

The Influence of Cognitive Bias of the Managers in the Selection and use of Capital Budgeting Techniques: Evidence of Sri Lanka

Samsudeen Thowfeek Ahamed¹ - Sri Lanka Institute of Advanced Technological Education (SLIATE)¹.
Athambawa Haleem² - South Eastern University of Sri Lanka²

Article Info

Volume 83

Page Number: 8755 - 8767

Publication Issue:

May - June 2020

Abstract:

This study examines the influence of cognitive bias of the managers in the selection and usage practice of capital budgeting techniques of listed companies in Colombo Stock Exchange (CSE). Although many studies have been conducted in relation to behavioral finance and corporate decisions, sufficient evidences have not yet been found from the previous seminal works relating to the influence of cognitive behavioral biases of managers in the selection and usage practice of the quantitative techniques of capital budgeting process (CBT) or capital investment decision process. Therefore, this study was aimed to investigate three closely related behavioral biases (managerial overconfidence, optimism and risk perception bias) and their influence on the selection and usage practice of capital budgeting techniques in Sri Lanka. The primary data were collected for this study using a self-administered questionnaire from 104 CFOs working in listed companies in CSE. The study revealed that CFOs optimism and overconfidence were positively correlated with the advanced capital budgeting methods only in NPV and statistically not significant with IRR and PI. Meanwhile, both cognitive biases were statistically not significant with PB, ARR and DPB of simple capital budgeting methods. However, CFOs optimism and overconfidence were positively correlated with RO and SA of sophisticated capital budgeting methods. Meanwhile, CFOs risk perception was not supported with any of the methods other than PB. The study also summarized that firms in listed in CSE rarely use sophisticated capital budgeting methods for their capital investment decision. This study concludes that manager's behavioral characteristics significantly influence on the selection and usage practice of capital budgeting techniques of listed companies in Colombo Stock Exchange (CSE).

Keywords: Behavioral Finance, Managers cognitive bias, Capital Budgeting Techniques, Optimism, Overconfidence and Risk perception.

Article History

Article Received: 19 November 2019

Revised: 27 January 2020

Accepted: 24 February 2020

Publication: 18 May 2020

INTRODUCTION

Background of the Study

Firms around the world behave differently even if they are similar in all aspects. What causes them to behave the way they do is not well understood question among many corporates (Graham & Harvey, 2008). This is due to the irrational behavior and individual heterogeneity of managers who make errors in corporate decisions (Hackbarth, 2008). The major three decisions in traditional corporate finance are investment, financing and dividend decisions (Shefrin, 2001). The theories of

traditional finance operate with fundamental assumptions in the real market. According to Fama (1970) documented three basic assumptions in traditional finance; firms' prime objective is to maximize profit, operate in an efficient market and decision makers are rational in nature. Meanwhile, behavioral finance argues that the decision makers are irrational due to their individual heterogeneity (Heaton, 2002). Hence, managers who make errors in the corporate decisions which in turn affect the firm's value. They represent a systemic bias in decision making processes and these biases include

overconfidence, optimism, representativeness, anchoring, personal risk aversion, bounded rationality and mental accounting and many more (Baker et al., 2004; Barberis, & Thaler, 2003; Malmendier & Tate (2005); Hackbarth (2008). Over the last two decades, an increasing amount of literature have attempted to investigate many irrational errors and behaviors of managers related to financing decision. Landier and Thesmar (2009); Gervais (2010); Malmendier, Tate and Yan, (2011); Gervais, Heaton and Odean (2011); Graham et al., (2013) and Bin Xu (2014) were some of the prominent studies. Managers' individual bias and their characteristics have a significant influence on corporate decisions (Hackbarth, 2009). As a result, the studies on behavioral corporate finance keeps on expanding and explores to investigate the effects of managers' irrational behavior. However, existing empirical studies so far have been discussed only the influence of managers' behavioral bias on financing decision or financing choice. Nonetheless, sufficient evidence have not yet been found from the previous seminal works relating to the influence of cognitive behavioral biases of managers in the selection and usage practice of the quantitative techniques of capital budgeting process (CBT) or capital investment decision process. Firm's survival and success in the long-run depend on effective investment decision where capital budgeting is one of the crucial components in the investment project which impacts on the performance of the firm (Bennouna, Meredith & Marchant 2010). However, cognitive behavioral bias of chief executives may allow, sometime, to make errors and mistakes in the selection techniques on the decision of capital budgeting. This will result in poor firm performance and eventually affect the firm value. Studies related to capital budgeting and behavioral aspects of managers are rare in nature and not popular in most of the developing countries over the last two decades (Lingesiya, 2016). Hence, a need is emerged to study and investigate the influence of cognitive behavioral biases of managers in the selection techniques as a part of the capital budgeting process, especially in developing countries. This is a considerable omission in the existing literature in the context of developing economy like Sri Lanka. Therefore, a theory-practice gap is emerged to be investigated the influence of managers cognitive behavioural bias and selection techniques in the process of capital budgeting as the quantitative methods play prominent role in the success of capital investment project. Sri Lanka is a developing

market, marching towards upper middle-income economy from lower middle-income economy. The country also marked with lower per capita income of USD 5000 in 2018 and aims to enhance to USD 10000 mark by 2020 (www.cbsl.lk). Sri Lanka is basically confronted with bank base finance with the less mature capital market. As a result, the country faces difficulties in attracting Foreign Direct Investment (FDI) and heavily depend on more debt finance (Ravi, 2015). Despite the importance of this issue, according to the researcher's knowledge, there is a dearth of published research in the Sri Lankan context which deals with behavioural finance and capital budgeting needed to be desperately investigated. Hence, given the importance of this fact that the researcher attempt to examine the three closely related behavioral biases of corporate managers (Managerial Optimism, Overconfidence and Risk Aversion) and the influence of these factors in the selection and usage techniques of capital budgeting for developing corporate world like Sri Lanka. This could be the first attempt that the researcher is trying to do a survey on this area and bring a novel contribution to the area of behavioral finance.

Research Problem

Among the three corporate decisions in Traditional finance, the decision on capital budgeting is one of the three prominent decisions where firms are trying to find out the answer the questions of what and how much of funds to be invested in a viable project (Khan & Jain, 2007; Verbeeten, 2006). The major issues for almost all the firms around the world are that the finance available for capital investment is limited and the environment in which they operate is so complex and volatile that posits many challenges to managers for making an efficient capital investment decision (Kersyte, 2011). As a result, finance managers have to take a careful step as they allocate resources across the firm to make sure the capital investment project provides firm a positive cashflow and maximize shareholder wealth. Capital budgeting passes through many stages in the process which could be documented as pre and post-implementation of capital budgeting project (Mukherjee & Henderson, 1987). Further, according to Dayananda et al. (2002) stated that quantitatively analyzing the financial appraisal is the key element, which encounters a systematic financial analysis, during the capital budgeting decision-making process that helps finance managers to maximize firm value and shareholder wealth. The way of selecting the

finest capital investment project, which gives positive cashflow in the long-run, primarily depends on choosing the right capital budgeting tools or techniques (Wnuk-Pel, 2014). Hence, uses of accurate Capital Budgeting Technique to forecast the future cashflow is a vital component in the financial appraisal which helps the firm identify viable capital investment project. The selection and the use of CB techniques are not subjective, lots of textbooks recommend to deploy Discounted Cash-flow (DCF) methods while others rejecting due to some limitations. Potential errors cannot be avoided on the suitability of selecting and using appropriate capital budgeting techniques (Graham, Harvey & Puri, 2013). Despite the fact that finance managers are compelled to select and use the right CB techniques in the capital budgeting decision-making process which may deteriorate the future positive cash flow of the project and weaken the wealth of the shareholder (Barwise et al., 1989). Moreover, capital budgeting decision is one of the greatest challenges confronts by Finance Managers, especially choosing appropriate techniques in the process of capital budgeting which helps them to maximize firm value. However, these decisions are not depending solely on strict technical, economical calculations (Shefrin, 2001) and the calculations to rely on the manager's knowledge, abilities and awareness of them (Bertrand & Schoar, 2003). Human factors, past experiences, culture and individual characteristics of managers are also important in corporate decisions (Kaplan, Klebanov & Sorensen, 2007). In view of all that has been mentioned above highlights that the degree of involvement by finance managers is greater on the selection and use of techniques in the capital budgeting decision-making process than other factors. Irrational behavioural errors and mistakes leave by managers during the process of capital budgeting decision-making is an important obstacle to maximize firm value which derives from managers' cognitive imperfection and emotional influence (Graham, Harvey & Puri, 2013; Leon et al., 2008;). Notwithstanding, the theory of traditional finance assumes and argues that senior managers are rational when they make corporate decisions (Puri & Robinson, 2007). Nonetheless, Shefrin, (2001) found that managers influence on the capital investment project either by overestimating or underestimating the future cash flow due to the variation in their individual heterogeneity. As a result, findings from the past surveys with regards to capital budgeting, the choice over capital budgeting

techniques and investment decision needed to be reviewed whether the adverse results are derived in the above decisions due to managerial errors and biases. In support of the above argument, (Lin, Hu & Chen, 2008) demonstrated that the recent market shock in may emerging countries like Malaysia, Taiwan and Brazil has created a loss of faith of investors in the stock market of these countries. As a result, they believe that this uncertain situation happened due to an irrational decision made by executive managers. Moreover, the key argument needed to be developed from the findings of Morawakage & Nimal (2015) that Colombo Stock Exchange (CSE) experiences leverage effect which is believed to be held due to the irrational decision made by corporate managers in the investment decision. Hence, there is a serious concern that these issues pertain due to bias decisions and errors made by corporate manager on the choice over capital budgeting techniques in capital budgeting decision-making process. As a result, an important question needs to be raised over the behavioral biases of corporate managers whether they influence significantly on the choice over the techniques of capital budgeting in a capital investment project. Behavioral finance becomes the fastest growing theory in financial management which influence on three important corporate decision such as investment, financing and payout decision. A significant number of studies related to managerial behavioral finance has been carried out by many scholars in the developed market during the last three decades. However, the same studies are not very much popular in the Asian market and there is a dearth of literature in relation to capital budgeting and behavioural finance. Therefore, developing market like Sri Lanka would pose challenges in applying managers' corporate decision with their behavioral biases. Such an incomplete perspective on the business problem has raised serious issues in recent studies on corporate finance (Huang, Joseph, Shieh & Yu, 2016). Therefore, this study aims at examining the influence of three closely related behavioral characteristics of corporate managers, extensively documented in behavioral corporate finance (Managerial optimism, overconfidence and risk perception) on the pick over the techniques of capital budgeting decisions-making process. This would be a fairly novel contribution to the existing literature and brings new insights for empirical evidence in developing economy like Sri Lanka. Hence, the core objective of this study is to examine the influence of managers' cognitive

behavioral bias in the choice over the techniques of capital budgeting decision-making of companies which are listed in CSE.

Literature Review

Traditionally, financial managers need to concentrate on three important decisions to maximize firm value subsequent to improve the wealth of the shareholder (Graham, Harvey & Puri, 2015). The first and foremost is the investment decision in which managers seek to identify a viable long-term investment project to generate positive cashflow (Freeman & Hobbes, 1991). Financing is another vital decision to make a choice between the use of debt and equity to make sure the flow of funds for identified potential investment project (Pike & Neale, 2009). Dividend decision is the third decision which needs an answer on how to reward the shareholder (Azhagaiah & Sabari, 2008). According to the modern theory of the firm, Maximizing the firm value is the core objective of any organization. In order to achieve this objective, managers get involved in three valuable corporate decision (investment, financing and dividend) of which investment decision is the key to achieve the financial goal as it brings positive cash flow in long run to the organization. (Mustapha and Mooi 2001). Firm's survival and wealth maximization are basically depending on long-term positive investment decision (Bennouna, Meredith & Marchant, 2010). The investment decision can be made by the organization in the form of different projects selection through strong capital budgeting decision-making process. Thus, the stage of quantitative analysis in the project selection or investment decision is one of the important aspects in the process. Hence, selecting accurate techniques or methods helps the firm to make sure that the investment project brings positive future cash flow. Hence, it is apparently important to discuss the related concepts of capital budgeting and various stages in the capital budgeting decision-making process.

Capital Budgeting

Several scholars have attempted to provide different definitions for Capital budgeting decisions (CB). According to financial management theory, CB is defined as the process of analyzing and selecting long-term investments opportunities to maximize shareholder wealth (Kalyebara & Islam, 2014; Dayananda Irons, Harrison, Herbohn, & Rowland., 2002; Peterson &

Fabozzi, 2002; Schlegel, Frank, & Britzelmaier, 2016). Capital Budgeting involves a colossal amount of money to be invested, as a result, the decision must be made carefully to ensure the positive cash flow in long-run which maximize firm value (Pike, 1988; Pike & Neale, 2009; Hermes, Smid, & Yao, 2007). Hence, the investment on capital projects is being evaluated based on a number of important variables such as time value of money, assumption of economic condition, qualitative judgement, the techniques deployed to assess the project and many more. As a quantitative tool, the Technique or Methods of Capital Budgeting is of a vital factor which is applied in the capital budgeting decision-making process. As a result, a significant number of researchers trying to study the nature of capital budgeting methods, their selection criteria, its usage pattern, its practices that the firms do around the world and the determining factors in the selection process. Thus, several definitions were emerged for the past two decades in relation to capital budgeting decision, the methods of capital budgeting and capital budgeting practices. Accordingly, Verbeeten (2006) stated that 'Capital budgeting decisions are the methods and techniques used to evaluate and select an investment project' (p.31). Moreover, Segelod (1997) defines "capital budgeting is as the procedures, routines, methods and techniques used to identify investment opportunities, to develop initial ideas into specific investment proposals, to evaluate and select a project and to control the investment project to assess forecast accuracy". Hence, it is necessary to discuss the past studies conducted in association with capital budgeting techniques and their choices or selection.

Graham and Harvey (2001) introduced well popular methods in capital budgeting decision and they identified Net Present Value (NPV), Internal Rate of Return (IRR), Pay Back (PB), Discounted Pay Back (DPB), Profitability Index (PI), Accounting Rate of Return (ARR), Annuity, Earning multiple (PIE), APV, Sensitivity analysis, Value at risk and Real options. Meanwhile, Chief Financial Officers (CFO) in the corporate sector quite often use NPV, IRR, PB and ARR predominantly as the quantitative tool to select viable capital investment project (Pike, 1996; Kester et al., 1999; Hermes et al., 2007). On the other hand, Scholars divide these techniques mainly into two categories: non-discounted cash flow (DCF) methods and Discounted cash flow (NDCF) methods. The PB and ARR regarded as NDCF techniques, whereas NPV, IRR have been considered as

DCF methods which consider the importance of the time value of money (Cooper et al., 2002). However, increasing technology, globalization and volatile environment have created a vacuum to rethink the traditional methods which are used to evaluate the capital investment project. As a result, sophisticated capital budgeting methods were developed recently to fill the theory-practice gap aiming to help firms to maximize shareholder wealth. These methods consist of Tobin's Q theory, accelerator theory, financial constraints theory and real options theory (Rigopoulos, 2014). It is important to demonstrate the relationship between behavioural biases of managers and the selection of techniques used in the capital budgeting decision process. However, previous research conducted by Klauss (2006) found that causal relationships between overconfidence and project selection with project evaluation choices. Azouzi and Anis (2012) study show how CFO emotional bias affects investment decisions. Heaton's (2002) suggests optimistic managers wish to invest in negative NPV value projects. Puri and Robinson (2007) document that managers make systematically different investment choices during the evaluation process of capital investment projects, because of their optimistic nature of characteristics shown in their corporate action. As a result, it is important to discuss the cognitive behavioral bias or irrational characteristics of managers in greater detail.

Managers' Overconfidence

Moore and Healy (2008) define overconfidence in three aspects. First is the "overestimation of one's actual ability, performance, level of control, or chance of success". They also further define overconfidence as the "excessive certainty regarding the accuracy of one's belief". The third definition of overconfidence is "the better-than-average effect of an individual". On the other hand, Malmendier and Tate (2015) define that overconfidence as the belief of a manager that he can bring out the future value of a project higher than what is normally expected by a non-overconfident manager does. Similarly, Gervais (2010) states that overconfidence as miscalibration of the future outcome from a viable project which could generate positive value to the firm and bring success to the organization. In summary from the above definitions, it can be concluded that people with overconfident nature overestimate the future value of the firm's investment and failed to measure or ignore

the possible risk which could result in the increase of the corporate risk than other factors.

Managers' Optimism

The literature in cognitive psychology demonstrates that optimism is a positive expectation about a future event posit by an individual. Segerstrom (2001) defines optimism is the positive outcome expectancies of future cashflow. On the other hand, Heaton (2002) and Malmendier and Tate (2005a) define optimism as the managers' overestimation of the future cash-return from a viable project. Meanwhile, Heaton (2002) and Hackbarth (2008) defined optimism as the manager's propensity to overestimate his/her firm's expected future earnings. As a result, optimists tend to discount unwanted facts when making evaluations, and mentally reconstruct experiences to avoid contradictions (Taylor & Gollwitzer, 1995). Hence, if a manager believes that his experience and personal characteristics help him to control the positive outcome of future cash flow of a project, he would be more optimistic and highly committed to work for them obtain the positive result (Weinstein, 1980). Hence, managerial optimism needed to be studied in the investment decision process on how this psychological bias influence on the choice of techniques in capital budgeting decision process.

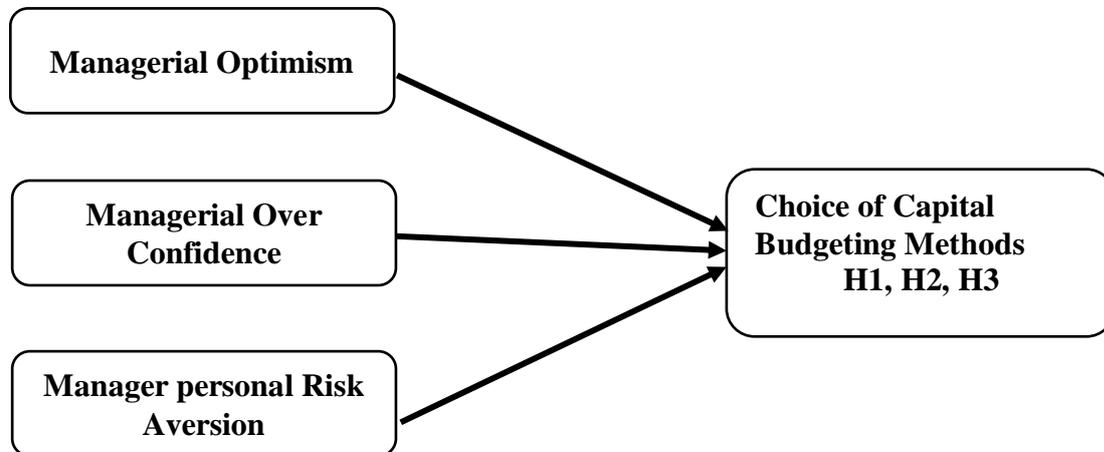
Managers Risk Aversion

A definition of risk aversion is given by Kahneman and Tversky (1979) who state that "a person is a risk averse if he prefers the certain prospect (x) to any risky prospect with the expected value (x^2). People prefer larger expected returns, provided that everything else (including risk) is constant. Risk averse people are willing to give up some expected return in return for a lower risk level (March & Shapira, 1987). Therefore, based on the above empirical review a conclusion could be driven that managers' cognitive irrational behavioral may influence on the choice over the techniques of capital budgeting decision-making process. As a result, it is paramount importance to examine the influence of cognitive bias of managers (Managerial Optimism, Managerial Overconfidence and Managers Personal Risk Aversion) on the choice over the techniques of capital budgeting decision-making process. Subsequently, following the conceptual model was developed to demonstrate the relationship between the dependent variable (choice of quantitative techniques in

capital budgeting) and independent variables (Optimism, Overconfidence and Risk Aversion).

Conceptual model

Managers' Behavioral characteristic



(Developed by the researcher)

Hypothesis development

Based on the above conceptual framework, the hypothesis was developed to test the influence of manager's behavioral characteristics and choice over the techniques of capital budgeting decision-making process. Thus, the following testable hypothesis was developed.

H1: Managerial optimism influences on the choice over the techniques of the capital budgeting decision-making process

H2: Managerial overconfidence influences on the choice over the techniques of the capital budgeting decision-making process.

H3: Managers' risk perception bias influences on the choice over the techniques of the capital budgeting decision-making process

Measuring Variables.

The techniques of capital budgeting decision are measured into three major categories adopted by many authors such as (Mohamed & Lingsiya, 2015; Daunfelt & Hartwig, 2014; Harvey & Arbeláez, 2005; Graham et al., 2015). The first category was simple capital budgeting method which includes PB and

ARR. The second category was advanced capital budgeting method which includes NPV, PI, IRR, MIRR and DPB. The third category was sophisticated capital budgeting method which consists of Tobin's Q , real options, sensitivity analysis, CAPM and so on. Managerial optimism was measured using the famous study conducted by Graham and Harvey (2013) and they borrowed from well-established psychology literature (Scheier and Carver's Life Orientation Test Revised or LOT-R test) to measure optimism which is a popular and custom designed psychometric test. The indicators include Expectation of future events, the respondent's ability of managing the difficult situation and frequency of events that the respondents involved. On the other hand, measuring CFO/CEO overconfidence is an inherently difficult task for a longtime in finance. However, it is been measured using several ways over the years such as the stock option of CEO or CFO and their propensity to buy stocks from the company (Ben-David et al., 2008), the Chief Executive Officers (CEOs) information and voice appeared in magazine and newspaper articles about their organization (Fedyk, 2015). This study measures the overconfidence deployed by Ben-David et al., (2013), where he

developed a new proxy method in measuring managerial overconfidence based on CFOs/CEOs' opinions on the prospective change in the stock market and economic condition of the country. Three indicators that measure managerial overconfidence: Expected annual return of the company, stock market prediction and expected economic situation of the country. The three indicators then divided into 5 items to measure the managerial overconfidence.

Meanwhile, this study follows the approach of (Graham et al., 2013) to measure executive's risk-aversion and they deployed through inquiring a series of questions using gambling techniques of their lifetime income to measure risk-aversion. Further, Barsky et al., (1997) indicate that there can be a certain cognitive bias of people due to prejudice exists, especially changing job is costly, may apparently discourage people to take risky alternatives. Considering all the above measures, the researcher decided to footprint the same questions used by Graham et al., (2013) to measure the risk-aversion bias of chief managers in this study. Hence, there were two alternative job options given to the prospective respondent to choose either safe income possibility or risky income option. The option of safe income was coded as (a) and the option of risky income was coded as (b). If the respondent picked (a), then he is classified as being the most risk-averse person. If the respondent picked (b), then he is classified as being the most risk-tolerant individual. The major indicators to measure the risk aversion are the respondent's opinion about risk perception and investment in different departments.

Research Design and Methodology

This study comes under the positivist paradigm with the aim of examining the empirical evidence of the quantitative techniques deployed in the process of capital budgeting decision-making and the influence of cognitive behavioural bias of chief executives on the selection process. The approach of this study is, without any hesitation, deductive approach to test how theoretical concepts are being applied in the Sri Lankan context in the capital budgeting process. For

this purpose, primary data were collected using a survey strategy by developing a structured questionnaire which helps to find an answer to research questions of this study. So as to measure the quantitative techniques used in the capital budgeting process, the questions were depicted from previous studies of (Graham & Harvey, 2001; Graham. et al., 2013; Daunfelt & Hartwig, 2014; Bin-Xu, 2014; Ben-David, 2013; Zheng-Hui, 2012) were taken. Nonetheless, significant alterations were made to the questionnaire to match with the Sri Lankan context. The wording and structure of the questionnaire then were tested for its validity and reliability with few academics and 5 companies from sample respondents. The structured questionnaire developed for this consists of both open ended and close ended questions. The questionnaire was then e-mailed and posted through the register to all listed companies in the Colombo Stock Exchange (CSE) to reach CFO/Director of finance along with the covering letter. However, to enhance the response rate, if the questionnaire not reached to definite executive and bounced back, alternately it was again sent to (controller, treasurer, or CEO) responsible for making a financial decision. The population of the study is acquired from all the companies listed in the CSE, consisting of 290 companies covering 20 business sectors with a Market Capitalization of Rs. 2,748.10 Billion as of 20 January 2020. Since only 290 companies are listed on the Colombo Stock Exchange in Sri Lanka and decided to consider the whole population as the sample for the study based on (Sekaran & Bougie, 2013). And representing Sri Lanka and thus the findings are robust for generalization.

Data Analysis

The content of the questionnaire was validated through a Pilot survey using a self-administered questionnaire aiming at five CFOs as the sample. The respondents clearly understood all the questions in the manner in which the researcher was intended, as a result, they spent an average of 17 minutes completing a questionnaire. Subsequently, the results

and design of the pilot study were confirmed to have been so good. In addition, an item-scale reliability analysis was performed using SPSS to produce the Cronbach's alpha (α) value for each variable of each item-scale. It was found that the reliability of the measures was well over the minimum threshold level of 0.60 in each case (Gliner & Morgan, 2000) and concluded that all the measures were generally reliable. This survey uses descriptive statistics and inferential statistics to analyse the data using SPSS 20.0 and the data also analyze descriptive statistics, correlation analysis, multiple linear regression analysis was used to address the objectives of the study. Since the data comprise cross-sectional elements, econometrically the model can be multiple regression and explained as follows:

$$\text{Capital Budgeting Methods (CBM)} = \alpha + \beta_1 (\text{OPTM}) + \beta_2 (\text{OVM}) + \beta_3 (\text{RSK}) + e$$

Where:

CBM = represents the selection of Capital Budgeting Methods in a single year.

OPTM = represents Managerial Optimism

OVM = represents Managerial Overconfidence

RSK = represents Managerial Risk Perception

α = the intercept and e = error term

Regression between behavioral biases of managers and capital budgeting decision

A multiple regression analysis was performed to investigate as to whether CFOs behavioral characteristics are associated with the choice of quantitative techniques in the capital budgeting process. The analysis was performed using both multivariate ordinal probit and ordinal logistic to run the regression for each quantitative techniques of capital budgeting decision to calculate the contribution of each behavioral characteristics (Optimism, overconfidence and risk aversion) on the variation of selecting quantitative techniques of capital budgeting in capital budgeting decision process. Thus, the changes can be explained by managers' optimism, overconfidence and risk perception were statistically significant. R-square (R^2), coefficient and t-value ($p < 0.05$) were calculated to find out the significant association between managers' optimism, overconfidence and risk aversion on the selection of c quantitative techniques in the capital budgeting process. The results are shown in Table 1.1 below

Table 1.1

Multiple regression estimation of behavioral characteristics and capital budgeting methods

Variable		PB	ARR	DPB	NPV	IRR	PI	RO	SA
OPT	Coef	0.0033	-0.002	-0.01	0.35***	0.25	0.06	0.0598***	0.062*
	t-value	1.64	1.12	0.85	3.40	1.11	0.54	2.28	1.94
OVM	Coef	0.11	0.01	-0.04	0.82***	0.05	0.13	0.33**	0.16
	t-value	0.67	0.08	-0.22	3.23	0.25	0.73	1.78	2.43
RSK	Coef	2.38**	0.13	0.00	0.12	-0.06	-0.11	0.45	0.34
	t-value	3.61	1.12	0.04	1.06	-0.60	-0.17	0.61	0.49
CFO_EDU	Coef	1.52**	0.13	0.00	1.13**	0.13	14	0.03	0.08
	t-value	1.80	0.54	0.04	1.73	0.54	17	0.30	0.43
CFO_AGE	Coef	0.30**	0.18	0.09	0.30	0.30	10	0.04	0.19
	t-value	2.45	1.41	0.70	0.28	0.28	72	0.24	1.08
CFO_TENU	Coef	0.06	0.14	0.34	0.47**	0.01	28	0.13	0.11
	t-value	0.49	0.17	0.49	2.37	0.18	38	1.12	0.63

N	104	104	104	104	104	104	104	104
R2	0.03	0.04	0.024	0.52	0.021	0.03	0.43	0.032

Note: Coef- Coefficient, Significant * $p < .10$, ** $p < .05$, *** $p < .01$,

As per the results depicted in Table 1.10, multiple regression test was used to analyse the relationship between managerial optimism and the choice of quantitative techniques in the capital budgeting process. The result showed that managerial optimism is positively associated with advanced capital budgeting method only in NPV method ($M=2.41$, $SD=.132$, $r = 0.42$, $p < 0.01$) which mean optimistic CFOs selects NPV method for capital budgeting decision. Meanwhile, managerial optimism was statistically not significant with other advanced capital budgeting methods (IRR and PI). Moreover, CFOs optimism also is statistically not significant in the use of simple capital budgeting methods (PB, ARR and DPB). Hence, CFOs optimism positively correlated and statistically significant with the use of sophisticated capital budgeting method: RO ($M=3.11$, $SD=.234$, $r = 0.64$, $p < 0.01$) and SA ($M=1.01$, $SD=.023$, $r = 0.53$, ($p < 0.10$))

Similarly, multiple regression was also used to test the association between managers' overconfidence and the choice of quantitative techniques in the capital budgeting process. CFOs overconfidence positively correlated with advanced capital budgeting method (NPV) which is statistically significant ($M=2.41$, $SE=.132$, $r=-0.63$, $p < 0.01$) which mean overconfident CFOs select negative NPV project. However, CFOs overconfidence is statistically not significant for simple capital budgeting methods (PB, ARR and DPB). Meanwhile, CFOs overconfidence positively correlated and statistically significant with the use of sophisticated capital budgeting method RO ($M=3.11$, $SE=.234$, $r = .34$, $p < 0.05$) and not significant with the use of SA ($M=1.01$, $SE=.023$, $r = .43$, $p > 0.05$). Multiple regression also was used to test the association between Managers' risk perception and the selection of quantitative techniques in the capital budgeting process. The

result shows that CFOs' risk perception positively correlated and statistically significant with the use of only simple capital budgeting method PB ($M=2.41$, $SE=.254$, $r = .38$, $p < 0.05$). However, CFOs risk perception is statistically not significant for none of the other capital budgeting methods (PB, ARR, DPB, PI, IRR, SA and RO). This result clearly indicates that CFOs with risk aversion only use PB method for the capital budgeting decision. Further analysis also was done to test the variation between CFOs demographic characteristics and the use of quantitative techniques in the capital budgeting process. CFOs education and age are positively correlated and statistically significant with use of PB and NPV ($M=2.41$, $SE=.132$, $t(104) = 1.8$ ($p < 0.05$) and ($M=2.41$, $SE=.132$, $t(104) = 1.8$ ($p < 0.01$) respectively. Similarly, CFOs education and Tenure are positively correlated and statistically significant with use of NPV as the preferred capital budgeting method. Thus, the result of the hypothesis developed in this study is discussed as follows.

Results on the hypothesis tests

Based on multiple regression analysis as predicted in table 1.10 and p -value for Managerial Optimism and techniques used in capital budgeting decision-making process were calculated. In-terms of H_1 both sophisticated capital budgeting methods (SA and RO) are statistically significant ($p=0.02$, $p=0.03$) with managerial optimism, which is less than α value ($P < 0.05$). Hence, the hypothesis was supported that managerial optimism on choice over the techniques of capital budgeting decision-making process. This means that optimistic managers are not willing to use simple capital budgeting methods. However, the managerial optimism was statistically significant on the use of NPV as the capital budgeting method. Hence, the hypothesis was supported that managerial optimism has a significant association with the

choice over the techniques of capital budgeting decision-making process. In connection with multiple regression analysis as predicted in table 1.10 and p -value for overconfidence and the methods used as the quantitative techniques in the capital budgeting decision-making process were calculated. In terms of $H2$ RO is statistically significant ($p=0.01$). However, SA is statistically not significant ($p=0.123$) which is more than α value ($P < 0.05$). Hence, the hypothesis was supported with managerial overconfidence and the use of sophisticated capital budgeting method in capital budgeting decision. This means that overconfidence managers are willing to use sophisticated capital budgeting methods and not willing to use simple capital budgeting methods. However, the managerial overconfidence was statistically significant on the use of NPV as the capital budgeting method. Hence, the hypothesis was supported that managerial overconfidence has a significant influence on the selection of quantitative techniques in the capital budgeting process. Based on multiple regression analysis as predicted in table 1.10 and p -value for risk perception and the use of capital budgeting methods were calculated. In terms of $H3$ Only PB was statistically significant ($p=0.01$). However, none of the CFOs was using sophisticated and advanced capital budgeting methods. Thus, the hypothesis was supported that there is a significant association between managers' risk aversion and the use of simple capital budgeting method. Therefore, it can demonstrate that CFOs with risk aversion are more inclined.

Findings and Conclusion

The survey found that managerial optimism and overconfidence are positively related with the use of NPV as the preferred capital budgeting method to select capital budgeting decision. Meanwhile, optimistic and overconfidence CFOs never use other advanced capital budgeting methods (IRR and PI). Meanwhile, CFOs optimism and overconfidence were not related with the use of simple capital

budgeting methods (PB, ARR and DPB). Moreover, CFOs optimism was positively related with the use of sophisticated capital budgeting method (RO and SA) and however, firms which are listed in Colombo Stock Exchange rarely use sophisticated capital budgeting methods for their capital investment decision. Meanwhile, optimistic and overconfidence CFOs never use other advanced capital budgeting methods (IRR and PI). Meanwhile, CFOs optimism and overconfidence were not related with the use of simple capital budgeting methods (PB, ARR and DPB). Moreover, CFOs optimism was positively related with the use of sophisticated capital budgeting method (RO and SA) and however, firms which are listed in Colombo Stock Exchange rarely use sophisticated capital budgeting methods for their capital investment decision.

Future Research

The empirical findings of this study are quite largely consistent with the existing literature in behavioral finance. While the exact mechanism by which the personal characteristics of top managers affects corporate policies is still in the black box, this study suggests that managers behavioral bias influence corporate decisions. Hence, the study provides some promising future research ideas in relation to managers' behavioral characteristics and corporate decisions. Managerial bias decisions and Corporate governance: Recent work has begun to look seriously at how and when governance can mitigate managerial biases and corporate decision (Banejee, Humphreyjenner, and Nanda 2015b; Kolasinski and Li 2013), which seems to offer a promising direction for additional research to explore the role of corporate governance mechanisms in managerial bias decisions. Since bias decisions of senior managers may destruct firm value. Therefore future study documents the agency cost problem with behavioral corporate finance. Managers' behavioral bias interaction between investment and financing decision with firm performance: This thesis is limited to investigate between managers' behavioral bias and capital budgeting and financing decisions.

However, firm performance is the goal of financial management. Future studies may examine the effects of managerial overconfidence, optimism and risk aversion in a framework where leverage, investment and debt maturity decisions can be modelled to test the variation in the firm performance. Overall, this survey shows that managers' behavioral bias plays an important role in Firms' selection of capital budgeting method in capital budgeting decisions. Particularly, managerial overconfidence, optimism and risk aversion may cause biased capital budgeting decision which is a contradiction to the finance theory.

References

1. Atrill, P. (2009). Financial management for decision makers (5th ed.). Harlow, England: FT/Prentice Hall.
2. Azouzi, M. A., & Anis, J. (2012). CEO Emotional bias and capital structure choice: Bayesian network method. *Journal of Arts, Science & Commerce*. 2(3), 18-24
3. Banerjee, S., Humphery-Jenner, M., and Nanda, V. K., (2015). Restraining Overconfident CEOs through Improved Governance: Evidence from the Sarbanes-Oxley Act (2015). Review of Financial Studies, 28 (10), 2812-2858; SSRN: <https://ssrn.com/abstract=2240050> or <http://dx.doi.org/10.2139/ssrn.2240050>
4. Baker, M., Ruback, R. & Wurgler, J. (2004). The maturity of debt issues and predictable variation in bond returns. *Journal of Financial Economics*, 70 (3), 261-291
5. Barberis, N. and Thaler, R. (2003), "A survey of behavioral finance", in Harris, M. and Stulz, R. (Eds), *Handbook of the Economics of Finance*, Elsevier, North-Holland.
6. Barsky, F., Robert, B., Juster, T., Kimball, M.S. & Shapiro, M.D. (1997). Preference Parameters and Behavioral Heterogeneity: An Experimental Approach in the Health and Retirement Study, *The Quarterly Journal of Economics*, 112(2), 537-579, <https://doi.org/10.1162/003355397555280>
7. Bertrand, M., & Schoar, A. (2003). Managing with style: The effect of managers on
9. Firm policies, *Quarterly Journal of Economics*, 118(4), 1169-1208
10. Bennouna, K., Meredith, G.G., & Marchant, T. (2010). Improved capital budgeting decision making: evidence from Canada, *Management Decision*, 48(2), 225-247. <http://dx.doi.org/10.1108/00251741011022590>
11. Ben-David, I., Graham, J.R., & Harvey, C.R., (2008). "Managerial Overconfidence and Corporate Policies." Working Paper, Duke University.
12. Ben-David, I., Graham, J. R. & Harvey, C. R. (2013). Managerial miscalibration, *Quarterly Journal of Economics*, 128(4), 1547-1584
13. Bin Xu (2014) corporate financing decisions: the role of managerial overconfidence. Loughborough University's Institutional Repository. A Doctoral Thesis. <https://dspace.lboro.ac.uk/2134/16652>
14. Dayananda, D., Irons, R., Harrison, S., Herbohn, J., & Rowland, P. (2002). Capital budgeting: financial appraisal of investment projects, (1st edition), Cambridge, Cambridge University press
15. Cho, D. (1996). An alternative and practical theory of capital budgeting: Stockholder wealth maximization approach. *The Mid -Atlantic Journal of Business*, 32(2), 93-104
16. Cooper, W.D., Morgan, R.G., Redman, A., & Smith, M. (2002). Capital Budgeting Models: Theory vs. Practice, *Business Forum*, 26(1 & 2), 15-19
17. Daunfeldt, S.-O., & Hartwig, F. (2014). "What Determines the Use of Capital Budgeting Methods? Evidence from Swedish Listed Companies. *Journal of Finance and Economics*, 2(4), 101-112.
18. Fama, E.F. (1970), "Efficient capital markets: a review of theory and empirical work", *The Journal of Finance*, Vol. 25 No. 2, pp. 383-417.
19. Freeman, M., & Hobbes, G. (1991). Capital Budgeting: Theory versus Practice, *Australian Accountant*, 61(8), 36-41. <http://dx.doi:10.1080/00137918408902894>
20. Fedyk, A. (2015) Overcoming Overconfidence: Teamwork and Self-Control. Available at SSRN: <https://ssrn.com/abstract=2432221> or <http://dx.doi.org/10.2139/ssrn.2432221>

21. Gervais, S. (2010). Capital budgeting and other investment decisions. Investors, Corporations, and Markets. *Behavioral Finance*, 413-434
22. Gervais, S., Heaton, J. B., & Odean, T. (2011). Overconfidence, Compensation Contracts, And Capital Budgeting; *The Journal of Finance*, 66 (5), 152- 210
23. Gliner, J. A., & Morgan, G. A. (2000). *Research methods in applied settings: An integrated approach to design and analysis*. Mahwah, N.J: Lawrence Erlbaum
24. Graham, J. and Harvey, C. (2001) 'The theory and practice of corporate finance: evidence from the field', *Journal of Financial Economics*, 60(2-3), pp. 187-243.
25. Graham, J.R., Harvey, C.R. & Puri, M. (2013). Managerial attitudes and corporate actions, *Journal of Financial Economics*, 109(1), 103-121.
26. Graham, John R., Mark Leary, & Michael Roberts, (2015). A Century of Capital Structure: The Leveraging of Corporate America, *Journal of Financial Economics* 118, 658683.
27. Kolasinski, A., and Li, X. (2010), "Can Strong Boards and Trading Their Own Firm's Stock Help CEOs Make Better Decisions? Evidence from Acquisitions by Overconfident CEOs" *Journal of Financial and Quantitative Analysis*, 48 (4), 1173–1206
28. Hackbarth, D. (2008). Managerial traits and capital structure decisions. *Journal of Financial and Quantitative Analysis*, 43, 843–882.
29. Hackbarth, D. (2009). Determinants of corporate borrowing: A behavioral perspective, *Journal of Corporate Finance*, 15(4), 389-411.
30. Harvey and Arbeláez (2005). Capital budgeting decisions: a survey of Latin American practices, *Latin American Financial Markets: Developments in Financial Innovations. International Finance Review*, 5 (2), 45 – 61
31. Heaton, J. B., (2002). Managerial optimism and corporate finance, *Financial Management*, 31(2), 33-45.
32. Hermes, N., Smid, P., & Yao, L. (2007). Capital budgeting practices: A comparative study of the Netherlands and China, *International Business Review*, 16(5), 630-654. <http://dx.doi.org/10.1016/j.ibusrev.2007.05.002>
33. Huang, J. Y., Joseph C.P., & Shieh, Y.C.K. (2016). "Starting points for a new researcher in behavioral finance". *International Journal of Managerial Finance*, 12 (1), 92 – 103
34. Kahneman, D. & Tversky, A. (1979). Judgment under uncertainty: Heuristics and biases, *Journal of Advanced & Applied Sciences*, 185(4157), 1124-1131.
35. Kaplan, S.N., Klebanov, M.M., & Sorensen, M. (2007), Which CEO characteristics and abilities matter? Working paper, University of Chicago.
36. Kester, G., Chang, R.P., Echanis, E.S., Haikal, S., Md. Isa, M., Skully, M.T., Tsui, K.C., & Wang, C.J. (1999). Capital budgeting practices in the Asia-Pacific region: Australia, Hong Kong, Indonesia, Malaysia, Philippines, and Singapore, *Financial Practice and Education*, 9(1), 25-33
37. Klauss, C.P., (2006) Capital investment decisions with managerial overconfidence and regret aversion. Doctoral Thesis, University of Bath School of Management
38. Landier, A. & Thesmar, D. (2009). Financial contracting with optimistic entrepreneurs, *Review of Financial Studies*, 22(1), 117-150
39. Leon, F.M., Isa, M and Kester, G.W. (2008) 'Capital Budgeting Practices of Listed Indonesian Companies'. *Asian Journal of Business and Accounting*, 1(2), 175-192.
40. Lin, Y., Hu, S., & Chen, M. (2005). Managerial optimism and corporate investment: Some empirical evidence from Taiwan. *Pacific-Basin Finance Journal*, 13(5), 523-546.
41. Lin, Y., Hu, S., & Chen, M. S. (2008). Testing pecking order prediction from the viewpoint of managerial optimism: Some empirical evidence from Taiwan, *Pacific-Basin Finance Journal*, 16(1), 160-181
42. Lingesiya, K. (2016). Capital budgeting theory and practice: A review and agenda for future research. *Journal of Applied Economic and Finance*, 3(2), 15-32
43. Malmendier, U., & Tate, G. (2005). CEO overconfidence and corporate investment. *The journal of finance*, 60(6), 2661-2700.
44. Malmendier, U., & Tate, G. (2005a). Does overconfidence affect corporate investment? CEO overconfidence measures revisited.

- European Financial Management*, 11(5), 649659.
49. Malmendier, U., Tate, G., & Yan, J. (2011). Overconfidence and Early-Life Experiences: The Effect of Managerial Traits on Corporate Financial Policies. *The Journal of Finance*, 66(5), 1687-1733
50. Malmendier, U., & Tate, T. (2015). Behavioral CEOs: The Role of Managerial Overconfidence. *The Journal of Economic Perspectives*, 29(4), 37-60
51. March, James G., & Zur Shapira, (1987). Managerial perspectives on risk and risk taking, *Journal of Management Science*. 33 (4), 1404-1418
52. Mohamed, N & Lingesiya, K., (2015), "Capital budgeting practices: evidence from Sri Lanka", *Journal of Advances in Management Research*, 12 (1), 55-67
53. Moore, D. A. and Healy, P. J. (2008). The trouble with overconfidence, *Psychological Review*, 115(2), 502-517.
54. Morawakage, P. S., & Nimal, P.D. (2015). Equity market volatility behavior in Sri Lankan context. *Kelaniya Journal of Management*, 4 (2), 112- 117
55. Peterson, P.P., & Fabozzi, F.J. (2002). *Capital Budgeting: Theory and Practice*, New York: Wiley and Sons.
56. Pike, R.H. (1988). An empirical study of the adoption of sophisticated capital budgeting practices and decision making effectiveness, *Accounting and Business Research*, 18(3), 341-351.
57. Pike, R.(1996).A longitudinal survey on capital budgeting practices, *Journal of Business financing and Accounting*, 23(1),79-92.
58. Pike, R., & Neale, B. (2009). *Corporate finance and investment decisions and strategies*, 6th edn., Harlow: Pearson Prentice Hall.
59. Puri, M., & Robinson, D. T. (2007). "Optimism and economic choice". *Journal of Financial Economics*, 86(1), 71-99.
60. Ravi, J (2015). Daily mirror, Sri Lank capital market change, Retrieved <http://www.dailymirror.lk/97867/will-sri-lanka-s-capital-market-change-for-the-good-in-2020>2015-12-03 02:59:02
61. Rigopoulos, G. (2014) 'Real Options Adoption in Capital Budgeting: A Highlight of Recent Literature'. *Journal of Economics and Business Research*, 20(2), pp. 41-51.
62. Sautner, Zacharias, and Martin Weber, (2009), How do managers behave in stock option plans?
63. Clinical evidence from exercise and survey data, *Journal of Financial Research* 32, 123–155
64. Segelod, E. (1998). Capital budgeting in a fast-changing world, *Long Range Planning*, 31(4), 529–541.
65. Sekaran, U., & Bougie, R. (2010). *Research methods for business: A Skill Building Approach* (5th ed.). New Delhi, India: Wiley India (p) Ltd.
66. Shefrin, H. (2001). "Behavioral corporate finance," *Journal of Applied Corporate Finance*, 14 (2), 113-126
67. Verbeeten, F. H. M. (2006). Do organizations adopt sophisticated capital budgeting practices to deal with uncertainty in the investment decisions? A research note. *Management Accounting Research*, 17(1), 106–120.
68. Zheng, H. (2012). *Essays in Behavioral Corporate Finance*. UC Berkeley: Economics. Retrieved from: <http://www.escholarship.org/uc/item/3w4276r3UC> Berkeley Electronic Thesis and Dissertations).