



**FINAL DETERMINATION ON:**  
***THE COST OF CAPITAL FOR DESIGNATED  
SMP OPERATORS***

**Final Determination – ECS 23/2009**

Issue Date – 2 November 2009

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# 1. Final Determination

1. Having regard to the matters contained in the Preliminary Determination on the Cost of Capital for Designated SMP Operators Consultation Document (ECS02/2009) issued by the Utilities Regulation and Competition Authority (URCA) on 19th August, 2009; and having regard to the representations and objections received from interested parties as summarised in this document; and having regard to URCA's responses to such representations and objections and URCA's reasoning behind its Final Determination as set out in this document URCA, in exercise of its powers under s. 100(5) of the Communications Act, 2009 ("the Comms Act") hereby issues a Final Determination on the Cost of Capital for Designated SMP Operators
2. This document, upon its issuance, constitutes the formal notice of a Final Determination to Bahamas Telecommunications Company Ltd. (BTC) and Cable Bahamas Ltd. (CBL), for the reasons explained in this document, that the mid-point estimates for the nominal cost of capital in Table 1 below are final and must be used as input to any regulatory measure that requires the inclusion of a reasonable rate of return under s. 40(3)(b) of the Comms Act and for the defined high level markets:

Table 1. URCA's Final Determination on Nominal WACC for SMP Markets/Operators

High Level SMP Markets/Operators	URCA Preliminary Determination	URCA Final Determination
Fixed voice (BTC)	8.9%	10.29%
Mobile voice and mobile data services (BTC)	11.0%	11.71%
High speed data services and connectivity (CBL)	9.3%	10.86%
Pay TV (CBL)	9.6%	10.86%

3. URCA recognizes that setting a rate of return that is too low could make future investment unattractive to investors. Setting the rate of return too high would allow the regulated entity to earn excessive returns at the expense of its wholesale and retail customers while also potentially distorting pricing signals to investors. URCA is satisfied that the overall approach to estimating the final nominal WACC for the two SMP operators is consistent with providing investment incentives to existing and emerging operators and strikes a reasonable balance between URCA's estimation of the WACC as set out in its Preliminary Determination and the proposed WACC put forward by interested parties.
4. This Final Determination will be reviewed by URCA when URCA determines that market conditions warrant it. Additionally, this Final Determination is made without prejudice to URCA's powers under the Comms Act, the outcome of any ongoing or future consultation, and any regulatory or other measures carried out or issued by URCA pursuant to such powers.

## 2. Introduction to consultation

5. On 19<sup>th</sup> August, 2009, URCA published its Preliminary Determination (the Consultation) on the nominal Weighted Average Cost of Capital (WACC) associated with the activities of certain electronic communications licensees in the Commonwealth of The Bahamas, and solicited views on its proposals from licensees and other interested parties.
6. The cost of capital is typically used as a key input into any cost models used to set cost oriented rates (interconnect/wholesale), retail price regulation frameworks (e.g. price caps), and in the assessment of regulatory accounts. The objective of setting the WACC is to allow a sufficient return to investors that provides adequate incentives for investment and spurs innovation in electronic communications infrastructure and services. As such, an appropriate rate of return on capital employed is a very important element in the regulatory process.
7. The licensees to whom the relevant cost of capital will apply are BTC and CBL.
8. Following a six week consultation from 19<sup>th</sup> August, 2009 to 1<sup>st</sup> October, 2009, and based on responses from two operators (BTC and CBL), this document presents URCA's Final Determination, including a discussion of the substantive comments raised by the industry and URCA's further comments and policy views. All views of respondents have been taken into account when arriving at the Final Determination in relation to the appropriate rate of return for BTC and CBL.
9. URCA wishes to thank respondents for their participation in the public consultation process. The quality of submissions was high and URCA appreciates the input received and believes that the Final Determination reflects the strength of the responses.
10. Copies of this document may be downloaded from URCA's web site at [www.urbahamas.bs](http://www.urbahamas.bs).

### 2.1 Background to consultation

11. In accordance with s.4 of the Comms Act the electronic communications sector policy in The Bahamas has as its main objectives the furtherance of the interests of consumers and persons in The Bahamas in relation to the electronic communications sector. This involves the need to:
  - improve both the quality and the price of the electronic communications services used by all persons in The Bahamas; and
  - encourage and safeguard future investment in the sector.
12. Section 116 and Schedule 4 of the Comms Act specify that BTC is subject to an interim presumption of significant market power (SMP) in the following markets:
  - the provision of fixed voice services; and
  - the provision of mobile voice and mobile data services.and that CBL is presumed to have SMP in the following markets:
  - the provision of pay TV services; and
  - the provision of high-speed data services and connectivity.
13. Where a presumption of SMP applies under s. 116, each licensee in each high level market where they have SMP is subject to obligations designed to maintain, encourage and promote sustainable

competition. Additionally, so long as a licensee is presumed to have SMP, it will be unable to engage in the provision of any electronic communications networks or carriage services that it is not already licensed to provide when the Comms Act comes into force until URCA has confirmed the licensee's compliance with any SMP obligations imposed on it.

14. These ex-ante SMP obligations may include, but are not limited to, imposing price controls on services offered by SMP licensees in the high level markets in which they have SMP and/or requiring the licensees to set prices for those services equal to cost.
15. An essential ingredient in economic regulation and in setting price controls and/or cost oriented prices in particular, is the cost of capital. Under s. 40(3)(b) of the Comms Act URCA, prior to imposing conditions on SMP licensees shall:

*"take into account the investment made by the relevant licensee and allow the licensee a reasonable rate of return on capital efficiently employed, taking into account the risks involved."*

16. As explained in Section 3, the cost of capital is a genuine cost incurred by companies when doing business. Cost oriented regulatory pricing must, in expectations, provide businesses with a sufficiently reasonable rate of return to cover the cost of capital.
17. The subject of this document is to determine a reasonable rate of return (i.e., the cost of capital) for BTC and CBL.

## **2.2 General comments**

18. In responding to this consultation, CBL argued that the consultation on the types of obligations on CBL under s. 116(3) of the Comms Act commenced on 1st October, 2009, prejudiced its ability to submit properly on the Preliminary Determination on the Cost of Capital. CBL also sought clarification from URCA on the following:
  - the markets in which CBL is presumed to be an SMP operator; and
  - whether the SMP designation in s. 116 of the Comms Act only relates to retail services.
19. In addition, CBL suggested that if URCA cannot reverse CBL's SMP designation then URCA should regulate (CBL) only in a very light-handed manner.
20. URCA believes that to carry out a separate and early consultation on the cost of capital in the form of this WACC consultation allowed both BTC and CBL to give attention on the very important issues surrounding a proper determination of the cost of capital. To the extent that all or some SMP obligations being consulted on as part of the separate consultation on Types of Obligations to be imposed on CBL (ECS19/2009), or indeed on BTC (ECS18/2009) are implemented, there will be a need to use a WACC estimate. To the extent that there are no SMP obligations that need a WACC estimate, the WACC would not be applied.
21. In any event, both CBL and BTC were given an opportunity to provide further submissions. Thus, following the 1<sup>st</sup> October, 2009 deadline for responses, CBL and BTC submitted supplementary submissions and data to URCA. In response to the submissions by the two operators, URCA sought clarification on the methodology and data sources which informed the basis of those submissions. In making its Final Determination on the Cost of Capital for Designated SMP Operators, URCA has reviewed carefully and in detail all submissions by respondents and responses to the requests by URCA for clarification.
22. As regards the clarifications sought by CBL about markets in which it is presumed to be an SMP operator and the services that the SMP designation in s.116 of the Comms Act relates to, CBL is

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invited to consider the details provided in the consultation on the Types of Obligations on CBL (ECS19/2009).

23. As previously noted above, the designation of CBL as an SMP operator is enshrined in the Comms Act. URCA has an obligation to ensure that remedies are efficient and proportionate to their purpose. The cost of capital is used for a number of regulatory obligations which may be imposed on operators with SMP (as well as operators to be subject to other obligations, such as universal service obligations, in some instances); the outcome of the Preliminary Determination on Types of Obligations for SMP Operators is a separate process. URCA considers that the WACC consultation is not the appropriate forum for debate on the SMP obligations.

### 3. Introduction to the cost of capital

24. The cost of capital, like operational and capital expenditure, is a genuine cost of doing business. It is the minimum rate of return necessary to attract capital to an investment.<sup>1</sup> Unless a business's profits can cover the cost of capital, the company will be unable to attract the investment capital it requires. Cost oriented regulatory pricing must provide investors with an expectation of earning a return that is commensurate with the cost of capital. The cost of capital has four important characteristics:
- a. It reflects the **risk** of the investment. It is the expected rate of return for investments with a similar risk profile.<sup>2</sup> The greater the risk associated with the investment, the greater the rate of return investors will require before they agree to finance it, so the greater the cost of capital.
  - b. It reflects the **opportunity cost** of investment. Investors face a variety of investment opportunities, so the expected rate of return on any investment must be sufficient to compensate for the next best investment. Even in a world of perfect certainty, where investors face no risk, money has a time value: a dollar today is worth more than a dollar tomorrow because the former can be put to an economically productive use.
  - c. It is **forward-looking**. Investment returns are uncertain and actual returns may differ from expected returns. The cost of capital is an expected rate of return.
  - d. It is **market-determined**. This means it is determined by the balance between supply and demand for capital.
25. In a regulatory context, the cost of capital may be thought of as a regulated profit margin, or mark-up, over efficient costs.
26. Regulators typically use the cost of capital in two ways. Firstly, it can be used to help identify whether a regulated, or prospectively regulated, business is earning excess economic profits. Since the cost of capital represents the rate of return that compensates investors for the risks and opportunity costs they bear it is a good benchmark of normal (or reasonable) economic profits over the long-run.<sup>3</sup>
27. There are several measures of profit that regulators can compare the cost of capital to, when conducting an assessment of profitability.
28. Conceptually, the best measures are economic measures of profit, such as the internal rate of return (IRR). In the context of a profitability test, the IRR is the rate of return that equates the replacement cost of the company's assets (at the start of the period over which profits are to be assessed) with the present value of net cash flows earned over the assessment period.<sup>4</sup> This measure is the most suitable

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<sup>1</sup> More precisely, it is "the expected rate of return prevailing in capital markets on alternative investments of equivalent risk". See Kolbe, A. L., Read, J. A., Hall, G. R. (1984), *The Cost of Capital: Estimating the Rate of Return for Public Utilities*, MIT: Massachusetts.

<sup>2</sup> The word 'expected' means the probability-weighted rate of return. It does not refer to a 'hoped for' or 'most likely' rate of return.

<sup>3</sup> In competitive markets, a company's profits can exceed or fall below its cost of capital in the short-run. However, if profits *persistently* exceed the cost of capital, existing competitors would be expected to expand, and new rivals to enter, so as to compete profits back down toward the industry cost of capital. If profits were to *persistently* fall below the cost of capital, the company would be unable to continue financing its functions and repaying its investors, and it would eventually be forced to exit the market. Thus, the cost of capital can be thought of as a good long-run competitive benchmark of profitability.

<sup>4</sup> The 'truncated IRR' approach assumes that the business is disposed of at the end of assessment period, so the

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for assessing profitability because, like the cost of capital, it reflects market values and takes into account the opportunity cost of investment. The main difficulties with this approach are:

- obtaining good cash flow data over a long enough period of time to conduct the analysis;
- obtaining suitable market-based valuations of the company's assets; and, where applicable
- determining a sensible allocation of assets specific to the regulated divisions of the business.

29. Alternative measures of profitability used by economic regulators are accounting measures, such as the return on capital employed (ROCE), or the return on equity (ROE). ROCE is usually calculated by dividing the company's earnings before interest and taxation (EBIT) by the capital employed during the relevant time period. ROE is calculated by dividing net earnings after tax by total equity capital employed. Though relatively straightforward to calculate, such measures can be conceptually difficult to apply because they are typically very sensitive to treatments of depreciation and accruals, which can vary over time and across companies.<sup>5,6</sup>
30. Secondly, regulators use the cost of capital to calculate the allowed profits of businesses, which in turn can be used to set cost-oriented tariffs. Allowed profits are typically calculated by multiplying the value of the capital employed in the provision of regulated services by the cost of capital.
31. The cost of capital is a tool used to balance the interests of consumers, access seekers, and regulated businesses. If allowed profits are set too high, then consumers will end up paying too much. If allowed profits are set too low, the firm will be unable to attract sufficient capital to undertake efficient investment. The aim of balancing interests in this way is to maximise welfare to society through gains in economic efficiency.

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terminal cash flow will be the replacement cost of the assets at that time.

<sup>5</sup> For a discussion of techniques for conducting profitability analysis, see OFT (2003), "Assessing Profitability in Competition Policy Analysis", Economic Discussion Paper 6, July, *A report prepared for the Office of Fair Trading by OXERA*. This report primarily focuses on profitability analysis under competition laws, though much of the discussion is transferable to the assessment of profits for regulated companies.

<sup>6</sup> As noted in OFT (2003), the ROCE and ROE can sometimes be adjusted so as to be comparable with the IRR. Though a description of the techniques used to do this is outside the scope of this consultation document, the key point is that in some circumstances adjusted versions of ROCE and ROE may be helpful indicators.



## 4. The Weighted Average Cost of Capital

32. The cost of capital is typically measured using the Weighted Average Cost of Capital (WACC). The WACC takes into account main sources of possible funding for a company, debt and equity, and the relative proportions of these (gearing), in order to determine a (weighted) average cost of capital for the business
33. The WACC can be expressed either in real or nominal terms (where the real WACC excludes the impact of inflation). The choice over whether a real or nominal measure will be appropriate will depend on the purpose to which the WACC will be put. One use will be the assessment of reported earnings, which will be calculated initially using historic cost data. Profit measures based on the returns on capital employed measured using historic cost will overstate the degree of profitability to the extent that inflation has resulted in historic cost asset values understating current values. The most straightforward approach to dealing with this issue is to compare historic cost profit measures to the nominal WACC.<sup>7</sup> Therefore, URCA will determine a nominal WACC
34. The WACC can also be expressed with and without an adjustment for corporate taxation, which captures the tax shield benefits of debt. Given that corporate earnings in The Bahamas are currently not taxed, URCA will make no tax adjustment to the estimated WACC.<sup>8</sup>
35. The WACC (with no tax adjustment) can be written formulaically as:

$$WACC = r_e(1 - g) + r_d g ,$$

where  $r_e$  is the cost of equity,  $r_d$  is the cost of debt, and  $g$  is the business's gearing ratio (the ratio of total debt to total debt plus total equity). The cost of equity and cost of debt components of the WACC are now briefly discussed.

### 4.1 The cost of equity

36. The cost of equity is the expected rate of return required by investors on equity that compensates them for the risk they bear, and the opportunities they forgo by committing funds to the firm.
37. The cost of equity cannot be observed directly; it must be estimated. The most common approach used by practitioners and regulators to estimate the cost of equity is the Capital Asset Pricing Model (CAPM).<sup>9</sup> The CAPM states that the expected return on an asset is linearly related to the non-diversifiable (so-called systematic) risk associated with holding that asset. When applied to equity capital, the CAPM may be written:

$$r_e = r_f + (r_m - r_f)\beta_e ,$$

where  $r_f$  is the risk-free rate (the expected return on a completely riskless asset),  $r_m$  is the expected return on the market portfolio (a hypothetical portfolio comprising all available assets in the market),

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<sup>7</sup> This comparison will be less reliable if the rate of future inflation is expected to differ significantly from past inflation rates.

<sup>8</sup> Although there is presently no corporate taxation in The Bahamas, companies are required to pay annual licence fees, annual company fees, stamp duties and import duties. However, interest is not deductible against these expenses, so Bahamian companies do not enjoy any tax shield advantages from debt.

<sup>9</sup> The CAPM was independently discovered by William Sharpe (1964), John Lintner (1965) and Jan Mossin (1966).

$r_m - r_f$  is the market risk premium (MRP), and  $\beta_e$  is the equity beta (which measures the stock's exposure to systematic risk).

38. Systematic risk refers to the sensitivity of the company's returns to the movement of returns on the entire market: when the return on the market moves up or down, the return on the company's equity will move by more than the market return (if  $\beta_e$  is greater than 1 in absolute terms) or less than the market return (if  $\beta_e$  is less than 1 in absolute terms).
39. As well as systematic risk, companies also face unique, or company-specific, risk that is not related to market risk. However, the CAPM assumes that investors, who are taken to be rational and risk-averse, use all market information (which is assumed to be freely available to all investors) to adjust their asset holdings so as to eliminate company-specific risk and achieve the best possible trade-off between risk and return.
40. The CAPM suggests that, provided capital markets function efficiently, equity investors will, in expectations, only be compensated for bearing systematic risk. Since rational investors would always diversify away firm-specific risk to optimise their portfolio mix, such risk should not be priced by the market. The implication for regulators is that, when setting allowed rates of return, compensation should only be awarded to investors for bearing systematic risk.
41. Like all economic models, the CAPM has its limitations. For example, the actual returns of low-beta stocks have tended to be much too high relative to the CAPM's predictions, and the returns of high-beta stocks have tended to be much too low.<sup>10</sup> In addition, the betas estimated using the CAPM are sometimes found to suffer from considerable statistical imprecision. However, as discussed above, despite these limitations the CAPM continues to be the most popular method with many regulators for estimating the cost of equity.
42. The main alternatives to the CAPM, for the purposes of cost of capital estimation, include the Dividend Growth Model (DGM) and the Fama-French three-factor asset pricing model (the Fama-French model).
43. In its simplest form, the DGM suggests that a company's cost of equity is equal to the discount rate that equates the company's current stock price to the present value of the future stream of expected dividends, which are expected to grow in perpetuity at some constant rate. BTC applied the constant DGM as a cross-check on the estimated costs of equity for the comparator companies used in its peer group.
44. Among the several practical limitations of this model, the main one is the difficulty in forecasting the long-term growth in dividends. In addition, the constant growth assumption is only suitable for stable, mature industries. The communications industry on the other hand tends to be characterised by rapid technical progress and expansion, and the resulting DGM estimates may prove misleading. Furthermore, Cornell (1999) points out that earnings forecasts are typically available only over the short-to-medium term, and that these growth rates usually exceed the long-run rate of economic growth. Projecting these high earnings rates into perpetuity implies that the company in question will eventually (in the long-run) overwhelm the entire economy.<sup>11</sup> This is not a sensible result. For these reasons, URCA did not pursue the constant DGM approach.

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<sup>10</sup> Fama, E. F., French, K. R. (2004), "The Capital Asset Pricing Model: Theory and Evidence", *Journal of Economic Perspectives* 18(3), 25–46.

<sup>11</sup> Cornell, B. (1999), *The Equity Risk Premium: the Long-run Future of the Stock Market*, Wiley: New York.

45. The Fama-French model states that the cost of equity is explained by three factors: the CAPM's market risk premium (the MRP); a firm size factor (the return on small-firm stocks minus the return on large-firm stocks); and a book-to-market factor (the return on high book-to-market ratio stocks minus the return on low book-to-market ratio stocks). Each factor represents a risk premium that contributes towards the overall risk premium of the equity. As with the DGM model, there are several practical and theoretical limitations to this model. In particular, the empirical support for the model has been mixed (depending on the datasets used to implement it), and the theoretical foundations for the size and book-to-market factors are less developed than that which underpins the CAPM. Moreover, the model is quite data intensive. For these reasons, the Fama-French model has not been widely used by practitioners or regulators, and URCA does not intend to employ it for the present purposes.
46. Notwithstanding the CAPM's apparent shortcomings, it continues to be the most widely used asset pricing model for regulatory purposes. In 2003, Professors Stephen Wright, Robin Mason and David Miles conducted an extensive academic study on cost of capital techniques for a group of UK regulators.<sup>12</sup> In that study, they reviewed several alternatives to the CAPM and found that each had its own drawbacks. They concluded that "there is no one clear successor to the CAPM for practical cost of capital estimation". In a 2008 report on regulatory accounting practices, the European Regulators Group (a collection of European telecommunications regulators) noted that: "Even if many different methodologies are available to calculate the cost of equity, the Capital Asset Pricing Model (CAPM) is largely the preferred one in IRG countries".<sup>13</sup> Finally, those Caribbean regulators who have made determinations on the cost of capital, or set out a cost of capital methodology, have employed the CAPM.<sup>14</sup>
47. URCA used the CAPM for the purposes of estimating the cost of equity. BTC and CBL agreed with, and used, the CAPM as the primary model for estimating the cost of equity.
48. In addition, URCA used recent determinations by regulators in other jurisdictions as a secondary source of evidence and as a reasonableness check on the CAPM estimates.

## **4.2 The cost of debt**

49. The cost of debt measures the expected cost of borrowing to the business. Since debt comes in many forms (e.g. corporate bonds, debentures, bank loans), and in different maturities, it is generally impossible to observe a single rate of interest that could be identified as the company's cost of debt.
50. Therefore, the cost of debt is commonly estimated by adding to the risk-free rate a debt premium,  $p$  :

$$r_d = r_f + p.$$

51. The debt premium is the additional return lenders require in order to compensate them for the risk of borrowers defaulting, and also for the time value of money associated with lending.

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<sup>12</sup> Wright, S., Mason, R., Miles, D. (2003), "A Study into Certain Aspects of the Cost of Capital for Regulated Utilities in the U.K.", *a Smithers & Co. Ltd. report to the OFT and U.K. economic regulators*.

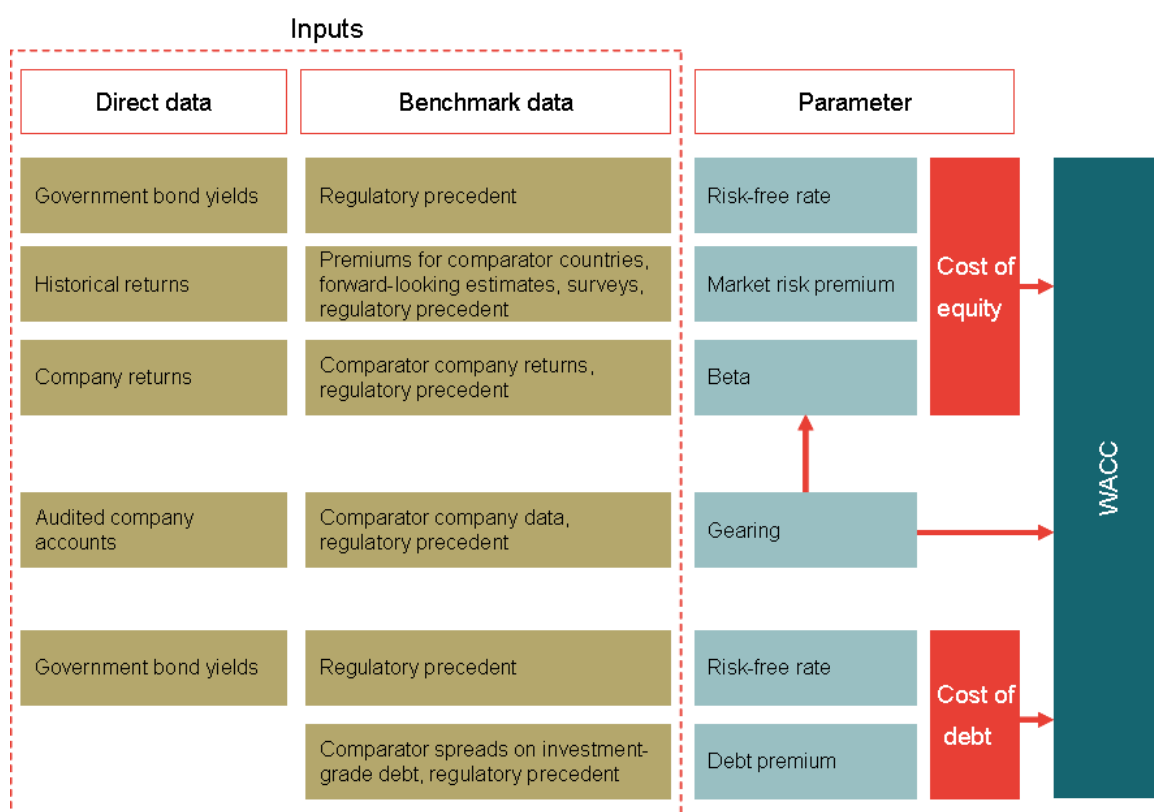
<sup>13</sup> ERG (2008), *Regulatory Accounting in Practice 2008*, September, p.32.

<sup>14</sup> See, for example, ICT Cayman Islands (2008), OUR Jamaica, ECTEL Eastern Caribbean countries (2008), and TAT&T Trinidad & Tobago (2008).

### 4.3 Estimation process

- 52. Figure 1 describes the basic process employed by well-established regulators, such as those in the European Union, for estimating the cost of capital. The process uses a combination of direct data (e.g. historical government bond yields as a proxy for the risk-free rate, and historical risk premiums for the country of interest when estimating the MRP) and benchmark data sources (e.g. past regulatory precedent and data from comparator countries and firms).
- 53. In some cases, benchmark data are used to supplement and cross-check estimates generated using direct data. In other instances, benchmark data are the primary source of evidence because direct data are missing or are too incomplete to be used reliably.
- 33. Section 5 explains that benchmark data is particularly important for the purposes of this determination since sufficient direct data is unavailable in many instances for The Bahamas.

Figure 1. Cost of capital estimation process used by most European regulators



- 55. The basic steps for computing the WACC are to separately estimate the costs of equity and debt (though some ingredients of both, such as the risk-free rate, must be consistent), and then use a measure of gearing to weight these relative costs of finance. Gearing is also used in the estimation of betas; the details are described in Section 6.

## 5. Estimation issues and principles

56. This section discusses some high-level issues URCA faces in estimating the cost of capital for the designated SMP operators, and sets out some principles URCA followed in confronting these issues.

### 5.1 Data and Bahamas-specific considerations

57. The process of determining the cost of capital is typically very data intensive. The better the quality of the data, the less uncertainty there will be over the final estimates.

58. BTC and CBL are the two major electronic communications firms presently operating in The Bahamas; BTC is currently government owned so is unquoted. Therefore, for BTC and CBL the available local company data (on company returns, risk measures, debt premiums, and gearing) is quite limited. As a result, the use of benchmarks from overseas jurisdictions (to supplement any local data) will be unavoidable.

59. In addition, since The Bahamas is a small economy by world standards, benchmark data on macroeconomic components of the cost of capital (such as the risk-free rate and the MRP) from other economies will also be required in order to carry out the analysis.

60. Finally, like many established overseas regulators, URCA relied on the rich pool of regulatory precedents on the cost of capital from other jurisdictions to help inform its estimates of key parameters.

61. Ideally, most of these past regulatory determinations should be from similar jurisdictions. ‘Similar’ countries will be those which, for example: have comparable populations and demographics; have similar exposures to macroeconomic factors; have comparable institutional arrangements and regulatory frameworks, etc. In this sense, the best comparators for The Bahamas will be other Caribbean nations.

62. Unfortunately, however, there are relatively few examples of past Caribbean decisions on the cost of capital, in any industry. The most recent relevant decisions include the following:

- In 2008 the Eastern Caribbean Telecommunications Authority (ECTEL) issued guidance to its member states on Long Run Incremental Cost (LRIC) models for fixed and mobile telecommunications networks, and this Draft Manual provided examples of cost of capital calculations for Caribbean fixed line and mobile operators.<sup>15</sup>
- In 2008, the Telecommunications Authority of Trinidad & Tobago issued a consultation report on costing methodologies for the telecommunications sector, which provided some indication of the Authority’s initial thinking on the magnitude of betas for telecommunications (in particular, mobile) operators.<sup>16</sup>
- In 2008 the Cayman Islands’ ICTA issued a decision on its earlier consultation on an appropriate FLLRIC costing methodology, which covered the ICT’s approach to cost of capital.<sup>17</sup>

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<sup>15</sup> ECTEL (2008), *Draft Manual for the LRIC Models of the Fixed and Mobile Telecommunications Networks for the ECTEL Member States*, June.

<sup>16</sup> TAT&T (2008), *The Costing Methodology for the Telecommunications Sector*, 29 May.

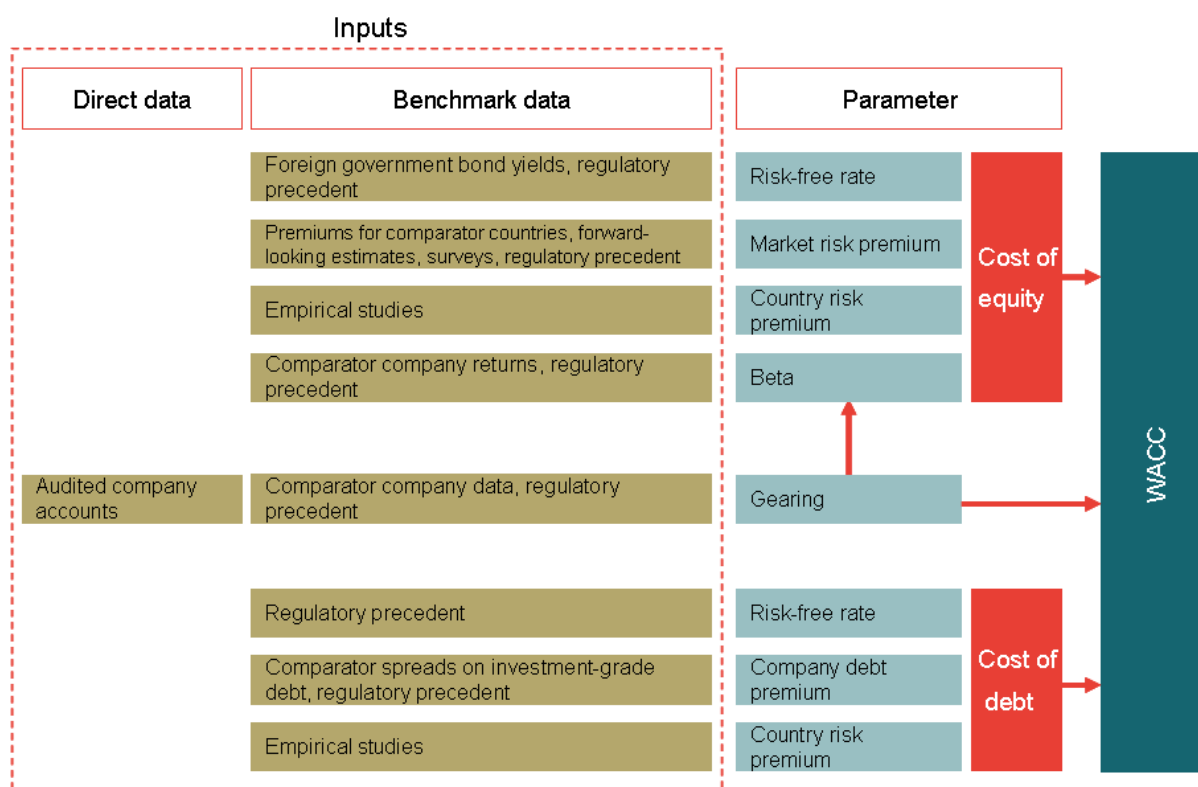
<sup>17</sup> ICT A (2008), *Decision for the Costing Manual Consultation (CD 2005-1)*, ICTA Decision 2008-2, July.

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- In 2008 OUR Jamaica issued a consultation document on the WACC for Cable & Wireless Jamaica.<sup>18</sup>

63. Given the limited number of Caribbean decisions available, URCA has also used recent cost of capital determinations by communications regulators based in other small, island jurisdictions including Bahrain, Guernsey, Jersey, Malta, New Zealand, and The Republic of Ireland, as well as several UK regulatory decisions, to sanity-check the various estimated cost of capital parameters (see Figure 2 below).

Figure 2. Cost of capital estimation process used by URCA



64. In addition, the small economy features of The Bahamas, as well as minor Central Bank restrictions on the flow of capital in and out of the country, means that equity and debt investors in Bahamian companies may be more exposed to ‘country risk’ than investors in larger, more developed economies.<sup>19</sup> As such, both equity and debt investors in Bahamian companies may require a country

<sup>18</sup> OUR Jamaica (2008), Estimate of the Weighted Average Cost of Capital for Cable and Wireless Jamaica: Consultative Document, 9 May.

<sup>19</sup> Currently, The Bahamas operates a number of Exchange Control regulations. Under these regulations, foreign currency transactions above a certain size must first gain approval from the Central Bank of the Bahamas before they can proceed. Such transactions include: “loans, dividends, profits, capital repatriation, foreign currency accounts (Guidelines for Opening and Classification of Accounts), Exchange Control designations, emigration facilities, issue and transfer of shares, travel, import and sundry payment facilities exceeding the Authorised Dealer limits, gift remittances, and investment currency transactions (e.g. purchase of real estate abroad, or purchase of shares of a foreign entity).” However, these restrictions are not so stringent so as to render The Bahamian economy ‘closed’. URCA understands that the large majority of applications to the Central Bank are approved; typically, the main impact on these flows is the delay associated with working through the approval process. For further discussion, see [http://www.centralbankbahamas.com/exchange\\_control.php](http://www.centralbankbahamas.com/exchange_control.php).

risk premium, over and above the standard MRP, for the additional risk they bear. URCA explicitly makes allowance for this in the cost of capital determined for the SMP operators (as shown in Figure 2).

65. A number of other Caribbean regulators — such as ECTEL (2008), ICT (2008), and OUR Jamaica (2008) — have made explicit allowances for country risk in the cost of capital. In contrast, regulators in developed economies such as the UK have not felt the need to make such allowances (as illustrated in Figure 1).
66. BTC and CBL agreed that due to data limitations in The Bahamas it is sensible to use benchmark data and regulatory determinations from other jurisdictions to inform and demonstrate the reasonableness of URCA's final estimates of the cost of capital and its components. BTC submitted that when company peers are used (e.g. for the estimation of betas) the comparators should be chosen carefully. URCA agrees with this point and discusses the selection of peers in more detail in Section 6.
67. BTC also cautioned that care must be taken when comparing regulatory decisions from other jurisdictions. For example, variations in tax rates between countries may make fair comparisons of the determined rates of return difficult. URCA agrees, and points out that both in the Consultation and in this Final Determination, it considered only the tax-free costs of capital determined by other regulators, so as to avoid false comparisons (see Table 22). Nevertheless, URCA acknowledges that other differences (such as country risk and gearing) can also hinder fair comparisons.
68. Each of the key parameters used to calculate the WACC — the risk-free rate, MRP, country risk premiums, beta, gearing and company debt premium — are estimated and discussed in greater detail in Section 6.

## **5.2 The use of ranges**

69. The process of estimating the cost of capital and its individual components can be prone to uncertainty (due to the unavailability or quality of data, or imperfect estimation techniques). To deal with the inherent uncertainty surrounding estimates, it is standard practice for regulators to estimate a plausible range (as opposed to just a single number) for the cost of capital for regulated businesses, and then exercise judgment over the appropriate point along that range.<sup>20</sup> The greater uncertainty in the estimates, the wider the proposed range should be to accommodate that uncertainty. URCA agrees with this approach.
70. Furthermore, the determination of the cost of capital should carefully balance the interests of consumers, access seekers, and regulated businesses. Therefore, it is sensible to estimate a range for the cost of capital that recognises the possibility of estimation error, and then to select a value within that range that strikes an appropriate balance between the requirements of interested parties. In addition, this approach allows URCA to take into account qualitative factors that affect the cost of capital, but which may not be easily quantifiable.
71. BTC and CBL agreed that it is regulatory best practice to make use of ranges, especially since the cost of capital is forward-looking so there can be significant uncertainty around individual parameter values. BTC suggested that in certain instances, where there is only one clear approach to estimating a parameter, there is no requirement to draw on evidence from a range of sources. BTC cites the risk-free rate as an example. BTC argued that the best approach to determining a forward-looking risk-free rate for regulatory purposes is to use the most current observed yield on a long-dated US

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<sup>20</sup> See, for example, MCA Malta (2008), Decision and Further Consultation on Estimating the Cost of Capital, April, pp.7-8.

Treasury bond. URCA agrees that when there is a clearly superior estimation approach, there is no need to appeal to inferior methods for the sake of generating a range. However, in practice there are very few instances where there is clearly one best approach to the exclusion of others. For example, in the specific case of the risk-free rate, URCA explains in Section 6.1 that there are significant weaknesses with the method proposed by BTC that rule it out as the only approach worth considering.

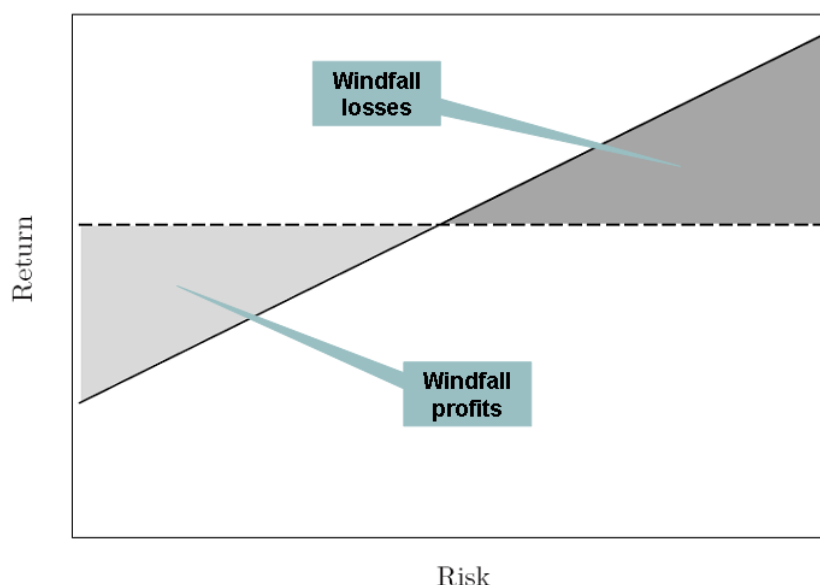
72. On the issue of ranges, CBL raised a number of points. Firstly, URCA should be clear about how outliers in a sample (e.g., a dataset, or from a range of sources of evidence) are identified and excluded. URCA agrees and has endeavoured to be clearer in the Final Determination. Secondly, CBL argues that it is not clear whether, or under what circumstances, URCA would opt for the high-end, midpoint, or low-end of a range. URCA, like most regulators, will use the midpoints of the ranges it determines. However, it is careful in developing the high and low ends of its ranges in the first instance, and also endeavours to explain the process it has used in doing so. Clearly, if the upper or lower end of a range moves, so will the midpoint.

### **5.3 Market-specific costs of capital**

73. Section 116 of the Comms Act identifies four relevant high level markets where SMP is presumed. These markets are:
- fixed voice (in which BTC is the incumbent);
  - mobile voice and mobile data (in which BTC is the incumbent);
  - high speed data and connectivity (in which CBL is the entrant); and
  - pay TV services (in which CBL is the incumbent).
74. As previously stated, the costs of capital estimated by URCA will be essential for the purposes of setting retail price controls, and for establishing cost-based charges at the wholesale level (i.e. for access and interconnection services). In addition, the cost of capital will be useful in monitoring returns under regulatory information disclosure.
75. When determining the cost of capital for these purposes, an important issue to consider is whether URCA ought to set the same cost of capital for all SMP operators, regardless of which SMP markets they supply (i.e. BTC and CBL would be assumed to have the same cost of capital for all SMP services they offer), or whether the determined costs of capital should be market specific (i.e. separate costs of capital would be determined for each of the SMP markets BTC and CBL operate in).
76. To the extent that the provision of fixed voice, mobile voice and mobile data, high speed data and connectivity and pay TV services all entail significantly different risk (in particular, systematic risk, which is measured by the business's beta), there is a strong case for setting separate costs of capital. Given the differences in the demand, cost and technology characteristics of the four relevant markets, it is reasonable to suppose that risks do vary. These issues are explored in greater detail in Section 6.5.
77. Given such variations in risk, setting a common cost of capital for all markets may give rise to regulatory errors: windfall gains for operators with low risk businesses (meaning customers and access seekers will pay too much), and under-compensation for operators with intrinsically high risk businesses (which could weaken incentives for operators to make welfare-enhancing network investments). Both outcomes would be harmful to consumers in the long-run.



Figure 3: Regulatory errors from ignoring variations in market-specific risk



78. Figure 3 illustrates this idea by considering the stylised case of a hypothetical operator who supplies some bundle of fixed and mobile telephony services. The solid curve represents the risk-return tradeoff faced by the operator as they alter the mix between their fixed and mobile offerings. It is generally agreed that mobile-only operators face higher risk than fixed-only operators, so as the operator adds a greater proportion of mobile services to their portfolio of offerings, they take on more risk and move rightward along the curve. At the far right of the curve, the operator is a mobile-only provider, and at the far left the operator is a fixed-line only provider. The upward slope of the curve reflects the classic risk-return trade-off; in order to take on more risk, investors in the business expect to be compensated by a higher return.
79. Suppose the regulator sets a single cost of capital for all telephony operators, regardless of business type. This rate of return is represented by the flat dashed curve that intersects the upward-sloping solid line. Any operator with an actual risk-return combination lying within the lightly-shaded region will be overcompensated (i.e. be allowed more profits than necessary for the risk actually borne). Such firms will be able to overcharge their customers or access seekers and, as a result, earn supernormal rents. Any operator with an actual risk-return pairing lying within the darkly-shaded region will be undercompensated (i.e. be allowed too little profit for the risk actually borne). Such operators will be unable to attract capital to undertake efficient, welfare-enhancing investment, which will be to the detriment of consumers. The size of the regulatory error will be greatest when the operator lies at either end of the fixed/mobile spectrum.
80. Setting separate costs of capital for each market, to reflect the underlying risk of the operations, will mean determining market-specific betas. The major practical difficulty here is the fact that very few telephony companies are so-called 'pureplay' companies, i.e. companies engaged exclusively in the provision of fixed voice, or mobile voice, or data, or cable TV services. Most operators offer a mix of fixed and mobile services, so the estimated betas for these companies will reflect a combination of the risks associated with each of these activities. There are a number of companies around the world who operate fixed telephony only businesses (i.e. they do not offer mobile services), but most of these will also offer internet services and, increasingly, such operators are also moving into the provision of television services over their fixed networks. Similarly, traditional cable TV operators are increasingly employing their networks to offer data services and voice. Finally, the emergence of more advanced wireless platforms has allowed traditional mobile operators to move into the provision of data services.

81. Section 6.5 deals with the specific issues related to estimating market-specific betas. Broadly, however, URCA's approach is to estimate betas for as many close-to-pureplay operators as possible, and then exercise its judgment on a sensible beta range for each of the markets, given what is known about the characteristics of each of those markets.
82. Other cost of capital parameters that could vary by market are the gearing ratio and the debt premium. The optimal level of gearing for a company, and its cost of corporate borrowing, depends on, among other things, the risk of bankruptcy. This in turn depends in part on the non-diversifiable risk of the business, which can vary across markets. However, as illustrated in Sections 6.4 and 6.5.2.2 other regulators have tended not to vary assumptions around gearing and debt premiums across markets (although assumptions around these parameters may change over time). URCA does not intend to set market-specific gearing ratios and debt premiums for the purposes of this determination. Therefore, the key parameter that will drive any potential differences in the cost of capital across the SMP markets will be beta.
83. Other parameters that should remain unchanged across markets include the risk-free rate, the MRP and the country risk premium, as these are all macroeconomic parameters that apply to all businesses in the economy.
84. In their submissions, BTC and CBL estimated market-specific costs of capital, so the SMP operators agreed with URCA's approach on this issue. However, it should be noted that the costs of capital presented by the parties were very similar between markets. For example, BTC proposed a WACC of 11.90% for fixed operators and a WACC of 12.11% for mobile operators; CBL proposed a WACC of 11.90% for providers of high speed data services and a WACC of 11.10% for cable TV operators.

## **6. Estimation of individual parameters**

85. This Section describes in greater detail the individual parameters used in the computation of the final cost of capital, and sets out URCA's revised estimates of these parameters as appropriate.

### **6.1 Risk-free rate**

86. The risk-free rate is the interest rate that an investor would expect to earn by holding a riskless asset. This rate is used when estimating the cost of debt and the cost of equity.
87. Since, in practice, no asset is completely free of risk, the risk-free rate cannot be observed directly. It is often proxied using the return on a suitably riskless and liquid (frequently traded) asset, such as the yield on a government bond.

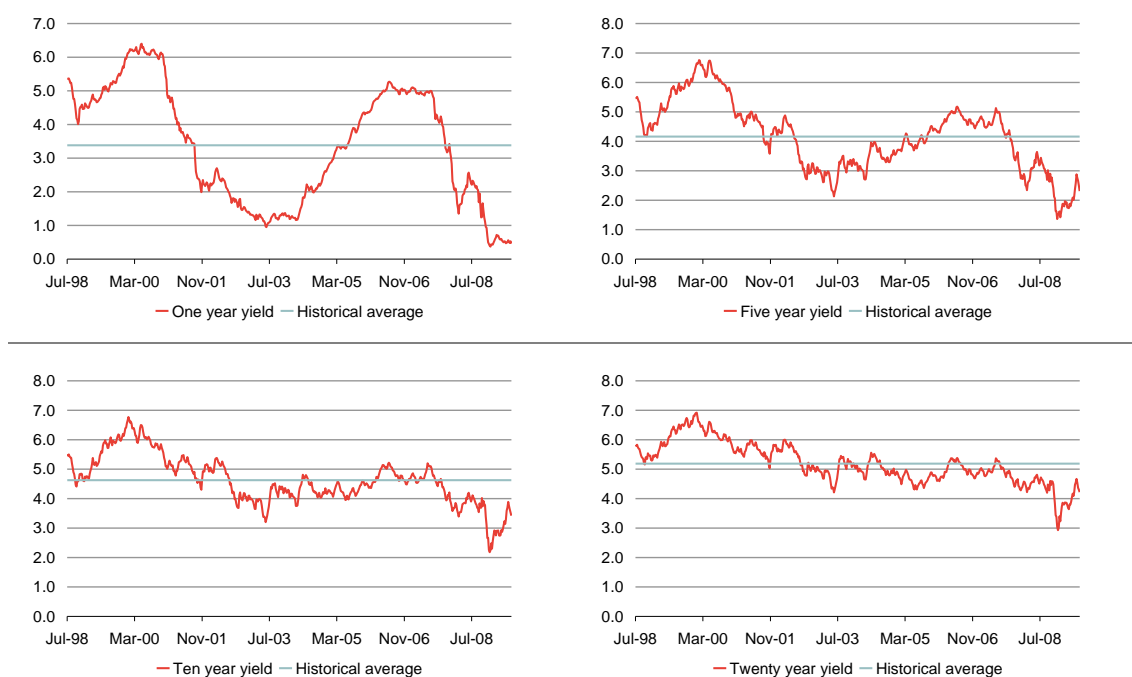
#### **6.1.1 Government bond yield data**

88. The risk-free rate for Bahamian entities would ideally be best determined using direct evidence on The Bahamas government's borrowing rates. However, local market data on bond yields are sparse. The Central Bank of The Bahamas reports on its website retail lending rates (e.g. the three-month time deposit rate, the residential mortgages rate, and the interest rate on consumer loans), as well as wholesale lending rates (e.g. the discount (bank) rate, and the prime lending rate — both of which are reference rates used by Bahamian commercial banks). However, no statistics are freely available from the Central Bank of the Bahamas on government security yields.

## The cost of capital for designated SMP operators

89. The Bahamian government does occasionally issue securities. For instance, there is currently a Commonwealth of The Bahamas Sovereign USD Bond, maturing in 2033, with a current (as at 23 July 2009) yield of approximately 7.6%.<sup>21</sup> However, since these securities are traded so infrequently, they likely have a large liquidity risk premium component in the yield, which makes them unsuitable for the purposes of determining the risk-free rate.
90. In lieu of reliable local data, URCA has based its assessment on US Treasury rates. The advantage of using US data is that US Treasury securities markets are deeply traded, and data on yields are readily available for a wide range of maturities and over a long period of time. BTC and CBL generally supported the use of US Treasury rates to benchmark the risk-free rate.
91. The use of US data to proxy the risk-free rate is consistent with regulatory precedent from the Caribbean. For instance, The Cayman Islands' ICTA benchmarked the risk-free rate to US Treasury yields in its 2008 determination on its Forward Looking Long Run Incremental costing methodology; similarly, OUR Jamaica used US Treasury rates to proxy the risk-free rate when determining the cost of capital for Cable & Wireless Jamaica in 2008; and ECTEL used US Treasury bond yields to proxy the risk-free rate in its 2008 Draft Manual on LRIC pricing.
92. URCA collected market yields on US constant (one-year, five-year, ten-year and twenty-year) maturity Treasuries for the period July 1998 to July 2009 from the US Federal Reserve. These yields are plotted in Figure 4.

Figure 4. Nominal yields on US Treasury securities July 1998-July 2009



Source: US Federal Reserve, URCA analysis

93. Given that a range of maturities for government debt are available, a question arises over which is the most appropriate for the purposes of determining the cost of capital. Various regulators have

<sup>21</sup> According to Bloomberg, as at 23 July the Commonwealth of The Bahamas Sovereign USD Bond had a bid rate of 7.8% and an ask rate of 7.3%.

adopted different positions on this issue. Some regulators have chosen to match the term of the risk-free rate to the length of the regulatory cycle on the grounds that the regulatory period is the relevant horizon over which risks ought to be assessed; matching maturities to the regulatory cycle would align the company's cost of raising finance with periodic resetting of tariffs.<sup>22</sup> Other regulators have elected to employ long-maturity rates on the basis that the term structure of interest rates used to determine the cost of capital ought to approximate the economic lifespan of the regulated company's assets, which are typically long-lived.<sup>23</sup> Many UK regulators have tended to refer to a range of maturities to inform their assessment of the appropriate risk-free rate without necessarily matching maturities to the length of the regulatory period or the expected economic lifespan of the regulated assets; typically these regulators choose a rate that is broadly consistent with a medium-term rate.

94. In its submission on the Consultation, BTC argued that URCA should benchmark the risk-free rate to the yield on a very long-dated government security—a 30 year Treasury bond—on the grounds that “equity has an infinite life”. Doing so would raise the risk-free rate by just three basis points above the rate proposed in the Consultation (i.e. from 4.3% to 4.33%), so the practical effect of adopting BTC's approach would be very slight. However, URCA has a number of reservations over BTC's rationale for very long-dated maturities.
95. Firstly, in practice most equity investments are not long-term as BTC suggests. A number of international studies have found average equity holding periods are two years or less. For example, Lakonishok et al (1991) study 769 pension funds in the US between 1985 and 1989 and find that annual portfolio turnover rates of around 50% (which equates to an average holding period  $12/0.5=24$  months) are typical in their sample.<sup>24,25</sup> Barber and Odean (2000) examine the trading patterns of 66,465 households invested with a major discount broker in the US over the period 1991 to 1996 and find that, on average, these investors turn over 75% of their portfolios annually (i.e. an average holding period of 16 months).<sup>26</sup> Gaspar et al (2002) analyse a database that records the quarterly filings of large institutional investors (i.e. those with more than US\$100 million dollars under discretionary management) to the US Securities and Exchange Commission and find annual portfolio turnover rates of approximately 80% (i.e. an average holding period of 15 months).<sup>27</sup> Odean (1999) reports that the annual turnover rate on the NYSE in 1998 was approximately 76%.<sup>28</sup> The preceding evidence suggests that it is not appropriate to presume that equity investors have infinite investment horizons.
96. Secondly, the risk-free rate is relevant to the cost of debt as well as the cost of equity. Although some companies do issue debt of very long maturity, these companies are typically low-risk firms in mature markets; most companies issue debt for much shorter durations. Alexander and Chia (2002) analyse

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<sup>22</sup> See, for example, NZ Commerce Commission (2009), Revised Draft Guidelines: The Commerce Commission's Approach to Estimating the Cost of Capital, 19 June; TRA Bahrain (2009), Cost of Capital: Draft Determination, MCD/07/09/049, 20 July.

<sup>23</sup> An example of a regulator that has adopted long-maturity rates is the Telecommunications Authority of Trinidad & Tobago (2008), The Costing Methodology for the Telecommunications Sector, 29 May.

<sup>24</sup> The annual portfolio *turnover rate* is the percentage of a portfolio that is traded (either bought or sold) in a year.

<sup>25</sup> Lakonishok, J., Shleifer, A., Thaler, R., Vishny, R. (1991), “Window Dressing by Pension Fund Managers”, *American Economic Review* 81(2), 227–231.

<sup>26</sup> Barber, B. M., Odean, T. (2000), “Trading is Hazardous to Your Wealth: The Common Stock Investment Performance of Individual Investors”, *Journal of Finance* 55(2), 773–806.

<sup>27</sup> Gaspar, J. M., Massa, M., Matos, P. (2002), “Shareholder Investment Horizons and the Market for Corporate Control”, *Journal of Financial Economics* 76(1), 135–165.

<sup>28</sup> Odean, T. (1999), “Do Investors Trade Too Much?”, *American Economic Review* 89(5), 1279–1298.

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850 bonds issued by infrastructure and utility companies between 1996 and 2001 and report that the vast majority of issues in their sample were for fewer than four years.<sup>29</sup>

97. Thirdly, the use of 30 year maturities would seem inappropriate since the length of regulatory cycles in The Bahamas will typically be three to four years, and the expected economic lives of modern telecommunications equipment is generally in the region of 10 to 20 years.
98. CBL suggested that URCA leave the one-year Treasury yield out of the calculation on the grounds that a one-year maturity is neither consistent with the typical duration of a regulatory cycle in The Bahamas, nor the expected lifespan of the regulated assets. URCA considers this suggestion reasonable.
99. BTC also argued that URCA should not rely on historical interest rate data to determine a forward-looking risk-free rate as historic yields may not be indicative of future rates. BTC recommended using a current Treasury bond rate (BTC used the yield observed on a single day — 9 September 2009), or a forecast rate supplied by a data service such as Value Line.
100. URCA agrees that it should determine a forward-looking risk-free rate. However, URCA disagrees that yields observed on a single day necessarily provide the best forward-looking estimates. As the charts in Figure 4 show, Treasury yields can be quite volatile over time. Given such volatility, the rate measured on any single day might represent a transient peak or trough. The charts also suggest that although rates move around over time, they seem to fluctuate about some long-run level.<sup>30</sup> A historic average over a reasonable period of time provides a reasonable approximation to this long-run level, and has the benefit of smoothing out large movements over time.
101. Forecast rates can be useful as cross-checks, but it is often difficult to understand how they have been calculated; the assumptions made by data providers are not always transparent.
102. Finally, many regulators appeal to historic interest rate data when setting the risk-free rate.
103. On these grounds, URCA intends to continue using historic data to benchmark the risk-free rate.
104. The key features of the interest rate data collected are summarised below in Table 2.

Table 2. Descriptive Statistics of US Treasury yields July 1998-July 2009

<b>Statistic</b>	<b>One-year</b>	<b>Five-year</b>	<b>Ten-year</b>	<b>Twenty-year</b>
Mean	3.4%	4.2%	4.6%	5.2%
Std. Dev.	1.7%	1.2%	0.8%	0.7%
Minimum	0.4%	1.4%	2.2%	2.9%
Maximum	6.4%	6.8%	6.8%	6.9%

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<sup>29</sup> Alexander, I., Chia, S-C. (2002), "Bond Finance: a Growing Source of Funds for Utility and Infrastructure Companies?", *International Journal of Regulation and Governance* 2(1), 1–25.

<sup>30</sup> For example, government bond yields in many economies dropped considerably during (and immediately after) the financial crisis as investors moved to the relative safety of government securities. However, as these economies have begun to recover, yields have begun to recover. This sort of mean-reverting behaviour is typical of many macroeconomic variables, including interest rates.

105. Examination of the average historical yields presented above suggests that a reasonable range for the risk-free rate is between 3.5% and 5.0%, with a midpoint value of 4.3%. Dropping the one-year yields from the sample, as suggested by CBL, narrows the range to 4.2% to 5.2%, with a midpoint of 4.7%.<sup>31</sup>

## 6.1.2 Evidence from past regulatory decisions

106. Table 3 summarises some recent regulatory determinations on the risk-free rate by various regulators around the world.<sup>32</sup>

Table 3. Recent regulatory determinations on the nominal risk-free rate

Determination	Primary data	Rates
TRA Bahrain (2009) <sup>33</sup>	Ijara Sukuks, US Treasuries	3.2% - 5.8%
ICT A (2008) <sup>34</sup>	US Treasuries	4.4%
Ofcom (2009a) <sup>35</sup>	UK gilts	4.5%
Ofcom (2009b) <sup>36</sup>	UK gilts	4.1% - 4.8%
ComReg (2008) <sup>37</sup>	German and Irish government bonds	4.5% - 5.0%
OUR Jamaica (2008) <sup>38</sup>	US Treasuries	4.5%
ECTEL (2008) <sup>39</sup>	US Treasuries	2.7%
MCA (2008) <sup>40</sup>	Malta government stocks	3.9% - 4.2%
OUR Guernsey (2008) <sup>41</sup>	UK gilts	4.6% - 5.0%

<sup>31</sup> In Table 5 of CBL's submission, CBL used a risk-free rate of 4.7% for the purposes of calculating the cost of equity, but retains URCA's original estimate of the risk-free rate, 4.3%, for the purposes of calculating the cost of debt. This is inconsistent. URCA sees no reason to apply one risk-free rate in the cost of equity and another in the cost of debt. URCA has consistently used a value of 4.7% for the risk-free rate throughout the WACC calculation. See section 7.

<sup>32</sup> The determinations covered in this and other Tables in this document are not necessarily exhaustive. Rather, the Table covers a reasonably representative sample of determinations by regulators of fairly similar size, as well as decisions by the UK regulator, Ofcom.

<sup>33</sup> TRA (2009), Cost of Capital: Draft Determination, MCD/07/09/049, 20 July.

<sup>34</sup> ICTA (2008), Decision for the Costing Manual Consultation (CD 2005-1), ICT Decision 2008-2, July.

<sup>35</sup> Ofcom (2009a), Sky's Cost of Capital: Annex 10 to pay TV phase three consultation document, 16 June.

<sup>36</sup> Ofcom (2009b), A New Pricing Framework for Openreach: Statement, 22 May.

<sup>37</sup> Commission for Communications Regulation Ireland (2008), Eircom's Cost of Capital, 22 May.

<sup>38</sup> OUR Jamaica (2008), Estimate of the Weighted Average Cost of Capital for Cable and Wireless Jamaica: Consultative Document, 9 May.

<sup>39</sup> ECTEL (2008), Draft Manual for the LRIC Models of the Fixed and Mobile Telecommunications Networks for the ECTEL Member States, June.

<sup>40</sup> MCA (2008), Decision and Further Consultation on Estimating the Cost of Capital, April.

<sup>41</sup> OUR Guernsey (2008), Price Control for Cable & Wireless Guernsey – Decision Notice, February.

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TRA Bahrain (2005) <sup>42</sup>	US Treasuries, UK gilts	4.3% - 4.8%
Ofcom (2005a) <sup>43</sup>	UK gilts	4.6%
Ofcom (2005b) <sup>44</sup>	UK gilts	4.6%
NZ Commerce Commission (2005) <sup>45</sup>	New Zealand government bonds	5.9%
Ofcom (2004) <sup>46</sup>	UK gilts	5.0%
JCRA (2004) <sup>47</sup>	UK gilts	5.0%
UK Competition Commission (2003) <sup>48</sup>	UK gilts	5.1% - 5.3%

Notes: All values rounded to one decimal place

107. Excluding any apparent outlier values (ECTEL, 2.7%; TRA Bahrain, 3.2%), the Table above shows that most regulators have determined nominal risk-free rates within the range 4.0% to 6.0%. The lower bound of this range is close to the lower bound of the range suggested by data on average historical yields (4.2%). The upper bound of this range exceeds the range derived by examining historical yields (5.2%). Notwithstanding these small differences, the range suggested by the historical data seems broadly consistent with recent regulatory precedent from around the world.

Having considered the available evidence, URCA considers that the range suggested by historical yields, 4.2% to 5.2%, is an appropriate range for the risk-free rate.

URCA determined a final risk-free rate range of 4.2% to 5.2%, with a midpoint value of 4.7%.

## **6.2 Market risk premium**

108. The MRP measures the additional expected return over and above the risk-free rate required by investors to compensate them for holding the market portfolio — a hypothetical portfolio of assets comprising all assets (including all traded and non-traded assets) in the economy. It therefore represents the premium investors can expect to earn for bearing only risk that cannot be diversified

<sup>42</sup> TRA (2005), Batelco's Cost of Capital, 20 November.

<sup>43</sup> Ofcom (2005), Wholesale mobile voice call termination markets – a proposal to modify the charge control conditions, 7 June.

<sup>44</sup> Ofcom (2005), Ofcom's Approach to Risk in the Assessment of the Cost of Capital, 18 August.

<sup>45</sup> Commerce Commission (2005), Draft Determination on the Application for Pricing Review for Designated Interconnection Services, 11 April.

<sup>46</sup> Ofcom (2004), Partial Private Circuits Charge Control: Final Statement, 30 September.

<sup>47</sup> Coleago Consulting (2004), Regulating JT: Final Report (a report for Jersey Competition Regulatory Authority), February; and JCRA (2004), Re: Jersey Telecom's Cost of Capital, Decision Paper and Direction 2004-4, 29 April.

<sup>48</sup> Competition Commission (2003), Vodafone, O2, Orange and T-Mobile: Reports on references under section 13 of the Telecommunications Act 1984 on the charges made by Vodafone, O2, Orange and T-Mobile for terminating calls from fixed and mobile networks, February.

away. Furthermore, the MRP captures investors' expectations about future returns, so it is necessarily a forward-looking measure.

109. Since the market portfolio is a hypothetical portfolio that cannot be observed, the MRP cannot be measured directly; it must be estimated. There is a wide range of evidence available to assess an appropriate value for MRP for regulatory purposes, though none of these specifically deal directly with MRP estimates for The Bahamas. The various sources of evidence include:

- historical data on the MRP across a range of economies;
- expectations of future risk premium, based on the views of investors and financial market experts; and
- recent regulatory decisions on the MRP by regulators from around the world.

110. Considering evidence on the MRP from a range of different economies provides useful information on the true value of the MRP that cannot be gained by examining the excess returns on a single market alone. In particular, the premium (over and above the risk-free rate) earned by investors in any given country may be very high or low for idiosyncratic reasons; such variations may be smoothed out by considering the returns on a number of different economies. Furthermore, estimation of the MRP with reference to the returns observed in just one country (e.g. The Bahamas) would be inconsistent with the fact that most economies are at least partially integrated.<sup>49</sup> Finally, the relatively thinly traded and immature financial markets in The Bahamas mean that obtaining precise MRP estimates using Bahamian data alone is not feasible. The practice of obtaining MRP estimates by reference to evidence from a range of economies is commonly used by many regulators around the world.

### **6.2.1 Historic evidence on the MRP**

111. One of the most comprehensive analyses of historic MRP data is a dataset presented by Dimson, Marsh and Staunton (2009).<sup>50</sup> The authors estimate the average MRP for 17 countries using historical returns data from 1900 to 2008, as well as a MRP for a 'world' index and a European index.

112. Figure 5 plots the historic MRP (measured against bonds) calculated by Dimson, Marsh and Staunton for these markets; the world MRP and European MRP are shaded grey. The MRP for the world index, averaged over the 108-year period, was 4.6%, while the corresponding MRP for Europe was 5.0%. The mean across all 17 countries was 5.7% and the standard deviation was 1.8%.

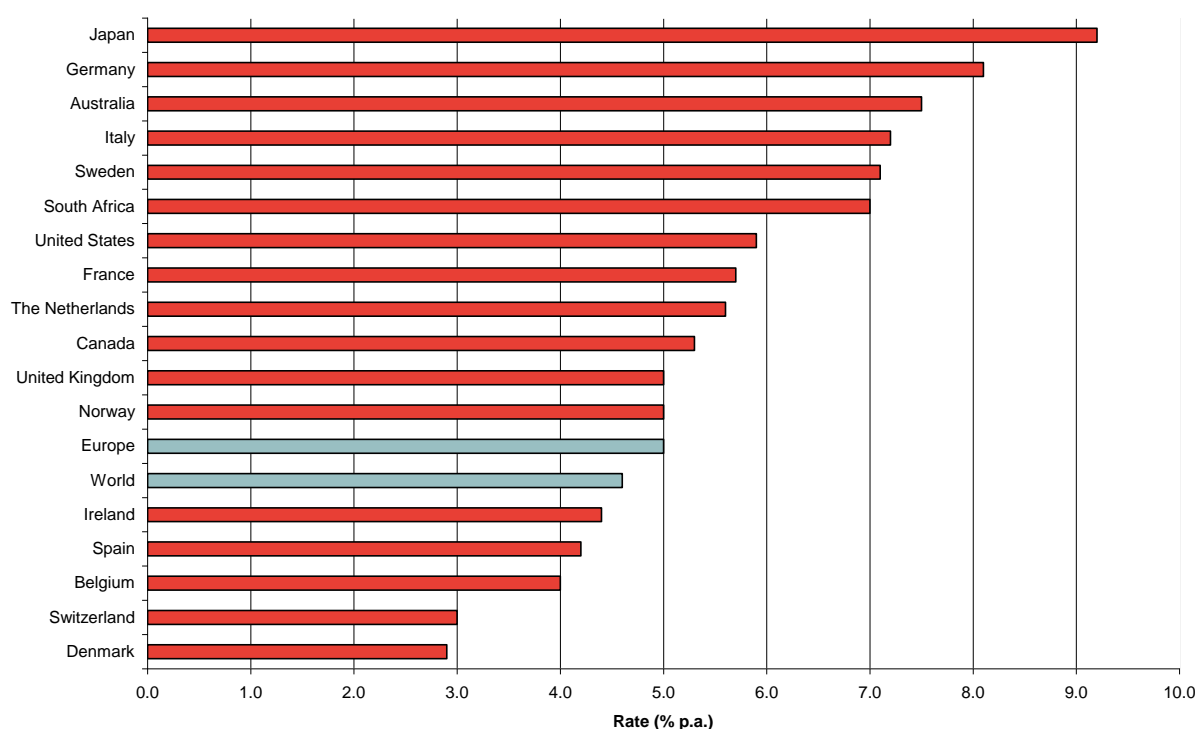
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<sup>49</sup> As explained in footnote 19, although The Bahamas government presently operates some international capital flow restrictions, the high frequency of approvals to move funds suggests that The Bahamas is at least partially integrated with the world economy.

<sup>50</sup> Dimson, E., Marsh, P., Staunton, M. (2009), *Credit Suisse Global Investment Returns Sourcebook 2009*.



Figure 5: Average historic market risk premiums 1900-2008



Source: Dimson, E., Marsh, P., Staunton, M. (2009), *Credit Suisse Global Investment Returns Sourcebook 2009*

Notes: All averages are arithmetic averages; premiums are measured relative to bonds rather than bills

### 6.2.2 Other studies of historic premiums

113. The Dimson, Marsh and Staunton dataset is the most comprehensive in terms of the number of countries covered, but there are other studies of historic risk premiums.

- Morningstar publishes annually the Ibbotson Stocks, Bonds, Bills and Inflation Valuation Yearbook, which calculates historic risk premiums on a number of US indices (i.e. the S&P 500 index, the value-weighted NYSE index, and the NYSE deciles 1-2 index). Using returns data covering the years 1926 to 2008, Morningstar calculates the average historic risk premium (over a medium horizon) to be between 6.3% and 7.0%.<sup>51</sup>
- A study by Siegel (1999) analysed US data over a longer period (1802 to 1998) and concluded that the average premium of equities over bonds was 4.7%.<sup>52</sup>
- Damodaran (2008) examines US stock returns and Treasury bond yields over the period 1928 to 2007 and calculates the average historic premium to be approximately 6.4%.<sup>53</sup>

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<sup>51</sup> Morningstar (2009), *Ibbotson S&P 500 Valuation Yearbook*, Chicago.

<sup>52</sup> Siegel J (1999), "The Shrinking Equity Premium", *Journal of Portfolio Management* 26(1), 10-17.

<sup>53</sup> Damodaran (2008), "Equity Risk Premiums (ERP): Determinants, Estimation and Implications", *Stern Business School working paper*.

114. When assessing the relevance of the various pieces of historical evidence it is important to note that the confidence intervals around the estimates can be reduced by considering returns over very long periods (e.g. the Dimson, Marsh and Staunton, and Siegel, analyses). However, greater statistical precision has to be weighed against the relevance of using data from the 19th century, which may not represent a good basis for estimating forward-looking equity returns.

115. The international evidence on the historic MRP for developed economies provides a range of values from around 4.5% to 7.0%.

### **6.2.3 Other evidence on the MRP**

116. There are a number of other sources of evidence on the MRP that can be used to supplement the historic data. The most important of these are: models that use additional information to adjust the historic returns data; and survey evidence on investors' expectations.

#### **6.2.3.1 Forward-looking estimates**

117. Academic studies have modelled investors' ex ante expectations of equity returns based on time series data of equity returns and other macro-economic variables. Examples of these studies include the following:

- Fama and French (2002) infer the MRP by applying the DGM to a large equity index to estimate the required return on that index, and then calculating the excess return on equities by subtracting the risk-free rate. Applying this approach to US data produces an estimate of the MRP of approximately 3.5% (covering the period 1872 to 2000).<sup>54</sup>
- Ibbotson and Chen (2001) apply a similar approach to Fama and French, using historical data on earnings growth and GDP per capita to proxy dividend growth. This analysis obtains estimates of the MRP for the USA of approximately 6.0%.<sup>55</sup>
- Cornell (1999) applies a version of the DGM, which bases the assessment of future dividend growth on investment analysts' projections for the first five years followed by a transition to the long-term nominal growth rate of the economy. Applying this approach to 1996 data produces a forward-looking MRP of 4.5%.<sup>56</sup>

118. These studies generate a wide range of estimates for the MRP, though there are two main themes emerging from this evidence. Firstly, these studies tend to produce estimates of the MRP slightly below that suggested by the historic data. Secondly, the results of these studies are consistent with a range of the MRP of 3.5% to 6.0%.

#### **6.2.3.2 Survey evidence**

119. Various surveys of MRP expectations have been undertaken. These surveys have covered financial economists, company finance officers and investment analysts. A summary of this evidence is provided below in Table 4. MRP expectations from financial economists and company finance officers tend to be in line with the observed historic data while the expectations from investment analysts and fund managers tend to be lower.

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<sup>54</sup> Fama, E. F., French, K. R. (2002), "The Equity Premium", *Journal of Finance* 57(2), 637–659.

<sup>55</sup> Ibbotson, R. G., Chen, P. (2001), "The Supply of Stock Market Returns", *Yale International Center for Finance working paper*, June.

<sup>56</sup> Cornell, B. (1999), *The Equity Risk Premium: the Long-run Future of the Stock Market*, Wiley: New York.

Table 4: Survey evidence on the MRP

Evidence	Description	Value for MRP
Welch (2000) <sup>57</sup>	Survey of over 100 mainly US financial economists	6.0%
Welch (2001) <sup>58</sup>	Update of survey of financial economists	5.0%
Welch (2008) <sup>59</sup>	Survey of 400 finance professors	5.0% (average, US) 4.5% (average, non-US)
OXERA (2000) <sup>60</sup>	Survey of UK companies	5.0%
Bruner et al (1998) <sup>61</sup>	US survey of corporations and financial analysts	5.0% - 6.0%

120. The results from these various surveys suggest a range of 4.5% to 6.0% for the MRP.

### 6.2.3.3 Evidence from past regulatory decisions

As a final source of evidence, it is useful to examine recent determinations on the MRP by regulators in other jurisdictions. Table 5 below summarises this evidence.

Table 5. Recent regulatory determinations on the MRP

Determination	Rate
TRA Bahrain (2009)	5.1% - 6.1%
Ofcom (2009a)	5.0%
ICT A (2008)	6.0%
Ofcom (2009b)	4.5% - 5.0%
OUR Jamaica (2008)	4.1%
ComReg (2008)	4.8% - 6.0%
MCA (2008)	5.0% - 6.0%
OUR Guernsey (2008)	4.5%

<sup>57</sup> Welch, I. (2000), "Views of Financial Economists on the Equity Premium and Other Issues", *Journal of Business* 73(4), 501-37.

<sup>58</sup> Welch, I. (2001), "The Equity Premium Consensus Forecast Revisited", *Yale School of Management working paper*

<sup>59</sup> Welch, I. (2008), update of the Welch (2000) paper.

<sup>60</sup> The OXERA (2000) report and the evidence from UK financial institutions were cited by the UK Competition Commission in the report Vodafone, O2, Orange and T-Mobile: Reports on references under section 13 of the Telecommunications Act 1984 on the charges made by Vodafone, O2, Orange and T-Mobile for terminating calls from fixed and mobile networks, (2003, p190).

<sup>61</sup> Bruner R., Eades K., Harris, R., Higgins, R. (1998), "Best Practices in Estimating the Cost of Capital: Survey and Synthesis", *Financial Management* 27, 13–28.

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TRA Bahrain (2005)	5.0%
Ofcom (2005a)	4.5%
Ofcom (2005b)	3.0% - 5.0%
NZ Commerce Commission (2005)	5.1%* - 6.1%*
Ofcom (2004)	5.0%
JCRA (2004)	2.6% - 5.5%
UK Competition Commission (2003)	2.6% - 4.6%

Notes: \* The NZ Commerce Commission employs a tax-adjusted version of the CAPM to accommodate a local dividend imputation tax regime, which produces a MRP range of 6.0% to 7.0%. Removing the effect of the tax adjustment from the MRP requires subtracting the product of risk-free rate (5.87%) and the personal rate of income tax (33%) from the MRP.

All values rounded to one decimal place.

121. The regulatory determinations surveyed above suggest a range for the MRP of 2.6% to 6.1%, with most regulators using values in the range 4.5% to 6.0%.

122. Table 6 summarises the evidence on the MRP from the various sources considered so far.

Table 6: Summary of MRP evidence

Evidence	Estimated range
Historical data	4.5% - 7.0%
Forward-looking estimates	3.5% - 6.0%
Survey evidence	4.5% - 6.0%
Recent regulatory determinations	2.6% - 6.1%

123. This Table shows that the historical, forward-looking and survey evidence are consistent with, and overlaps, the range of values employed by various regulators recently. The full range suggested by all the evidence, however, is quite wide: 2.6% to 7.0%. Excluding the lower and upper bounds of this range as possible outliers suggests a tighter range for the MRP estimate of approximately 4.0% to 6.0%.

124. CBL agreed that this is a reasonable range for the MRP.

125. BTC incorrectly argued that, URCA calculated “only the historical risk premium”. BTC cited the academic work of Dr Roger Morin, who argues that an appropriate estimate of the MRP should give “equal weight to historical risk premium and the prospective risk premium forecast”. As explained above, URCA surveyed a range of estimates of the MRP, including those based on historic data, forward-looking estimates, survey evidence and regulatory precedent. Then, by excluding outliers from these various sources, URCA developed a plausible range of MRP values. The forward-looking estimates considered by URCA fell comfortably within this range.

126. BTC proposed (in contradiction to the recommendations of Dr Morin) that the MRP should be calculated entirely on a forward-looking basis. BTC suggests that URCA’s backward-looking data on risk premiums may no longer be applicable if structural shifts, such as the recent financial crisis, have occurred. The phrase “structural shift” is potentially misleading here. It implies an event that has a permanent, or very long-lasting, effect on macroeconomic conditions. Financial crises, on the other

hand, are often followed by periods of recovery and growth. Viewed over a long period of time, they more closely resemble one-off shocks than structural shifts.

127. Some of the historic evidence used by URCA spans the past 108 years, during which several financial crises (e.g. the stock market crash of 1987 or the collapse of the dotcom bubble in the 1990s) have occurred. The motivation for looking at trends and averages over such a long period of time is to incorporate useful economic information from boom and bust periods, without placing undue emphasis on any one of these events. URCA is of the view that provided the historic data spans a reasonable period of time, it is entirely appropriate to employ backward-looking evidence on the MRP.

128. BTC provided a forward-looking estimate of the MRP by applying the constant DGM. Assuming that the current dividend yield on the S&P 500 index is 2.10%, that dividends grow will grow in perpetuity at between 9.16% and 10.29%, and that the (forward-looking) risk-free rate is 4.33%, BTC calculated the forward-looking MRP as 7.70%. This estimate exceeds the upper bound of the range proposed by URCA.

129. There are several methodological and conceptual difficulties with BTC's approach. Firstly, the expected growth in dividends is difficult to forecast, and users of the DGM (including BTC) typically appeal to earnings growth forecasts as a surrogate for dividend growth forecasts. In order to follow this approach, it is necessary to assume that forecasts do not systematically underestimate or overestimate earnings, and that growth forecasts are based on the same information that the market uses to value firms' stocks (Grinblatt and Titman, 2002, pp.388–390).<sup>62</sup> Secondly, dividend growth forecasts, which are generally only available for the short-to-medium-run, often exceed the long-run rate of economic growth. It seems unreasonable to assume that dividends will continue to grow indefinitely at between 9.16% and 10.29%.

130. A more realistic application of the DGM would be to assume that dividends grow initially (say over the next five years) at the forecast rates, and thereafter at the long-run rate economic growth. To illustrate the impact of respecifying the model in this way, URCA implemented the so-called two-stage DGM assuming:

- the current dividend yield on the S&P 500 is approximately 2.1%;
- dividends will grow over the next five years at either 9.16% (scenario 1) or 10.29% (scenario 2);
- the long-run rate of GDP growth in the US is approximately 5.0% per annum;
- the current risk-free rate is 4.7% (which is consistent with the risk-free rate determined by URCA above); and
- the total market capitalisation of the S&P 500 is currently US\$ 9,090,249 million (sourced from Thomson Datastream).

131. With these assumptions, the MRP calculated under scenario 1 using the two-stage DGM was approximately 2.9%, and the MRP under scenario 2 was approximately 3.1%. Both values were considerably lower than the value proposed by BTC, 7.70%. The difference arises because BTC assumed unrealistically that dividends earned by investors across the market would continue growing indefinitely at the very high rates forecast over the next five years.

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<sup>62</sup> Grinblatt, M., Titman, S. (2002), *Financial Markets and Corporate Strategy*, 2nd edition, McGraw-Hill: New York.

132. Having carefully considered the submissions received, URCA is satisfied that its original range for the MRP, 4.0% to 6.0%, is appropriate.

URCA determined a final MRP range of 4.0% to 6.0%, with a midpoint value of 5.0%

## 6.3 Equity country risk premium

133. The MRP estimated in the previous Section represents the excess return, over the riskless rate that equity investors can expect to earn in a representative economy. It was calculated by reference to the past and expected future excess returns for a broad cross section of countries.

134. However, it seems likely that equity investors in particularly small emerging economies, such as The Bahamas, may require a return even greater than the standard MRP — an equity country risk premium — in order to commit funds. Generic factors that explain country risk premiums may include, among other things, geopolitical or sovereign risk, dependency on other nations for trade or aid (which may amplify the sensitivity of local returns to foreign macroeconomic shocks), and restrictions on capital flows.<sup>63</sup>

135. The standard CAPM formula may be modified to incorporate the equity country risk premium (ECRP) as follows:

$$r_e = r_f + (MRP + ECRP)\beta_e$$

136. Professor Aswath Damodaran of Stern Business School, New York University, has estimated long-term equity country risk premiums for a range of countries, including The Bahamas.<sup>64</sup> His approach is the following. First, recent (January 2009) country credit ratings from Moody's are obtained (the rating for the Bahamas was A1), and the default spread for that rating (based on traded country bonds) over a default-free government bond rate is calculated. This is a measure of the country risk premium on debt (which is used later in Section 6.7).<sup>65</sup>

137. Next, the equity country risk premium is calculated by multiplying the country risk premium on debt by an estimate of the relative equity market volatility for that market — the standard deviation of the returns on the country's equity markets divided by the standard deviation of returns on the country's debt markets. To increase the precision of this estimate, Professor Damodaran uses the average relative equity market volatility for a large number of emerging economies, 1.5. Following this approach, Professor Damodaran obtains an equity country risk premium for The Bahamas of approximately 2.1%.

138. The relatively small estimate reflects the fact that the factors that drive such premiums, described in paragraph 134 above, are not particularly severe in the case of The Bahamas.

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<sup>63</sup> For a useful discussion on country risk premiums, see Ogier, T., Rugman, J., Spicer, L. (2004), *The Real Cost of Capital: A Business Field Guide to Better Financial Decisions*, Prentice Hall: Glasgow.

<sup>64</sup> See <http://pages.stern.nyu.edu/~adamodar/>.

<sup>65</sup> This country-spread model is also described in Morningstar (2009), p.121.

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139. URCA used a value of 2.1% as an estimate of The Bahamas risk premium required by equity investors in the SMP operators. URCA notes that ECTEL's 2008 Draft Manual on LRIC pricing also used Professor Damodaran's estimates of country risk premiums for Caribbean nations.<sup>66</sup>

140. BTC and CBL agreed that the approach set out above to estimate the country risk premium is reasonable, and that the estimated size of the premium is appropriate.

URCA determined a final equity country risk premium of 2.1%.

## **6.4 Gearing**

141. Gearing represents the relative weight of debt and equity financing of a business. Gearing is used in the cost of capital estimation process in two places: first, when transforming asset betas to equity betas (and vice versa);<sup>67</sup> and, second, when calculating the capital structure weights in the WACC formula.

Table 7. Actual gearing of SMP operators

	2008	2007
<b>BTC</b>		
Total debt*	61,527,000	71,536,000
<i>less</i> Cash	118,600,000	135,351,000
Net Debt	(57,073,000)	(63,815,000)
Total equity	436,904,000	446,003,000
<b>Gearing**</b>	<b>0.0%</b>	<b>0.0%</b>
<b>CBL</b>		
Total debt***	53,115,620	63,993,469
<i>less</i> Cash	6,254,779	4,817,180
Net Debt	46,860,841	59,176,289
Total equity	108,684,870	88,294,485

<sup>66</sup> See ECTEL (2008), Appendix IIA and IIB.

<sup>67</sup> Section 6.5 below defines and discusses equity and asset betas.

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Net debt plus total equity	155,545,711	147,470,774
<b>Gearing</b>	<b>30.1%</b>	<b>40.1%</b>

Source: Audited company accounts

Notes: \* Loans payable; \*\* Gearing taken to be zero since net debt is negative; \*\*\* Current portion of long term debt *plus* long term debt *plus* redeemable preference shares; all amounts reported in Bahamian dollars

142. Table 7 calculates the actual (book value) gearing for BTC for 2007 and CBL for 2007 and 2008 using data from the companies' published audited accounts. In the case of BTC, net debt (total debt less cash and cash equivalents) is negative, so gearing is taken to be zero. BTC's current capital structure may in large part be explained by the fact it is currently government owned. However, gearing, like all other elements of the cost of capital, must be forward-looking. It is conceivable that, following privatisation, BTC may become funded through a greater level of debt than is currently the case. URCA has taken this possibility into account when determining an appropriate level of gearing for BTC. CBL's gearing over the past two years has averaged approximately 35%.

143. Various regulators have taken different approaches to gearing. Some regulators have chosen to use the actual gearing of the regulated business. Other regulators have tended to use a notional, or 'optimal', level of gearing.<sup>68</sup> Table 8 plots some recent regulatory determinations on gearing and identifies the decisions that relied on notional gearing.

Table 8. Recent regulatory determinations on gearing

Determination	Fixed telephony	Mobile telephony	Data	Pay TV
TRA Bahrain (2009)	0.0%*	0.0%*	0.0%*	
Ofcom (2009a)				30%*
ICT A (2008)	45%*	35%*		
Ofcom (2009b)	35%*		35%*	
ComReg (2008)	30%* - 50%*			
ECTEL (2008)	45% - 83%	13% - 54%		
MCA (2008)	20%* - 40%*	10%* - 30%*		20%* - 40%*
OUR Guernsey (2008)	10%*			
TRA Bahrain (2005)	5%		5%	
Ofcom (2005a)		10% - 30%*		

<sup>68</sup> In the field of corporate finance, 'optimal' gearing is sometimes taken to mean the capital structure that minimises the company's expected cost of capital. This is achieved by trading off the tax advantages of debt against the expected costs of financial distress. Other considerations that companies may take into account when organising their debt policies may include the mitigation of free cash flow agency problems, or the availability of internal sources of finance.



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Ofcom (2005b)	30%* - 35%	30%* - 35%
NZ Commerce Commission (2005)	30%*	
Ofcom (2004)		30%* - 35%
JCRA (2004)	10%* - 30%*	10%* - 30%*
UK Competition Commission (2003)		10%

Notes: \* Notional/optimal gearing

144. The Table shows that communications regulators have typically applied gearing ratios of 10% to 50%.

145. The main rationale for employing actual gearing is to more closely reflect the true financial structure of the regulated business. This approach presumes that profit-maximising companies have appropriate incentives to optimise their borrowing so as to minimise their cost of capital, so there is no need for the regulator to impose restrictions or guidance on capital structure.

146. Other regulators have taken the view that, for various reasons, some companies may be prone to borrow too much. Such behaviour may impose two potential costs. Firstly, the cost of capital of the business will generally increase with the level of debt in the business (to reflect the increased credit risk), so excessive borrowing can lead to inefficiently high financing costs. Secondly, some businesses may borrow so much that they place themselves in danger of financial distress or complete default. In the case of essential services, these costs may eventually be passed through to consumers, which should be avoided. Thus, in order to discourage inefficiently high borrowing, and to lessen the risk of default, some regulators have chosen to apply a notional level of gearing that is consistent with maintaining an investment grade rating, when determining the cost of capital. Companies are free to borrow beyond this point, but they would not be compensated for the costs of doing so.

147. URCA supports the approach of employing notional gearing, although it also considers that it is useful to set this notional level of gearing with reference to the actual capital structures of companies that are comfortably of investment grade.

148. The “trade-off theory” of corporate debt suggests that companies identify their optimal level of gearing by weighing the tax benefits of debt against the increasing probability of financial distress with additional borrowing; as the proportion of debt in the business the effect of the interest tax shield becomes amplified, but so too does the probability of default since lenders have a larger claim on the cash flows of the company.

149. Recently, TRA Bahrain (2009) proposed that, since Bahraini companies face no corporate taxation and therefore enjoy no debt tax shield, the optimal level of gearing for Bahraini companies is 0% (see Table 8). Given that The Bahamas operates a similar tax regime to Bahrain, it is appropriate to consider whether a similar argument should apply for the purposes of this determination.

150. URCA notes that, according to the corporate finance literature, companies adopt corporate debt for several reasons that are unrelated to the tax advantages of borrowing. Some of these reasons include:

- the mitigation of free cash flow agency problems;<sup>69</sup>
- imperfect or incomplete capital markets;<sup>70</sup>
- the prospective costs of financial distress or bankruptcy;<sup>71</sup>
- the availability or shortage of internal finance;<sup>72</sup>
- the nature of strategic interactions between competitors, suppliers and customers;<sup>73</sup>
- whether or not the firm is in the market for corporate control;<sup>74</sup> and
- the firm's growth prospects.<sup>75</sup>

151. The notion that corporate debt policies are not solely determined by the tax advantages of debt is supported by the observation that CBL has a reasonably substantial level of debt (as shown in Table 7). This suggests to URCA that it would not be sensible to apply a notional gearing of 0%.

152. In order to determine an appropriate notional level of gearing, URCA took the following steps:

- First, calculate the actual gearing ratios for each of the comparator fixed telephony, mobile telephony, fixed and mobile telephony, and pay TV companies. This is done by taking the average (over at least five years) value of total debt, subtracting cash and cash equivalents, and then dividing by the sum of average total debt and average (over the same time period) market capitalisation of the company.<sup>76</sup>
- Second, examine the current credit ratings for each of these companies and drop any with grade worse than a Standard & Poor's rating of A-.
- Third, using the remaining firms in the sample, exercise judgment to identify a sensible level of notional gearing.

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<sup>69</sup> Jensen, M. C. (1986), "Agency Costs of Free Cash Flow, Corporate Finance and Takeovers", *American Economic Review* 76(2), 323–329.

<sup>70</sup> Rose, J. R. (1959), "The Cost of Capital, Corporation Finance, and the Theory of Investment: Comment", *American Economic Review* 49(4), 638–639; Modigliani, F., Miller, M. H. (1963), "Corporate Income Taxes and the Cost of Capital: A Correction", *American Economic Review* 53(3), 433–443.

<sup>71</sup> Myers, S. C. (1984), "The Capital Structure Puzzle", *Journal of Finance* 39(3), 575–592

<sup>72</sup> Myers, S. C., Majluf, N. S. (1984), "Corporate Financing and Investment Decisions When Firms Have Information That Investors Do Not Have", *Journal of Financial Economics* 13(2), 187–221

<sup>73</sup> Harris, M., Raviv, A. (1991), "The Theory of Capital Structure", *Journal of Finance* 46(1), 297–355

<sup>74</sup> Harris, M., Raviv, A. (1988), "Corporate Control Contests and Capital Structure", *Journal of Financial Economics* 20, 55–86; Stulz, R. (1988), "Managerial Control of Voting Rights: Financing Policies and the Market for Corporate Control", *Journal of Financial Economics* 20, 25–54.

<sup>75</sup> Graham, J. R. (2000), "How Big Are the Tax Benefits of Debt?", *Journal of Finance* 55(5), 1901–1941

<sup>76</sup> The reason for deducting cash and cash equivalents is because when firms issue debt, they often do so in tranches much larger than they use immediately; some of the debt capital is used immediately but the residual is retained in the business as cash. The retained cash needs to be deducted from total debt because it has not in effect added to the company's gearing. The theoretically correct approach would be to deduct only the incremental cash from borrowing, rather than all cash balances, but in practice it is impossible to identify what the incremental amount is. The pragmatic solution is to deduct all cash balances.

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153. URCA identified from Thomson Datastream 16 electronic communications companies with a current S&P or Fitch rating of A- or better, for whom gearing data were available. These companies are listed in Table 9.

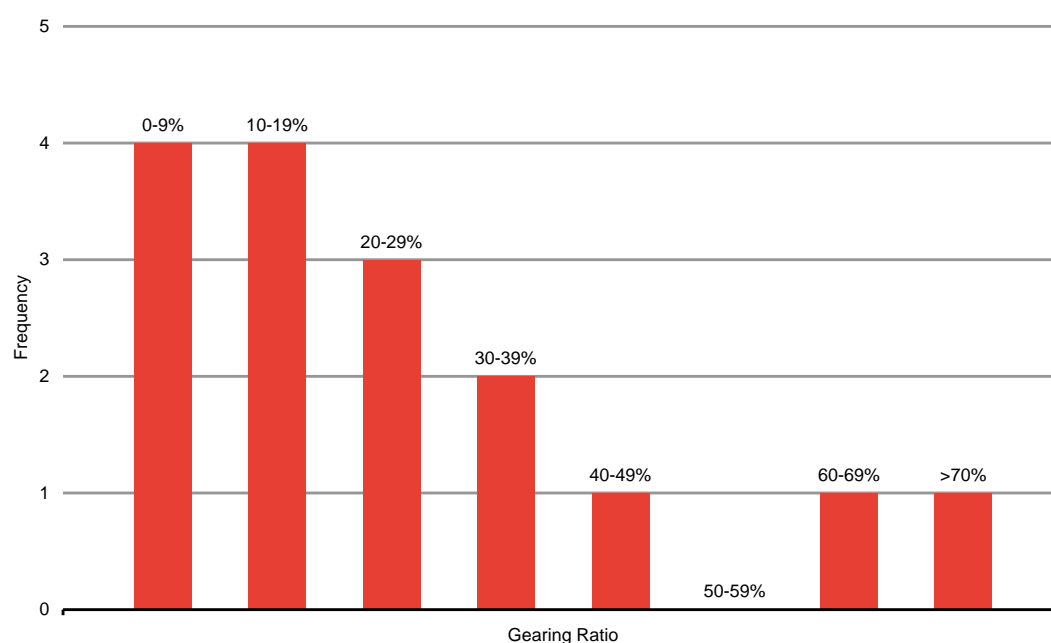
Table 9. Sample of global A- rated telephony companies

Company	Country	Company	Country
AT&T Inc	United States	Singapore Telecom	Singapore
Belgacom SA	Belgium	Swisscom AG	Switzerland
China Mobile	China	Telefonica Emisiones SAU	Spain
China Telecom 'H'	China	Telekom Malaysia	Malaysia
Chunghwa Telecom	Taiwan	Telenor	Norway
France Telecom	France	Telefonica O2 Czech Republic	Czech Republic
KT Corporation	South Korea	Verizon Communications	United States
Qatar Telecom	Qatar	Vodafone Group Plc	United Kingdom

Source: Thomson Datastream, Telegeography

154. Figure 6 plots the frequency distribution of these comparator companies' average gearing ratios; the horizontal axis presents gearing bands, while the vertical measures the number of companies from our sample within each of those bands.

Figure 6. Frequency distribution of gearing ratios of global A- rated telephony companies



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Source: Thomson Datastream, S&P, Fitch Ratings, URCA analysis

155. The chart suggests that the clear majority (nearly 70%) of the companies operate with ratios within the range 0% to 30%. This is comfortably within the gearing range allowed by other regulators recently, 0% to 50%.

156. For the reasons discussed above, URCA considers it unlikely that a gearing ratio of 0% is optimal for Bahamian companies. Therefore, URCA applied a gearing range of 10% to 30%, with a midpoint value of 20%. CBL and BTC both agreed that URCA's proposed notional gearing range was appropriate.

157. For this Final Determination, URCA has continued to apply a gearing range of 10% to 30%, with a midpoint value of 20%.

URCA determined a final gearing range of 10% to 30%, with a midpoint value of 20%.

## 6.5 Equity beta

158. The equity beta measures the exposure of a common stock to systematic risk. It also captures the impact of financial structure on the risk faced by the business; typically, the greater the level of debt in the business, the greater will be the equity beta. If this effect is removed one is left with the asset beta, which measures the systematic risk associated with the activity of the business.

159. Examples of factors that affect equity betas are:

- **Economy-wide demand shocks.** Because unexpected changes in aggregate demand affect all businesses in the economy, the risk associated with these shocks cannot be diversified away. Firms' exposure to such shocks will depend on the sensitivity of costs and revenues to the state of the economy.
- **Regulatory regime.** Under low-powered incentive regimes (e.g. traditional US rate of return style regulation) companies are less exposed to unexpected macroeconomic cost shocks because these can more easily be passed through to customers. In contrast, under high-powered incentive regimes, with low cost pass-through, the business is more exposed to economy-wide shocks.
- **Inflation.** Both anticipated and unanticipated inflation can alter the costs faced by the economic agents that firms interact with. These agents include customers, suppliers, lenders and the government. Such economy-wide cost adjustments will affect the variability of companies' profits and, therefore, the level of non-diversifiable risk they face.
- **Real interest rates.** Unexpected changes in real interest rates, and in the term structure of interest rates (i.e. the spread between real yields on short-dated and long-dated bonds), will affect the discount rates at which projects are valued. Companies with long-lived (e.g. infrastructure) assets in particular will be exposed to interest rate risk. Some interest rate risk may be eliminated in interest rate swap markets, but there will usually remain some residual risk that cannot be hedged away.
- **Financial leverage.** An increase in a company's financial leverage — the ratio of debt to total capital — tends to scale up the volatility of returns to shareholders. Because obligated payments on debt do not vary with the level of revenues, and debt holders have a priority call over equity holders on cash flows, financial leverage magnifies the non-diversifiable risk of the cash flows distributable to equity holders.

- **Growth opportunities and operational flexibility.** Businesses with more growth opportunities tend to have greater exposure to non-diversifiable risk because: (i) expansion often adds leverage, which increases the sensitivity of the company's cash flows to market movements; and (ii) since companies with more growth opportunities have cash flows with longer duration, their values tend to be more responsive to changes in macroeconomic factors such as interest rates.

By contrast, businesses that can easily contract or suspend operations when market conditions turn unfavourable should be less sensitive to unexpected changes in macroeconomic conditions, and their betas should be commensurately lower. Businesses with large shutdown/resumption costs that are sunk will find abandonment/suspension difficult, and will therefore face greater exposure to market risk.

160. To the extent that businesses face different exposures to these factors, their betas (and, therefore, their costs of capital) will differ also.<sup>77</sup>

161. URCA is of the view that the characteristics of each of the relevant SMP markets may be sufficiently different that it would be inappropriate to a priori assume a single cost of capital for all of them without first assessing the potential differences in beta values for companies operating in each market. For instance, fixed voice services are mature offerings, with relatively inelastic retail demand (reflecting the commoditised nature of the product) and stable costs over time. In contrast, mobile services markets, like high speed data markets, are newer and highly dynamic: they are characterised by fast-moving technology and rapid innovation. In addition, costs in these markets tend to be more volatile than those associated with fixed voice markets, and demand (measured by customer churn) tends to be relatively more elastic. The very high uptake of cable TV services in The Bahamas (i.e. in excess of 90% penetration) is suggestive that demand for these services may not be particularly sensitive to macroeconomic conditions. Table 10 compares the four relevant SMP markets across a number of risk drivers.

162. Given these differences it would seem appropriate to investigate any possible differences by individually estimating the betas for each of the relevant SMP services. If, as an empirical matter, the estimates prove to be quite similar across markets, there may be value in simplifying the approach by applying a common cost of capital to one or more markets.

163. URCA also considered whether it ought to estimate separate betas for telephony (voice and data) wholesale and retail services, since provision of retail services likely entails greater exposure to systematic risk than provision of wholesale services. The reasons for possible differences in risk profiles are mainly the following:

- demand for retail services tends to be more sensitive to macroeconomic shocks than demand for wholesale services; and
- suppliers of retail services tend to face a greater threat of competition than suppliers of wholesale services.

164. However, there are considerable practical difficulties in estimating separate wholesale and retail betas, primarily due to the paucity of relevant returns data. In particular, it is difficult to find a sufficiently large sample of listed pureplay, retail or wholesale telephony companies to obtain

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<sup>77</sup> In fact, beta is the only WACC parameter in this determination that varies across the SMP markets; all other parameters are assumed constant across markets.

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statistically sound beta estimates.<sup>78</sup> Furthermore, URCA is unaware of any approach for reliably decomposing the betas of integrated telephony companies into wholesale and retail components.

165. Therefore, for pragmatic reasons, URCA has not estimated separate wholesale and retail telephony betas.

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<sup>78</sup> In contrast, as demonstrated below, it is feasible to construct reasonably large samples of listed pureplay fixed telephony and mobile telephony providers for estimation purposes.

Table 10. Comparison of risk drivers for SMP providers in individual SMP markets

Driver	Fixed voice	Mobile voice and data	High speed data	Pay TV
Overall demand volume	<p>Uncertain future retail market share due to competition</p> <p>Demand for call services cyclical to some extent, but less so than mobile voice services</p>	<p>Uncertain future retail market share due to competition. In other jurisdictions (e.g., Jamaica), entry has had significant impact on incumbent's market share</p> <p>Some potential for overall growth (penetration) in the market</p> <p>Potential for the emergence of new services</p>	<p>Overall demand relatively uncertain due to nascent nature of services</p> <p>Uncertain retail market share due to potential impact of competition</p>	<p>In The Bahamas, demand split between residential and business (hospitality industry) customers</p> <p>Very high penetration rates suggest that demand may be fairly inelastic</p> <p>Uncertain impact of various technologies (cable, satellite) on market share and growth</p>
Forward looking prices	Market liberalisation and competition likely to lead to downward pressure on some prices	Market liberalisation and competition likely to lead to downward pressure on prices	Market liberalisation and competition likely to lead to downward pressure on prices	Potential for competing technologies may place downward pressure on prices
Forward looking operational expenditure	Relatively stable opex over time, typically related to provision of network services	Majority of opex likely to be in the provision of network services. May also have relatively high retail costs	Majority of opex likely to be in the provision of network services	Majority of opex likely to be in the provision of network service
Forward looking capital expenditure	Relatively stable capex over time for voice services, although BTC is currently in the process of upgrading its network to a NGN platform	Majority of capex likely to be in the provision of network services	Relatively stable capex over time, typically related to provision of network services, although some large network upgrades can occur from time to time	Majority of capex likely to be in the provision of network services

## 6.5.1 Evidence from past regulatory decisions

166. Table 11 summarises some recent regulatory determinations from various jurisdictions on the equity beta.

Table 11. Recent regulatory determinations on equity beta

Determination	Fixed telephony	Mobile telephony	Data*	Pay TV
TRA Bahrain (2009)	0.6 – 1.0	0.6 – 1.0	0.6 – 1.0	
Ofcom (2009a)				0.85
ICT A (2008)	0.9	1.1		
Ofcom (2009b)	0.8 – 0.9**		1.0 – 1.1**	
TAT&T (2008)		>1.0		
OUR Jamaica (2008)	0.7***		0.7***	
ComReg (2008)	0.6 – 1.4			
ECTEL (2008)	1.0 – 1.4	0.9 – 1.8		
MCA (2008)	0.9 – 1.4	1.1 – 1.3		0.9 – 1.4
OUR Guernsey (2008)	0.9 – 1.1			
TRA Bahrain (2005)	1.0 – 1.2		1.0 – 1.2	
Ofcom (2005a)		1.0 – 1.9		
Ofcom (2005b)	0.8 – 0.9**		1.1 – 1.2**	
NZ Commerce Commission (2005)	0.7 – 1.1			
Ofcom (2004)			1.3****	
JCRA (2004)	0.8 – 1.0	0.8 – 1.0		
UK Competition Commission (2003)		1.0 – 1.6		

Notes: All values rounded to one decimal place; as these are equity betas, the reported values partly reflect the gearing assumptions made by the regulator; \* although not always explicitly stated, fixed telephony and pay TV operators will tend to offer data services; \*\* in this determination Ofcom determined a beta for the copper access network (which URCA has classified as a 'fixed telephony' beta) and separate beta for the "rest of BT" (which URCA has classified as a beta for high-value services, such as data services); \*\*\* this determination related only to interconnection, retail and data services provided by C&W Jamaica, but OUR Jamaica applied a beta for the whole of C&W Jamaica notwithstanding that the operator also provides mobile services; \*\*\*\* this determination related to the setting of wholesale rates for access to partial private circuit segments, but Ofcom employed a beta for the whole of the BT Group when determining rates.

167. When interpreting these results, it is important to recognise that most regulators have focussed their attention on the regulation of fixed telephony services and mobile telephony services; few have determined the cost of capital separately for data services or pay TV services. Most fixed telephony, mobile telephony and pay TV operators now provide data services over their networks. When determining betas for fixed voice calling, mobile voice calling and pay TV operations, regulators tend not to remove the influence of data service provision, due to the practical estimation difficulties associated with doing so.



168. These various determinations suggest that some plausible equity beta estimates for: fixed telephony services are in the range 0.6 – 1.4; mobile telephony services are in the range 0.9 – 1.9; data services are in the range 1.1 – 1.3; and pay TV services are in the range 0.9 – 1.4.

## **6.5.2 Empirical estimation**

169. Equity betas are estimated as the coefficient of the regression of the company's equity returns against the returns for the market as a whole.

170. As BTC is currently wholly state-owned, there are no stock returns data for the company. And, whilst CBL is listed on The Bahamas International Securities Exchange, URCA was unable to obtain any share price data for the company. Finally, even if a larger sample of Bahamian comparator companies were available, thin trading on the Bahamas International Securities Exchange would raise doubts around significant reliance on Bahamian share price data. In the absence useable local data, URCA had to rely on stock price data for comparator companies from other countries in order to obtain its own estimates of beta.

171. Ideally, the comparator companies used for this exercise should be pureplay firms, i.e. those exclusively engaged in the relevant activity to the exclusion of all others. However, it is difficult to find a sufficient number of such comparators. For example, traditional fixed line telephony operators have, over time moved into providing mobile and data services; many mobile operators now offer wireless data services; and some cable TV companies have started to offer telecommunications services over their networks. In the absence of completely pureplay comparators, URCA had to rely on close-to-pureplay comparators, i.e. companies whose main activities comprise the activities of interest.

172. Daily share price data over the past 15 years were collected from Thomson Datastream for the following categories of companies:

- 13 close-to-pureplay fixed telephony companies;
- 19 close-to-pureplay mobile telephony companies; and
- 13 pay TV companies.

173. In addition, daily stock index data for the same 15 year period, for each of the markets containing the primary listings of the sample companies above were collected.

174. Next, equity betas for each of the sample companies were estimated:

- for the last one year period (ending July 2009);
- for the last three year period; and
- for the last five year period.

175. The estimated equity betas for the comparator firms will partly reflect financial gearing, which will vary from company to company. In order to compare betas across companies, it was necessary to remove the effect of gearing. This was done by transforming the estimated equity betas into asset betas. Then, once sensible ranges for the asset betas are obtained, the estimates must be transformed back to equity betas for use in the CAPM. This is done using the notional level of gearing determined earlier in Section 6.4.

176. The technical details of the beta estimation procedure, including a description of the approach used to de-gear equity betas to asset betas, and then to re-gear, are set out in the attached Appendix.

### **6.5.2.1 Results presented in the Consultation**

177. The Tables in the Appendix report, for each of the comparator companies considered, the estimated equity beta, associated standard error (which is a measure of the statistical precision of the estimates),

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and the estimated asset beta. The estimated asset betas for each of the subsamples, and the implied equity betas (consistent with a gearing level of 20%) are summarised below in Table 12.

178. The median of the asset beta estimates for close-to-pureplay fixed telephony companies ranged between 0.4 and 0.6 over time periods; the mean of the estimates ranged between 0.5 and 0.6. The high and low values for the betas were calculated by adding and subtracting, respectively, one standard deviation to the mean values. So, for example, the high value for fixed telephony operators over the one year estimation period, 0.7, was calculated by adding one standard deviation across fixed telephony companies, 0.2, to the mean asset beta across companies, 0.5.

179. As noted above, it is difficult to identify truly pureplay operators in the industry since telephony companies — fixed telephony companies in particular — have, over time, broadened their product offerings and adopted new technologies. Therefore, URCA has had to rely on data on close-to-pureplay companies for benchmarking purposes. In order to cross-check the estimates for the fixed telephony companies, URCA also estimated betas for the available fixed telephony comparators using data over the period 1995 to 1999 — a period in which many of the sample companies would likely have been closer to pureplay than they currently are, since many of the present product offerings had not yet emerged. The median value of the asset beta estimates, which are presented in Table 24, was approximately 0.6; the mean value of the estimates was between 0.6 and 0.7. This broadly agrees with the estimates obtained using more current data, and suggests that although fixed telephony companies have diversified their activities over time, this broadening of scope has not altered their risk profiles appreciably.

Table 12. Summary of beta estimates across various time periods (ending July 2009)

Operator		1 year		3 year		5 year	
		Asset beta	Equity beta	Asset beta	Equity beta	Asset beta	Equity beta
Fixed	Median	0.4	0.5	0.5	0.6	0.6	0.7
	Mean	0.5	0.6	0.5	0.7	0.6	0.7
	Std dev	0.2		0.2		0.2	
	High	0.6	0.8	0.7	0.9	0.7	0.9
	Low	0.3	0.4	0.4	0.5	0.4	0.5
	Mobile	Median	0.6	0.7	0.7	0.9	0.8
	Mean	0.6	0.8	0.7	0.9	0.7	0.9
	Std dev	0.3		0.3		0.3	
	High	0.9	1.2	1.0	1.3	1.1	1.3
	Low	0.3	0.4	0.4	0.5	0.4	0.5
Pay TV	Median	0.4	0.5	0.6	0.7	0.6	0.8
	Mean	0.4	0.5	0.5	0.6	0.5	0.7
	Std dev	0.2		0.2		0.2	
	High	0.6	0.7	0.7	0.9	0.7	0.9
	Low	0.2	0.2	0.3	0.4	0.4	0.4

Notes: Asset betas were converted to equity betas using the Miller adjustment (see Appendix) using a notional gearing of 20%; all values rounded to one decimal place

180. The median of the asset beta estimates for mobile telephony companies ranged between 0.6 and 0.8 across time periods; the mean of the estimates fell within the range 0.6 and 0.7. As expected, the data suggests that the operations of mobile telephony companies are riskier than those of fixed telephony companies, though not by a substantial margin. The median of the asset beta estimates for pay TV companies ranged between 0.4 and 0.6 across time periods; the mean of the estimates ranged between 0.4 and 0.5.

181. Table 12 suggests that the betas of all the companies estimated using data over just the past one year are universally smaller than betas estimated over longer horizons. This is not surprising since the impact of large macroeconomic changes, such as the recent financial crisis, generally only feed through to betas gradually over time. Therefore, in the Consultation URCA placed more weight on medium-term estimates than very short-run (one-year) estimates. The estimated high and low values for the three-year and five-year periods suggested the following ranges for asset betas:

- fixed telephony – 0.4 to 0.7;
- mobile telephony – 0.4 to 1.1; and
- pay TV – 0.3 to 0.7.

182. From regulatory precedent in other jurisdictions, its qualitative assessment of the risk drivers for each market and its quantitative assessment, URCA considers that it is reasonable to expect the asset beta for a pureplay fixed telephony operators to be lower than that for pureplay mobile operators. The demand for mobile services is more variable, whilst the impact of end-to-end competition may also be greater on a mobile operator than on an incumbent fixed telephony provider. Both of these factors point to a relatively higher beta for a pureplay mobile operator.

183. There is less international precedent on the relative levels of beta for cable TV providers and data service providers (both relative to each other and relative to fixed and mobile telephony). However, taking into account the specific conditions of the Bahamian market (in particular, the high levels of penetration of cable TV), URCA considers that it is reasonable to expect the asset beta for CBL's cable TV business to be similar to that for BTC's fixed telephony business, although potentially with a slightly higher upper end to the range, reflecting the possibility of greater future competition for cable TV services.<sup>79</sup>

184. Of the four markets considered by URCA in this consultation, the data market is the most nascent. Given the unavailability of even close-to-pureplay data service operators, it was not possible to directly estimate a corresponding range for such providers. In coming to a view on a suitable range for such operators, URCA had to exercise its judgment, taking into account the qualitative features of data service providers.

185. URCA's preliminary view was that since fixed telephony, mobile telephony and pay TV operators all provide data services, the risk profile of data service companies will be a blend of the risks faced by fixed telephony, mobile telephony and pay TV operators. The take-up of data services is lower than the take up of cable TV, and fixed and mobile voice services. As such, the potential uncertainty over the take up of a nascent product could point to a relatively higher asset beta for the high speed data market, perhaps comparable to the beta values for mobile companies before mobile services became more established. However, full end-to-end competition in the provision of high speed data services may be less prevalent

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<sup>79</sup> Requirement for tariff rebalancing in the retail fixed telephony market may, in the short term, reduce the potential impact of competition in this market.

than that for mobile telephony services. This factor would be expected to have a downward impact on the relative level of the asset beta for a data service provider, compared to a mobile operator.

186. Using the empirically estimated asset betas summarised in paragraph 181 as a starting point, and its judgment on the qualitative features of the SMP markets in The Bahamas, URCA determine the following asset beta ranges:

- fixed telephony – 0.4 to 0.7;
- mobile telephony – 0.6 to 1.1;
- data services – 0.4 to 0.8; and
- pay TV – 0.4 to 0.9.

187. With a gearing range of 10% to 30%, the corresponding equity beta ranges are:

- fixed telephony – 0.4 to 1.0;
- mobile telephony – 0.7 to 1.6;
- data services – 0.4 to 1.1; and
- pay TV – 0.4 to 1.3.

188. The equity beta ranges estimated by various regulators (presented in Table 11) for the same categories are:

- fixed telephony – 0.6 to 1.4;
- mobile telephony – 0.9 to 1.9;
- data services – 0.6 to 1.3; and
- pay TV – 0.9 to 1.4.

189. URCA's estimated ranges for the fixed telephony, mobile telephony and data services markets are largely in line with the corresponding ranges allowed by other regulators.<sup>80</sup> The upper bound of URCA's range for pay TV services is also broadly consistent with that of other regulators'. However, the URCA's lower bound estimate for this market is considerably lower than that used by MCA (2008) and Ofcom (2009a). It is possible that a wider set of regulatory determinations on pay TV services, were they available, would produce a broader range of equity beta estimates.

190. Considered in the round, URCA is of the view that its equity beta estimates are reasonable. These estimates are summarised in Table 13:

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<sup>80</sup> At least some of these differences are due to variations in gearing assumptions between URCA and other regulators.

Table 13. Beta values proposed by URCA in the Consultation

	Low	High
Fixed Voice	0.4	1.0
Mobile Voice and Mobile Data	0.7	1.6
High Speed Data and Connectivity	0.4	1.1
Pay TV	0.4	1.3

### 6.5.2.2 Responses from the SMP operators

191. BTC and CBL agreed that separate betas should be determined for each of the relevant markets, but submitted that URCA had underestimated the appropriate betas in the Consultation. In proposing their own beta estimates, both operators proposed alternative peer groups: BTC suggested an alternative set of fixed and mobile comparators; and CBL agreed with the pay TV peer group used by URCA but suggested a set of data services comparators not considered by URCA. BTC also argued that URCA should use betas adjusted for the tendency to revert towards the beta of the market portfolio, rather than so-called “raw” betas.

192. In selecting its peer group of fixed and mobile operators, BTC applied two filters to identify those companies that were most relevant. Firstly, BTC screened for close-to-pureplay operators by excluding from the peer group any company that had a revenue contribution of less than 60% from fixed, or mobile, services. URCA agrees in principle that this may be a useful criterion for identifying comparators, but notes that it can be difficult to implement such a filter properly. In particular, BTC used revenue contributions from a single year only, 2008, on the grounds that historic revenue contributions provide outdated information. However, companies often alter their activities over time, and diversify into new markets as they grow and as new opportunities emerge. Companies also withdraw from some markets as competitors take greater market share, or as consumer preferences change over time. Therefore, if such a filter is to be applied, average revenue contributions over a number of years may be more appropriate.

193. As discussed earlier, it is impossible to identify a set of perfect comparators; some companies in the sample will invariably be better matches to the company of interest than others. A pragmatic approach is to choose the peer group by including companies involved in broadly similar activities, and rule out companies that are obviously not. URCA did this by examining the description of the companies’ activities reported by Thomson Datastream, and also the companies’ annual reports. In addition, as explained in paragraph earlier, URCA determines the reasonableness of its recent beta estimates for fixed operators by repeating the estimation exercise for the available fixed telephony comparators using data over the period 1995 to 1999 — a period in which many of the sample companies would likely have been closer to pureplay than they currently are.

194. The second filter applied by BTC involved ruling out very large companies (i.e. those with a market capitalisation of US\$15 billion or more), on the basis that the risk profile of smaller providers is more likely to match BTC’s. To support this approach, BTC cited the small company risk discount theory, which states that “small companies often have limited access to capital, limited ability to weather a market downturn, limited resources to develop and market new products, and so on”. URCA does not deny the insights provided by the small company risk discount theory, but notes that in setting the cost of capital it has allowed the SMP operators country risk premiums on the cost of equity and on the cost of debt. These premiums partly reflect the fact that Bahamian companies are generally smaller, are less well resourced and have more limited access to capital markets than many overseas firms. Therefore, these

allowances already allow for the small company effect, and making further allowances by excluding large companies from the peer group may amount to double-counting.

195. BTC then sourced two year betas, estimated using weekly returns data, for 13 fixed and 13 mobile peers from Bloomberg. BTC's suggested beta for fixed operators was 0.87, which is within the beta range proposed by URCA in the Consultation, but above the midpoint value, 0.7, used. BTC's suggested beta for mobile operators was 0.90, which is towards the top end of the range proposed but well within the range proposed by URCA in the Consultation, and below the midpoint value, 1.1, used.<sup>81</sup>

196. URCA has carefully considered BTC's approach to estimating betas and sees no reason to set aside the peer groups of fixed and mobile originally used in the Consultation. URCA acknowledges that its comparator groups are not exhaustive, but considers that they are sufficiently large and representative so as to obtain reasonable estimates of beta.

197. CBL accepted that URCA's pay TV group of peer companies was representative and appropriate. However, CBL considered that URCA's estimates for these companies appeared too low, so sourced five-year raw betas, estimated using monthly returns, for these companies from Bloomberg. The Bloomberg estimates were similar to many of URCA's, but the estimates for some companies were significantly different. Based on these estimates, CBL proposed a beta range of 0.4 to 1.6, with a midpoint value of 1.0.

198. CBL objected to URCA's approach to determining the beta range for data service providers. In the Consultation, URCA was of the preliminary view that it was not feasible to identify a sufficiently robust peer group of close-to-pure-play operators. Therefore, URCA made an assessment of the likely beta range based on the qualitative features of data service providers, vis-à-vis their similarities and dissimilarities to fixed, mobile and pay TV companies.

199. In submissions, CBL identified a group of 13 high speed data providers that may be suitable peer companies. CBL then sourced five-year monthly betas for these operators, and these estimates implied a beta range for data services of 0.5 to 1.8, with a midpoint value of 1.15.

200. URCA remains of the mind that its approach in the Consultation of viewing the risk-profile of high speed data operators to be a blend of the risks faced by fixed line, mobile and cable TV operators is reasonable. URCA points out that high speed data services are delivered over fixed line, mobile and cable TV networks. In addition, as discussed in the previous section, high speed data services share some of the demand characteristics of other services, such as mobile telephony.

201. Nevertheless, URCA has considered the high speed data comparators proposed by CBL and agrees that they are a reasonable set of peers on which to make an assessment of beta. In coming to this view, URCA notes that many of the providers suggested by CBL also offer telephony or pay TV services, which lends further weight to the qualitative assessment URCA made in the Consultation. The results of URCA's own empirical estimates for this peer group are presented in the next section.

202. A potentially major limitation with the SMP operators' approach is their use of betas estimated using low-frequency returns data: BTC proposed weekly betas, and CBL proposed monthly betas. Wright et al (2003) show that the precision of beta estimates increases with the frequency of the underlying returns data because the number of observations available over the relevant estimation period increases with higher frequency data.<sup>82</sup> The authors of that study estimated the beta for Vodafone over a five year

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<sup>81</sup> URCA questioned why the two betas proposed by BTC should be so similar, and BTC responded in cross-submissions that "the betas for mobile and fixed carriers have been converging over the past seven or so years, with the betas of mobile carriers declining over time, and fixed betas rising somewhat over time". See BTC letter to URCA, Re: Preliminary Determination on Cost of Capital, dated 14 October 2009, p.2.

<sup>82</sup> Wright, S., Mason, R., Miles, D. (2003), "A Study into Certain Aspects of the Cost of Capital for Regulated Utilities in the

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period and showed that not only did the actual beta estimate vary as the frequency of data changed, but the standard error of the daily estimate was almost a quarter the size of the standard error of the monthly estimate, and more than half the size of the standard error of the weekly estimate.<sup>83</sup> Furthermore, it is well-recognised that weekly and monthly estimates can vary considerably over the same estimation period, depending on which days (within the week or month) are used as reference points to calculate returns.<sup>84</sup> This is a problem that daily estimates do not suffer from.

203. These two factors—low frequency and day-of-the-week, or day-of-the-month, effects—largely explain why CBL’s pay TV estimates diverged from URCA’s, even though a common peer group was employed. To demonstrate this point, URCA re-estimated the five-year betas of the pay TV peer group using monthly, rather than daily, data. Table 14 presents the results against CBL’s five year monthly betas.

Table 14. Comparison of CBL's and URCA's raw five year pay TV betas

Company	CBL monthly	URCA monthly		URCA daily		% diff in std. error
	Equity beta	Equity beta	Std. Error	Equity beta	Std. error	
Virgin Media Inc	1.70	1.68	0.25	1.69	0.05	-418%
BSkyB Group	0.74	0.74	0.15	0.82	0.03	-356%
Cablevision Systems Corp	1.68	1.79	0.26	1.10	0.05	-450%
Comcast Corporation	0.82	0.96	0.14	1.13	0.03	-368%
Crown Media Holdings Inc	1.76	1.47	0.39	1.07	0.07	-436%
Dish Network Corp	1.38	1.12	0.17	1.12	0.04	-294%
Liberty Global Inc	1.62	2.07	0.21	1.22	0.04	-451%
Liberty Media Corp	2.63	1.70	0.31	1.30	0.06	-403%
Lodgenet Entertainment Corp	4.78	3.11	0.53	1.07	0.10	-449%
Mediaset Spa	0.83	0.70	0.11	0.72	0.03	-335%
Shaw Communications Inc	0.34	0.44	0.14	0.51	0.03	-387%
Time Warner Cable Inc	0.97	0.31	0.45	0.85	0.09	-412%
Vivendi	0.76	0.71	0.11	0.78	0.02	-406%

U.K.”, a Smith & Co. Ltd. report to the OFT and U.K. economic regulators.

<sup>83</sup> One potential weakness of using daily data is that the estimates can be biased by thinly traded stocks. However, URCA checked for this problem by examining companies’ bid-ask spreads and the stickiness of quoted prices through time; companies that were found to be thinly traded were dropped from the sample.

<sup>84</sup> See for instance Acker, D., Duck, N. W. (2006), “Reference-Day Risk and the Use of Monthly Returns Data: A Warning Note”, Discussion Paper No. 04/557.

204. In most cases, URCA's betas move closer to CBL's when estimated using monthly rather than daily data. However, what is clear is that standard errors of the estimates fall by a factor of three to four times when daily data are used in place of monthly data. In other words, the precision of the estimates are considerably improved with high-frequency data. Therefore, URCA is of the view that it is more appropriate to use daily beta estimates, wherever possible.

205. BTC argued that URCA should employ "adjusted" rather than "raw" betas. There are two main reasons why raw beta estimates may need to be adjusted. Firstly, there may be unavoidable imprecision in estimates (even with good data, covering a long period of time). This may call for the use of out-of-sample (prior) information — such as a view about the size of the industry beta, or a belief that the true beta for the company lies closer to the market beta of one — to adjust the raw estimates. Secondly, there is some evidence that the betas of many companies have a tendency to converge towards the market average of one over time.

206. A common method of adjusting raw betas is the so-called Blume (1971, 1975) approach.<sup>85</sup> The Blume approach adjusts for the possibility that betas are probably mean reverting towards one. It involves weighting the raw estimate with a proportion of 2/3 and the market beta of one with a proportion of 1/3. Regardless of whether the raw estimate lies above or below one, the effect of this weighting scheme is to move it closer towards the market beta.

207. URCA notes that there is a significant body of literature, both from academic sources and practitioners, on the merits of employing adjusted betas. Furthermore, a number of commercial data services (such as Bloomberg and Merrill Lynch) use adjusted betas. URCA therefore considers it is reasonable to apply the Blume adjustment. The results are presented in the next section.

### **6.5.2.3 URCA's updated estimates**

208. In updating its beta estimates, URCA:

- applied Blume adjustments to all raw equity betas; and
- estimated daily betas for the high speed data peer group proposed by CBL.

209. Table 26 to Table 29 present URCA's updated beta estimates. The empirical estimates are summarised below in Table 15.

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<sup>85</sup> Blume, M. E. (1971), "On the Assessment of Risk", *Journal of Finance* 26(1), 1–10; Blume, M. E. (1975), "Betas and Their Regression Tendencies", *Journal of Finance* 30(3), 785–795.



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Table 15. Summary of Blume-adjusted beta estimates across various time periods (ending July 2009)

Operator		1 year		3 year		5 year	
		Asset beta	Equity beta	Asset beta	Equity beta	Asset beta	Equity beta
<b>Fixed</b>	Median	0.5	0.6	0.6	0.8	0.6	0.7
	Mean	0.6	0.7	0.6	0.8	0.6	0.8
	Std dev	0.2		0.2		0.1	
	High	0.7	0.9	0.8	1.0	0.8	1.0
	Low	0.4	0.5	0.5	0.6	0.5	0.6
	Median	0.6	0.8	0.7	0.9	0.8	1.0
<b>Mobile</b>	Mean	0.6	0.8	0.7	0.9	0.7	0.9
	Std dev	0.3		0.3		0.3	
	High	0.9	1.1	1.0	1.2	1.0	1.3
	Low	0.3	0.4	0.4	0.6	0.4	0.6
	Median	0.5	0.6	0.6	0.7	0.6	0.8
	Mean	0.6	0.7	0.6	0.8	0.7	0.8
<b>Data</b>	Std dev	0.2		0.3		0.3	
	High	0.8	1.0	0.9	1.1	0.9	1.2
	Low	0.3	0.4	0.4	0.4	0.4	0.5
	Median	0.4	0.5	0.6	0.8	0.6	0.8
	Mean	0.4	0.5	0.5	0.6	0.6	0.7
	Std dev	0.2		0.2		0.2	
<b>Pay TV</b>	High	0.6	0.8	0.7	0.9	0.7	0.9
	Low	0.2	0.2	0.3	0.4	0.4	0.5

Notes: Asset betas were converted to equity betas using the Miller adjustment (see Appendix) using a notional gearing of 20%; all values rounded to one decimal place

210. Following the convention used in the Consultation, URCA disregarded very short-run (one-year) betas in favour of medium-run betas. Doing so suggests the following ranges for asset betas:

- fixed telephony – 0.5 to 0.8;
- mobile telephony – 0.4 to 1.0;
- high speed data services – 0.4 to 0.9; and
- pay TV – 0.3 to 0.7.

211. With a gearing range of 10% to 30%, the corresponding equity beta ranges are:

- fixed telephony – 0.5 to 1.1;
- mobile telephony – 0.4 to 1.4;
- high speed data services – 0.4 to 1.3; and
- pay TV – 0.3 to 1.0.

212. Recall, the equity beta ranges estimated by various regulators (presented in Table 11) for the same categories are:

- fixed telephony – 0.6 to 1.4;
- mobile telephony – 0.9 to 1.9;
- data services – 0.6 to 1.3; and
- pay TV – 0.9 to 1.4.

213. Examination of the individual determinations encompassed by these ranges does not reveal any obvious outliers. These determinations, when taken on a case by case basis seem reasonable, even though the ranges that result when these determinations are collated together are quite wide. The fact that the final ranges are quite wide partly reflects the underlying uncertainty around the appropriate beta, but also differing assumptions over gearing.

214. Notwithstanding these issues, URCA considers that the regulatory ranges presented above are useful in refining its own estimates. The regulatory ranges for each of the four markets suggest that the lower bounds of the empirically-estimated ranges are too low. URCA recognises that if the rate of return SMP operators are permitted to earn is set too high, consumers will be charged too much. On the other hand, if the allowed rate of return is set too low, companies may be deterred from undertaking future efficient and welfare-enhancing investments. URCA is mindful that following the recent liberalisation of communications markets in The Bahamas, it is essential to signal to existing operators and potential future entrants that they can expect to earn reasonable returns by investing in The Bahamas.

215. The overall cost of capital can be quite sensitive to beta, so URCA has chosen its final beta values carefully — taking into account the available empirical and regulatory evidence — in order to set appropriate rates of return.

216. For fixed operators, the empirical estimates suggest a lower bound of 0.5 and the regulatory ranges suggest a lower bound of 0.6. URCA believes that a value of 0.6 is appropriate, for the reasons discussed above; URCA believes that the upper bound of its estimated fixed beta range, 1.1, is reasonable. Similarly, in view of the regulatory precedent on mobile betas, URCA's lower bound of 0.4 appears too low; however, URCA is satisfied that the upper end of the range is appropriate. URCA therefore favours a beta range of 0.8 to 1.4. With respect to the beta for high speed data service providers, URCA considers that the lower end of its range should be revised upward to 0.6, which is consistent with the lower end of the regulatory range. Since the upper bound of its estimated range is consistent with the upper bound suggested by the regulatory range, URCA is comfortable that it should be left unchanged. Finally, although URCA's estimated lower bound for the pay TV beta, 0.4, is consistent with the lower bound proposed by CBL, it appeared too low against the lower bound implied by other regulatory decisions. Therefore, URCA considers a more appropriate value is 0.6. Similarly, the estimated upper bound of URCA's estimated range seems low relative to the upper end of the regulatory range. Therefore, URCA used the upper bound employed in the Consultation, 1.3.

217. In summary, the final equity beta ranges determined by URCA are:

## ***The cost of capital for designated SMP operators***

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- fixed telephony – 0.6 to 1.1;
- mobile telephony – 0.8 to 1.4;
- high speed data services – 0.6 to 1.3; and
- pay TV – 0.6 to 1.3.

URCA determined the following final equity beta ranges and point estimates:

- fixed telephony – 0.6 to 1.1 (0.85, midpoint);
- mobile telephony – 0.8 to 1.4 (1.10, midpoint);
- high speed data services – 0.6 to 1.3 (0.95, midpoint); and
- pay TV – 0.6 to 1.3 (0.95, midpoint).

## **6.6 Debt premium**

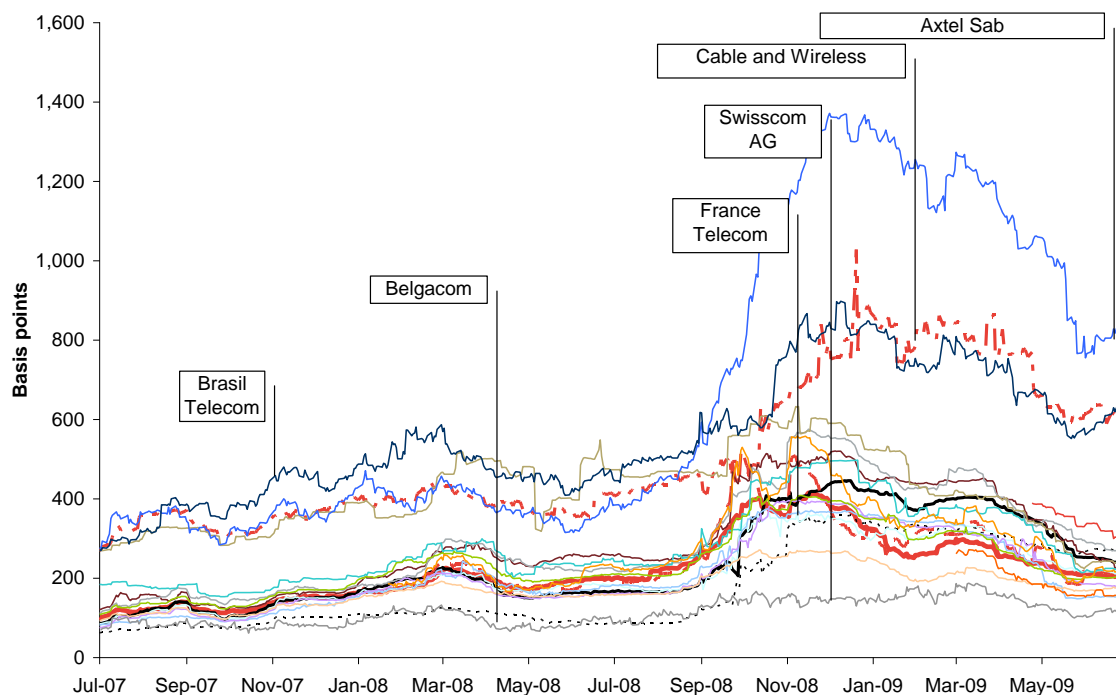
218. The debt premium is the spread between the corporate rate of borrowing (usually, the rate of return on traded bonds) and the risk-free rate. This premium compensates lenders for the risk of credit default, and also for the opportunity cost of funds loaned.

219. URCA's estimates of the debt premium for each of the SMP operators is based on the average spreads paid by electronic communications operators around the world with credit ratings of A- or better, on plain vanilla debt issues with maturities of between five years and 15 years.<sup>86</sup> The data on debt spreads, collected from Thomson Datastream, were of daily frequency for each company, and covered at least the last two years.

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<sup>86</sup> Instruments with additional features, such as convertibility or call options, were excluded from the sample for the purposes of this analysis as such features can attract additional premiums that are unrelated to credit risk or illiquidity.

Figure 7: Historic debt spreads paid by telecommunications firms July 2007- July 2009



Source: Thomson Datastream

220. In determining the debt premium, URCA calculated average spreads over a period of at least two years, rather than relying exclusively on current spreads. The reason is because, although spreads have widened considerably in recent times as a result of the 2007-2008 financial crisis, it seems unlikely that they will remain at present levels over the medium run. An average over time reflects some of this recent increase in corporate borrowing costs, but also takes into account more ‘normal’ times, when spreads were at more sustainable levels.

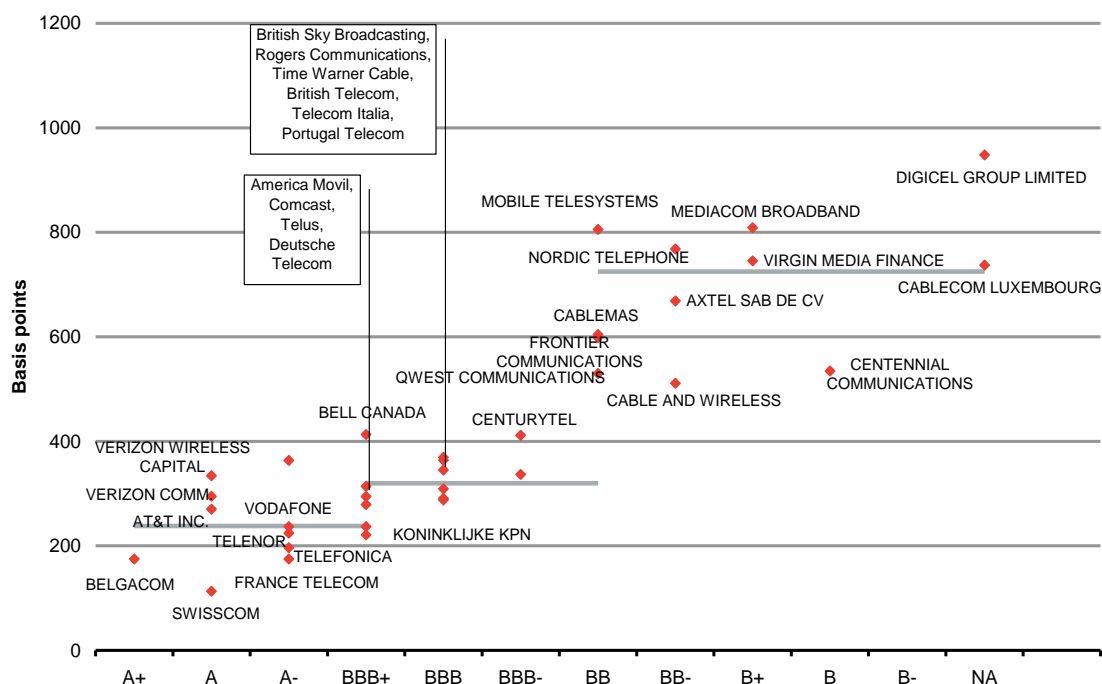
221. URCA identified 116 bond issues by telephony companies with maturities between five (5) and fifteen (15) years.<sup>87</sup> When more than one issue was outstanding for the same company, the average spread across issues was used for that company. The historic (average) spreads for each of the comparator companies is plotted in Figure 7.

222. It is clear that there is considerable variation in debt premiums paid by firms, even within the same industry. Much of this variation can be explained by expected credit risk. This is clearly shown in Figure 8, which ranks the companies in the sample by their current credit rating; the grey bars plot the average spread for the corresponding rating class.<sup>88</sup> As expected, debt spreads are inversely related to companies’ ratings; the stronger the rating, the smaller the premium the company need pay lenders when raising debt capital.

<sup>87</sup> Two of these issues — by Cable & Wireless Plc, and by Qwest Communications International Inc — were dropped from the sample as the reported spreads were negative at some point in the series.

<sup>88</sup> Current company credit ratings were obtained from the Standard & Poor’s website. In some instances, Standard & Poor’s ratings were not available for some companies. In these cases, Fitch ratings were used instead.

Figure 8: Debt spreads organised by credit rating



Source: Thomson Datastream, S&P, Fitch Ratings

223. The average debt spreads for these companies, organised by rating class, are summarised in Table 16.

Table 16: Average debt spreads by rating class

Rating class	Average spread
A	2.4%
A-	2.4%
B	3.2%
Non-investment	7.2%

Source: Thomson Datastream

Notes: All values rounded to one decimal place

224. These results suggest that a reasonable estimate of the debt premium paid by companies whose debt is comfortably investment grade (i.e. A- or better), is approximately 2.4%.

225. URCA considers that it is useful to benchmark the debt premium against the premiums that are consistent with an A- rating so as to provide appropriate incentives for operators to maintain a sound credit rating.

### 6.6.1 Evidence from past regulatory decisions

226. Table 17 summarises a number of recent regulatory determinations on the debt premium.

Table 17. Recent regulatory determinations on debt premiums

Determination	Fixed telephony	Mobile telephony	Data	Pay TV
Ofcom (2009)				1.5%
ICT A (2008)	1.6%	1.6%		
Ofcom (2008)	2.0% - 3.0%		2.0% - 3.0%	
ComReg (2008)	1.2% - 1.9%			
MCA (2008)	1.0% - 3.5%	1.0% - 3.5%		1.0% - 3.5%
OUR Guernsey (2008)	1.0% - 1.5%			
TRA Bahrain (2005)	0.9%		0.9%	
Ofcom (2005a)		1.0% - 3.5%		
Ofcom (2005b)	1.0%		1.0%	
NZ Commerce Commission (2005)	1.2% - 1.8%			
Ofcom (2004)			1.0%	
JCRA (2004)	1.2% - 1.7%	1.2% - 1.7%		
UK Competition Commission (2003) <sup>89</sup>		1.0% - 4.0%		

Notes: All values rounded to one decimal place

227. The premiums allowed by regulators falls within the range of 0.9% to 3.5%, with a midpoint of 2.2%. The estimated A- premium of 2.4% determined by URCA falls comfortably within this range.

228. BTC and CBL agreed with the debt premium calculated by URCA.

URCA determined a final debt premium value of 2.4%.

## 6.7 Country risk premium on debt

229. Section 6.3 introduced the notion of country risk premiums for equity investors, and presented an estimate for The Bahamas. Like issuers of equity capital, issuers of corporate debt in small emerging economies such as The Bahamas may find it more expensive to raise debt capital than peers in developed economies.

<sup>89</sup> Competition Commission (2003), Vodafone, O2, Orange and T-Mobile: Reports on references under section 13 of the Telecommunications Act 1984 on the charges made by Vodafone, O2, Orange and T-Mobile for terminating calls from fixed and mobile networks, February.

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230. The premium paid by such debt issuers reflects compensation to lenders for the additional risks they perceive in supplying capital. The factors that may contribute to these premiums were explained in Section 6.3.

231. The standard cost of debt formula may be modified to incorporate the country risk premium on debt (DCRP) as follows:

$$r_d = r_f + p + DCRP .$$

232. Professor Damodaran has estimated country debt risk premiums for a range of economies, including The Bahamas, by obtaining recent (January 2009) country credit ratings from Moody's and calculating the default spread for that rating (based on traded country bonds) over a default-free government bond rate. By this measure, Professor Damodaran estimates the country debt risk premium for The Bahamas to be approximately 1.4%.

233. URCA proposes to employ this value as a measure of The Bahamas risk premium on debt for the purposes of determining the cost of capital for the SMP operators.

234. BTC and CBL agreed with the estimate of the DCRP proposed by URCA, and the method used to estimate this value.

URCA determined a final country risk premium on debt of 1.4%.

## 7. Final WACC Determination

235. Table 18 to Table 21 present a summary of

- the WACC values proposed by URCA in the Consultation for each SMP market;
- the WACC values proposed by the SMP operators in submissions; and
- URCA’s final determination on the WACC values (based on the parameters determined above) for each SMP market.

Table 18. URCA’s final determination on WACC for providers of fixed voice services

Parameter	URCA Consultation	BTC submission	URCA Final Determination		
			Low	Mid	High
Risk-free rate	4.30	4.33	4.20	4.70	5.20
MRP	5.00	7.70	4.00	5.00	6.00
Equity country risk premium	2.10	2.10	2.10	2.10	2.10
Equity beta	0.70	0.87	0.60	0.85	1.10
<b>Cost of equity</b>	<b>9.10</b>	<b>12.86</b>	<b>7.86</b>	<b>10.74</b>	<b>14.11</b>
Risk-free rate	4.30	4.33	4.20	4.70	5.20
Debt premium	2.40	2.40	2.40	2.40	2.40
Country risk premium on debt	1.40	1.40	1.40	1.40	1.40
<b>Cost of debt</b>	<b>8.10</b>	<b>8.13</b>	<b>8.00</b>	<b>8.50</b>	<b>9.00</b>
Gearing	20%	20%	10%	20%	30%
<b>Nominal WACC</b>	<b>8.90</b>	<b>11.91</b>	<b>7.87</b>	<b>10.29</b>	<b>12.58</b>

Notes: Any minor differences in calculations (from those presented in submissions or consultation documents) are due to rounding.



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Table 19. URCA's final determination on WACC for providers of mobile voice and mobile data services

Parameter	URCA Consultation	BTC submission	URCA Final Determination		
			Low	Mid	High
Risk-free rate	4.30	4.33	4.20	4.70	5.20
MRP	5.00	7.70	4.00	5.00	6.00
Equity country risk premium	2.10	2.10	2.10	2.10	2.10
Equity beta	1.10	0.90	0.80	1.10	1.40
<b>Cost of equity</b>	<b>11.80</b>	<b>13.10</b>	<b>9.08</b>	<b>12.51</b>	<b>16.54</b>
Risk-free rate	4.30	4.33	4.20	4.70	5.20
Debt premium	2.40	2.40	2.40	2.40	2.40
Country risk premium on debt	1.40	1.40	1.40	1.40	1.40
<b>Cost of debt</b>	<b>8.10</b>	<b>8.13</b>	<b>8.00</b>	<b>8.50</b>	<b>9.00</b>
Gearing	20%	20%	10%	20%	30%
<b>Nominal WACC</b>	<b>11.06</b>	<b>12.11</b>	<b>8.97</b>	<b>11.71</b>	<b>14.28</b>

Notes: Any minor differences in calculations (from those presented in submissions or consultation documents) are due to rounding.

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Table 20. URCA's final determination on WACC for providers of high speed data services and connectivity

Parameter	URCA Consultation	CBL submission	URCA Final Determination		
			Low	Mid	High
Risk-free rate	4.30	4.70	4.20	4.70	5.20
MRP	5.00	5.00	4.00	5.00	6.00
Equity country risk premium	2.10	2.10	2.10	2.10	2.10
Equity beta	0.80	1.20	0.60	0.95	1.30
<b>Cost of equity</b>	<b>9.98</b>	<b>13.22</b>	<b>7.86</b>	<b>11.45</b>	<b>15.73</b>
Risk-free rate	4.30	4.30	4.2	4.7	5.2
Debt premium	2.40	2.40	2.4	2.4	2.4
Country risk premium on debt	1.40	1.40	1.4	1.4	1.4
<b>Cost of debt</b>	<b>8.10</b>	<b>8.10</b>	<b>8.00</b>	<b>8.50</b>	<b>9.00</b>
Gearing	20%	20%	10%	20%	30%
<b>Nominal WACC</b>	<b>9.60</b>	<b>12.20<sup>90</sup></b>	<b>7.87</b>	<b>10.86</b>	<b>13.71</b>

Notes: Any minor differences in calculations (from those presented in submissions or consultation documents) are due to rounding.

<sup>90</sup> In submissions CBL actually argued for a cost of capital of 11.9% for high speed data services and connectivity, rather than the 12.2% reported in Table 20. This is because CBL erroneously calculated the cost of equity as 12.9% using the cost of equity inputs reported above. (CBL correctly calculated the cost of equity for pay TV services.) Using the same inputs employed by CBL, URCA re-calculated the cost of equity implied by CBL's submission as 13.2%. This raised the overall WACC claimed by CBL from 11.9% to 12.2%

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Table 21. URCA's final determination on WACC for providers of pay TV services

Parameter	URCA Consultation	CBL submission	URCA Final Determination		
			Low	Mid	High
Risk-free rate	4.30	4.70	4.20	4.70	5.20
MRP	5.00	5.00	4.00	5.00	6.00
Equity country risk premium	2.10	2.10	2.10	2.10	2.10
Equity beta	0.80	1.00	0.60	0.95	1.30
<b>Cost of equity</b>	<b>9.98</b>	<b>11.80</b>	<b>7.86</b>	<b>11.45</b>	<b>15.73</b>
Risk-free rate	4.30	4.30	4.20	4.70	5.20
Debt premium	2.40	2.40	2.40	2.40	2.40
Country risk premium on debt	1.40	1.40	1.40	1.40	1.40
<b>Cost of debt</b>	<b>8.10</b>	<b>8.10</b>	<b>8.00</b>	<b>8.50</b>	<b>9.00</b>
Gearing	20%	20%	10%	20%	30%
<b>Nominal WACC</b>	<b>9.60</b>	<b>11.06</b>	<b>7.87</b>	<b>10.86</b>	<b>13.71</b>

Notes: Any minor differences in calculations (from those presented in submissions or consultation documents) are due to rounding.

236. The relatively wide cost of capital bands for each market reflect the uncertainty surrounding the underlying parameter values (in particular, the beta values).

237. For the purposes of making a determination, URCA used the midpoint of the estimated ranges for each of the SMP markets:

- fixed voice services – 10.29% (BTC proposed 11.9%);
- mobile voice and mobile data services – 11.71% (BTC proposed 12.1%);
- high speed data services and connectivity – 10.86% (CBL proposed 12.2%); and
- pay TV services – 10.86% (CBL proposed 11.1%).

238. As a final step, it is appropriate to sense-check the point estimates above by reference to past regulatory precedent. Table 22 summarises some recent regulatory decisions on the cost of capital. To aid comparability with URCA's estimates above, all values reported in Table 22 have been calculated as nominal, tax-free (vanilla) WACCs using the raw parameter estimates determined by the regulators.

239. Although these estimates are useful sense checks on the proposed ranges above, they must be interpreted with care because these estimates are sensitive to the gearing assumptions used to gear and de-gear betas. In addition, the very wide cost of capital range estimated by OUR Jamaica (2008) is due in large part to the application of a substantial adjustment for Jamaican currency risk (against US currency),

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in addition to a premium for Jamaican sovereign risk.<sup>91</sup> There is no need to make a similar adjustment for currency risk for The Bahamas since the Bahamian dollar is pegged to the US dollar.

Table 22. Recent determinations on nominal tax-free WACC

<b>Determination</b>	<b>Fixed telephony</b>	<b>Mobile telephony</b>	<b>Data</b>	<b>Pay TV</b>
TRA Bahrain (2009)	6.8% - 10.7%*	6.8% - 10.7%*	6.8% - 10.7%*	
Ofcom (2009a)				7.9%
Ofcom (2009b)	7.0% - 8.6%		7.7% - 9.2%	
ICT A (2008)	8.9%*	10.0%*		
ComReg (2008)	7.0% - 9.8%			
OUR Jamaica (2008)	5.1% - 18.8%*		7.0% - 16.1%*	
MCA (2008)	8.3% - 11.2%*	9.3% - 11.4%*		8.3% - 11.2%*
OUR Guernsey (2008)	8.5% - 9.6%			
TRA Bahrain (2005)	11.1% - 12.6%*		11.1% - 12.6%*	
Ofcom (2005a)		8.8% - 11.7%		
Ofcom (2005b)	7.4% - 7.6%		8.5%	
NZ Commerce Commission (2005)	8.8% - 11.1%			
Ofcom (2004)			9.6% - 9.9%	
JCRA (2004)	7.0% - 9.4%	7.0% - 9.4%		
UK Competition Commission (2003)		7.5% - 12.3%		

Notes: All values rounded to one decimal place; \* includes some adjustment for country risk

240. Excluding OUR Jamaica (2008), which seems an obvious outlier, the WACC ranges estimated by various regulators, by market, are:

- fixed telephony – 6.8% to 12.6%;
- mobile telephony – 6.8% to 12.3%;
- data services – 6.8% to 12.6%; and
- pay TV – 8.3% to 11.2%.

<sup>91</sup> OUR Jamaica (2008, p.18) explains that currency risk “is the risk that an investment's value will change because of currency exchange rates, or the uncertainty about the rate at which revenues or costs denominated in a particular currency can be converted into another.”

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241. URCA's estimated WACC values, presented in paragraph 237, lie comfortably within these ranges. After carefully considering the submissions of the SMP operators in response to the Consultation, URCA is satisfied that the final WACC values it has determined are consistent with recent regulatory precedent, and are reasonable and appropriate.

URCA determined the following final WACC values for the SMP markets:

- fixed voice services – 10.29%;
- mobile voice and data services – 11.71%;
- high speed data services and connectivity – 10.86%; and
- pay TV services – 10.86%.

## Appendix – Estimation of equity betas

### Data collection

For the estimation of betas and debt spreads, the following primary data were necessary:

- daily share price data for a collection of comparable companies;
- bid-ask spreads for each of the companies;
- stock index data for the economies in which the primary listings of these companies occur (typically, the FTSE, MSCI or S&P country index);
- total debt for each of the companies, measured at fiscal year end;
- total cash and cash equivalents for each of the companies, measured at fiscal year end;
- total market capitalisation at fiscal year end for each of the companies;
- debt spreads for each of the companies on any plain vanilla bond issues with maturities ranging from five to 15 years; and
- current company credit ratings.

To obtain these data, and to refine the list of suitable comparator companies, several information sources were exploited:

- Thomson Datastream;
- Thomson Worldscope;
- Telegeography Global Communications Database;
- Business Week's Company Insight Center; and
- company websites and various other internet sources.

After collecting data on a large number of telephony companies, operating in various countries, the sample was screened by examining the company profile reports reported in the Thomson Datastream and WorldScope database, on Telegeography, and company websites, to identify each firm's main lines of business. This allowed the grand sample to be divided into three subsamples:

- fixed telephony services (13 companies);
- mobile telephony services (20 companies); and
- pay TV services (13 companies).

Most fixed line operators provide internet services, and sometimes TV services as part of a bundled package. Therefore, inevitably, the resulting beta estimates for this group of companies will reflect more than simply the systematic risk associated with fixed voice telephony services. These effects are taken into account by some sense checks, which are described below.

In addition, the "cable TV" subsample was constructed so as to include only those companies that have cable TV as the main line of business, although it is noted that several companies do offer additional telecommunications (primarily, data) services.

Since BTC is currently state-owned it is unlisted so no share price data on it could be collected. CBL is listed on The Bahamas International Securities Exchange, but CBL's share price data were not captured by Datastream.

## Estimation process

Prior to estimation each subsample was further screened to identify illiquid (infrequently-traded) stocks, since thin trading can result in biased beta estimates. This was done by examining the companies' bid-ask spreads and removing those whose spreads were above 1.5%. While this cut-off is a subjective one, the final selection is not particularly sensitive to it, as most illiquid companies that were excluded had spreads in the range of 5.0% to 7.0% of the price.

For those companies with missing bid-ask spreads, a simple examination of share price movements over time revealed the illiquid stocks, and these were also excluded from the final estimation.

Company and stock index returns were calculated by taking the log difference of the stock price and index values, respectively.

Each company's estimated equity beta,  $\hat{\beta}_e$ , was obtained by running the following regression

$$r_e = const + r_m \beta_e + error,$$

where  $r_e$  is the return on the company's stock,  $const$  is a constant term,  $r_m$  is the return on the relevant country index, and  $error$  is a random error term.

The estimated equity betas for these companies will partly reflect financial gearing,  $g$ , which will vary from company to company. In order to compare betas across companies, it is necessary to remove the effect of gearing. This is done by transforming the estimated equity betas into asset betas using the Miller adjustment:

$$\beta_{Miller} = \hat{\beta}_e (1 - g).$$

When total debt exceeds cash and cash equivalents, company gearing is calculated as:

$$g = \frac{\text{Total debt} - \text{Cash \& equivalents}}{\text{Market capitalisation} + \text{Total debt} - \text{Cash \& equivalents}}$$

In all other cases, gearing is assumed to be zero. Total debt, cash and cash equivalents, and market capitalisation are measured at fiscal year end; 2008 data for these measures are carried forward as forecasts to 2009.

Once the asset beta for the SMP operators was been estimated, it was transformed back to an equity beta, for use in the CAPM formula, using the following relationship:

$$\beta_e = \frac{\hat{\beta}_{Miller}}{(1 - g_{SMP})},$$

where  $g_{SMP}$  is the notional gearing determined for the SMP operators.

Betas were estimated over windows of one, three and five years, all ending in July 2009. Each window uses all available data. If the data are truncated or missing, the betas were computed only with the available observations.

As noted above, it is difficult to identify truly pureplay operators since telephony companies — fixed telephony companies in particular — have, over time, broadened their product offerings and adopted new technologies. Therefore, URCA has had to rely on data on close-to-pureplay companies for benchmarking purposes. In order to cross-check the first set of estimation results for using these companies, URCA also estimated betas for the "fixed telephony" and "fixed and mobile" telephony

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samples using data for the period 1995 to 1999 — a period in which many of the sample companies would likely have been more pureplay than they currently are.



## Estimation results – the Consultation

The following Tables present raw beta estimates for comparator fixed-only, mobile-only and pay TV operators.

Table 23. Beta estimates for fixed-only operators (to July 2009)

Company	1 year			3 years			5 years		
	Equity Beta	Std. Error	Asset Beta	Equity Beta	Std. Error	Asset Beta	Equity Beta	Std. Error	Asset Beta
Sri Lanka Telecom	0.90	0.07	0.86	1.00	0.06	0.95	1.09	0.04	0.98
Telecom Egypt	0.45	0.05	0.45	0.49	0.04	0.45	0.50	0.04	0.44
Telkom SA Ltd	0.61	0.08	0.50	0.63	0.05	0.54	0.67	0.04	0.59
LG Dacom Corporation	0.39	0.07	0.27	0.53	0.05	0.37	0.65	0.05	0.41
SK Broadband	0.70	0.07	0.35	0.63	0.05	0.39	0.64	0.04	0.40
BT Group Plc	0.85	0.08	0.42	0.85	0.04	0.56	0.84	0.04	0.56
Telefonos de Mexico	0.66	0.04	0.43	0.70	0.03	0.47	0.72	0.02	0.50
Empresa Nacional de Telecomunicaciones SA	0.68	0.04	0.56	0.81	0.03	0.68	0.82	0.03	0.67
Iowa Telecommunications Services Inc	0.69	0.05	0.32	0.74	0.04	0.37	0.72	0.03	0.37
Telekom Slovenije Dd	0.90	0.04	0.60	0.84	0.03	0.70	0.84	0.03	0.68
Iliad SA	0.48	0.05	0.38	0.56	0.04	0.49	0.66	0.04	0.60
Windstream Corporation	0.89	0.05	0.39	0.88	0.03	0.44	0.86	0.03	0.44
Colt Telecom	0.65	0.09	0.65	0.67	0.06	0.66	0.70	0.05	0.58
Min	0.39		0.27	0.49		0.37	0.50		0.37
Max	0.90		0.86	1.00		0.95	1.09		0.98
Median	0.68		0.43	0.70		0.49	0.72		0.56

## The cost of capital for designated SMP operators

Table 24. Beta estimates for fixed-only operators (to July 1999)

Company	1 year			3 years			5 years		
	Equity Beta	Std. Error	Asset Beta	Equity Beta	Std. Error	Asset Beta	Equity Beta	Std. Error	Asset Beta
LG Dacom	0.53	0.09	0.38	0.72	0.05	0.48	0.69	0.04	0.51
BT Group Plc	1.28	0.09	1.23	1.02	0.06	0.98	1.06	0.05	1.00
Deutsche Telekom	1.06	0.08	0.77	0.87	0.05	0.56	0.87	0.05	0.46
AT&T Inc*	0.65	0.10	0.56	0.72	0.06	0.62	0.76	0.05	0.65
Bezeq*	0.53	0.08	0.34	0.62	0.04	0.35	0.61	0.03	0.32
Cable & Wireless	1.46	0.12	1.22	1.29	0.07	1.13	1.30	0.06	1.15
Digital Telecom Philippines	1.59	0.12	0.58	1.18	0.07	0.57	1.18	0.07	0.64
Hellenic Telecom Org*	0.74	0.04	0.69	0.74	0.05	0.71	0.74	0.05	0.69
KT Corp	0.69	0.08	0.60	0.69	0.08	0.53	0.69	0.08	0.53
Singapore Telecom*	0.37	0.06	0.37	0.51	0.04	0.51	0.52	0.03	0.52
Tata Communications*	0.91	0.21	0.91	0.68	0.16	0.68	0.62	0.14	0.62
Telecom Italia	0.89	0.08	0.28	0.83	0.06	0.36	0.82	0.05	0.39
Telefonica SA	1.18	0.04	0.82	1.16	0.03	0.79	1.15	0.02	0.74
Min	0.37		0.28	0.51		0.35	0.52		0.32
Max	1.59		1.23	1.29		1.13	1.30		1.15
Median	0.89		0.60	0.74		0.57	0.76		0.62

Notes: \* no bid-ask spreads could be identified but traded prices did not appear sticky

Table 25. Beta estimates for mobile-only operators (to July 2009)

## The cost of capital for designated SMP operators

Company	1 year			3 years			5 years		
	Equity Beta	Std. Error	Asset Beta	Equity Beta	Std. Error	Asset Beta	Equity Beta	Std. Error	Asset Beta
Centennial Communications	0.76	0.14	0.23	0.86	0.08	0.27	0.89	0.08	0.29
China Mobile Ltd	1.09	0.04	1.09	1.16	0.02	1.16	1.21	0.02	1.21
Idea Cellular Ltd	1.15	0.07	0.88	1.01	0.05	0.82	1.01	0.05	0.80
Mobile Telesystems	0.96	0.06	0.07	0.95	0.03	0.16	0.83	0.03	0.14
Mobistar SA	0.20	0.04	0.18	0.24	0.03	0.23	0.27	0.02	0.26
MTN Group Ltd	1.09	0.09	1.03	1.13	0.06	1.05	1.11	0.05	1.04
O2 Plc							1.17	0.15	1.15
Spice Communications	0.58	0.19	0.58	0.65	0.12	0.58	0.65	0.12	0.40
Sprint Nextel Corp	1.83	0.13	0.41	1.65	0.08	0.89	1.61	0.06	1.07
Taiwan Mobile	0.22	0.05	0.20	0.38	0.04	0.35	0.37	0.03	0.36
TIM Participacoes SA	0.80	0.06	0.56	0.82	0.04	0.68	0.85	0.03	0.76
Japan Communications	0.95	0.15	0.88	0.82	0.11	0.82	0.88	0.10	0.88
Virgin Mobile							0.35	0.13	0.26
Vivo Participacoes	0.76	0.06	0.42	0.80	0.04	0.52	0.84	0.04	0.53
Vodafone Group Plc	0.85	0.05	0.59	0.89	0.04	0.69	0.91	0.03	0.74
Millicom International Cellular	1.43	0.10	1.17	1.50	0.07	1.36	1.45	0.06	1.31
U.S. Cellular Corp	1.08	0.07	0.80	1.03	0.05	0.83	0.99	0.04	0.76
Idea Cellular Ltd	1.15	0.07	0.88	1.01	0.05	0.82	1.01	0.05	0.80
Verizon	0.78	0.04	0.54	0.79	0.03	0.60	0.79	0.02	0.59
Leap Wireless Intl	1.20	0.09	0.58	1.19	0.08	0.72	1.16	0.06	0.80
Min	0.20		0.07	0.24		0.16	0.27		0.14
Max	1.83		1.17	1.65		1.36	1.61		1.31
Median	0.95		0.58	0.92		0.70	0.90		0.76

## Estimation results – Final Determination

The following Tables present URCA's Blume-adjusted betas for fixed line, mobile, pay TV and high speed data service providers.

Table 26. Blume-adjusted beta estimates for fixed-only operators (to July 2009)

Company	1 year			3 years			5 years		
	Equity Beta	Std. Error	Asset Beta	Equity Beta	Std. Error	Asset Beta	Equity Beta	Std. Error	Asset Beta
Sri Lanka Telecom	0.93	0.07	0.89	1.00	0.06	0.95	1.05	0.04	0.95
Telecom Egypt	0.64	0.05	0.62	0.66	0.04	0.61	0.66	0.04	0.59
Telkom SA Ltd	0.74	0.08	0.60	0.75	0.05	0.65	0.78	0.04	0.68
LG Dacom Corporation	0.59	0.07	0.42	0.68	0.05	0.48	0.77	0.05	0.48
SK Broadband	0.80	0.07	0.40	0.75	0.05	0.46	0.76	0.04	0.48
BT Group Plc	0.90	0.08	0.45	0.90	0.04	0.60	0.90	0.04	0.59
Telefonos de Mexico	0.78	0.04	0.50	0.80	0.03	0.54	0.81	0.02	0.56
Empresa Nacional de Telecomunicaciones SA	0.79	0.04	0.64	0.87	0.03	0.73	0.88	0.03	0.73
Iowa Telecommunications Services Inc	0.79	0.05	0.37	0.83	0.04	0.41	0.82	0.03	0.42
Telekom Slovenije Dd	0.93	0.04	0.63	0.89	0.03	0.74	0.89	0.03	0.72
Iliad SA	0.65	0.05	0.51	0.71	0.04	0.62	0.78	0.04	0.71
Windstream Corporation	0.93	0.05	0.41	0.92	0.03	0.46	0.91	0.03	0.46
Colt Telecom	0.77	0.09	0.77	0.78	0.06	0.77	0.80	0.05	0.66
Min	0.59		0.37	0.66		0.41	0.66		0.42
Max	0.93		0.89	1.00		0.95	1.05		0.95
Median	0.79		0.51	0.80		0.61	0.81		0.59

## The cost of capital for designated SMP operators

Table 27. Blume-adjusted beta estimates for mobile-only operators (to July 2009)

Company	1 year			3 years			5 years		
	Equity Beta	Std. Error	Asset Beta	Equity Beta	Std. Error	Asset Beta	Equity Beta	Std. Error	Asset Beta
Centennial Communications	0.84	0.14	0.26	0.91	0.08	0.28	0.93	0.08	0.30
China Mobile Ltd	1.06	0.04	1.06	1.11	0.02	1.11	1.14	0.02	1.14
Idea Cellular Ltd	1.10	0.07	0.84	1.01	0.05	0.82	1.01	0.05	0.80
Mobile Telesystems	0.97	0.06	0.08	0.96	0.03	0.17	0.89	0.03	0.15
Mobistar SA	0.46	0.04	0.42	0.49	0.03	0.47	0.51	0.02	0.50
MTN Group Ltd	1.06	0.09	1.00	1.09	0.06	1.01	1.07	0.05	1.00
O2 Plc							1.10	0.14	1.08
Spice Communications	0.72	0.19	0.72	0.77	0.12	0.68	0.77	0.12	0.47
Sprint Nextel Corp	1.55	0.13	0.34	1.43	0.08	0.78	1.40	0.06	0.93
Taiwan Mobile	0.48	0.05	0.44	0.59	0.04	0.54	0.58	0.03	0.56
TIM Participacoes SA	0.87	0.06	0.60	0.88	0.04	0.73	0.90	0.03	0.81
Japan Communications	0.96	0.15	0.89	0.88	0.11	0.88	0.92	0.10	0.92
Virgin Mobile							0.58	0.13	0.44
Vivo Participacoes	0.84	0.06	0.46	0.87	0.04	0.57	0.90	0.04	0.57
Vodafone Group Plc	0.90	0.05	0.63	0.93	0.04	0.71	0.94	0.03	0.77
Millicom International Cellular	1.28	0.10	1.05	1.34	0.07	1.21	1.31	0.06	1.18
U.S. Cellular Corp	1.06	0.07	0.78	1.02	0.05	0.82	0.99	0.04	0.76
Idea Cellular Ltd	0.85	0.04	0.54	0.86	0.03	0.65	0.86	0.02	0.64
Verizon	1.14	0.09	0.58	1.13	0.08	0.68	1.11	0.06	0.76
Leap Wireless Intl	0.84	0.14	0.26	0.91	0.08	0.28	0.93	0.08	0.30
Min	0.46		0.08	0.49		0.17	0.51		0.15
Max	1.55		1.06	1.43		1.21	1.40		1.18
Median	0.96		0.60	0.93		0.71	0.93		0.76

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Table 28. Blume-adjusted beta estimates for pay TV operators (to July 2009)

Company	1 year			3 years			5 years		
	Equity Beta	Std. Error	Asset Beta	Equity Beta	Std. Error	Asset Beta	Equity Beta	Std. Error	Asset Beta
Virgin Media Inc	1.60	0.09	0.35	1.51	0.06	0.61	1.46	0.05	0.75
BSkyB Group	0.89	0.06	0.74	0.88	0.03	0.76	0.88	0.03	0.80
Cablevision Systems Corp	1.18	0.07	0.30	1.08	0.05	0.33	1.07	0.05	0.35
Comcast Corporation	1.13	0.05	0.60	1.09	0.04	0.62	1.09	0.03	0.65
Crown Media Holdings Inc	1.04	0.14	0.17	1.03	0.09	0.23	1.05	0.07	0.30
Dish Network Corp	1.15	0.08	0.39	1.10	0.05	0.61	1.08	0.04	0.62
Liberty Global Inc	1.27	0.07	0.14	1.18	0.04	0.25	1.15	0.04	0.32
Liberty Media Corp	1.25	0.12	0.27	1.20	0.06	0.61	1.20	0.06	0.66
Lodgenet Entertainment Corp	1.03	0.22	0.03	1.04	0.13	0.29	1.05	0.10	0.39
Mediaset SpA	0.79	0.05	0.61	0.81	0.03	0.68	0.82	0.03	0.74
Shaw Communications Inc	0.63	0.04	0.48	0.67	0.03	0.51	0.68	0.03	0.49
Time Warner Cable Inc	0.93	0.15	0.56	0.90	0.09	0.53	0.90	0.09	0.44
Vivendi	0.82	0.04	0.63	0.83	0.02	0.69	0.85	0.02	0.72
Min	0.63		0.03	0.67		0.23	0.68		0.30
Max	1.60		0.74	1.51		0.76	1.46		0.80
Median	1.04		0.39	1.04		0.61	1.05		0.62

## The cost of capital for designated SMP operators

Table 29. Blume-adjusted beta estimates for high speed data service providers (to July 2009)

Companies	1 year			3 years			5 years		
	Equity Beta	Std. Error	Asset Beta	Equity Beta	Std. Error	Asset Beta	Equity Beta	Std. Error	Asset Beta
QSC AG	0.83	0.10	0.78	0.89	0.07	0.88	0.91	0.06	0.91
LG Powercom Corp	0.64	0.10	0.40	0.64	0.10	0.41	0.64	0.10	0.43
Abovenet Inc.*	0.48	0.11	0.43	0.45	0.07	0.41	0.43	0.07	0.39
Cogent Communications	1.23	0.10	0.91	1.28	0.07	0.97	1.25	0.11	0.98
Earthlink Inc	0.83	0.05	0.83	0.86	0.04	0.86	0.91	0.04	0.91
NIFTY Corp	0.36	0.03	0.36	0.45	0.04	0.45	0.45	0.04	0.45
So-net Entertainment	0.91	0.08	0.91	0.95	0.06	0.95	1.01	0.06	1.01
MDU Communications	0.53	0.17	0.31	0.49	0.11	0.31	0.49	0.09	0.39
United Internet	0.90	0.09	0.72	0.97	0.06	0.81	1.02	0.05	0.91
Zon Multimedia	0.85	0.06	0.51	0.86	0.04	0.60	0.83	0.03	0.64
Tiscali Spa	1.11	0.16	0.24	1.08	0.09	0.25	1.06	0.07	0.28
Forthnet	0.93	0.10	0.44	0.85	0.06	0.55	0.84	0.05	0.63
Min	0.36		0.24	0.45		0.25	0.43		0.28
Max	1.23		0.91	1.28		0.97	1.25		1.01
Median	0.84		0.48	0.86		0.57	0.87		0.63

Notes: \* Historic accounting data could not be sourced for Abovenet Inc. so URCA used the implied gearing levels employed by CBL to de-gear the estimated equity beta