

Research Paper

## **An Empirical Analysis on Capital Budgeting Models, Uncertainty Tools, Cost of Capital and Firm Performance: A Comparison between Australia and Sri Lanka**

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### **Abstract**

**Purpose:** This paper explores how environmental differences in developed and emerging economies affect capital budgeting techniques (CBT) choices and, as a result, influence firm performance.

**Design:** A quantitative-descriptive literature-review analysis provides this two-nation study with an understanding of the underlying forces and issues; which were used to shape the design and content of the questionnaire; which were sent to 300 stock-exchange-listed firms (150 in Australia and 150 in Sri Lanka). Secondary data for 2013-17 are acquired from the ASX, CSE's websites and are used to compute *return on assets*, *return on equity*, *Tobin Q*, and *earnings per share* for the sampled firms.

**Findings:** Australian firms tend to rely heavily on sophisticated CBTs, relatively small Sri Lankan firms prefer simple analysis techniques, but larger Sri Lankan firms tend to be as adept at sophisticated CBT analysis as Australian firms. Further, while Australian firms have a positive association between their performance and their use of more sophisticated CBTs (Tobin's Q, excepted), Sri Lankan firms tend to experience a negative association between their performance and their use of more sophisticated CBTs (EPS, excepted).

**Original:** The study adds to the general knowledge on CB practices by showing that the nature of the firm appears to swamp the nurture of the environment in which it is embedded

**Keywords:** Capital budgeting practices, firm performance, developed market, emerging market

### **1. Introduction**

In the traditional theory of the firm, firms seek to expand stakeholders' wealth by maximising the value of the firm (Gervais, Heaton and Odean, 2012; Frino, Hill and

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Chen, 2013; Hamzah and Zulkafli, 2014). Capital budgeting (CB), a key input to achieving that goal, is the rational allocation of limited capital across a plethora of viable prospective investment. In its simplest form financial management is the acquisition and use of cash by firms to purchase real assets to generate cash flows that provide a return to stakeholders. A significant part of the process involves finance managers seeking answers to three critical decisions (Dayananda et al. 2002; Pindado and Chabela, 2006; Khan and Jain, 2007):

- I. “Investment Decisions” focus on asset investment. Specifically, financial managers, in choosing where and how much to invest, employ a variety of investment evaluation tools within the capital-budgeting process (Baldenius,2003; Verbeeten, 2006; Basu and Drew, 2010).
- II. “Financing Decisions” are associated with the flow of funds from capital markets to the corporation and how financial managers choose between using debt and equity in financing investment projects and opportunities. (Agrawal and Mandelker, 1987; Donkor and Duffey, 2013; Jackson, Keune and Salzsieder, 2013; Elsas, Flanneryand Garfinkel, 2014).
- III. “Dividend Decisions” are concerned with the disposal of profits, e.g. what should be returned to owners and what should be retained for future growth (Gugler, 2003; Azhagaiah and Sabari, 2008; Franc-Dabrowska, 2009).

In this context, the financial manager’s decisions are linked by the cash flow identity (investing decisions – spending money; financing decisions – raising money; and dividend decisions – distributing money) which restricts their degree of freedom in making financial decisions. These decisions are key to the survival of firms, can interact with options, and are greatly influenced by CB; where CB is defined as the practice of analysing investment opportunities in long-term assets which are expected to harvest benefits for more than one year. In this respect, CB is the process of analysing opportunities and deciding whether funds should be contributed to an investment or not (Azhagaiah and Sabari, 2008). The fundamental goal of the firm is considered to be maximisation of value, which is generally accepted as the only rational basis for making CB decisions. In practice, Chief Financial Officers (CFOs) who are capable of identifying appropriate capital investments by reducing the cost of finance and enhancing the firm’s value are often satisfied.

This study examines the capital budgeting practices in two countries in two different levels of economic development; developed and emerging markets. Prior research into the relationship between CB practices and performance has been frequently conducted in previous years (Farragher et al., 2001; Haka, Lawrence, and George, 1985; Kim, 1981; Pike, 1984). Specifically, while Christy, (1966); Farragher et al. (2001); Klammer (1973); Pike (1984) found that merely adopting refined CB practices does not enhance firm performance, other studies identified an association between CB practices and firm performance (Kim, 1981; Vadeei et al., 2012). These mixed outcomes, in the extant literature, point to a gap in the understanding of the relationship between CB practices and firm performance, especially in terms of differences between firms in developed and emerging countries. The main research question is ‘what is the association between

capital budgeting techniques employed and firm performance within Australian and Sri Lankan listed firms?’ Although previous research has scrutinized CB practices, this study is one of only a few using a comparative approach (Peel, 1999; Harvey, 2001; Brounen, Jong and Koedijk, 2004; Graham and Hermes, Smid, and Yao, 2007) to contrast national-development level with capital budgeting techniques (CBT) choices and corporate performance. Australia’s well-developed market operates within a relatively-small open economy, and its business standards, practices, and regulations are efficient, effective, and well respected. Sri Lanka is an emerging economy that has witnessed considerable economic progress after the conclusion of the civil war in 2009 (Central Bank of Sri Lanka, 2013). As a result, long-term investment has increased significantly, as have the range of CB techniques being used by firms. This study considers the similarities and differences in capital-budgeting-practice in Australian and Sri Lankan firms. Findings will provide insights on CBT that will help managers determine the most appropriate use of investment analysis, techniques and risk models. Particularly, how environmental differences in developed and emerging economies affect capital budgeting techniques choices and, as a result, influence firm performance.

The paper is organised as follows. Section 2 discusses the literature review. Section 3 presents the methodology used. Section 4 shows the findings, while section 5 offers a conclusion with study limitations and way forward.

## **2. Literature Review**

The importance of corporate investment decisions lies in their impact on stakeholder wealth (Beranek, 1975; Cooper and Petry, 1994; Stulz, 1999; Bosch-Badia, Montllor-Serrats, and Tarrazon-Rondon, 2014). The literature highlights, for the most part, two key approaches in CB, the: process approach and evaluation approach. The process approach takes a wide perspective and tries to explain how firms make investment decisions and how investment opportunities are identified, developed, justified, and finally approved (Mukherjee and Henderson, 1987; Pirttila and Sandstrom, 1995; Harris and Raviv, 1996; Soltani, Nayebzadeh and Moeinaddin, 2014; Batra and Verma, 2014). In contrast, the evaluation approach is traditional theory and considers how firms should treat investment decisions and focuses more on financial appraisal and the selection of proposed investments in long term resources (Arnold and Hatzopoulos, 2000; Wnuk-Pel, 2014). This emphasis on evaluation approach includes appraisal methods, risk analysis methods, cost of capital and long term investment advice.

### *2.1 Capital budgeting appraisal techniques*

#### *2.1.1. Investment-analysis techniques in developed countries*

CBT focused studies have a long tradition in accounting and finance literature. CB practices in the USA have been comprehensively surveyed, concerning their firms’ investment appraisal. Klammer (1973) found that only 19 percent of sample of 369 large industrial firms used discounted cash flow (DCF) techniques to evaluate proposed capital investments in 1959, the percent increased from 38 to 57 percent from 1964 to 1970. Hendricks (1983) reported that choice of DCF was 76 percent in 1981. Bierman and Smidt (1993) reported that 99 percent of the respondents in 1992 survey of the 100 largest fortune 500 firms used internal rate of return (IRR) or net present value (NPV) as their primary or secondary appraisal technique. Graham and Harvey (2001) noted that most respondents select NPV and IRR as their most frequently used capital budgeting

techniques; 75 percent of firms always use NPV for their capital investment appraisal while Block (2007) noted that only 14 percent of firms use real option (RO, with an option to expand or abandon) in the capital budgeting practices in USA. Pike (1988) noted that the DCF methods use in the UK had increased from 58 to 84 percent from 1975 to 1986. Brounen, Jong and Koedijk (2004) report that almost 53 percent of UK CFOs relies to some extent on IRR. On the other hand, Alkaraan and Northcott (2006) note that 99 percent CFOs say that they use NPV. Still, UK CFOs use pay-back period (PBP) as their favourite technique (Brounen, Jong and Koedijk, 2004; Alkaraan and Northcott, 2006). DCF has become the main evaluation method in Canada (Jog and Srivastava, 1995; Vijay and Ashwani, 1995; Bennouna, Meredith and Marchant, 2010). In particular DCF use appears to have increases from a low around 35 percent in the early 1960s to 90 percent or more in the early 1990s. Recent studies note that NPV is now widely used by Canadian firms, but a sizeable percent use IRR as their primary or secondary model in capital decision making (Bennouna, Meredith and Marchant, 2010; Baker, Dutta and Saadi, 2011). While in 2011, surveys show that 17 percent of Canadian firms practice RO for their CB decisions (Baker, Dutta and Samir, 2011). The case of Australia, comparing the results of studies by McMahon (1981), Lilleyman (1984), Freeman and Hobbes (1991) stated an increase in the use of DCF techniques in Australia from 52 percent of respondents in 1979 to 75 percent in 1989. Kalyebara (1998) also found that 75 percent of respondents to 1996 survey used NPV followed by IRR and PBP. More recently, Troung, Partington and Peat (2008) found that 94 percent of CFOs used NPV, followed by PBP and IRR.

### *2.1.2. Investment-analysis techniques in emerging countries*

There are only a limited number of studies emphasising CB evaluation techniques in emerging countries. Kester and Chong (1998), Chan, Kamal and William (2004), Farah, Mansor and George (2008) emphasised on Malaysia, Indonesia, China and Singapore; African economies are examined by Coleman (1995), Sulaiman (2007), Pradeep and Lemay (2009), Hassan, Hosny and Vasilya (2011), Maroyi and Margaretha (2012), while India was examined by Manoj (2002), Satish, Sanjeev and Roopali (2009) and Shvetasingh and Surendra (2012). The results of a survey of firms in Singapore, China and Indonesia in which they found that DCF and NDCF were the most frequently used methods. In Malaysia, Hong Kong and Singapore CFOs use the PBP as their favourite capital budgeting technique (Wong et al. 1987). Kester and Chong (1998) and Kester et al. (1999) found that executives of Singaporean firms considered IRR and PBP to be equally important for evaluating and ranking capital investments. The researchers also reported the same finding for firms in Hong Kong, Indonesia, Malaysia and Philippines (Kester et al. 1999). The prior results notice that Africa is consistent with the increasing use of DCF techniques as NPV and IRR to their capital investment selection. Andrews and Butler (1986) and Du Toit and Pienaar (2005) noted that South African large firms tended to employ more sophisticated capital budgeting techniques. Still simple capital budgeting techniques were more popular among small and medium firms. In a study of India, NPV criterion was observed to be a widely used capital budgeting technique followed by IRR while still relying on simple CBT such as the PBP and ARR but there usage also has declined (Anand, 2002; Singh, Jain, and Yadav, 2012).

### *2.1.3. Risk-assessment techniques*

Effective CB decisions involve not only investment-analysis techniques but also risk-analysis techniques and cost-of-capital estimation (Graham and Harvey, 2001; Andor, Mohanty, and Toth, 2015). Risk analysis of investments is also seen as a critical aspect of the CB decisions (Zinn, Lesso and Motazed, 1977; Ho and Pike, 1991; Ho and Pike, 1998; Chadwell-Hatfield et al.2011; Gitman, Juchau and Flanagan, 2011). The term risk with reference to CB decisions may be defined as the variability in actual returns originating from an investment, in relation to estimated return at the time of the initial CB decisions (Jain, Singh, and Yadav, 2013). As noted earlier, risk assessment techniques consist scenario analysis, sensitivity analysis, decision tree and monte carlo (Bennouna, Meredith, and Marchant, 2010; Graham and Harvey, 2001). Drury and Tayles (1996) found that the firms in UK employing sensitivity analysis as the preferred technique for dealing with risk analysis. Graham and Harvey (2001) found that the majority of US firms use firm-wide discount rate as preferred tool. The majority of Canadian firms use risk analysis tools, with the main ones being sensitivity analysis, scenario analysis and risk-adjusted discount rate (Bennouna, Meredith, and Marchant, 2010). The results are similar to the Hong Kong, Indonesia, Malaysia, Philippines, Australia and Singapore study from Kester et al. (1999). Moreover, the majority of China, Kuwait and Singapore firms use sensitivity and scenario analysis technique as a risk assessment tool (Kester and Chong, 1998; Chan, Kamal and William, 2004; Mutairi, Tian, and Tan, 2009).

### *2.1.4. Cost of capital*

Cost of capital is the expected rate of return required by market participants to attract them to a particular investment (Frino, Hill and Chen, 2013; Zeeman and Naumann, 2005). The cost of capital estimation is the main parameter of DCF calculation (Bennouna, Meredith, and Marchant, 2010). In CB, the cost of capital is used, as a: 1) minimum profitability rate that prospective investment returns are exceed; and, 2) discount rate applied to cash flows. Arnold and Hatzopoulos (2000); McLaney, Pointon, Thomas, and Tucker (2004) noted that the weighted average cost of capital (WACC) is the most popular approach used in estimating the cost of capital in UK. Interestingly, a significant minority of small firms still use the interest rate payable on debt. In comparisons, WACC was more popular in USA than in Canada (Payne, Heath and Gale 1999). In Australia, Kester et al. (1999) noted that the Capital Asset Pricing Model (CAPM) was the most common method when estimating the cost of capital. This study support Truong et al. (2008) assertion that the trends towards increased use of CAPM selecting cost of capital. The Australian results are similar to Graham and Harvey (2001) for the USA. Brounen, Jong, and Koedijk (2004) report that CFOs in European firms rely on CAPM, to some extent, when estimating cost of capital.

### *2.1.5. Contingent variables and capital budgeting*

Several authors align contingency theory in the setting and design of the CB practices: Chen (1995), Chen (2008), Grinyer, Al-Bazzaz, and Yasai-Ardekani (1986), Pike (1986). Contingency theory suggests that for a firm to be effective there must be a strong fit between its structure and context. Identifying contingent variables for CB decisions is a very delicate and a somewhat heroic task, that needs to consider all the complex interrelationships between CB practices and performance (Gordon & Miller, 1976; Maccarrone, 1996; Pike & Ho, 1991). The existing literature shows that important



characteristics (contingencies) affecting firm structure include; firm characteristics, environmental uncertainty and behavioural characteristics (Covaleski, Dirmsmith, & Samuel, 1996; Mitchell, 2002; Reid & Smith, 2000). Firm attributes such as size, capital concentration, risk and uncertainty, ownership and industry attention are considered important determinants of CB practices (Abdel-Kader & Luther, 2008; Chen, 1995; Pike, 1983). A measure of the expertise level of the CFOs is necessary, since it may be predictable that CFOs with higher skills (a higher level of education, experience and maturity, etc.) will have less difficulty in understanding and using sophisticated CB techniques.

#### *2.1.6. CBT and firm performance*

Firm performance (profit) is best measured by the aggregate wealth generated by the firm before distribution to its stakeholders, rather than the accounting earnings allocated to the equity holders (Haka et al., 1985). Financial theory suggests that implementing a sophisticated CB system will enhance firm performance (Copeland, 1992). The association between CB practices and firm performance has not received wide attention in the literature, other than a few researchers (Farragher et al., 2001; Klammer, 1973; Kim, 1981; Pike, 1984; Vadeei et al., 2012) who focused their studies on the impact of CB on firm performance. Klammer (1973) surveyed 369 manufacturing firms in the US, to test the relationship between CB and firm performance. The study found no significant relationship between CB techniques and firm performance. Kim (1981) conducted two studies similar to Klammer's (1973), but found a positive association between the CB process and firm performance. In contrast, research done by Pike (1984) found a negative relationship between CB evaluation techniques and firm performance. Farragher et al. (2001) used multiple-regression models to determine the relationship between CB and business performance and found no discernible relationship between the CB process and firm performance. Vadeei et al. (2012) looked at the relationship between CB techniques and firm performance in listed manufacturing firms in Iran and found a significant positive correlation between CB practices and ROA and that those firms which used sophisticated CB techniques performed better than firms using less sophisticated techniques. The literature review suggests that CB studies (with some exceptions) have mostly focused on developed countries and that there is still significant scope for studies of the situation in emerging markets. Also, only a few studies have provided a serious comparison of CB practices in developed vs. emerging countries.

Based on the literature the following alternative hypotheses are proposed to be tested.

*H<sub>1</sub>: Firms and respondents characteristics have an effect on the choice of capital budgeting techniques employed.*

*H<sub>2</sub>: A firm's CB techniques are expected to have a positive influence on a firm's performance.*

### **3. Research Method and Design**

Initially the population to be sampled was drawn from 200 firms listed on the Australian Securities Exchange (ASX) from ASX200 and 289 firms listed on the Colombo Stock Exchange (CSE) were considered. In selecting the study population, this study excludes financial, investment and securities sector firms, as their unique financial attributes,

intensity of regulation, and/or intensive use of leverage are likely to confuse the outcomes under study. The risk of missing data was minimized by excluding firms that were not listed throughout the review period giving 150 Australian listed firms and 150 Sri Lankan listed firms.

Data was collected in two phases. The first phase constituted a structured survey questionnaire which was followed by a second phase of gathering the appropriate financial statements for the relevant period. In phase one, a structured questionnaire survey (on a Likert scale of 1-5, where 5 is strongly agree) was used to explore the CB practices of Australian and Sri Lankan firms as an example of a developed and emerging market. The questionnaire sought information on the CB practices of the responding firms Phase two examines CB practices via the lens of an evaluation approach; which allows for a connection between these different perspectives and firm performance in Australian and Sri Lankan-listed firms. Phase two links the primary data gathered in phase one with secondary data, annual reports of the relevant firms during 2013-17, taken from the ASX, CSE's and SIRCA database to provide: *return on assets* (ROA), *return on equity* (ROE), Tobin's Q (TQ), and *earnings per share* (EPS). The effective-response rate was 31.47 and 48.67 percent from Australia and Sri Lanka respectively. The secondary data for the computation of Return on Assets (ROA), Return on Equity (ROE), Tobin Q (TQ), and Earnings per share (EPS) were obtained from the annual reports of the relevant firms during the period of 2013-17, per the ASX, CSE's and SIRCA databases. Statistical analysis were conducted utilising social science software 22.1 (SPSS) and includes descriptive statistics and correlation analysis.

**Table 1. Variable Measurement**

CB Technique	A firm's choice of CB technique is defined as the most frequently used technique by respondent firms (or dummy which takes the value of 1 if the firm is using at least two or more of CB techniques and the value 0 otherwise).
<b>Firm characteristics</b>	
Number of employees	Dummy variables would either take the value of 1 if the firm belongs to the more than 500 employees, otherwise it would take the value of 0.
Income source	Dummy variables would either take the value of 1 if the firm belongs to the more than 80 percent domestic income, otherwise it would take the value of 0.
Ownership	Dummy variables would either take the value of 1 if the firm belongs to the domestic ownership, otherwise it would take the value of 0.
Level of risk	Dummy variables would either take the value of 1 if the firm belongs to the higher risk, otherwise it would take the value of 0.
<b>CFOs characteristics</b>	
Education	The value is 1 if the managers have master degree or more, otherwise it takes the value of 0.
Age	The value is 1 if the manager's ages is in the 55-65 category, otherwise it takes the value of 0.
Experience	The value is 1 if the manager has been in their position longer than 10 years; otherwise it takes the value of 0.

Source: Authors.

## 4. Results and Discussion

### 4.1. Descriptive Statistics

As seen in Table 2, NPV and IRR methods are now widely utilised among Australian firms participating in the survey. However, PBP is (also) prevalent in Australia. Whereas, most Sri Lankan respondents select PBP and IRR as their most regularly used capital budgeting techniques but substantial percent uses PBP as their primary method in capital

budgeting decision. The NPV method is less preference in Sri Lanka, only 56 percent of the respondents note they use PBP always. Interestingly, large percent of Australian and Sri Lankan firms still used PBP even though other non-discounted-cash-flow capital-budgeting techniques (e.g. DPP and ARR) are used infrequently in Australia. Only 51 percent of Australian firms include ARR in their primary CBT. This is consistent with Sri Lanka, where DPP and ARR are only used by, respectively, 30 and 24 percent of the questionnaire respondents. The Table 2 Likert scale results suggest that PBP, NPV, and IRR are frequently used in both Australia and Sri Lanka but Australian firms are likely to rely more on NPV and IRR than Sri Lankan firms. These findings are consistent with George’s (2011) finding that Western European firms employ NPV significantly more often than West Africa firms and that ARR is the most favoured technique of West Africa firms. This result is, also, consistent with the findings of Shields, Chow, Kato, and Nakagawa (1991). However, empirical research by Bennouna, Meredith, and Marchant, (2010) is marginally contrarian, in that they found that some large Canadian firms did not use DCF, even though Canada is considered a developed country.

**Table 2. Investment-analysis techniques**

Methods	Australian Firms		Sri Lankan Firms	
	Frequently or Mostly	Mean*	Frequently or Mostly	Mean*
PBP	83	4.16	85	4.01
DPP	36	2.87	30	2.81
ARR	51	3.24	24	2.77
NPV	98	4.62	56	3.64
IRR	98	4.62	67	3.78

Source: Authors.

The results in Table 3 illustrate that, in Australia, scenario approach and sensitivity analyses are the most extensively used techniques for assessing the capital investments risk. Compared to Australian firms, Sri Lankan firms appear to use scenario approach more often. Interestingly, few firms in Sri Lanka use decision tree approach or probabilistic simulation to evaluate risk (respectively, 12 and 13 percent of the respondents) and only 16 percent Australian respondents consider risk adjusted discount rate. The Likert-scale responses in Table 3 suggest that scenario approach and sensitivity analyses are extensively used by Australian and Sri Lankan firms. This finding is consistent with a study by Kester et al. (1999) who report that sensitivity and scenario methods are the most substantial techniques for investment risk assessment among Australia, Indonesia, Hong Kong Malaysia, Singapore and Philippines.

**Table 3. Risk analysis techniques**

Methods	Australian Firms		Sri Lankan Firms	
	Frequently or Mostly	Mean*	Frequently or Mostly	Mean*
Scenario	76	4.04	79	4.25
Sensitivity	76	3.94	34	3.18
Decision tree	31	3.04	12	2.92
Monte Carlo	13	2.87	13	2.66
Risk adjusted	16	2.56	29	3.04

Source: Authors.

Table 4 presents information on the use and estimation of the cost of capital. The results indicate that 85 percent of Australian firms rely on the WACC, when estimating the cost



of equity capital. In line with the Sri Lankan results, 85 percent indicate that they use the WACC most commonly. Compared to the Sri Lankan firms, Australian firms appear to use the WACC and CAPM more often. Excitingly, WACC has clearly established its position as the most popular method in both countries. This is consistent with studies by Arnold and Hatzopoulos (2000) and McLaney et al. (2004). Whereas dividend yield on shares method and CAPM method are used much less; 24 and 31 percent of the Australian and Sri Lankan firms report they use these methods frequently.

**Table 4. Cost of capital**

Methods	Australian Firms		Sri Lankan Firms	
	Frequently or Mostly	Mean*	Frequently or Mostly	Mean*
WACC	85	4.24	85	3.93
CAPM	75	4.04	31	2.74
Interest payable	49	3.38	64	3.63
Dividend yield	24	2.82	36	3.04
Earnings yield	33	3.00	37	3.12

Source: Authors.

Table 5 reports the results of the survey on the techniques used by Australian and Sri Lankan to guide long term investment decisions. Most of the firms in Australia adhere to the real option analysis over the other techniques. The real option analysis is highly ranked as an frequently/mostly practice in capital budgeting with 73 percent in Australia whereas 30 percent of Sri Lankan firms indicate they frequently/mostly use this technique, instead, the real option analysis is used more by Australian firms than by Sri Lankan firms. The results also reveal the mean values for the real option and game theory are 3.58 and 3.09 followed by balanced score card with 2.69 in Australia whereas the mean value for the real option is 2.79 of the Sri Lankan firms.

**Table 5. Investment guide**

Methods	Australia		Sri Lanka	
	Frequently/Mostly	Mean*	Frequently/Mostly	Mean*
Real option	73	3.58	30	2.79
Game theory	42	3.09	4	2.29
Balanced score	20	2.93	18	2.67
Value chain	13	2.69	17	2.53

Source: Authors.

#### 4.2. Capital Budgeting and Firm Performance

Tables 6 and 7 present the correlation matrix for all the variables in the study. It examines the association between the CBTs, firm and its CFOs characteristics and firm performance. Overall, the correlations are low between the variables in Australia and Sri Lanka whilst there are some statistically significant relationships. Of the Australia, the results show that there is a positive relationship between choice of capital budgeting techniques (CBT) and firm performance proxies except TQ in Australia. This indicates that firm performance measures tend to increase with an increase in the sophistication level of capital budgeting practices. In Sri Lankan, there is a negative relationship between CBT and firm performance based on accounting (ROA and ROE) and marketing (TQ) based measures which indicated that less sophisticated level of choice of CBTs lead

to less firm performance. The results of the correlation matrix further show the extent of correlation between firm and CFOs characteristics used in this study. In Australia, CFOs' educational background (ED) is negatively correlated with ROA, ROE whilst ED is positively related with firm performance based on market measures (EPS and TQ) and also observed ED has significant relation on EPS at a 1 percent level. In contrast, there is a positive association between ED and firm performance measures except ROE in Sri Lanka. CFOs maturity (experience) is positively correlated with ROA and TQ in Australia while it is negatively correlated with ROE and EPS. In addition, CFOs maturity is significantly correlated with CFOs management experience at a 5 percent level in Australia and Sri Lanka. Whereas CFO maturity is negatively associated with firm performance, except for ROA. Of the Australia, CFOs maturity is a positive relationship with ROA and EPS but there is a negative relationship with ROE and TQ. CFOs management experience (ME) is positively correlated with ROA and TQ while it is negatively correlated with ROE and EPS in Australia and significant effect on TQ, only at a 5 percent level. In Sri Lanka, there is a positive association between ME and ROA, ROE and EPS while it is a positive relationship with TQ. Besides, the number of employees (NE) is negatively correlated with firm performance based on accounting (ROA and ROE) and market measures (EPS and TQ) in Australia and Sri Lanka whilst it is significantly correlated with ROA at a 5 percent level in Australia. Domestic income (DI) earned capacity is negatively associated with ROA, EPS and TQ whilst it is positively associated with ROE in Australia but is significantly correlated with EPS at a 1 percent level. In Sri Lanka, there is a negative relationship between DI earned capacity and firm performance measures (ROA, ROE, EPS and TQ). Moreover, there is a positive relationship between firms' ownership and firm performance measures except EPS. Of the Sri Lanka, firms' ownership is positively associated with ROA and ROE but it is negatively correlated with market measures. Additionally, firm's risk position (level) is positively correlated with all the firm performance measures in Australia while it is significantly related on TQ at a 5 percent level. There is a negative correlation with firms' performance measures except ROA in Sri Lanka.

**Table 6. Correlation analysis – Australia**

	CBT	ED	Age	ME	NE	DI	OW	Risk	ROA	ROE	EPS	TQ
CBT	1											
ED	-.028	1										
Age	.000	.083	1									
ME	-.075	-.006	.791**	1								
NE	.047	.042	.035	.107	1							
DI	-.243*	-.124	-.084	.056	.126	1						
OW	.101	-.204	.214	.136	.072	.147	1					
Risk	-.070	.072	.073	-.281*	.067	.050	.062	1				
ROA	-.143	.139	.068	.084	-.076	-.005	.144	.191	1			
ROE	-.146	-.114	-.018	.056	-.097	-.019	.225	-.125	.588	1		
EPS	.051	.073	.111	.132	-.078	-.212	-.190	-.059	-.006	.529**	1	
TQ	-.021	.019	-.169	-.043	-.030	-.175	-.054	-.095	-.40	-.274*	-.100	1

Source: Authors.

**Table 7. Correlation analysis – Sri Lanka**

	CBT	ED	Age	ME	NE	DI	OW	Risk	ROA	ROE	EPS	TQ
CBT	1											
ED	-.171	1										
Age	.065	.196	1									
ME	.014	.041	.571**	1								
NE	-.115	-.159	-.012	-.120	1							
DI	.082	.135	-.050	-.048	.143	1						
OW	-.152	-.016	-.263	-.395**	.189	-.151	1					
Risk	-.174	.120	-.076	-.109	-.083	-.119	.079	1				
ROA	.068	-.119	.115	.170	-.566**	-.080	.051	.146	1			
ROE	.080	-.069	-.243	-.175	-.073	.003	.275	.199	.357	1		
EPS	.022	.362*	-.104	-.077	-.156	-.311*	.200	.263	.008	.197	1	
TQ	-.125	.090	-.179	.325**	-.173	-.085	-.261	.524**	.077	.166	.230	1

Source: Authors.

## 5. Conclusion and Future Research

The findings of this study illustrate that most Australian firms select DCF as their most frequently used investment analysis technique and the usage of DCF appears to be more intense than what is suggested in prior studies. Sri Lankan firms tend to use PBP more often than other investment analysis techniques. Sri Lankan respondents tend to use PBP more intensively than Australian firms and then IRR is the next most intensively used Capital budgeting technique in Sri Lanka. The scenario approach and sensitivity analysis are the most extensively used techniques for assessing the capital investments risk in Australia, but Sri Lankan firms appear to use scenario approach more intensively than Australian firms. The results, also, suggest that most Australian and Sri Lankan firms rely to some extent on the WACC when estimating the cost of capital. Compared to the Sri Lankan firms, Australian firms appear to use the WACC and CAPM more often. Australian CFOs tend to adhere to real option analysis over other techniques. In contrast, Sri Lankan firms use real option analysis infrequently when deciding on capital investments. The cross-national differences that this study observed in the supplication of CB practices suggest that significant differences in the Australian and Sri Lankan economies and cultures are driving the differences in CB practices. Australia (as a developed nation) has extensive human capital, making the use of sophisticated evaluation methods more convenient, applicable and necessary in terms of domestic competition. In contrast, Sri Lanka, as an emerging nation, has less ready access to human capital, which makes the use of sophisticated evaluation methods more difficult and less necessary in terms of local competition. However, the choice to use more sophisticated techniques vs. simpler alternatives tends to vary with a firm’s attributes (size, available human capital, etc.) and the relative benefits to large Sri Lankan firms may be even greater than those to large Australian firms, e.g. if Australian firms (large and small) are more likely to use more sophisticated techniques than small Sri Lankan firms, then (logically) large firms in Sri Lankan will tend to have less competent competition than Australian large firms. These results are, consistent with a study by Al-Ajmi et al. (2011) which reported that firm’s attributes such as ownership, sources of revenue etc., have some impact on decisions to adopt CB and method of estimating cost of capital and risk. However, these outcomes sharply contrast with Farah et al. (2008) who found that there

is no statistically significant relation between firm attributes and CB techniques. On balance, these results affirm the H<sub>1</sub> assertion that: *Firms and respondents characteristics have an effect on the choice of CB practices employed*. Further, significant differences in institutional systems, corporate governance mechanisms and corporate culture also may account for differences between Australian and Sri Lankan small-firm CB practices. Descriptive results argue that sophisticated methods (i.e., NPV and IRR) methods are now widely utilised among Australian firms participating in the survey. These findings are consistent with previous studies (e.g. Klammer, 1973; Mustapha and Mooi, 2001; Gilbert, 2005; Olawale, Olumuyiwa, and George, 2010) and suggest that Australian CFOs rely more heavily on sophisticated analysis methods than their Sri Lankan counterparts. In line with, the findings, suggest that Australian firms applying sophisticated CBTs tend to have better firm performance measures (other than TQ). Conversely the choice of a CBTs tends to have a negative influence on firm performance measures (other than EPS) in Sri Lanka. On the basis of this study's findings and the mixed findings of other researchers, the assertion of H<sub>2</sub> that: *A firm's CB techniques are expected to have a positive influence on a firm's performance* is not affirmed. This lack of affirmation does not mean there is no correlation/causation between CB techniques and firm performance, only that future research needs to expand its scale (e.g., more firms in the sample), reduce its scope (e.g., fewer industry classifications in the sample) or change its approach (e.g., add indirect effects in the equation being regressed). The weak, mixed findings in this study are consistent with those of earlier studies (Al Mutairi et al., 2011; Gilbert, 2005; Klammer, 1973; Mooi & Mustapha, 2001; Olawale, Olumuyiwa, & George, 2011). The findings of this study provide a number of interesting implications for policymakers and academics. The study adds to the general knowledge on CB practices by showing that the nature of the firm appears to swamp the nurture of the environment in which it is embedded. Therefore, this study contributes to understanding the role CB play in business decision making by demonstrating the need for more sophistication in firms' analysis of long-term investment decision making and underinvestment can be minimised. This study also contributes to the accounting/finance literature by adding to a small cohort of comparative studies in CB practices. For academics and accounting educators should start to broaden students' views towards the scope of CB. In complex real-world situations, reconciling the outputs of a multifaceted approach to CB methods is more likely to give the depth and width of input needed to achieve an optimal capital investment plan. Future research should consider: 1) Generating more generalised conclusions by greatly encompassing a much larger number of emerging and developed countries in the study; and 2) Investigating whether the use of multiple CB methods has an impact on the capital structure of a firm and whether long-term decisions are affected.

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