Submission
In Response to the OUR's
Consultation Document

# "Estimate of the Weighted Average Cost of Capital for Telecommunications Carriers in Jamaica"

## Second Consultation Document

23 November, 2009

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## OFFICIAL STATEMENT

The succeeding comments are not exhaustive and Digicel's decision not to respond to any particular issue raised by the OUR or any party does not necessarily represent agreement, in whole or in part with the OUR's position on these issues; nor does any position taken by Digicel in this document mean a waiver of any sort of Digicel's rights in any way. Digicel expressly reserves all its rights. Any questions or remarks that may arise as a result of these comments by Digicel may be addressed to:

Digicel (Jamaica) Limited
Legal and Regulatory Department
Richard Fraser
Head of Legal and Regulatory
10-16 Grenada Way
Kingston 5, Jamaica

Fax: +1 (876) 920 4626
Tel: +1 (876) 878 0409
Email: richard.fraser@digicelgroup.com

# 1 INTRODUCTION

In this response by Digicel to the OUR's second consultation on the weighted cost of capital[1] (WACC) we identify numerous errors in the numbers and methods used by the OUR to obtain a WACC estimate. Perhaps of greater concern to Digicel is the OUR's stated intention to use one WACC for all regulatory purposes and for all sections of the industry. Digicel considers this to be indefeasible since WACC varies greatly between different sectors of the telecommunications industry and between different firms. Moreover, Digicel is greatly surprised that the OUR has not sought to estimate the WACC of any telecommunications company in Jamaica. Rather, it has applied data from abroad which is typically not suitable for the purpose the OUR has used it.

These very serious concerns lead Digicel to urge the OUR to publish at least one more consultation on the real/nominal WACCs that would apply to the fixed network. If any other sector (e.g. mobile) is to have any price regulated in future then a separate consultation on WACC should be undertaken.

Digicel's main concerns identified in this response are listed in bullet form in the summing up section.

Digicel organises it response to the Consultation as follows:

We discuss estimation risk first in section 2. This is an important section as it outlines why WACC estimates are so uncertain especially in emerging markets. Sections 3 to 10 and section 12 address each of the possibly uncertain components of WACC estimation. The importance of project, divisional and section WACCs is discussed in section 11. Issues regarding real and nominal WACC and real option costs are discussed in sections 12 and 13 respectfully. Section 15 discusses the lack of transparency of the OUR's consultation document – certainly we could not work out where several of the numbers came from or why they were relevant or correct. We provide answers to the OUR's consultation questions in section 16 noting there that many very important questions were omitted from the Consultation. Section 17 provides a summing up.

# 2 ESTIMATION RISK

In this section Digicel discusses the general risk of estimation error in measuring the cost of capital. We discuss this here since whatever method is chosen to estimate the WACC for a company or class of operations undertaken by several companies, substantial under or over

[1] Often "the cost of capital" refers to the cost of debt, with the cost of equity being a separate measure. However, we use the term "cost of capital" in a general sense and not specifically referring to the cost of debt finance.

estimation is a distinct possibility. One of the main reasons for this is that every methodology that can be used to estimate WACC has significant flaws.

The capital asset pricing model (CAPM) is considered by most experts to be the least flawed approach when being applied to companies in developed economies. Even there, however, the empirical evidence is not supportive. As Wright, Mason, and Miles say in their report to the UK Office of Fair Trading, *"The ever-growing anomaly literature presents a considerable challenge to the CAPM."* [2]

However, when the cost of capital in emerging markets is to be estimated the preference for CAPM over other approaches pretty much disappears. Some of the most respected experts advocate that other methods are preferred for in emerging markets. The reasons for this are complex but mainly involve:

(i) the failure of the underlying assumptions of the CAPM model to hold in emerging markets and

(ii) the additional opportunities for error that arises when estimating the cost of capital in emerging markets.

The CAPM model is based on the following assumptions:[3]

- that the mean and variance of returns are all that matter to investors
- information acquisition is costless and there is no private information

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[2] Stephen Wright, Robin Mason, and David Miles (2003), "A Study into Certain Aspects of the Cost of Capital for Regulated Utilities in the U.K", Report for U.K. economic regulators and the Office of Fair Trading: page 59.

[3] A now legendary critique is by Seth Klarman (1991), *Margin of Safety* (now out of print. 2nd hand copies are selling for over US$2000). *"I find it preposterous that a single number reflecting past price fluctuations could be thought to completely describe the risk in a security. Beta views risk solely from the perspective of market prices, failing to take into consideration specific business fundamentals or economic developments. The price level is also ignored, as if IBM selling at 50 dollars per share would not be a lower-risk investment than the same IBM at 100 dollars per share. Beta fails to allow for the influence that investors themselves can exert on the riskiness of their holdings through such efforts as proxy contests, shareholder resolutions, communications with management, or the ultimate purchase of sufficient stock to gain corporate control and with it direct access to underlying value. Beta also assumes that the upside potential and downside risk of any investment are essentially equal, being simply a function of that investment's volatility compared with that of the market as a whole. This too is inconsistent with the world as we know it. The reality is that past security price volatility does not reliably predict future investment performance (or even future volatility) and therefore is a poor measure of risk."*

- there are no transaction costs
- the marginal investor holds a portfolio that includes every traded asset in the market
- markets are not segmented across countries at all
- that the market portfolio is observable i.e. there is a balanced portfolio that includes every single possible available asset, such as real estate, precious metals, valuable art, wine and valuable collectables (historic cars, stamps jewellery etc), and the returns on all possible investments opportunities are unobservable.
- the riskiness of an investment is that which is added to the market portfolio.

An important criticism of applying CAPM in emerging markets is that these markets are at least partially segmented[4] such that financial asset prices are not determined in an equilibrating environment due to inefficiencies and a lack of liquidity.[5]

Also, financial data distributions from emerging markets are known to be skewed and leptokurtic and these factors are very important to investors as they provide information about risk which is now known to be of importance.[6] This aspect of risk is not accounted for in the CAPM model.[7]

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[4] This is an accepted fact among financial economists. See for example the empirical evidence by one of the world's leading financial economists, Campbell Harvey (2004), "Country Risk Components, the Cost of Capital, and Returns in Emerging Markets", Mimeo, Duke University; and National Bureau of Economic Research, Cambridge, Mass; available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=620710. See also Geert Bekaert, Campbell R. Harvey, Christian T. Lundblad, Stephan Siegel (2008), "What Segments Equity Markets?" an NBER working paper, available at: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1108156

An important research paper which discusses recommended modifications to the CAPM model are discussed in Bekaert, Geert and Campbell R. Harvey, (1995), "Time-Varying Conditional World Market Integration," *Journal of Finance*, 403-444.

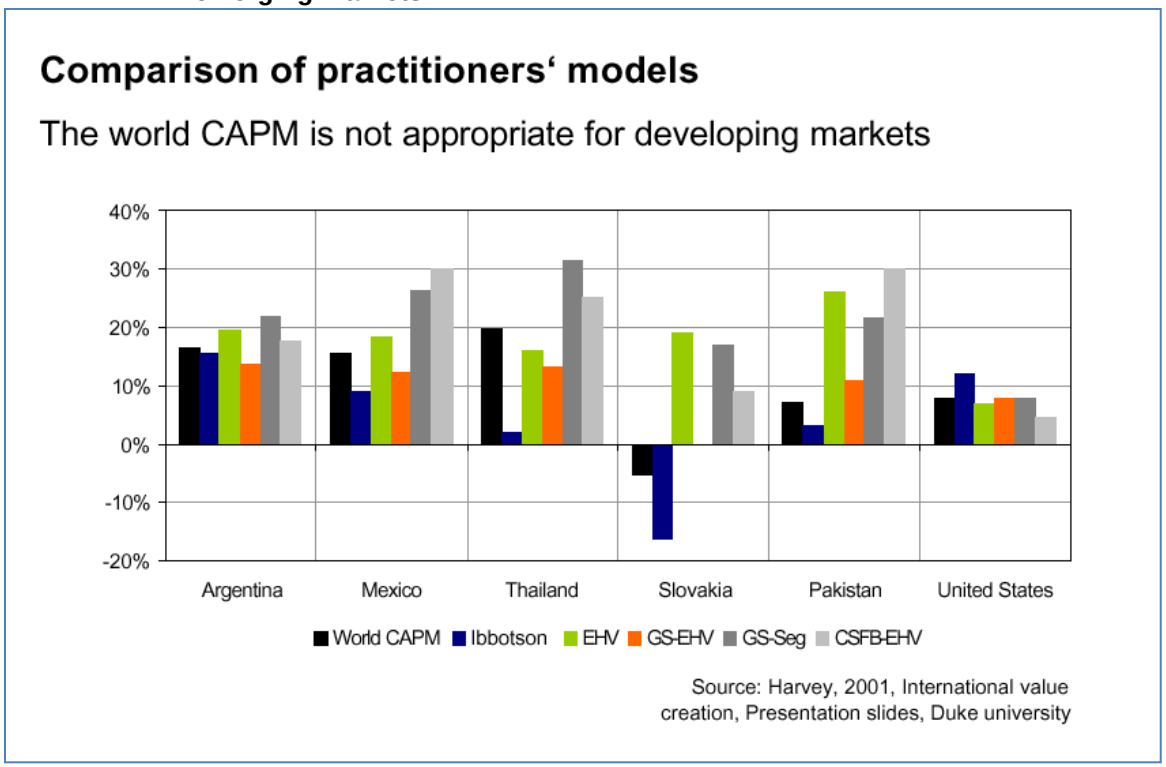
[5] In emerging markets the assumptions of CAPM methods do no not hold. CAPM methods for estimating the cost of capital have not been designed to deal with the unavoidable, unsystematic risk arising from imperfect diversification. Fundamentally, the efficient markets hypothesis (EMH) (strong or weak form) is unlikely to hold (see for example, Burton G. Malkiel (2003), "The Efficient Market Hypothesis and Its Critics", *Journal of Economic Perspectives*, Volume 17, No 1, pp 59 – 82). For public companies in the Caribbean national stock markets are small, concentrated, and can be manipulated. What is more, the level and quality of company information in emerging markets is likely to be less than is needed for the EMH to hold.

[6] The implications of this for investment selection are discussed in: Bekaert, Erb, Harvey and Viskanta, (1998), "Distributional Characteristics of Emerging Market Returns and Asset Allocation," *Journal of Portfolio Management*, Winter, pp 102-116. For a discussion the relevant behavioural economic psychology and its relevance to risk and return see Daniel McFadden (2001), "Economic Choices", *American Economic Review*, Vol. 91 No. 3: pp 351-378. In 2002 the Nobel Prize in economics was awarded for research into economic psychology and human judgment and decision-making under

Another pertinent problem with simple (unadjusted) CAPM is that it is largely a constant parameter model. It is now known that many of the inputs are time varying parameters and models that allow for this have been shown to out-perform simple CAPM in developed market economies.[8]

The Figure 1 comes from a presentation to a corporate finance class. It compares for emerging markets the asset pricing of simple CAPM with other methods. The US is added for comparison reasons.

**Figure 1: Harvey's comparison of the performance of various assets pricing models in emerging markets**




The models used are colour coded with the CAPM model in black.[9]

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uncertainty. This research shows that skewness and leptokurtosis are important sources of risk for investors.

7 The mean-variance assumption of the CAPM model can hold only if (i) all investors have quadratic utility functions or (ii) returns are normally distributed. Neither is borne out by research.

8 See for example, (i) Wright, Mason, and Miles (2003), *supra* note 2; (ii) Bill B. Francis and Delroy M. Hunter (2006), "The Role of Currency Risk in Industry Cost of Capital", Mimeo, University of South Florida.

9 The models used were: (i) CAPM, (ii) The Ibbotson model, (iii) the Erb, Harvey and Viskanta model, (iv) Goldman Sachs Integrated model, (v) The Goldman Sachs Segmented model, and (vi) and a hybrid of (iii) a model used by Credit Suisse First Boston.

In developed economies regulatory best practice is not to solely rely on the cost of capital figure provided by a CAPM calculation but to use other methods as well as a wide range of figures possibly from different industries or countries. CAPM may be the preferred approach for generating WACC estimates in developed economies but it remains contentious and few experts would bet their own money on CAPM generated WACC estimates being highly accurate. Thus we see ranges of WACC component figures published by leading regulators in developed economies. One reason for this is that there are broad confidence intervals associated with certain estimated WACC input values.

In the United Kingdom the authorities considered a range of WACC estimates for each affected firm including a spread between higher and lower company betas. In the USA the FCC decided that WACC estimates for fixed network operators appeared too low when considered alongside all the data the FCC had available to it about S&P500 returns and chose to increase the equity beta over modelled estimates by approximately 25%.[10]

In emerging markets including Jamaica the use of the CAPM methodology is controversial.[11,12] The empirical evidence suggests that in emerging markets other approaches than the traditional CAPM may be less problematic.[13] Certainly each firm the OUR intends to apply any form of price regulation to should have several cost of capital values considered by the regulator – also in light of the greater uncertainty attached to any single cost of capital estimate.

The fact that the OUR has not done this and that several of the OUR's parameter estimations employ invalid methods (which we discuss further below) supports Digicel's view about the Consultation generally, that the OUR has not considered the topic with the requisite level of care. Reliance on a single figure for, say, C&W price capping purposes, implies a lack of appreciation of the weaknesses in the CAPM methodology and in the methods to obtain CAPM model input values, especially in emerging markets. Cost of capital estimation is a complex and

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[10] AT&T/WorldCom submitted the following equity beta calculations: BellSouth (.65), Verizon (.68), SBC (.83), ALLTEL (.74), and CenturyTel (.84). In conclusion the FCC considered these numbers too low and stated that it would use a beta of 1. Federal Communications Commission DA 03-2738, adopted August 28, 2003, p.41.

[11] In his commentary in the World Bank discussion paper, *"Portfolio Investment in Developing Countries", Harvey concludes, I tried to be constructive in my discussion. In my opinion, a model that allows for both segmentation and integration is more in tune with the sorts of markets that we are looking at."*

[12] See Campbell Harvey (2001), "Asset Pricing in Emerging Markets", in Orley Ashenfelter, Section Editor, *International Encyclopaedia of the Social and Behavioural Sciences*, Elsevier Science Limited, pp. 840-845.

[13] See for example, Estrada J (2002), "Systematic risk in emerging markets: the D-CAPM", *Emerging Markets Review*, Volume 3, Number 4, 1, pp. 365-379.

contentious topic that above all else requires expert judgment since the numbers obtained by any method cannot by themselves be relied upon with any confidence.[14]

Further adding to Digicel's concern with this consultation is the lack of transparency and commentary explaining where the OUR's numbers come from (discussed in section 15) and the OUR's stated intention to apply the same WACC across the industry. The latter is in Digicel's opinion not a sustainable position (also discussed below).

Another factor that Digicel is concerned may have been present in this consultation is a level of regulatory opportunism. In particular we have the impression that the OUR is interested in getting as lower a WACC as it can with insufficient concern for whether that WACC is compensatory for whichever firm it is to be applied to. Some of the OUR methods are unconventional and some are invalid and we discuss them below. Doing whatever works to get regulated prices lower in the short term may have political appeal, however, in the long-run it is most certainly to the detriment of consumers as well as investors. Investors are most reluctant to invest where they perceive the risk of regulatory opportunism and thus the unambiguous long term outcome of such is that consumers suffer. Ofcom captures the point of it when considering the value of the equity risk premium (ERP):

> *"Traditionally, Ofcom has considered that the downside risk associated with taking too low a value for the ERP (discouraging discretionary investment) is more detrimental to the interests of consumers than taking too high a value (leading to higher prices to customers) and has tended to the higher end of the possible range."* [15]

The conclusion is that even in developed economies one cannot have confidence in a single CAPM estimate that is mechanically generated and may be applied to several companies – even if this was done using "correct" CAPM methods. In the case of emerging economies including Jamaica the problem is even more pronounced. Here it is not even accepted that the CAPM model is the most suitable given the alternatives. Digicel appreciates that the OUR needs to estimate the cost of capital for certain parts of the industry and the CAPM is an option for doing this. However, as it involves assumptions that do not hold in reality and substantial uncertainty surrounding the value of some of the inputs, the OUR at the very least should employ several estimates of sector-specific WACCs and the input values used to estimate WACC. In the end judgement will be important based on an understanding of all the numbers and their limitations.

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[14] In considering these issues Credit Suisse say that "long-term investors are better off considering the 'margin of safety' concept". See Michael J. Mauboussin and Alexander Schay (2001), "Ruminations on Risk: Beta Versus Margin of Safety", Credit Suisse First Boston.

[15] "Ofcom's approach to risk in the assessment of the cost of capital", (2005), P.4.

# 3 MARKET RISK

Market risk is a key source of risk for investors. It can also be termed macroeconomic risk. It includes changes in interest rates, changes in inflation, economic growth and catastrophic risk. Changes in the term structure of interest rates also included in market risk.

Neither firms nor investors can diversify this risk away. It must therefore be included in the estimation of WACC. Where this is done by using the capital asset pricing model (CAPM) the market risk is measured with a beta. For a large public company this is then multiplied by the equity risk premium (ERP) which yields the total risk premium for a risky asset.[16]

# 4 INDUSTRY SPECIFIC RISK

Industry specific risk includes:

- Risk of that sunk costs involving a certain level of technology become outdate – technology risk.
- The risk that commodities or inputs that are used by the industry are disproportionately affected – commodity risk.
- Laws and regulations may change in ways that negatively impact on investors – termed legal risk.

In order for firms to diversify away industry specific risk they must be fully diversified across other industries. Most companies do not do this – they specialise in the industry in which they operate. Virtually no company will be diversified in this way.

In the case of public companies, however, investors will in theory be able to diversify this risk away although in small economies and particularly small emerging economies, due to market segmentation significant residual risk is likely to remain.[17]

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[16] In the arbitrage pricing model and the multi-factor model, betas are estimated against individual market risk factors, and each factor has its own price (risk premium).

[17] One of the main assumptions of the CAPM model is that there is not segmentation across markets.

# 5 THE RISK-FREE RATE

It is very important that the risk free rate (RFR) is correctly determined since both the cost of equity and the cost of debt to a company are calculated on top of the RFR.

In its Consultation the OUR has not adequately addressed the issue of estimating the RFR in an emerging market. The OUR has expressly identified a US Risk-free rate on page 30 of the Consultation but has not explained how this then enters into the calculation of the cost of equity or debt for Jamaican companies. The calculations appear to have been done outside the consultation such that readers of the consultation cannot trace how these (and other figures found in the Consultation) were derived. In this regard the consultation lacks the level of transparency that any consultation process should facilitate.

In order to estimate the WACC for a Jamaican company there would ideally be long term frequently traded Jamaican Government bonds in Jamaican dollars. Short term rates are unsatisfactory as they suffer from reinvestment risk and short term influences that do not match the company's investment situation, for example the average life of its assets. We now discuss this issue in further detail.

## 5.1 Long or short term debt

For an investment to be risk free the first fundamental tenant is that the expected return must always be equal to the actual return. Two basic things that are needed for this to occur are that:

- There must be no default risk, and
- There must be no re-investments risk;

Taken together these two points imply that the RFR will depend on the time horizon chosen for the risk-free security.

Re-investments risk refers to the fact that re-investment rates at maturity are uncertain and this implies risk. Also bond coupons earned periodically will need to be re-invested at uncertain rates during the period to bond maturity. Zero coupon US Treasury bonds are now available, although we can also use the yield curve to re-price bonds to take account of re-investment risk.[18]

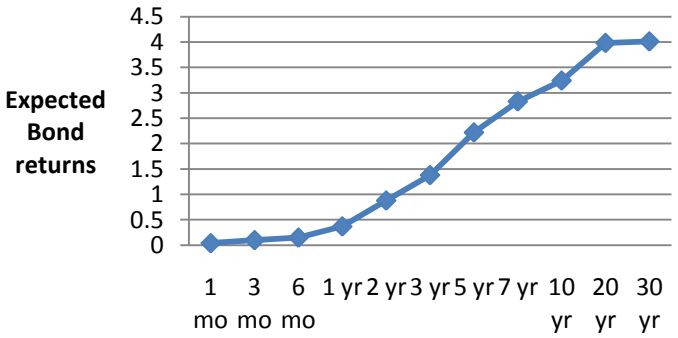
[18] Including this latter aspect of re-investment risk in the pricing of bonds is most important when the yield curve is sloping upward significantly more steeply than is normal – as is likely to be the situation presently.

Rather than calculate risk-free rates annually in order to take account of re-investment risk, however, a compromise is to select a Treasury maturity period that matches the average duration of the company's assets to the average duration of its liabilities. For the S&P 500 this has been estimated to be approximately 16 years.[19] Note, however, that this period will be longer for S&P 500 firms that are younger than average and longer for S&P 500 firms that have higher growth than average.[20] Digicel is a young firm and is growing rapidly which means that for Digicel 10 year bonds will understate the proper risk-free rate that should be applied to it. For this reason we are advised that a 20 year bond rate should be used in the estimation of Digicel's WACC.

When the yield curve is unusually steeply upward sloping as is the case at present with short term US rates being close to zero, it is prudent to also estimate short term risk-free rates and compare these with short term equity premiums. Among other things this can provide a valuable sanity check to the outcome of a process that is known to provide uncertain and varied results, most especially at unusual times such as these when Bond and Bill rates are especially low due to such things as recession and the extreme levels of liquity being provided to the markets. Digicel suggests that the OUR also make such assessments and compare them with the results using standard practice which looks at the returns on long term bonds. Digicel's investigation showed a US risk-free rate of 4.36%.

The yield curve shown is Figure 2 suggests that we are in very perculiar times for asset pricing.

**Figure 2: US Treatury Bond Yield Curve (Sept 09)**




We note the US interest rates have risen slightly since this graph was created.

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[19] See Aswath Damodaran (2008), "What is the risk-free rate? A search for the basic building block", mimeo, *Stern School of Business*, New York University.

[20] Digicel is a young firm and is growing rapidly which suggests that for Digicel 10 year bonds will understate the proper risk-free rate that should be applied to it.

## 5.2 Getting from US$ bond rates to J$ rates

As there are no frequently traded long term Jamaican dollar government bonds we have two options: (i) estimate the rate in a country with a history of frequently traded virtually default-free bonds and then convert company cash flows to this currency; or (ii) to estimate a local currency discount rate.

The preferred way of overcoming the lack of a long-term government bond rate in Jamaica is to use government bond rate from another country that has a full range of government bond maturities. However, even in countries with a AAA credit rating we see that the "risk-free" rate varies between them. The primary reason for this is that expectations of inflation differ across in different countries. Risk-free rates do not account for differences in expected inflation. It is thus imperative that regulated service cash flows are also estimated in which ever currency the risk-free bond rate is denominated in. As Damodaran says, "*it is not where a project or firm is domiciled that determines the choice of a risk free rate, but the currency in which the cash flows on the project or firm are estimated.*"[21]

Interest rate differences across countries do not fully reflect differences in expected inflation. While in most cases interest rates will have to adjust at some time so as to correct any discrepancy this need not be the case for sustained periods.[22]

As Jamaica does not issue long term bonds in Jamaican dollars and to avoid the need to adjust all projected cash flows for inflation and currency differences, the preferred approach would be to estimate a suitable local currency discount rate.

As a way of overcoming the lack of long term frequently traded J$ bonds the OUR has adopted as the risk-free rate a US Treasury Bond. However, as Digicel's cashflows are in J$ the preferred appproach is to derive a J$ discount rate from a foreign RFR (e.g. long term US Treasury bonds). In order to do this we need to have information about expected inflation rates in the USA and Jamaica. Putting country risk to one side, in order to estimate the rate in another currency we need to know the differences in expected inflation in both countries. It is not inflation today that is needed but what investors expect in the future.[23] We do not have current inflation expectations estimates for either the USA or Jamaica.

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[21] Damodaran (2008), p.13, *supra* note 6.

[22] For example, we have seen low inflation economies with relatively high interest rates sustain both for very long periods.

[23] A number of sources are used to estimate inflation expectations including: financial market data, including surveys of consumers, and economists' predictions. Recent analysis suggested that US inflation expectations are anywhere from 2 to 3.5%, depending on the source and the period over which inflation expectations are projected (1 to 10 years).

For expediency in this reply Digicel proposes to use actual inflation as a proxy for expected inflation. However, before any numbers are finalised this proxy should ideally be replaced with 'expected' values and the resulting WACC results compared with those obtained by using the most recent inflation data.

In August 2009 the US inflation figure was -1.5%.[24] We believe the figure for Jamaica over a broadly similar period was about 8.5% based on a figure of 8.1% until October 2009.

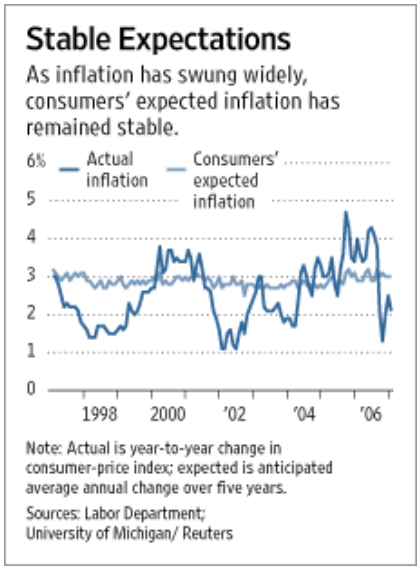
$$\text{Cost of capital in J\$} = \text{Cost of capital in US\$} * \frac{(1 + \text{expected inflation in Jamaica})}{(1+ \text{expected inflation USA})} - 1$$

$$= 0.436 * \left[\frac{1.085}{0.85}\right] - 1 = 14.96\%$$

Digicel suggests that while US inflation is very likely to rise to 2% or 3% or quite possibly more as the economy recovers from recession, it seems as likely that a similar rise in inflation will occur in Jamaica at roughly the same time suggesting that CPI changes are unlikely to result in signicant changes in the RFR expressed in J$ terms.

To this we need to add soverign risk. The OUR has listed it at 5.35%. However we note in some detail in section 7 that the rating agencies have a substancially higher figure for Jamaica. Digicel also provides information in section 7 which suggests that a figure of 10% is in fact reasonable.

**Figure 3: Actual compared with Inflation expectations**




[24] See the US Labour Department website and the data on the following page: http://www.bls.gov/cpi/cpi_dr.htm

The graph shown in Figure 3 shows there is significant risk of error when using actual inflation as a proxy for expected inflation.

# 6 THE COST OF DEBT

Chapter 3 pages 12 to 14 of the OUR's consultation seeks to estimate the cost of debt to Jamaican telecommunications network licensees in US dollar terms. The first number the OUR proposes is that *"[t]he cost of debt for telecommunications companies in Jamaica is estimated by adding the maximum company premium of 2.0% to the average yield on GOJ six month Treasury Bills"*. There is no information provided as to how this 2% was arrived at; e.g. whether it is based on an average of the debt costs of licensees in Jamaica. Digicel would like the OUR to make this information public.

Digicel also notes that the OUR has taken bond rates (see Table 1) with little relevance to bond rates that apply to any network licensees in Jamaica. If firms in Jamaica have issued their own bonds then the market rates for those bonds are the ones the OUR should use. Digicel has issued bonds (as we discuss further below) and feel sure that C&WJ, FLOW and Claro will have done likewise.

**Table 1: The OUR's Table 4 "COST OF DEBT FOR COMPARABLE GLOBAL COMPANIES"**

| Company | Country | Moody's Ratings | Market capitalization | Cost of Debt |
|---|---|---|---|---|
| AT&T | USA | A2 | $211,235,555,970 | 5.55% |
| BCE INC | Canada | Baa2 | $29,151,244,600 | 7.19% |
| BRITISH TELECOMS | UK | Baa2 | $35,662,882,086 | 7.19% |
| NIPPON TELEGRAPH & TEL | Japan | Aa2 | $68,284,458,135 | 5.55% |
| FRANCE TELECOM S.A | France | N/a[1] | $87,265,396,950 | N/a |
| TELEFONICA S.A. | Spain | Baa1 | $138,017,681,013 | 7.19% |
| DEUTSCHE TELEKOM AG | Germany | Baa1 | $82,384,919,220 | 7.19% |
| VODAFONE | UK | Baa1 | $171,225,484,760 | 7.19% |
| TELEFONOS DE MEXICO S.A. | Mexico | A3 | $18,381,130,200 | 5.55% |
| VERIZON | USA | A3 | $104,976,676,640 | 5.55% |
| 1 - Bond rating not available | **Weighted average Cost of Debt** | | | 6.42% |

In practice Jamaican telecommunications network licensees (JTNL) will each have a different cost of debt as for one thing they each have a different credit rating. This is true for all network providers whether in Jamaica or elsewhere.

Digicel notes that even the biggest names in telecommunications around the world have to pay significantly more than 2% above the cost of own country six month government Treasuries for debt finance. The actual premium will depend on several factors that impact on risk and

companies have very different risk profiles. Digicel suggests that it is apparent from studying the OUR's numbers that the 2% figure used by the OUR is invalid. Indeed the inconsistencies are clear from the OUR's figures. It claims that the US dollar cost of debt is 9.86%, but if we take the 2008 six month US Treasury rate from this we end up with 8.2% (4.36 if we take the annual average from the beginning of the series in 1982). So we end up with 8.2% on top of the 6 month Treasure rate in the US and 2% on top of the Jamaican 6 month Treasure rate. Clearly, what the OUR has done here cannot be correct.[25]

The OUR also implies here that JTNLs raise the debt they need in Jamaica or that it makes commercial sense to do so. Digicel contests this and asks the OUR to provide the analysis that would support the OUR's implied claim. Rather, Digicel for one raises most of its debt financing on foreign markets and in US dollars. One reason for this is that most of Digicel capital investment costs are not in Jamaican dollars, and where debt was used to free equity, Jamaican dollars would also not be the appropriate currency.[26] However, as Digicel's cash flows are in J$ it is appropriate to convert the US$ rate at which the company borrows into a J$ rate.

The OUR has also used illegitimate means to estimate the cost of debt in J$ and US$. It has, for example, allowed for its (albeit incorrect) estimation of currency risk but has not included other risk including its figure for Sovereign risk – also incorrectly estimated for reasons we discuss in section 7).

When different costs of debt it is imperative that the same period used to estimate one sort of debt or asset is the same as those it is compared with. The OUR has not done this and this also makes its interest rate comparisons invalid.[27]

What is more, the OUR appears to have adopted the rate of 6 month GOJ Treasury bills as if it was a risk-free rate. 6 month Treasury bills do not generate the correct yields for assessing the cost of debt or equity, notwithstanding the other issues that must be taken into account when seeking to price emerging economy debt in local currency.[28] We discuss this further in section 5. As there are no long term J$ bonds that are frequently traded we looked at the most recently issued long term J$ bonds. The "Series Y" issued mid 2009 and due 2039 pays a fixed rate of 23.75% with coupons paid quarterly. This is pretty close to the J$ RFR equivalent we estimated

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[25] Debt or equity risk premiums generally change as the risk-free rate changes. While a 5% risk premium is acceptable to investors when the RFR is 4%, it may be unacceptable when the RFR rises to 5%.

[26] There is no established forward exchange market to for J$ to US$ and thus this is not an available way of overcoming such a problem.

[27] "The 10 year GOJ yield uses the yield curve estimated by Bloomberg and is averaged over the period January 2007 to February 2009."

[28] Using short term rates can provide a valid sanity check where then yield curve is steeply upward sloping but then equity risk would also need to b e assessed over a short period which is not what the OUR has done.

above of 24.22%. 2009 figures for Digicel's two most recent US$ bond offering show an average cost of 11%.[29] Taking account of other debt (non-bond debt) would push this rate higher, however, in the interested of expediency and solely for demonstration purposes we have used 11% in our calculations below.

# 7 INTERNATIONAL RISK

International risk is another form of risk that cannot be diversified away and must therefore be included in any WACC estimation for Jamaican Telecommunications network operators. It incorporates the risk that political decisions will impact on investors' returns including default risk, currency risk, the risk of war or *coupe de tat*, along with and other aspects of systemic country specific risk.

The empirical evidence overwhelmingly supports the existence of country specific risk factors. There are two reasons why country specific risk in not diversifiable:

1) Markets remain partially segmented. For whatever reason investors tend to be bias in favour of their own market.

2) Returns across market are highly correlated.

The main sources of country specific risk are:

- Sovereign rating agencies
- Organisations that provide broad measures of country risk such as *The Economist* country assessment unit.
- To use market based measures such as volatility of asset markets and the currency value.

The problems with sovereign risk measures by the ratings agencies are primarily twofold:

(i) The rating are typically 2 or 3 years behind what is actually going on in the markets and this in turn reflects investors' views about the future

[29] We also draft the OUR attention to the likelihood of this rate climbing as we move forward. This is also the view of Keith Collister: "Since the cost of debt is based upon current borrowing rates, it should also climb as the firm becomes more exposed to the risk of bankruptcy and the effect will be exacerbated if the tax advantage of borrowing also dissipates (as a result of operating losses)".

(ii) They focus on default risk and hence under-value country specific risk.[30]

Organisations that provide a broader measure of risk do not disclose the model they use and thus these suffer from being black box estimators and are not therefore valid for regulatory purposes. However, it is interesting to note that they score Jamaica as a much more risky environment than the comparable sovereign risk estimates provided by the rating agencies. See Figure 4.

**Figure 4: The Economist Group – Country Risk Rating**

Country risk ratings

**Nations in hock**

Oct 22nd 2008

From Economist.com

**As the world economy founders, credit risk is on the rise**

Economist.com rankings

**Country risk**

Selected countries and territories, September 2008 (except where noted)

| Least risky | | | Most risky | | |
|---|---|---|---|---|---|
| Rank | | Score* | Rank | | Score |
| 1 | Switzerland † | 12 | 120 | Zimbabwe | 86 |
| 2 | Finland ** | 14 | 119 | Iraq | 80 |
| | Norway ** | 14 | 118 | Sudan | 76 |
| | Sweden †† | 14 | 117 | Myanmar | 75 |
| 5 | Canada ** | 17 | 116 | Nicaragua | 69 |
| | Denmark † | 17 | 115 | Jamaica | 68 |
| | Netherlands § | 17 | 114 | Kenya | 66 |
| 8 | Germany †† | 18 | 113 | Cuba | 64 |
| 9 | Austria ** | 19 | 112 | Cambodia | 62 |
| | France †† | 19 | 111 | Côte d'Ivoire | 61 |
| 11 | Belgium †† | 20 | | Ecuador | 61 |
| 12 | Singapore | 21 | | Pakistan | 61 |
| 13 | Japan ** | 23 | | Venezuela | 61 |
| 14 | Ireland # | 24 | | Vietnam | 61 |
| | Britain | 24 | 106 | Syria | 60 |
| | United States † | 24 | | | |

*Out of 100, with higher numbers indicating more risk. Scores are based on indicators from three categories: currency risk, sovereign debt risk and banking risk.

† May 2008; ** July 2008; †† June 2008; § August 2008; # February 2008

http://www.economist.com/markets/rankings/displaystory.cfm?story_id=12406980

Market based measures could involve:[31]

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[30] Jamaica Long-Term Ratings Lowered To 'B-'; Outlook Is Negative

[31] Market measures have their flaws. Damodaran identifies these as investor mood shifts, irrationality and the fact that liquidity issues cannot be separated out of volatility measures.

1. Bond default spreads

2. Credit default swap spreads

3. Market volatility
   The conventional way of estimating the risk associated with equity is to use the standard deviation of equity stock prices. Ideally the relative volatilities would be obtained from the options market since this will provide estimates based on present market conditions. In practice historical volatility is usually used. The measures obtained will unfortunately lead to a bias in the RP on the low side since the more illiquid the market the lower volatility.

In the case of Jamaica a mix of 1 and 3 are best since 1 by itself only measures default risk. Less developed Jamaican financial markets rule 2 out.

As bond default spreads are a measure of sovereign risk, Country Specific Risk will in any case be higher than the sovereign risk alone. In its consultation the OUR has attempted to account for sovereign risk and currency risk. It has however understated the current sovereign risk figure for Jamaica. The OUR has recorded sovereign risk as 5.35%.

Ratings agency Moody's list a figure of 6% but this relates to circumstances prior to the current recession. In Digicel's view and also in the view of CitiBank, the arguments are compelling that Moody's measure of Jamaican Sovereign Risk substantially understates the risk implied by the current situation since:

(i) It is primarily focussed on default risk,

(ii) Sovereign risk agencies in general are accepted as lagging at least 2 or 3 years behind market developments such that the rating when announced is already out of date,

(iii) The relative situation of Jamaica has worsened since the financial market lead recession began, and

(iv) In March Standard and Poors lowered its rating for Jamaica. Its report was titled, *"Jamaica Long-Term Ratings Lowered To 'B-'; Outlook Is Negative"*. This is equivalent to virtually a Ba3 to B Moody's rating (approximately a 7.8% to 13.5% risk premium).[32]

[32] See also, for example, "Government Of Jamaica Gets Poor Credit Rating", Published Aug 11, 2009. *"The Government of Jamaica's credit has been reduced by the Standard and Poor (S&P) to CCC-. This represents a reduction from B- in the last quarter. The fiscal deficit raced to $35 billion during the first quarter of this year, up from the $8 billion recorded during the same period of last year."*

Digicel's bankers Citibank have fairly recently adopted a political risk premium of 10% for Jamaica (see Figure 5). Digicel's view is that a political risk premium of 10% is reasonable.

**Figure 5: Citibank's Political risk premium which is applied to Digicel (Sept 09)**

| Caribbean | PRP (bps) |
|---|---|
| Haiti | 1500 |
| Guyana | 1400 |
| Jamaica | 1000 |
| Grenada | 950 |
| St Vincent & Grenadines | 650 |
| Suriname | 650 |
| Aruba | 350 |
| Barbados | 300 |
| Trinidad & Tobago | 300 |
| Bermuda | 0 |
| Anguilla | NA |
| Antigua & Barbuda | NA |
| Bonaire | NA |
| British Virgin Islands | NA |
| Cayman | NA |
| Curacao | NA |
| Dominica | NA |
| French Guiana | NA |
| Guadeloupe | NA |
| Martinique | NA |
| St Lucia | NA |
| St. Kitts & Nevis | NA |
| Turks & Caicos | NA |
| **Region Median** | **650** |

Source: Citibank

# 8 THE EQUITY RISK PREMIUM (ERP)

The equity risk premium (ERP) is the premium demanded by investors for investing in a market portfolio which includes all risky assets in the market, instead of investing in a riskless asset. The ERP does not therefore concern any individual risky asset but is concerned with regard to risky assets as a class. [33]

In developing economies like Jamaica there is not an adequate time serious of equity market data to use in calculating an ERP. For all countries in this position the accepted approach is to

[33] A nice definition is as follows, *"The equity risk premium is the difference between the expected rate of return on shares (collectively) and the risk free rate of return. It is the amount of extra return investors demand for taking the extra risk involved in investing in shares."* http://moneyterms.co.uk/equity-risk-premium/

set the ERP equal to the ERP in a country with a long data history. For Jamaica the USA appears to be the obvious choice.

The long horizon ERP in the USA is simply an average total return on stocks over the very long run less the return of long-term Treasuries. A very long time series of data is required in order to keep the standard error to a reasonable level. A 25 year time series has a standard error of 4%; a 50 year time series has a standard error of 2.83%.

The OUR chose a simple average of numbers presented by C&W. Digicel notes that 3 of the 4 time series behind these numbers were 1970 – 2005. Digicel believes that experts would not be willing to rely on 1970 – 2005 data series where a much longer series was available. Common practice is to use the Ibbotson data series that runs from 1926, although some researches prefer an even longer series.

**Table 2: The OUR's Table 2**

| Source | Method | Market | Period | EMRP Estimate |
|---|---|---|---|---|
| Morningstar (formerly Ibbotson) "Stocks, Bonds, Bills, and Inflation Yearbook 2007", Valuation edition | Realised equity returns in excess of the risk free rate (in US dollar terms) | US | 1970-2005 | 4.75% |
| | Realised equity returns in excess of the risk free rate (in US dollar terms) | Canada | 1970-2005 | 3.88% |
| | Realised equity returns in excess of the risk free rate (in US dollar terms) | UK | 1970-2005 | 5.54% |
| | Realised equity returns in excess of the risk free rate | US | 1926-2006 | 7.1% |
| Duke University Fuqua business school (2007). | Survey of US CFOs | US | 2007 | 3.4% |
| Dimson, Marsh, and Staunton, "Global Investment Returns Yearbook 2006". | Arithmetic average premium over bonds | US | 1900-2005 | 6.5% |
| | Arithmetic average premium over bills | US | 1900-2005 | 7.4% |
| | Arithmetic average premium over bonds | UK | 1900-2005 | 5.3% |
| | Arithmetic average premium over bills | UK | 1900-2005 | 6.1% |
| | Arithmetic average premium over bonds | World | 1900-2005 | 5.1% |
| | Arithmetic average premium over bills | World | 1900-2005 | 6.1% |

The ERP numbers as presented in the OUR's Table 2 provide too little information describing the numbers and how they were derived for any of them to be used as part of an averaging exercise. For example, the ERP is a percentage in excess of the RFR (long term Treasuries) but the OUR's Table 2 does not provide information about this and we cannot assume that each has been determined in exactly the same way and in relation to the same Treasury assets. Indeed, the values in the bottom cell of the OUR Table 2 have more information provided with them than the values from the top of the Table which are those chosen by the OUR. We know that all the bottom cell examples represent arithmetic averages which we do not know about the averages used by the OUR i.e. the numbers in the top cell of Table 2. Digicel also notes that

one of the figures which the OUR used in the averaging exercise, the 4.1%, is not found in Table 2 at all. We have no idea what it is or where it comes from and thus we cannot comment more on it except to note that it is below all ERP figures we have seen for the USA derived from long time series data.

Moreover, Digicel does not believe it is legitimate to use equity returns in US dollars from other countries' markets such as Canada and the UK, as the OUR has done. There are other factors at play that make this averaging illegitimate – averaging these numbers implies that the numbers are perfectly comparable which they are not. The average return to equities differs significantly across countries and converting this average into US dollars ignores the underlying reasons for those differences. What is more, since we are using US market data there is no needed or legitimacy in going to other countries' markets to find data that is denominated in US dollars. As well as not being legitimate it gives the impression that the OUR is "shopping" for numbers it prefers.

What is needed is:

(i) a very long times series of equity returns. The Ibbotson series dates from 1926 and is most commonly used, and

(ii) the return on long term US Treasury Bonds over the same period

No averaging is necessary or justified to calculate the ERP. The OUR's averaging has contaminated whatever quality data exists in Table 2 by mixing it with data about which we know far too little about. From the data we have available Digicel believes the figure of 7.1% for 1926 – 2006 represents the arithmetic average of stock returns minus some sort of US Treasury Bill rate. Using 10 years Treasury Bonds the geometric mean less the RFR gives an ERP of 6.10%, and the arithmetic mean an ERP 7.73% for the period 1926 – 1998.[34] An update of the series would be ideal but the end result is unlikely to differ significantly.

We believe the evidence shows that the OUR's averaged figure of 4.8% for US equity risk in addition to the RFR is not correct as was the method used to obtain it. The figure is clearly too low. In this regard we note the following quote from UK regulator Ofcom,

> *"Traditionally, Ofcom has considered that the downside risk associated with taking too low a value for the ERP (discouraging discretionary investment) is more detrimental to*

[34] Suggestions that these figures will be different in future are supposition and until it occurs are unproved. One theory is that financial services/advisory firms that try to provide such forecasts are trawling for business when they make these claims.

> *the interests of consumers than taking too high a value (leading to higher prices to customers) and has tended to the higher end of the possible range."* [35]

Using CAPM and assuming an equity beta of 1 and not allowing for any small cap premium[36], Digicel suggests that the ERP for C&W Jamaica is as follows:[37]

$$\text{Expected cost of equity}_{\text{C\&WJ\_fixed}} = 4.36 + 1.0(6.92\%) + 10\% = 21.28\%$$

Given the ongoing dispute as to whether a geometric or arithmetic mean should be used Digicel has taken an average of the two. What we end up with is a single point estimate and takes no account of the data and estimation errors and wide confidence intervals associated with key inputs – especially those relating to beta.

# 9 SMALL CAP PREMIUM

Digicel believes the OUR is incorrect in attributing the small cap premium issue to a study by Fama and French. Rather, the evidence in favour of it was first identified more than 10 years earlier. It appears that as further research also confirmed its existence Fama and French incorporated the effect in their model.[38]

The small cap premium is fully consistent with modern portfolio theory upon which CAPM is based, which states that risk is linked with return. Small-cap stocks unquestionably carry higher risks than large-cap stocks, hence they deliver higher returns.

One of the World's leading experts Aswath Damodaran of the Stern School of Business, states,

> *"[T]here are two ways in which we can respond to the empirical evidence that small market cap stocks seem to earn higher returns than predicted by the traditional capital*

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35 "Ofcom's approach to risk in the assessment of the cost of capital", (2005), P.4.

36 Digicel has not included any small cap premium since we have done any research to see whether C&W is of a size to justify one.

37 We can also look at the problem in terms of the additional cost of equity that must be paid in Jamaica over and above the cost of equity in the country of the RFR (the USA). The additional cost of equity attributable to Jamaica would be:

$$Country\ risk\ premium * \left(\frac{Standard\ deviation\ Jamaican\ equity}{Standard\ deviation\ Jamaican\ bonds}\right)$$

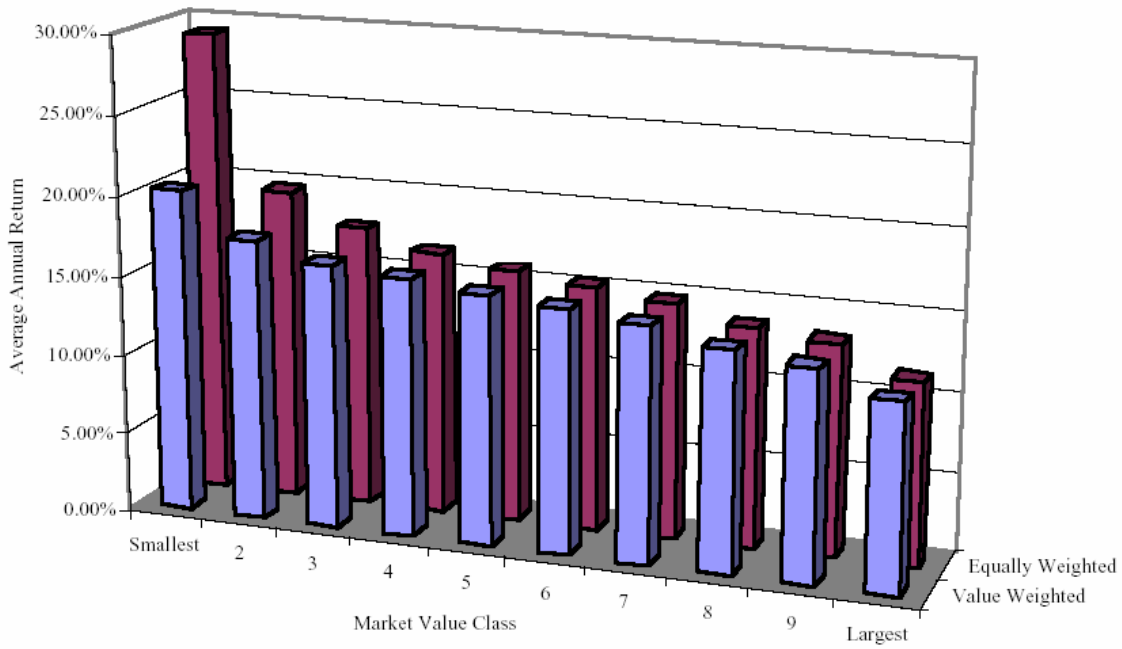
For such an approach to provide an acceptable measure would require that Jamaican equity and bond markets were efficient in an economic sense, which is not the case and so we have looked no further at this option.

38 The evidence was first presented by Banz, Rolf W. (1981), "The Relationship between Return and Market Value of Common Stocks," *Journal of Financial Economics*, 9, pp 3-18.

*asset pricing model. One is to view this as a market inefficiency that can be exploited for profit: this, in effect, would require us to load up our portfolios with small market cap stocks that would then proceed to deliver higher than expected returns over long periods. The other is to take the excess returns as evidence that betas are inadequate measures of risk and view the additional returns are compensation for the missed risk. The fact that the small cap premium has endured for as long as it has suggests that the latter is the more reasonable path to take."* [39]

In Figure 6 we provide the data that shows that the scale of return to equity depended on the size of the firm, i.e. that the risk premium is greater the smaller the company.

**Figure 6: Annual Returns by Market Value (1927-2001)**




Source: Damodaran (2003)[40], Raw Data from French (2002)

The exact size of the small cap risk premium is still subject to intense debate. It is likely, for example, to include some amount due to smaller publically traded stock being less liquid. Where an illiquidity discount is added to the cost of capital as it must be in Digicel's case, we want the small cap premium to be free of a liquidity effect in order to avoid double counting. A way of doing this has yet to be found, which is one reason why the debate about the exact scale of the

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[39] Aswath Damodaran (2008), "Equity Risk Premiums (ERP): Determinants, Estimation and Implications", Mimeo, Stern School of Business, NYU: p.30.

[40] Aswath Damodaran, (2003), *Investment Philosophies: Successful Strategies and the Investors who Made Them Work*. (John Wiley & Sons).

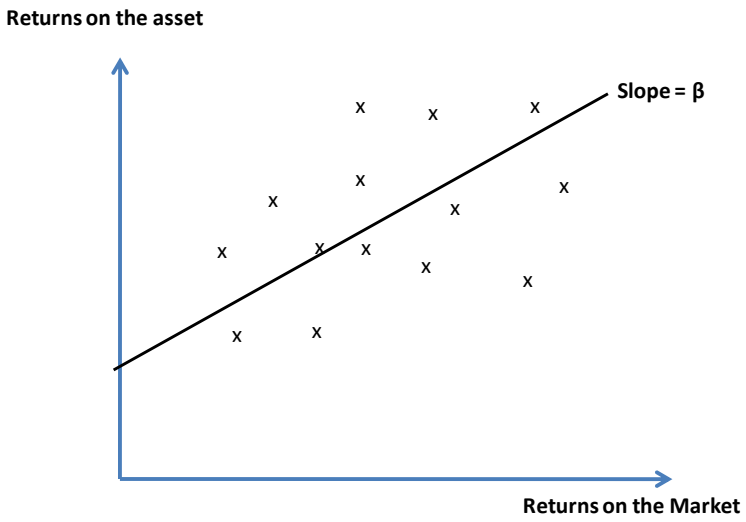
small cap premium is not resolved. From our reading of expert comments in the literature, however, the risk premium associated with small cap stocks is thought to be between 1% and 1.5% per year and the risk premium associated with small cap value stocks[41] at closer to 2%. Digicel is not a traded company. We suggest a small cap premium of 1.5% in addition to the ERP for large cap firms it reasonable.

# 10 EQUITY BETAS

## 10.1 Measuring beta and why it matters

Betas are obtained by regressing the asset's returns against those of an index of a market portfolio. Beta is the slope of this regression as shown in Figure 7. Betas measure the relative risk of assets against a diversified portfolio.[42]

**Figure 7: A typical beta regression**




In estimating beta there are several choices that need to be made. The main ones are:

1. Which market index is to be used?
   Using each of the 5 or 6 main market indices in the US as "the market index" can provide betas for the same stock that differ by 20% where all else remains the same.

[41] A value stock is one that tends to trade at a lower price than is indicated by its fundamentals (e.g.. dividends, earnings, sales, etc.).

[42] The diversified portfolio assumption is seen as more or less reasonable in highly developed and thickly traded markets but as it is accepted that emerging markets tend to be partially segmented, this assumption is one of the many weaknesses in using CAPM in emerging economies.

2. Over what length of time should beta be estimated?

3. In obtaining the returns on the assets that are to be used in a regression what interval between measurements should be used?

These choices can make a large difference to the results. Indeed, even for the major US indices we see the beta for the same company differing substantially depending on which index is used in the regression.

What is more, since betas are empirical estimations we must end up with a confidence interval. Typically, a 95% confidence interval will involve a range for beta where the larger number is easily more than twice the smaller number. If the beta midpoint for the beta of AT&T was 0.93 (as appears in the OUR's consultation) the 95% confidence interval is likely to look approximately like 0.55 to 1.31. To then take the midpoint and apply this rigidly is to do more than the data allows. This is one of the reasons why a midpoint estimate would not in Digicel's opinion be in keeping with what a "reasonable regulator" would do. Indeed, we see below that having estimated all manner of betas for each of the firms in the sector, Ofcom and the FCC chose higher betas in order to head off any criticism that they had "tortured the data".

As Digicel is not a traded stock this prevents a regression estimate of its beta being obtained. Hence it may be argued that the betas of publically traded cellular telecoms companies that earn their reviews in emerging markets in the region should be used in deciding what a suitable beta might be for Digicel. Below, in the absence of better data we use the average of the betas from 3 such companies as a proxy for Digicel's market beta. These are also Barra betas and they serve to contrast those used by the OUR in its Consultation.

**Figure 8: The OUR's list of telecoms companies used for beta estimation**

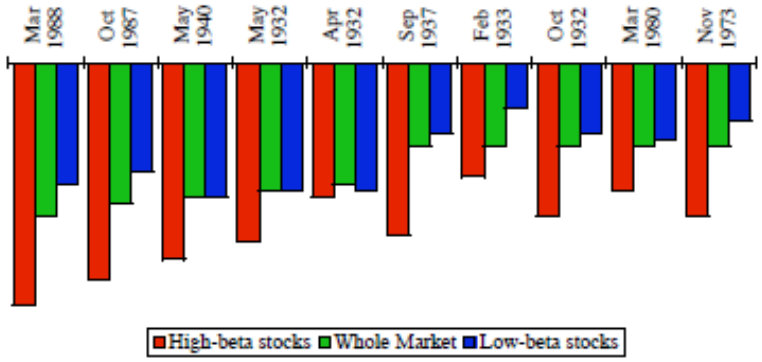
| Company |
|---|
| |
| AT&T |
| BCE INC |
| BRITISH TELECOMS |
| NIPPON TELEGRAPH & TEL |
| FRANCE TELECOM S.A |
| TELEFONICA S.A. |
| DEUTSCHE TELEKOM AG |
| VODAFONE |
| TELEFONOS DE MEXICO S.A. |
| VERIZON |

In the case of C&W Jamaica (C&WJ) there is little reason to believe *apriori* that C&WJ would have a beta that was close to the firms presented by the OUR in its consultation (which we

show in Figure 8). The telecom companies in this list earn most of the revenues in developed economies and are listed there. Indeed, Digicel does not see why the OUR did not estimate C&W's beta range since its stock is traded, given the possibly poor proxies that the OUR's list of companies provide for the variability of C&W's returns to a suitable market index over time.

In Figure 9 we show information that helps explain why fair beta estimates matter.

**Figure 9: Why Beta matters: Returns and Betas: Ten Worst Months between 1926 and 1991**




Source: Dam: Chapt 3 Figure 38

## 10.2 Barra Betas

There are several proprietary methods on the market for estimating betas i.e. not using standard regression methods. Barra provides one of them and it is Barra betas that the OUR has chosen. The OUR's use of a proprietary method of estimating betas is a departure from accepted practice. Rather, historic premiums are the accepted means of estimating forward-looking risk premiums.

The only leading regulatory authority that has considered proprietary betas and Barra betas in particular is the FCC. We note that the FCC rejected Barra betas specifically in favour of those provided by Value Line which are estimated by the conventional means of using historic data. Indeed, the Barra betas that were rejected by the FCC appear to be the same ones the OUR has used in its consultation. These mainly relate to large US fixed line companies. We include the FCC's comments below. Note in particular FCC footnote 275.[43] Other best practice regulators also use historic data for estimating risk.

[43] Federal Communications Commission DA 03-2738, Adopted: August 28, 2003, p.43

95. Beyond the general problems inherent in using incumbent LEC betas to calculate a TELRIC cost of capital, we have additional problems with the specific betas proposed by AT&T/WorldCom. AT&T/WorldCom use beta and risk premium estimates in their CAPM analysis developed by BARRA, a consulting firm.[273] BARRA is not nearly as well known or widely circulated as Value Line, and it is unlikely to have nearly as much influence on the expectations of investors.[274] Value Line perhaps is the largest and most widely circulated investment advisory service, and it exerts influence on a large number of institutions and individual investors and on the expectations of these investors.[275] In making its own capital budgeting decisions, it is noteworthy that AT&T relies in part on Value Line betas, but not at all on BARRA betas.[276] Accordingly, we will not rely on the BARRA betas proposed by AT&T/WorldCom in this case.

[273] *See* AT&T/WorldCom Ex. 5, at 23-25.

[274] *See* MORIN, *supra* note 225, at 65.

[275] In addition, the BARRA betas are derived by estimating a multiple regression equation specifying that beta is a function of many different independent variables. More typically, beta is measured based on simple regression analysis of changes in a company's stock market price and changes in a broad stock market average price over time. Value Line is among those financial companies that use the simple regression analysis. It also adjusts its betas to account for their long-term tendency to converge to 1, a routine practice among investment services that publish betas. *Id.* at 65, 67-68. Numerous studies have found that betas do regress over time to 1.00. *Id.* at 67-68. This is a compelling reason for using betas that are so adjusted.

In additional to the above a further rationale for using historic data for forward-looking beta is provided by UK regulator Ofcom,

> *"Equity beta estimation is usually carried out in order to estimate what the relationship between a firm's returns and those of the market will be on a forward-looking basis. Expectations of this sort are very difficult to measure though, so equity beta values for a company are typically calculated by regressing data on past returns against the past returns associated with an appropriate market index."* [44]

A further problem with using proprietary methods for beta estimation is that they are unproven, and they lack transparency – the Barra method is a 'black box'. There is no compelling evidence that Barra predictions are better than those based on using historical data – the most widely used method and the one for which there is a broad a consensus among financial experts.

Barra betas are not accepted by the profession as providing superior forward-looking measures compared to conventional methods. The FCC rejected the same and Digicel urges the OUR to do likewise and to use accepted methods for obtaining forward-looking values.[45] The conclusion seems clear; Barra figures are unsuitable for regulatory purposes. Indeed, as we explain above,

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[44] "Ofcom's approach to risk in the assessment of the cost of capital", Second consultation in relation to BT's equity beta, Issued: 23 June 2005, p.20.

[45] Digicel's bankers Citibank uses its own proprietary methods for estimating WACC but as these are not disclosed they are not useful for regulatory purposes.

there is little reason to believe that betas estimates for the companies chosen by the OUR would have very much explanatory power over the market in regard to C&WJ's variability of returns compared to the relevant market.

The criticism Digicel has of Barra betas is notwithstanding the fact the companies chosen by the OUR are not at all closely related to the circumstances of C&WJ even more unrelated to Digicel's circumstances applicable to estimating Digicel's cost of capital. Cellular telecoms company betas are known to be significantly higher than for fixed network betas and higher again in emerging markets. In the next section we provide evidence of this. In the next section Digicel argues that any WACC based on the beta values presented by the OUR in its consultation should not in any case be applied to Digicel or to mobile network operators in Jamaica.

## 10.3 Activity related betas

The OUR estimates a single beta for all licensed network operators in Jamaica. For the same reason, however, as the OUR favours the use of divisional WACCs, betas should in theory be estimated for activities that are distinctly different. While in practice this cannot be justified for every distinct activity due to the difficulties of obtaining the necessary data, it can and should be done for the most important investment areas in the industry. At the most aggregated level this would include fixed network investments and mobile network investments; not least because the evidence from numerous jurisdictions around the world is overwhelming that the cost of capital for fixed and mobile networks is substantially different. Digicel presents information to this effect below in this section.

In this regard OUR's decision *"to estimate the cost of capital for telecommunications Carriers in Jamaica"*, with no separate WACC for mobile networks is indefensible. Mobile network operators have significantly higher ERPs, betas and WACCs than do fixed wire incumbents.

Where they exist together, even the prospect that 2G and 3G networks in the same jurisdiction have different betas and WACCs should in principle result in separate figures being estimated – this way companies are not being undercompensated for their costs and distinctly different investment projects are being appropriately rewarded. The UK regulator Ofcom explains the rationale for doing so,

*"Lastly, in considering whether it is appropriate to disaggregate the WACC, as discussed in Ofcom's 2005 consultation it is important to consider the risks of making Type I and Type II errors:*

- *Type I error, i.e. incorrectly using a single beta figure when the difference in risk between for example voice and data is significant:*
    - *Allowing excessive returns on MCT; and*

- *Allowing insufficient returns on the rest of a MNO's activities if these were to be regulated.*

- *Type II error, i.e. incorrectly using a disaggregated beta when the difference in risk between for example voice and data is not significant:*

  - *Allowing insufficient returns on MCT; and*

  - *Allowing excessive returns on the rest of a MNO's activities if these were to be regulated."* [46]

We checked for equity betas of mobile network operators in Latin America and came up with Table 3. Although these betas are by Barra and we have argued that Barra betas are not suitable for regulatory purposes, they provide a stark contrast to the Barra betas used by the OUR which are provided and which can be found in Table 4.

**Table 3: Betas by Barra – Mobile Operators (Latin America)**

| | America Movil Beta | NII Holdings Beta | TIM Beta |
|---|---|---|---|
| 31-Aug-09 | 1.579 | 2.047 | 1.289 |
| 31-Jul-09 | 1.587 | 2.063 | 1.321 |
| 30-Jun-09 | 1.601 | 1.989 | 1.218 |
| 29-May-09 | 1.599 | 1.970 | 1.215 |
| 30-Apr-09 | 1.571 | 1.896 | 1.145 |
| 31-Mar-09 | 1.549 | 2.008 | 0.900 |
| 27-Feb-09 | 1.638 | 2.029 | 1.092 |
| 30-Jan-09 | 1.705 | 1.884 | 1.182 |
| 31-Dec-08 | 1.763 | 2.153 | 1.380 |
| 28-Nov-08 | 1.731 | 2.074 | 1.394 |
| 31-Oct-08 | 1.794 | 1.963 | 1.655 |
| 30-Sep-08 | 1.499 | 2.099 | 1.726 |
| 29-Aug-08 | 1.518 | 1.874 | 1.840 |
| 31-Jul-08 | 1.515 | 1.966 | 1.913 |
| 30-Jun-08 | 1.540 | 2.076 | 1.854 |
| 30-May-08 | 1.490 | 2.313 | 2.016 |
| 30-Apr-08 | 1.467 | 2.475 | 1.935 |
| 31-Mar-08 | 1.837 | 1.939 | 2.021 |

[46] Ofcom, "Mobile call termination Statement", 27 March 2007, p.362

| | | | |
|---|---|---|---|
| 29-Feb-08 | 1.843 | 1.880 | 1.959 |
| 31-Jan-08 | 1.897 | 1.642 | 2.155 |
| 31-Dec-07 | 2.013 | 1.239 | 2.611 |
| 30-Nov-07 | 1.940 | 1.267 | 2.217 |
| 31-Oct-07 | 1.953 | 1.203 | 1.828 |
| 28-Sep-07 | 1.811 | 1.249 | 1.849 |
| 31-Aug-07 | 1.744 | 1.296 | 1.993 |
| 31-Jul-07 | 1.745 | 1.309 | 1.996 |
| 29-Jun-07 | 1.691 | 1.334 | 2.064 |
| 31-May-07 | 1.859 | 1.295 | 2.005 |
| 30-Apr-07 | 1.853 | 1.325 | 2.038 |
| 30-Mar-07 | 1.835 | 1.408 | 1.963 |
| 28-Feb-07 | 1.835 | 1.407 | 1.916 |
| 31-Jan-07 | 1.860 | 1.332 | 1.879 |
| 29-Dec-06 | 1.862 | 1.327 | 1.938 |
| 30-Nov-06 | 1.860 | 1.332 | 1.879 |
| 31-Oct-06 | 1.862 | 1.327 | 1.938 |
| 29-Sep-06 | 1.869 | 1.332 | 1.949 |
| Average | 1.731 | 1.703 | 1.758 |

Source: Credit Suisse and BARRA

The average beta for Wireless network companies in the USA is 1.28 according to Damodaran using data supplied by ValueLine. On average fixed line providers in the USA appear to have a beta of 1.06. We should have no expectation that mobile or fixed licensees in Jamaica will have betas close to these values.

**Table 4: The OUR's Betas**

**ESTIMATED BETAS FOR GLOBAL COMPANIES**

| Company | | | Levered (Raw) | Unlevered | Re-levered |
|---|---|---|---|---|---|
| | Tax Rate | Bara Predicted Beta | Historical Beta | | |
| AT&T | 39.27% | 0.93 | 1.13 | 0.81 | 0.95 |
| BCE INC | 36.10% | 0.70 | 0.93 | 0.67 | 0.96 |
| BRITISH TELECOMS | 28.00% | 0.79 | 1.31 | 0.53 | 1.71 |
| NIPPON TELEGRAPH & TEL | 39.54% | 0.71 | 0.28 | 0.22 | 0.88 |
| FRANCE TELECOM S.A | 34.43% | 0.64 | 1.31 | 0.79 | 1.14 |
| TELEFONICA S.A. | 32.50% | 0.69 | 1.25 | 0.49 | 1.77 |
| DEUTSCHE TELEKOM AG | 38.90% | 0.73 | 1.54 | 0.99 | 1.07 |
| VODAFONE | 28.00% | 0.80 | 1.02 | 0.84 | 0.83 |
| TELEFONOS DE MEXICO S.A. | 28.00% | 0.82 | 1.02 | 0.30 | 2.35 |
| VERIZON | 39.27% | 0.84 | 0.95 | 0.57 | 1.16 |
| Weighted Average | 34.40% | 0.79 | 1.10 | 0.69 | 1.15 |

Source of tax rates: http://chrisbanescu.com/blog/2008/12/27/us-corporate-tax-rates-vs-all-oecd-countries/

Source of UK tax rate: http://www.ukinvest.gov.uk/United-Kingdom/4016067/en-GB.html

As we have stated above, the uncertainty associated in general with several of the WACC parameters including the equity beta, suggests that a cautious approach to beta estimation is essential. The uncertainty surrounding beta estimation requires that the beta for each regulated or potentially regulated firm is estimated – not least because the beta for each firm is likely to be significantly different and because the information helps inform the regulator about where the level for a fair WACC for a specific sector of the industry should be set. The overwhelming evidence is that little if any reliance can be placed on a single beta or WACC estimate (see section 2 above for more information).

Below we provide the firm-specific betas report by Ofcom in their very extensive 2003 investigation into mobile telecoms. Both tables are copied from Annex E of Ofcom's report.

**Table 5: Ofcom equity beta estimates (all at actual gearing levels)[47]**

| # | Estimated for MNO | Data Frequency | Index | Period | Gearing | Estimate (range) |
|---|---|---|---|---|---|---|
| 1. | $O_2$ | Daily | UK | 2002-03 | $0_2$ actual | 1.58 |
| 2. | Vodafone | Daily | UK | 2002-03 | Vodafone actual | 1.42 |
| 3. | $O_2$ (+ Dimson adjustment) | Daily | UK | 2002-03 | $0_2$ actual | 1.15-1.25 |
| 4. | Vodafone (+ Dimson adjustment) | Daily | UK | 2002-03 | Vodafone actual | 1.01-1.31 |
| 5. | $O_2$ | Daily | World | 2002-03 | MNOs' actual | 1.33 |
| 6. | Vodafone | Daily | World | 2002-03 | Vodafone actual | 1.09 |

Note that:

- estimates (3) and (4) for O2 and Vodafone respectively are lower than corresponding estimates (1) and (2) because the Dimson adjustment has been applied to the former; and
- estimates (5) and (6) differ from estimates (1) to (4) in that they are measured against the FTSE All World index.

The table below shows a range of other beta estimates that have been made available to Ofcom and estimate from the London Business School and RMS along with Ofcom's proposed range.

[47] Ofcom, "Wholesale mobile voice call termination consultation: Proposals for the identification and analysis of markets, determination of market power and setting of SMP conditions", Explanatory Statement and Notification, 19 December 2003, p 209. Betas supplied by The Brattle Group (2003).

**Table 6: Further equity beta estimates**[48]

| # | Author (estimated for MNO) | Data Frequency | Index | Period | Gearing | Estimate (range) |
|---|---|---|---|---|---|---|
| 7. | T Mobile (Vodafone) | Daily | UK | 2000-03 | 10%/ 30% | 1.7-2.1/ 2.2-2.7 |
| 8. | Vodafone (Vodafone) | Daily | UK | 2001-03 | 10% | 1.6-1.9 |
| 9. | RMS (Vodafone) | Monthly | UK | 1997-02 | Vodafone actual | 1.0 |
| 10. | **Oftel** | **-** | **-** | **-** | **10%/ 30%** | **1-1.6/ 1.3-1.9** |

Ofcom set a range of *"1.0 to 1.6 (midpoint 1.3) which erred on the side of caution, i.e. in favour of estimates towards the top of or above the range recommended by The Brattle Group"* [Ofcom's consultants]. *"The midpoint of the Brattle Group's range against the FTSE is 1.2 for Vodafone, and 1.15 for $O_2$"*. In Ofcom's words, this reflects *"the degree of uncertainty in estimation, and other factors such as the possible need for an upwards adjustment for foreign operations."* [49]

A discussion about the very closely related issue of project and divisional WACCs appears in section 11 and Digicel asks that this section be read with the present section.

Digicel has provided information above which we believe should convinces the OUR that its policy proposal that only one WACC and one beta be calculated to potentially apply to any "carrier" will not provide an acceptable solution.

## 10.4 Illiquidity discount

Illiquidity depresses the value of the company and increases the risk premium that applies to it. In the case of a private firm like Digicel this is particularly important when estimating its cost of capital.[50]

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[48] *Ibid*, pp 209-210.

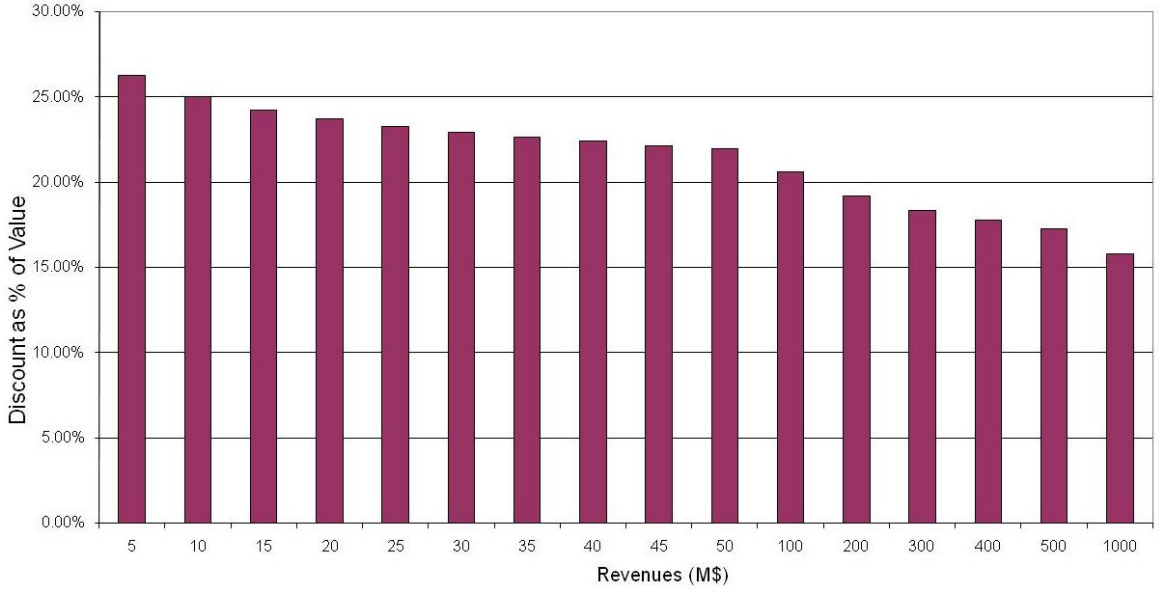
[49] *Ibid* p. 211.

[50] Damodaran summarises the rationale for illiquidity discounts in general as follows:

*"The notion that investors will pay less for illiquid assets than for otherwise similar liquid assets is neither new nor revolutionary. Over the last two decades researchers have examined the effect of illiquidity on price using three different approaches. In the first, the value of an asset is reduced by the present value of expected future transactions costs, thus creating a discount on value. In the second, the required rate of return on an asset is adjusted to reflect its illiquidity, with higher required rates of return (and lower values) for less liquid assets. In the third, the loss of liquidity is valued as an option, where the holder of the illiquid asset is assumed to lose the option to sell the asset when it has a high price. All three arrive at the conclusion that an illiquid asset should trade at a lower price than an otherwise similar liquid asset."*

Different approaches have been used by academic researchers to estimate illiquidity discounts but the values obtained mostly tend to fall within a broadly similar and believable range. Damodaran provides a graph of illiquidity discounts based on the research of Silber (1991) which we present as Figure 10.[51] We believe this is likely to understate the discount for Digicel Jamaica since these numbers relate to the US markets which have significantly lower volatility than those of emerging markets. The evidence applies to restricted stock companies – as a proxy for private companies.

**Figure 10: Illiquidity Discounts: Base Discount of 25% for profitable firm with $10 million in revenues**




Source: Damodaran

Digicel Jamaica's turnover for 2009 was $426 million. Digicel considers that a liquidity discount of 17.5% is conservative in its case.

## 10.5 Adjusting for private company equity risk

In theory beta is a measure of risk added to a fully diversified portfolio by adding a certain investment. In the case of public companies traded in thick integrated markets this is a more or

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Aswath Damodaran (2005), "Marketability and Value: Measuring the Illiquidity Discount", Mimeo, Stern School of Business, NYU, p.17. The following statement on page 35 also confirms the need for a liquidity discount to be attached to assets that are less than liquid.

*"Both the theory and the empirical evidence suggest that illiquidity matters and that investors attach a lower price to assets that are more illiquid than to otherwise similar assets that are liquid."*

[51] Silber, William L. (1991), "Discounts on Restricted Stock: The Impact of Illiquidity on Stock Prices", *Financial Analysts Journal*, July-August 1991, pp. 60 – 64.

less reasonable if not entirely accurate approximation. In the case of private firms, however, the assumption clearly does not hold. For such firms the owner has a disproportionate share of his or her own wealth in the company such that their investment behaviour is not like the marginal investor around whose behaviour the simple version of the CAPM model depends.[52] Without adjustments to the CAPM model betas for private firms will understate their market risk and their cost of capital. The estimation of such companies' WACCs is thus significantly more problematic than it is for public companies. Along with the absence of historical price information for private firm equity, estimating and using betas for private firms is a good deal more complex than it is for public firms, especially in emerging markets.

As an entrepreneurial private firm the risk incurred which is not faced by a public firm and which needs to be compensated, concerns equity risk which investors cannot diversify away:

- Entrepreneurs invest a disproportionate share of their own money in the company and in doing so are not diversified.

- The degree to which this occurs will form the basis of a necessary adjustment in the cost of capital calculations.

Private equity risk is especially relevant to the situation in Jamaica as the record supports the view that public companies were not prepared to enter the Jamaican telecommunications market on a large scale in the late 1990s and early 2000s when C&W was the sitting incumbent and was still a virtual monopolist.[53] Digicel was prepared to take that risk and it is now history that we did invest hugely in Jamaica and in so doing improved the quality of life here. Digicel is now easily the largest provider of mobile telecommunications services in Jamaica.

It cannot then be assumed that Digicel's cost of capital can be valued as if Digicel was a public firm. A time may be reached in a number of years when it can be argued that this should be done for regulatory purposes as future circumstances may suggest that the company should eventually go public. But as Digicel remains a rapidly growing entrepreneurial company in a very difficult financial period, that time is still a number of years off. It must therefore be the case that any regulation of a price of a service which Digicel supplies that involves the use of a WACC figure should reflect the fact the Digicel is a private entrepreneurial company where equity is not fully diversified. Digicel thus incurs a higher cost of capital than it would if it was a public company. If for example a mobile service is to be price regulated in the future, the WACC used

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[52] Indeed, there has been an upward trend in firm specific risk over many years. The evidence suggests that one factor that has contributed to cause this is the increased role of small stocks in the market. See for example, James A. Bennett and Richard W. Sias (2004), "Why has Firm-Specific Risk Increased over Time?" available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=633484

[53] It is commonly the case in emerging markets around this time that entrepreneurs rather than public companies were the second entrants into markets that had been recently liberalised.

must take into account the financial reality faced by easily Jamaica's largest player – Digicel. A WACC that is set for a hypothetically public mobile company does not reflect that reality. For the OUR to adopt such an approach would under-compensate Digicel and expose the OUR to accusations of opportunism. Digicel would have no choice but to vigorously contest such a decision.

In order to estimate the cost of capital for a private firm it is necessary to estimate beta based upon total risk rather than the more conventional beta based upon market risk alone. The rationale summarised above is un-contentious and straightforward; the owner of a private business is not diversified i.e. his or her wealth is tied up in this business. Consequently, the owner is exposed to all of the risk in the company and not just the non-diversifiable risk.

Quoting from Damodaran a leading authority on such issues:

> *"**Adjusting for Non-Diversification***
> *(...)*
> *At the limit, if the owner has all of his or her wealth invested in the private business and is completely undiversified, that owner is exposed to all risk in the firm and it is not just the market risk (which is what the beta measures). There is a fairly simple adjustment that can allow us to bring in this non-diversifiable risk into the beta computation. To arrive at this adjustment, assume that the standard deviation in the private firm's equity value (which measures total risk) is $\sigma_j$ and that the standard deviation in the market index is $\sigma_m$. If the correlation between the stock and the index is defined to be $\rho_{jm}$, the market beta can be written as:*
>
> $$Market\ Beta = \rho_{jm}\ \frac{\sigma_j}{\sigma_m}$$
>
> ***Market beta***
> *To measure exposure to total risk ($\sigma_j$), we could divide the market beta by $\rho_{jm}$. This would yield the following.*
>
> $$\frac{Market\ Beta}{\rho_{jm}} = \frac{\sigma_j}{\sigma_m}$$
>
> *This is a relative standard deviation measure, where the standard deviation of the private firm's equity value is scaled against the market index's standard deviation to yield what we will call a total beta.*
>
> $$Total\ Beta = \frac{Market\ Beta}{\rho_{jm}}$$
>
> ***Total Beta***

*The total beta will be higher than the market beta and will depend upon the correlation between the firm and the market; the lower the correlation, the higher the total beta.*

*You might wonder how a total beta can be estimated for a private firm, where the absence of market prices seems to rule out the calculation of either a market beta or a correlation coefficient. Note though, that we were able to estimate the market beta of the sector by looking at publicly traded firms in the business. We can obtain the correlation coefficient by looking at the same sample and use it to estimate a total beta for a private firm."* [54]

Using CAPM the cost of equity for a traded firm in an emerging market = RFR + β *(Mature Market Premium) + International RP

As a private untraded small firm the CAPM formula must be modified such that we get the following for the cost of equity for Digicel:

$$Digicel's\ cost\ of\ equity = RFR + \left[\left(\frac{Beta}{correlation\ \{\rho_{jm}\}}\right) * Mature\ market\ RP\right] + small\ cap\ premium + illiquidy\ premium + international\ RP)$$

This assumes that the equity owners have their wealth entirely invested either in Digicel Jamaica or assets whose value is perfectly correlated with that of Digicel Jamaica. In fact this overstates the exposure to risk of Digicel Jamaica's owners. Without going into details about the private finances of Digicel's investors, Digicel's estimations suggest that a figure of 75% exposure is reasonable good estimate.

We also add here a small cap risk premium of 1.5% (see section 9 for more information). Using the average of the latest beta estimates for regional cellular telecoms operators America Movil, TIM and NII Holdings of 1.64 (see Table 3) we obtain the following for Digicel's expected cost of equity. Using a preliminary value for $\rho_{jm}$ of 75% which we estimated as an average for regional emerging market cellular network providers we get the following:[55]

$$\text{Expected cost of equity}_{\text{Digi\_WACC}} =$$

$$4.36\% + \left[\left(\frac{1.64}{correlation\ \{\rho_{jm}\}} * 75\%\right) * 6.92\%\right] + 17.5\% + 1.5\% + 10\% = 44.70\%$$

---

[54] *Ibid* p.1

[55] Obtaining a value for ρ_jm for Digicel is no trivial matter. Ideally what is required is a temporal average over a specified time period where $\rho_{jm}$ quantifies the correlation between the logarithm of the stock price and the logarithm of the stock index.

# 11 PROJECT AND DIVISIONAL WACCS

In estimating a WACC for the industry the OUR has employed information that is highly biased in the direction of fixed incumbents and particularly C&W Jamaica. What the OUR appears not to appreciate is that fixed incumbents and mobile network operators have on average very different costs of capital. We discuss this in terms of the OUR's pursuit of a divisional WACC and the absence of the far more important application of targeted WACCs, that being for stand apart major investment projects and estimating sector specific WACCs where these are clearly distinct from the rest of the industry.

## 11.1 Divisional WACCs and the Boston Consulting Group method

The OUR followed a method of estimating divisional WACCs which it appears to have obtained from a publication on the Web which is based on earlier work done by the Boston Consulting Group (BCG).[56] The OUR assigns numbers under six categories but provides no discussion explaining the values assigned. There is virtually no discussion explaining the OUR's thinking behind the values it decided to assign.

Digicel also notes that the (BCG) method for assigning divisional WACC has been subject to very little investigation and analysis in the literature. One published paper that did look at the BCG method found that its performance was encouraging *"when used on very homogeneous companies which resembled a single division."* The authors conclude by saying that, *"This method may offer a plausible and comparatively uncomplicated method for adjusting a firm's total cost of capital for divisional use."* [57]

Digicel has serious doubts about the efficacy of relying on this method for regulatory purposes as it has not been subject to much analysis and it would seem that it is not widely accepted by professional and researchers alike. Indeed, the word 'heuristic' used by the OUR and BCG to describe the BCG method conveys a process of trial and error. There are other accepted methods used for assigning division WACC which are more work intensive and Digicel suggests that their adoption would be the more prudent approach.

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[56] See Edouard DELOM DE MEZERAC (2006), "Should we use the company-wide cost of capital in investment decisions?" Student Thesis for Master's in Science of Management - Finance Major, Supervisor: Bruno Husson.

[57] See Juergen Bufka, Oliver Kemper and Dirk Schiereck (2004), "A note on estimating the divisional cost of capital for diversified companies: an empirical evaluation of heuristic-based approached", *The European Journal of Finance*, 10, pp 68-80.

## 11.2 Project and sector WACCs

In the Abstract of the Consultation document the OUR writes, *"This Consultation Document seeks to estimate the cost of capital for Jamaican telecommunications carriers based on the estimated cost of debt and equity for the industry."* In paragraph 1.1 of the Consultation it says, *"the OUR has decided to estimate the cost of capital for telecommunications Carriers in Jamaica rather than undertake the assessment for an individual company."*

Digicel considers that this approach constitutes the most serious error in the consultation document. We suggest that this section also be read in conjunction with the very closely related issues addressed Section 10.3 on activity and divisional betas.

We have noted already in section 10.3 that WACCs and betas for all regulated and potentially regulated companies should be estimated since they will sometimes be substantially different, and because there is so much uncertainty surrounding any WACC and beta estimate it is simply not prudent to take a less circumspect approach. For the same reason more than one method should be used particularly in emerging economies as the assumptions of the CAPM approach are well known not to hold.

There is another powerful argument, however, which counters the OUR's 'one figure' approach and that is that the industry has distinct sectors which involve idiosyncratic investments. The same reason for choosing to assess WACCs on a divisional basis thus also requires that substantially different investment projects have their own WACC estimate if they are to be subject to some form of price regulation. Indeed, the argument in favour of regulated and distinctly different sectors having their own separate WACCs is much more important than a similar argument in favour of divisional WACCs – an argument the OUR favours.

To assign a WACC which involves a higher or lower WACC than the true (unknown) project-specific WACC will result in serious long-run economic consequences; the most serious would occur if the project attracted a WACC which was not compensatory to investors. The potential for this to occur given the OUR's intention to apply one WACC across the industry is more than acute. If, for example, at some future time the OUR proved market dominance involving Digicel and imposed some form of price control on it using the same WACC that was applied to C&W (e.g. for fixed interconnection services), Digicel would be substantially under-compensate. Digicel's WACC is higher than for C&W. Mobile network operator WACCs are in general significantly higher than they are for fixed networks. In Section 10.3 which discusses beta estimation we show that betas are also substantially higher for mobile networks, especially those in emerging markets, than they are for fixed incumbents.

Moreover, as WACC estimation provides only a rough (and possibly biased) indication of the true if unknown WACC value, and different licensees have different WACCs, accepted practice in this area involves the assessment of the WACC for all regulated firms in a specific sector and

for this information to be used in deciding on a sector WACC which is compensatory to all broadly efficient providers.

# 12 GEARING RATIOS

Now concerning the issue of gearing, the OUR writes in its consultation that the average gearing for comparable companies was determined to be 45.67. In order for interested parties to meaningfully respond requires that the OUR also report on the details of its calculations. This would include identifying which companies it considers are comparable and if these are not Jamaican companies some discussion as to why the gearing of foreign very large public companies should be similar to small Jamaican and Caribbean companies in the same sector should be similar. For example, theory says that the greater risk associated with the Jamaican (or emerging economy) market requires that optimal gearing will be lower than in developed markets – a situation that would also apply to C&W Jamaica. Optional gearing also depends on where in the business cycle the economy is.

Moreover, if at some time in the future a WACC is applied to mobile network licensees in Jamaica the gearing and indeed the WACC would need to account for the gearing of these firms and also the fact that Digicel is a small private entrepreneurial firm. There are numerous reasons why optional gearing can vary substantially for private firms. The OUR has not addresses any of these issues in its consultation.[58]

In light of these omissions Digicel has used its own gearing figure for Jamaica which is 15%.

# 13 REAL WACC

## 13.1 Regulated prices

If the regulated prices are not regulated in real terms then the WACC should be in nominal terms. Except for price capping it is most often the case that prices are regulated in nominal terms. With this in mind Digicel has estimated values in this response in nominal terms. We urge the OUR to follow a similar approach i.e. to use real WACC only when regulated prices are set in real terms. This represents internationally accepted practice.

In order to estimate a WACC in real terms correct practice requires that we start by estimating and using a real RFR. In this case it will be the US real RFR. Note however, that real RFRs vary

[58] We discuss certain issues concerning Digicel being a small private entrepreneurial firm in section xxxx.

between countries so we need to be careful to make all appropriate adjustments if real RFRs are used from other countries. Digicel notes that the OUR has not used a real RFR in arriving at its real WACC estimate. The OUR's approach will introduce further error to the WACC estimate and thus it should not be used.

## 13.2 Indexation

On pages 20 to 22 of its consultation the OUR discusses issues pertaining to converting nominal to real WACC, i.e. removing the element of price inflation. This discussion appears to pertain very specifically to C&W and in particular the price cap which would apply to C&W.

It appears to Digicel that the means of revaluation employed of assets has three faults:

1. The plant index used would need to be substantially narrowed to that plant which is concerned with price-capped services,

2. There should be a weighting of the various elements in line with their use by C&W in the provision of price capped service.

3. Perhaps the main element that should appear in such an index is the capitalised labour invested in the access network. Digicel strongly suspects that this element is not present in the plant index chosen.

If some form of price regulation was to be applied to any other aspects of C&W's activities or indeed to Digicel, a different plant index would be needed and of course as we discuss in detail above, a different WACC calculation would also be required.

Digicel also draws the OUR's attention to the fact that price regulation involving a "price inflation – X" mechanism increases the risk and cost of capital for the regulated firm. Such a mechanism would appear to be implied by the OUR's choice to use the real WACC figure.[59]

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[59] Price-cap regulation takes no account of cost or demand changes related to the economic cycle, thus raising the degree of market risk to which a company is exposed. This 'regulatory risk' increases the company's cost of capital as investors require higher average returns in compensation. See (i) Wright et al (2003) *supra* note 2, and (ii) Alexander I., Mayer C., and Weeds H., (1996), "Regulatory Structure and Risk: An International Comparison", World Bank.

# 14 REAL OPTIONS

Digicel appreciates the OUR's comments on the use of real options costs in WACC estimation. The OUR has noted in detail comments made by Ofcom. If we understand Ofcom's views on this topic correctly Ofcom believes that:

- Real option costs may be important for higher risk services – those involving new services and/or new technology
- That Ofcom should find a way of estimating real option costs in the case of next generation access networks and to a lesser extent next generation core networks
- The application of real options to regulation is an area in which best practice has not yet been determined
- For the fixed incumbent the real options were unlikely to be significant in the case of traditional access products

Ofcom did not address the real option costs of mobile network operators. Digicel notes that *a priori* we should believe that the value of real options in emerging market would be higher than for similar services/products in developed economies because emerging markets involve:

- Higher risk
- Lower density investment, and
- the options on average should be longer lasting and therefore more valuable.

Real options theory suggests that there are real options costs involved in many investments even if they are difficult to estimate. We accept the OUR's and Ofcom's view that they are likely very small for traditional fixed network access products. But for mobile network investments we should expect real options costs to be higher. Digicel suggests that any consultation involving the regulation of mobile access prices should ideally address these issues. At the very least the literature suggests that a failure to include them in mobile network WACC estimation is likely to lead to an under-estimate of the true if unknown WACC. This is one more reason in addition to all those we discussed in the response (especially in section 2 on estimation risk) why regulators should adopt a predisposition toward determining a mobile WACC that is somewhat higher than the numbers suggest.

# 15 THE CONSULTATION LACKS TRANSPARENCY

The OUR's Consultation suffers from an acute lack of information and analysis about how values were obtained and how values relate to each other. Many numbers appear to have been obtained outside of the Consultation as there is no discussing concerning them. In this way readers are left to in the dark. We have mentioned a number of examples in this response document and will not repeat them here. Many of the problems relate to numbers apparently obtained from other jurisdictions where there has been no consideration of reasons why they may or may not be suitable for Jamaica. Indeed, for one of the most complex areas of regulation the OUR's is a very short consultation indeed and being so short it seems inevitable that it would lack transparency.

There are numerous topics of relevance that the OUR has not included in its Consultation questions. The Consultation has omitted many issues that would be important in a full and transparent consultation.

Note that the concerns Digicel has about the lack of transparency are quite separate from the use of incorrect methods and practises that that are not accepted main stream practice, which we have identified above.

# 16 THE OUR'S CONSULTATION QUESTIONS

Question 2.1: Do respondents agree with the proposed country risk premium as calculated and put forward in Table 1? If no, state the reasons and provide data to support your response.

**Digicel does not agree. The issues are discussed in some detail above and especially in section 7**.

Question 2.2: Do respondents agree with the proposed market risk premium? If no, state the reasons and provide data to support your response. Question 3.1: Do respondents agree with the estimated cost of debt for telecommunications carriers? If no, state why and provide supporting evidence.

**Digicel does not agree. The issues are discussed in detail above and especially in Section 8. Related issues are also discussed in Sections 9, 10 and 11.**

Question 3.2: Which type of gearing do respondents recommend be used and what is the corresponding value of the gearing ratio? Explain and provide supporting data.

**Digicel urges the OUR to estimate the WACC for each firm that is to be regulated using the actual gearing of the specific firm. Without doing this the OUR will be hampered in deciding how many WACCs it needs considering all sectors to be regulated, and what the appropriate level of each WACC should be (section 12 specifically discusses the issue of gearing).**

Question 4.1: Should the WACC be estimated in a range? If yes, state reasons and explain how it could be applied.

**A WACC should be estimated for all potentially regulated firms. A reasonable range for each should be calculated. The issues are discussed above and especially in Sections 2, 8 and 10.**

Question 4.2: Do respondents agree with the use of the yield on 10-year U.S. Treasury Bonds as a measure of the risk free rate?

**Digicel does not agree that its WACC should be estimated using 10 year U.S. Treasury Bonds. 20 year bonds are more suitable in Digicel's case. The issues are discussed in some detail above and especially in Section 5.**

Question 4.3: Do respondents agree with the estimated revaluation rate and the method used to arrive at the rate? If no, please explain why and provide an alternate rate and methodology.

**Digicel does not agree. The issues are discussed in some detail above in Section 13**

Question 4.4: Do respondents agree with the value assigned to each criterion for the retail and interconnection divisions? If no, please provide alternative values with sufficient explanation for each.

**Digicel does not agree. The issues are discussed in some detail above in Section 11 and also in 10.3.**

# 17 SUMMING UP

Digicel has identified numerous errors and erroneous assumptions in the OUR's WACC consultation. Besides the incorrect WACC numbers found in the consultation Digicel's greatest concern is the OUR's stated intention to use one WACC for all regulatory purposes and for all sections of the industry. This is an indefeasible position. WACC varies greatly between different sectors of the telecommunications industry and between different firms.

Moreover, the OUR has not sought to estimate the WACC of any telecommunications company in Jamaica. Its WACC estimate is based on numbers published in other jurisdictions adjusted (incorrectly) for international risk. Digicel considers that the OUR's approach is too parsimonious to provide results that can be taken forward.

One of the greatest omissions from the Consultation is the lack of recognition that as a private entrepreneurial firm the estimation of Digicel's WACC must include other parameters than those used to estimate the WACC for a large public firm. In the event that the price of a service provided by Digicel becomes regulated in the future, the result of this omission would be to under-compensate Digicel, a situation we will vigorously contest.

The consultation also fails to recognise the severe shortcomings and uncertainty surrounding many of the values that are estimated inputs into a CAPM based the WACC equation. In developed economies the CAPM is known to have severe problems – the theoretical assumptions, for example, impose strict behavioural parameters on investors which are not consistent with how investors actually behave. Empirically, the CAPM model is a poor predictor and indeed is outperformed in developed markets by augmented CAPM methods. In emerging economies such as Jamaica the results provided by simple CAPM are even more contentious – even assuming the method is properly followed at each point. Having said this, the tone of the OUR's Consultation suggests a confidence in the WACC estimates which concerns Digicel greatly. Recognising the substantial risk of error and statistical bias in the results investors in general would prefer the authorities to adopt a more circumspect approach to this topic.

Finally Digicel believes that at least one more consultation is required on the WACC that would apply to the fixed network which addresses the WACC for the case where: (i) regulated price were set in real terms, and (ii) regulated prices are set in nominal terms.

If any other sector (e.g. mobile) is to have any price regulated in future then a separate consultation on WACC should be undertaken then.

The OUR should not seek to impose one WACC on two or more firms where at least of firm has a substantially different WACC than the other(s).

Based on 15% debt; 85% equity; a cost of equity of 44.9%, a cost of Debt of 11%; a corporate tax rate of 33.33%; Digicel's preliminary estimate of its own WACC is 44.7%. The two main reasons it is relative high are: (i) the estimate of Digicel's equity beta suggests it is much closer to 2 than 1, (ii) because Digicel is a private entrepreneurial company such that (a) a majority of company risk is not diversifiable and thus a total beta must apply (b) the associated illiquidity discount must be added and (iii) the correlation of Digicel's market value with the market is much less than perfect. These measurement issues are outlined in detail above.

A summary of Digicel main concerns identified in this response are listed in bullet form below:

- There are numerous errors in method and fact. Several of the values used by the OUR are incorrect or the method is incorrect leading to incorrect values.

- Lack of transparency: numbers are often inserted with no discussion about where they came from or how they were derived.

- No WACC has been calculated for any actual licensee in Jamaica. Rather the OUR has sought to use data from other jurisdictions without recognising which foreign data can or should be used and what its limitations are.

- The OUR states that it intends to do what theory and evidence says it must not do – use a single WACC for any and all firms that may be regulated in the future with no account taken of the different sectors and the substantially different cost of capital that occurs in practice between sectors and between licensees.

- As the largest telecoms licensee in Jamaica and the largest mobile service provider, it is essential that Digicel's cost of capital be taken into account should the OUR have a legal basis for regulating the price of any of its services in the future or those of its direct competitors. As a private entrepreneurial company Digicel's marginal equity holder is not diversified as the CAPM model assumes and thus the model must be modified to account for this. These are standard adjustments in theory although the data requirements make the estimation task onerous.

- Theory and evidence say that an illiquidity discount must also be incorporated in the cost of capital calculations for Digicel.

- The OUR requires that WACC should be in real terms and its own calculations have followed this. However, unless the regulated prices are in real terms also then WACC should be in nominal terms. This suggests that a price cap applied to C&W would involve a WACC estimated in real terms. If, however, services like interconnection are to have their prices set in J$ then WACC estimates should be in nominal terms.

- The OUR appears to have substantially undervalue Jamaican sovereign risk.

- In some cases the OUR has employed methods or figure that are incorrect or are contentious. This includes the use of Barra betas and the use of a Boston Consulting Group method for estimating divisional WACCs. Digicel draws the OUR's attention to the need for any method that is not the one supported by an existing consensus among experts to be vigorously defended in the Consultation if the OUR is not to be accused of a lack of prudence. Neither in the case of Barra betas or the Boston Consulting Group method is a significant defence presented in the Consultation.

- The OUR provides little transparency of how it arrived at its chosen gearing ratio. It would appear to be an average of the gearing of large telephone incumbents located in developed economies. Digicel believes the implicit assumption adopted by the OUR, that all phone companies whether in developed or emerging markets whether fixed or mobile etc ought to have similar gearing, requires a robust defence. Indeed, No such defence appeared in the Consultation. Digicel contests this assumption.