AN EVALUATION OF THE CAPITAL BUDGETING PROCESS FOR A MULTINATIONAL FIRM

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CHAPTER ONE: INTRODUCTION

1.1 The Topic

Throughout my academic and practical life, capital budgeting has always interested me. I suppose this is because it is contradictory in it's very nature, it forms such a critical aspect of business, yet it is arbitrary in its application. In many organisations that I had worked for, there was quite a deviation between theory and practice.

My interest in the topic was further aroused by a case study that I read in Bruner (1999), "Best Practices in Estimating the Cost of Capital." I, like Bruner, am interested in those areas of the cost of capital estimation where finance theory is silent or ambiguous and practitioners are left to their own devices.

It then occurred to me that limiting the study to just cost of capital would limit the benefit and it would probably be of more use examining how this cost of capital is used in Capital Budgeting. To optimise the benefit, I then decided to expand the study to include Capital Budgeting in a Multinational context.

To do justice to the topics chosen, it would have been a futile exercise surveying South African companies on the various aspects of capital budgeting, hoping that the response rate would be sufficient to eliminate bias. I decided, rather to choose one large world

class multinational conglomerate with the knowledge that all aspects of capital budgeting would be covered in detail at this enterprise. The company chosen ranks in the top ten industries in the UK and is a dominant player in the foods, drinks and retailing sector. Total annual turnover for the Multinational in the financial year ending 2000 amounted to R132 billion.

1.2. A Summary of the Proposal

For the purposes of this study I have adopted a case study approach, based on a Multinational company in the UK, with business units geographically spread throughout the world, including South Africa. I intend to provide a detailed analysis of all aspects of the Capital Budgeting process.

The dissertation will cover the following areas:

- The capital appraisal techniques used to evaluate capital projects.
- The determination of a cost of capital.
- Adjustments to the cost of capital in a multinational context.

The approach in this study will be to divide Capital Budgeting into the three specific areas as detailed above, discuss the theory associated with the subject, analyse empirical research on the topic and critically evaluate the findings of the practices at the

Multinational chosen for this study. Due to confidentiality reasons I shall refer to the company as "PLC" for the purposes of this study.

1.3. Objectives of the Study

The objective of the study is to evaluate the capital investment appraisal process of "PLC", in the light of theoretical and empirical literature on the subject, leading either to suggestions for improvement or acknowledging the merit of the current practice. It is expected that "PLC" utilises sophisticated methods for investment appraisal but does allow room for improvement.

1.4. Structure of the Dissertation

Chapter two contains the literature review on the capital appraisal process. Chapter three contains the literature review on the cost of capital calculation. Chapter four contains the literature review on cost of capital adjustments in a multinational context. The literature review is extensive, but it is impossible to do justice to the topic, considering it's wide applicability, without exploring all the issues. My search included loaning many articles from international libraries. I believe I would not be able to evaluate the practices at "PLC" adequately without analysing the topic completely. Note that the empirical evidence in the literature review is formatted in ascending date order.

Chapter five deals with the research instruments with some background information into the methodology to enhance the reader's understanding.

Chapter six reports the findings as submitted by the respondents to the questionnaires forwarded. Additional notes were also forwarded by the respondents. The response to the questionnaires and additional notes are included in appendices 1 to 4.

Chapter seven concludes the dissertation, suggesting methods of improvement to current "PLC" capital budgeting methods.

CHAPTER TWO: CAPITAL BUDGETING

Chapter two consists of a discussion on the capital investment appraisal process. The theory on the subject is briefly explained followed by relevant empirical evidence. Appraisal methods such as Net Present Value (NPV); Internal rate of Return (IRR); Payback and Economic value Added (EVA) techniques followed by project risk. In order to limit the discussion I decided only to include the more recent articles researched on the topic.

2.1. Capital Appraisal Techniques: Theory

The theory of capital budgeting is based on the economic theory that investments are undertaken until marginal cost is equal to marginal revenue, thus maximising the value of shareholder wealth. Marginal revenue is the return on investment and marginal cost is the cost of capital.

A firm should invest in capital projects only if they yield a return in excess of the opportunity cost of investment. The opportunity cost of the investment is also known as the minimum required rate of return, cost of capital, discount rate or interest rate.

Capital appraisal techniques use evaluation methods like the Net Present value, Internal Rate of Return, Payback and Economic Value Added while adjustments for stand alone

project risk is considered. The theory to each of these approaches is discussed in the following paragraphs, followed by empirical evidence.

2.1.1. Net Present Value

The computation of net present value requires the following steps:

- Choose an appropriate rate of discount
- Compute the present value of the cash proceeds expected from the investment
- Compute the present value of the cash outlays required by the investment
- Sum the present values of the proceeds minus the present value of the outlays

The sum is the net present value of the investment. The accept / reject criterion is to accept all investments whose net present value is greater than or equal to zero and to reject all investments whose net present value is less than zero. A positive net present value is the capital gain from the investment, over and above the cost of the investment used in the calculation.

2.1.2. Internal Rate of Return (IRR)

The IRR is the interest rate that, when used to discount all cash flows resulting from an investment, will equate the present value of the cash receipts to the present value of the cash outlays. It is the discount rate that will cause the net present value of an investment

to be zero. Alternatively, the IRR can be described as the maximum cost of capital that can be applied to finance a project without causing harm to the shareholders. The decision rule is that if the IRR is greater than the opportunity cost of capital, the investment is profitable and would yield a positive NPV.

2.1.3. Payback

It is defined as the length of time that is required for a stream of cash proceeds from an investment to recover the original cash outlay required by the investment. If the stream of cash flows from the investment is constant each year, the payback period can be calculated by dividing the total cash initial outlay by the amount of the expected annual cash proceeds. The deficiencies of the payback method is that it does not take into account cash flows that are earned after the payback date and it does not take into account differences in the timing of the proceeds which are earned prior to the payback date. Payback computations ignore the important fact that future cash receipts cannot be validly compared with an initial outlay until they are discounted to their present values. This can be remedied by calculating a discounted payback period but it cannot be a complete measure of an investment's profitability. It can estimate whether a project is likely to be profitable, but it cannot estimate how profitable an investment will be.

2.1.4. Economic Value Added (EVA)

EVA is similar to what investors subscribe to earning a residual income after subtracting the cost of capital from the after-tax operating profits generated by any business or project. EVA is simply a measure of a company's return on capital relative to its cost of capital, and can be stated mathematically as follows: -

EVA = NOPAT – Capital charge

and therefore

EVA = NOPAT – (WACC x Capital Employed)

where:

NOPAT = Net operating profit after cash taxes

WACC = Weighted average cost of capital

Capital Employed = Invested Capital

Shareholder value is created when EVA is positive. The EVA measurement recognises the returns on investment over and beyond the cost of debt or equity capital. EVA will be negative if the returns from the investment cannot cover the cost of raising the capital, and although earnings will increase shareholder wealth will be destroyed. Stern Stewart and Co advocated the use of EVA.

The following is a quotation from Stern: "To win the competition for capital and build a premium valued company, an attractive rate of return surely must be earned. But

aspiring to earn a high return is not enough. To maximise its rate of return, an already highly profitable unit may pass by truly attractive investment opportunities. Units earning inadequate returns may seek still more capital in the hope of spending their way back to a better return. Stars will be starved, the dogs fed. In both cases capital is misallocated. EVA will increase if operating profits can be made to grow without tying up any more capital, if new capital is invested in any and all projects that earn more than the full cost of capital, and if capital is diverted from activities that don't cover the cost of capital," The Quest for Value, Stewart (1991)..

Because EVA is a residual income measure that subtracts the cost of capital from operating profits, discounting EVA produces the same NPV measures as discounting projected cash flows and subtracting the upfront investment, according to Stewart (1991). The following is an illustration of the FCF Approach and the EVA Approach:

Consider a project in which R2000 of capital is invested in two equal stages, R1000 upfront and R1000 at the end of the first year. NOPAT of R250 is made in the first year and R500 thereafter. Depreciation is deducted from NOPAT in the EVA approach. The discount rate is equal to 10%. FCF in year 2 is capitalized as a perpetual terminal value.

Illustration one: The FCF and EVA Approach to discounting

FCF Approach

	0	1	2
NOPAT	R -	R250	R500
- Investment	1000	1000	0

FCF	(1000)	(750)	500
NPV factor at 10%	1.0	0.9091	9.091
NPV = R2863	(1000)	(682)	4545

EVA Approach

	0	1	2
NOPAT	R -	R250	R500
Capital	1000	2000	2000
Beginning Capital	0	1000	2000
x Cost of Capital	10%	10%	10%
Capital Charge	R0	R100	R200
EVA			
NPV factor	1.0	0.9091	9.091
NPV = R2863	R0	R136	R2727

Source: Stewart "The Quest For Value" 1991

The FCF does yield an accurate value, but according to Stewart, fails to provide any meaningful measures to assess progress in creating value or useful benchmarks to judge performance. It is not clear why the illustration has not added back depreciation to NOPAT in the FCF cash flow as is the normal practice. If the depreciation charge in NOPAT is ignored the equivalence of the two measures can be demonstrated as in the illustration above.

2.1.5. Project Risk

In this section risk is analysed in the context of local projects, that is, not in a multinational context as this type of specific risk is discussed in chapter four. Stand alone risk measurement approach measures the total risk of a project in isolation from the shareholders or any other investment the firm may have. It measures the dispersion of the outcomes for a specific project. Traditional methods of measuring this risk are standard deviations and probability distributions, simulations and sensitivity analysis. An adjustment can be made to the discount rate or cash flow of the project to reflect such risk.

2.2. NPV, IRR, EVA , Payback and Project Risk: Empirical Evidence

In the empirical evidence, Mao (1970) discussed the disparity between theory and practice in capital budgeting. Two observations were made. First, when the investment decision only involves a small portion of the resources of the company, risk is primarily considered to be the prospect of not meeting some target rate of return. However, when the investment concerns a large proportion of company resources, risk also involves a danger of insolvency.

Klammer (1972) reported results that show a clear majority had started using discounting methods in 1970. He also reported firms that used discounting as a primary method also reported use of some non - discounting method as a secondary standard.

In Fremgren (1973) sixty-seven percent of the firms responding to the survey questionnaire stated that they considered risk and uncertainty explicitly in the analysis of individual capital investment proposals.

Fremgren (1973) noted that non-financial justifications are just as important in the capital investment decision. Just because an investment does not meet a test of profitability, does not necessarily mean that it is unprofitable. In today's atmosphere of environmental concern, he found that only 10 percent of the firms indicated that pollution control was regarded as a suitable justification for capital investment.

Petty, Scott and Bird (1975) contended that more sophisticated risk-adjustment techniques would not be employed until risk can be measured more precisely and one can show its effect on the firm's cost of capital.

In Gitman and Forrester (1977) the respondents were asked to indicate which of the techniques they used to adjust for risk and uncertainty. The most popular technique involved adjusting the minimum rate of return upward. It is not surprising since this is the easiest method.

Gitman and Forrester (1977) sampled 268 major companies experiencing high stock price growth and known to make large capital expenditures. The results indicate a strong preference for sophisticated capital budgeting techniques as the primary tool of analysis, and the use of the internal rate of return as the dominant technique. The study also indicated the most popular secondary technique used is the payback period.

Schall, Sundem and Geijsbeek (1978) conducted a survey which indicated the increasing sophistication of capital budgeting techniques. 86% used IRR or NPV.

Aggarwal (1980) maintains that it is difficult, if not impossible, to assess accurately in practice the rate of discount that will be consistent with the riskiness of the cash flow stream being discounted. He goes on to say that DCF techniques, like any other capital budgeting technique, depend critically on the projections of cash flows.

J. Piper (1981) found that increasing the cut off rate to take account of risk appeared intuitively sensible on the basis that the greater the risk the greater should be return.

He found two major weaknesses in this approach:

a) The assumption has the effect of making risk perfectly correlated with time. Risk can be related to the early development stage and not the later product sales. Risk is related to underlying factors which aren't necessarily correlated with time.

b) Secondly, the cost of capital to a company assumes a risk element and only if investments will increase the markets view of the appropriate risk premium will the cost of capital change.

Pike (1983) supported the recent evidence that DCF techniques continued to gain support, although the rate of adoption is only gradual. The use of DCF methods is strongly associated with size. Payback is found to be the most popular method, enjoying equal popularity in smaller and larger firms alike, however it is not the sole criterion.

Moore and Reichert, (1983) observed that strong emphasis is being placed upon vigorous financial analysis in today's high-risk, increasingly competitive environment. Also, there appeared to be a high degree of compatibility between the financial techniques employed by practitioners and those advocated by academics.

Moore and Reichert (1983) found that the movement to implement new financial techniques developed somewhat unevenly with certain industries more actively involved than others. For example, industries producing office equipment and computers, soap, cosmetics, pharmaceuticals, motor vehicles and aerospace products appear to be leaders in the adoption of comprehensive financial techniques.

Klammer and Walker (1984) cite the increase in the use of more sophisticated capital budgeting techniques to the presence of more individuals in responsible positions who have received formal education in the use of these techniques. Another reason, he says, may be that firms have responded to an increasingly uncertain environment by using more sophisticated techniques, with some firms emulating others, in a "follow the leader approach."

In a study comparing Japanese and US practices, Hodder (1986) observed that a fundamental difference between Japanese firms and US firms was that Japanese firms generally appear to be less "numbers driven" than US companies .The most theoretically correct technique yields results that are only as good as the inputs. Japanese firms tend to

focus on critical input assumptions including possible scenarios and management responses.

Hodder (1986) concluded that although most Japanese firms are not formally using DCF techniques, they all seem to be incorporating the time value of money in their analysis. There are no indications that Japanese firms using simplified ROI or payback procedures are making better investment decisions than Japanese firms using DCF or equivalent techniques.

In Pike (1988) it was found that the greatest revolution in the capital budgeting process is undoubtedly in the assessment of project risk. 86% of the firms sampled required a formal assessment of risk. Capital expenditure requests commonly require information on best / worst cases and project sensitivities to key assumptions.

Pike (1988) found three quarters of 100 large UK companies claimed to use IRR in appraisal projects. He states that the most likely reason for the rapid uptake in these techniques during the 1980's is the general availability of DCF functions on spreadsheets and other financial software. The IRR method he concludes, does not demand a discount rate assumption prior to calculations, and is therefore now no more difficult to compute than the payback method.

Pike (1988) investigated the possible reasons why the payback method was so popular despite its shortcomings. It was found to provide a measure of investment profitability;

simple to calculate, useful as a first screening device and concentrates on early cash flows which determine the success of a project.

Mills (1988) also indicated that the popularity of IRR is in part psychological, a measure of investment worth in percentages is more appealing to executives. He found the non - requirement for a cut off rate as the most important reason for the preference of the IRR method.

With regard to empirical evidence in the South African context, Parry and Firer (1990) indicated a general lack of understanding of advanced risk-analysis techniques. All firms felt that there was a need for more quantitative approaches to coping with uncertainty, although the feeling was stronger amongst the capital-intensive firms. However, all respondents indicated that entrepreneurial skills and judgement remained an important part of the process, despite the need for a quantitative approach.

Parry and Firer (1990) suggested that South African companies use less sophisticated capital budgeting techniques. Most of the high capital intensive companies use IRR as a primary method, the low capital intensive companies clearly prefer to use the accounting rate of return.

Dilon and Owens (1997) note that EVA does not have a precise definition and Stern Stewart and company use 164 variations of the overall measure according to specifics of the application. The study also looks at the relationship between EVA and NPV.

Dilon and Owens (1997) note that a major potential drawback to the use of EVA as well as the other measures is the single year focus. Executive management recognizes the need for long term measures of success especially when evaluating capital projects. In its basic form, the calculation of EVA does not consider the implications of decisions to future years. Maximising current EVA may be done to the detriment of future years. Also the study, raises the issue of whether PV (EVA) equals NPV even after an adjustment for depreciation and suggests that PV (EVA) is not equal to NPV.

De Villiers and Auret (1998) cite a benefit of EVA being that it accounts for the opportunity cost of capital from the profits generated. The study claims the disadvantage of EVA in that it is based on accounting profits. Any distortions in accounting returns are then carried forward to the EVA calculation.

Jeffreys and Firer in an unpublished article state that the short term nature of EVA can be overcome by smoothing EVA numbers over several years in an executive compensation system. The study goes on to highlight the use of EVA in South Africa as very recent, with only two organisations having used the system for more the four years. Nine out of the ten respondents used EVA as a capital budgeting tool.

2.3. Concluding Remarks on Capital Appraisal Techniques

Empirical evidence certainly suggests that a shift to the use of more sophisticated appraisal techniques is indicated, with methods such as EVA finding it difficult to get off

the ground. In light of the preceding evidence best practice would be the use of DCF techniques (IRR and NPV) to appraise investments with the payback method used as a supporting measure. The NPV measure should be prime as it gives me an absolute measure: the larger the NPV, the more value will be added to the project. The payback method assists me as a first cut screening device. Also, the accuracy of the cash flow estimation is critical and best practice for stand alone project risk would be to adjust cash flows for risk (risk is not perfectly correlated with time) rather than adjust the discount rate while non-financial justifications should play an equally important part of the capital investment decision where entrepreneurial skill and judgement remained an integral part of the process.

I have noticed that some large industries in South Africa have adopted EVA into their businesses although there is still a fair amount of controversy about it's effectiveness. EVA has conceptual shortcomings: discounting EVA does not produce the same result as NPV does. A severe shortcoming of EVA is thus that it is based on discounting accounting profit while NPV is based on discounting cash flows of a project. The EVA method does not provide a solution to the problem of 'short termism' in decision making by managers, who might manipulate such a ratio when it is tied to incentive compensation.

CHAPTER THREE: COST OF CAPITAL

Chapter three discusses the cost of capital, examining the theory followed by relevant empirical evidence. The cost of capital is normally expressed by calculating a Weighted Average Cost of Capital (WACC), which together with it's components, the cost of debt and the cost of equity is discussed. There are several methods of calculating the cost of equity, such as the Capital asset Pricing Model (CAPM); the Discounted Cash Flow (DCF) method and Bond Yield plus Risk Premium Approach, each of which are discussed in detail.

3.1. Cost of Capital - Theory

It is the minimum rate of return a firm should earn on its capital in order to leave the share price unchanged. This is the hurdle rate or discount rate that is used to discount cash flows from capital budgeting proposals to their net present value. In theory (Pocock, Correia and Wormald 1991) to estimate a firm's cost of capital, a financial manager should identify all the permanent and non-temporary sources of finance employed by the firm, estimate their individual costs and combine the component costs to arrive at the total weighted average cost of capital (WACC). WACC is not the only way to calculate a cost of capital. Another way is to use the asset beta (the all equity beta)/the flow to equity approach.

3.1.1. WACC

Most firms employ several types of capital, called capital components; with common and preferred stock, and with debt, being the three most frequently used types. The investors who provided the funds expected to receive a return on their investment. If all the firm's investors were common shareholders then the cost of capital would equal the cost of equity. The capital components of the WACC calculation is as follows:

1. That portion of short-term interest bearing debt that is considered to be permanent financing

2. All long term debt

3. All preferred stock

4. All common equity

need to be calculated before the WACC is calculated. Each firm has in mind a target capital structure, defined as that mix of debt, preferred and common equity which causes its stock price to be maximised. When the firm raises new capital, it tries to stick to the targeted capital structure over time.

The formula for the WACC is:

$$WACC = Wd\ Kd\ (1 - T) + Wp\ Kp + We\ (Ke / Ks)$$

Wd, Wp and We are the target weights for debt, preferred stock and common equity respectively. The cost of debt component of the WACC would be an average of several

types of debt used for its permanent financing, while the common equity will be an average of the cost of retained earnings and the cost of new common stock.

The weights used in the WACC calculation could be based on the accounting values shown on the firms balance sheet (book values), or on the market values of the different securities shown on the firms balance sheet or on the firms optimal capital structure, which becomes the firm's target market value weights.

3.1.1.1. The Cost of Debt, Kd (1 - T)

The first step in estimating the cost of debt is to determine the rate of return debt holders require. Companies normally use both fixed and floating rate debt, straight and convertible debt, with each type having a different cost. Current and prospective interest rates as advised by the firm's investment bankers should be obtained. This is the cost of new, marginal debt and will not be the same as the historical rate. For capital budgeting purposes, the relevant cost is the marginal cost of new debt to be raised during the planning period. The after tax cost of debt is used to calculate the weighted average cost of capital, because interest payments are deductible, the government in effect pays part of the total cost. The cost of debt to the firm is less than the rate of return required by debt holders.

After tax component cost of debt = Interest rate - Tax savings

$$= Kd - Kd\,T$$

$$= Kd (1 - T)$$

T is the firms marginal tax rate. The South African tax rate for corporations is 35 percent. However, other taxes payable could increase this rate to 40 percent. Also, the tax rate is zero for a firm with losses.

3.1.1.2. Cost of Preferred Stock, Kps

A number of firms use preferred stock as part of their permanent financing mix. Preferred dividends are not tax deductible. Therefore, the company bears their full cost, and no tax adjustment is used when calculating the cost of preferred stock. The method of calculating the cost of preferred stock used to calculate the weighted average cost of capital is the preferred dividend divided by the net issuing price, which is the price the firm receives after deducting flotation costs.

3.1.1.3. Cost of Common Stock / Retained Earning Ks

A firm can raise common equity capital in two ways:

1) by retaining earnings and

2) by issuing new common stock

Ks is the rate of return stockholders require on the firms common stock while Ke is the return required on retained earnings. The reason why a cost of capital is assigned to

retained earnings involves the opportunity cost principle. The firm's net income after taxes and after preferred dividends belongs to its common stockholders. Management may either pay out earnings in the form of dividends or retain earnings to be ploughed back into the business. However, the use of all the earnings involves an opportunity cost, as stockholders could have received this income as dividends and could have invested this income elsewhere. The minimum the firm should earn on its retained earnings is as much as the investor could earn on alternative investments of equivalent risk.

There are three methods that can be used to calculate the cost of equity. These are:

1) The Capital Asset Pricing Model (CAPM)

2) Dividend - Yield - plus - Growth - Rate, or Discounted Cash Flow (DCF) Approach

3) The Bond - Yield - plus - Risk - Premium Approach

3.1.1.3.1. The CAPM Approach

The required return on any asset as per the CAPM approach can be expressed as:

$$Ke = Rf + B\ (Rm - Rf)$$

Where: Rf = Interest rate available on a risk free bond

Rm = Return required to attract investors to hold the broad market portfolio of risky assets

B = the relative risk of the particular asset

Estimating the Risk Free Rate

Brigham (1991) also goes on explain that long term Treasury bonds are often used as a proxy for a riskless asset because: -

A) Capital market rates include a real, riskless rate plus a premium for inflation, which reflects the inflation rate over the life of the asset. T bond rates, on the other hand reflect expected inflation over a long period, so they are less volatile than T bill rates.

B) Common stocks are long term securities, most investors have a long investment horizon. Therefore stock returns will include long term inflation expectations similar to the inflation expectation in T bond rates.

C) Treasury bills are subject to random disturbances as they are used by most Governments to control money supply. T bonds are also affected by Government action but not to the same degree as treasury bills.

Estimating the Market Risk Premium

The market risk premium can be estimated on the basis of:

- Ex post or historical returns

- Ex ante or forward looking returns

Ex Post Risk Premiums

The most complete, accurate and up to date ex post risk premium study is available annually from Ibbotson Associates, which examines market data over long periods of time to find the average annual rates of return on stocks, T bills, T bonds and a set of high grade corporate bonds.

The choice of beginning and ending periods can have a major impact on the calculated risk premiums. Ibbotson Associates used the longest period available to them, but had their data begun later, or ended earlier, their results would even have indicated negative risk premiums. Therefore historical risk premiums should be approached with caution.

Ex Ante Risk Premiums

The ex post approach used by Ibbotson Associates assumes that investors expect future results, on average, to equal past results. Investors today probably expect results in the future to be different from those in the past, especially during the Great Depression and World Wars. The ex ante premiums uses the discounted cash flow model to estimate the expected market rate of return. This procedure recognises that, if markets are in equilibrium, the expected rate of return on the market portfolio is also its required rate of return.

Expected rate of return = Km = Dy + g

The major task is to estimate g, the average expected long term growth rate for the market index. Estimating a constant long-term growth rate for a portfolio of stocks such as the S & P 500 is simpler than for individual stocks.

Financial service companies such as Merrill Lynch publish, on a regular basis, a forecast of DCF methodology for expected rate of return on the market, publishing a bimonthly forecast in the publication, Quantitative Analysis. The T bond rate is subtracted from the market forecast to obtain an estimate of the current market premium. Note that ex ante premiums are not stable, they vary over time, so it is advisable to use the most current estimates of ex ante premiums.

Estimating Beta

The last parameter needed for a CAPM cost of equity estimate is the beta coefficient. A stock's beta is a measure of its volatility relative to that of an average stock, and betas are generally estimated by running a linear regression between past returns on the individual stock and past returns on some market index. This is known as historical betas. Historical betas, however show how risky a stock was in the past, but investors are interested in future risk. A company could have been perceived to be safe in the past, but things change, and the future risk could be quite different. This is quite an assumption considering historical betas of individual firms are not very stable. However, researchers

have found ways to improve historical betas, which has led to the development of two different types of betas:

- Adjusted betas

- Fundamental betas

Marshall E Blume as explained in Brigham (1991) introduced adjusted betas, showing that true betas tend to move toward 1-0 over time. He recommended that the firm start with its pure historical statistical beta, make an adjustment for the expected future movement toward 1-0, and produce an adjusted beta which makes an adjustment for future risk. The adjustment process involves complex statistics.

Brigham (1991) also states that other researchers (no names given) have extended the adjustment process to include such fundamental risk variables as financial leverage, sales volatility etc., to produce a fundamental beta. Changes in a firm's operations and capital structure are taken into account.

However, the plain, old historical beta is the basis calculation, calculated as the slope of the characteristic line. When calculating historical betas the period lengths are important as they produce different results. Brigham, Gapenski and Erhrardt (1999) suggest using five years as a reasonable period and recording many observations of return, weekly or perhaps daily. The index used to represent the market is an important consideration. In theory, the broader the index, the better the beta.

The bottom line is that one can calculate betas in many different ways, and depending on the methods used, different betas, hence difference costs of capital, will result. The choice is a matter of judgement and data availability, as there is no "right" beta. Hopefully, betas derived from different sources will, for a given company, be close together, thereby instilling confidence in the CAPM cost of capital estimate.

3.1.1.3.2. The DCF Approach

This approach is based on the theory that the current stock price is simply the discounted flow of future dividends. The after tax cost of equity is established by the following equation:

$$Ks = D_1/Po + g$$

Where :

$$Po = \frac{D_1}{(1+Ks)} + \frac{D_2}{(1+Ks)^2} + \frac{D_3}{(1+Ks)^3} + \ldots\ldots + \frac{Doo}{(1+Ks)^{oo}}$$

because the intrinsic value of a stock, Po is the present value of its expected dividend stream.

The share price, Po can be obtained from any financial newspaper, and next years annual dividend can be estimated relatively easily, however the growth rate, g, expected by the marginal investor is difficult to obtain. The model assumes a constant growth rate.

Historical Growth Rates

If earnings and dividend growth rates have been fairly stable in the past, and this trend is likely to continue, then the past growth rate may be used as an estimate of the future growth rate. Again, there is no stipulated length of the period of analysis and the length chosen should be reflective of future conditions. The calculated growth rate is extremely sensitive to beginning and ending years chosen for the calculation. This problem could be overcome by using an average to average calculation, where an average is calculated for the beginning by the taking the start of the period and the preceding year. A similar process is used for the ending year.

A least squares regression using time as the independent variable is a good method of calculating historical growth rates by log linear least squares regression. All data points in the series are considered, thus, it is least likely to be biased by a random by high or low beginning or ending year. Historical growth rates should be used with caution.

Retention Growth

Another method for estimating the growth rate is: -

$$g = b\,(r)$$

r is the expected future return on equity, b is the proportion of earnings that firm is expected to retain. A constant growth rate is assumed, by assuming that the payout rate, and thus the retention rate, (b=1 payout), to remain constant and it is assumed that the

return on new investment will equal the current ROE and risk of future projects will have the same degree of risk as the firm's existing assets.

Analysts' Forecasts

Analysts forecast and then publish growth rate estimates for most of the larger publicly owned companies. Value line provides these forecasts for approximately 1700 companies, providing summary information such as the median and range of forecasts. These forecasts are based on non-constant growth, which is then used to develop a proxy constant growth rate. A fifty year period is chosen, the present value of dividends beyond fifty years is zero, a weighted average growth rate is developed and used as a constant growth rate for cost of capital purposes.

3.1.1.3.3. Bond - Yield - Plus - Risk – Premium Approach

A third method for estimating the required rate of return on equity calls for adding an estimated risk premium to the company's own bond yield:

$$Ks = \text{Company's own bond yield} + \text{Risk Premium}$$

A firms bond yield to maturity can be estimated quite easily if the bond is publicly traded. The problem is trying to estimate the risk premium. As discussed earlier,

Ibbotson Associates publishes historical risk premiums and all the weaknesses associated with historical risk premiums were also discussed.

The current risk premium may be established by a survey approach and a DCF approach. The DCF approach is similar to the method discussed earlier. The survey approach would include a large number of institutional investors, asking them what premium above the return on one company's bonds would make them indifferent between the stock and bonds.

Brigham (1991) suggests that his work on the subject indicates that the over own debt risk premium has ranged from about 2 - 5 percentage points, but he warns: use a current risk premium when estimating equity capital costs by the bond-yield-plus-risk premium method.

3.1.2 The flow to equity method as a cost of capital

Another standard approach to valuation when a firm is financed with equity and debt is the flow to equity method. This approach is similar to the WACC method and provides exactly the same answer as long as the debt structure remains unchanged throughout the project's life. FTE can give more exact answers if financial risk is not constant. The FTE approach discounts the cash flow from the project to the equity holders of the levered firm at the cost of equity capital.

A levered cash flow (LCF) is calculated from the unlevered cash flow, the difference being the after tax interest payment and any repayment of debt capital.

The next step is to determine the discount rate by taking the discount rate on unlevered equity and levering it with a target debt to equity ratio.

$$r_s \text{ (discount rate)} = r_o (1-T_c) (r_o - r_b)$$

Where r_s = unlevered discount rate

r_o= debt

T_c= equity

R_b= interest rate

The present value of the cash flow is the LCF divided by the levered discount rate less the initial outlay of cash.

3.2. Cost of Capital – Empirical Evidence

Reilly and Wacker (1973) focussed on the mathematical error of using the weighted average cost of capital to represent the true overall capital cost. They concluded that the calculation of weighted average cost leads to an erroneous value of the minimum acceptable level of return. The fault lies in the general inability to express the root of a polynomial as an algebraic combination of the roots of other related polynomials.

Schall, Sundem and Geijsbeek (1978) conducted a survey and found that 46 percent of responding firms employ a weighted average cost of capital and 8 percent use a risk free rate plus a premium for the cost of equity calculation.

Bethlehem (1973) set out to define the cost of capital, to explain why it is important to calculate the cost of capital and to identify the problems associated with its determination. The finding has been that the cost of capital, like any other business cost, represents the minimum return that must be earned by the use of a resource if its employment is to be justified in terms of the profit or wealth maximising goals of an enterprise. In an uncertain world, however, different securities need to be ranked according to their respective risks and possibilities of growth and this results in divergence in the component costs of capital. He found problems arose when calculating the cost of capital due to the fact that various factors that need to be considered in calculating the cost of capital cannot be known with certainty because they relate to the future. The factors, therefore have to be estimated and this makes all calculations of the cost of capital subjective. The paper discusses the changing conditions in money and capital markets and hence to actual and prospective changes in interest rates.

Brigham (1975) found that companies that use a cost of capital as a hurdle rate, provided some interesting insights into practical attempts to measure the cost of capital. First, 29 out of 31 companies use balance sheet figures (book weights) to calculate the weighted average cost of capital. It was not always clear if the weights represented the actual book value figures at the time the cost of capital was calculated or a target capital structure. Second, the companies all use the after tax cost of new debt. Most concentrate on long term debt, but several use an average of long and short-term costs. Further, executives have as much trouble estimating the cost of equity as academicians do, and many of the

questionnaire respondents and interviewees were quite candid in admitting that they rely heavily on judgement. As to quantitative measures, most use the D/P and g formulation, with g being estimated on the basis of past earnings growth. Two companies specifically indicated their use of the CAPM (Capital Asset Pricing Model) approach, although both indicated that they also use D/P + g.

Nantell and Carlson (1975) concluded in their paper that the modern weighted average cost of capital concept is valid for determining the optimal capital structure that maximises the value of the firm. In addition, it is also valid for use as a cutoff rate in the evaluation of capital projects.

Keane (1977) looked at the irrelevance of the firm's cost of capital as an investment decision tool pointing out that the reality is however that the discount rate for any given investment is outside the control of the individual firm because the price of time and the price of risk are determined solely in the market place.

He questions whether the firms cost of capital provides a useful basis for ascertaining the discount rate for individual investment projects. The components of the firms capital structure reflect the risk categories of the firms assets. The "cost" of the former derives from the latter. If the firm has one project and has issued a single financial security to finance it with the same maturity as the project, it would be valid to equate the discount of the project with the observed cost of the financial security, because, in the circumstances, the latter would reflect fully the average of the one year rates expected

for that risk class over the life of the project. If however, the firm issues one or more financial securities with a different maturity from that of its project, then the "cost" of the security obviously ceases to be equal to the average of the one year rates expected over the life of the project and therefore ceases to be the relevant discount rate. The paper also discusses the usefulness of the cost of capital concept, which depends on the assumption that the market rate of interest remains constant over time. The interest rate varies over time, and can be quite significantly different over the duration of the income flow.

Arditti and Levy (1977) presented the argument that the finance textbooks traditional post tax cash flow can be misleading. Basically, the paper states that there are two mistakes in these texts: One in defining the projects' cash flow and one in defining the cost of capital. These two mistakes may offset each other in some cases. In the evaluation of a project the interest tax savings that can be attributed to that debt financed portion of the projects cost should be excluded from the projects cash flow. The reason is that since interest is tax deductible then the effective post tax cost of debt component is actually (1-t)i rather than i. When evaluating cash flows it is obvious that in practice firms do not finance each project by the same debt equity mix. However, if a particular project is entirely financed by debt, the market assumes that this distortion in the firms target capital structure is temporary, since subsequent projects will be financed so that the firms target debt equity ratio is met. Financing sources cannot be allocated to a particular investment, therefore the interest tax saving should be excluded from the

projects cash flow stream. These two authors suggest that the practices stated above are essentially contradictory, for setting the cost of debt equal to (1-t)i and applying the after tax discount rate to all projects, one does in fact take the interest tax saving into account and implicitly allocate the firms total debt financing to each project.

The original Sharpe - Lintner capital asset pricing model as noted by Friend, Westerfield and Granito (1978) advanced to explain the variations in risk differentials on different risky assets has now been widely questioned on the basis of empirical evidence, and a large number of modified theories have been proposed to explain the discrepancies between theory and observation. In the long run there is an observed linear relationship between risk and return on individual stocks but the short term relationship is erratic and has not been explained satisfactorily by the difference observed between the market rate of return of stocks and the risk free rate. Questions have been raised about the relationship between the expected and actual rates of return. Findings by Friend, Westerfield and Granito (1978) indicate that investors hold heterogenous expectations as to expected return and risk and the short sales mechanism is imperfect and they do not properly aggregate risks of individual assets to measure the risk of an entire portfolio. This conflicts with an important assumption made in the capital asset pricing model (CAPM) and it raises questions about the justifications for sole reliance on beta or covariance with the market return rather than on variance (or standard deviation) of the assets own returns as a measure of the market's appraisal of asset risk. It is argued by Friend, Westerfield and Granito (1978) that the CAPM is defective but as a scientific

hypothesis, no valid test of this model has ever been carried out because all testable implications of the theory follow from the ex ante efficiency of the market portfolio and thus the theory is not testable unless the true market portfolio is known and used in the test.

Friend, Westerfield and Granito (1978) looked at possible modifications to the CAPM using a powerful grouping technique to indicate a more appropriate market proxy and concluded that individual asset standard deviation is an appropriate additional measure of risk.

Boudreaux, Long, Ezzel and Porter (1979) refuted Arditti's technique of using total cash flows citing the assumption that this results in incorrect future debt values, interest, interest tax subsidies, and therefore present values and NPV's. The total cash flow specification allows debt value across time to remain a constant proportion of (changing) market value.

Brigham and Shome (1980) examined the risk premium approach to estimating the cost of common equity capital, sometimes called the stock bond yield spread method. One approach to estimate risk premium is a historical study of the returns actually earned on stocks and bonds. In these studies it is assumed that a portfolio of stocks is formed, held for a period of time, and then liquidated. Similarly, a bond portfolio is formed, and its historical rate of return is estimated. The difference between returns on the stock and bond portfolios is then determined, and this historical yield spread is then used as an

estimate of the risk premium of stocks over bonds. Brigham and Shome (1980) found serious problems with this procedure. The particular holding period used is essentially arbitrary, but it can make a huge difference in the final outcome. They found that if short holding periods are used returns are volatile but even with holding periods of ten years or more, risk premiums can vary by as much as twenty percentage points. In the twenty to fifty year holding period, 1926 - 1978, the calculated rates of return on common stocks ranged from 3.1 percent to 16.9 percent. Returns on long term US Government bonds ranged from 0.9 percent to 4.5 percent over the same period. Therefore risk premiums on an average share of stock as determined by the historic data ranged from 0.8 percent to 15.0 percent.

Brigham and Shome (1980) highlighted the model's weakness in the use of historic yield spread as estimates of current risk premiums. The true risk premium built into the common equity at any point in time reflects the difference between expected returns on stocks and bonds in the future. Expected, or ex ante returns may, on rare occasions, equal the ex post returns that were realised in some past period, but this would be the exception, not the rule.

Because different stocks are regarded as facing different amounts of risk exposure, institutional investors find it useful to group each stock into one of several "risk classes". The next step is to establish a required rate of return for each stock. This could be done by adding a premium to the treasury bond rate. These premiums are based on what

investors think is reasonable, given their perceptions of current conditions and their aversion to risk.

Brigham and Shome (1980), discussed yet another approach at estimating risk premiums inferred from the stock prices and bond yields that exist in the market. Depending on what assumptions are made about the long-term dividend growth of a firm, the DCF model is typically used in either of the following forms:

1. Constant Growth, or Gordons Model

2. Non Constant Growth DCF Model

Using either the constant or non constant model, an expected return for the market index is calculated, the yield on a risk free security is then subtracted, and a forward looking risk premium for the market is estimated. The accuracy of this method depends on the proper measurement of the riskless rate and on the validity of the assumptions of the DCF model.

Brigham and Shome (1980) found that the cost of equity tracks interest rates quite closely. They also found that the cost of equity capital for the electric utilities in the 1970's has risen faster than that of the utilities in the 1960's.

They concluded that industrial firms' risk premiums, no matter whether they are measured by the constant or non-constant growth models, whether they are for the Dow Jones 29 or the S+P 399, or whether they are based only on historical data or on the Value Line analysts forecasts, tend to track one another closely.

Linke and Zumwalt (1984) suggest that DCF analyses of stock values should give recognition to the fact that firms commonly pay dividends quarterly. The DCF formulation is correct only if the entire annual dividend is paid at year end, the present value of four quarterly dividends is greater than the present value of one year end dividend.

In 1976, Stephen A. Ross developed a new theory of securities pricing called the Arbitrage Pricing Theory (APT). According to APT the return on investor can expect from a share is related to the risk free rate and numerous other factors rather than just the return on the market as predicted by CAPM.

Page (1985) reviewed the results of empirical research carried into the APT using data from the Johannesburg Stock Exchange. One of the major advantages of the APT from an empirical research point of view is that the market portfolio does not need to be established. This implies that one need not measure the entire universe of assets but can undertake empirical research using a sub set of risky assets.

Page (1985) concluded that security returns on the JSE are explained by a two factor model. In comparing the APT and the CAPM, he found the APT to be substantially better with regard to the explanation of variability in share returns.

Retief, Affleck - Graves and Hamman (1986) looked at estimating a cost of capital for an unlisted company with regard to estimating a cost of equity using the CAPM method. The problem arises as to how best to estimate beta for an unlisted company. Usually if

the company is a listed company the beta parameter can be estimated using the market model (Fama, Fisher, Jensen and Roll, 1969 as in Retief, Affleck-Graves and Hamman 1986).

Unfortunately unlisted companies find it difficult to use this model due to the absence of a regular market price for the equity of the company. To overcome this problem many texts suggest that the unlisted company choose a listed company in the same type of business and use that beta (BL), but beta is directly related to the leverage employed in the company (Hamada, 1972 as in Retief, *et al* 1986)

Therefore it is necessary to first unlever the beta of the listed company in order to derive the unlevered beta as follows:

$$B_L = Ba + Ba\ (D/E)\ (1\text{-}T)$$

$$= Ba\ (1 + D/E(1\text{-}T)$$

$$= \frac{Ba}{1+D/E\ (1\text{-}T)}$$

where Ba = unlevered beta for the listed company

D= the total value of debt

B_L = levered (estimated) beta for the listed company

E = the total value of equity in the listed company

T= the tax rate

The beta for the unlisted company can then be estimated by re - levering this Ba by the leverage employed by the unlisted company.

Gitman and Mercurio (1982) surveyed cost of capital techniques used by respondents to a questionnaire to measure their cost of capital. Key aspects of this process considered were the relevant capital components, weighting schemes, measurement of specific cost components, and actual cost of capital values and stability.

It was found that:

- The majority of respondents do not include current liabilities when calculating their cost of capital.

- The data indicated a substantial number of firms exclude certain of their capital structure components when calculating the cost of capital.

- Respondents used some type of weighted average when determining their cost of capital. However, 17 percent of the respondents used the cost of the specific source of funds employed as a cut off rate for making financial decisions. Such an approach clearly runs counter to theory, and suggests that a number of respondents were acting differently from what the theory suggests of the firms using a weighted average. The majority appeared to use target capital structure weights. Second most popular were market value weights.

- The majority of respondents indicated they did not adjust for tax.

- Nearly two thirds of respondents indicated that they used current market based costs of similar obligations when measuring the cost of debt. While the majority of the respondents behaved in a fashion consistent with theory, surprisingly one third of the respondents use historic rather than current costs.

- Most firms calculate one cost of equity capital not differentiating the cost of retained earnings from the cost of new common stock equity.

- The use of current dividend yield plus growth, as specified by the Gordon model and the use of a risk adjusted market return seem to be the most popular computational procedures for estimating this return.

Pocock, Correia and Wormald (1991) surveyed one hundred and twenty six companies listed under the industrial sector of the Johannesburg Stock Exchange. Questions were based on cost of capital measurement techniques. Financial managers were asked about the sources of capital found in the respondents capital structure and 62 percent of the respondents indicated that current liabilities are used to estimate the firms cost of capital. This is suprising since current liabilities is considered a non-permanent source of finance. Also 22 percent of respondents considered retained income to have no cost, which is in conflict with financial theory. Thirty five percent of the respondents used the specific source of finance to estimate the company's cost of capital. Of note, was that the larger firms actions are more in line with financial theory.

The study also indicated that the majority of respondents used the marginal rather than historical cost to determine the component cost of debt. The popular method to calculate the cost of equity was the current dividend yield plus growth.

Harris and Marston (1992) cite the benefit of using ex ante risk premia is the estimation of changes in market risk premia over time. They concluded that with changes in the economy and financial markets, equity investments may be perceived to change in risk. For instance, they say, investor sentiment about future business conditions likely affects attitudes about the riskiness of equity investments compared to investments in the bond markets.

Jaggannathan and McGrattan (1995) put a case forward for the CAPM, plotting the return / beta relationship for four types of assets over a period as long as 66 years. The result was more or less a positively sloped, straight-line, just as the CAPM predicts. The straight line relationship breaks down over shorter time periods, but for those interested in the longer view, the CAPM still has something to offer.

Bruner (1999) conducted a telephone survey of leading practitioners, a sample of 27 firms, interviewing the individual in charge of estimating the firms WACC. He found that WACC is the dominant discount rate used in DCF analyses and weights are based on the market, not book, value mixes of debt and equity. The survey findings are summarised below:

Risk Free Rate of Return

When respondents were asked what they used for a risk free rate the following comments were noted (Page 161).

"Ten year Treasury bond or other duration treasury bond if needed to better match project horizon," and

"We use a three to five year treasury note yield, which is the typical length of our company's investment. We match our average investment horizon with maturity of debt. The survey revealed a strong preference for long-term bond yields."

Beta Estimates

Data used to estimate beta can materially affect the results. Increasing the time period can improve statistical reliability of the estimate but can conclude outdated or stale information but shortening the observation period may include observations that are not normally distributed. Choosing a market index is also problematic, since the market return should consist of a portfolio of all risky assets, including human capital and other non-traded assets. Beta providers use an index as a surrogate for the market.

Over half of the corporations in the sample rely on published sources for their beta estimates, although 30 percent calculate their own. The best known provider of fundamental beta estimates is the consulting firm BARRA. Of interest was the following response, "We do not use betas estimated on our stock directly. Our company beta is

built up as a weighted average of our business segment betas - the segment betas are estimated using pure play firm betas of comparable companies" (Page 162).

Market Risk Premium

Because expected future returns are unobservable, all survey respondents extrapolated historical returns into the future on the presumption that past experience heavily conditions future expectations. Where respondents differed was in their use of arithmetic versus geometric average historical equity returns. The arithmetic mean return is the simple average of past returns. Assuming the distribution of returns is stable over time and that periodic returns are independent of one another, the arithmetic return is the best estimator of expected return, according to Bruner. The geometric means return is the internal rate of return between a single outlay and one or more future receipts. It measures the compound rate of return investors earned over past periods. If returns are not volatile the geometric average will be less than the arithmetic average but if returns are volatile the difference between the arithmetic and geometric average is wide. Seventy one percent of survey respondents support the use of the arithmetic mean return over T-bills as the best surrogate for the equity market risk premium.

Ehrhardt (1994), as cited by Bruner (1999) recommends use of the geometric mean return if one believes stockholders are "buy and hold" investors.

Comments from financial advisers were, "We employ a self estimated 5 percent (arithmetic average). A variety of techniques are used in estimation. We look at Ibbotson data and focus on more recent periods, around 30 years (but it is not a straight 30 year average). We use smoothing techniques, Monte Carlo simulation, and a dividend discount model on the S and P 400 to estimate what the premium should be, given our risk free rate of return," and "We use a 7.4 percent arithmetic mean, after Ibbotson, Sinquefeld. We used to use the geometric mean following the then scholarly advice, but we changed to the arithmetic mean when we found later that our competitors were using the arithmetic mean and scholars' views were shifting." Bruner noted the diversity among survey participants, 27 sample companies appearing to use a 60 plus year historical period to estimate returns, one citing a window of less than 10 years, two citing windows of about 10 years. One began averaging with 1960 and another with 1952 data. Theory calls for a forward looking market risk premium and practitioners are trying their best to incorporate one, Bruner (1999) noted.

3.3. Concluding Remarks on Cost of Capital

Companies are at liberty to choose among many variables to calculate the cost of capital and as Bruner (1999) stated, some consensus has emerged among sophisticated firms branding the practices as "theoretically correct," "traditional," "textbook," "appropriate" or "useful rule of thumb." There still lies ambiguity and confusion over how this theory can be applied.

Best practice on calculation of cost of capital is to calculate a weighted average cost of capital where the organisation has a set target capital structure or use the FTE method if financial risk is not constant. WACC should only be used as long as the debt structure remains unchanged throughout the project's life. Weights should be based on market, not book, value mixes of debt and equity. The cost of debt should be adjusted for tax, calculated at current market based rates. Best practice also suggests that current liabilities be excluded from the debt calculation as it is offset by the increase in current assets. The most popular method of calculating the cost of equity is the bond-yield-plus-risk premium although the bond-yield-plus-risk premium approach suffers from shortcomings such as an arbitrary market premium value. The CAPM method is acceptable and reasonably accurate especially in the long term, empirical evidence suggesting it is acceptable as best practice. When using the CAPM method, the risk free rate should be a long term bond yield rate, such as T-bond rates as they are less volatile and reflect expected inflation over a long period. Best practice uses betas obtainable from published sources, which also publish fundamental betas with variables such as leverage and sales volatility factored in (Brigham 1991). For the market premium calculation the best practice would be to use historical returns only as a guide. Ex ante risk forecasts are available and published in the US by financial services companies (Brigham 1991) using DCF methodology. Future results will not, on average equal past results. Best practice also suggests careful choice of beginning and end periods included in the calculation for historical data.

CHAPTER FOUR : COST OF CAPITAL IN A MULTINATIONAL CONTEXT

Chapter four contains a discussion on how a cost of capital may be modified to assess investments in foreign countries. The theory of the nature of these adjustments is discussed followed by empirical evidence. Adjustments to the cost of capital that are discussed are for political risk and country risk.

4.1. Cost of Capital Adjustments in a Multinational Context - Theory

In most countries, government intervene in their national economies. This increases the political risks that multinational firm's face. Political risks takes various forms from changes in tax regulations to exchange controls, from stipulations about local production to expropriation, from commercial discrimination against foreign controlled businesses to restrictions on access to local borrowings. Although political risks poses severe threats and could create profitable opportunities for multinational companies, firms have not treated the matter seriously (Buckley1987).

The assessment of political risk should involve: -

- The recognition of political risk and its likely consequences.

- Developing policies to cope with / manage political risk.

- Developing tactics to maximise compensation should a crisis occur.

Risks affect shareholder value in two ways, symmetric risks such as fluctuations in GDP, exchange rates or interest rates, where there is an upside and a downside potential and asymmetric risks which have only downside impacts and reduce cash flows, thereby reducing value whether or not they contribute to the overall volatility of the firm. Examples of downside risks are expropriation actions, or war damage.

The expected cash flows from projects facing downside risks will be lower than under normal conditions but such adjustments will be greatest in earlier years instead of compounding over time as would be implied if the discount rate is adjusted and used over all periods.

Therefore risks associated with the volatility of world macroeconomic variables, symmetrical risks, will not have major cash flow impacts, and because they contribute to the volatility of shareholders' portfolios they will command a risk premium.

The beta of an offshore project with respect to the investing company's benchmark portfolio can be estimated in two ways:

1. Directly, by regressing returns on local shares against the home market portfolio.

2. Indirectly, by estimating the beta of the project relative to the local market portfolio and multiplying the result by the country beta, the beta of the local market portfolio relative to the home market portfolio.

Differences in project betas should be reflected as adjustments to equity, which in turn will result in changes in the weighted average cost of capital.

Country equity market volatilities are different in emerging countries to those of developed countries. Professor Donald Lessard has argued that a US firm's beta risk in an investment in an offshore project would be the product of a beta for the project (as if domestic) and a country beta reflecting the volatility of the US equity market relative to the volatility of the offshore equity market. The adjustment for country betas in estimating local WACC is controversial.

A risk adjusted discount rate formulation may be useful as a first cut for screening offshore investments. The final evaluation of specific projects should employ expected cash flows over various scenarios.

Offshore projects can be modeled either in the local or the parent currency. The suggested approach, according to Bruner (1999) is that all cash flow modeling be done in local currency and translated into the parent currency at forward rates and the PV calculation done in the parent currency using the beta as in point 2 above.

The offshore project beta can be estimated as follows, offshore project beta = beta of comparable home country project X country beta

The country beta is made up of:

- The volatility of the stock market (or the macro-economy of the country in question) relative to that of the home country.

- The correlation of these changes in value with the home country.

A coefficient of 1.0 implies that the cost of equity for a project in the country in question is equal to that for a similar project in the home country. A coefficient below 1.0 shows that the market covariance risk of investments in the target countries is quite small compared to the home country.

Country betas capture the effect of market risk of the target country, but they do not reflect potential impact on expected cash flows of downside risks such as expropriation action, payment difficulties, etc. This risk might be mitigated by scenario estimates, and so on, based on relevant operating experience and large amounts of judgement and common sense.

Theory suggests that emerging markets projects are associated with additional effects: political risk, country equity market volatility and difference in currency fluctuations (i.e. inflation expectations). Accordingly, the UK sterling rate of return for a project in South Africa will be:

Local CAPM = Rf + ^ + (Beta country * Beta firm)(EMRP)

^ - Political risk EMRP – expected market risk premium

Political risk premia, according to theory, may be derived from yield spreads, and from the premia charged for political risk insurance. The choice is arbitrary, and it is observed that the spread appears to increase with the term of the issue.

An alternative approach is to calculate the NPV in the local currency discounted at adjusted local WACC (excluding country beta) rate translated to home currency at the spot rate.

4.2. Cost of Capital Adjustments in a Multinational Context - Empirical Evidence

Stonehill and Nathanson (1968) interviewed 219 United States firms and 100 foreign firms, found that 64 percent did not vary cost of capital for foreign investments. Some answers suggested positive risk absorption methods, such as borrowing locally, buying insurance or getting faster payback. The survey of methods currently being used by a sample of multinational firms showed no consistent pattern of foreign investment analysis.

Solnik (1974) suggests an even greater reduction of risk can be attained by diversifying a portfolio internationally. Movement in stock prices in different countries are unrelated. When securities of one country are doing worse than expected, another market is likely to be doing better, hence offsetting the losses.

Severn (1974) states that currently the multinational can reduce risk by foreign direct investment, however increase in international economic integration may increase the correlation between the U.S. business cycle and those of other countries, and thereby limit the degree to which risk can be reduced by foreign direct investment.

Adler (1974) explored whether the traditional financial decision rules for the case of a two country firm can be duplicated. The analysis in this paper is incomplete, however if future analysis of data reveals extensive segmentation of the international capital market, models developed for the single country firm may not be applicable without considerable modification.

Fama (1977) states that risk adjusted discount rates are known, but the rates for the different periods preceding the realization of a cash flow need not be the same, and the rates relevant for a given period can differ across cash flows. However, he says it might be reasonable to assume that the risks in the reassessments of the expected value of a cash flow are constant through time and across cash flows, at least for an investment project of a given type or for a firm whose activities are not anticipated to change much in nature through time. In this instance he suggests a single risk adjusted discount rate or cost of capital can be applied to all cash flows of a project or firm.

Agmon and Lessard (1977) tested whether investors appear to recognise the extent of multinational diversification with a sample of U.S. firms listed on the New York Stock Exchange. The results support the hypothesis that U.S. investors recognise the international composition of the activities of U.S. based corporations. The paper states that this is only a first step towards a specification of the relationship between real corporate variables, such as the international distribution of operations and capital market variables. They observed that MNC's often can diversify internationally at a

lower cost than portfolio investors, the study suggests that the diversification motive should be given more serious consideration.

Shapiro (1978) examined problems faced by MNC's capital budgeting. To cope, he suggests efforts to maximise the use of available information should be increased instead of reducing cash flows or adjusting discount rates. He suggests cash flow adjustments are preferred on the grounds that there is available more and better information on the effects of such risks on future cash flows than on the required discount rate. The value of a project is determined by the net present value of future cash flows back to the investors, therefore, he suggests the parent MNC should value these cash flows that can be repatriated. He also states that economic and political risks are unsystematic, therefore there is no theoretical reason to adjust a firms cost of capital to reflect them.

Shapiro (1978) looks at the sophisticated cash flow adjustment technique recommended by Stonehill and Nathanson where each years cash flow is charged a premium for political risk insurance whether or not each insurance is purchased. He criticises the method as inadequate as the book value of the asset may be different from the economic value of the project. He suggests comparing the cost of political risk insurance with its expected benefits using a complex model.

Shapiro (1978) provided an extensive analysis of the cost of capital used to value foreign projects. He claimed that when an affiliate's risk level differed from that of its parent company, the affiliate's cost of capital must reflect these differences. He also suggested

adjusting a project's expected cash flows rather than changing the cost of capital to reflect political and economic risk. Changes to a projects cash flows were suggested. He felt that more reliable information could be obtained on how risk factors affect expected cash flows than on required discount rates.

Oblak and Helm (1980) sampled MNC's, asking them to rank the capital budgeting technique they use most frequently. The internal rate of return method was the favourite as the primary evaluation method, while the payback period was frequently mentioned as the secondary criterion. The firms that use DCF methods were also asked to identify how the discount rate was determined. Majority of the MNC's used the weighted average cost of capital, although almost half of these did not vary the discount rate for foreign investments.

The study by Doukas and Travlos (1988) investigates acquiring firms share price changes associated with foreign acquisition announcements. The valuation effect of acquisition announcements by multinational firms not already operating in the target firms country, on average, is positive and statistically significant.

Another interesting result is that shareholders of MNC's benefit the most when their firm's expansion is taking place in less developed countries. Moreover, the results confirm the view that investors correctly perceive the benefits inherent in a multinational network as well as the diversification benefits of shares of multinational firms.

Wilson (1990) investigated capital budgeting techniques of United Kingdom based multinationals. He found that there was a high degree of central control over capital budgeting with some companies having fairly rigid decision making processes. The main board evaluates projects, while projects which are not financially sound will be screened and will never reach the main board.

Shao and Shao (1993) examined the capital budgeting techniques used by European affiliates of U.S. based transnational companies. The results showed that foreign managers preferred to use sophisticated techniques as their primary methods of analysis but in reality their actual usage of these advanced capital budgeting techniques was not as popular as parent company managers perceived. It was also found that while European managers made use of sophisticated risk assessment techniques, they did not make use of sophisticated risk adjustment techniques.

Lessard (1996) studied segmentation versus integration of world markets and gains from international diversification. He stated that with fully integrated markets, the advantage to international diversification is a pure diversification effect, a reduction in the non-systematic risk of the portfolio. With segmented markets gains might be even greater, since prices would adjust to reflect the fact that some previously undiversifiable risk was becoming diversifiable. Lessard observed that investor holdings suggest that, relative to the proportions in the world market portfolio, investors in each country tend to concentrate their portfolios in domestic securities. He asks the question, is this investor

behaviour rational within the context of efficient, internationally integrated capital markets? Departures from the idealized conditions, such as differential transaction costs, taxes or restrictions on foreign exchange transactions would result in differential returns to residents and non residents, leading investors of different nationalities to hold different portfolios. However, they are taking on extra risk that is potentially diversifiable therefore the difference in reward should compensate for the difference in risk.

A multinational company can adopt one of two approaches in evaluating an investment across borders: A) Cash flows in a local currency at forward exchange rates and discount them at the home cost of capital with which to discount local currency and B) translate the NPV at the current spot rate. Most companies prefer approach A as they have more confidence in a home WACC rate (Bruner 1999). Also where the investor lives is important, as the shareholders would probably be from the same country.

4.3. Concluding Remarks on Cost of Capital Adjustments in a Multinational Context

Adjustment to the cost of capital for political risk and country risk is a controversial topic. Best practice suggests that the cost of capital should be adjusted for projects in foreign countries, especially if there is extensive segmentation of the international capital market. Symmetrical risks which affect macro-economic variables should command a risk premium as they contribute to the volatility of shareholders' risk

premium. The cost of capital may be adjusted by calculating a country beta and a political risk premium. Political risk premium could include a premium charged for political risk insurance or a difference in the yield spread. Unfortunately there is no clear best practice and the choices are arbitrary. The adjustment for country risk and beta can be done at two different stages and basically these are the two ways in which the home country can effect this adjustment:

Firstly, by calculating the cash flows of the project in the local currency and translating to the home currency at forward exchange rates, thereafter discounting by the home country WACC rate which includes adjustments for country and political risk.

Secondly, by calculating the cash flows in the local currency, discounting the cash flows by a local WACC rate and translating to the home currency at spot rates.

Further studies on the nature of the adjustments need to be undertaken as the empirical evidence suggests problems which can lead to a wide divergence in estimated capital costs.

CHAPTER FIVE: RESEARCH INSTRUMENTS

In this chapter I will explain the various procedures I needed to complete in order to accomplish my objective of appraising the capital investment procedure at "PLC".

As an employee of the South African subsidiary of "PLC" I had come to respect the sophistication of part of the performance appraisal process I was exposed to. It was my expectation that the entire capital budgeting process would be equally sophisticated. I had further expectations with regard to the quantification of the cost of capital. At this stage, I expected that "PLC" used the bond-yield-plus-risk premium approach to value the cost of equity and that CAPM was not considered. With regard to the capital evaluation techniques, I expected the EVA technique to take a primary role as it is a company policy to include the EVA ratio in every appraisal. This would have detracted from the effectiveness of the capital appraisal technique as the method has shortcomings as discussed in section 2.2 above.

I did not know what to expect on translation of currency of foreign projects when evaluated at the centre of excellence (head office where all projects finally end up for board approval). I was aware that the calculation of the NPV was performed in local currency, but was uncertain whether any further adjustments were made.

I prepared a draft questionnaire using Bruner (1999) as a guide. These questions were subsequently altered to suit "PLC" business processes. The centre of excellence treasury department calculates the WACC rate for an individual country which is used by

financial managers to convert their cash flows to NPV. It was at this point that I decided to split the questionnaire into two, one to the Finance Director for investment appraisal (appendix one) and the other to the Corporate Treasurer for the cost of capital information (appendix two). The financial director is responsible for all the rest of world operations, excluding key markets such as the UK and US, but includes markets of Africa, Australia, Far East, India and S. America.

Questionnaires were designed and e-mailed to management of "PLC" in June 2000. The questionnaire sent to the Finance Director, Rest of World Operations covered aspects of the techniques used in appraisal of investments. Questions asked covered the primary and supporting techniques used in the appraisal of investments such as NPV, IRR, payback and EVA method, foreign investment evaluation and risk adjustments to stand alone projects. The questionnaire was completed and returned electronically in July 2000, and is attached in appendix one. A clear, detailed and prompt reply was noted. Another questionnaire sent to the treasurer of "PLC" covered the cost of capital calculation. Questions asked covered the methods used to calculate the component costs of the WACC derivation (cost of debt and cost of equity), criteria used in the weighting of these components and adjustments made to the cost of capital to reflect risk of foreign investments. The questionnaire was completed and returned electronically in November 2000 (appendix two) and enabled me to set about my objective in a thorough manner. The respondent very kindly forwarded additional notes

with worked examples on the WACC methodology (appendices three and four). These responses are analysed in the following chapter.

CHAPTER SIX: FINDINGS

Chapter six analyses the findings of the practices at "PLC" as indicated by the respondents, refer appendices one to four. The capital appraisal techniques, the cost of capital and adjustments to the cost of capital are reported as per the response to the questionnaire and additional material forwarded by respondents and at the end of each finding an evaluation against best practice as indicated in chapters 2 to 4 is undertaken. The detailed nature of the response facilitated a comprehensive analytical review.

6.1 Capital Appraisal Techniques

The first question asked about the evaluation techniques used in appraising divisional investment projects and whether these measures were primary or supporting measures (appendix one).

The results indicate a strong preference for sophisticated DCF techniques such as NPV and IRR as the primary tool of analysis, and payback also being the primary methods, while EVA and the profit impact are supporting methods. All three methods are used because the respondent maintains that each one has a different story to tell. The payback must fall within the company's goals, that is, four years or below. The respondent also uses EVA as a supporting measure to back up the other methods because it is a company requirement, but maintains that EVA should not produce significantly different results, and if it does he would be very concerned. He says he finds the EVA method

unnecessary and confusing. Accounting return (profit impact) is used to enhance understanding to gauge if profit targets are what the city and financial investors expect (appendix one).

Evaluated against best practice "PLC" uses DCF techniques such as IRR and NPV for investment appraisal but counter to best practice the payback method is used as a primary measure. It is quite unusual that the payback method is used as a primary tool of analysis. There are three primary measures at "PLC": NPV, IRR and the payback method, the respondent saying that they are necessary as "each has a different story to tell". The payback method is perhaps used as a first cut screening device or it could be that it is demanded by non-financial managers. There is a maximum payback stipulated period of four years which does seem rather long for a business that operates in the fast moving consumer goods industry. Also, it is not clear whether a discounted payback is calculated or not.

The IRR is calculated and in order to be acceptable, has to provide a return in excess of the local WACC rate plus 10 percent. This seems excessively punitive and the logic behind this requirement is not clear. To me, this seems to be an individual discretionary choice, probably based on experience, rather than scientifically derived. However the importance of the NPV calculation is recognised and the benefit in absolute terms is considered and evaluated in accordance with best practice.

"PLC" uses EVA as a secondary measure for appraisal purposes and because managers are incentivised on economic profit arising from the EVA calculation, the calculation is necessary and correctly so, it is used merely as a supporting measure in capital investment appraisal.

Responses and findings to questions two to four are analysed under cost of capital adjustments in a multinational context Section 6.3.

The fifth question covered adjustments for stand alone project risk (appendix one). The respondent indicated that adjustments to cash flow projections and sensitivity analysis were performed with no adjustment to the discount rate. With regard to risk adjustment for stand alone project sensitivity analysis, the following are a few of the comments, "carrying out a sensitivity analysis around key elements and the subsequent impact on the cash flow is imperative. To me this is where a lot of skill and judgement is involved in an investment decision and I often work with several variations of the same model. The output and the assumptions used in a sensitivity analysis are what should be discussed with fellow business partners. The amount of sensitivity analysis done is dependent on size and complexity and certainty of the elements within a project" (appendix one).

Best practice suggests that cash flows and not discount rates be adjusted for stand alone project risk as risk is not correlated with time and the cost of capital assumes a risk element. Only if investments will increase the markets view of the appropriate risk

premium will the cost of capital change. Best practice also suggests using entrepreneurial skill and judgement and non-financial justifications. Stand alone project risk is mainly evaluated by means of sensitivity analysis. The fact that the number of sensitivities performed depends on the intensity of the capital investment is logical. The company forbids increasing the discount rates makes perfect sense as risk is not perfectly correlated with time. At "PLC" skill and judgement remained an integral part of the process despite the need for a quantitative process, in accordance with best practice.

6.2. Cost of Capital

The corporate treasurer explained their methodology behind the WACC rate calculation:

"The WACC rate represents a company's cost of raising funds. Typically company's raise funds through borrowing or issuing equity, therefore the WACC rate represents the returns expected by the bond holders (i.e. the banks and investors who lend the company money) and the equity holders (i.e. the investors who hold the company's shares). While bondholders assume a default risk, equity holders assume an additional market risk. This additional risk is caused by the fact that while the returns on corporate bonds are stable and largely unaffected by what happens to the market, the returns on equity are dependant on the market conditions. To be compensated for this incremental risk, the equity holders expect a premium on their investment. This is called the market risk premium. The returns expected by the bond and equity holders are largely determined by

two factors: interest rates and the amount of risk undertaken." (appendix three). The weights used in the WACC calculation are based on the market values of the different securities shown on 'PLCs' balance sheet (appendix three).

Best practice suggests using the WACC rate as a discount rate if the debt structure remains unchanged and the FTE rate could be used if financial risk is not constant. There is no evidence of a target capital structure and whether it is used in the weighting of the WACC calculation and if it is not used, should be considered for the future especially as "PLC" is using the WACC method and intends to use it for the future.

Specific questions were asked covering the cost of debt and the cost of equity.

6.2.1. Cost of Debt

The first question asked whether marginal cost, historic cost or any other method was used when calculating the cost of debt.

The company uses the group's current cost of debt in the cost of debt calculation. Further comments were, "To calculate project specific WACC rates we use the marginal cost of debt as the project is assumed to be funded with newly raised capital. Group WACC is used to calculate Group's performance while project specific WACC rates are used to evaluate investment proposals (appendix two). When asked whether current liabilities was excluded from the total value of debt, the response was that the total of debt is defined as long and short-term borrowings and minority interest. When asked

about the after tax cost of debt the respondent said that the group's marginal tax rate, imputed effective tax rate of 27% (appendix three) is used to adjust the cost of debt which is tax deductible.

Best practice would be to use a net after tax cost of debt and current liabilities be excluded from the debt calculation. The net after tax cost of debt calculation cannot be faulted in any way. In the cost of debt calculation the fact that current liabilities is excluded from the debt calculations is in line with theory, as normally the increase in current assets is offset by the increase in current liabilities. Current liabilities is excluded, since it is the net capital that is related to sales activity that is that is important.

6.2.2. Cost of Equity

When asked what method was used to calculate the cost of equity the treasurer said that the CAPM methodology is used to calculate the cost of equity. The question that followed asked about the risk free rate, beta and market premium (appendix two). The ten-year government bond rate of 6 percent is used for the risk free rate. (appendix three). Beta is obtained from on-line resources, such as Bloomberg. The respondent says that a market risk premium is assumed to be 5 percent based on historical data.

Best practice suggest that the CAPM method may be deployed to calculate the cost of equity, using a long term bond yield rate for the risk free rate, fundamental betas and forward looking market premiums. There is currently a fair amount of debate

surrounding the accuracy of the CAPM method by advocates of the Arbitrage Pricing Theory (APT) who suggest that a multivariate approach is preferable to the single factor CAPM. The company could research the merits of this approach although empirical evidence suggests that the CAPM method is still sound and accurate in the long term. For the CAPM cost of equity a ten-year government bond rate is used as the risk free rate, which is in line with best practice as common stocks are long-term securities, most investors have a long investment horizon and expected inflation is forecasted over a long period.

The respondent notes that beta is obtained from on-line resources, such as Bloomberg and a market risk premium is assumed to be 5% based on historical data.

Best practice suggest fundamental betas be obtained from published sources as historical betas show how risky a stock was in the past, but things change, and the future could be quite different. Researchers have found ways to improve historical betas, by calculating adjusted betas and fundamental betas. There is no indication in the response whether betas that are obtained are historical betas, adjusted betas or fundamental betas. The above should be noted if historical betas are used although historical beta is still used as the basis of the calculation. Also, obtain betas from a few different sources and compare to achieve confidence in the beta calculation, thereby instilling confidence in the CAPM cost of capital estimate. Betas can be calculated in many different ways with significant

variations in the result, which is the cost of capital. There is no 'right' beta and this is where discretion sets in.

Also best practice recommends a forward looking market premiums be used, using the most current ex ante risk premiums and carefully choosing the time period in the calculation. A historical risk premium is used which should be approached with caution. The choice of beginning and end periods in historical data can have a major impact on the results. The period used is not stated and there is no evidence that any smoothing techniques, like the Monte Carlo simulation, for instance, is used. An ex ante risk premium approach is advisable as investors today probably expect results in the future to be different from those in the past, especially as the past included major events such as the Great Depression and World Wars which will not necessarily repeat themselves in the future. Ex ante premiums are not stable, they vary over time, so it is advisable to use the most current estimates of ex ante premiums.

6.2.3. Weightings

The last question on WACC rates asked whether current debt to market equity, market debt to market equity or book debt to book equity weighting factors were used in the WACC calculation. Market debt to market equity is the weighting used, defined as total market capitalisation (appendix two).

Appendix three provides a worked example of the WACC calculation that is actually used by "PLC". This illustration is included to show the various components of the cost of capital, of a home country WACC rate demonstrating how it actually comes together in a real life situation.

Illustration two: Cost of debt and equity

'PLC' head office is located in the United Kingdom and therefore a UK WACC rate is calculated.

Cost of Debt = 7% x (1 - 0.27%)

= 5.11%

Cost of Equity = Rf + Market risk premium

= 6% + 5% (Beta assumed to be 1)

= 11%

These are then weighted based on the company's capital structure on a market value of debt to market value of equity basis. Market value of debt is defined as long and short-term liabilities and minority interests. Market value of debt is defined as total market capitalisation (appendix two). Market value of debt plus market value of equity equals enterprise value. 'PLC' is financed 18 percent debt and 82 percent by equity (appendix three).

Kd weighted = 18% x 5.11% = 0.9198%

Ke weighted = 82% x 11% = 9.0200%

UK WACC Rate 9.9398%

This rate is rounded up to 10% for convenience (appendix three). Note that the workings of the WACC rate has been restructured to work in this format.

Best practice on calculation of cost of capital is to use a weighted average cost of capital if the debt structure remains unchanged throughout the project's life. Also, best practice suggests that market, not book value rates are used in the WACC calculation for the weighting of the component capital elements. The practice at "PLC" does not deviate from best practice, however there is no evidence of whether the debt structure remains constant or if a target capital structure is in use.

6.3. Cost of Capital Adjustments in a Multinational Context

6.3.1. Country WACC Rates

The second and third questions in appendix one asked the respondent which currency and WACC rate would be used to evaluate a South African project in a multinational context. The following was the reply, "Always in the local currency of the investment using the local WACC rate. It makes it more understandable for local management and avoids questions about what exchange rate assumptions have you used. After the

evaluation, I might translate the final NPV into sterling for reporting to London purposes."

The respondent also added that there might be decisions using multi-currency. He implied that these were not common. In this situation the UK WACC rate would be used, following either of these options:

- If the exchange rate is kept constant for each year of the calculation, use UK inflation assumptions even on the Rand cash flow.
- If South African inflation assumptions for the Rand cash flow is used, then vary the exchange rate accordingly.

The fourth question asked about adjustments made to the cost of capital to reflect risk of investment opportunities in different countries (appendix one). The cost of capital is adjusted to reflect risk of investment opportunity in different countries, which is calculated by the central treasury department. The company WACC rate is adjusted for local inflation and for an assumed 'risk' associated with that market.

The treasurer was asked what adjustments were made to WACC to reflect risk of investment opportunities in different countries (appendix two). The following was the reply, "Each country is assigned a WACC rate. These country specific rates are calculations based on country risk premiums and inflation. Country risk premium is derived from target country government bond spreads to US treasuries. Inflation

differential to the UK is used to estimate a long term borrowing rate for the target country," (appendix two).

The respondent went on to explain that each country is assigned a WACC rate, as in appendix three. The following is an explanation (appendix three) provided by the respondent. The need for individual currency WACC rate arises from the fact that interest rates vary from one country to another and that investing in certain countries carries more risk than investing in other countries. To determine individual country WACC rates, the treasury department of 'PLC' determines long-term interest rates and the level of risk undertaken by investing in that country (i.e. the sovereign risk). In the analysis that follows frequent reference is made to Brazil, a country that is perfect for illustration purposes due to wide variations in the macroeconomic variables, especially inflation prevalent in the economy.

The following paragraphs explain how the cost of capital at "PLC" is adjusted for projects in foreign countries where a home WACC rate is adjusted to form a local WACC rate. At the end of the following paragraphs best practice will be analysed followed by an analysis of "PLC" practice against best practice.

6.3.1.1. Determining Long-term Interest Rates

Appendix three explains how a long term borrowing rate for a target country is calculated as follows. For most currencies long-term interest rates do not exist therefore

the company uses another measure to determine the long-term cost of borrowing. The respondent maintains that as inflation is generally regarded as the best indicator of long-term interest rates, inflation differentials to the UK are used to calculate implied long-term interest rate in individual countries. The long-term implied interest rate for the rand is calculated by adding the difference between the inflation in South Africa and the UK to the long-term Sterling rates.

The respondent went on to explain that the methodology used in calculating inflation rates is based on an approach that combines the historical rates with a forecast for the next two years. The historical rates and the forecast rates are averaged with weighting of one third and two thirds respectively. These averages are then assigned to inflation bands (appendix three).

INFLATION BANDS

Description	Lower	Upper	Assumed
Deflationary		1.00%	0.50%
Low Inflation	1.00%	2.00%	1.50%
US Parity	2.00%	3.00%	2.50%
UK Parity	3.00%	4.00%	3.50%
Moderate Inflation	4.00%	6.00%	5.00%
Inflationary	6.00%	10.00%	8.00%

High Inflation	10.00%	25.00%	12.00%
Hyper Inflation	25.00%		

Appendix three

The respondent explained that the reason "PLC" used this methodology is to ensure that countries that have not demonstrated a history of sustainable economic growth rates with low inflation are not assigned too low levels of inflation as a result of future low inflation expectations. For example, although the bank forecast inflation in Brazil to be approximately 5% for the next two years, Brazil is assigned an inflation rate of 12%. This arises from the historical levels of inflation evidence in Brazil. As recent as four years ago the Brazilian economy was plagued by hyperinflation, there is a little evidence that Brazil can sustain low levels of inflation going forward. The combination of historical rates with the forecasts places Brazil in the high inflation band, which is assigned a rate of 12%. The UK inflation is 3.5%, and average inflation in South Africa is assumed to be 5%, therefore the inflation differential for South Africa is 2.5%. South Africa is assumed to be in the moderate inflationary band (appendix three).

6.3.1.2. Determining Sovereign Risk

Appendix three explains how sovereign risk is calculated. The respondent says that the methodology in calculating sovereign risk is based on credit ratings assigned by the

rating agencies, such as Standard and Poors. These ratings are then compared to spreads between the US dollar denominated bonds issued by these governments against similar maturity US government bonds. The spread is the incremental return expected by the investors to compensate for the additional risk inherent in investing in that country. The respondent goes on to say that comparing the spreads enables them to account for additional risk premium assessed by the financial markets in that country.

Brazil for example, is assigned a credit rating of BB-by the rating agencies.

SOVEREIGN RISK RATINGS (From lowest to highest)

Rating	Implied Risk %
AAA	0
AA+	0.25
AA	0.25
AA-	0.50
A+	1.00
A	1.00
A-	1.00
BBB+	1.00
BBB	2.00
BBB-	2.00
BB+	2.00
BB	3.00

BB-	4.00
B+	4.00
B	4.00
B-	5.00

Appendix three

The treasurer goes on to explain that a rating of BB- implies a sovereign risk premium of approximately 4%. Again Brazil is used as an example and the recent turmoil in the financial markets caused by the spreads between dollar dominated bonds issued by the Brazilian government and similar maturity US government bonds increase to over 8%. To balance between the long-term view of the rating agencies and the short-term view of the financial markets, a sovereign risk of 6% is assigned to Brazil. South Africa is assigned a sovereign risk of 3%.

Illustration three: South African WACC rate

This is my analysis of the workings of the SA WACC rate. As per appendix four, the SA WACC rate is 14%, using a SA inflation rate of 5% and sovereign risk of 3%. This illustration shows clearly how the UK (home country) WACC rate is used as a basis and adjusted to a SA (local) WACC rate for country risk.

Kd = 18% x (5.11% + 1.5% +3%) = 1.91%

Ke = 82% x (11% + 1.5% + 3%) = 12.04%

SA WACC = 14.44%

Rounded down to 14%

1.5% - inflation differential

3% - sovereign risk

The UK WACC rate is 10% and the SA WACC rate is 14%. (Appendix four)

Best practice suggests that the cost of capital be adjusted for projects in foreign countries. The cost of capital may be adjusted by calculating a country beta and a political risk premium. There is a fair amount of controversy surrounding the adjustment of the cost of capital for the country beta. Further research is necessary to confirm whether it is in fact a best practice. Best practice also suggests that a multinational company can adopt one of two approaches in evaluating an investment across borders: A) Cash flows in a local currency at forward exchange rates and discount them at the home cost of capital with which to discount local currency and B) translate the NPV at the current spot rate.

"PLC" uses approach 'B' which is perfectly acceptable. In other words, in the multinational context, the practice at 'PLC' to discount local projects with the local WACC rate in the local currency and translate the NPV to the home country at the spot rate, is in line with theory.

The adjustment for country betas is controversial. The country beta adjustment may be warranted if there is capital market segmentation on geographic or currency lines. It seems that the South African and English markets are increasing the pace of integration, therefore one should be careful not to duplicate the risk adjustment in the local WACC calculation.

Country betas capture the effect of market risk of the target country and although 'PLC' does not use country betas to obtain this distinction, a specific country rate is calculated based on country risk premium and inflation.

Country betas are only relevant if the NPV calculation is done by the parent company using home WACC rates, therefore will not apply in the "PLC" context.

The company does account for sovereign risk by adjusting the cost of capital to arrive at a local WACC rate. An implied risk is calculated in conjunction with ratings on each country as specified by the agencies. A word of caution must be expressed in relying solely on rating agencies assessment as there could be bias affecting the assessment and also broad assumptions made by agencies that should be questioned before use.

CHAPTER SEVEN: CONCLUSION (RECOMMENDATIONS)

In summary, in light of the preceding theories and empirical evidence the capital budgeting practices at "PLC" are quite acceptable. This company has experienced high stock price growth and is known to make large capital expenditures. It is evident that 'PLC' uses sophisticated capital budgeting techniques like the NPV and the IRR, however the payback method is used as a primary measure, deviating from practice. The practice at "PLC" is to adjust the IRR, that is, to add on 10% to the WACC rate in order to be acceptable. Any additional adjustments to the IRR should be carefully considered and justified accordingly before projects are accepted or rejected. If the payback method is to be relied upon as a primary measure my suggestion would be to calculate a discounted payback based on cash flows for a more accurate assessment of the viability of the project. Although this will not provide any new information on the viabilility of the project due to the fact that the NPV is calculated as well, it will provide certain users (those that might be tempted to use the payback ratio in isolation) more meaningful information. There might be certain managers who prefer and understand the payback method, therefore a discounted payback will enhance this understanding.

The EVA method is used as a supporting measure and chances are that it will increase in importance if the company continues to use economic profit to gauge business

performance. The company should spend resources to address the shortcomings of the EVA approach and if these weaknesses are ironed out and the method is still acceptable and adds value then managers should be properly trained in the workings of the EVA method to understand the link between capital appraisal and business performance.

The cost of capital is a weighted average cost of capital which is quite acceptable as long as business risk remains constant. The weightings are based on market rates, in accordance with best practice. The net after tax cost of debt and the inclusion of the components making up the total debt value is perfectly in line with best practice. The cost of equity is based on the CAPM methodology which in terms of best practice is theoretically superior to the DCF and the bond-yield-plus-risk-premium approach although the CAPM is criticised for being a single factor model. Further research into a multivariate approach is necessary. Improvements to the beta and market premium estimates as suggested in the previous chapter will certainly enhance the accuracy of the cost of capital estimate.

It is good practice that 'PLC' varies the cost of capital for foreign investments as the empirical evidence suggests that multinational firms show no consistent pattern of foreign investment analysis. Adjustments to the cost of capital for foreign investments include inflation and sovereign risk premiums. Cash flows are discounted by the local WACC rate and translated to the UK at spot exchange rates. This practice is theoretically sound. Perhaps, in addition to the sovereign risk assessment provided by the agencies a

detailed and coherent study of the economy and other investments made by other large firms in the country to be invested in should be performed. Discoveries could be made of key issues resulting in a strength or competitive edge that might otherwise have been considered to be a weakness by the agency (currently two reputable agencies differ in their assessments of South Africa). This will ensure that the cost of capital is not unnecessarily penalised and profitable investments are not ignored in the process.

As Bruner (1999) said our research is a reminder of the old saying that too often in business we measure with a micrometer, mark with a pencil and cut with an axe. Despite the many advances in finance theory, the particular 'axe' available for estimating a company's cost of capital is still a blunt one. The degree of error is 1 to 2 percentage points. Managers should be aware of the margin of error before making important capital decisions.

Finally, while the cost of capital, in association with numerical evaluation techniques provides a basis of evaluation, managers must equip themselves with complete and accurate information of the environment they operate in to make an informed business decision. I concur with management of "PLC" that qualitative factors are just as important and wise business judgement cannot be substituted.

It is evident that "PLC" uses world class practices and much thought and research has gone into the choice of practices it utilizes. No doubt, "PLC" has access to ample resources which lends itself to obtaining sound advice from experts and professionals

and being a market leader has to single-mindedly pursue being at the forefront of world class practices in order to maintain it's competitive edge.

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APPENDIX ONE

To: Finance Director, Rest of World Operations - PLC

PROJECT APPRAISAL TECHNIQUE

CONFIDENTIAL

Please fill in the following questionnaire with regard to the practices in the company to assist the casewriter, G. Bhoora to compile a case study analysis on Capital Budgeting. This information will be treated with the utmost confidence. Please contact G.Bhoora at telephone number 27 31 9105004 should you require any assistance.

Please expand on answers where necessary by inserting text under the relevant area in the Microsoft Word document. I thank you kindly for your participation.

QUESTIONNAIRE

Please cross the correct answer or fill in the blank, where appropriate

1) In appraising divisional investment projects: Which of the following project evaluation techniques do you use. Where a technique is used please indicate whether it is a Primary (P) or Supporting (S) measure and why this technique is used.

	YES	NO	P	S
NPV	Yes		Yes	
IRR	Yes		Yes	
PAYBACK	Yes		Yes	
EVA	Sometimes			Yes
OTHER Profit Impact				Yes

Why is this technique used?

The key techniques for me are NPV, IRR & payback period. These are tried, tested & work! I think each of the three tells you something different. Whilst a company may have certain goals e.g. the payback must be within 4 years or the IRR must be at least the local WACC+10%, the NPV is the only one of the three that gives you the absolute benefit.

EVA shouldn't really be much different from the calculation of NPV & I would be worried if it gave significantly different results. I therefore find it unnecessary. It can also be slightly confusing as it gets shrouded in all the mystery of MFV etc. There is nothing more robust than a straight cash flow & the calculation of the returns on your investment at your required investment rate. Having said that, I have sometimes used an EVA type format of calculation to fit in with company requirements (but this is always a back up to the other three).

I also often look at the profit impact. Whilst this doesn't represent the cash reality of an investment, the company may have concerns around profit targets (e.g. what the City & Financial Investors expect), & so you need to understand this context.

2) If you had to evaluate a South African project, would you do so in Sterling or in Rands?

Always in the local currency of the investment using the local WACC rate. It makes it more understandable for local management & avoids questions about what exchange assumptions have you used (e.g. have you varied them year by year – which you shouldn't!). After the evaluation I might translate the final NPV into Sterling for reporting to London purposes.

The only times I would used another currency is where the project is across more than one market e.g. closing a plant in one country & investing in another.

3) In relation to Question 2, depending on whether you use the home currency or the local currency, would you use a central WACC rate or a South African WACC rate as a discount rate to evaluate the project?

As stated, if I am doing a South African project in Rand you must use the local WACC rate. If you do this, you must also use local inflation assumptions.

If I was translating the cash flows into sterling for a multi currency decision (as mentioned under 2)), then I would use the UK WACC rate. You then have two options:

- If you keep the exchange rate constant for each year of the calculation, then you need to use UK inflation assumptions even on the Rand cash flow.
- If you use S.Africa inflation assumptions for the Rand cash flow, then you need to vary the exchange rate accordingly.

4) Having estimated the company's cost of capital, do you make any further adjustments to the cost of capital to reflect the risk of investment opportunities in different countries?

If so, please describe fully

Absolutely. I normally just take the set assumption calculated by treasury. However the calculation they do is to adjust the company WACC rate for local inflation / strength of the local currency (these are related) & then for an assumed 'risk' associated with that market.

5) Do you use any of the following methods to adjust for stand alone project risk, that is the risk of a project in isolation?

	Y	N
A). Adjustment to cash flow projections	Yes	
B). Adjustments of discount rate		No
C). Sensitivity Analysis	Yes	
D). Other		

If any of the above methods are used, please describe fully.

I do not vary the discount rate, as this would not be acceptable to company guidelines.

However carrying out a sensitivity analysis around key elements & the subsequent impact on the cash flow is imperative. To me this is where a lot of the skill and judgement involved in an investment decision is required &

I often work with several variations of the same model. The output & the assumptions used in a sensitivity analysis are what should be discussed with fellow business partners.

The amount of sensitivity analysis you do if of course related to size, complexity and certainty of the elements within a project.

APPENDIX TWO

To: The Corporate Treasurer PLC

COST OF CAPITAL CALCULATION

CONFIDENTIAL

Please fill in the following questionnaire with regard to the practices in the company to assist the casewriter, G. Bhoora to compile a case study analysis on Capital Budgeting. This information will be treated with the utmost confidence. Please contact G.Bhoora at telephone number 27 31 9105004 should you require any assistance.

Please expand on answers where necessary by inserting text under the relevant area in the Microsoft Word document. I thank you kindly for your participation

QUESTIONNAIRE

Please cross the correct answer or fill in the blank, where appropriate

1. In order to arrive at a final the cost of capital, how do you estimate your before tax cost of debt?

	Y	N
A). Marginal cost		

B). Historic average		
C). Other		

If any of the above methods are used, please describe fully.

To calculate Group WACC we use Group's current cost of debt. To calculate project specific WACC rates we use marginal cost of debt as the project is assumed to be funded with newly raised capital. Group WACC is used to calculate Group's performance while project specific WACC rates are used to evaluate investment proposals.

2. Do you exclude current liabilities when calculating the total value of debt?

Total value of debt is defined as long and short-term borrowings and minority interest.

3. Please explain how a tax rate is calculated to arrive at the after tax cost of debt.

Both Group WACC rate and project specific WACC rates use the Group's marginal tax rate to arrive at the after-tax cost of debt.

4. The CAPM version of the cost of equity has three terms: a risk free-rate, a volatility or beta factor, and a market risk premium. If you do not use CAPM to calculate the cost of equity, please explain why it was not considered?

We use the CAPM methodology.

5. How do you estimate your cost of equity and why is it done this way?

Cost of equity is calculated using the CAPM methodology. Beta is obtained from on-line resources, such as Bloomberg. Market risk premium is assumed to be 5% based on historical data. We use 10-year government bond rate as the risk free rate.

6. When calculating the cost of equity, do you use beta estimates?

Yes.

7. If beta estimates are used, please indicate which method would be used.

	Y	N
A). Published Source (indicate which) Bloomberg	X	
B). Financial advisors estimate		
C). Self calculated		

If self calculated, please explain.

8. What weighting factors do you use in the calculation of WACC?

	Y	N
A). Current debt to market equity		
B). Market debt to market equity	X	
C). Book debt to book equity		
C). Other		

If any of the above methods are used, please describe fully.

Market value of debt is defined as long and short-term liabilities and minority interest. Market value of equity is defined as total market capitalisation. Market value of debt + market value of equity = enterprise value.

9. Having estimated the company's cost of capital, how do you make any further adjustments to reflect the risk of investment opportunities in different countries?

Each country is assigned a WACC rate. These country specific rates are calculated based on country risk premium and inflation. Country risk premium is derived from target country government bond spreads to US treasuries. Inflation differential to the UK is used to estimate a long-term borrowing rate for the target country.

10. Is the cost of capital used for purposes other than project analysis? (For example, to evaluate divisional performance?). If yes, please explain fully.

Cost of capital is used for the following:
To determine Group and country specific economic profit
To evaluate investment opportunities
To determine bonus pay-outs

APPENDIX THREE

COUNTRY WACC RATES

Methodology

The WACC rate represents a company's cost of raising funds. Typically companies raise funds through borrowing or issuing equity, therefore the WACC rate represents the returns expected by the bond holders (i.e. the banks and investors who lend the company money) and the equity holders (i.e. the investors who hold the company's shares). While bondholders assume a default risk, equity holders assume an additional market risk. This additional risk is caused by the fact that while the returns on corporate bonds are stable and largely unaffected by what happens to the market, the returns on equity are dependent on the market conditions. To be compensated for this incremental risk, the equity holders expect a premium on their investment. This is called the market risk premium. The returns expected by the bond and equity holders are largely determined by two factors: interest rates and the amount of risk undertaken.

The need for individual country WACC rates arises from the fact that interest rates vary from one country to another and that investing in certain countries carries more risk than investing in other countries. To determine individual country WACC rates, therefore, we need to determine the long-term interest rates and the level of risk undertaken by investing in that country (i.e. the sovereign risk).

Determining Long-Term Interest Rates

For most currencies long-term interest rates do not exist therefore another measure is required to determine the long-term cost of borrowing. As inflation is generally regarded as the best indicator of long-term interest rates, inflation differentials to the UK are used to calculate implied long-term interest rates in individual countries. In other words, the long-term implied interest rate for the Real is calculated by adding the difference between the inflation in Brazil and the UK to the long-term sterling interest rates.

The methodology used in calculating inflation rates is based on an approach that combines historical rates with a forecast for the next two years. The historical rates and the forecast rates are averaged with weighting of one third and two thirds respectively. These averages are then assigned to inflation bands (please refer to the appendix for a list of the inflation bands). This methodology ensures that countries that have not demonstrated a history of sustainable economic growth with low inflation are not assigned too low levels of inflation as a result of future low inflation expectations.

For example, although the banks forecast inflation in Brazil to be approximately 5% for the next two years, Brazil is assigned an inflation rate of 12%. This arises from the historical levels of inflation evidenced in Brazil. As recent as four years ago the Brazilian economy was plagued by hyperinflation, hence there is little evidence that Brazil can sustain low levels of inflation going forward. The combination of historical rates with the forecasts places Brazil in the high inflation

band, which is assigned a rate of 12%. The UK inflation is 3.5%, which results in an inflation differential for Brazil of 8.5%.

Determining Sovereign Risk

The methodology in calculating sovereign risk is based on credit ratings assigned by the rating agencies, such as Standard & Poors. These ratings are then compared to spreads between US dollar denominated bonds issued by these governments against similar maturity US government bonds. The spread is the incremental return expected by the investors to compensate for the additional risk inherent in investing in that country. Therefore comparing the spreads enables us to account for additional risk premium assessed by the financial markets on that country.

Brazil is assigned a credit rating of BB- by the rating agencies (please refer to appendix II for a list of credit ratings). A rating of BB- implies a sovereign risk premium of approximately 4%. However, the recent turmoil in the financial markets caused the spreads between dollar denominated bonds issued by the Brazilian government and similar maturity US government bonds to increase to over 8%. To balance between the long-term view of the rating agencies and the short-term view of the financial markets, a sovereign risk of 6% is assigned to Brazil.

Putting It All Together

The WACC rate for Brazil is then derived from the UK WACC as follows:

WACC UK = 18% x (1 – Tax Rate[1]) x 5-Year UK Interest Rate[2]
+ 82% x (10-Year UK Interest Rate + Market Risk Premium)

In this equation, the first line gives the cost of debt while the second line gives the cost of equity. These are then weighted based on 'PLC's capital structure (PLC is financed 18% by debt and 82% by equity). The incremental return the equity holders expect over bondholders, the risk premium, is assumed to be 5%. This is the amount the market returns have historically exceeded the interest rates. The equation then becomes:

UK WACC = 18% x 73% x 7% + 82% x (6% + 5%) = 10%

From this, we can calculate the WACC rate for Brazil:

Brazil WACC = 18% x 73% x (7% + Inflation Differential[3] + Sovereign Risk)
+ 82% x (6% + Inflation Differential + Sovereign Risk + 5%)

This equation then becomes:

Brazil WACC = 18% x 73% x (7% + 8.5% + 6%) + 82% x (6% + 8.5% + 6% + 5%) = 23.5%

[1] PLC's imputed effective tax rate is 27%. The tax rate is used to adjust the cost of debt which is tax deductible.
[2] Including PLC's borrowing premium.

Inflation Bands

Description	Lower	Upper	Assumed
Deflationary	1.00%	0.50%	
Low Inflation	1.00%	2.00%	1.50%
US Parity	2.00%	3.00%	2.50%
UK Parity	3.00%	4.00%	3.50%
Moderate Inflation	4.00%	6.00%	5.00%
Inflationary	6.00%	10.00%	8.00%
High Inflation	10.00%	25.00%	12.00%
Hyperinflation		25.00%	20.00%

Sovereign Risk Ratings

from lowest risk to the highest risk

Rating	Implied Risk
AAA	0%
AA+	0.25%
AA	0.25%
AA-	0.50%
A+	1.00%
A	1.00%

[3] The UK inflation is already built in to the WACC rates. Adding the inflation differential will give the Brazilian inflation.

A-	1.00%
BBB+	1.00%
BBB	2.00%
BBB-	2.00%
BB+	2.00%
BB	3.00%
BB-	4.00%
B+	4.00%
B	4.00%
B-	5.00%

APPENDIX FOUR

F00 Strategic Plan Instructions

Economic Profit Bases Used by 'PLC'

Currency code		Country	Currency	FX					WACC	Inflation	Sovereign risk
				2001	2002	2003	2004	2005			
AED		UAE	Dirham	5.93	5.93	5.93	5.93	5.93	10.0%	2.5%	1.00%
ARS	= USD	Argentina	Peso	1.63	1.63	1.63	1.63	1.63	13.5%	2.5%	4.75%
ATS		Austria	Schilling	19.95	19.81	19.68	19.54	19.40	8.5%	1.5%	0.50%
AUD		Australia	Dollar	2.50	2.48	2.45	2.43	2.40	8.5%	1.5%	0.50%
BBD	= 1.98 x USD	Barbados	Dollar	3.23	3.23	3.23	3.23	3.23	11.0%	2.5%	2.00%
BEF		Belgium	Franc	58.49	58.09	57.69	57.28	56.88	8.0%	1.5%	0.25%
BHD		Bahrain	Dinar	0.60	0.60	0.59	0.59	0.58	11.0%	1.5%	3.00%
BMD	= USD	Bermuda	Dollar	1.63	1.63	1.63	1.63	1.63	11.0%	2.5%	2.00%
BOB		Bolivia	Bolivano	10.27	10.83	11.43	12.05	12.72	18.0%	8.0%	4.00%
BRL		Brazil	Real	3.41	3.60	3.79	4.00	4.22	19.0%	8.0%	5.00%
BSD	= USD	Bahamas	Dollar	1.63	1.63	1.63	1.63	1.63	9.0%	2.5%	1.00%
BWP		Botswana	Pula	8.20	8.98	9.83	10.77	11.79	22.5%	12.0%	5.00%
BZD	= 1.98 x USD	Belize	Dollar	3.23	3.23	3.23	3.23	3.23	11.0%	2.5%	2.00%
CAD		Canada	Dollar	2.37	2.35	2.32	2.30	2.28	8.0%	1.5%	0.25%
CHF		Switzerland	Franc	2.20	2.15	2.11	2.07	2.02	7.0%	0.5%	–
CLP		Chile	Peso	905.55	928.19	951.39	975.17	999.55	12.5%	5.0%	1.50%
CNY		China	Yuan	13.62	13.76	13.90	14.04	14.18	12.0%	3.5%	2.00%
COP		Colombia	Peso	3,498.00	3,830.00	4,194.00	4,592.00	5,028.00	23.5%	12.0%	5.75%
CRC		Costa Rica	Colon	522.96	572.64	627.04	686.61	751.84	21.5%	12.0%	3.75%
CUP	= 23 x USD	Cuba	Peso	37.49	37.49	37.49	37.49	37.49	15.5%	2.5%	7.00%
CYP		Cyprus	Pound	0.89	0.90	0.91	0.92	0.92	10.5%	3.5%	0.50%
CZK		Czech Republic	Koruna	56.80	58.22	59.68	61.17	62.70	12.0%	5.0%	1.00%
DEM		Germany	Mark	2.84	2.82	2.80	2.78	2.76	8.0%	1.5%	–
DKK		Denmark	Krone	10.74	10.74	10.74	10.74	10.74	9.0%	2.5%	0.25%
DOP		Dominican Republic	Peso	27.51	29.03	30.62	32.31	34.09	18.0%	8.0%	4.00%
ECS		Ecuador	Sucre	30,644.00	36,007.00	42,308.00	49,712.00	58,412.00	29.5%	20.0%	4.00%
ESP		Spain	Peseta	241.26	239.60	237.93	236.27	234.60	8.0%	1.5%	0.25%
ETB		Ethiopia	Birr	13.19	13.32	13.46	13.59	13.73	14.5%	3.5%	5.00%
FIM		Finland	Markka	8.62	8.56	8.50	8.44	8.38	8.0%	1.5%	0.25%

FX, WACC, Inflation and Sovereign Risk

Currency code	Country	Currency	FX					WACC	Inflation	Sovereign risk
			2001	2002	2003	2004	2005			
FRF	France	Franc	9.51	9.45	9.38	9.31	9.25	8.0%	1.5%	–
GBP	UK	Pound	1.00	1.00	1.00	1.00	1.00	9.0%	2.5%	–
GHC	Ghana	Cedi	5,498.00	6,460.00	7,591.00	8,919.00	10,480.00	30.5%	20.0%	5.00%
GRD	Greece	Drachma	502.78	507.81	512.89	518.01	523.19	11.0%	3.5%	1.00%
GTQ	Guatemala	Quetzal	13.42	14.16	14.94	15.76	16.62	17.0%	8.0%	3.00%
GYD	Guyana	Dollar	296.96	304.39	312.00	319.80	327.79	16.0%	5.0%	5.00%
HKD	Hong Kong	Dollar	12.70	12.45	12.20	11.95	11.71	8.0%	0.5%	1.00%
HNL	Honduras	Lempira	25.86	28.32	31.01	33.96	37.18	21.0%	12.0%	3.00%
HTG	Haiti	Gourde	30.98	33.92	37.14	40.67	44.54	32.5%	12.0%	15.00%
HUF	Hungary	Forint	399.10	437.01	478.53	523.99	573.77	19.0%	12.0%	1.25%
IDR	Indonesia	Rupiah	12,500.00	13,687.50	14,987.81	16,411.65	17,970.76	26.0%	12.0%	8.25%
IEP	Ireland (Republic of)	Punt	1.14	1.13	1.13	1.12	1.11	8.0%	1.5%	0.25%
ILS	Israel	Shekel	7.78	7.97	8.17	8.38	8.59	12.5%	5.0%	1.25%
INR	India	Rupee	74.46	78.56	82.88	87.44	92.25	19.0%	8.0%	5.00%
IQD	Iraq	Dinar	0.52	0.52	0.53	0.53	0.54	57.5%	3.5%	50.00%
ISK	Iceland	Krona	113.44	112.31	111.19	110.07	108.97	9.0%	1.5%	1.00%
ITL	Italy	Lira	2,808.00	2,788.00	2,769.00	2,750.00	2,730.00	8.0%	1.5%	0.25%
JMD	Jamaica	Dollar	70.77	77.49	84.85	92.92	101.74	21.0%	12.0%	3.00%
JOD	Jordan	Dinar	1.17	1.18	1.20	1.21	1.22	13.5%	3.5%	4.00%
JPY	Japan	Yen	172.78	169.32	165.94	162.62	159.37	7.0%	0.5%	–
KES	Kenya	Shilling	129.49	136.61	144.13	152.05	160.42	19.0%	8.0%	5.00%
KHR	Cambodia	Riel	6,612.00	6,976.00	7,360.00	7,765.00	8,192.00	33.0%	8.0%	20.00%
KRW	South Korea	Won	1,989.00	1,989.00	1,989.00	1,989.00	1,989.00	11.0%	2.5%	2.25%
HYD	= 0.83 x USD	Cayman Islands	Dollar	1.35	1.35	1.35	1.35	1.35	9.5%	2.5%	0.50%
LBP		Lebanon	Pound	2,588.00	2,730.00	2,880.00	3,038.00	3,205.00	18.0%	8.0%	4.00%
LKR		Sri Lanka	Rupee	128.42	140.62	153.98	168.61	184.63	37.0%	12.0%	20.00%
LRD		Liberia	Dollar	70.51	71.21	71.93	72.64	73.37	29.0%	3.5%	20.00%
LUF	= BEF	Luxembourg	Franc	58.49	58.09	57.69	57.28	56.88	8.0%	1.5%	–
LYD		Libya	Dinar	0.75	0.75	0.76	0.77	0.78	29.0%	3.5%	20.00%
MAD		Morocco	Dirham	15.87	16.03	16.19	16.35	16.51	12.5%	3.5%	3.00%
MMK		Myanmar	Kyat	11.97	14.07	16.53	19.42	22.82	44.5%	20.0%	20.00%
MTL		Malta	Lira	0.67	0.67	0.68	0.69	0.69	11.0%	3.5%	1.00%
MUR		Mauritius	Rupee	43.34	45.72	48.24	50.89	53.69	16.0%	8.0%	2.00%
MWK		Malawi	Kwacha	83.41	98.01	115.16	135.32	159.00	29.5%	20.0%	4.00%
MXN		Mexico	Peso	17.14	18.76	20.55	22.50	24.64	21.0%	12.0%	3.25%
MYR	= 3.8 x USD	Malaysia	Ringgit	6.19	6.19	6.19	6.19	6.19	12.5%	2.5%	3.75%
MZM		Mozambique	Metical	24,503.00	26,831.00	29,380.00	32,171.00	35,227.00	22.5%	12.0%	5.00%

FX, WACC, Inflation and Sovereign Risk

Currency code		Country	Currency	FX					WACC	Inflation	Sovereign risk
				2001	2002	2003	2004	2005			
NGN		Nigeria	Naira	170.46	186.65	204.38	223.80	245.06	22.5%	12.0%	5.00%
NLG		Netherlands	Guilder	3.20	3.17	3.15	3.13	3.11	8.0%	1.5%	–
NOK		Norway	Krone	12.56	12.56	12.56	12.56	12.56	9.0%	2.5%	–
NZD		New Zealand	Dollar	3.23	3.20	3.17	3.13	3.10	8.0%	1.5%	0.25%
OMR		Oman	Rial	0.63	0.63	0.63	0.63	0.63	10.0%	2.5%	1.00%
PEN		Peru	Nuevo Sol	5.97	6.30	6.65	7.01	7.40	17.0%	8.0%	3.00%
PHP		Philippines	Peso	69.52	73.35	77.38	81.64	86.13	17.5%	8.0%	3.75%
PLN		Poland	Zloty	7.43	8.14	8.91	9.76	10.68	19.0%	12.0%	1.25%
PTE		Portugal	Escudo	290.70	288.69	286.69	284.68	282.68	8.5%	1.5%	0.50%
PYG		Paraguay	Guarani	5,917.00	6,479.00	7,095.00	7,769.00	8,507.00	22.0%	12.0%	4.00%
ROL		Romania	Leu	32,071.00	37,683.00	44,278.00	52,027.00	61,132.00	32.5%	20.0%	7.00%
RUR		Russia	Rouble	49.53	58.19	68.38	80.34	94.40	57.5%	20.0%	33.75%
SAR		Saudi Arabia	Riyal	6.05	5.99	5.93	5.87	5.81	9.0%	1.5%	1.00%
SCR		Seychelles	Rupee	8.34	8.17	8.01	7.85	7.69	10.0%	0.5%	3.00%
SEK		Sweden	Krona	13.18	12.92	12.66	12.40	12.16	7.0%	0.5%	0.25%
SGD		Singapore	Dollar	2.61	2.55	2.50	2.45	2.40	7.0%	0.5%	–
SIT		Slovenia	Tolar	312.72	329.92	348.07	367.21	387.41	16.0%	8.0%	2.00%
SKK		Slovakia	Koruna	72.39	79.27	86.80	95.04	104.07	23.5%	12.0%	5.75%
SLL		Sierra Leone	Leone	3,359.00	3,678.00	4,027.00	4,410.00	4,829.00	37.0%	12.0%	20.00%
SVC		El Salvador	Colon	15.05	15.88	16.76	17.68	18.65	17.0%	8.0%	3.00%
SZL		Swaziland	Lilangeni	11.09	12.15	13.30	14.56	15.95	22.5%	12.0%	5.00%
THB		Thailand	Baht	64.64	64.64	64.64	64.64	64.64	11.0%	2.5%	2.00%
TND		Tunisia	Dinar	2.00	2.05	2.10	2.15	2.21	13.0%	5.0%	2.00%
TRL		Turkey	Lira	903,002.00	1,061,027.00	1,246,707.00	1,464,881.00	1,721,235.00	30.5%	20.0%	5.25%
TTD		Trinidad & Tobago	Dollar	10.36	10.62	10.89	11.16	11.44	13.0%	5.0%	2.00%
TWD		Taiwan	Dollar	51.04	50.53	50.03	49.53	49.03	8.0%	1.5%	0.25%
TZS		Tanzania	Shilling	1,410.00	1,544.00	1,691.00	1,852.00	2,028.00	22.0%	12.0%	4.00%
UGX		Uganda	Shilling	2,506.00	2,569.00	2,633.00	2,699.00	2,766.00	16.0%	5.0%	5.00%
USD		USA	Dollar	1.63	1.63	1.63	1.63	1.63	9.0%	2.5%	–
UYU		Uruguay	Peso	20.71	22.67	24.83	27.19	29.77	19.0%	12.0%	1.00%
VEB		Venezuela	Bolivar	1,209.00	1,421.00	1,670.00	1,962.00	2,305.00	34.0%	20.0%	9.00%
VND		Vietnam	Dong	23,658.00	23,895.00	24,134.00	24,375.00	24,619.00	14.5%	3.5%	5.00%
XAF	= 655.95 x Euro	Central Africa	Franc	951.13	944.57	938.01	931.45	924.89	16.0%	1.5%	8.50%
XCD	= 2.7 x USD	East Caribbean	Dollar	4.40	4.40	4.40	4.40	4.40		2.5%	
XEU		11 Euro countries	Euro	1.45	1.44	1.43	1.42	1.41		1.5%	
XPF	= 18.18 x FRF	French Polonesia	Franc	172.89	171.80	170.53	169.26	168.17		1.5%	
ZAR		South Africa	Rand	10.92	11.19	11.47	11.76	12.05	14.0%	5.0%	3.00%

FX, WACC, Inflation and Sovereign Risk

Currency code	Country	Currency	FX					WACC	Inflation	Sovereign risk
			2001	2002	2003	2004	2005			
ZWD	Zimbabwe	Dollar	69.44	76.04	83.27	91.18	99.84	22.5%	12.0%	5.00%