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Capital Budgeting in Practice: An Explorative Study on Bangladeshi Companies

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Abstract: This descriptive research sheds light on capital budgeting practices of the companies in Bangladesh. 56 companies from different industry sectors were chosen based on convenience of data collection for survey. This is the first comprehensive study on this topic to focus on companies in Bangladesh. Questionnaire was developed based on [7]'s survey instrument. Results show that NPV and IRR are dominated methods of capital budgeting, however payback period (PBP) is used by large percentage of companies. In general, companies in Bangladesh are more sophisticated in terms of capital budgeting techniques used and risk adjustment practices thereby than companies in other emerging economies but less sophisticated than companies in developed world in terms of risk adjustment practice. Influence of some factors i.e., CEO/CFO background and company size on capital budgeting practices have also been explored.

I. Introduction

This research explores the extent of using sophisticated Capital Budgeting techniques in Bangladeshi companies. Capital budgeting is concerned about evaluation of long term investment opportunities and committing companies' limited productive resources in viable opportunities to strengthen and renew their productive capabilities [15],[3]. Such commitments are kind of irreversible because reversals disturb firms' economic and financial performances. Therefore, success and growth of a company largely depends on its ability to effectively allocate capital in productive use. Lacks in evaluation and decision tools to identify and exploit long term investment opportunities risk survival and hinder strategic growth of companies [6], [2]. Due to the importance of capital budgeting decisions, it has been a topic of research for many years. Empirical researches of the sixties exhibited primacy of payback period [11]. From early 1970s a shift happened in the capital budgeting techniques used by firms. More companies not only in developed world but also in other economies such as Africa started using sophisticated techniques such as NPV (net present value), IRR (internal rate of return) etc [23], [2], [16].

An extensive survey on companies in the USA depict that large firms heavily rely on present value (discounted cash flow) techniques and use risk adjusted discount rate (required rate of return or cost of capital), while small firms heavily rely on payback period method [7]. Australian firms too use CAPM and weighted average cost of capital as the discount rate to use in present value techniques [20]. Studies on UK corporations reveals that majority of those firms use sophisticated textbook prescribed methods of capital budgeting which include NPV, IRR and others and formal risk appraisal methods [2], [5]. But most of the companies use firm risk rather than project specific risks in appraising investment projects and besides sophisticated discounted cash flow techniques, managers still use simple rule-of-thumb [7], [2].

Although companies in emerging economies such as Rwanda, Jordan, Czech Republic, Finland, India, Pakistan and others are shifting toward more sophisticated techniques of capital budgeting, this is true for large companies. Small companies in these economies still use payback period as the primary tool for investment evaluation. Even larger companies in many cases use discounted methods as a secondary technique. In terms of risk adjustment and estimation of cost of capital companies in emerging economies lags behind US and UK firms [14], [18], [22], [12], [10], [15].

There has been almost no research on capital budgeting and/or investment evaluation techniques of the companies in Bangladesh. One study as in reference [4] determined the comparative value of different capital budgeting techniques on the cash flows of a particular bank branch. So this study fails to provide any general insight about the capital budgeting practices of Bangladeshi companies. The study in reference [19] conducted a survey on 50 companies from different industry sectors to assess management accounting development and practices in Bangladesh. They collected and presented data on capital budgeting techniques used by firms along with other management accounting measures. According to them majority firms (50% to 80%) in all industry sectors use discounted cash flow techniques and few firms use payback period for long-term investment decisions. But, this study did not have any discussion/section on risk adjustment, discount rate and other factors related to capital budgeting. Therefore, this exploratory research to review capital budgeting practices in

Bangladeshi companies is likely to bring out insights from an untapped area of corporate finance in the context of a developing economy.

II. Objective

Broad objective of this research is to elaborate on the capital budgeting practices of Bangladeshi companies. For that purpose following specific objectives are pursued-

- Identify to what extent different capital budgeting techniques such as NPV, IRR, Payback Period, Discounted Payback Period, Profitability Index, Sensitivity Analysis, Scenario Analysis, Real Options Approach, and Decision Tree Analysis are used.
- Identify the extent of using different discount rates i.e. firm/company, divisional, project specific, country, industry, risk adjusted and other.
- Identify whether companies estimate their cost of capital or use a predefined discount rate (as prescribed by corporate headquarters of multinationals or using some rule of thumb)
- Identify the risk factors usually taken into consideration to adjust cost of capital and cash flows
- Evaluate the influence (if any) of some factors i.e. CEO/CFO background, tenure & age and company size (measured by annual sales revenue) on the capital budgeting practices.

III. Research Method

A. Survey Instrument

This is an exploratory research based on survey data. Previously used questionnaire developed by Graham & Harvey (2001) has been used as the survey instrument with some modifications. The questionnaire was first pilot tested on 3 companies to make sure that respondents understand the information solicited in the questionnaire. Based on recommendations of the respondents of pilot survey some adjustments (rephrasing) were made on the questionnaire.

B. Sample

The questionnaire has been handed in person to finance managers of 56 companies in different industry sectors 50 of them returned filled in questionnaires. Companies from major industry sectors of the country were chosen for survey on the basis on available contacts of the researcher and accessibility of information.

Table 1: Respondent profile

Industry Sector	No of companies contacted	No of companies responded
Pharmaceuticals	15	15
Cement	7	6
Ceramic	5	5
Textile & Garments	12	10
Food & Beverages	8	6
Others	9	8
Total	56	50

C. Survey method

Data has been collected as a part of assignment by MBA students taking an introductory finance course in the Institute of Business Administration, University of Dhaka, Bangladesh under the researcher. At the beginning of the semester each student were asked to choose a company and look for a contact person in finance department of the company. Students were allowed to use the personal contacts of themselves, their friends/family and of the researcher as well as they were provided access to the alumni database of the institute. After each student identified a company and contact there in, the researcher sent a letter of request to the concern person to allow the student to oversee their financial management practices as this will help the students to relate theory into practice. Through those contacts students got access to the finance manager of those companies. Students met the finance managers once in a month to clarify and understand the practical aspect of the theory they learnt in class room. In their last meeting, at the end of the 4 month semester, students handed in the questionnaire provided by the instructor/ researcher to the respective finance manager. Due to the relationship developed throughout the semester the response rate was as high as 89%. After the students submitted the filled in questionnaire, the researcher randomly checked with the respondent manager over phone for authenticity of the responses.

IV. Findings

A. Capital Budgeting Techniques

Respondents were asked to choose how frequently they use a particular capital budgeting technique. Responses were sought about the broad categories of capital budgeting techniques i.e. discounted cash flow methods (DCF) which include NPV, IRR, Profitability Index(PI) and discounted payback period (DPBP); non discounted cash flow methods (non-DCF) like Payback period (PBP) and risk adjusted methods such as sensitivity analysis, scenario analysis, real options approach and decision tree analysis. Results are shown in the table below-

A large majority of firms always or often use DCF methods which are recommended as sophisticated techniques in finance literature. Of the different DCF methods, NPV and IRR are most frequently (always or often) used methods followed by PI. Percentage of companies frequently using NPV and IRR are respectively 88% and

79% whereas about 67% of the companies surveyed frequently use profitability index (PI). In fact, PI is a technique to be used to choose among competing investment opportunities, if there is limited financial resources (capital rationing) [3]. Capital rationing especially hard rationing is not a regular phenomena, it thrives only in case of weak financials and/or high risk of financial distress [21], [3]. Therefore, less frequent use of PI makes reasonable sense from theoretical perspective. However, other DCF method, discounted payback period (DPBP) is not widely used technique. Nearly half of the firms surveyed rarely or never uses DPBP.

Table: Degree of application of different capital budgeting techniques

Capital Budgeting Technique	Frequency of use				
	Always	Often	Sometimes	Rarely	Never
NPV	68%	20%	7%	3%	2%
IRR	60%	19%	12%	2%	7%
PI	42%	25%	19%	9%	5%
PBP	56%	19%	9%	9%	7%
DPBP	28%	14%	12%	16%	30%
Sensitivity Analysis	23%	26%	26%	9%	16%
Scenario Analysis	14%	30%	21%	12%	23%
Real option approach	5%	14%	19%	16%	46%
Decision tree approach	5%	7%	18%	21%	49%

In contrast to the heavy use of common DCF methods, payback period (PBP) a rudimentary non-DCF technique is quite popular among the respondent firms. 75% of the companies surveyed always or often use PBP, which is very close to the usage of IRR technique.

Among the risk adjusted methods sensitivity analysis and scenario analysis are found to be almost equally applied techniques, being frequently used by 49% and 44% firms. But decision tree approach and real option approach are rarely or never used by majority (62% and 70% respectively) of the respondent firms.

In terms of broad category DCF and non-DCF methods are almost equally used methods. In comparison to the risk adjusted methods, DCF and non-DCF methods are more commonly used by the respondent firms. However, almost all firms use several techniques in parallel.

B. Discount Rate

To use DCF methods companies need to discount the expected cash flows using a discount rate. Discount rate is the opportunity cost of capital or the required rate of return. Discount Rate for the entire company may differ from the discount rate of a particular division/Strategic Business Unit (SBU) or of a foreign subsidiary or of a particular investment project. Companies need to choose the appropriate discount rate considering the risk associated with the investment opportunity. To get an overview of the discount rates used by the companies, respondents were asked to rate different discount rates in terms of their frequency of use. Following table shows the summary result:

Table: Use of different discount rates

	Frequency of use				
	Always	Often	Sometimes	Rarely	Never
Discount rate for the entire company	56%	14%	14%	5%	11%
Country specific discount in case of an overseas project	11%	5%	5%	23%	56%
Divisional discount rate in case project is under a particular division or SBU	7%	16%	12%	16%	49%
Risk-adjusted discount rate (considering country and industry risk)	35%	19%	12%	9%	25%
Different discount rate for each component cash flow that has different risk	7%	21%	23%	9%	40%

Discount rate for the entire company is the most commonly used discount rate. 70% respondents always or often use this to discount expected cash flows. Next commonly used discount rate is the risk adjusted discount rate. 54% of the respondent companies frequently use this discount rate. On the other hand, very few companies use country specific or divisional discount rate or use different discount rate for each component of cash flow that has different risk. Percentages of respondent companies rarely or never using these discount rates are respectively 79%, 65% and 49%.

C. Estimation of cost of capital/ discount rate

86% of the respondent companies estimate their cost of capital/ discount rate. The rest either use non-DCF methods of capital budgeting or use a predefined discount rate determined based on some rule of thumb or a rate recommended by their corporate head quarters (in case of multinationals). Most (84%) of the companies estimating cost of capital use weighted average cost of capital (WACC) as discount rate. Others directly use the cost of debt (usually prevailing bank interest rate) as discount rate.

D. Risk Adjustment

Discount rates and expected cash flows are not static. According to finance literature, the discount rate to be used must reflect the current and expected risks associated with the investment opportunity. As capital budgeting techniques are used to evaluate long term investment opportunities, factors like, unexpected inflation,

change in foreign exchange rate, general interest rate change, term structure change, risks of financial distress and others not only change the risks associated with the investment but also the expected cash flows from/for the investment. Therefore, for proper evaluation of investment projects discount rate and cash flows should be adjusted there for. To review the practice of Bangladeshi companies in this respect, responses regarding adjustment of discount rates and/or cash flows due to the change in above mentioned risk factors are sought. Results are summarized below:

Table: Risk factors taken into account

		Discount rate	Cashflow	Both	None
a)	Risk of unexpected inflation	11%	13%	57%	19%
b)	Foreign exchange risk	13%	19%	38%	30%
c)	Unexpected change in general interest rate	24%	3%	42%	31%
d)	Term structure risk (change in long term vs. short term interest rates)	13%	14%	27%	46%
e)	Risk of financial distress	3%	14%	24%	59%

As evident from the high percentage of companies adjusting both discount rate and cash flows for unexpected inflation, unexpected change in foreign exchange rate and general interest rate; these three are considered to be the most important risk factors to influence discount rate and cash flows. Almost half of the respondent companies don't make any adjustments for term structure risk and about 60% companies don't make any adjustments for risk of financial distress. That means majority of companies perceive these two factors to have little influence on discount rate and cash flows.

E. Taking decision in contrast of the recommendations derived using capital budgeting techniques

For number of reasons companies may take decision in opposition to the recommendation derived from capital budgeting techniques used. Although 51% of the companies surveyed rarely or never take such contrasting decision, 28% of the respondents frequently do so. Most frequently cited three reasons for such decisions are inadequate fund, policy and/or regulation and strategic alignment (in order) as presented in the following table. Least common reasons are top management's lack of confidence on the capital budgeting technique used and on the forecasted cash flows respectively.

Table: Common reasons for taking decision in contradiction to recommendation derived by capital budgeting

Reasons	Percentage of firms				
	always	often	sometimes	rarely	never
a) Inadequate fund for investment	30%	33%	4%	15%	18%
b) Policy or regulatory reasons	16%	40%	20%	4%	20%
c) Strategic alignment	21%	25%	16%	21%	17%
d) Top management's lack of confidence on the capital budgeting technique used	15%	7%	15%	7%	56%
e) Top management's lack of confidence on the forecasted cash flows	15%	15%	22%	11%	37%
f) Others (please mention)	0%	0%	3%	0%	97%

F. Factors influencing Capital budgeting Techniques Used

Descriptive Statistical Analysis (cross tabulation) results from SPSS shows that companies have CFO/CEO with MBA/Business Masters are most frequent users of DCF and risk adjusted methods; Companies having CFO/CEO with non-business masters are frequent users of DCF methods but moderate users of risk adjusted methods. These two categories of companies also use non-DCF methods but less frequently. Companies having CFO/CEO with business or non-business undergrad degrees usually use Non-DCF methods (table: selected cross tabulation results are presented in next page). Analysis between CFO/CEOs age and tenure with the company shows that companies with older and longer termed CFO/CEOs have a tendency to rely more on non-DCF methods compared to DCF and risk adjusted methods. Majority of large companies frequently use non-DCF methods, followed by DCF and risk adjusted methods respectively. Company discount rate is most frequently used as the rate for discounting cash flows of investment opportunities by companies with CEO/CFOs of age between 50-59; tenure above 9 years and having (business or non-business) masters degree. Majority of the companies rarely use country specific or divisional discount rate irrespective of their CEO/CFO background. Companies with CEO/CFOs of age between 40-59; tenure between 4-9 years and having business masters degree frequently adjust discount rate for country, industry and other risks. Very few companies use different discount rates for cash flows having different risks. Company size, measured in terms of sales revenue does not have any impact on the choice of discount rate. CEO/CFO background or company size does not have any impact on the frequency to taking decision contrasting to that derived by capital budgeting techniques. However none of the crosstab results are statistically significant.

V. Conclusion

This study has added value in finance literature by bringing out insights about the capital budgeting practices in Companies operating in Bangladesh. This is the first comprehensive study on this topic on Bangladeshi companies.

Table: Selected Cross-tab output

How frequently does your company use company discount rate?					
CEO/CFO Education	non-business graduate	business graduate	business masters	non-business masters	Total
Never	0.0%	0.0%	7.0%	4.7%	11.6%
Rarely	0.0%	0.0%	4.7%	0.0%	4.7%
Sometimes	4.7%	2.3%	7.0%	0.0%	14.0%
Frequently	0.0%	0.0%	11.6%	2.3%	14.0%
Always	2.3%	2.3%	39.5%	11.6%	55.8%
Total	7.0%	4.7%	69.8%	18.6%	100.0%

Symmetric Measures

		Value	Asymp. Std. Error ^a	Approx. T ^a	Approx. Sig.
Ordinal by Ordinal	Kendall's tau-b	.067	.143	.470	.638
	Spearman Correlation	.074	.161	.474	.638 ^c
Interval by Interval	Pearson's R	.032	.132	.203	.840 ^c
N of Valid Cases		43			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

How frequently does your company use discount rate adjusted to country, industry and other risks?					
CEO/CFO Education	non-business graduate	business graduate	business masters	non-business masters	Total
Never	4.8%	0.0%	9.5%	9.5%	23.8%
Rarely	2.4%	2.4%	4.8%	0.0%	9.5%
Sometimes	0.0%	0.0%	9.5%	2.4%	11.9%
Frequently	0.0%	2.4%	14.3%	2.4%	19.0%
Always	0.0%	0.0%	31.0%	4.8%	35.7%
Total	7.1%	4.8%	69.0%	19.0%	100.0%

Symmetric Measures

		Value	Asymp. Std. Error ^a	Approx. T ^a	Approx. Sig.
Ordinal by Ordinal	Kendall's tau-b	-.019	.140	-.133	.894
	Spearman Correlation	-.014	.164	-.086	.932 ^c
Interval by Interval	Pearson's R	.050	.158	.315	.755 ^c
N of Valid Cases		42			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

NPV is the most frequently used capital budgeting technique in the companies surveyed. IRR, PI and PBP are next most popular methods. Majority of the companies use multiple techniques. The results in this aspect are line with the recommendations of finance texts. However studies on other countries especially emerging economies like Rwanda, South Africa, Czech Republic reveal prevalence of PBP and DPBP techniques [18], [1], [9], [13]. Even studies on European countries like Sweden and Finland depicts dominance of PBP method [17], [14]. So it can be said that Bangladeshi companies follow practices of firms in developed world (the USA, Great Britain) where NPV and IRR are prevalent methods followed by PBP of capital budgeting [7], [18]. Majority of the firms in this study use company discount rate for evaluating projects, a good percentage use risk adjusted discount rate. A large percentage of Bangladeshi companies studied also adjust discount rates and cash flows for several risk factors such as inflation, exchange rate fluctuation and change in interest rates. Therefore, it can be concluded that capital budgeting practices of the companies in Bangladesh is more sophisticated than many other emerging economies. Firms in the USA and other developed economies can be considered as benchmark for the capital budgeting practices of Bangladeshi companies. In this respect Bangladeshi companies lack in the use of risk adjusted methods namely sensitivity, scenario and decision tree analysis and other probabilistic techniques.

Although researches in other countries revealed a correlation between company size measured in annual sales and the sophistication in capital budgeting techniques this research did not find any such relationship [1], [7]. Rather CEO/CFO background i.e. education, tenure with the company and age influence the capital budgeting practices as found in [7].

Results show that majority of companies usually follow the recommendation derived by the capital budgeting techniques, only few (less than one third) of them frequently take investment decision in opposition to the recommendation of the capital budgeting tools. This is sensible at the high level of sophistication (revealed from the research) in capital budgeting practices. Moreover, the frequently cited reasons for such opposing decisions i.e. fund constraint, strategic alignment, policy & regulation and others strengthens the conclusion that majority of the companies surveyed are sophisticated in terms of their capital budgeting practices.

However, results of the study cannot be generalized because the sample taken was chosen based on convenience. Scientific sampling was not possible because companies usually are reluctant to disclose information. Perhaps it could be done if the information was sought by some regulatory authorities. Moreover, the results were not statistically significant to worth generalizing. This research was a comprehensive one, because there were companies from many different industries in the sample. But, due to convenient sampling some industry sectors dominated and might have biased the results. Research on specific industry sector is worth exploring, as practices may differ from industry to industry. Even firms' life cycle stage might have influence on the practice. Practices of firms at matured or growth stage are likely to be more sophisticated than those of new firms. Most firms of this study were at growth or matured stage. This can be a reason for finding high level of sophistication in practice. Analysis of small, new firms might have different results.

Another limitation of the paper is that it did not focus in detail on the process of estimating cost of capital, which is a crucial input in capital budgeting methods. Future researches can focus on estimation of cost of capital. In terms of factors influencing the choice of capital budgeting technique this research used only two factors CEO/CFO background and company size measured by annual sales volume. Other factors like life stage of the company, industry, size measured by paid up capital, type of ownership and others were left out of the scope of this study, but have the merit to be explored. Future researches can focus on these factors. Also, the impact of capital budgeting techniques used on company performance is another area of research to explore.

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