

## A Review of Capital Budgeting Practices: Developed and Developing Country Context

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### ABSTRACT

*The main purpose of this paper is to analyse existing literature the use of capital budgeting practices by firms in a comparative perspective to see whether any differences between developed and developing countries context. Trends towards sophisticated techniques have continued in developed and developing countries; though, developed countries, most of the firms are using sophisticated capital budgeting techniques however, that even though over time the use of the simple techniques method has declined as a primary tool for investment evaluation. In context of developing countries most frequently employ with non-discounted cash flow techniques and discounted cash flow techniques. The study notes there still remains a difference between developed and developing countries and theory-practice gap in the sophisticated capital budgeting techniques, and simple capital budgeting techniques. What this study suggestions is that the difference between developed and developing countries firms is smaller than might have been expected based upon the differences in the level of economic height, at least with respect to the use of sophisticated techniques as investment appraisal tool.*

**Keywords** Capital Budgeting Practices, Developed Countries, Developing Countries.

### 1. INTRODUCTION

The objective of firm has evolved in response to the corporate social responsibility (CSR) debate, which goes back to 1950s. The traditional theory of the firm over relied on the now disputed goal of maximising shareholder wealth. Hettihewa (2016), in discussing this corporate shift in objectives, noted that the debate over whether firms should focus on producing economic goods and profits or serve an array of broader social goals. Bowen (1953) was part of a vanguard that shifted the Theory of the Firm to shareholder theory and from there to stakeholder theory (Freeman, 1994). The current Theory of the Firm posits that firms maximise their value by making decisions to maximise the wealth of their stakeholders (Frino, Hill, & Chen, 2013; Gervais, Heaton, & Odean, 2012; Graham, Harvey, & Puri, 2015; Hamzah & Zulkafli, 2014; Kalyebara & Islam, 2014). Capital budgeting, a key input to achieving that goal, is the rational allocation of limited capital across a plethora of viable prospective investment (De Andrés, De Fuente, & San Martín, 2015). In this context, decisions made by financial managers 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 Capital budgeting; where Capital budgeting is defined as the practice of analysing investment opportunities in long-term assets which are expected to harvest benefits for more than one year (Archer, Choate, & Racette, 1979; Correia, Mayall, O'Grady, & Pang, 2005). Al-Ajmi, Al-Saleh, and Hussain (2011), also, suggest that Capital budgeting is the process of determining which investments will maximise stakeholders' wealth. This study investigates whether Capital budgeting practices differ significantly between developed and emerging countries. This study will compare the Capital budgeting practices of

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both developed and emerging country firms in order to provide insights and evidence of the use of differing investment analysis, techniques and tools to help managers determine the most appropriate Capital budgeting portfolio that will help maximise firm wealth. Moreover, this study would hopefully benefit academics, researchers, policy-makers and practitioners of both countries and other similar countries through exploring the impact of Capital budgeting practices on firm performance, and pursuing strategies to improve the current status of it.

## 2. CAPITAL BUDGETING PRACTICES

The term investment refers to commitments of resources made in the hope of realising future benefits. It is the process of allocating resources for major capital or investment expenditures (Bierman & Smidt, 2007; Boudreaux, Rao, & Das, 2014) and is seen as being worthwhile to the extent it creates value for its stakeholders (Aharoni, 1966; Ross, Bianchi, Christensen, Drew, Westerfield, & Jordan, 2014).

### 2.1 Contingency Theory in Context of Capital Budgeting Practices

Several authors align contingency theory in the setting and design of the Capital budgeting process: 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. Consequently, resource-distribution efficiency is not individually achieved via only adopting sophisticated, theoretical best-investment techniques and procedures, but also entails the *fit* between the corporate context and the design and operation of the Capital budgeting system (Pike, 1984).

The literature mostly identifies two key Capital budgeting approaches:

- The *process approach* which takes a wider perspective and attempts to explain how firms make investment decisions in practice; how investment opportunities are identified, developed, justified and finally approved (Batra & Verma, 2014; Hall, 2000; Harris & Raviv, 1996); and
- The *evaluation approach*, which denotes traditional theory, presents procedures for how firms should treat investment decisions and focuses more on the financial appraisal and selection of proposed investments in long-term resources (Arnold & Hatzopoulos, 2000; Wnuk-Pel, 2014).

### 2.2 Capital Budgeting Process Developed vs. Emerging Countries

Capital budgeting technique focused studies have a long tradition in finance literature (Schlegel, Frank, & Britzelmaier, 2016). . Several articles have dealt with capital appraisal techniques around the world. Most of these studies have focused on developed countries such as the United States (Graham & Harvey, 2001; Shao & Alan, 1996), Canada (Baker, Dutta, & Saadi, 2011; Bennouna *et al.*, 2010; Jog & Srivastava, 1995), the United Kingdom (Arnold & Hatzopoulos, 2000; Alkaraan & Northcott, 2006), and Australia (Freeman & Hobbes, 1991; Truong *et al.*, 2008).

#### 2.2.1 The US Experience

Capital budgeting practices in the US have been comprehensively surveyed concerning their firms' investment appraisal. These include studies reported by Block (2005), Bierman and Smidt (2007), Chen (1995), Fremgen (1973), Gittman and Forrestter (1977), Graham and Harvey (2001), Hendricks (1983), Klammer (1973), Klammer and Walker (1984), Mao (1970),

Payne *et al.* (1999), Pitty, David, and Bird (1975), Ryan and Ryan (2002), Schall *et al.* (1978), Shao and Alan (1996) and Trahan and Gittman (1995). These studies suggest that NPV and IRR (DCF techniques) are the dominant methods of evaluating and ranking proposed capital investments in the USA. On the basis of recent studies in the US, CFOs are not always in agreement as to the best choice of theoretical method. Klammer (1973) found that whereas only 19 percent of a sample of large industrial firms used DCF techniques to evaluate proposed capital investments in 1959, this increased to 38 percent in 1964 and 57 percent in 1970. Hendricks (1983) reported that the percentage increased to 76 percent by 1981. Bierman and Smidt (1993) reported that 99 percent of the respondents in their 1992 survey of the 100 largest Fortune 500 firms used IRR or NPV as either the primary or secondary evaluation measure. Graham and Harvey (2001) noted that approximately 75 percent of respondents selected NPV and IRR as their most frequently used Capital budgeting techniques; and also that small firms employed the PBP almost as frequently as other DCF techniques. Block (2005) noted that 14 percent of the firms used RO in their Capital budgeting practices.

### **2.3 The UK and Western European Experience**

During the past few decades many studies of UK Capital budgeting practices have been undertaken (Arnold & Hatzopoulos, 2000; Alkaraan & Northcott, 2006; Beattie, Goodacre, & Thomson, 2006; Drury & Tayles, 1996; Pike, 1988; Pike, 1996; Sangster, 1993; Wilkes, Samuels, & Greenfield, 1996). These studies have concentrated mainly on the usage of Capital budgeting appraisal techniques. Trends in the UK over the past four decades are quiet revealing. Pike's (1988) study noted that the use of DCF methods had increased from 58 percent in 1975 to 84 percent in 1986 with the IRR being used by 42 percent of the firms compared with 23 percent for the NPV method. The PBP was the most widely used technique and adopted by 92 percent of the respondents including 47 percent who stated that they always used this method. Further studies in the 1990s noted the continued use by UK firms of DCF techniques with Wilkes *et al.* (1996) suggesting by 1994 the use of such techniques had risen to around 85 percent (much more than what was found in most eralier studies). These results indicate that the theory-practice gap is narrowing. Whereas DCF was used by only 58 percent of large firms in 1975 most large firms are now using either IRR or NPV with over 90 percent of small and medium firms also using these methods. Furthermore, one third of large firms in 1975 used one technique, with approximately one third using two techniques and the remaining one third using three or more techniques. Recent studies show 67 percent of firms now use three or more techniques for their appraisal (Alkaraan & Northcott, 2006). The general picture in the UK is that the PBP method is still an important method while DCF methods seem to have also increased in importance.

### **2.4 The Canadian Experience**

Several studies have dealt with Capital budgeting practices of firms in Canada over the past several decades. These include studies reported by Baker *et al.* (2011), Bennouna *et al.* (2010) and Jog and Srivastava (1995). DCF has become the main appraisal techniques in Canada (Bennouna *et al.*, 2010; Jog & Srivastava, 1995). In particular the use of DCF appears to have increased from a low of around 35 percent in the early 1960s to approximately 90 percent or more in the early 1990s. NPV is now widely utilised among Candian firms but a sizeable percentage still use IRR as their primary model in capital decision making. The theory-practice gap remains a regular theme in the Capital budgeting Canada based literature, in particular with regard to NPV. Compared to previous Canadian studies, there has been a narrowing of the theory-practice gap. While the 2011 survey shows 17 percent of responding firms used RO for their Capital budgeting decisions (Baker *et al.*, 2011), the majority of Canadian firms use risk analysis tools with the main ones being sensitivity analysis, scenario analysis and risk-adjusted

discount rates. Compared to previous research, recent studies show a substantial increase in sensitivity analysis and use of risk-adjusted discount rates.

## 2.5 The Australian Experience

A number of studies into the Capital budgeting practices of Australian firms have been conducted, including Anderson (1982), Freeman and Hobbes (1991), Kalyebara (1998), Lilleyman (1984), McMahon (1981) and Truong *et al.* (2008). These studies cover a range of issues (e.g., which Capital budgeting techniques are used, how firms rank the significance of these techniques, and how discount rates are determined). Comparing the results of studies by Lilleyman (1984) and McMahon (1981) and their study outcomes, Freeman and Hobbes (1991) found an increase in the use of DCF techniques from 52 percent of respondents in 1979 to 75 percent in 1989. Kalyebara (1998) also found that 75 percent of respondents to a 1996 survey used NPV followed by IRR and PBP. While the study found that the use of DCF techniques dominated, the PBP was still employed in investment appraisals. A majority of extant studies specify that firms use more than one technique. More recently, Truong *et al.* (2008) found that 94 percent of CFOs used NPV, followed by PBP and IRR. They also noted that RO analysis has gained more relevance in Capital budgeting in Australia albeit was not yet part of the main stream. Table 1 summarises the major findings on Capital budgeting appraisal techniques in developed countries.

**Table 1** Capital budgeting appraisal techniques in developed countries\*

Author	Year published	Country	Most favoured	DCF (%)		NDCF (%)	
				IRR	NPV	PBP	ARR
Freeman & Hobbes	1991	Australia	NPV	72.00	75.00	44.00	33.00
Kester, Chang, Echanis, Haikal, Mansor, Skully, Tsui, & Wang	1999	Australia	NPV/IRR	96.00	96.00	93.00	73.00
Truong, Partington, & Peat	2008	Australia	NPV	81.00	94.00	90.00	57.00
Jog & Srivastawa	1995	Canada	IRR	62.00	41.00	53.70	14.90
Bennouna, Meredith, & Marchant	2010	Canada	NPV	87.70	94.20		
Baker, Dutta, & Saadi	2011	Canada	NPV	68.40	74.60	67.20	39.70
Liljebloom & Vaihekoski	2004	Finland	IRR/PBP	22.90	18.80	22.90	6.30
Brounen, De Jong, & Koedijk	2004	France	PBP	44.07	35.09	50.88	16.07
Brounen, De Jong, & Koedijk	2004	Germany	PBP	42.15	47.58	50.00	32.17
Hanaeda & Serita	2014	Japan	PBP	26.51	23.35	56.02	43.87
Shinoda	2010	Japan	IRR	75.61	74.93	56.74	20.29
Brounen, De Jong, & Koedijk	2004	Netherlands	NPV	56.00	70.00	64.71	25.00
Hermes, Smid, & Yao	2007	Netherlands	NPV	74.00	89.00	84.00	2.00
Wnuk-Pel	2014	Poland	IRR	58.00	57.00	34.00	15.00
De Andrés, De Fuente, & San Martín	2015	Spain	IRR	74.10	71.10	39.30	
Holmen & Pramborg	2009	Sweden	PBP	34.00	49.00	57.00	38.00
Sandahal & Sjögren	2003	Sweden	PBP	22.70	52.30	78.10	21.10
Daunfeldt & Hartwig	2014	Sweden	NPV	30.05	61.14	54.40	23.83
Brounen, De Jong, & Koedijk	2004	UK	PBP	53.13	46.97	69.23	38.10
Drury & Tayles	1996	UK	PBP	57.00	43.00	63.00	41.00
Pike	1996	UK	PBP	81.00	74.00	94.00	50.00
Pike	1986	UK	PBP	75.00	68.00	92.00	56.00
Ballantine, Galliers, & Stray	1995	UK	PBP	7.00	3.00	16.00	11.00
Block	2005	UK	PBP	39.00	38.00	76.00	28.00
Arnold & Hatzopoulos	2000	UK	IRR	68.00	62.00	46.00	41.00
Alkaraan & Northcott	2006	UK	NPV	89.00	99.00	96.00	60.00
Wilkes, Samuels, & Greenfield	1996	UK	PBP	80.00	65.00	89.00	43.00
Sangster	1993	Scotland	PBP	58.00	48.00	78.00	31.00
Block	1997	US	PBP	16.40	11.20	42.70	22.40
Graham & Harvey	2001	US	IRR	75.61	74.93	56.74	20.29

Ryan & Ryan	2002	US	NPV	76.70	85.10	52.60	14.70
<b>Chen</b>	<b>2008</b>	<b>US</b>	<b>NPV/IRR</b>				
Trahan & Gitman	1995	US	NPV	79.80	81.00	66.70	59.50
Burns & Walker	1997	US	IRR	84.00	73.00	73.00	21.00
Hassan, Shao, & Shao	1997	US	IRR	39.60	15.35	26.23	15.35

\*Note: Percent of using discounted and non-discounted techniques among the developed countries including Australia, Canada, US, UK, Netherland, Germany, France, Sweden, Singapore, Japan, Finland and Poland.

## 2.6 The Emerging/Developing Country Experience

There are only a limited number of studies emphasising Capital budgeting evaluation techniques in emerging countries. Chan, Kamal, and William (2004); Farah, Mansor, and George (2008); Kester and Chong (1998); Khalid, Matkin, and Morse (2017) placed emphasis on Malaysia, Indonesia, China, and Singapore; African economies were examined by Coltman (1995); Hassan, Hosny, and Vasilya (2011); Maroyi and van der Poll (2012); Pradeep and Lemay (2009); Kantudu, (2007) while India was examined by Manoj (2002); Satish, Sanjeev, and Roopali (2009); Singh, Jain, and Yadav (2012). Limited studies on the perception of CFOs in emerging, particularly the South-eastern Asia, countries were found. These studies reporting on the results of a survey of firms in Singapore, China and Indonesia, found that DCF and NDCF are the most frequently used methods. In Malaysia, Han (1986) found the PBP to be the most frequently used evaluation technique. Wong, Farragher and Leung (1987) surveyed a large sample of firms in Malaysia, Hong Kong and Singapore and found significant use of the PBP in Malaysia. In Hong Kong, they found the PBP and ARR to be equally popular. Though, recent studies established that firms in South-Eastern Asia employ NDCF techniques and DCF techniques equally to their long-term decisions. Capital budgeting practices studies on African firms indicate a shift in the appraisal techniques employed by firms. Falusi (1983) chose 60 manufacturing firms (45 of which are listed on the Nigerian Stock Exchange) to determine the extent to which firms in Nigerian use DCF techniques. The study found that 89 percent of listed firms made use of the NPV method while the PBP method was used by the remaining listed firms as well as non-listed firms. The results for African firms are consistent with the increasing use of DCF in capital investment selection. Previous studies on Capital budgeting practices undertaken in South Africa (e.g., Andrews & Butler, 1986; Du Toit & Pienaar 2005) noted that larger firms tend to employ more sophisticated Capital budgeting techniques with simpler Capital budgeting techniques being more popular among small and medium firms. In the case of Nigeria, firms still employ NDCF techniques, although the use of PBP and ARR methods have declined recently. A considerable amount of evidence is available about Capital budgeting practices in Asian countries through studies by Manoj (2002); Hussaini and Shafique (2013); Satish *et al.* (2009); Singh *et al.* (2012). Manoj (2002) examined corporate finance practices using a sample drawn from India. The study consisted of 474 private firms and 51 public sector firms. The researcher employed a questionnaire to test the Capital budgeting practices, capital structure, dividend policy and cost of capital of the selected firms. The results revealed that most respondents consider the objective to maximise earnings before interest and tax (EBIT) and earnings per share (EPS) as their corporate finance practice. Further, DCF methodology was the most popular method for evaluating Capital budgeting decisions with the majority of respondents using the NPV and IRR in their analysis with larger firms more frequently using NPV than their smaller counterparts. Over the years certain noteworthy studies in India were conducted. In these studies of India, NPV criterion was observed to be a widely used Capital budgeting technique followed by IRR although, still relying on simple Capital budgeting techniques such as the PBP and ARR but there usage had declined.

**Table 2** Capital budgeting appraisal techniques in emerging countries\*

Author	Year Published	Country	Most favoured	DCF(%) with		NDCF(%) with	
				IRR	NPV	PBP	ARR
Pereiro	2006	Argentina	IRR	100.00	87.00	32.00	
Velez & Nieto	1986	Colombia	IRR	73.00	66.00	19.00	
Lidija & Silvija	2007	Croatia	IRR	59.00	42.00	56.00	8.00
Lazaridis	2004	Cyprus	PBP	8.86	11.39	36.71	17.72
Wong, Farragher, & Leung	1987	Hong Kong	PBP/ARR	32.00	37.00	47.00	47.00
Kester, Chang, Echanis, Haikal, Mansor, Skully, Tsui, & Wang	1999	Hong Kong	PBP	86.00	88.00	100.00	80.00
Lam, Wang, & Lam	2008	Hong Kong	NPV	57.10	66.70	81.00	81.00
Anand	2002	India	IRR	85.00	66.30	67.50	34.60
Verma, Gupta, & Batra	2009	India	NPV/PBP	10.00	40.00	40.00	26.70
Singh, Jain, & Yadav	2012	India	IRR	78.57	50.00	64.28	39.28
Kester, Chang, Echanis, Haikal, Mansor, Skully, Tsui, & Wang	1999	Indonesia	NPV/IRR	94.00	94.00	81.00	56.00
Leon, Isa, & Kester	2008	Indonesia	PBP	63.60	63.60	86.40	40.90
Hassan, Hosny, & Vasilya	2011	Kuwait	NPV	6.49	21.62	8.47	
Kwong	1986	Malaysia	NPV	66.70	77.80		
Wong, Farragher, & Leung	1987	Malaysia	PBP	35.00	47.00	60.00	42.00
Kester, Chang, Echanis, Haikal, Mansor, Skully, Tsui, & Wang	1999	Malaysia	PBP	89.00	91.00	94.00	69.00
Kantudu	2007	Nigeria	PBP	16.67	10.00	26.67	13.33
Kester, Chang, Echanis, Haikal, Mansor, Skully, Tsui, & Wang	1999	Philippines	PBP	94.00	81.00	100.00	78.00
Wong, Farragher, & Leung	1987	Singapore	IRR/PBP/ARR	52.00	31.00	52.00	52.00
Kester, Chang, Echanis, Haikal, Mansor, Skully, Tsui, & Wang	1999	Singapore	PBP	88.00	86.00	98.00	80.00
Hall	2000	S. Africa	IRR	32.30	16.90	16.90	
Hall & Millard	2010	S. Africa	ARR	23.70	28.60	4.80	33.30
Maroyi & van der Poll	2012	S. Africa	NPV	50.00	92.00	0.00	0.00
Pradeep & Lemay	2009	S. Africa	PBP	28.00	36.00	39.00	22.00
Haddad, Sterk, & Wu	2010	Taiwan	PBP	47.83	30.43	52.17	26.09

\*Note: Percent using discounted and non-discounted techniques among the emerging countries including Argentina, China, Colombia, Croatia, Cyprus, Hong Kong, India, Indonesia, Kuwait, Malaysia, Nigeria, Philippines, South Africa and Taiwan.

### 3. RISK ASSESSMENT OF CAPITAL BUDGETING

Risk analysis of investments is a critical aspect of Capital budgeting decisions (Chadwell-Hatfield *et al.*, 1996; Gitman *et al.*, 2011; Ho & Pike, 1991; Ho & Pike, 1998; Zinn, Lesso, & Motazed, 1977). The measurement of return in Capital budgeting brings with it, its own special challenges. Appraising future cash flows, their timing, and the level of their uncertainty presents the largest challenge as return and risk must be measured together by CFOs when employing techniques (Bennouna *et al.*, 2010). Ryan and Ryan (2002) found the use of quantitative techniques in the US (to analysis investment risk) was similar with Australia—although there was an increasing use of scenario analysis, mainly via simulation. Canadian CFOs were seen to use risk analysis techniques, with the prime ones being scenario analysis, sensitivity analysis and the risk-adjusted discount rate (Bennouna *et al.*, 2010). The results were similar to the Australian, Indonesian, Hong Kong, Malaysian, Singaporean and Philippine study

by Kester *et al.* (1999) who found that sensitivity and scenario methods were the most substantial techniques used for investment risk assessment. They, also found that the majority of Australian CFOs use the CAPM; Indonesian and Pilipino CFOs use the cost of debt plus risk premium method and Hong Kong CFOs use the dividend yield plus growth rate method. Black, Parry, Anderson, and Bennett (2002) note that the majority of New Zealand CFOs use CAPM, whereas the majority of Chinese, Kuwaiti and Singaporean CFOs use sensitivity and scenario analysis methods when valuing risk of investments (Chan *et al.*, 2004; Kester & Chong, 1998; Mutairi *et al.*, 2009). In India, Anand (2002) noted that a majority of CFOs use sensitivity analysis and scenario analysis when analysing capital investments, while a few CFOs relied on a risk-adjusted discount rate, Monte Carlo simulation and decision-tree analysis. Anand, also, noted that large public sector and large firms were more likely to use scenario analysis for assessing investment risk than private and smaller firms. Also, large firms were more likely to use decision-tree analysis than small firms. Brounen *et al.* (2004) found that large firms were more likely to use NPV and the CAPM when calculating the discount rate in the UK, the Netherlands, Germany and France.

#### **4. PROPER USE OF AND PITFALLS IN DISCOUNTED CASH FLOW**

##### **4.1 Cash Flow Estimation**

Assessment of cash flows requires immense understanding of the investment before it is implemented (Brigham, 1992; Kashyap, 2014; Modigliani & Miller, 1958). Clearly the most significant stage in analysing a possible investment is estimating its cash flows and the investment outlays that will be required as well as the net cash inflows the investment will produce. Many variables are involved in cash flow forecasting and many individuals and sections of the firm participate in the process (Brigham & Gapenski, 1997). Cash flow estimation can be considered from two different angles; cash inflows and outflows that:

- i. Are represented by the increase in revenue that is attributable to the investment under review; These also arise as savings in future costs resulting from the purchase of an item of plant or business arrangement (Wilson & Keers, 2003),
- ii. Result from future costs and expenses associated with an investment; In estimating these cash flows, any interest or finance charges on funds acquired should be ignored (Wilson & Keers, 2003).

In terms of specific characteristics of Capital budgeting practice, DCF techniques should be based on cash flows and not accounting income (Brealey & Myers, 2003). Estimating cash flows properly is more vital than fine-tuning the other investment estimations. It is difficult to estimate most investments' tangible cash flows accurately. DCF calculations do not call for accurate estimates but for accurate assessments of the mean of possible outcomes (Myers, 1984). Common issues in estimating discounted cash flows are deducting from accounting income: non-cash expenses (e.g., depreciation); an allocation of existing overhead costs; interest expenses, and income tax (Nicholson & Ffolliott, 1966). Such errors make it extremely difficult for top management to verify the true cash flows, risks and the present value of capital investment proposals. Moreover, firms are expected to recognise inflation in Capital budgeting decisions (Brigham & Ehrhardt, 2011). Inflation impacts not only on an investment's future cash flows but also the opportunity cost used as the discount rate (Menachem & Venetia, 1983). In the UK, inflation was properly treated in DCF analysis by only 27 percent of firms (Drury & Tayles, 1996) and also Pike (1996) found that there had been a significant increase in the number of firms making explicit adjustments for inflation: 58 percent of firms made adjustments for changes in general inflation while 56 percent of firms specified different rates for all costs and revenues. Pike (1996) also found that 70 percent of firms estimated future cash flows at constant prices and discounted the investment cash flows at real discount rates. This

method is only consistent with financial theory if the assumptions apply, in that future cash flows are expected to increase at the general rate of inflation and income tax and therefore the results indicated are surprising in relation to the increasing sophistication of Capital budgeting techniques employed. According to Ryan and Ryan (2002) only 31 percent of the firms in the US always or often use inflation adjusted cash flows. McLaney, Pointon, Thomas, and Tucker (2004) noted that 67 percent of UK firms took tax effects into account when estimating the cost of capital, while Truong *et al.* (2008) revealed that in most Australian firms, investment analysis took no account of the value of imputation tax credits.

#### 4.2 Cost of Capital

The cost of capital is the expected rate of return that is needed to draw market participants to a particular investment (Frino *et al.*, 2013; Gitman *et al.*, 2011; Zeeman & Naumann, 2005). In economic terms, the cost of capital for a given investment is the opportunity cost of forgoing the next best alternative investment (Petty, *et al.*, 1996; Pratt & Grabowski, 2008). The cost of capital is the main parameter of DCF calculation (Bennouna *et al.*, 2010). The firm's cost of capital expressed as a decimal or percent is used in two ways in Capital budgeting: i) as a minimum profitability rate that prospective investment returns must exceed; and ii) as a discount rate applied to cash flows. The cost of capital is a factor in compensation plans, with bonuses dependent on whether the firm's return on invested capital exceeds the cost of capital (Brigham & Ehrhardt, 2011). The cost of capital is a crucial issue for the firm as it provides the discount rate in the evaluation of capital investment. The intuitive appeal of the capital asset pricing model (CAPM) and weighted average cost of capital (WACC) methods ensures their sustained popularity in firms (McLaney *et al.*, 2004; Zeeman & Naumann, 2005). CFOs regularly employ the CAPM as a technique to assess the viability of investment proposals and estimate the cost of capital for which they need to know the market risk premium. In the CAPM model, the cost of capital of an investment can be predicted based on the *beta* of the investment and the market risk premium. Another method also used to estimate cost of capital is the WACC. This WACC is a vital metric in the traditional literature of corporate finance. The WACC is intended to be the cut-off point in Capital budgeting decisions. CFOs tend to view investments that equal or exceed the hurdle rate as contributing to stakeholder wealth maximisation, while those that fail are viewed as being dilutive to value. Various studies have considered the way in which the cost of capital has been calculated and employed as the discount rate in Capital budgeting. Westwick and Shohet (1976) found that in UK the most popular method for selecting the minimum rate of return for use in investment appraisal decisions was to use the firm's bank overdraft rate while less than 10 percent firms mentioned the use of a WACC. This has changed significantly over the subsequent years. Hodgkinson (1989) found that 36 percent of large firms in the UK used the WACC as the discount rate. In more recent years, slightly over half of the UK firms employ a WACC estimate. Arnold and Hatzopoulos (2000); McLaney *et al.* (2004) note that the WACC is the most popular approach used in estimating the cost of capital. Interestingly, a significant minority of smaller firms are still using the interest rate payable on debt. Graham and Harvey (2001) reported that only 47 percent of firms surveyed in the UK used the CAPM compared to 73 percent usage of the CAPM in the US. In Canada, Payne *et al.* (1999) compared the Capital budgeting practice of US and Canadian firms and found that the WACC is more popular in the US than in Canada. This considerable preference for the CAPM has also been confirmed through other studies in Canada (Bennouna *et al.*, 2010; Jog and Srivastava, 1995) and Central and Eastern Europe (CEE) countries (Andor *et al.*, 2015). In Australia, Freeman and Hobbes (1991) found that only 40 percent of firms use the WACC to evaluate investment while 39 percent of firms use the cost of borrowing. However, Truong *et al.* (2008) noted that the CAPM is the most common method used in estimating the cost of capital in Australia. The next most popular method is the cost of debt plus some premium for equity. It seems that alternative asset pricing models are not being adopted by Australian firms. This study supports the Kester *et al.* (1999) assertion of increasing usage of the CAPM for estimating the cost of capital. The Australian results are similar to Graham and Harvey's (2001) study in the US. Usage of the CAPM in



Australia is substantially higher than in the UK (McLaney *et al.*, 2004), or Canada (Jog & Srivastava, 1995). In the European context, Brounen *et al.* (2004) found a slightly different practice in the use of CAPM relative to findings from other countries. Nevertheless, *rule-of-thumb* techniques continue to enjoy extensive use. The WACC is widely used as a discount rate in estimating the cost of capital. A survey of Paksitani firms by Hussaini and Shafique (2013) found the WACC method to be dominant. Research in India noted that the CAPM was the most popular method with 54 percent of firms estimating a cost of capital (Anand, 2002). The second and the third most popular methods are Gordon's dividend discount model and earnings yield. In a comparative study between Dutch and Chinese firms, the results indicated that 67 percent of Dutch firms used the WACC for discounting purpose while only 10 percent of Dutch firms used a project dependent (risk-adjusted) cost of capital. Similarly, with Chinese firms, 53 percent of firms frequently used the WACC, with 29 percent firms mentioning the use of the cost of debt. 16 percent of firms suggested the use of a project dependent cost of capital. Chinese firms appear to use the cost of debt more often (Hermes *et al.*, 2007). Kester and Chong (1998) report that 52 percent of Singaporean firms use a single discount rate while the remaining firms rely on the WACC. In a South African survey, Pocock, Correia, and Wormald (1991) found that 35 percent of firms employ the cost of the specific source of finance for the investment as the discount rate. In Indonesia, 47 percent of firms use risk premium methods to calculate their cost of equity while risk-adjusted discount rates and the CAPM are less frequently used (Farah *et al.*, 2008).

## 5. CONCLUDING REMARKS

Many researchers have over the years made extensive efforts to survey and identify the quantitative techniques used by firms around the world. Early and recent research in Capital budgeting in the US (Graham & Harvey, 2001), UK (Arnold & Hatzopoulos, 2000), Sweden (Sandahal & Sjogren, 2003), UK, Netherlands, Germany and France (Brounen *et al.*, 2004), Netherlands and China (Hermes *et al.*, 2007) and Australia (Truong *et al.*, 2008), have reported that, over time, firms are increasingly adopting more refined Capital budgeting practices. However, for the most part, these studies have focused on the application and enhancement of modelling techniques. The trend towards the adoption of more refined Capital budgeting practices has led researchers to consider whether these refinements have actually improved firm performance and profitability. The mixed outcomes in the extant literature and a dearth of comparative studies suggest a significant gap in understanding Capital budgeting practices and firm performance, especially in terms of similarities and differences in developed and emerging countries. In the US, survey results noted that the sophistication of Capital budgeting methods used by CFOs have increased over time. Similarly, some earlier studies of Capital budgeting practices in South-east Asia (Malaysia, Hong Kong, Philippines, and Singapore) ascribe equal significance to DCF and NDCF methods. It appears that Asian and African CFOs tend to rely more on NDCF methods than sophisticated methods, when selecting long-term investments. Lee and Ip (1984) revealed that the PBP and the NPV were the most regularly used techniques in Hong Kong. Wong *et al.* (1987) revealed that the PBP was the most prevalent prime method used in Malaysia. In a prior study of Malaysian firms, Han (1986) found that the most prevalent techniques for adjusting for risk were shortening the PBP and requiring higher rates of return for riskier investments. Kester and Chong (1998) and Kester *et al.* (1999) suggested that CFOs of Singaporean firms found the PBP and IRR to be equally significant for ranking and analysing long-term investments. The studies, also, suggest that these results are similar for firms in Australia, Hong Kong, Indonesia, Malaysia and the Philippines. While there are clear limitations to the literature review, it suggests that a majority of Capital budgeting studies are focused on developed markets and that there is a scarcity of serious analyses of the situation in emerging markets. This study seeks insights that will prepare the way for general rules and outcomes in future research.

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