

DETERMINATION

Batelco's cost of capital

Batelco's Cost of Capital

A Determination issued by the Telecommunications
Regulatory Authority

9 August 2003

Purpose: Determination on Batelco's Cost of Capital to be used in subsequent calculations for overall operational costs for the provision of services.



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1 Introduction

At the outset of the liberalisation process in the Kingdom of Bahrain, a number of procedures and regulations need to be put in place. These procedures are being created bearing in mind the main objectives of the Regulatory Authority under the Telecommunications Law (Legislative Decree No. 48 of 2002 promulgating the Telecommunications Law, Section 3b), namely

- “1) To protect the interests of subscribers and users in respect of:*
the tariffs charged for services;
the availability and provision of service;
the quality of services; and
the protection of personal particulars and privacy of the services.
- 2) To promote effective and fair competition among new and existing licensed operators.*
- 3) Ensure, when assessing applications involving provision of public telecommunications services, that any applicant or any person to whom any such service falls to be provided, shall be able to provide those services.”*

In order to properly regulate the telecommunications market, in particular circumstances, it is necessary for the TRA to have information relating to the cost of provision of services by licensed operators that are in a dominant position or have significant market power.

1.1 The significance of Cost of Capital

Cost of capital is simply one of the many costs that are incurred by any business. It is less immediately visible and tangible than costs such as wages and operating expenses, but nevertheless exists. In normal circumstances a business must seek to make a return on the capital that is actively employed by the business that is equal to the recurring cost of that capital. This ensures that investors in the business can be properly compensated for the risk that they take for supplying capital to the business. A return that is greater than the cost of capital represents super-profit and is usually associated with some form of monopoly structure in the market, which is not in the best interests of consumers.

Because cost of capital must recognise the expectations of investors, its calculation or measurement must consider factors which are external to the business itself. This can lead to some complexity.

It is often the case that a large business actually comprises several individual business streams that have differing risk profiles and thus different costs of capital.

1.2 The purpose of this document

This document represents a determination following publication of a consultation paper, to which comments have been received from two interested parties, on the derivation of the appropriate Cost of Capital to be used in calculations of the costs of Batelco. This information is particularly necessary when calculating the relevant costs to be included

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when considering Interconnect charges, certain tariffs and other matters that may be applicable to Batelco, as a licensee that may be determined to be in a dominant position or have significant market power. Sections 57 and 58 of the Telecommunications Law, in particular, give rise to the need to consider cost of capital.

The document considers both the methodology to be used in calculating cost of capital and calculations that relate to Batelco.

1.3 Comment by interested parties

A more complete summary of comments received will be found in section 8.

The two organisations that responded agreed with the TRA that the use of the Weighted Average Cost of Capital (WACC) and Capital Asset Pricing Model represented appropriate techniques and measures.

Despite this important extent of agreement, the respondents then applied assumptions and calculations that resulted in very different expressions of WACC. One respondent deriving an overall number of 17.10%, whilst the other derived 7.50%. The equivalent number derived by the TRA is 10.75%

In the circumstances of such a wide disparity, it is the task of the TRA to discriminate between suggested bases of calculation that may represent partisan positioning on the part of respondents and those comments that, on an objective judgement, have fundamental merit.

It will be found that the TRA has accepted the merit of certain arguments but has not accepted the majority of those put forward. The acceptance of certain arguments has given rise to a small adjustment to the numbers put forward in the consultation document.

In order that these changes can be traced, much of the original consultation material is repeated in this determination document.

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2 The determination

2.1 Batelco business streams for which separate costs of capital must be calculated

Section 1.1 has noted that large businesses comprise multiple business streams, which face different risk profiles and thus have differing costs of capital.

The TRA is of the opinion, that in the case of Batelco, at this present time, at least three separate costs of capital should be determined, in order to permit price scrutiny and regulation:

1. Cost of Capital for connection (last mile) network services (Access Network Services)
2. Cost of Capital for core / fixed network services and International facilities and services
3. Cost of Capital for mobile network services

In order to derive multiple costs of capital, the TRA has sought first to derive a cost of capital for Batelco as a single entity. This is subsequently adjusted to reflect the relative 'riskiness' of the separate business streams.

2.2 The determined cost of capital

Access network services	8.40%
Core/fixed network services and International Facilities services	9.63%
Mobile network services	11.77%

TRA has determined that the cost of capital of Batelco as a single entity is 10.75%

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3 Principles underpinning consideration of Cost Of Capital

The cost of capital that a firm faces represents the equilibrium return investors expect from investing in a firm with a specific set of risks.

The risks that an investor faces, in addition to market risks, are influenced by the ratio of debt versus equity that comprises the capital structure of the company.

Debt, by virtue of the fact that it has a higher priority on claims, in the event that a firm goes into bankruptcy, in addition to normally having fixed interest payments, implies a lower risk for lenders than for holders of equity, who face higher levels of uncertainty and lower priority in the event of bankruptcy.

A business accordingly lowers its cost of capital by having a prudent proportion of its capital in the form of debt. The term debt encompasses a range of term liabilities including equipment leases, vendor finance and similar arrangements, in addition to formal instruments such as loans, bonds and derivatives.

Accordingly, in its considerations of the cost of capital of a company such as Batelco it becomes necessary for The TRA to consider matters such as the debt/equity ratio that should apply and the risks and costs that arise from employing the particular mix of debt and equity. These issues are considered within the umbrella of the Weighted Average Cost of Capital (WACC) concept.

As the term suggests it is necessary to determine both the cost of debt and the cost of equity; the latter varies with the level of debt within the capital structure of the company.

In the future, Batelco may, in response to its changed circumstances within its home market, or for other reasons, undertake activities or take actions that give rise to a significant change in its capital structure or in other ways alter the present perception of risk by investors in Batelco. Such actions and activities would influence the cost of capital.

At this time, however, TRA only considers present circumstances and reasonably foreseeable events. Should the cost of capital of Batelco materially change, in the future, TRA will revisit the issues that are the subject of this determination..

3.1 Weighted Average Cost Of Capital

The combined level of return expected represents the combined level of risk between debt and equity, this is known as the weighted average cost of capital (WACC).

The WACC method assumes that the firm has a long-term optimal, constant debt / Equity (D/E) ratio and does not include floatation costs or the effect of subsidized financing.

The WACC method combines the cost of both debt and equity, with a weighting factor applied to each that reflects the debt/equity ratio of the overall business, or of individual business streams:

(a) Estimating the cost of debt is comparatively straightforward. Data tends to be readily available on the rates of return on government debt of varying duration. Data can also be obtained on commercial rates of return.

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(b) However, estimating the cost of equity capital raises more complex issues. Actual, or ex-post, returns to equity can fluctuate substantially from one year to the next.

The issue arises as to whether the company has adopted an appropriate or "optimal" gearing ratio (debt as a proportion of debt and equity). As debt finance can have tax advantages over equity finance (because interest payments, unlike dividends, are normally a tax deductible expense for a company, in jurisdictions where corporate taxation applies), it is possible to reduce the overall cost of capital by switching from equity to debt. Clearly the taxation advantage does not presently apply in Bahrain.

Higher gearing will increase the firm's equity cost (due to increased volatility of equity earnings) but over a certain range this will be more than compensated for by greater reliance on debt finance.

The WACC approach to determining cost of capital is applied by most regulatory authorities around the world.

Sections 4 and 5 of this document consider the principles that apply to deriving the cost of equity and debt, and provide contextual material/data derived from various sources.

Section 6 considers the particular factors that should apply in Bahrain and to Batelco in particular, and puts forward calculations of the cost of capital of Batelco, and business streams within its overall undertaking. The calculations are placed in the context of data supplied in earlier sections

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4 Pricing (Cost) of Equity

There are various methods that can be used to price equity; some are more theoretically strong than others.

Financial assets are acquired for the cash flows expected from owning them. Consequently perceptions of value have to be backed up by reality, which implies that the price paid for any asset should reflect the cash flows it is expected to generate, and the risks involved in undertaking this obligation.

There are five broad approaches to pricing of equity:

1. Relative valuation by which the value of an asset is estimated by looking at the pricing of comparable assets relative to a common variable such as earnings, cash flows, book value;
2. Discounted cash flow valuation, which relates the value of an asset to the present value of expected future cash flows on that asset;
3. Arbitrage pricing theory, allows the actual return $R(i)$ on asset- i to be influenced by a number of market-wide variables or "factors", such as interest rates, exchange rates etc
4. Capital Asset Pricing Model (CAPM), which relates the value of equity to the implied risk investors must bear;
5. Contingent claim valuation, which uses options pricing models to measure the value of assets with share option characteristics.

There is much academic material that explores the relative merits of the methods. This is accordingly not reproduced in this document.

Based on the academic merits, proven track record and availability of data to implement the method, the TRA is of the opinion that the CAPM is the most appropriate method to be used for the calculation of the equity price to be used in Bahrain at present. Use of CAPM is consistent with the recommendations put forward by the European Community for its member states' telecom regulators. Future reviews may consider the adoption of Arbitrage Pricing Theory as a more theoretically robust methodology, however the application of this at present remains difficult.

4.1 Capital Asset Pricing model

The Capital Asset Pricing Model (CAPM) provides a basis for determining a discount rate that reflects the returns required by diversified investors in equities. CAPM recognises that investors are broadly risk averse and seek to limit the impact of exposure to the risks associated with individual businesses by creating a diversified investment portfolio.

The risk faced by an individual business can be broken down as:

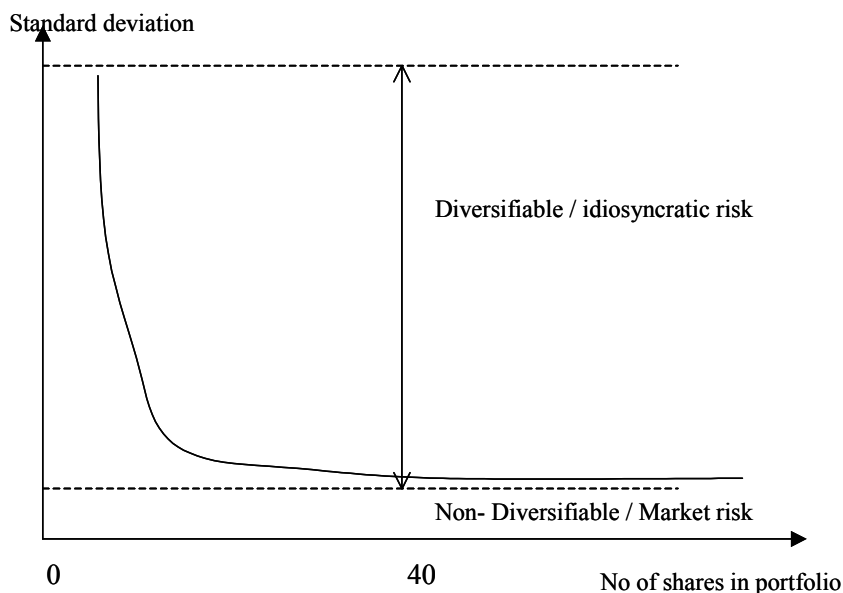
- Project specific risk
- Competitive risk
- Industry specific risk

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- International risk
- Market risk

The diagram below illustrates the impact of reduced volatility on a portfolio by the addition of shares / firms in a portfolio:



CAPM recognises research that suggests that investors require a premium for investing in equities rather than in risk free investments. The premium is commonly known as the market risk premium and notionally represents the premium required to compensate for investment in the equity market in general.

To assess the impact of a particular single investment (share) within a portfolio that itself reflects the overall market risk, it is necessary to consider what is known as the “beta” of that particular investment.

“Beta” represents the contribution of the individual investment (share) to the variance of the market portfolio as a fraction of the total portfolio variance. The value of “beta” thus shows the extent to which the share moves in relation to the market as a whole. A share with a “beta” in excess of one is more variable than the market as a whole and will give rise to a relatively high cost of capital. Shares with a “beta” less than one will tend to move less than the market as a whole and will indicate a relatively low cost of capital.

An implication of the above is that the cost of equity capital only includes those (non-diversifiable) risks that are general market risks. The fact that a company operates in a competitive sector of the market place does not necessarily mean that it will have a high cost of capital: its “beta” may be low.

Estimates of “beta” vary according to the period examined. Betas calculated over a long period can be suspect, because the nature of the firm’s activities may have changed. Shorter horizons may give too much weight to single events, and can result in

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large variation in the cost of capital between reviews because of changes in the estimated beta. Typically 60-month data are used to derive betas, although some analysts also use 36-month data.

It follows from the above that in determining the cost of equity it is necessary to consider:

1. The return that can be obtained from a 'risk free' investment.
2. The return that reflects diversified market risk (equity risk premium, "ERP") i.e. the extra return required by an investor to put his/her money into equities rather than risk free investments
3. The Beta factor for the individual investment (share) under consideration, which determines whether the risk associated with that investment (share) is less or greater than the risk of the market overall.

4.1.1 Risk Free Rate

This is the rate of return available on financial instruments considered to have virtually no possibility of default.

The yield on the 10-year government bond is normally chosen to determine this parameter. Long-term bonds have an advantage as a benchmark in that long-bond prices reflect not only today's short-term interest rate, but also future expected interest rates. However, as we wish to get the best proxy for a 'risk-free' rate, it is best to consider an income return rather than a total return, such as the redemption yield of a government bond. As stock markets are always looking forward, yields must equate to anticipated levels of market interest rates. Price changes in bonds are due to unanticipated yield changes. Consequently we should ideally use the 10-year swap interest rate as a proxy for the risk-free rate.

In the UK, between 1987 and the present time the 10-year interest rate on swaps rose to a high of 12% in the late 1980's and have fallen to around 5.5% more recently. The real 10-year UK government bond yield should be equal to the real return global investors would expect on a risk free asset, abstracting from any currency risk. This return (although no formal direct relationship can be established) is ultimately tied to the global economy's real growth potential, which is estimated to be around 2.5%¹. Global investors should also be compensated for expected UK inflation of around 2.2%² and currency risks associated with investing in sterling denominated assets of say 0.5%. The overall risk free in the UK is thus approximately $(2.5+2.2+0.5) = 5.2\%$, which equates to approximately the market expectation of interest rates on 10 year government bonds of 5.5%. In the recent report from the competition commission in the UK on mobile termination, it had agreed nominal risk free rate as of June 2002, to be 5.2%.

It will be seen, in section 6, that this rate provides a useful benchmark when considering parameters that are appropriate to Bahrain.

¹ UK Treasury estimates

² UK Treasury estimates

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4.1.2 The Market Risk (Equity Risk) Premium

The historic Market Risk (ERP) can be measured by comparing the return on equities with the return from risk free investments. The return on equity can be decomposed into a capital gain, representing the price appreciation over the holding period and an income return, i.e. the dividend.

There have been many studies that have attempted to measure the ERP, however the most recent and comprehensive study has been carried out by Dimson, Marsh and Staunton. Their findings have highlighted important data about previous estimates of UK ERP, in some cases revealing that the real UK equity performance was about half the figure estimated previously. The study also goes beyond just the USA and UK markets, which has been the basis of most previous studies.

The study by the London Business School and ABN AMRO derived a historic ERP, based on the geometric mean, of 4.9% based on 101 years of data.

The following table highlights the historic equity risk premium over bonds for various developed countries.

Historic Equity risk premia relative to bonds for various countries, 1900-2000:

Country	Arithmetic mean	Geometric mean	Minimum return	Maximum return	Standard deviation
Australia	8.0	6.3	-30.6	66.3	18.9
Belgium	4.9	3.0	-35.4	74.8	20.4
Canada	6.0	4.5	-36.8	54.7	17.8
Denmark (from 1915)	3.4	2.2	-29.2	70.8	16.7
France	7.1	5.0	-32.7	83.7	21.6
Germany (99 years exc. 1922/23)	9.9	6.7	-64.4	116.9	28.4
Ireland	6.0	4.0	-63.8	83.7	20.4
Italy	8.4	5.0	-39.6	152.2	30.0
Japan	10.4	6.3	-44.2	193.0	33.3
Netherlands	6.7	4.7	-43.9	107.6	21.4
Spain	5.1	3.2	-34.0	69.1	20.2
Sweden	7.7	5.5	-38.3	90.5	22.4
Switzerland (from 1911)	4.2	2.7	-34.4	52.2	17.9
UK	5.6	4.4	-38.0	80.8	16.7
USA	6.9	5.0	-40.8	57.7	19.9

Source: Dimson, Marsh and Staunton (ABN AMRO/LBS)

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The annualised equity risk premium relative to bonds over 101 years was 4.4% for the UK and 5.0% for the USA. Across all 15 countries covered, the cross sectional average risk premium was 4.7%.

This level of ERP is lower than that reported from earlier studies. The following explains why ERP would have been higher in the past:

- There has been productivity and efficiency growth;
- Improvements in management and corporate governance;
- Extensive technological change;
- Stock prices have probably risen because of a fall in the required rate of return due to diminished investment risk;
- International trade and investment flows have increased and the ending of the cold war may have led to a more stable business environment. However recent world events may have replaced the cold war as a destabilising force in international affairs;
- Another factor that may have lowered the required returns by equity investors is that they now have improved opportunities to diversify both domestically and internationally, reducing the volatility historically associated with the financial markets. These factors have contributed to, and are now built into higher stock prices.

Within the telecoms sector, specific recent events may have again changed the risk premium, these would include:

- Increased awareness of the risks associated with untested technologies that would impact the value of future advanced data and 3G services - these revenues may need to be discounted at a higher rate.
- An increase in the proportion of the cost base that is sunk or irreversible leads to an increase in the risk because of likely asymmetry in returns.

Recent events in the telecom industry, in particular overcapacity in the market and substantial gearing for many companies have impacted the reputation of the industry, however other sectors of the economy globally have also suffered, many for alternative reasons, thus the telecoms sector should not be isolated. These other industries include:

- IT sector
- Technology and media sector
- E-business sector
- Financial services sector
- Manufacturing sector

The equity risk premium is considered for an investor with a well-diversified portfolio and thus the impact of the telecoms sector will not be dramatic.

The TRA recognises, that the equity risk premium can vary between country to country and the cross-sectional average figure of 4.7% from the Dimson study may not truly reflect the Bahraini equity market risk premium. The TRA is therefore mindful that it would be appropriate to increase country cross-sectional average.

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The appropriate increase can vary from very little to almost the default premium of Bahrain. However, it must be recognised that Bahrain has a very sophisticated financial system and is considered to be the financial hub of the Middle East and therefore is to a significant extent integrated into the world financial markets.

4.1.3 The Prospective Risk Premium And The Cost Of Capital

The focus so far has been on historic risk premium, however emphasis needs to be placed on the "prospective" risk premium, i.e. the reward investors now require for taking on risk. Where the geometric mean is appropriate for historic results, the arithmetic mean is an appropriate measure for forward looking results, since it presents the mean of all the returns that may possibly occur over the investment holding period.

The historic arithmetic means are influenced by the periods of extreme volatility during the 20th century; periods of extreme hyperinflation etc may not occur in the future. Historic data therefore should be taken with care when trying to determine future risk premia.

More plausible estimates of the expected future arithmetic risk premium will be obtained if we adjust the historic estimates of arithmetic risk premia downwards to reflect today's market view about future equity market volatility levels.

The approach is to take the historic geometric means as given and treat them as unbiased estimates of the future geometric mean. Then recalculate the arithmetic means assuming current projections of early 21st century levels of volatility. Dimson, Marsh and Staunton (ABN AMRO / LBS) have carried out such an exercise.

To convert from a pure historic estimate of the risk premium into a forward-looking projection, we need to reverse – engineer the factors that have driven up stock markets over the last 101 years. These include:

- Unanticipated growth in cash flows
- Gain from falls in the required risk premium

Dimson, Marsh and Staunton (ABN AMRO / LBS) provide the following table:

Estimates of ex ante risk premia based on ex post premia:

Risk Premium Vs Bills	UK	US	Index of 15 countries
Historic risk premium (1900-2000)	4.7*	5.6	6.1**
Less unanticipated dividend growth	1.7	0.1	1.3
Less fall in required risk premium	0.6	1.4	1.3
Expected geometric – mean risk premium	2.4	4.0	3.4
Approx expected arithmetic – mean risk premium	3.5	5.0	4.5

* Risk premium calculated relative to return on UK treasury bills

** Risk premium calculated relative to return on US treasury bills

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For a full account of the derivation of these assumptions, readers are requested to read the Dimson and Marsh study.

These estimates of prospective equity risk premium have been used by the Competition Commission in the UK, for their investigation of mobile termination charges in the UK.

Again the data is used to benchmark the Bahrain position represented in section 6.

4.1.4 Beta Factors And Debt/Equity Mix

The beta should be calculated using rolling daily/monthly data measured over a period of say 5 years. However, historic beta may not give an accurate measure of the current level of risk in the telecoms sector. The table below highlights the Beta (Levered and Unlevered) for a range of companies in the telecommunications industry:

Estimates of Beta for worldwide telecommunications companies (~Q4 2002):

	Equity Beta	Unlevered Beta
Europe		
British Telecom (UK)	0.68	0.31
Cable and Wireless (UK)	1.16	0.47
Vodafone (UK)	0.99	0.87
Kingston Comm (UK)	0.80	0.58
Deutsche Telecom (Ger)	0.98	0.36
Telefonica (Spain)	0.98	0.36
Telecom Italia	1.04	0.52
Swisscom	0.54	0.45
USA		
AT&T Corp	0.83	0.48
Sprint Corp	1.23	0.90
Bell South Corp	0.77	0.59
Bell Canada Int	1.37	0.08
SBC	0.72	0.59
AsiaPac		
Telecom NZ (NZ)	0.82	0.55
Telecom de Chile	1.21	0.62
Telefonos de Mexico	1.12	0.84

The above table lists primarily incumbent operators globally and we may draw a conclusion that incumbent telecom operators tend to have a beta that is lower than the

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market. It is also assumed to be lower than that of new carriers – who have a shorter trading history and tend to have higher associated risks.

The historical beta of each comparable company is also inextricably linked to the gearing level of that company. The selection of the appropriate debt/equity ratio involves perhaps the most subjectivity of discount rate selection analysis. The tax deductibility of the cost of debt, in most jurisdictions, means that the higher the proportion of debt the lower the WACC, although this would be offset, at least in part, by an increase in the beta factor as leverage increases. The debt /equity mix selected should be consistent with the level implicit in the measurement of the beta factor.

4.1.5 Weighted Average Cost Of Capital and Parentage

The Weighted Average Cost of Capital (WACC) of a company may be influenced by the leverage of its owners or parents. The following table highlights the WACC and corresponding government ownership for a range of telecom companies globally. This table is shown to determine if this relationship can be observed in practice and if some adjustment needs to be made in calculating the cost of capital of Batelco.

Approximate WACC rates and government ownership for selected telecom operators:

Note: this is only an illustration to examine any empirical relationship between WACC and government ownership – it does not serve as a benchmark for WACCs in other countries.

Rank		WACC	Government Ownership
1	Telmex	15.7	0.0%
2	Qwest	15.7	0.0%
3	Worldcom	13.5	0.0%
4	Vodafone	13.3	0.0%
5	France Telecom	13.0	63.6%
6	Telecom Italia	11.9	3.46%
7	British Telecom	11.9	0.2%
8	Deutsche Telekom	11.7	58.2%
9	Bell Canada	11.7	0.0%
10	SBC	10.8	0.0%
11	Sprint	10.1	0.0%
12	Telefonica	9.9	0.0%
13	AT&T	9.8	0.0%
14	Verizon	8.7	0.0%
15	BellSouth	8.6	0.0%
16	Telstra	8.2	50.1%

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17	NTT	7.9	53.2%
18	KPN	7.5	43.0%
19	Eircom	7.4	1.1%
20	Telecom New Zealand	7.2	0.0%
	Average	10.7	

Source: Capital subsidies, profit maximisation, and acquisitions by partially privatised telecommunications Carriers, J Gregory Sidak, January 2001

The data does not provide sufficient evidence that a firm with partial government ownership might de facto have access to subsidised capital to justify an adjustment to calculations associated with Batelco.

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5 Pricing Debt

The value of a particular issue of corporate debt depends essentially on three items: (1) the required rate of return on riskless (in terms of default) debt (e.g., government bonds or the very high grade corporate bonds); (2) the various provision and restrictions contained in the debt covenants (e.g., maturity date, coupon rate, call terms, seniority in the event of default, etc.); (3) the probability that the firm will be unable to satisfy some or all of the indenture requirements (i.e., the probability of default).

However in practice, estimating the cost of debt is comparatively straightforward, as data is readily available on the rates of return on government debt of varying duration. Data can also be obtained on commercial rates of return in various countries for various companies of different size and industry.

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6 Bahrain Particular Adjustment Factors For Consideration

There are a number of factors that need to be considered in the determination of cost of capital in the context of Bahrain, which imply adjusting the international best practice data for suitability in Bahrain. These factors include:

- Country risk free rate – which varies depending on economic activity and government monetary policies
- Country risk premium – this may vary depending on the political climate, the size and liquidity of the stock market, together with any particular industry bias in the country and the stock market
- Type of investors in Batelco and their location – this represents the currency risk for a investor investing in Bahraini Dinar dominated equity or debt
- Size and liquidity of the Bahrain stock market – may impact the impact a particular stock has upon the market indices

6.1 Risk Free Rate

Ideally the risk free rate should be in the same currency as the business; Bahraini Dinars.

The risk free rate in Bahrain can be found by examining the issuance of government bonds. The bond markets in the Middle East are still relatively immature and the size of the market reflects this.

There have been a number of bond issuances in Bahrain with various durations of term maturity, with the rate almost always tied to the underlying Libor rate. The following table highlights some of the bond issuances.

Bonds issued in Arab countries:

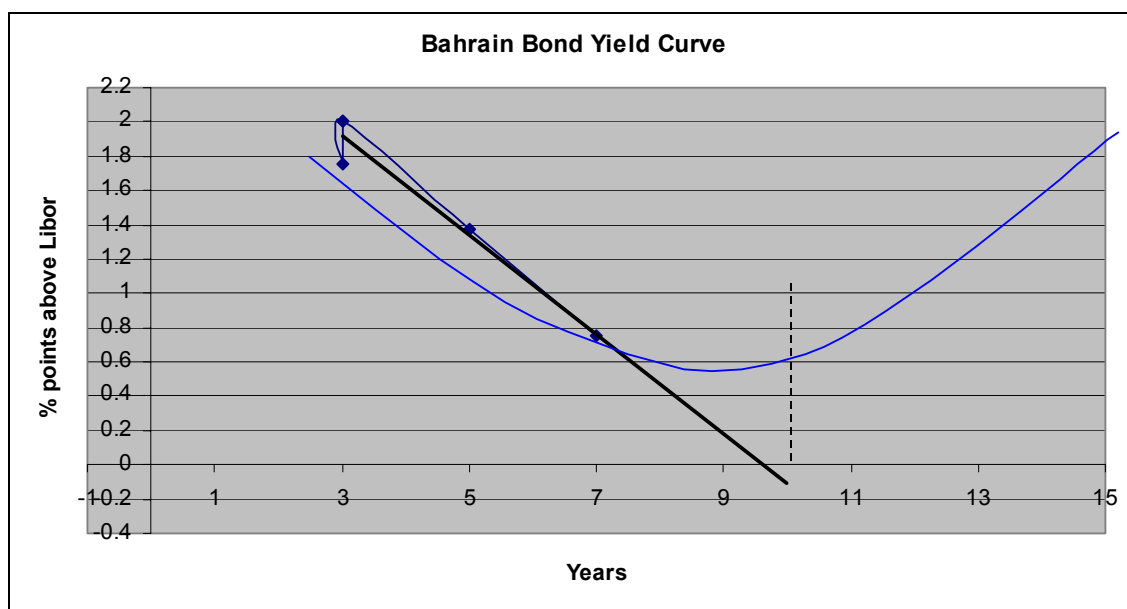
Country	Issuer	Date	Cur	Amount (m)	Maturity	Yields
Bahrain						
	Bahrain Commercial Facilities Company	Jul 94	BD	7	3	Libor +2%
	Aluminium Bahrain	Oct 94	BD	100	7	Libor + 0.75%
	Bahrain International Bank	Sept 95	BD	60	3	Libor +1.75%
	Bahrain International Bank	Jun 96	BD	60	5	Libor + 1.37%

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	Bahrain Commercial Facilities Company	Dec 97	BD	7	3	Libor + 2%
	TOTAL		BD	227		
	US \$ = BD 0.38		\$	597		

Source: Arab Bond Markets – Moving from the embryonic stage to the take off stage

We can derive a 10 year bond yield value from the trend of the line, however it appears that the yield will not continue to be downward sloping and will either flatten out or be humped as is common in many markets.



Assuming that the yield curve will be humped, an approximate 10 year yield is estimated to be Libor + 0.6%. With Libor in Mid 2002, quoted as 1.94%, this equates to a risk free rate of 2.54%. This does not assume any currency risk, since the Bahrain Dinar is pegged to the dollar, the currency risk may be minor, and we have assumed this to be 0.5%. There is also a country risk premium that an international investor would see; with a sovereign rating for Bahrain of Ba1, this equates to approx 2.5%. Thus the risk free rate for an international investor, investing in Bahrain, is $(2.54\% + 0.5\% + 2.5\%) = 5.54\%$.

This compares to a UK rate, which is 5.2%. To validate this rate, we can invoke the principles of Uncovered Interest Parity and Purchasing Power Parity. The theory suggests that in the long term (and in perfect markets) the difference between the long-term interest rates of two countries is the difference between the inflation rates of the two countries. Assuming the UK long-term inflation target remains and is achieved, then the long-term Bahrain inflation rate implied is approximately 2.8%, which does not appear to be unreasonable.

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6.2 Market Risk (Equity Risk Premium)

Although there will be subtle differences between each country, we expect the equity risk premium in Bahrain be similar to that of the US and other nations. Assuming volatility to be 15% over the next decade and assuming historic risk premium of Bahrain has resembled that of the other 15 nations in the study conducted by Dimson, Marsh and Staunton (ABN AMRO / LBS), then the appropriate cross-sectional rate is 4.5%. However the reflection of increased uncertainty of the Bahraini equity sector should result in an uplift of the value.

For the reasons outlined in section 4.1.2, the TRA suggests the cross-sectional average ERP be uplifted by between 10% - 20%. This results in an uplift of this rate by 15%. Hence the appropriate equity risk premium for a diversified investor investing in telecom equities within Bahrain is 5.18%.

6.3 Beta and Gearing

Batelco has no/minimal debt and is substantially equity funded. Historically it has been a stable company and forms a large part of the Bahrain stock market (~15%), and as such we would suggest Batelco forms a significant majority of the market holding and would intuitively suggest a beta around "1" before liberalisation commenced.

The effect of liberalisation of the telecom sector solely will impact the volatility of Batelco with respect to the market; however if the other sectors of the economy are also liberalised, then the impact of Batelco on the market indices will be reduced.

Having undertaken analysis of share price data from the Bahrain stock exchange for the exchange and Batelco over a range of periods and data intervals, we have calculated the historic beta for Batelco. Data was obtained from Dow Jones Reuters Business Interactive LLC.

The following table indicates the beta values for Batelco for various data periods:

Batelco's Beta values calculated from historic data points:

Data range and interval periods	Calculated Beta
Daily prices over last six months	0.64
Daily prices over last four years	0.43
Weekly prices over last 5 years	0.61
Monthly prices over last 5 years	0.61

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The TRA is of the view that daily price data may not be most appropriate for Bahrain as the market is still immature and inefficient / illiquid, and any company specific news may not travel to all investors as quickly as daily price analysis would implicitly assume. It is probably more appropriate to use weekly or monthly data. Within this context, Batelco's historic Beta over the past 5 years has been 0.61. Looking at the table further indicates that comparing daily data for the past 6 months, and 4 years, tends to imply that Batelco's Beta has risen, most probably, primarily due to the awareness in the market that the telecoms market was to be liberalised.

Taking account of Batelco's influence on the market and increased riskiness due to the sector being liberalised, we are of the opinion that Batelco's historic Beta of 0.61 be increased upwards, as appears to have already happened in the past 6 months.

We would suggest that the "beta" of Batelco in the near term (over the next 2-3 years) to be in the range 0.85 – 1.25 (average of 1.05). This would allow regulatory risks associated with the liberalisation of the sector to be incorporated within this value of Beta.

Barra's (a leading investment analysis company) predicted beta for Batelco (calculated in Dec 2002), was stated as follows, against

- World index = 0.361
- Local index = 0.927

The Barra position would appear to indicate that the TRA estimate of 1.05 is of the correct order for Beta with respect to the local index, which is commonly used by almost all regulators.

We would expect the company to still remain majority equity funded, however, the elimination of supernormal profits, through the regulatory process, will impact the company's ability to finance itself entirely from profits, and therefore we assume that it may need to issue additional debt (or equity – however this being a relatively expensive option, may be avoided). If we consider the timeframe over the next 2-3 years, under these circumstances we suggest for the purposes of cost of capital calculations, that Batelco will be 95% equity, 5% debt funded, as the company still has substantial cash reserves.

Ideally from an economic perspective, the TRA would suggest the capital structure of the company be "optimal". However, the "Modigliani-Miller Theorem" from where this concept arises is underpinned by the tax advantages of corporate debt, a situation which is currently not applicable in Bahrain.

6.4 Debt Price

The cost of debt is the interest that needs to be offered to raise capital in the form of debt. It should reflect the risk-free interest rate that investors would require for lending their money, adjusted to reward investors for the risk that the borrower will default.

The cost of debt is the market interest the firm has to pay on its borrowing and depends upon the general interest rates, the firm's default premium and possible tax advantages. From a recent report released by the BMA, listing the various money supply data, the Interest rates, were given as:

- Average Inter-bank Interest rate as 1.93% on 27th Mar 2002 (6 month)
- Average Current Interest rate as 1.94% on 27th Mar 2002 (3-6 month)

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- Ave Bus loan interest charged in Q4 2001 was 6.75% for Construction companies, 8.47% for Manufacturing, 5.94% for Trade, and 5.48% for other, with an average of 6.76%.

If we assume Batelco has significant assets in the form of buildings, equipment etc and also allow the company to be classified as a trade company (its retail business), the average of these could be approximated to be the debt rate for Batelco. The average of these two equates to approx. 6.35%. This equates to a debt spread of approximately 80 basis points, which would suggest an S&P rating of the higher value, "AAA" / "AA" – which does not seem unreasonable.

6.5 Batelco "Aggregate" WACC determination

Within the Bahrain environment, Batelco does not pay any direct tax on profits and therefore there are no implications in terms of tax deductibility of debt that would otherwise need to be considered in the WACC calculation.

$$\text{WACC} = 5\% * (6.35\% - \text{cost of debt}) + 95\% * ((5.54 - \text{risk free cost}) + 1.05 - \text{Beta} * 5.18\% - \text{market risk})$$

$$\text{WACC} = 0.32 + 10.4$$

$$\text{WACC} = 10.75\%$$

It will be noted that the 10.75% aggregate WAAC is based on Batelco's current financial situation and a view of short-run profitability and uses a debt equity ratio of 5:95. With the advent of competition it is anticipated that revenue may decrease and capital expenditure may increase. It may be argued that Batelco's D/E ratio will change more dramatically than has been assumed above. However, the time period considered within this consultation is 2-3 years. The TRA feels it appropriate to use the chosen D/E ratio for this period. TRA will, however, consider the actual D/E ratio, or the "optimum" ratio from time to time with a view to a further review of its calculations, should circumstances demand it.

6.6 WACC adjustments for different business divisions

In order to reflect the cost of capital for Batelco's different business streams, as described in section 2, the TRA will use the measurable beta for Batelco as a whole and adjust this to reflect the "relative" differences in risk associated with the different business streams. These adjustments are done by reflecting the relative differences in betas for similar companies operating in the defined sectors and relating these to the observed and measured beta of Batelco as a whole (aggregated beta).

The TRA has collected the beta for telecom companies operating in different service sectors. These have been obtained from Ibbotson, Value Line and various operators. The following table highlights the average industry betas for the various industry sectors:

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Beta for different industry sectors:

FIXED TELECOM OPERATORS	Levered	Unlevered		
	Raw	Raw	Source	Date
European				
British Telecom Group (UK)	0.68	0.31	Value Line Database, Morningstar and Compustat	Sep-02
Kingston Comm (UK)	0.80	0.58	Value Line Database, Morningstar and Compustat	Sep-02
Cable and Wireless (UK)	1.16	0.47	Value Line Database, Morningstar and Compustat	Jan-03
France Telecom (France)	1.24	0.50	Value Line Database, Morningstar and Compustat	Sep-02
Telecom Italia (Italy)	1.04	0.52	Value Line Database, Morningstar and Compustat	Sep-02
Telefonica (Spain)	1.19	0.72	Value Line Database, Morningstar and Compustat	Sep-02
Deutsche Telecom (Germany)	0.98	0.36	Value Line Database, Morningstar and Compustat	Sep-02
KPN (Netherlands)	1.01	0.35	Value Line Database, Morningstar and Compustat	Sep-02
Hungarian Telephone and cable Co	0.66	0.30	Value Line Database, Morningstar and Compustat	Jan-03
Sonera Corp	1.94	0.89	Value Line Database, Morningstar and Compustat	Jan-03
STET Hellas Telecoms	1.50	0.99	Value Line Database, Morningstar and Compustat	Jan-03
Telia AB	0.87	0.74	Value Line Database, Morningstar and Compustat	Sep-02
SwissCom	0.54	0.45	Value Line Database, Morningstar and Compustat	Sep-02
Hellenic Telecom	0.81	0.65	Value Line Database, Morningstar and Compustat	Sep-02
Average >>	1.03	0.56		
USA				
AT&T Corp (USA)	0.83	0.48	Ibbotson	Dec-02
Bell South Corp (USA)	0.77	0.59	Ibbotson	Dec-02
SBC (USA)	0.72	0.59	Ibbotson	Dec-02
Bell Canada International	1.37	0.08	Value Line Database, Morningstar and Compustat	Jan-03
Sprint Corp	1.23	0.90	Value Line Database, Morningstar and Compustat	Jan-03
US LEC Corp	1.02	0.27	Value Line Database, Morningstar and Compustat	Jan-03
Average >>	0.99	0.49		
Asia & South America				
Telecom New Zealand ADR	0.82	0.55	Value Line Database, Morningstar and Compustat	Jan-03
Telecom De Chile ADR	1.21	0.62	Value Line Database, Morningstar and Compustat	Jan-03
Telefonos De Mexico ADR	1.12	0.84	Value Line Database, Morningstar and Compustat	Jan-03
Average >>	1.05	0.67		

MOBILE TELECOM OPERATORS	Levered	Unlevered		
	Raw	Raw	Source	Date
Orange (France)	1.45		Orange as part of input to CC	Sep-02
AT&T Wireless (USA)	1.35	0.97	Value Line Database, Morningstar and Compustat	Jan-03
Vodafone Group (UK)	0.99	0.87	Value Line Database, Morningstar and Compustat	Jan-03
MM02 (UK)	1.22	1.10	O2 as part of input to CC	Sep-02
Verizon (USA)	0.88	0.64	Ibbotson	Dec-02
US Cellular	1.06	0.79	Ibbotson	Dec-02
Western Wireless Corp	1.69	0.91	Ibbotson	Dec-02
Sprint PCS	3.62	0.84	Value Line Database, Morningstar and Compustat	Jan-03
Average >>	1.53	0.87		

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<u>UTILITY COMPANIES</u>	Levered		Unlevered		Date
	Raw		Raw	Source	
Water Group (UK)					
National Grid Transco plc (UK)	0.60		0.29	Value Line Database, Morningstar and Compustat	Sep-02
BAA (UK)	0.88		0.66	Value Line Database, Morningstar and Compustat	Sep-02
British Energy plc (UK)	0.39		0.13	Value Line Database, Morningstar and Compustat	Sep-02
CenterPoint Energy Inc	0.28		0.18	Ibbotson	Dec-02
Enel S.p.A (Italy)	0.73		0.43	Value Line Database, Morningstar and Compustat	Sep-02
Endesa S.A (Spain, USA, Africa)	0.63		0.22	Value Line Database, Morningstar and Compustat	Sep-02
Korea Electric Power Corporation (KEPCO) (Korea)	1.12		0.39	Value Line Database, Morningstar and Compustat	Jan-03
Viridian Group plc (Ireland)	0.48		0.15	Value Line Database, Morningstar and Compustat	Sep-02
Southwest Gas Corp	0.51		0.32	Ibbotson	Dec-02
Edison SPA	0.64		0.06	Value Line Database, Morningstar and Compustat	Sep-02
RWE AG	0.68		0.41	Value Line Database, Morningstar and Compustat	Sep-02
International Power plc	1.00		0.48	Value Line Database, Morningstar and Compustat	Sep-02
Scottish Power	0.82		0.57	Value Line Database, Morningstar and Compustat	Sep-02
Scottish South	0.64		0.54	Value Line Database, Morningstar and Compustat	Sep-02
Centrica plc	0.84		0.73	Value Line Database, Morningstar and Compustat	Sep-02
Vivendi Environment	0.37		0.11	Value Line Database, Morningstar and Compustat	Sep-02
South Staffordshire Water	0.59		0.55	Value Line Database, Morningstar and Compustat	Sep-02
Severn Trent	0.51		0.28	Value Line Database, Morningstar and Compustat	Sep-02
United Utilities	0.57		0.30	Value Line Database, Morningstar and Compustat	Sep-02
Canadian Energy	0.36		0.28	Value Line Database, Morningstar and Compustat	Jan-03
Average >>	0.63		0.33		

<u>ISP / VAS</u>					
Integra SA	1.65		1.38	Value Line Database, Morningstar and Compustat	Sep-02
Medcost SA	0.76		0.69	Value Line Database, Morningstar and Compustat	Sep-02
Adori AG	0.72		0.72	Value Line Database, Morningstar and Compustat	Sep-02
Swissquote Group	0.84		0.84	Value Line Database, Morningstar and Compustat	Sep-02
Aspiro AB	1.76		1.58	Value Line Database, Morningstar and Compustat	Sep-02
Host Europe PLC	0.93		0.77	Value Line Database, Morningstar and Compustat	Sep-02
Liberty Surf	0.92		0.91	Value Line Database, Morningstar and Compustat	Sep-02
Lycos France	0.82		0.82	Value Line Database, Morningstar and Compustat	Sep-02
Wanadoo	1.31		1.30	Value Line Database, Morningstar and Compustat	Sep-02
ForthNet SA	1.00		1.00	Value Line Database, Morningstar and Compustat	Sep-02
Terra Network	1.33		1.32	Value Line Database, Morningstar and Compustat	Sep-02
Jippii Group OYJ	0.88		0.87	Value Line Database, Morningstar and Compustat	Sep-02
Lycos Europe NV	0.84		0.84	Value Line Database, Morningstar and Compustat	Sep-02
EasyNet Group	1.07		0.59	Value Line Database, Morningstar and Compustat	Sep-02
RealNetworks Inc.	1.93		1.93	Value Line Database, Morningstar and Compustat	Jan-03
Vignette Corp	2.54		2.53	Value Line Database, Morningstar and Compustat	Jan-03
Infonet Services Corp	0.25		0.22	Value Line Database, Morningstar and Compustat	Jan-03
Average >>	1.15		1.08		

The data has been sourced from Professor Aswath Damodaran (Damodaran Online) of Stern University, New York, who sources his data from Value Line Database, Morningstar and Compustat.

The companies included within each category represent a wide variety of businesses and the TRA believes form a representative sample for the particular sector. However, the utility sector beta may be an underestimate of the riskiness of Batelco's access business, and the TRA therefore feels it appropriate that the utility beta be uplifted by approximately 20% to more closely resemble a telephone access business.

We have mapped the various sectors to reflect the different business streams of Batelco, as shown below:

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Summary of Unlevered Beta's

Business type	Beta Raw	Beta Levered	Batelco business unit mapping
Utility sector	0.33*1.2 = 0.4	0.42	> <i>Access network services</i>
Incumbents	0.58	0.60	> <i>Core / Fixed network Services</i>
Cellular sector	0.87	0.92	> <i>Mobile Services</i>
VAS/ISP	1.08	1.13	> <i>Unregulated ISP/VAS sectors</i>
Average of aggregated businesses	0.71	0.77	> <i>Batelco as a single entity</i>

The above sector betas are adjusted to Batelco betas by prorating using the relationship between the Batelco aggregate beta of 1.05 and the simple average derived above i.e. 0.77.

Adjusted Beta for Batelco business streams:

Batelco business unit mapping	Beta
<i>Access network services</i>	0.55
<i>Core / Fixed network Services</i>	0.79
<i>Mobile Services</i>	1.21
<i>ISP/VAS Services (not regulated)</i>	1.48
<i>Batelco as a single entity</i>	1.05

Application of these betas results in a different WACC (cost of capital) for the different business units, as follows:

Batelco WACC for different business units:

Batelco business unit mapping	WACC
<i>Access network services</i>	8.40
<i>Core / Fixed network Services</i>	9.63
<i>Mobile Services</i>	11.77
<i>ISP/VAS Services (unregulated)</i>	13.20
<i>Batelco as a single entity</i>	10.75

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7 Review

In a national telecommunications market, such as Bahrain, that is expected to be subject to considerable development and change over the short to medium term, it is appropriate to review the cost of capital calculations in respect of changing conditions in telecoms markets and also in the financial markets, both nationally and internationally.

It is proposed that the cost of capital calculations are reviewed no later than 2 years from the date of the determination. If market circumstances, in the Telecommunications Authority's opinion, suggest that an earlier review would be appropriate, or if a market player or other such interested party should present a compelling case for an earlier review, then the Authority will be prepared to consider undertaking it.

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8 Comments Received

The TRA received two responses to the consultation; one from Batelco and one from MTC Vodafone.

Both respondents agreed to the use of the Weighted Average Cost of Capital (WACC) as a measure of the cost of capital and the use of the Capital Asset Pricing Model (CAPM) as a measure for the cost of equity.

Both disagreed on the WACC calculated by the TRA in the consultation, one suggesting it should be approximately 7.50% and the other suggesting it should be 17.10%.

One respondent disagreed with the principle of calculating separate cost of capitals for the different business streams. The TRA believes that the mean-variance theory would advocate this and for the purposes of the process of regulation that is to be applied in Bahrain this separation is appropriate and essential.

The respondent also suggested that the different business units will have a different capital structure which will effect the cost of capital, and the current method of pro-rating does not reflect this. The TRA believes it is sensible to assume that should the aggregate entity be separated, then the group capital structure be also applied to the individual business units.

One respondent suggested the TRA was confusing the time-period of measurement for the Beta, suggesting a shorter horizon of 24 months of data to be appropriate. The TRA had assumed the long-term in respect of beta was greater than 5 years. Only considering one or two years as the respondent suggested will bring in unacceptable cyclical factors into the beta. Most commercial Beta providers use anything from 36 to 50 months of data. E.G LBS use 50 months of data. The TRA does not believe any reputable provider uses less than 24 months of data.

One of the respondents suggested the use of a single source for Equity risk premium to be inappropriate and suggested the use of an average of a limited sample of data, which included some data based on geometric and some on arithmetic averages.

The other respondent suggested the Dimson and Marsh study to be appropriate.

Most regulators and other practitioners use the international market for equity risk premium, however the key point of consideration is whether the actual shareholders within Batelco can diversify internationally, without significant costs incurred. Indeed there are various sources of data that have attempted to forecast the future equity risk premium. The data quoted by one of the respondents was simply historic equity risk premium. Most previous studies did not have sufficient data points outside the USA to provide a truly international ERP. It is an acknowledged fact that the ERP has been on the decline for some time. A number of academics that quoted higher ERPs in the past have subsequently acknowledged that they may have used a higher ERP than would be expected.

For historic data on ERP, it has generally been accepted that the geometric average is the appropriate measurement. The Data the respondent provided, calculated the average using arithmetic averages in some cases.

The most recent and comprehensive study of the ERP has been conducted by Dimson and Marsh of LBS. It is generally regarded as the most relevant literature currently.

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This is what the competition commission in the UK now uses and is what the TRA has used.

Another respondent claimed that the TRA is adding sector specific risk to the ERP, which is a deviation from the theory. The TRA accepts the true CAPM should exclude all diversifiable risks, however there are major assumptions that are used in the CAPM, such that it has been found to have some short comings:

- Small firm effect
- Value effects
- Neglected firm effect
- Overreaction
- January effect
- Monday effect

and others. It also assumes that investors hold the market portfolio, and are truly diversified, by industry and geography. To see if these assumptions hold, one would need to look at Batelco's shareholders and their portfolios. This is not possible, but suffice it to say that a significant portion is held by the Bahrain government and also by the Bahraini population (either directly or through some financial instrument like a pension).

The ERP can vary by country, and where the stock market is thin and not mature the ERP can be slightly higher. By using the international ERP, we would be underestimating the true ERP for the majority of Batelco's shareholders. Hence the addition of the uplift, although wrong to originally call this industry specific risk, is still appropriate for the Bahraini stock risk.

One respondent suggested the risk free rate should be the world risk free rate (indicating either US or UK) with the addition of country risk. They highlighted OFTA as being one regulator that uses this approach. The TRA research suggests the consultants who prepared the report for OFTA actually provided a comparison between the local market and the international market, suggesting that local risk-free rate was around 7.6% whilst international risk free rate of the order of 4.0%. The consultants did not put forward the most appropriate cost of capital, either local or international, but suggested a range between the two.

In practice there is not a true risk free rate, the Treasury bill is used as a proxy for this. In practice it is difficult to find forward-looking treasury bills, hence we use government bonds as yet another proxy. Ideally an index linked gilt bond should be used, with a duration either of that to the life of an asset, the regulatory period of concern or valuation horizon. There is still debate over what the appropriate period should be, but generally many regulators have accepted 10 years as being appropriate.

The risk free rate should be in the same currency as the business, hence the appropriate bond to use is that denominated in Bahraini Dinars. Other developed countries use USA or UK bond rates, simply because they do not have local bond markets. Bahrain does have a bond market, albeit small.

The TRA understands that a very thin market may distort the returns, as demand will push the price upwards, however, it has checked the appropriateness of the rate, by invoking the principle of uncovered interest parity.

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If the Bahrain yield curve is used, then some element of specific risk can be included. These generally, include sovereign risk, unanticipated inflation or currency risk. Ideally, one would like to leave the CAPM in its pure form, by adjusting the company revenues to account for these risks, but clearly this is not possible here. Hence the addition of 2.5% sovereign risk. Since most international investors hold portfolios that are primarily dollar or sterling dominated, there is a currency risk that should be included. Hence the addition of 0.5% currency risks.

If as one respondent quotes, the US dollar yield rate is used, then there will be no sovereign risk or currency risk, and the risk rate would be 5.99%, based on historic averages as they quote. However forward looking 10 year US treasury notes are quoted as being approximately 3.32%, as of June 2003. The respondent claimed the current low yields on bonds are not representative in that they reflect extraordinary circumstances currently faced by the world economy in terms of conflict in the Middle East and recent precipitate fall in world stock averages. However, it is clear that the war in Iraq has ceased for a number of months, and any rebound in yields would have taken effect on the quoted yields by now.

Another respondent claimed the risk free rate is not directly related to the growth of the economy. The TRA accepts this and did not intend in making a direct relationship. However indirectly the longer-term risk free return will always be related to the longer-term growth of the economy and the inflation. The TRA quoted actual bond yields and quoted the economy growth and inflation to illustrate the relationship holds. The respondent also claimed it is wrong to add sovereign and currency risk. It claimed the TRA has added these risks to the growth of the global economy. This was not intended and in fact was not done. There are no additions in the USA or UK, because, these countries generally have AAA ratings and because most investors within these countries hold their portfolios in dollar and sterling, there is no currency risk. The respondent also claimed that currency risk and sovereign risk are incorporated in the debt spread, the TRA believes this is to be a false statement.

Both respondents agreed the debt spread commonly used by regulators tends to be approximately 80 to 120 basis points.

One respondent disagreed with the beta of 1.05 and proposed, that the asset beta lies between 0.75 and 0.80 from its sample. The TRA suggests the sample provided was too small and little value can be gained by simply looking at static betas. They also disagreed with using the local exchange. The TRA believes it is right to use the local exchange and this is common practice by other regulators. Generally it has been accepted due to the rise of the Information, Communication and Technology (ICT) sector prices in the bubble of 1999/2000, the ICT company betas were artificially low as these companies represented a majority of the exchange in some cases in excess of 50%. In reality, in the long term, the ICT sector normally represents around 25% of the stock market, and this is what is being seen now. The historic betas calculated over the past 3 to 5 years will therefore need to be revised upwards to reflect the true risk. The respondent suggested that mobile equity betas are now lower than fixed line betas, this statement, however, hides some factors that should not be ignored. The lower betas are for mobile operators that are geographically diverse, something the fixed sector may not be able to achieve easily, also these are for countries where the mobile market is approaching saturation and maturity, clearly not the case in Bahrain.

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One respondent suggested the TRA has used excess cash and status quo debt levels as the rationale for the assumed leverage levels of 5% debt. The respondent suggested these assumptions be changed, and that the TRA adopt an efficient capital structure.

The TRA agrees that ideally an optimal capital structure should be used, which in theory because of the tax advantages of debt, will suggest significant debt is carried to lower the overall WACC. Bahrain does not have these tax advantages, nevertheless debt is always a lower cost than equity. However the balance is clearly the corresponding impact increasing debt has on the cost of equity. Increasing levels of debt, make the volatility of equity earnings higher and therefore using the mean-variance argument should be rewarded higher.

Regulators do not normally allow inefficient capital structure costs to be passed onto competitors. However the debt advantages are not present in Bahrain. The TRA is therefore of the opinion that although there will be an optimal capital structure which may have higher levels of debt than the 5% used currently, the current level of 5% is appropriate for the relatively short period under review.

One respondent claimed the TRA is using an asset beta index and applying it to Batelco's equity beta. This was true, and the TRA accepts it should have uplifted the separate asset betas for the different business streams to reflect the 5% debt assumption. This has now been done, however because of the use of ratios there is no impact on the actual WACCs.

One respondent claimed it was discontented with the sample utility companies, and that because of an access deficit it was unfair to compare the access network to a utility network. The TRA believes the access network is a monopoly distribution network, similar in nature to gas, electricity or water distribution companies. The TRA is yet to be convinced of the size of the access deficit. Nevertheless, for the purposes of regulation, the time horizon we have chosen is 10 years. Clearly, this access deficit will be quickly eroded once price rebalancing commences and therefore the access deficit is not relevant in the discussion. Also, under the mean variance theory, it is the volatility with respect to the "market", which is of importance. The presence of an access deficit may not increase the volatility with respect to the "market".

Unfortunately there are no direct comparable access distributor companies, and therefore the sample chosen, reflects a broad view of gas, electricity and gas distributors. The sample covers USA, Europe and Asia, and therefore is broad. If there were possible Middle-East companies, the TRA would quite happily include these. The TRA however accepts it may be underestimating the access business beta, without directly comparable data and reliance on data for gas/electricity and water utilities. The TRA has therefore accepted the respondents suggestion that the beta be uplifted by approx 20%.

One respondent suggested the TRA was not coherent, in fact, although the TRA evidently lists a number of operators (section 4.1.5), which relate to fixed line businesses and their WACC rates to give an average of approximately 11%, whilst on the other hand, the TRA unfairly suggests a rate of around 9.7% for Batelco's core / fixed network services. The TRA would suggest that the table provided in section 4.1.5 was simply to understand any linkage between WACC and government ownership. Nevertheless, if the respondent had only taken the average of national fixed operators, (excluding, Qwest, Worldcom, Vodafone), the average is in fact closer to 10.1%. Also the TRA suggests recalculation of these WACCs with current expectations of risk-free rates and risk premiums, would result in the average being lower.