
Office of Utilities Regulation

Consultation Document

Estimate of the Weighted Average Cost of Capital for Telecommunications Carriers

2016 April 29



OFFICE OF UTILITIES REGULATION

**3rd Floor
PCJ Resource Centre
36 Trafalgar Road
Kingston 10
Jamaica
West Indies**

ABSTRACT

The previous estimate of the weighted average cost of capital (WACC) for the industry was done in 2010 and is now due to be updated. This Consultation Document contains the Office of Utilities Regulation's (OUR's) approach to updating the various parameters that are involved in estimating the WACC. The approach used in this document is largely consistent with the methodology that was determined by the OUR in the previous estimate of the WACC. As such, the cost of debt is estimated through imputation. The Capital Asset Pricing Model (CAPM) continues to be used as the preferred method to determine the cost of equity which is the same method used in previous consultations on the matter.

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CONSULTATION PROCESS

Persons who wish to express opinions on this Consultation Document are invited to submit their comments in writing to the Office of Utilities Regulation (“OUR”) by post, facsimile or email addressed to:

**Office of Utilities Regulation
P.O Box 593
36 Trafalgar Road
Kingston 10**

Attention: Evona Channer

**Fax: (876) 929-3635
Email: evona.channer@our.org.jm**

Responses are requested by 2016 May 27

Responses which are not confidential pursuant to sections 7(6) and 7A of the Telecommunications Act will be posted to the OUR’s website (www.our.org.jm). Respondents are therefore requested to supply their responses in electronic form to facilitate such postings.

COMMENTS ON RESPONSES

There will be a specific period for respondents to view other responses (non-confidential) and to make comments on them. The comments may take the form of either correcting a factual error or putting forward counter arguments. As in the case of the responses, comments which are not confidential pursuant to the Telecommunications Act will be posted to the OUR’s website.

Comments on responses are requested by 2016 June 10

Arrangement for viewing responses

This Consultation Document and the responses and comments received by the OUR will also be made available to the public through the OUR’s Information Centre (“OURIC”). Persons who wish to view this Document, responses and comments should make an appointment by contacting:

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2016 April 29

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Individuals with appointments should visit the OUR's offices at:

3rd Floor, PCJ Resource Centre,
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Kingston 10

Photocopies of selected responses and comments may be provided on request at a price which reflects the cost to the OUR.

CONSULTATIVE TIMETABLE

The timetable for the consultation is summarized in the table below:

<i>Event</i>	<i>Date</i>
Publish Consultation Document	2016 April 29
Responses to Consultation Document	By 2016 May 27
Comments on Responses	By 2016 June 10
Issue Determination Notice	By 2016 August 31

ABBREVIATIONS

ATWACC	–	After-tax Weighted Average Cost of Capital
CAPM	–	Capital Asset Pricing Mechanism
CRP	–	Country Risk Premium
ERP	–	Equity Risk Premium
GOJ	–	Government of Jamaica
LRIC	–	Long-Run Incremental Cost model
MRP	–	Market Risk Premium
OUR	–	Office of Utilities Regulation
OURIC	–	Office of Utilities Regulation Information Centre
WACC	–	Weighted Average Cost of Capital

CHAPTER 1: INTRODUCTION

- 1.1 On December 09, 2010 the Office of Utilities Regulation (OUR) published “*Determination Notice for Estimate of the Weighted Average Cost of Capital for Telecommunications Carrier in Jamaica*” Document No: TEL2009005_DET001 (the Determination Notice) and a related Reconsideration Document “*Reconsideration Of The Office’s Decision: Determination Notice “Estimate of the Weighted Average Cost Of Capital For Telecommunications Carriers”*” Document No: TEL2009005_DET001_RCN001 was published on August 29, 2011 (the Reconsideration Decision). The OUR considers it appropriate that the update of the cost of capital for the sector be undertaken at this time to account for any changes in the cost of acquiring capital by telecommunications companies. As the weighted average cost of capital (WACC) is an estimate of the future, which cannot be predicted with certainty, the OUR believes that it is prudent to update the estimate of the WACC every five (5) years.
- 1.2 The approach that will be used to determine the value for the parameters which are needed to estimate the WACC will be consistent with that which was approved by the Office in the Determination Notice unless the OUR finds that there are compelling reasons to deviate from the methodology which was approved in 2010. In essence, the OUR expects that this process will essentially be an update of the value for the parameters outlined in the Determination Notice using the approved methodology. As such, the OUR will not explore the various approaches for estimating the value of a particular parameter as this was already done in the Determination Notice. Persons interested in knowing the OUR’s rationale for employing the approved methodology and approach to estimating the value of a particular parameter relative to an alternative approach should refer to the Determination Notice.
- 1.3 Where available and appropriate, the WACC estimate will use data from the Annual Reports submitted to the OUR by licensees in the industry. In this regard, the OUR will use the maximum figures across all carriers and as such, the WACC serves as a maximum cost of capital for any firm in the industry. Therefore, it is unnecessary to calculate the WACC for any individual company in the industry as the estimated WACC for that company would either be less than or equal to the WACC calculated for the industry. That is, that company’s data would have already been taken into account in arriving at the estimated WACC. Therefore, none of the companies in the industry will be at a disadvantage if the industry WACC is used in determining prices.
- 1.4 As was done in 2010, a separate WACC will be calculated for the fixed line and mobile sections of the industry to account for the difference in

risk which exists in the two lines of the business. The OUR will continue to specify a range estimate for most variables with the point estimate for those variables being the simple average of the minimum and maximum values from the range. Prior to the issuance of its determination notice on this matter, the OUR will update the data used to estimate all parameters to a more recent period. The data used in this Consultation Document is to present the methodology for arriving at the estimate of the WACC and may not be representative of the actual value that will be determined for the WACC.

Question 1

Do you agree with the approach to estimate separate WACCs for fixed line and mobile?

PURPOSE OF CONSULTATION DOCUMENT

- 1.5 It is important that an appropriate cost of capital be estimated for the sector as it serves as a critical input into the long run incremental cost (LRIC) models used by the OUR to determine cost oriented rates for wholesale fixed and mobile interconnection services. The estimate of the WACC will be needed as an input into any pricing model to be developed or approved by the OUR as it serves as a measure of the return on capital which telecommunications companies are allowed to earn.

LEGISLATIVE FRAMEWORK

- 1.6 Section 29 of the Telecommunications Act, 2000, as amended by the Telecommunications (Amendment) Act, 2012 (the Telecommunications Act), deals with the obligation of carriers to grant interconnection and states that:

“29. - (1) Each carrier shall, upon request in accordance with this Part, permit interconnection of its public network with the public network of any other carrier for the provision of telecommunications services. ...

(4) The Office may, either on its own initiative in assessing an interconnection agreement, or in resolving a dispute between operators, make a determination of the terms and conditions of call termination, including charges.

- (5) *When making a determination of an operator's call termination charges, the Office shall have regard to the principle of cost orientation, so, however, that if the operator is non-dominant then the Office may also consider reciprocity and other approaches.”*

1.7 In accordance with Section 29 (4) and (5) of the Telecommunications Act, the WACC will be used by the Office when making a determination on call termination charges with a view of maintaining the principle of cost orientation.

STRUCTURE OF CONSULTATION DOCUMENT

1.8 The rest of this Consultation Document is structured in the following manner:

- (i) Chapter 2 outlines the general framework for estimating the WACC.
- (ii) Chapter 3 discusses the issue of the appropriate gearing for telecommunications networks.
- (iii) Chapter 4 estimates the cost of debt.
- (iv) Chapter 5 estimates the cost of equity.
- (v) Chapter 6 deals with how to convert the U.S. dollar WACC to a Jamaican dollar equivalent.
- (vi) Chapter 7 presents the estimated WACC.

CHAPTER 2: GENERAL FRAMEWORK FOR ESTIMATING THE COST OF CAPITAL

WACC FRAMEWORK

2.1 In general, companies usually obtain capital from debt or equity sources to fund their investments. The WACC is a proportional mix of the cost of acquiring funds from the different sources. As the risk of the company increases, there will be an increase in the cost of obtaining capital of one or all of the sources of capital. Therefore, a higher WACC of one company relative to another company facing similar market conditions indicates that the company with the higher WACC is perceived as more risky by investors. The higher the perceived risk by investors, the higher the return they expect to receive for investing in the company. For the purposes of regulation, the WACC is a measure of the return that companies, and by extension their investors, are allowed to make on their investment.

2.2 The nominal vanilla WACC is estimated using Equation 1.

$$WACC = w_d * k_d + w_e * k_e \dots\dots\dots (Equation 1)$$

where,

w_d - is the fraction of debt in the capital structure,

k_d - is the forward-looking cost of debt,

w_e - is the fraction of equity in the capital structure,

k_e - is the forward-looking cost of equity.

2.3 As a result of the thinness of the local market, the approach that will be used by the OUR to estimate the WACC will be to make the calculation from the point of view of a foreign operator investing in the Jamaican market in US\$ terms, add the country risk premium to account for factors specific to Jamaica and then convert the result from a US\$ rate to the J\$ equivalent. In our case, we will estimate the cost of capital for an efficient operator in a developed market and then add the necessary premium to account for the addition risk of investing in our market. This is consistent with the approach used in 2010.

TAX ADJUSTMENT

- 2.4 An after-tax cost of capital and a pre-tax cost of capital will also be estimated. The after-tax cost of capital reflects the fact that interest paid to debt holders is tax deductible (that is, corporate taxes are applicable after interest is deducted). Thus, the cost of debt is also calculated as an after-tax cost to ensure that it is comparable with the cost of equity, which is calculated after-tax. The corporate tax rate is 33.33%. The after-tax nominal weighted average cost of capital (ATWACC) is calculated as shown in Equation 2.

$$ATWACC = w_d * k_d (1-t) + w_e * k_e \dots\dots\dots (Equation 2)$$

where,

- w_d - is the fraction of debt in the capital structure,
- k_d - is the forward-looking cost of debt,
- w_e - is the fraction of equity in the capital structure,
- k_e - is the forward-looking cost of equity.
- t_e - is the tax rate

- 2.5 The nominal pre-tax cost of capital represents a grossing up of the calculated ATWACC such that the return allowed to the regulated company before it pays taxes is equivalent to the return allowed after it pays taxes. This is estimated as follows:

$$Pre-Tax WACC = ATWACC / (1-t) \dots\dots\dots (Equation 3)$$

CHAPTER 3: GEARING

- 3.1 Gearing is a measure of the degree of leverage for a company. It measures the amount of debt financing used by a company relative to the company's total value. Here, value is estimated as debt plus owner's equity.
- 3.2 There are three approaches to determining the level gearing to use in the WACC estimate - book-value gearing, market value gearing, and optimal gearing. The OUR is not in favour of the use of book-value gearing because it is based on historical cost and may be subject to manipulation for accounting purposes by management. Generally, the OUR prefers the use of a market determined value of a company's gearing or optimal (notional) gearing rather than using book-value gearing. This is because the market value of gearing is transparent and reflects the true capital structure of the company as determined by market forces. However, market value gearing may reflect inefficient decisions by a company with respect to the level of leverage used to fund its investments or the level of the interest rate paid on borrowed funds. Where inefficiency is a concern, then it is better to use optimal gearing in the estimation. This is especially relevant given that the WACC is an input in the LRIC model which is based on the network of a hypothetical efficient operator.
- 3.3 If a company only borrows by issuing bonds to the market, the market value of debt is simply the total value of these bonds. However, this is rarely the case. Typically, companies also borrow from other non-traded sources such as banks and related party loans. This makes calculating the market value of debt complicated as a method would have to be used to estimate a market value of non-traded debt¹. Where a company only borrows using non-traded debt then arriving at a market value for the company's debt is difficult. For a publicly traded company, the market value of equity is the same as its market capitalisation. That is, the number of shares outstanding multiplied by the market price of the shares. Estimating the market value of a private company is much more complicated and generally requires at least some data that is only available within the company.

1

In this case Professor Damodaran suggests the following

“ treat the entire debt on the books as one coupon bond, with a coupon set equal to the interest expenses on all the debt and the maturity set equal to the face-value weighted average maturity of the debt, and then to value this coupon bond at the current cost of debt for the company.”

http://pages.stern.nyu.edu/~adamodar/New_Home_Page/valquestions/mktvalofdebt.htm

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- 3.4 The only publicly traded telecommunications company in Jamaica is Cable and Wireless Jamaica Limited (C&WJ). For information, it should be noted that C&WJ's parent company Cable and Wireless Communications Plc has acquired Columbus Communications Jamaica Limited (CCJ) and CCJ and C&WJ are now operating under the brand "FLOW". However, the company data being used in this consultation predated the acquisition and new branding. Therefore, a market value of equity could only be calculated for C&WJ. However, C&WJ is a consolidated company and the data in its Audited Financial Statements are not segregated by fixed and mobile business lines. Further, C&WJ's 2014 Audited Financial Statement indicated that neither C&WJ Jamaica nor the C&WJ Group borrowed any funds through the issue of bonds. As such, there is no data to calculate the market value of the company's debts.
- 3.5 Digicel Group raised funds through market traded debt with Fitch ratings agency on May 21, 2015 affirming the Group and its subsidiaries B rating with a stable outlook². This could be used to determine the market value of debt for Digicel Jamaica Limited (Digicel). However, Digicel is a private company and so it would be a complicated and subjective process to determine the market value of equity for this entity.
- 3.6 Given the difficulties highlighted with respect to C&WJ and Digicel, the market value gearing approach will not be used. The OUR will continue to use an optimal gearing approach. This optimal gearing will be approximated using the average market value gearing of telecommunications companies in emerging markets. Table 1 below shows that on average fixed line companies in emerging markets have a gearing level of 25% while mobile companies in emerging markets have a gearing level of 21%.

Table 1: Market Value Gearing by Region

Industry Group	Telecom Services Fixed	Telecom (Wireless) Mobile
US	35.86%	54.98%
Europe	42.47%	33.01%
Japan	39.89%	35.50%
Emerging	25.09%	20.61%
China	30.56%	7.99%
India	42.16%	33.08%
Global	35.35%	28.77%

Source: http://pages.stern.nyu.edu/~adamodar/New_Home_Page/

- 3.7 As can be seen from Table 1, the level of gearing used in emerging markets tends to be lower than that used in more developed markets.

² <https://www.fitchratings.com/site/fitch-home/pressrelease?id=985134>

the level of gearing in Therefore, the OUR believes the gearing ranges used in the 2010 estimation still remains appropriate for local operators where funding tends to be sourced primarily from equity. As such, the OUR proposes to maintain an optimal gearing range of 10% - 30% for fixed line and 10% - 20% for mobile. These ranges are slightly below the average gearing used by other regulators in recent decisions on the matter as shown in Table 2.

Table 2: Recent Regulatory Decisions on Gearing

Regulators	Fixed	Mobile
ANCOM - 2012	40.20%	34.50%
ComReg - 2014	40%	30%
ACM - 2015	42%	42%
ictQatar - 2013	20%	20%
TRA - 2013	0% - 23%	0% - 23%
PTS - 2014		35%
MCA - 2012	40% - 50%	25% - 35%
OUR - 2015	10% - 30%	10% - 20%

Question 2

Do you agree with the use of an optimal gearing approach and the ranges specified?

CHAPTER 4: COST OF DEBT

- 4.1 The cost of debt of a company is the rate it pays its creditors when borrowing money. This is the sum of the risk free rate and the premium which creditors require for taking the risk of lending to a company. Companies may borrow long term in various ways such as issuing bonds, getting a loan from a bank, or borrowing from related parties, among other things. As the WACC is a forward looking methodology, it is important that the estimate of the cost of debt capture the cost of obtaining future debt financing. The cost of debt will be estimated using the following Equation 4.

$$k_d = r_f + CRP + D_p \dots\dots\dots (Equation 4)$$

where,

r_f is the risk free rate

CRP is the sovereign default spread

D_p is the debt premium

- 4.2 This approach is the similar to that used in the Determination Notice and is consistent with the approach used by other regulators in recent regulatory decisions.

RISK FREE RATE

- 4.3 The risk free asset is associated with an asset with essentially no risk of default by the borrower, that is, no credit risk. In reality, there is no instrument which meets this criterion. As such, a debt instrument which is closest to being free of default risk is generally used as the risk free rate. Sovereign debt Instruments with the highest quality credit rating (AAA) are generally considered appropriate proxies for risk free assets. The debt issued by the Government of Jamaica (GOJ) is not of this quality and therefore not considered risk free. As a result of this factor and the thinness of the local market, we will make the calculation from the point of view of a foreign operator investing in the Jamaican market in US\$ terms and then convert to J\$ terms. In our case, we will estimate the cost of capital for an efficient operator in a developed market and then add the necessary premium to account for the addition risk of investing in our market. In this regard, a United States of America (US) Government Treasury security will be used as the risk free asset. The risk free rate is an important variable as it is used in the estimate of both the cost of debt and the cost of equity.

- 4.4 There are varying reasons, all with some merit, for the choice of the specific tenor of the security to be used as the risk free instrument. One option is to use a security with a tenor that matches the length of the review period. Another option is to use a security with a tenor that matches the investment horizon of the companies being regulated. The choice could also be based on the duration of company's assets and liabilities.
- 4.5 Looking at the list of currently traded bonds issued by Digicel Group, all were issued with a tenor of seven (7) to eight (8) years. Data from the most recent available audited Annual Reports of telecommunications companies shows that with the exception of buildings, the average useful life of assets is three (3) to fifteen (15) years. Given the data on assets and liabilities, the OUR remains of the view that a security with a ten (10) year maturity period should be used as the risk free security. This is also the tenor of the security most widely used by other regulators, in recent decisions as the risk free security as shown in Table 3 below. As such, the market yield on U.S. 10 year Treasury Bonds at constant maturity will be used as the risk free security (See Figure 1 below).

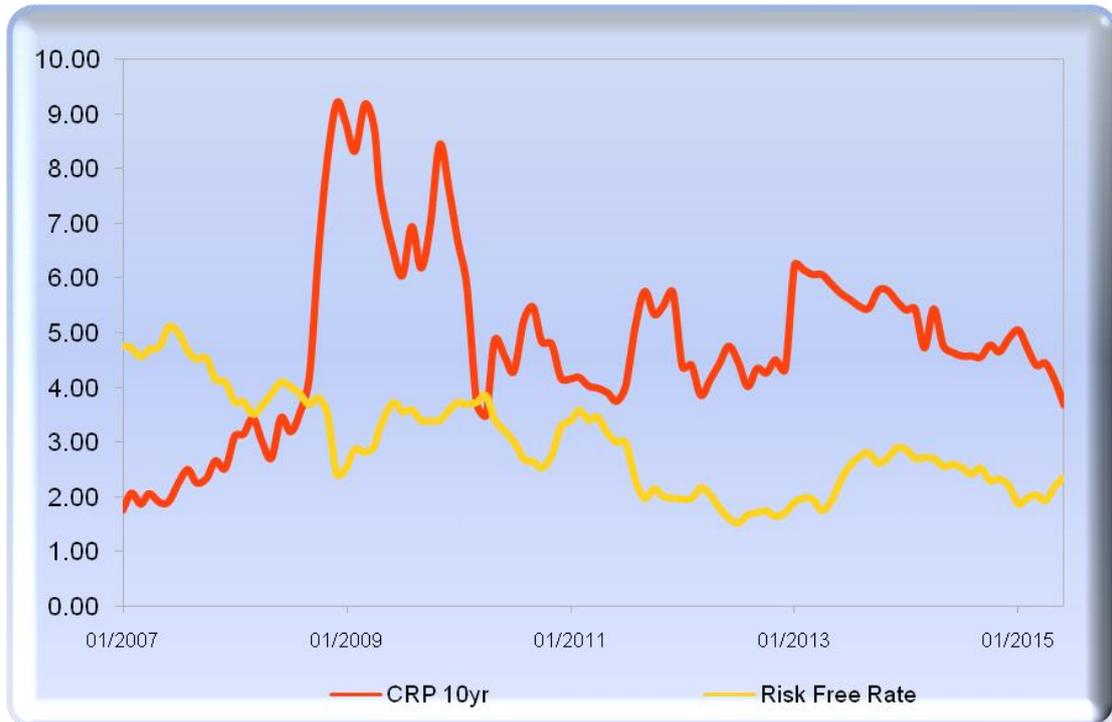
Table 3: Recent Regulatory Decisions on Risk Free Rate

Regulator	Method	Length of Period Averaged	Tenor (Years)	Rate
ANCOM - 2012	Historical Average	2 years	10	3.19
ComReg - 2014	Historical Average	Not Specific	10	2.30
ACM - 2015	Historical Average	3 years	10	1.49
ictQatar - 2013	Historical Average	Slightly less than 2 years	10	4.70
TRA - 2013	Current	Not Applicable	7	4.65
PTS - 2014	Historical Average	7 years	10	2.92
MCA - 2012	Current	Not Applicable	5 - 10	3.3 - 4.3
OUR - 2015	Historical Average	5 years	10	2.39

- 4.6 Another decision to be made surrounds whether the current rate or the average of past rates should be used as the estimate of the risk free rate. Economic theory suggests that the current rate should be used as the estimate of the risk free rate because it incorporates all current economic fundamentals as determined by the market. This was the approach used by the Office in 2010. Conversely, it is argued that because markets are not perfectly efficient, the current yield may not provide the best estimate of future yield. This is because markets are volatile. As such, it is suggested that an average of recent yields be used as the estimate of the risk free rate. In taking this average, it is also suggested that periods of known economic instability should be excluded. This approach of averaging past data is favoured in recent regulatory decisions as shown in Table 4 below. It is important that a consistent approach be taken in estimating all variables. That is, if an average is used to estimate a particular variable, then an average over

the same period should also be used to estimate all related variables. Similarly, if a period is to be excluded from the average when estimating one variable, it should be excluded when estimating all other related. The OUR will go with the trend from recent regulatory decisions and use a historical average. The OUR will average over a period of five years to increase the chance of nullifying the effect of outliers on the estimate. This results in a risk free rate of 2.39%.

Figure 1 Risk Free Rate and Country Risk Premium



Source:

<http://www.federalreserve.gov/datadownload/Output.aspx?rel=H15&series=0809abf197c17f1ff0b2180fe7015cc3&lastObs=&from=&to=&filetype=csv&label=include&layout=seriescolumn> and OUR estimation

Question 3

Do you agree with the approach to estimating the risk free rate? Please give reasons for your response where changes to the approach are being proposed.

COUNTRY RISK PREMIUM

4.7 The country risk premium (CRP) is a measure of the additional risk premium that investors requires for investing in GOJ securities relative

to comparable risk free securities. While many regulators have chosen to include a CRP in the estimate of the WACC, there is still no consensus as to the need for its inclusion. The CRP is a measure of the specific risk associated with investing in Jamaica.

- 4.8 The most widely used measure of CRP is the bond default spread. This is the difference between the yield to maturity of a debt instrument issued by an AAA rated (risk free) government and the yield to maturity of an internationally traded debt instrument with comparable features issued by the government of the country for whom the CRP is being calculated. This approach is consistent with the OUR preference of using market determined values for the parameters to be included in the WACC estimate. In our case, this is the difference between the yield to maturity on GOJ ten (10) year US\$ bonds and the risk free security discussed previously.
- 4.9 To be consistent with the estimation of the risk free rate, the CRP (see Figure 1 above) will be calculated by averaging the premium over the most recent five (5) year period. The results indicate that the CRP is 4.85.

DEBT PREMIUM

- 4.10 The debt premium is company specific and represents the average excess premium on the company's bond relative to the yield on a comparable sovereign bond of the country in which the company operates. Again the preferred approach would be to rely on market data to arrive at the premium. That is, the difference between the yield to maturity on ten (10) year US dollar corporate bonds issued by local telecommunications companies relative to the yield to maturity on ten (10) year US dollar GOJ bonds. However due to a lack of available data on bonds issued by local telecommunications companies, the OUR will benchmark its premium using the debt premium used in recent regulatory decisions. One option is to use the average premiums from these recent decisions which gives a range of 1.37 – 1.74 (see Table 4 below) for the debt premium. However, the OUR believes that the upper limit of this range may be too low in the case of Jamaica. Instead the OUR proposes to use the average lower limit from the recent regulatory decisions and the maximum upper limit from these recent decisions from the debt premium. This gives a range of 1.37 – 2.25 for the debt premium.

Table 4: Recent Regulatory Decisions on Debt Premium and Cost of Debt

Regulator	Methodology	Cost of Debt		Debt Premium
		Fixed	Mobile	
ANCOM - 2012	Imputed	7.9	7.9	1.4 - 1.5
ComReg - 2014	Imputed	4.8 - 5.8	4.8 - 5.8	1.5 - 2.25
ACM - 2015	Actual	5.3	5.3	
ictQatar - 2013	Imputed	5.4	5.4	0.5
TRA - 2013	Imputed	0	0	0
PTS - 2014	Imputed		5.21	2.2
MCA - 2012	Imputed	2.96 - 4.26	2.96 - 4.26	1.25 - 2.25
OUR - 2015	Imputed	8.60 - 9.48	7.93 - 9.48	1.37 - 2.25

Question 4

Do you agree with the estimate of the debt premium? Please be detailed in your response providing data to support your calculation where a different approach/value is being recommended.

- 4.11 The combination of the risk free rate, the CRP, and the debt premium result in an estimated cost of debt of 8.60 – 9.48 as shown in Table 5 below.

Table 3: Imputed Cost of Debt

	Minimum	Maximum
Risk Free Rate	2.39	2.39
CRP	4.84	4.84
Debt Premium	0.7	2.25
Cost of Debt	8.60	9.48

CHAPTER 5: COST OF EQUITY

CAPITAL ASSET PRICING MODEL

- 5.1 The cost of equity is the return that is required by shareholders for their investment in a company. There are various approaches that can be used to estimate the cost of equity. The merits of each method was discussed in the Determination Notice. Like most regulators, the OUR's preference in estimating the cost of equity is the use of the capital asset pricing model (CAPM). In fact, the CAPM methodology was used by all regulators in the OUR's sample of recent regulatory WACC decisions.
- 5.2 The CAPM is a theory that describes the relationship between a security's risk or a portfolio of securities risk and the expected rate of return associated with that risk. The theory is based on the assumption that security markets are efficient and investors are willing to trade risk for a higher expected return. As such, the CAPM estimates a cost of equity that is above the risk free rate. CAPM only factors systematic (undiversifiable) risk as all other risks can be eliminated through proper diversification. That is, only risks that affect the entire market are considered rather than risks specific to a particular company. For this reason the CAPM does not include any firm specific risk premiums. With CAPM, the cost of equity is calculated using the following Equation 5.

$$k_e = r_f + \beta_e (MRP + CRP) \dots\dots\dots (Equation 5)$$

where,

- k_e - is the forward-looking cost of equity,
- r_f - is the risk free rate,
- β_e - is the equity beta,
- MRP - is the market risk premium.
- CRP - is the country risk premium

BETA

- 5.3 Due to the thin nature of the Jamaica Stock Exchange and the fact that C&WJ is the only publicly traded telecommunications company in Jamaica, the OUR will not attempt to use any data from the local stock market in estimating the cost of equity. Instead, the OUR will use a benchmarking approach to estimating the cost of capital. In this regard,

the beta to be used in estimating the cost of equity will be ascertained from a set of comparable fixed and mobile companies.

- 5.4 In determining the set of comparable companies, there were three main criteria used. The OUR tried to ensure that the companies included operated either a fixed line network of a mobile network but not both. In many cases, the fixed network companies were triple play (fixed line, internet, and entertainment/cable) companies. Another factor in choosing the comparable companies is that they should be fairly small companies in terms of market capitalization. In general, the companies used in benchmarking the fixed segment were smaller than those used in benchmarking the mobile segment. Another key determining factor is that the companies chosen must be publicly traded on a major stock exchange so that reliable and extensive data for the company can be obtained. While it would have been ideal to include only companies from Latin America who may be exposed to similar circumstances as our local companies, this was not possible because in many cases they did not meet one of the three criteria discussed earlier. The comparable companies can be seen in Table 6 below.
- 5.5 The beta coefficient for a company measures the systematic risk of investing in that company's equity relative to the market. Specifically, beta measures the risk that a stock adds to a diversified market portfolio. A stock with more risk than the market will have a beta greater than one and a stock with less risk will have a beta lower than one.
- 5.6 The beta coefficient for the sets of comparable companies will be estimated using regression analysis. The returns from the stock for the company will be regressed against the returns from the market. The OUR has chosen to use the S&P 500 Index as the proxy for the market. The regression was estimated using five (5) years of monthly returns. The resultant betas are then unlevered³ to neutralise the effect of the companies gearing on the estimate. The unlevered betas are then relevered using the optimal gearing chosen by the OUR. Finally, the relevered betas are adjusted using the Blume adjustment. The Blume adjustment is a forward looking approach based on the assumption that over time, the beta of all companies tends towards one. As such, the adjustment pushes the regression betas closer to one, those below one are increased and those above one are decreased. Although the set of comparable companies primarily comprised small and medium cap companies, the OUR will continue to use the upper 95% confidence interval of the estimated betas for the upper limit of the beta estimate and the lowest mean value as the lower limit of the beta estimate. This ensures that the range chosen for beta estimate is consistent with that used by other regulators as can be seen in Table 7 below. The OUR proposes to use a value of 0.585 – 0.751 as the estimated beta for the

³ Beta is unlevered using the Modigliani formula.

fixed network and 0.665 – 0.867 as the estimated beta for mobile network.

Table 6 Beta

FIXED LINE	Country	Debt		Tax	Market Cap	Monthly	Monthly	Monthly Re-levered	Monthly Re-levered	Monthly Blume Adjusted	Monthly Blume Adjusted
		US\$m	Debt/Equity	Rate	(US\$m)	Levered Beta	Unlevered Beta	Beta (10% Gearing)	Beta (30% Gearing)	Beta (10% Gearing)	Beta (30% Gearing)
Alaska Communications Systems Group Inc	United States	\$188.36	1.74	0.400	\$108.52	0.529	0.259	0.276	0.326	0.515	0.548
Alteva	United States	\$0.33	0.02	0.400	\$21.87	0.417	0.413	0.441	0.519	0.625	0.678
Cincinnati Bell	United States	\$1,748.80	2.28	0.400	\$765.41	1.167	0.492	0.525	0.619	0.682	0.745
Consolidated Communications Holdings Inc	United States	\$1,360.00	1.36	0.400	\$1,000.00	0.800	0.441	0.470	0.554	0.645	0.701
FAIRPOINT COMMUNICATIONS, INC.	United States	\$902.70	1.99	0.400	\$454.01	1.490	0.679	0.725	0.854	0.816	0.902
Frontier Communications Corporation	United States	\$9,460.00	1.78	0.400	\$5,320.00	0.847	0.410	0.437	0.515	0.623	0.675
Otelco	United States	\$100.09	6.44	0.400	\$15.55	0.412	0.085	0.090	0.107	0.391	0.401
Windstream Holdings, Inc.	United States	\$8,728.10	18.38	0.400	\$474.89	0.889	0.074	0.079	0.093	0.383	0.392
Average		\$2,811.05			\$1,020.03	0.819	0.357	0.380	0.448	0.585	0.630
Minimum						0.412	0.074	0.079	0.093	0.383	0.392
Maximum						1.490	0.679	0.725	0.854	0.816	0.902
Standard Deviation						0.376	0.207	0.220	0.260	0.148	0.174
Count						8	8	8	8	8	8
Upper 95% Confidence Interval						1.079	0.500	0.533	0.628	0.687	0.751

MOBILE	Country	Debt		Tax	Market Cap	Monthly	Monthly	Monthly Re-levered	Monthly Re-levered	Monthly Blume Adjusted	Monthly Blume Adjusted
		US\$m	Debt/Equity	Rate	(US\$m)	Levered Beta	Unlevered Beta	Beta (10% Gearing)	Beta (20% Gearing)	Beta (10% Gearing)	Beta (20% Gearing)
Cellcom	Israel	\$912.00	1.46	0.265	\$626.64	1.815	0.877	0.949	1.038	0.966	1.026
Far Eastone Telecommunications	Taiwan	\$805.18	0.11	0.170	\$7,409.00	0.203	0.186	0.203	0.225	0.466	0.481
Idea Cellular	India	\$2,779.16	0.29	0.346	\$9,566.00	-0.008	-0.007	-0.007	-0.008	0.325	0.325
Millicom International Cellular S.A.	Sweden	\$549.13	0.08	0.220	\$7,270.00	0.636	0.601	0.653	0.718	0.767	0.811
MOBISTAR	Belgian	\$519.82	0.41	0.340	\$1,260.00	0.303	0.238	0.256	0.277	0.501	0.516
NII Holdings Inc	United States	\$678.09	337.36	0.400	\$2.01	1.231	0.006	0.006	0.007	0.334	0.335
NTELOS Holdings Corp.	United States	\$517.11	3.79	0.400	\$136.51	1.608	0.491	0.524	0.565	0.681	0.709
SK Telecom Co. Ltd.	South Korea	\$6,018.00	0.40	0.242	\$15,150.00	0.893	0.686	0.744	0.816	0.829	0.877
Smartone Telecommunications Holdings Limited	Hong Kong	\$371.48	0.17	0.165	\$2,180.00	1.114	0.975	1.066	1.179	1.044	1.120
United States Cellular Corporation	United States	\$1,151.90	0.38	0.400	\$3,000.00	0.694	0.564	0.602	0.649	0.733	0.765
Average		\$1,430.19			\$4,660.02	0.849	0.462	0.500	0.547	0.665	0.696
Minimum						-0.008	-0.007	-0.007	-0.008	0.325	0.325
Maximum						1.815	0.975	1.066	1.179	1.044	1.120
Standard Deviation						0.601	0.345	0.375	0.412	0.251	0.276
Count						10	10	10	10	10	10
Upper 95% Confidence Interval						1.221	0.676	0.732	0.802	0.820	0.867

Table 7: Recent Regulatory Decisions on Beta

	Blume Adjusted	Fixed	Mobile
ANCOM - 2012	Yes	0.71	0.74
ComReg - 2014	No	0.67 – 1.00	0.57 – 0.86
ACM - 2015	Yes ¹	0.69	0.69
ictQatar - 2013	Yes	0.69-0.75	0.69-0.75
TRA - 2013	Yes	0.75 – 0.85	0.75 – 0.85
PTS - 2014	Yes		0.77
MCA - 2012	No	0.57 - 0.99	0.61 - 0.95
OUR - 2015	Yes	0.585 - 0.751	0.665 - 0.867

¹Used Vasicek adjustment rather than Blume adjustment. They both assume that beta should be closer to 1

Question 5

Do you agree with the approach to estimating beta? Please provide a detailed response where changes to the approach are being proposed.

MARKET RISK PREMIUM

5.7 The market risk premium (MRP) also referred to as the equity risk premium (ERP) is the addition return that an investor requires above the risk free rate for investing in equities. The OUR proposes to continue using the average of historical returns to estimate the MRP. Despite the uncertainties associated with the period over which the returns should be estimated, and the method of averaging that should be used, it has been shown that this historical approach is more likely to overestimate the actual premium rather than underestimate it⁴. Most regulators have tended to use the MRP from independent studies like that of Damodaran as can be seen in Table 8 below. However, it should be noted that in most cases the independent studies were derived from a historical average.

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This is due to what is termed the equity risk puzzle where it is argued that historical equity risk premiums are higher than the amount which would be suggested using typical utility models for wealth.

Table 8: Recent Regulatory Decisions on Beta

Regulators	Type	MRP
ANCOM - 2012	Independent Studies	5.85
ComReg - 2014	Independent Studies	4.6 - 5.25
ACM - 2015	Historical	5
ictQatar - 2013	Various	6.3 - 6.8
TRA - 2013	Independent Studies	5.5-6.5
PTS - 2014	Various	5.4
MCA - 2012	Independent Studies	6.01 - 6.1
OUR - 2015	Historical	4.56 - 5.97

- 5.8 The OUR will use a long time period for the estimate. As such, annual data from 1953 – 2014 will be used as this is likely to neutralise the outliers on both sides of the mean. The period was chosen based on data availability. Both the geometric and arithmetic averages will be used to capture the range for the estimate. The result as shown Table 9 below, gives a range of 4.86 – 5.97 for the MRP. This is consistent with recent regulatory decisions as shown in Table 8 above.

Table 9: Market Risk Premium

Period	Geometric MRP	Arithmetic MRP
1953-2014	4.86	5.97

Question 6

Do you agree with the approach to estimating the MRP? Please provide a detailed response where changes to the approach are being proposed.

CHAPTER 6: CONVERTING US\$ WACC TO JAMAICAN DOLLAR WACC

- 6.1 In order to convert the parameters from US\$ in which they were estimated to their J\$ equivalent, the OUR will use the following Equation 6.

$$Parameter_{J\$} = (1 + Parameter_{US\$}) * \frac{(1 + Expected\ Inflation_{J\$})}{(1 + Expected\ Inflation_{US\$})} - 1 \dots\dots (Equation\ 6)$$

- 6.2 The point at which the conversion takes place is important. If the nominal, pre-tax, and after-tax WACC are all estimated in U.S. dollars and then converted to Jamaican dollars the resultant Jamaican dollar estimates will not equate to each other. In order to obtain consistent results, Equation 6 above will be used to convert the cost of debt and cost of equity from US\$ to J\$. This produces consistent results when converting the various WACC measures between the US\$ and J\$ equivalent.
- 6.3 An IMF report⁵ published in March 2015 indicated that “*growth should reach 2 percent in 2015/16, and inflation is projected to fall to an average of 5¼ percent, largely owing to lower fuel prices*”. The projected annual average inflation for fiscal year 2015/2016 for the US economy is 1.9%⁶. The OUR proposes to use these figures for expected inflation in the estimate of the WACC.

Question 7

Do you agree with the values to be used for expected inflation for Jamaica and the United States of America?

⁵ <https://www.imf.org/external/pubs/ft/scr/2015/cr1595.pdf>

⁶ <https://www.philadelphiafed.org/research-and-data/real-time-center/survey-of-professional-forecasters/2015/survq215>

CHAPTER 7: RESULTS

7.1 Combining the various parameters estimated in the previous sections results in a nominal pre-tax WACC for the fixed line of 13.92% in US\$ terms and 18.98% in J\$ terms as shown in Table 10 below. For mobile, the pre-tax WACC is 15.74 in US\$ terms and 20.95% in J\$ terms as shown in Table 11 below. It can be seen that for both the fixed line and the mobile WACC, the OUR has chosen a point estimate closer to the estimated maximum WACC than minimum.

Table 10: Fixed Line WACC

FIXED LINE	Minimum	Maximum	Point Estimate
Risk Free Rate	2.39%	2.39%	2.39%
Gearing	10.00%	30.00%	20.00%
Country Risk Premium	4.85%	4.85%	4.85%
Cost of Debt	8.60%	9.48%	9.04%
Cost of Debt - J\$	12.17%	13.08%	12.62%
Market Risk Premium	4.86%	5.97%	5.42%
Equity Beta	0.59	0.75	0.751
Tax Rate	33.33%	33.33%	33.33%
Expected Inflation - Jamaica	5.25%	5.25%	5.25%
Expected Inflation - U.S.	1.90%	1.90%	1.90%
Cost of Equity	8.07%	10.51%	10.09%
Cost of Equity - J\$	11.62%	14.14%	13.71%
Nominal WACC - US\$	8.12%	10.20%	9.88%
Nominal After-Tax WACC - US\$	7.83%	9.25%	9.28%
Nominal Pre-Tax WACC - US\$	11.75%	13.88%	13.92%
Nominal WACC - J\$	11.67%	13.82%	13.50%
Nominal After-Tax WACC - J\$	11.27%	12.52%	12.65%
Nominal Pre-Tax WACC - J\$	16.90%	18.77%	18.98%

Table 11: Mobile WACC

MOBILE	Minimum	Maximum	Point Estimate
Risk Free Rate	2.39%	2.39%	2.39%
Gearing	10.00%	20.00%	15.00%
Country Risk Premium	4.85%	4.85%	4.85%
Cost of Debt	8.60%	9.48%	9.04%
Cost of Debt - J\$	12.17%	13.08%	12.62%
Market Risk Premium	4.86%	5.97%	5.42%
Equity Beta	0.67	0.87	0.867
Tax Rate	33.33%	33.33%	33.33%
Expected Inflation - Jamaica	5.25%	5.25%	5.25%
Expected Inflation - U.S.	1.90%	1.90%	1.90%
Cost of Equity	8.84%	11.77%	11.28%
Cost of Equity - J\$	12.42%	15.44%	14.94%
Nominal WACC - US\$	8.82%	11.31%	10.95%
Nominal After-Tax WACC - US\$	8.53%	10.68%	10.50%
Nominal Pre-Tax WACC - US\$	12.80%	16.01%	15.74%
Nominal WACC - J\$	12.40%	14.97%	14.60%
Nominal After-Tax WACC - J\$	11.99%	14.10%	13.96%
Nominal Pre-Tax WACC - J\$	17.98%	21.14%	20.95%

7.2 Table 12 below shows that the nominal pre-tax WACC estimated for Jamaica is significantly above the nominal pre-tax WACC allowed in the other countries where a WACC has recently been estimated. This should adequately compensate for the higher risk, whether perceived or real, of operating in Jamaica relative to those countries.

Table 4: Mobile WACC

Regulators	Fixed	Mobile
ANCOM - 2012	10.70%	11.10%
ComReg - 2014	8.50%	8.70%
ACM - 2015	6.06%	6.06%
ictQatar - 2013	9.30%	9.30%
TRA - 2013	9.50%	9.50%
PST - 2014		7.80%
MCA - 2012	9.65%	10.80%
OUR (US\$) - 2015	13.85%	15.69%

Question 8

Do you agree with the estimated WACC for fixed and mobile networks?

APPENDIX: LIST OF QUESTIONS

Question 1

Do you agree with the approach to estimate separate WACCs for fixed line and mobile?

Question 2

Do you agree with the use of an optimal gearing approach and the ranges specified?

Question 3

Do you agree with the approach to estimating the risk free rate? Please give reasons for your response where changes to the approach are being proposed.

Question 4

Do you agree with the estimate of the default premium? Please be detailed in your response providing data to support your calculation where a different approach/value is being recommended.

Question 5

Do you agree with the approach to estimating beta? Please provide a detailed response where changes to the approach are being proposed.

Question 6

Do you agree with the approach to estimating the MRP? Please provide a detailed response where changes to the approach are being proposed.

Question 7

Do you agree with the values to be used for expected inflation for Jamaica and the United States of America?

Question 8

Do you agree with the estimated WACC for fixed and mobile networks?