Capital Budgeting Methods and Practices: Evidence from Privately Owned Firms in Pakistan

Abdual Waheed[1], Abdul Rashid[2] and Lubna Ansari[3]

https://doi.org/10.62345/jads.2024.13.3.109

Abstract

The aim of this research paper is to study the degree of using capital budgeting methods on choosing the appropriate project for investment by privately owned firms in Pakistan. We surveyed 58 chief executive officers (CEOs) of privately owned firms. Our survey contained fifteen questions to explore capital budgeting and cost of capital. The study covers the period from September, 2018 to May, 2019. Firms rely heavily on IRR as a project evaluation method. According to cost of capital methods, average historical rate of return on common stock is mostly used by the firms. The regression test showed significant relationship between firm characteristics with respective to the use of capital budgeting techniques and cost of capital methods.

Keywords: Capital Budgeting, Cost of Capital, Private Firms.

Introduction

Capital budgeting is the process of making planning decisions and analysis of opportunities for long-term investments in assets to produce benefits for more than one year (Horngren et al., 2000; Peterson & Fabozzi, 2002). In other words, we can say a capital budgeting is a decision to make a cash outflows in order to obtain cash inflows in the future (Hall & Millard, 2010). Capital budgeting decisions are one of the vital areas of firms' financial management (Rappaport, 1986; Stewart, 1991; Copeland et al., 1996). Inappropriate method of investment evaluation may also lead to a condition in which a firm refuses to participate into projects proposing a return greater than the cost of capital and the effectiveness of the firms deteriorates (Porter, 1985).

Allotting resources among investment plans is one of crucial choices made by top management, as it is the means of executing a firms' policy (Bowman & Hurry, 1993; Hofer & Schendel, 1978). Most empirical literature on capital budgeting practices has exclusively concentrated on the capital budgeting choice rule (Farragher et al., 2001; Kim, 1982). Corporate capital budgeting decisions methods are used by corporate executives in process of most critical decision making about capital budgeting.

Although, the executives have many capital budgeting methods, the use of such methods has not always been agreement with finance theory. In particularly, the payback period (PBP) method is said to be inappropriate and mistaken due to overlooks the time value of money and cash flows after cutoff date. Even if we use the discounted payback period (DPBP) technique, we cannot resolve the difficulty of ignoring cash flows beyond the cutoff date. Financial economists frequently cite the growing use of discounted cash flow (DCF) analysis as evidence of their growing influence on business practice (Graham & Harvey, 2001). Capital budgets are

[1]*Air University Islamabad. Email: awj_639@hotmail.com*
[2]*Associate Professor, International Islamic University Islamabad. Email: Abdulrashid@iiu.edu.pk*
[3]*Assistant Professor, University of Arid Agriculture, Rawalpindi.*
Corresponding Author Email: Lubna.ansari@uaar.edu.pk

Compliance with ethical standards: There are no conflicts of interest (financial or non-financial). This study did not receive any funding.

constructed on sales projections and on the estimated plant and equipment wanted to attain those projected sales (Hunt & Terry, 1993).

In the lively business environs, creating capital budgeting verdicts are among the vital and complicated of all management verdicts as it signifies major obligations of firms' capitals and have thoughtful concerns on the profitability and monetary permanency. There is a need an empirical analysis for the extent of financial stability achieved by the firms' capital budgeting decisions over a period of time (Kannadhasan & Nandagopal, 2008). With respect to the corporate finance practices, the well-known surveys are (Gitman & Forrester, 1977) study about capital budgeting methods used by main USA firms, (Porwal, 1976) survey on capital budgeting methods and profitability. The real option analysis was suggested numerous time to be more suitable than traditional net present value (NPV) for assessing research and development project (Newton et al., 2004).

This study examines whether privately owned firms in Pakistan used capital budgeting methods or not. If they use capital budgeting methods, what types of methods mostly used in their capital investment decisions. This study explores whether privately owned firms in Pakistan give importance to capital budgeting methods for making investment decisions as likely listed firms. This study also discusses the relationship between the capital budgeting methods and firms' and CEOs' characteristics.

Financial executives and academics have not been fully agreed regarding the best capital budgeting method choice. Miller, (1960), Schall et al. (1978) and Pike, (1996) find that most preferred method is payback period (PBP). (Istvan, 1961) find that accounting rate of return (ARR) is most preferred method. Mao (1970) reports to net present value as the least popular capital budgeting technique. Klammer, (1972) indicates discounted cash flow (DCF) models as a preferred method. Jog and Srivastava (1995) report a declined of accounting rate of return method acceptance in the United Kingdom and Canada. Evans and Forbes (1993) claimed that internal rate of return (IRR) method is most efficient in case of comparison.

Capital budgeting methods has been well examined in practice (Pike & Wolfe, 1988; Pike, 1988; Ho & Pike, 1991, 1992; Lefley, 1994; Pike, 1996; Abdel-Kader & Dugdale, 1998; Arnold & Hatzopoulos, 2000). Almost all of these prior studies capital investment techniques like payback period (PBP), IRR, NPV and different type of risk analysis techniques such as sensitivity analysis (SA), payback period (PBP) adjustment have been investigated. Pike (1996), Abdel-Kader and Dugdale (1998) investigated that mostly firms in their investment appraisal use many financial analysis method rather than one. They also found that the discounted cash flow methods (IRR and NPV) used more frequently than the former.

Arnold and Hatzopoulos (2000) studied the theory practice gap in capital budgeting: evidence from the UK. They examined the causes for the ongoing usage of traditional methods like rule of thumb methods as well as discounted cash flow (DCF) methods. They designated 300 United Kingdom firms and received response 32.4 percent. They compared their study results with (McIntyre & Coulthurst,1985; Pike,1982, 1988 & 1996) as they used similar characteristics in their studies. According to comparison, they found decreasing the payback period (PBP) methods used at upper level. The study results also showed that more than 90 percent of SMEs used discounted cash flow methods (either NPV or IRR). With respect to large firms, about 97 percent firms use NPV method and 84 percent use IRR method. So IRR takeover NPV as often firmwide used techniques. They also found nearly 67 percent of responding firms use three or more techniques.

Graham and Harvey (2001) examined 392 CFOs about their firms' corporate practices. They found that about 73.5 percent of responding CFOs use capital asset pricing model (CAPM), almost 34.3 percent use the CAPM multibeta approach, and nearly 15.7 percent use the discount dividend model, in case of estimating the cost of equity. Survey results also showed responding CFOs use different type of risk adjustment methods and mostly use a hurdle rate approach to

estimate their investment projects. They found that mostly responding CFOs use discount cash flows methods (74.9 percent NPV and 75.7 percent IRR) to estimate projects but many CFOs also use PBP method (56.7 percent). They concluded that mostly firms use many methods to estimate projects rather than one. Reliable with previous surveys, they indicated that large companies are heavily depend on the NPV and IRR, while small companies are mostly use PBP method. They also found that CEOs with MBA are preferably use NPV and CAPM approach than non-MBA. Small firms more likely to use "investors' expectations". Nearly 58 percent of the responding CEOs use the firmwide discount rate to estimate the projects although the project might have various risk features. Risk adjusted discount rate more likely to use by the large firms as compared to the small firms.

Ryan and Ryan (2002) surveyed the capital budgeting decision methods used by the fortune 1000 firms and found that NPV (about 96 percent) as the mostly used capital budgeting approach. Discounted cash flow methods (NPV and IRR) preferably used by the firms having large capital budgets. About 74.5 percent of the respondents used PBP at least half of the time. Almost 56.7 percent of the responding firms used discounted payback approach, nearly 43.9 percent used profitability index approach, about 33.3 percent used ARR approach and 21.9 percent used modified internal rate of return. According to scenario analysis, the mostly used technique was sensitivity analysis. About 46.6 percent of the responses used inflation adjusted cash flows were on a regular basis. Almost 50 percent of the firms used economic value added (EVA) and nearly 33 percent of the respondents used market value added (MVA). About 47.3 percent of the firms used IRR and 37.2 percent used simulation models. About 31 percent of the firms used program evaluation review technique and critical path method and complex mathematical models less used by the firms. The mostly firms used WACC technique to determine the suitable discount rate.

Mika and Eva (2004) surveyed of 144 firms listed on the Helsinki Stock Exchange. Their findings indicate that the Finnish firms still lag behind the USA and Swedish firms use DCF methods. They also found that IRR and PBP method are mostly used primary methods to assess investment projects. Surprisingly, about 40 percent of the firms used CAPM or multibeta model mostly used technique in calculating cost of equity and almost 27 percent of the respondents show that they have not much interest their RRR on equity. The median RRR for the capital is between 12 percent to 14 percent and more than 20 percent responses have a require rate of return (RRR) above 20 percent.

Hermes et al. (2006) surveyed 250 Dutch and 300 Chinese firms to compare the use of capital budgeting techniques among the firms. The study results show that CFOs of Dutch use more sophisticated capital budgeting as compared to CFOs of Chinese. Dutch firms most preferably used IRR method and NPV method is mostly preferred by Chinese firms (Truong et al., 2008) examined Australian firms and exposed that the use of real options approaches have increased in Australian capital budgeting. The NPV is frequently use to evaluating the investment projects and other methods like PBP also use by the firms. The project cash flow forecasts are made for the period of 3 - 10 years and project cash flow discounted at the WACC technique as calculated by the firm. For estimating the cost of capital CAPM will be used, the market risk premium in the range of 6% - 8% and the beta estimate will be attained from public sources. They also concluded that in calculating the cost of capital, CAPM will not be used. According to Lin (2010) surveyed and found that PBP is mostly used method and there is a positive association between risk and liquidity. In comparison the result of the study of (Hasan, 2013) showed that there is no any relationship. He found that this method related to its liquidity, simplicity and risk assessment (Moftah, 2013) examine the state of current investment assessment practices within Libyan firms. The main findings of survey show that non-financial factors play a more important role than financial factors. Though Libyan firms use multiple methods to estimate capital investments (PBP) the mostly used method while use of DCF methods is increasing but not as high as in

developed nations. About 50% responses used the cost of capital, mostly use subjectively like via interest rate observations and remaining use CAPM. Arslan et al. (2014) found that NPV and IRR are two mostly used methods.

Al-Ani (2015) investigated the relationship between strategic variables and use PBP in assessing the capital budgeting decisions from the perspective of investors and managers in Oman. According to managers' perspective, the survey results indicated that the risk and management incentive compensation variables have an effect on the use of Payback. According to investor viewpoint, risk and profitability variables also have an effect on the use of Payback. De Andres et al. (2015) studies that payback period most widely used tool, while real options are used relatively little. Their results confirm that size and industry are related to the frequency of use of certain capital budgeting techniques (Rossi, 2015) found that payback period, followed by NPV, is the most used method and more complex methods are most favored by the large enterprises.

Yaser et al. (2016) found that majority of the respondents use the NPV. Furthermore, age, educational qualification, managerial levels, years of experience, company size, among others all have significant effects on most capital budgeting methods. Dennis et al. (2016) found that NPV technique is the most prominent method applied by the sample companies. Barjaktarovic et al. (2016) showed that payback criterion is the most dominant capital budgeting technique used by firms in Serbia and large firms as well as multinational firms are more inclined to use discounted cash flow capital budgeting techniques and other sophisticated techniques. Szucsne (2016) studied that a considerable amount of European and US corporations calculate the indicator of the payback period, NPV and IRR are the two most frequently used discounted cash-flow methods. and companies in France and Hungary used the profitability index more often than companies in other surveyed countries. Shaban et al. (2017) concluded that NPV is mostly used evaluating technique by Jordanian industrial companies. Oki et al. (2018) found that sensitivity analysis of capital budgeting depends on a number of uncertain independent variables which may have some impacted on the investment results. Maaji et al. (2019) studied that payback period, NPV, accounting rate of return, discounted payback period are mostly used evaluate techniques.

Research Methodology

The study examined whether privately owned firms in Pakistan used capital budgeting methods or not. If yes, what types of capital budgeting methods were mostly used in their capital investment decisions. In survey, questionnaire was used. In most questions respondents were asked to give their opinion according to 5-point Likert scale. Where from early surveys of capital investment methods appropriate, questions were adopted (Alkaraan & Northcott, 2006; Graham & Harvey, 2001). Before sending to respondents, it was verified by academic specialists and made slight changes where essential. Substantial effort had given to design a detail questionnaire that allowed us to comprehensively explore and evaluate every feature of capital budgeting methods according to the responses.

Survey data was taken from privately owned firms having their offices in Islamabad but not listed in Stock Exchanges of Pakistan. The survey period was from September 2018 to May 2019. The firms CEO completed the survey and 58 responses were received. The survey data was composed of as follow: We had arranged appointments with the chief executive officer (CEO) to fill in the questionnaire. In case the appointment did not arrange (commonly due to the chief executive officer (CEO) work load) the survey was dropped their offices and received back whichever through personally visited or email.

This study determined the relationship between capital budgeting methods and firms' CEOs' characteristics. Our model is given below:

$$NPV_i = \beta_0 + \beta_1 SR_i + \beta_2 FS_i + \beta_3 INDU_i + \beta_4 EDUC_i + \beta_5 AGE_i + \beta_6 TENURE_i + \mu_i$$

$$IRR_i = \beta_0 + \beta_1 SR_i + \beta_2 FS_i + \beta_3 INDU_i + \beta_4 EDUC_i + \beta_5 AGE_i + \beta_6 TENURE_i + \mu_i$$

$RO_i = \beta_0 + \beta_1 SR_i + \beta_2 FS_i + \beta_3 INDU_i + \beta_4 EDUC_i + \beta_5 AGE_i + \beta_6 TENURE_i + \mu_i$

Capital budgeting methods; net present value (NPV),hurdle rate (HR), internal rate of return (IRR), earnings multiple approach (EMA), accounting rate of return (ARR), discounted payback period (DPBP), adjusted present value (APV), profitability index (PI), value-at-risk (VAR), sensitivity analysis (SA) and real options (RO). Firm characteristic; SR: Sales revenue of the firm (Pak rupees), FS: Foreign sales of the firm (% of total sales), INDU**:** Type of industry belong to the firm, EDUC: Education of CEO of the firm, AGE: Age of CEO of the firm, TENURE: CEO time in current job.

Capital budgeting methods and cost of capital methods are the dependent variables and sales revenue of the firm, foreign sales of the firm, type of industry, education of CEO of the firm, age of the CEO of the firms, CEO time in current job are the independent variables.

For estimation we used the logit estimation method (Hermes, 2007) in this study. In our analysis used variables are defined as follow: *NPV* value is 3 or 4 = 1, *NPV* value is less than 3 = 0; *IRR* value is 3 or 4 = 1, *IRR* value is less than 3 = 0; *HR* value is 3 or 4 = 1, *HR* value is less than 3 = 0; *EMA* value is 3 or 4 = 1, *EMA* value is less than 3 = 0; *APV* value is 3 or 4 = 1, *APV* value is less than 3 = 0; *PI* value is 3 or 4 = 1, *PI* value is less than 3 = 0; *ARR* value is 3 or 4 = 1, *ARR* value is less than 3 = 0; *SA value* is 3 or 4 = 1, *SA value* is less than 3 = 0; *VAR* value is 3 or 4 = 1, *VAR* value is less than 3 = 0; *RO* value is 3 or 4 = 1, *RO* value is less than 3 = 0; Average historical returns value is 3 or 4 = 1, it is 0 if the value of a firm is lesser than 3; Investors expectation value is 3 or 4 = 1, it is 0 if the value of a firm is lesser than 3; Regulatory decisions vale is 3 or 4 = 1, it is 0 if the value of a firm is lesser than 3; CAPM the "beta approach" value is 3 or 4 = 1, it is 0 if the value of a firm is lesser than 3; Multi beta CAPM value is 3 or 4 = 1, it is 0 if the value of a firm is lesser than 3; Discounted dividend/earnings model value 3 or 4 = 1, it is 0 if the value of a firm is lesser than 3; *SR* value < Rs. 500 Million = 1, *SR* value $\geq$ Rs. 500 Million = 0; *FS* value < 24% = 1, *FS* value > 24% = 0; *INDU* firm is Communication/media = 1, *INDU* firm is not Communication/media = 0; *EDUC* the CEO of the firm has a PhD = 1, *EDUC* the CEO of the firm has not PhD = 0; *AGE* the CEO of the firm is < 40 years = 1, *AGE* the CEO of the firm 40 or more years = 0; *TENURE* the current time CEO of the firm is $\leq$ 9 years = 1, *TENURE* the current time CEO of the firm is > 9 years = 0.

Empirical Results and Analysis

The section first of all describes the features of Pakistani privately owned firms and CEOs included in our survey. This debates the results associated in responses to the questions that we asked from CEOs regarding used of capital budgeting methods, to estimate cost of capital methods and capital structure. The study used univariate and multivariate examination of the association between capital budgeting practices and firm and CEO characteristics for Pakistani privately owned firms in the survey.

Firm and CEO Characteristics

Table 1 displays the evidence on the characteristics of firms and CEOs in the survey.

Table 1: Firms Characteristics

Sales (Millions of Rupees)		%
	< 25 Million	28
	25-99 Million	36
	100-499 Million	16
	500-999 Million	9
	1-5 Billion	9
	>5 Billion	2

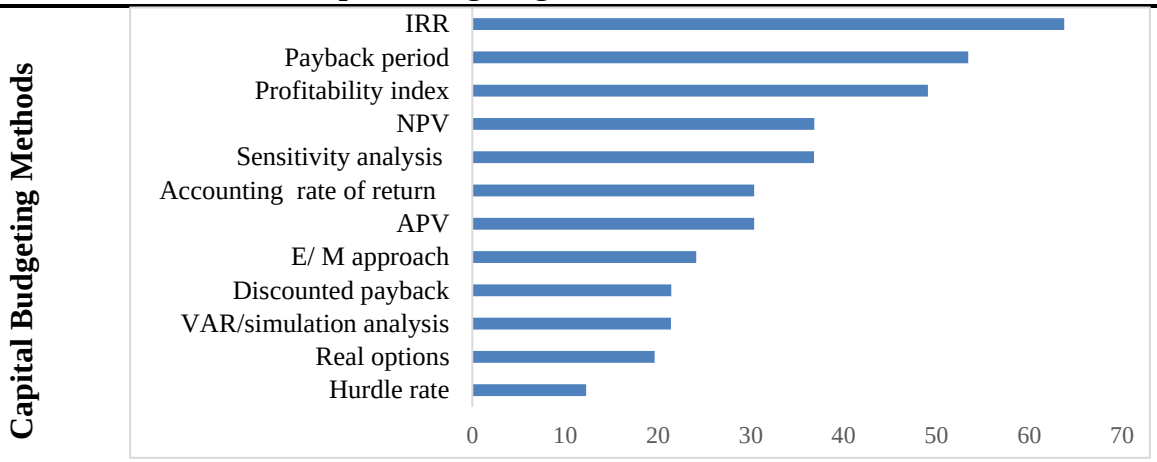
Foreign Sales (% of Total Sales)		
	0%	72
	1-24%	18
	24-49%	6
	≥ 50%	4
Industry		
	Automobile	2
	Banking/Finance/Insurance	7
	Building & Construction	42
	Communication/Media	16
	Education	2
	Energy	7
	Flour	2
	Pharmaceutical	10
	Poultry	2
	Services	10
CEO Education		
	Undergraduate	31
	MBA	16
	Non MBA masters	24
	> Master degree	29
Age of CEO		
	<40	19
	40–49	39
	50–59	23
	>60	19
CEO Tenure in Current Job		
	< 4 years	12
	4 - 9 years	17
	> 9 years	71

Source: Survey Results

Capital Budgeting Decisions

In our questionnaire the first question relate to the capital budgeting techniques used by the Pakistani privately owned firms. We asked firms give their opinion according to five-point Likert scale (ranging from 0 – 4, where 0 = never and 4 = always) regarding the usage of capital budgeting methods. This delivers information about the usage of the techniques and comparative significance of the various techniques. Our survey outcomes present (see Fig. 1) with respect to the % of CEOs' respond either mostly or always used a specific estimation method (% who responded whichever 3 or 4).

Figure 1: Use of Different Capital Budgeting Methods



As shown in figure 1, most respondents mentioned IRR and PBP as most regularly used methods; about 64% of CEOs mostly or always used IRR and 53% mostly or always used payback period. The PBP was the most regularly used capital budgeting method (53% mostly or always used it) other than IRR. This outcome was shocking in the sense that PBP method was said to be inappropriate and mistaken due to overlooks the cash flows and time value of money after the payback period. Nearly 49% of the firms said they used profitability index, while, other capital budgeting methods were used less regularly. For instance, almost 37% of the firms used net present value and sensitivity analysis, nearly 30% used accounting rate of return (ARR) and adjusted present value (APV), 24% used earning multiple approach, 21% used discounted payback period and VAR/simulation analysis, 20% real option and 12% used hurdle rate (HR). Table 2 shows the outcomes of the responses of Pakistani privately owned firms. First, the table show the % of CEOs who ranked certain capital budgeting approach as 3 and 4 (mostly or always). Then, the table displays the mean scores for the different techniques. Lastly, the table indicates the mean scores for various techniques of various types of firms according to their features and CEOs features debated in table 1. Table 2 also indicates that Pakistani privately owned firms CEOs most frequently used IRR technique in their capital investment decisions, about 64% of the firms' show they use IRR technique mostly or always with mean score of 2.45 that is 0.02 overhead the second most frequently use technique the PBP. The rarely use technique is the hurdle rate (HR) with mean score 1.02 and nearly 12% CEOs indicate they mostly or always use hurdle rate technique.

Table 2: Capital Budgeting Methods Used

	IRR	PB	PI	NPV	SA	ARR	APV	E/MA	DPBP	VAR	RO	HR
% 3 and 4 Scores	64	53	49	37	37	30	30	24	21	21	20	12
Mean Score	2.45	2.4	2.5	2.04	2.1	1.79	1.63	1.66	1.55	1.4	1.1	1.02
Total Sales												
< Rs.500 Million	2.22	2.3	2.4	1.91	1.9	1.64	1.56	1.63	1.44	1.4	1.1	0.96
≥ Rs.500 Million	3.64	2.8	3.1	2.73	2.8	2.55	2.10	1.91	2.20	1.8	1.5	1.40
	1.00	0.8	0.9	0.98	0.9	0.98	0.90	0.76	0.94	0.8	0.7	0.84
CEO Master/PhD												
Yes	2.88	3.0	3.1	2.47	2.2	2.44	2.31	2.12	2.31	2.0	1.9	1.44
No	2.27	2.1	2.2	1.85	2.0	1.53	1.35	1.46	1.25	1.2	0.8	0.85
	0.06***	0.01***	0.00***	0.04**	0.21	0.01***	0.00***	0.03**	0.00***	0.02**	0.00***	0.06*
CEO Age												
< 40	1.64	2.18	2.2	2.00	1.80	2.10	1.73	1.27	1.18	1.50	1.40	1.45
40 or Older	2.61	2.46	2.5	2.04	2.15	1.69	1.55	1.70	1.59	1.40	1.07	0.84
	0.98	0.72	0.7	0.54	0.80	0.18	0.33	0.87	0.82	0.41	0.25	.07*
CEO Tenure												
≤ 9 Years	2.53	2.41	2.5	2.00	2.06	2.13	2.00	2.06	1.65	1.94	1.69	1.59
> 9 Years	2.41	2.44	2.5	2.05	2.12	1.66	1.46	1.49	1.51	1.25	0.98	0.78
	0.39	0.53	0.4	0.55	0.57	0.11	0.07*	0.04**	0.37	0.04**	0.04**	0.01***
Industry												
Communication	3.33	2.56	2.8	2.89	2.25	2.25	2.22	2.33	1.89	2.25	1.13	1.67
Other	2.29	2.41	2.4	1.88	2.08	1.71	1.51	1.53	1.49	1.31	1.19	.9
	0.02**	0.38	0.1	0.01***	0.35	0.14	0.06*	0.03**	0.21	0.03**	0.55	.05**
Foreign Sales												
< 24% of Sales	2.58	2.56	2.6	2.08	2.16	1.90	1.67	1.72	1.67	1.50	1.19	1
≥ 24% of Sales	2.58	1.63	1.7	1.75	1.75	1.13	1.38	1.25	0.88	1.13	1.13	.7
	0.03**	0.04**	0.02**	0.25	0.18	0.06*	0.27	0.15	0.06*	0.23	0.45	0.26

Note: *, **, *** are significance levels of 10, 5 or 1 percent respectively.

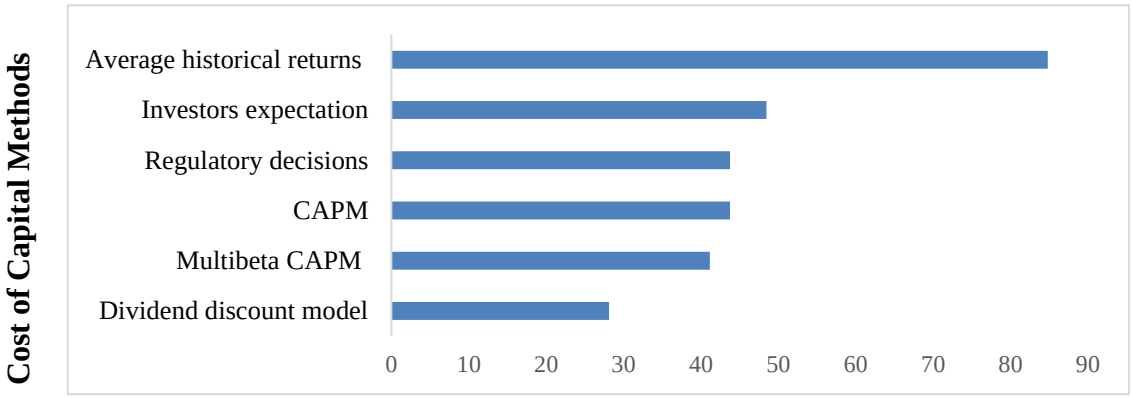
The outcomes of a standard differences of means test of the mean scores of the capital budgeting approaches for the six various types of firms mentioned in table 1 (firms size, % foreign sales of

total sales, industry, CEO education, CEO age and CEO tenure in current job) are reports in table 2 . The outcomes of these tests indicate, in case of firms size capital budgeting methods have insignificant mean score. Table also shows that CEOs having PhD degree have significantly higher mean score than CEOs having less than PhD degree and significant at the 1%, 5% and 10% levels. CEOs having age less than 40 years, only hurdle rate method is significant at the 10% level than CEOs having age more than 40 years. In case of CEO tenure in current job, CEO having tenure in current job less than or equal 9 years, HR method is significant at the 1% level, earning multiple approach, value at risk and real option methods are significant at the 5% level. With respect to industry, NVP is significant at the 1% level if firm belong to communication/media. With respect foreign sales, firms with lower foreign sales indicate IRR, PBP and profitability index methods that have significantly higher mean score and t-value significant (at the 5% level) as compare to higher foreign sales. Other methods show mean score insignificant t-values.

Cost of Capital Methods

In our survey, we asked CEOs about the techniques that were used to estimate the cost of capital. It is essential once firm uses DCF methods (NPV or IRR), we questioned respondents to give their opinion about the use of method that are most regularly use during estimating the cost of capital.

Figure 2: Use of Different Cost of Capital Methods



Our study results indicated that most frequently technique of appraising the cost of capital was average historical return on common stock, about 85% of firms mostly or always used it. The second popular method was whatever our investor tell us they require: almost 48% of the respondents mostly or always used it. The third most frequently used methods were by regulatory decisions and CAPM “beta approach”: nearly 44% of the respondents mostly or always used these. 41% of the respondents mostly or always used CAPM but including some extra “risk factor”. Only 28% of the respondents mostly or always used back out from discounted dividend/earnings model.

Table 3 shows the outcomes of the responses of Pakistani privately owned firms. First, the table show the % of CEOs who ranked definite method of cost of capital estimation as 3 and 4 (mostly or always). The table shows the mean scores for various techniques of various types of firms according to their features and CEOs features debated in table 1. The results shows that about 41% of the Pakistani privately owned firms in the survey do not estimate the cost of capital in most cases. Of them, average historical return on common stock technique is most frequently used in most cases by the respondents who regularly do estimate the cost of equity. Table

indicates that firms with PhD CEOs use the CAPM including some extra "risk factors" more often than firms having CEOs less than PhD degree. The table also shows that CEOs having tenure less than or equal to 9 years use discounted dividend/earnings model more often than CEOs having tenure in current job more than 9 years. In case of industry firms belonging to communication/media use more frequently discounted dividend/earnings model as compared to others. Other methods show mean score insignificant t-values.

Table 3: Cost of Capital Methods Used

	Average historical returns	Investors expectation	Regulatory decisions	CAPM, the "beta approach	CAPM but including some extra "risk factors"	Discounted dividend/ earnings model
% 3 and 4 scores	85	48	44	44	41	28
Mean	3.15	2.36	2.28	2.16	1.85	1.78
Total Sales						
< Rs.500 Million	3.07	1.94	1.87	1.43	1.56	1.00
≥ Rs.500 Million	3.14	2.62	2.46	2.57	2.00	2.23
	0.59	0.93	0.91	0.99	0.77	1.00
CEO Master/PhD						
Yes	3.30	2.90	2.90	2.89	2.80	2.90
No	3.09	2.13	2.00	1.87	1.46	2.00
	0.25	0.05**	0.02**	0.03**	0.01***	0.02**
CEO Age						
< 40	2.83	2.33	1.83	2.17	1.50	2.00
40 or Older	3.19	2.31	2.32	2.08	1.85	1.64
	0.83	0.48	0.81	0.44	0.70	0.26
CEO Tenure						
≤ 9 Years	2.92	2.54	2.62	2.54	1.92	2.23
> 9 Years	3.30	2.25	2.05	1.89	1.81	1.47
	0.90	0.26	0.10*	0.09*	0.42	0.05**
Industry						
Communication/Media	3.22	2.50	2.00	2.11	1.67	2.38
Other	3.13	2.32	2.38	2.17	1.92	1.58
	0.39	0.36	0.77	0.55	0.66	0.06*
Foreign Sales						
< 24% of Sales	3.19	2.35	2.23	2.10	1.75	1.70
≥ 24% of Sales	2.50	2.50	3.00	3.00	3.50	3.00
	0.13	0.56	0.81	0.82	0.94	0.92

Note: *, **, *** are significance levels of 10, 5 or 1 percent respectively.

The Capital Budgeting Techniques, Cost of Capital: (Multivariate Analysis)

The conversation in the earlier sections was constructed on comparing means. However, the conversation delivered some remarkable outcomes on the dissimilarities in the use of capital budgeting techniques among privately owned firms in Pakistan, in this section, we need to go one step advance by acting multivariate regression analysis.

The control variables we comprise are similar for all the model specifications. In this study we use firm characteristics as independent variables. In table 4, we use capital budgeting methods

as dependent variables. In table 5 cost of capital methods as dependent variables. Logit estimation technique used for all estimation and outcomes are reported in tables 4 and 5.

Capital Budgeting Methods

Table 4 indicates the outcomes for the use of the various capital budgeting methods. First, sales revenue of the firms earning multiplier approach is significant at the 10% level (see column [8]). According CE0 education of the firm profitability index is frequently used and significant at 1% level (see column [3]). With respect to foreign sales real option method is significant at the 5% (see column [11]). In view of CEO age ARR method is most frequently used with significant at the 5% level. According to CEO tenure in current job, NPV is significant at the 10% level. With respect to industry in which firm belong IRR method is significant at the 1% level (see column [1].

Table 4: Capital Budgeting Techniques: Multivariate Logit Analysis

	IRR	PB	PI	NPV	SA	ARR	APV	E/MA	DPBP	VAR	RO	HR
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Constant	0.008***	0.455	0.567	0.727	0.053*	0.221	0.657	0.146	0.604	0.112	0.334	0.871
Sales revenue	0.402	0.499	0.376	0.818	0.479	0.612	0.467	0.083*	0.949	0.283	0.112	0.323
Foreign Sales	0.658	0.716	0.879	0.359	0.228	0.530	0.033**	0.450	0.580	0.038**	0.031**	
CEO Education	0.003***	0.02**	0.001**	0.002***	0.306	0.004***	0.004***	0.148	0.022**	0.008***	0.015**	0.087*
Age of CEO	0.809	0.477	0.191	0.219	0.227	0.02**	0.192	0.021**	0.850	0.056*	0.986	0.154
CEO Tenure	0.457	0.749	0.323	0.092*	0.846	0.908	0.591	0.141	0.327	0.830	0.330	0.109
Industry	0.009***	0.275	0.309	0.222	0.011**	0.171	0.750	0.664	0.902	0.540	0.741	0.728

Note: *, **, *** are significance levels of 10, 5 or 1 percent respectively.

Cost of Capital Estimation

Table 5 indicates the outcomes for the use of the various techniques of estimating the cost of capital. First, the sales revenue of the firms, the average historical rate of return on common stock is significant at the 10% level [see column [13]. Second, percentage foreign sales of the firm and CEO tenure in current job, CAPM “the beta approach” is significant at the 5% level. Third, CEO education of the firm and industry belong to the firm, CAPM but including some extra “risk factors” is significant at the 1% level. Fourth, age of CEO age of the firm, by regularity decision is significant at 5% level.

Table 5: Cost of Capital Techniques: Multivariate Logit Analysis

	Average historical returns	Investors expectation	Regulatory decisions	CAPM, the "beta approach	CAPM but including some extra "risk factors"	Discounted dividend/earnings model
	(13)	(14)	(15)	(16)	(17)	(18)
Constant	0.02**	0.997	0.856	0.607	0.540	0.784
Sales revenue	0.092*	0.590	0.405	0.842	0.117	0.893
Foreign Sales	0.078*	0.585	0.238	0.029**	0.041**	0.314
CEO Education	0.086*	0.078*	0.098*	0.039**	0.008***	0.235
Age of CEO	0.354	0.079*	0.021**	0.042**	0.024**	0.909
CEO Tenure	0.757	0.387	0.258	0.044**	0.365	0.347
Industry	0.184	0.822	0.592	0.688	0.09**	0.163

Note: *, **, *** are significance levels of 10, 5 or 1 percent respectively.

Conclusion and Recommendations

Even though a massive body of experiential research has studied regarding capital budgeting methods for listed firms, it is unforeseen that minute study has been conducted on the capital budgeting methods for non-listed firms. Therefore, the core objective of this research is to inspect the use of capital budgeting methods and practices for non-listed firms in Pakistan.

Our survey of the practice of capital budgeting, IRR is mostly used by the Pakistani privately owned firms as a project evaluation method. With respect to cost of capital methods, average historical rate of return on common stock approach is mostly used by the Pakistani privately owned firms.

In our survey, we notice mixed evidence that, free cash flow considerations, under investment costs, signaling, asset substitution, free cash flow considerations, transactions costs, and product market concerns influence capital structure decisions and bargaining with employees.

Policy Implications

The findings may deliver useful information for investors or executives in their capital decision making process for evaluating new project in Pakistani as well as overseas markets. The important implications for policy makers are as follow:

One implication of these results for policy makers to recognize that chief executives are not as much of possible to follow the academically prohibited features and concepts in defining capital budgeting. This outcome rises options that have need of extra thought and research. Then, may be the theories are useable explanations of what firms should do but firms disregard the academic assistance. Further research is required to explore these topics. This finding may help the firms' executives and investor to evaluate new project in domestic as well as overseas markets.

References

- Abdel-Kader, M. G., & Dugdale, D. (1998). Investment in advanced manufacturing technology: a study of practice in large UK companies. *Management Accounting Research*, *9*(3), 261-284.
- Al Ani, M. K. (2015). A strategic framework to use payback period (PBP) in evaluating the capital budgeting in energy and oil and gas sectors in Oman. *International journal of economics and financial issues*, *5*(2), 469-475.
- Alkaraan, F., & Northcott, D. (2006). Strategic capital investment decision-making: A role for emergent analysis tools?: A study of practice in large UK manufacturing companies. *The British Accounting Review*, *38*(2), 149-173.

- Arnold, G. C., & Hatzopoulos, P. D. (2000). The theory-practice gap in capital budgeting: evidence from the United Kingdom. *Journal of business finance & Accounting*, *27*(5-6), 603-626.
- Arslan, M., Zaman, R., & Sidiqui, M. A. (2014). Impact of Firm Size on Capital Budgeting Techniques: An Empirical Study of Textile Firms in Pakistan. *Developing Country Studies*, *4*(18), 95-101.
- Barjaktarovic, L., Djulic, K., Pindžo, R., & Vjetrov, A. (2016). Analysis of the capital budgeting practices: Serbian case. *Management: Journal of Sustainable Business And Management Solutions In Emerging Economies*, *21*(79), 47-54.
- Graham, J. R., & Harvey, C. R. (2001). The theory and practice of corporate finance: Evidence from the field. *Journal of financial economics*, *60*(2-3), 187-243.
- Hall, J., & Millard, S. (2010). Capital budgeting practices used by selected listed South African firms. *South African Journal of Economic and Management Sciences*, *13*(1), 85-97.
- Hasan, M. (2013). Capital budgeting techniques used by small manufacturing companies. *Journal of service science and management*, *6*(1), 38-45.
- 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
- Ho, S. S., & Pike, R. H. (1991). Risk analysis in capital budgeting contexts simple or sophisticated?. *Accounting and Business Research*, *21*(83), 227-238.
- Jog, V. M., & Srivastava, A. K. (1995). Capital budgeting practices in corporate Canada. *Financial practice and education*, *5*(2), 37-43.
- Kannadhasan, M., & Nandagopal, R. (2008). Capital Budgeting in Corporate Sector–A Case Study. *Journal of Contemporary Research in Management*, *3*(1), 17-24.
- Klammer, T. (1972). Empirical evidence of the adoption of sophisticated capital budgeting techniques. *The Journal of Business*, *45*(3), 387-397.
- Lefley, F. (1994). Capital investment appraisal of advanced manufacturing technology. *The International Journal of Production Research*, *32*(12), 2751-2776.
- Lin, H. J. (2010). Why should managers like payback period?. *Available at SSRN 1688730*.
- Maáji, M. M., & Barnett, C. (2019). Determinants of capital budgeting practices and risks adjustment among Cambodian companies. *Archives of Business Research*, *7*(3).
- Mao, J. C. (1970). Survey of capital budgeting: Theory and practice. *Journal of finance*, 349-360.
- Oki, F., & Sivaruban, S. (2016). Capital budgeting and cost evaluation techniques: A conceptual analysis. *International Journal of Science and Research*, 1553-1557.
- Peterson, P. P., & Fabozzi, F. J. (2002). *Capital budgeting: theory and practice* (Vol. 10). John Wiley & Sons.
- Pike, R. H. (1988). An empirical study of the adoption of sophisticated capital budgeting practices and decision-making effectiveness. *Accounting and Business Research*, *18*(72), 341-351.
- Ryan, P. A., & Ryan, G. P. (2002). Capital budgeting practices of the Fortune 1000: how have things changed. *Journal of business and management*, *8*(4), 355-364.
- Schall, L. D., Sundem, G. L., & Geijsbeek, W. R. (1978). Survey and analysis of capital budgeting methods. *The journal of finance*, *33*(1), 281-287.
- Shaban, O. S., Al-Zubi, Z., & Abdallah, A. A. (2017). The extent of using capital budgeting techniques in evaluating manager's investments projects decisions (a case study on Jordanian industrial companies). *International Journal of Economics and Finance*, *9*(12), 175-179.
- Truong, G., Partington, G., & Peat, M. (2008). Cost-of-capital estimation and capital-budgeting practice in Australia. *Australian journal of management*, *33*(1), 95-121.