	.025	.816
	N	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96
herd 5	Pearson Correlation	-.013	-.130	-.040	-.073	.203*	.241*	.065	-.025	.020	.137	-.040	-.012	-.037	-.117	-.062	.103	-.207*	.006	.081	-.081	-.036	-.036	1	-.036	.243*	.017	.034	.217*	.305**
	Sig. (2-tailed)	.903	.207	.698	.482	.047	.018	.529	.813	.846	.183	.702	.907	.721	.255	.550	.316	.043	.951	.434	.432	.141	.731		.731	.017	.846	.034	.034	.003
	N	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96
anch 1	Pearson Correlation	.021	-.025	-.054	-.078	.032	.102	.126	.049	-.003	.072	-.012	-.049	-.052	-.141	-.115	.061	.074	.002	-.088	-.075	.078	.064	-.036	1	.243*	.285**	.005	.253*	.236
	Sig. (2-tailed)	.840	.812	.602	.453	.759	.323	.222	.633	.973	.486	.904	.635	.617	.172	.264	.556	.475	.984	.395	.468	.448	.537	.846		.017	.005	.537	.013	.021
	N	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96
anch 2	Pearson Correlation	.179	.004	.063	.060	.242*	.041	.167	.204*	.134	.230*	.125	.162	.079	-.356**	.181	.178	.243*	.112	.029	.095	.179	.106	.243*	.243*	1	.285**	.013	.349**	.533**
	Sig. (2-tailed)	.081	.970	.541	.564	.017	.689	.104	.046	.193	.024	.224	.114	.446	.000	.078	.082	.017	.279	.779	.358	.179	.303	.017	.017		.005	.905	.000	.000
	N	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96
anch 3	Pearson Correlation	.007	.143	.032	-.164	.202*	.227*	.180	.196	.193	.193	.086	.065	.037	-.302**	.239*	.234*	.151	.180	-.182	.023	.137	-.064	.017	.285**	.285**	1	.349**	.267**	.420**
	Sig. (2-tailed)	.948	.166	.754	.111	.048	.026	.079	.056	.059	.060	.403	.527	.722	.003	.019	.022	.141	.079	.076	.825	.137	.537	.846	.005	.005		.000	.009	.000
	N	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96
anch 4	Pearson Correlation	.208*	.045	.013	.024	.250*	.196	.047	.041	-.094	.113	.075	.130	-.057	-.115	.187	.328**	.049	-.048	-.112	-.090	.059	-.171	.034	.005	.013	.349**	1	.319**	.319**
	Sig. (2-tailed)	.042	.662	.901	.813	.014	.055	.651	.688	.364	.272	.469	.205	.581	.265	.068	.001	.636	.639	.275	.382	.566	.097	.034	.537	.905	.000		.002	.002
	N	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96
Total	Pearson Correlation	.387**	.478**	.549**	.057	.415**	.363**	.364**	.604**	.475**	.493**	.411**	.451**	.403**	-.453**	.545**	.316**	.463**	.324**	.152	.438**	.417**	.024	.305**	.236	.533**	.420**	.319**	.380**	1
	Sig. (2-tailed)	.000	.000	.000	.582	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.002	.000	.001	.141	.000	.000	.816	.003	.021	.000	.000	.002	.000	
	N	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96

Table (4) Descriptive statistics for the Dependent variables before data winsorizing

Variable	N.	Mean	Std. Dev.	Min.	Max.
TDR	96	.3134502	.8472979	0	7.919574
WACC	96	.1416219	.2021028	0	1.10263
CAPEX	96	.1416219	.2021028	0	1.10263

Table (5) Skewness and kurtosis tests for normality before winsorizing

Variable	N.	Pr skewness	Pr kurtosis	Joint test Adj chi2(2)	Prob>chi2
TDR	96	0.0000	0.0000	125.07	0.0000
WACC	96	0.2331	0.0000	19.49	0.0001
CAPEX	96	0.0000	0.0000	53.32	0.0000

Table (6) Descriptive statistics for the traditional firm characteristics before data

Variable	N.	Mean	Std. Dev.	Min.	Max.
Tangibility	96	0.4304	0. 2442	0.0098	0.9844
Profitability	96	-0.1288	1.3463	-12.107	0.4762
Size	96	13.1850	2.4276	0	17.6528
Growth	96	0.6525	1.0118	0.0115	9.3972

Table (7) Response rates for the debt question (Section D)

What factors affect your decision on the appropriate amount of debt for your firm?	%
Financial flexibility	0.40
The volatility of the firm´s earnings and cash flows	0.39
Firm´s credit rating	0.34
The transactions costs and fees for issuing debt	0.31
Minimization of the overall cost of capital of the firm	0.27
The tax advantage of interest deductibility	0.24
Minimization of the amount of debt of the firm	0.18
N/A	0.16
The appropriate amount of debt is no debt at all	0.11
To have enough debt that the firm is not an attractive takeover target	0.09
The personal tax cost of the firm´s investors face when they receive interest income	0.03

Table (8) Response rates for the foreign debt question (Section D)

What factors affect your firm's decisions about issuing foreign debt?	%
Foreign interest rates may be lower than domestic interest rates	0.34
N/A	0.27
Natural hedge	0.25
Keeping the ''source of funds'' close to the ''use of funds''	0.20
Exposure of the company to those foreign market	0.20
Foreign regulations require the firm to issue debt abroad	0.14
Other	0.08
The observations of the decision other companies in the sector are doing	0.07
Different corporate tax rates	0.06

Table (9) Response rates for the equity question (Section D)

What factors affect your firm's decisions about issuing common stock?	%
Maintaining target debt-to-equity ratio	0.31
Cheapest source	0.26
Inability to obtain funds using other sources	0.24
It gives investors a better impression	0.24
Providing shares to employee bonus/stock option plans	0.19
Least risky source	0.16
Equity ownership majorities	0.13
If the stock price has recently risen	0.10

Table (10) Response rates for the impact of covid-19 question (Section D)

Have financial market conditions (specifically the COVID-19) caused you to change the way you estimate and use the cost of capital? If so, how?	%
No	0.76
Yes	0.24

Reasonings for the firms that answered Yes:

- Payment of outstanding loans and tax liability and maintain stock reserve to reduce external liabilities of the company
- Became more conservative
- All targets changed due to the faced losses
- Revenues shrinkage that might lead to the increase debt usage in the future
- Higher weight for market and financial risks
- Reducing employees' number
- Reducing the cost of debt by choosing least interest debt
- The company in real estate market was negatively affected, however the cost of capital estimation did not change.
- Low rate of production and higher competition due to large supply
- The impact of the pandemic on future growth has been reviewed
- Increase in supply in the local market and the decrease in consumer demand with a low level of per capita income

Table (11) Logit hierarchical regression

VARIABLES	(1)	(2)	(3)	(4)
Tangibility	-1.417	-1.245	-1.739	-0.990
	(1.307)	(1.294)	(1.839)	(1.843)
Profitability	3.785	3.681	4.055	2.496
	(2.625)	(2.683)	(3.574)	(3.468)
Size	-0.318	-0.293	-0.387	**-0.448****
	(0.203)	(0.203)	(0.327)	(0.215)
Growth	**-4.610*****	**-4.966*****	**-6.711****	**-7.914****
	(1.622)	(1.787)	(2.606)	(3.461)
Age		-0.0967	-0.207	-0.754
		(0.369)	(0.444)	(0.529)
Gender		-0.841	-0.920	-2.573
		(0.836)	(1.170)	(1.688)
Education level		0.145	0.371	1.036
		(0.527)	(0.590)	(0.690)
Marital status		0.329	1.150	0.746
		(0.742)	(1.431)	(1.493)
Optimism			-0.423	-0.500
			(0.668)	(0.676)
Overconfidence			0.755	**1.818****
			(0.773)	(0.909)
Illusion of control			-0.957	**-1.134***
			(0.587)	(0.633)
Loss aversion			0.931	1.122
			(0.835)	(0.750)
Herding			-0.0893	0.109
			(0.464)	(0.494)
Anchoring			-0.403	-0.783
			(0.520)	(0.496)
Extraversion			0.239	-0.160
			(0.463)	(0.446)
Conscientiousness			-0.365	-0.725
			(0.601)	(0.552)
Agreeableness			0.415	0.608
			(0.483)	(0.515)
Emotional stability			0.0525	0.209
			(0.551)	(0.517)
Openness			-0.532	-0.606
			(0.532)	(0.633)
Financial literacy			-0.258	0.167
			(1.360)	(1.549)
CFO membership				22.80
				(17.99)
CFO BM*Optimism				-6.293
				(8.445)
CFO BM*Overconfidence				**-27.55*****
				(5.993)

CFO BM*Illusion of control				5.431
				(5.064)
CFO BM*Loss aversion				6.423
				(16.43)
CFO BM*Herding				1.764
				(5.683)
CFO BM*Anchoring				**13.60*****
				(5.239)
Constant	5.158**	4.486	7.286	6.538
	(2.571)	(3.117)	(7.126)	(6.857)
Observations	96	96	96	96

Table (12) logit regression for the significant factors

VARIABLES	Probability of becoming debt free
Size	**-0.413**
	(2.16) *
Growth	**-3.918**
	(2.53) *
Cash hold	2.927
	(1.13)
Non-debt tax shield	**-62.430**
	(2.13) *
Dividends payout	14.950
	(1.70)
Constant	6.281
	(2.90) **
N	96

Table (13) Hierarchical regression using WACC as dependent variable (Debt free firms)

VARIABLES	(1)	(2)	(3)	(4)
Tangibility	0.154	0.309	0.207	1.698
	(0.541)	(0.757)	(1.622)	(0.579)
Profitability	0.467	0.575	-1.633	**-3.120***
	(0.559)	(0.751)	(1.536)	(0.365)
Size	0.0211	0.0641	-0.202	**-0.257***
	(0.0749)	(0.0744)	(0.128)	(0.0242)
Growth	0.239	-0.0500	0.755	2.120
	(0.712)	(0.650)	(0.926)	(0.479)
Age		0.0743	0.236	1.005
		(0.308)	(0.425)	(0.229)
Gender		0.282	-0.411	-0.360
		(0.369)	(0.544)	(0.137)
Education level		-0.0646	-0.953	**-1.704***
		(0.247)	(0.489)	(0.197)
Marital status		0.863	-0.190	-1.195
		(0.494)	(0.796)	(0.265)
Optimism			0.308	0.555

			(0.465)	(0.130)
Overconfidence			1.694	2.341
			(1.535)	(0.391)
Illusion of control			-0.425	-0.350
			(0.470)	(0.130)
Loss aversion			0.564	**0.834***
			(0.580)	(0.121)
Herding			-0.458	-0.545
			(0.768)	(0.175)
Anchoring			0.0401	-0.312
			(0.301)	(0.109)
Extraversion			-0.493	**-1.113***
			(0.388)	(0.169)
Conscientiousness			-1.151	-1.510
			(1.207)	(0.274)
Agreeableness			0.754	**0.803***
			(0.646)	(0.122)
Emotional stability			-0.145	-0.476
			(0.450)	(0.117)
Openness			-0.654	**-1.003***
			(0.341)	(0.109)
Financial literacy			-1.250	-2.349
			(0.885)	(0.466)
CFO membership				1.896
				(0.493)
Constant	-1.233	-2.498	5.668	10.28*
	(1.027)	(2.069)	(3.970)	(1.121)
Observations	23	23	23	23
R-squared	**0.039**	**0.378**	**0.957**	**0.998**

Table (14) Hierarchical regression using WACC as dependent variable (Debt firms)

VARIABLES	(1)	(2)	(3)	(4)
Tangibility	**0.646****	**0.730****	**0.735***	**1.025****
	(0.275)	(0.292)	(0.402)	(0.460)
Profitability	**-0.112*****	**-0.115*****	**-0.0943*****	**-0.0951*****
	(0.0383)	(0.0403)	(0.0256)	(0.0275)
Size	**-0.0513***	-0.0466	-0.0267	0.00326
	(0.0287)	(0.0301)	(0.0327)	(0.0356)
Growth	0.415	0.398	0.442	0.349
	(0.332)	(0.351)	(0.338)	(0.332)
Age		-0.0232	0.0379	-0.0842
		(0.0959)	(0.103)	(0.134)
Gender		-0.274	-0.315	-0.185
		(0.253)	(0.265)	(0.328)
Education level		0.0876	0.146	**0.225***
		(0.136)	(0.112)	(0.132)
Marital status		-0.237	-0.402	-0.204
		(0.269)	(0.312)	(0.390)

Optimism			-0.0994	0.0240
			(0.109)	(0.125)
Overconfidence			**-0.443***	**-0.422**
			(0.154)	(0.178)
Illusion of control			0.138	0.0352
			(0.141)	(0.168)
Loss aversion			-0.0734	-0.0698
			(0.176)	(0.208)
Herding			0.0790	0.118
			(0.116)	(0.151)
Anchoring			0.115	0.0946
			(0.115)	(0.124)
Extraversion			**0.270***	**0.362***
			(0.0887)	(0.109)
Conscientiousness			-0.00974	0.0110
			(0.157)	(0.162)
Agreeableness			-0.0431	0.00459
			(0.0987)	(0.122)
Emotional stability			0.141	0.0918
			(0.130)	(0.134)
Openness			-0.116	-0.0727
			(0.0962)	(0.122)
Financial literacy			**0.635**	**0.609***
			(0.272)	(0.356)
CFO membership				**6.344**
				(3.013)
CFO BM*Optimism				**-1.279**
				(0.579)
CFO BM*Overconfidence				-0.400
				(0.480)
CFO BM*Illusion of control				0.178
				(0.313)
CFO BM*Loss aversion				0.149
				(0.362)
CFO BM*Herding				-0.0768
				(0.297)
CFO BM*Anchoring				-0.207
				(0.388)
Constant	-0.765	-0.856	-1.356	-2.753
	(0.517)	(0.851)	(1.249)	(1.658)
Observations	73	73	73	73
R-squared	**0.215**	**0.242**	**0.441**	**0.499**

Table (15) Hierarchical regression using CAPEX as dependent variable (Debt free firms)

VARIABLES	(1)	(2)	(3)	(4)
Tangibility	-0.186	-0.216	0.0829	-0.0404
	(0.110)	(0.126)	(0.261)	(0.643)
Profitability	0.110	0.0207	0.122	0.245
	(0.153)	(0.185)	(0.257)	(0.406)
Size	0.0155	-0.000980	-0.0503	-0.0458
	(0.0163)	(0.0124)	(0.0225)	(0.0269)
Growth	**-0.264***	-0.181	-0.292	-0.405
	(0.142)	(0.152)	(0.197)	(0.532)
Age		0.0254	0.0528	-0.0108
		(0.0505)	(0.0740)	(0.254)
Gender		**-0.112****	-0.252	-0.256
		(0.0459)	(0.0944)	(0.152)
Education level		-0.0686	-0.0491	0.0130
		(0.0543)	(0.0680)	(0.219)
Marital status		**-0.210****	**-0.440***	-0.357
		(0.0767)	(0.142)	(0.295)
Optimism			0.147	0.127
			(0.0974)	(0.144)
Overconfidence			0.714	0.660
			(0.289)	(0.434)
Illusion of control			-0.205	-0.211
			(0.0996)	(0.145)
Loss aversion			0.0344	0.0120
			(0.104)	(0.134)
Herding			-0.336	-0.328
			(0.140)	(0.195)
Anchoring			0.134	0.163
			(0.0587)	(0.121)
Extraversion			0.0582	0.109
			(0.0638)	(0.188)
Conscientiousness			-0.379	-0.350
			(0.216)	(0.304)
Agreeableness			0.139	0.135
			(0.0974)	(0.135)
Emotional stability			-0.101	-0.0738
			(0.0745)	(0.130)
Openness			-0.128	-0.0993
			(0.0687)	(0.121)
Financial literacy			0.379	0.470
			(0.240)	(0.517)
CFO membership				-0.157
				(0.547)
Constant	0.0797	0.653*	0.832	0.451
	(0.216)	(0.328)	(0.683)	(1.244)
Observations	23	23	23	23
R-squared	**0.318**	**0.458**	**0.955**	**0.959**

using CAPEX as dependent variable (Debt firms)

VARIABLES	(1)	(2)	(3)	(4)
Tangibility	**-0.154****	**-0.142***	**-0.240****	-0.229
	(0.0725)	(0.0726)	(0.112)	(0.147)
Profitability	0.00685	0.00710	0.0105	0.0104
	(0.00479)	(0.00503)	(0.00727)	(0.00801)
Size	0.00389	0.00641	0.00472	0.00323
	(0.00796)	(0.00857)	(0.00892)	(0.0124)
Growth	**-0.142****	**-0.148****	**-0.125***	**-0.138****
	(0.0592)	(0.0623)	(0.0631)	(0.0659)
Age		-0.0198	0.00733	0.00414
		(0.0317)	(0.0335)	(0.0500)
Gender		-0.0606	-0.0554	-0.0803
		(0.0588)	(0.0625)	(0.0705)
Education level		-0.0123	0.00275	0.00561
		(0.0269)	(0.0282)	(0.0356)
Marital status		-0.0597	-0.0979	-0.118
		(0.0671)	(0.0714)	(0.0887)
Optimism			-0.0295	-0.0326
			(0.0349)	(0.0456)
Overconfidence			-0.0416	-0.0296
			(0.0438)	(0.0490)
Illusion of control			0.0519	0.0407
			(0.0489)	(0.0643)
Loss aversion			0.000667	0.0144
			(0.0593)	(0.0665)
Herding			-0.0231	-0.0191
			(0.0420)	(0.0520)
Anchoring			**0.0487***	0.0480
			(0.0289)	(0.0338)
Extraversion			-0.0194	-0.0304
			(0.0279)	(0.0364)
Conscientiousness			0.00814	0.00443
			(0.0459)	(0.0506)
Agreeableness			-0.0275	-0.0289
			(0.0349)	(0.0403)
Emotional stability			-0.0181	-0.0162
			(0.0278)	(0.0308)
Openness			-0.0457	-0.0482
			(0.0283)	(0.0340)
Financial literacy			0.0246	0.0485
			(0.0901)	(0.103)
CFO membership				0.207
				(1.183)
CFO BM*Optimism				0.0332
				(0.188)
CFO BM*Overconfidence				-0.132
				(0.241)

CFO BM*Illusion of control				0.113
				(0.135)
CFO BM*Loss aversion				0.0123
				(0.152)
CFO BM*Herding				-0.0128
				(0.0892)
CFO BM*Anchoring				-0.0725
				(0.148)
Constant	0.227	0.344*	0.647**	0.685*
	(0.146)	(0.201)	(0.298)	(0.397)
Observations	73	73	73	73
R-squared	**0.123**	**0.151**	**0.280**	**0.305**

Table (17) Principal components analysis – eigen values greater than one

PCA for	Component	Eigenvalue	Cumulative
Firm characteristics	Comp 1	1.54775	0.3869
	Comp 2	1.21048	0.6896
Managerial demographics	Comp 1	1.94565	0.4864
	Comp 2	1.01572	0.7403
Behavioral characteristics	Comp 1	2.16245	0.3604
	Comp 2	1.13612	0.5498
Personality traits	Comp 1	1.59088	0.3182
	Comp 2	1.20717	0.5596
Interception	Comp 1	5.89585	0.9826

Table (18) Eigenvectors- without rotation

	Variable	Comp1	Comp2
Firm characteristics	Tangibility	-0.4868	**-0.5558**
	Profitability	-0.2703	**0.7546**
	Size	**0.5873**	0.1835
	Growth	**0.5874**	-0.2968
Managerial demographics	Age	**0.5534**	-0.0758
	Gender	**-0.5813**	-0.1284
	Education level	0.0278	**0.9837**
	Marital status	**0.5959**	-0.1007
Behavioral characteristics	Optimism	0.3967	0.2152
	Overconfidence	**0.5056**	-0.4036
	Illusion of control	0.4233	**-0.5636**
	Loss aversion	0.3444	0.4185
	Herding	0.4312	0.0933
	Anchoring	0.3215	**0.5378**
Personality traits	Extraversion	-0.0838	**0.733**
	Conscientiousness	**0.6658**	0.1283
	Agreeableness	0.0119	**-0.5788**
	Emotional stability	**0.5603**	-0.2352
	Openness	0.4854	0.2363
Interceptions	CFO BM*Optimism	0.4068	
	CFO BM*Overconfidence	0.4098	
	CFO BM*Illusion of control	0.4071	NA
	CFO BM*Loss aversion	0.41	
	CFO BM*Herding	0.4074	
	CFO BM*Anchoring	0.4084	

Figures
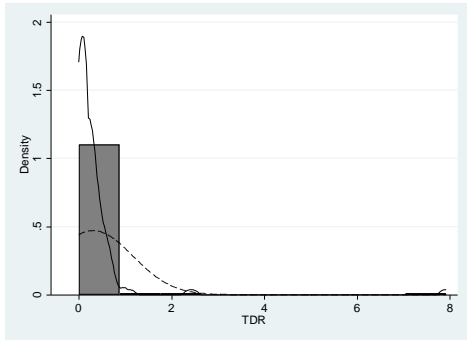
Figure (1) Histogram of TDR non-winsorized
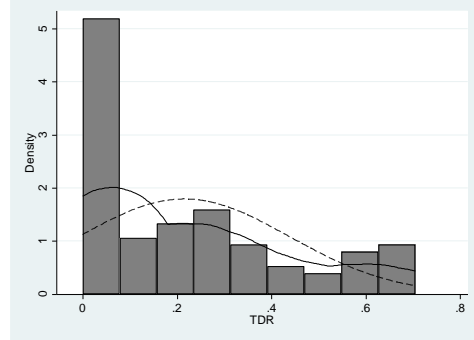
Figure (2) Histogram of TDR winsorized
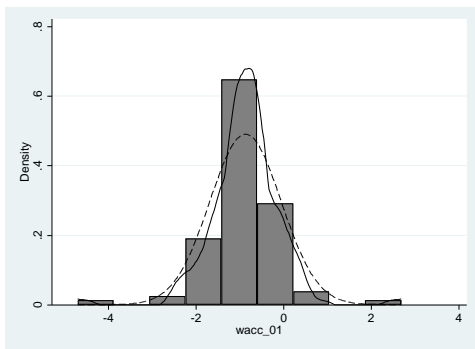
Figure (3) Histogram of WACC non-winsorized
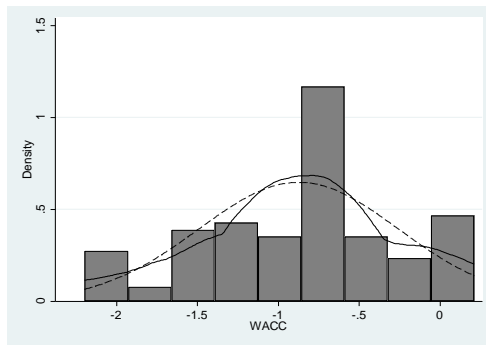
Figure (4) Histogram of WACC winsorized
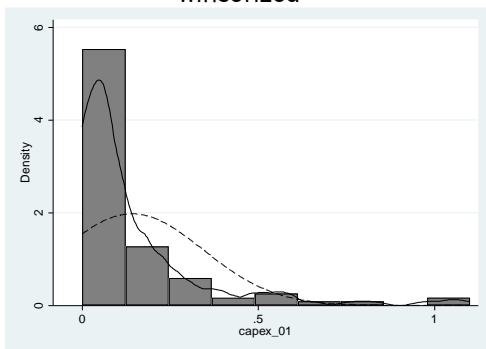
Figure (5) Histogram of CAPEX non-winsorized
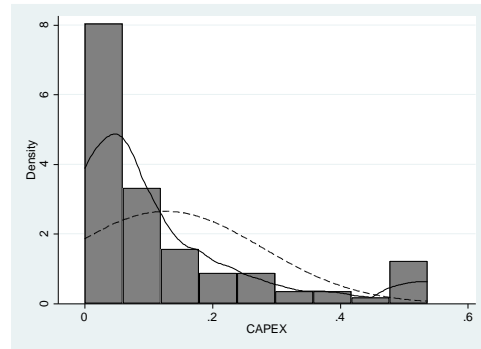
Figure (6) Histogram of CAPEX winsorized
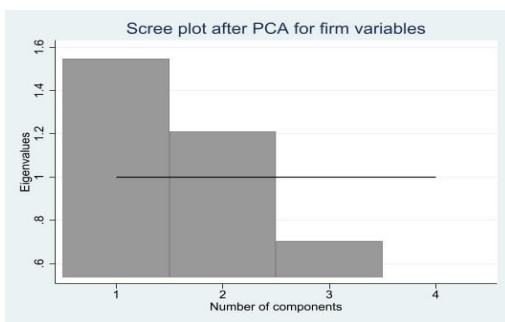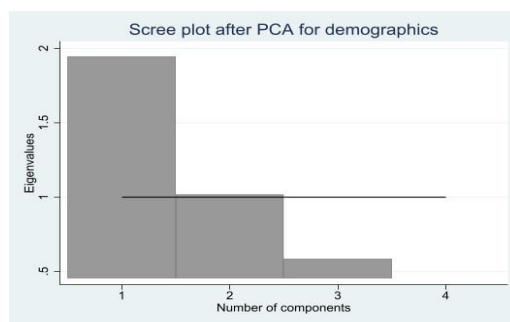

Figure (7) Scree plot for firm variables
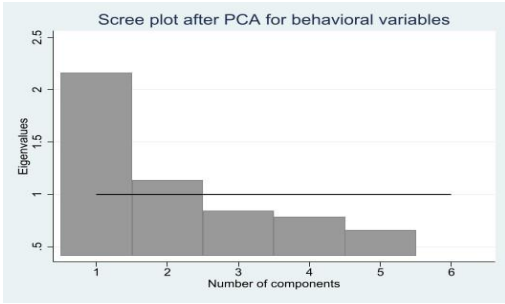

Figure (8) Scree plot for demographics
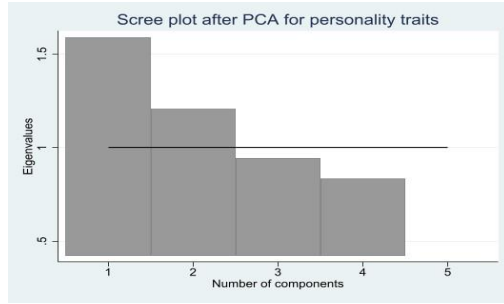
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Figure (9) Scree plot for behavioral variables
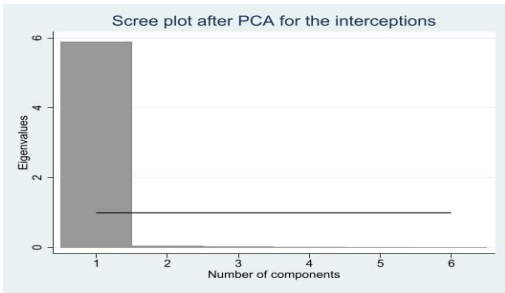

Figure (10) Scree plot for personality traits

Figure (11) Scree plot for interceptions
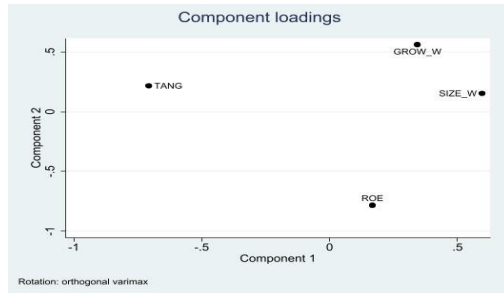
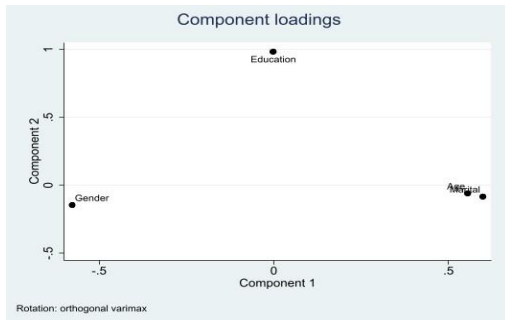Figure (12) Loading plot for firm variables
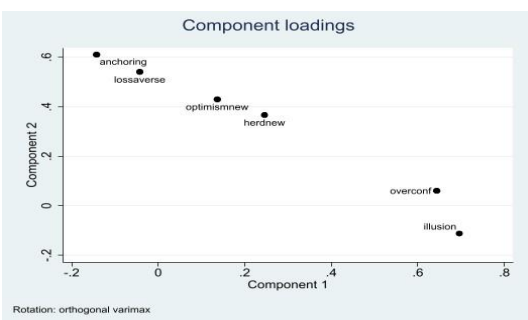

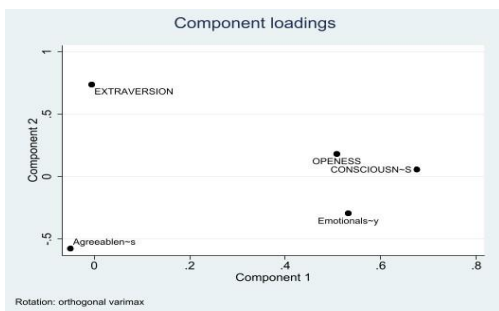Figure (13) Loading plot for demographics

Figure (14) Loading plot for behavioral

Figure (15) Loading plot for personality traits