

# HASHEMITE KINGDOM OF JORDAN



## Telecommunications Regulatory Commission (TRC)

**Notice requesting comments on the calculated Weighted Average Cost  
of Capital**

**Date**

**1 September 2016**

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## 1 Introduction and Background of this Consultation

1. The legal and regulatory background with respect to the operators' Weighted Average Cost of Capital (WACC) has been discussed in detail during the WACC Principles Consultation titled "*Notice Requesting Comments On The Principles to be Used In The Calculation Of Operator's Regulated Cost Of Capital*" of 2007 and is not repeated here. The purpose of this consultation is to present and consult about the WACC input parameters and final results.
2. On January 28<sup>th</sup>, 2008 TRC released its Determination (No. 5-4/2008) on the WACC Principles and the WACC calculations presented in this consultation are consistent with these principles.
3. Based upon the theory and principles discussed in the document above, TRC has estimated both the input parameters as well as the final WACC for each operator and an "efficient" for fixed and mobile operators. The operators for which the TRC has estimated the WACC are Jordan Telecom Company (JTC), Petra Jordanian Mobile Telecommunication Company (Orange Mobile), Jordan Mobile Telephone Services Company (Zain Jordan) and Umniah Mobile Company.
4. For each input parameter (the risk free rate (1), equity risk premium (2), beta (3), cost of debt (4) and gearing (5)), this paper discusses the alternative estimation methodologies considered by TRC and the final results obtained. The results on input parameters are then used to obtain the WACC estimates.
5. TRC reserves the right to adjust its approach and estimates taking into consideration the results of this consultation.

## 2 Methodology for Estimating WACC

### 2.1 The Purpose of Estimating WACC

1. TRC sets regulated prices for a range of services provided by Jordanian telecoms operators. These regulated prices are an output of TRC's regulatory and operators cost models, which calculate the cost of providing particular services, based on efficient operating and capital costs.
2. An important cost that companies incur when providing services is the opportunity cost of providing the service, reflecting the fact that funds are diverted from earning a return on the next best investment of equal risk. The risk faced by investors in undertaking the activity is a crucial factor in determining this cost. This remuneration for risk is measured by the WACC, which allows investors in the company to recover their investment including the opportunity cost of capital employed.
3. Investors typically use the WACC as a benchmark to assess a particular investment against other potential investments with equal risk. Unless a firm earns a return in excess of its cost of capital, it will not create economic profit. The WACC is then equal to the return on different types of capital that an investor would earn on activities of the same risk. If the two types of capital are equity and debt, the WACC is equal to the weighted average return on equity and on debt:

$$WACC_{post-tax} = r_e \frac{E}{V} + r_d \frac{D}{V} (1 - t_c)$$

Where:

- $r_e$  = return on equity (cost of equity)
- $r_d$  = return on debt (cost of debt)
- $E$  = market value of equity
- $D$  = market value of debt
- $V$  = market value of Firm (D+E)
- $t_c$  = marginal corporate tax rate

Where the weights are equal to the relative proportions of debt and equity used in financing the licensees' assets.

### 2.2 Treatment of Inflation and Tax

1. TRC regulatory cost models forecast costs in nominal terms, consequently; the TRC sets a real WACC to ensure operators are remunerated appropriately for inflation. It is important to ensure that operators are only remunerated for inflation once in the overall regulatory package, and inflation is not double counted in both the asset base and the WACC. In accordance, the final WACC estimates are stated in real terms. In the TRC's regulatory cost models, costs of equipment are forecast with inflation embedded in the asset price trends, and so the WACC should be set in real terms, so that the operator is remunerated for inflation through the asset base.
2. The nominal WACC can be derived from the real WACC estimates using the following formula:

$$(1 + WACC_{nominal}) = (1 + Inflation\ rate) * (1 + WACC_{real})$$

3. The TRC has calculated both the pre- and post-tax WACC to allow flexibility in the adoption of the cost of capital within relevant cost modeling. The use of a pre- vs. a post-tax WACC relates to the treatment of the tax shield (the tax deductible interest) in the allowed revenue. If the tax shield is subtracted from the allowed revenue then the pre-tax WACC has to be used. The pre-tax WACC is based on the rates of return that the company needs to earn before paying any taxes. This implies that pre-tax returns need to be higher than post-tax returns to account for the fact that part of the pre-tax return will be used to pay taxes. This approach is easy to implement if one is willing to assume that the statutory tax rate correctly reflects the (forward-looking) tax liability, on average. In this case the pre-tax WACC, based on the statutory tax rate, will fully cover the company's tax liability.
4. If the tax shield is not subtracted from the allowed revenue, then the appropriate measure of the WACC is the post-tax vanilla one; which is the weighted average cost of capital using a pre - tax cost of debt and a post - tax cost of equity. This is more applicable if the statutory tax rate does not reflect the actual tax that operators pay, either because of tax deferrals or tax exemptions.
5. The relationship between the pre-tax and post-tax WACC is defined by the following formula:

$$WACC_{pre-tax} = WACC_{post-tax} / (1 - t_c)$$

### 2.3 Cost of Equity Methodology

1. The allowed rate of return has to at least equal the expected cost of capital for investors to commit capital to the Jordanian telecommunications sector. The expected cost of capital is inherently unobservable, which is why one must rely on models that depend on historical observable data to estimate the cost of capital.
2. The Capital Asset Pricing Model (CAPM) was adopted to estimate the cost of equity based on theory and in accordance with TRC Principles.<sup>1</sup> The CAPM has been the workhorse model in international telecoms and utility regulation, and is the preferred approach pursuant to the 2008 WACC Principles.
3. Under the CAPM, the cost of equity for a particular company or activity is calculated as follows:

$$\text{Cost of Equity} = \text{Risk free Rate} + \text{Equity Beta} * \text{Equity Risk Premium}$$

where:

- The risk-free rate is equal to the return an investor expects on an investment in a safe asset whose returns do not co-vary with the market;
- The equity beta measures the covariance between the returns of the company/activity against that of the market. The equity beta measures the systematic risk of the company, which is the risk that an investor remains exposed to even after diversifying his portfolio; and
- The equity risk premium equals the risk premium above the risk-free rate that an investor demands for investing in the market portfolio.

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<sup>1</sup> TRC (28 January 2008): "Regulatory Decision on the Principles to be used in the Calculation of Licensees' Regulated Cost of Capital".

## 2.4 Cost of Debt Methodology

1. In addition to estimating the cost of equity, the calculation of the WACC also involves allowing for the cost of debt. Since companies often finance their activities by issuing debt, not just equity, the cost of capital must incorporate an allowance for the cost of debt.
2. The TRC estimates the cost of debt for an efficient operator with the weighted average of company embedded debt (existing debt) and new debt (debt issued over future regulatory period):

$$\text{Cost of Debt} = \% \text{ Embedded Debt} * \text{Cost of Embedded Debt} + \% \text{ New Debt} * \text{Cost of New Debt}$$

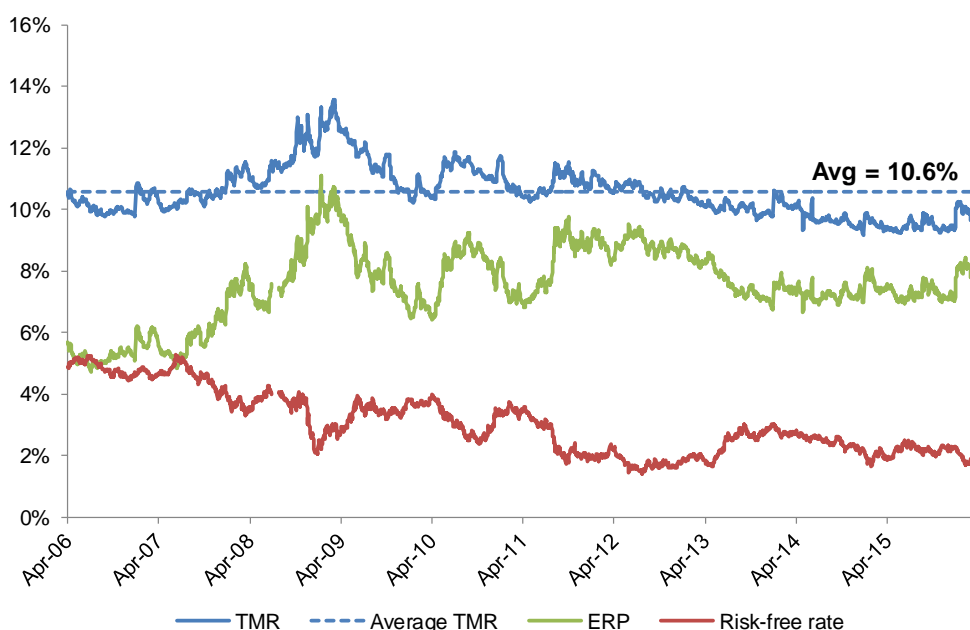
Q1: Do stakeholders agree with estimating the cost of debt based on the weighted average of embedded and new debt costs? Please justify your response.

### 3 Total Market Return

1. This section sets out proposed estimates for the risk-free rate and equity risk premium (ERP) – input parameter 2, which together make up the total market return (TMR). The TRC estimates the TMR for a developed market first, with reference to the US market, which provides liquid data over a long period of time.
2. Estimates of the Jordanian country risk premium are presented separately in section 4.
3. The TRC adopts the Total Market Return (TMR)<sup>2</sup> formulation of the CAPM:  

$$\text{Cost of Equity} = \text{Risk free Rate} + \text{Beta} * (\text{Total Market Return} - \text{Risk free Rate}) + \text{Jordanian Country Risk Premium}$$
4. This formulation involves considering the ERP and risk-free rate in conjunction, as the total market return is calculated first and the ERP is then backed out by subtracting the risk-free rate. This approach effectively assumes that the TMR is (broadly) constant over time, with inverse co-movement between the risk-free rate and the ERP offsetting each other.
5. The co-movement between the risk-free rate and the ERP can be observed in historical data for developed markets, such as the US. In particular, by using government bond yields as a proxy for the risk-free rate, and forward-looking market estimates of the equity risk premium, one can determine whether there is any co-movement. Figure 3.1 shows this relationship between the US risk-free rate and ERP, with the corresponding TMR.

**Figure 3.1**  
**Change in US TMR, ERP and Risk-free Rate over Time (Nominal)**



Source: Bloomberg; Note: Data up to 28 March 2016.

6. Figure 3.1 highlights the inverse relationship between the risk-free rate and the ERP for the US market. Following the onset of the global financial crisis in 2008, the risk-free rate has consistently declined, whilst the ERP has increased. Together, these movements have

<sup>2</sup> An alternative formulation is the Equity Risk Premium (ERP) formulation, where the ERP and the risk-free rate are determined independently of each other. In other words, the approach implicitly assumes there is no relationship between the risk-free rate and the ERP, and consequently there is no need to consider them together.

offset each other, such that the total market return (blue line) has remained relatively stable. In the figure above, the total market return exhibits the least volatility because it is composed of two offsetting elements, in the risk-free rate and ERP.

7. The TMR approach is built on the theory that in times of heightened market volatility investors dispose of risky assets such as equity, which increases the required return for holding stocks and hence the ERP, and use the proceeds to buy risk-free assets such as government bonds, which reduces the yield of risk free assets (“flight to quality”).<sup>3</sup>
8. Given this theory and evidence, the TRC has adopted the TMR formulation of the CAPM when estimating the cost of equity for the Jordanian telecoms operators which is in-line with TRC Principles.

### 3.1 Total Market Return

9. The TRC estimates the TMR using long-run historical data on observed market returns. Adopting a TMR based on long-run data is consistent with the view that the total market return tends to be relatively stable over time, and that the level will revert to this long-run mean over time. In this sense, a long-run average is forward-looking since it captures expectations that the TMR will return to this level over a future regulatory period. An additional advantage of using long-run historical data is that the estimate is likely to be relatively stable across multiple regulatory periods, since that passing of a regulatory period will not lead to much change in a long-run historical average calculated using more than 100 years of data. This stability in the parameter leads to regulatory stability that enhances investor confidence in the regulatory framework.
10. Dimson, Marsh, and Staunton (2016) present long-run averages of the total market return for various countries and regions, using data from 1900 to the present day.<sup>4</sup> Table 3.1 shows the averages for the US over the period 1900 to 2015, both as an arithmetic average and as a geometric average.

**Table 3.1**  
**Average US Total Market Return 1900 to 2015 (Real)**

Arithmetic average	Geometric average
8.3%	6.4%

*Source: Dimson, Marsh, Staunton (February 2016), p15.*

11. The TMR based on the long-run historical data is 8.3 per cent based on the arithmetic average and 6.4 per cent based on the geometric average.<sup>5</sup> The theoretical literature argues that the arithmetic average is more appropriate when the historical period is long relative to the forecast period. In this case, since the Dimson, Marsh and Staunton database covers 115 years of data relative to a short regulatory period, the arithmetic average is considered to be appropriate. Therefore a TMR of 8.3% is adopted for a developed market.

<sup>3</sup> See for example: (1) Campbell, J. Y. and Cochrane, J.H. (1999) By force of habit: A consumption-based explanation of aggregate of stock market behaviour, *Journal of Political Economy*, 107, 205-51; (2) Wright, S. et al. (September 2006): “Report on the Cost of Capital – provided to Ofgem”; Smithers & Co Ltd; (3) Harris, Robert, and Marston, Felicia (1999) “The Market Risk Premium: Expectational Estimates Using Analysts’ Forecasts”, Darden Business School Working Paper No 99-08; (4) Maddox, F., D. Pippert and R. Sullivan (1995), “An Empirical Study of ex ante Risk Premiums for the Electric Utility Industry,” *Financial Management*, 89-95.

<sup>4</sup> Dimson, Marsh, Staunton (2016), *Credit Suisse Global Investment Return Sourcebook 2016*, p 15.



### 3.2 The Risk Free Rate - Input Parameter (1)

12. The risk free rate represents the return on a theoretically riskless asset. A government bond is generally accepted to be such a “riskless” asset and the return on government bonds or bond yields are considered to be satisfactory proxies of risk free returns.
13. The TRC uses long-run historical data to estimate the risk-free rate. Dimson, Marsh, and Staunton (2016) present long-run averages of real bond returns, using data from 1900 to present.<sup>6</sup> Table 3.2 shows the US averages over the period 1900 to 2015.

**Table 3.2**  
**Long-run Average of US Bond Returns 1900-2015 (Real)**

Arithmetic average	Geometric average
2.5%	2.0%

*Source: Dimson, Marsh, Staunton (February 2016), p15.*

14. The real risk-free rate obtained is 2.5 per cent based on the arithmetic average, consistent with the approach for the TMR.

### 3.3 Conclusion on Total Market Return

15. Based on the above analysis, the TRC proposes the following estimates for the total market return and risk-free rate. The ERP is calculated as the difference between the total market return and risk-free rate estimates, in line with the TMR formulation of the CAPM. Table 3.3 summarizes TRC’s proposed approach to estimating the TMR.

**Table 3.3**  
**Estimates of the total market return, risk-free rate and ERP**

TMR	RfR	ERP
8.3%	2.5%	5.8%

Q2: Do stakeholders agree with adopting a long-run historical approach to estimating the TMR and risk-free rate?

Q3: Do stakeholders agree with the adoption of the arithmetic mean to calculate the total market return and risk-free rate?

<sup>6</sup> Dimson, Marsh, Staunton (2015, 2016), Credit Suisse Global Investment Return Sourcebooks, p 15.

## 4 Country Risk Premium

1. This section provides the TRC's approach to including a country risk premium (CRP) in the CAPM for the additional risk that investors face when investing in Jordan.
2. It is widely recognised in financial literature that there is more risk in investing in a country with increased sovereign debt risk than a mature market like US or Germany.<sup>7</sup> The CAPM allows only systematic or non-diversifiable risk to be remunerated in the cost of capital, so country risk should only be included if it is regarded as a systematic risk.
3. To estimate the CRP, the TRC has chosen to use Credit Default Swap (CDS) spreads from the CDS market. Although the theoretical literature offers a range of possible methods to estimate the CRP, including the difference in yields between Jordanian and mature market government bonds, there are difficulties in applying these methods to the Jordanian case. In particular, Jordanian government bonds are currently guaranteed by the US government, and therefore their yield does not reflect the true risk investors in Jordan face. Applying the CDS method makes use of the most reliable data available for Jordan.
4. Damodaran provides estimates of CRP using CDS spreads, and calculates the average CDS spread for each sovereign credit rating class to obtain CRP estimates for countries without CDS spreads.<sup>8</sup> Jordan's current sovereign credit rating is B1, as rated by Moody's.<sup>9</sup> Whereas default spreads are not available for Jordan itself, Professor Damodaran uses the average default spread for the rating class B1, which is 4.99% in 2015.<sup>10</sup> Figure 4.1 shows the evolution of the CRP for Jordan.

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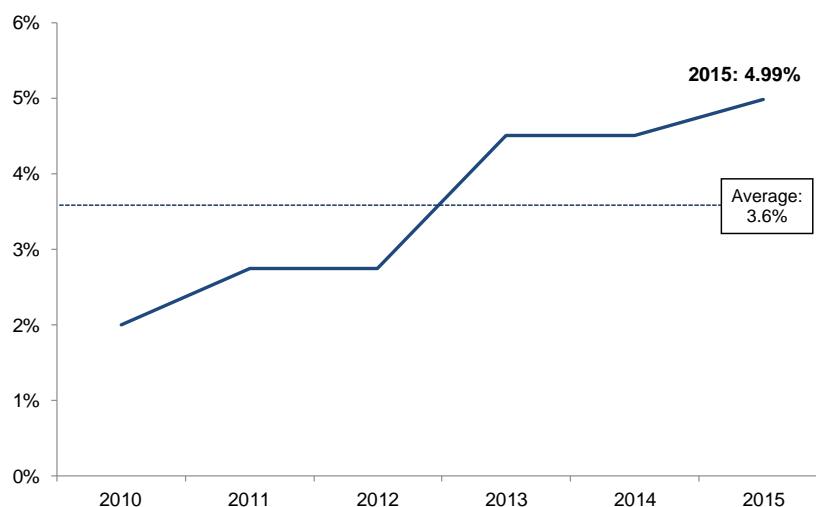
<sup>7</sup> See e.g. French & Poterba (1991): "Investor diversification and international equity markets", American Economic Review. See also Bali and Cakici (2006): "World Market Risk, Country-Specific Risk and Expected Returns in International Stock Markets", Working Paper who find that "*country-specific total and idiosyncratic risks are significantly priced in an ICAPM framework with partial integration.*" Also see a report prepared by the CER's advisers Oxera (2012): What is the cost of capital of Bord Gais Networks on the different ways the sovereign debt crisis affects the cost of debt and equity.

<sup>8</sup> Damodaran (2015), Equity Risk Premiums (ERP): Determinants, Estimation and Implications – The 2015 Edition, p. 58, 59.

<sup>9</sup> Moody's Website (2016), <https://www.moody.com/credit-ratings/Jordan-Government-of-credit-rating-600018522>.

<sup>10</sup> Damodaran subtracts the US CDS spread from the US-dollar-denominated CDS spreads of the countries under consideration, and thereby eliminates any effect of inflation as well as potential non-default risks captured by CDS spreads.

**Figure 4.1**  
**Country Risk Premium based on Default Swap Spreads (Damodaran)**



Source: Damodaran.

5. This figure above shows that the Jordanian CRP has increased considerably over the past 5 years, following two downgrades by Moody's: From Baa3 (lower medium grade) to Ba2 (speculative) in 2011 and from Ba2 to B1 (highly speculative) in 2013.<sup>11</sup> The first downgrade was a response to the political turmoil in the region (following events in Tunisia and Egypt), which increased fiscal and economic downside risks.<sup>12</sup> The second downgrade was due to a slowdown in economic growth and external shocks, leading to a deterioration of Jordan's public finances.<sup>13</sup> This latter downgrade had a much larger effect on the default spread. As the recent increase in the CRP estimate was due to temporary political and business cycle events, it is likely that the default spreads will decrease in the near future. As a result, the forward looking CRP may be better captured by an average over time than by the 2015 value.
6. Damodaran also argues in favor of using an average rather than the most recent default spread, as default spreads are volatile with respect to political events, business cycles, crises etc.<sup>14</sup> In line with this argument, the TRC uses the average default spread over the period 2010 to 2016, which is 3.6 per cent.

Q4: Do stakeholders agree about the use of CDS spreads to estimate the country risk premium?

Q5: Do stakeholders agree with taking a long-run average of CDS spreads to estimate the country risk premium?

<sup>11</sup> Moody's Website (2016), <http://www.tradingeconomics.com/country-list/rating>.

<sup>12</sup> Moody's (2011), Moody's changes Jordan's sovereign outlook to negative, aligns government ratings at Ba2, see [https://www.moodys.com/research/Moodys-changes-Jordans-sovereign-outlook-to-negative-aligns-government-ratings--PR\\_213580](https://www.moodys.com/research/Moodys-changes-Jordans-sovereign-outlook-to-negative-aligns-government-ratings--PR_213580).

<sup>13</sup> Moody's (2013), Moody's downgrades Jordan's government bond rating to B1, outlook stable, see [https://www.moodys.com/research/Moodys-downgrades-Jordans-government-bond-rating-to-B1-outlook-stable--PR\\_276482](https://www.moodys.com/research/Moodys-downgrades-Jordans-government-bond-rating-to-B1-outlook-stable--PR_276482).

<sup>14</sup> Damodaran (2015), Equity Risk Premiums (ERP): Determinants, Estimation and Implications – The 2015 Edition, p. 57.

## 5 Beta – Input Parameter 3

1. Beta is a measure of the non-diversifiable risk of an asset relative to the risk of the market portfolio. It is defined as the covariance between returns on an asset and returns on the market portfolio, divided by the variance of returns on the market portfolio.

### 5.1 Effect of Efficiency on Beta

2. As beta is a measure of systematic risk, efficiency will only affect beta if it affects the systematic, i.e. non-diversifiable, risk of the assets relative to the market portfolio. An operator that has achieved productive efficiency produces its goods and services with the optimal combination of inputs to produce maximum output for the minimum cost. Productive efficiency implies that an operator cannot produce more of one good without producing less of another.
3. If a previously inefficient operator minimises costs, profits increase (*ceteris paribus*). This, however, does not imply that the volatility, i.e. the riskiness, of profits increases. As a consequence, productive efficiency is not a beta factor. Hence, in order to determine the beta for an efficient operator, the TRC relies on the betas of the Jordanian operators and international comparators.

### 5.2 Impact of Revenue Shares on Beta

4. Jordanian mobile operators face a number of different taxes. Their profits are taxed at the corporate tax rate of 24 per cent. In addition, there is a 10 per cent revenue share fee, which is applied to operating revenues regardless of operators' profitability. Moreover, they have to pay an annual Licensing Fee (i.e. up to 1 per cent of revenues) and an annual spectrum fee (a fixed amount based on area and technology). Lastly, they may be subject to certain non-recurring regulatory fees.<sup>15</sup>
5. The TRC generally expects that operators subject to revenue share have higher betas, everything else being equal. As the rate is applied to revenues regardless of the profitability of the operator, the volatility of profits is higher in the presence of a revenue tax. For example, a hypothetical operator with zero profits would not pay any taxes in a purely profit-based taxation regime and hence end up with net profits of zero. In the presence of a revenue share, however, the same operator would pay a certain share of revenues to the government and hence end up with negative profits. This example illustrates that revenue shares increase the volatility of returns to shareholders, which constitutes an increase in systematic risk. Beta, being a measure of systematic risk, is hence expected to be higher for operators subject to revenue shares, i.e. Jordanian mobile operators.

### 5.3 Approach to Estimating Betas for Fixed and Mobile Operators

6. While Jordan Telecom Group is a Jordanian corporation, Zain Group and Batelco Group are internationally diversified corporations with Jordanian subsidiaries.
7. Zain Jordan is a near wholly owned subsidiary of Zain Group, an internationally diversified mobile telecoms company with operations in Bahrain, Iraq, Lebanon, Sudan, South Sudan, Kuwait, and Jordan. Its Jordanian subsidiary generates only around 12 per cent of Zain Group's revenues.<sup>16</sup>
8. Similarly, Umniah is part of the Bahrain Telecommunications (Batelco) Group, an internationally diversified telecoms company with operations in Bahrain, Egypt, Kuwait,

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<sup>15</sup> Deloitte (May 2015), "Digital inclusion and mobile sector taxation in Jordan", p. 25.

<sup>16</sup> Telegeography (2016), Zain Group company summary.

Jordan, Yemen, Maldives, Saudi Arabia and several island states. Its Jordan business generates 21 per cent to total group revenues.<sup>17</sup>

9. As a consequence, the beta estimates of Zain Group and Batelco Group will not be relied on, which reflect the systematic riskiness of the entire group relative to their local reference index, rather than the risk specific to their Jordan subsidiaries. Instead, the TRC assumes that Zain Jordan's and Umniah's betas are affected by the risk of the Jordanian revenue share in a similar way as JTG's mobile business.
10. The TRC's view is that Umniah's and Zain Jordan's betas should be based on Orange Mobile's beta.

#### **5.4 Fixed versus Mobile Operators' Betas**

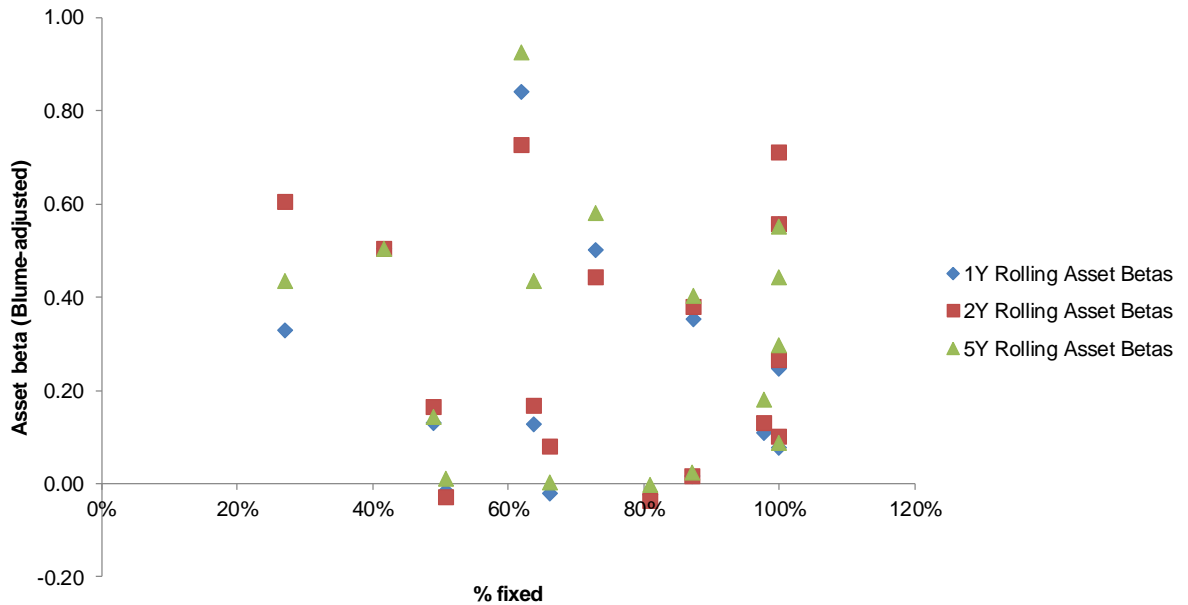
11. In the sample of Jordanian operators and regional comparators, there is no significant relationship between the asset betas (one-year, two-year, and five-year rolling asset betas) and the share of fixed operations. This finding suggests that the systematic riskiness, and hence the betas, do not differ significantly between fixed and mobile operations. An intuitive explanation for this finding is that the income elasticity of demand for mobile services has converged to that of fixed services in recent decades, as mobile telecommunication has become more ubiquitous. As a consequence of this development, the two types of telecom services appear to face a similarly inelastic demand and hence similar systematic risk. Figure 5.1 supports this argument as it shows that there is no relationship between the proportion of revenues derived from fixed activities and the asset beta for a range of Middle Eastern and North African telecoms companies who provide both fixed and mobile services.
12. As Jordan Telecom Group's beta reflects both fixed and mobile operations, the key issue is whether systematic riskiness differs between these types of operations in the absence of the 10% revenue share.<sup>18</sup> As there is no such difference, one can assume that Jordan Telecom Company and Orange Jordan had the same asset beta in the absence of a revenue share.

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<sup>17</sup> Telegeography (2016), Batelco Group company summary.

<sup>18</sup> As other activities contribute only 16 per cent of JTG's revenues, we do not expect these to have a material effect on the beta.

**Figure 5.1**  
**Asset betas not Correlated with the Percentage of Fixed Operations**



Source: Bloomberg.

### 5.5 Estimation Methodology

- In estimating JTG's betas, the first step is to decide on a reference index, data frequency, the estimation window, and the formula for de-levering the beta. Table 5.1 summarises the TRC's view, with details on each component below.

**Table 5.1**  
**Beta Estimation Technique**

<b>Issue</b>	<b>Description</b>	<b>Reasoning</b>
<b>A) Reference index</b>	Local Jordanian stock market index: Amman Stock Exchange General Index	In line with investor's probable market portfolio; "home bias" leads investors to favor stocks in home market
<b>B) Data Frequency</b> (Daily, weekly, or monthly returns)	Daily (higher frequency of data gives more robust estimates).	Estimates more statistically robust with higher data frequency; underlying stock price sufficiently liquid to assume no serial correlation between daily returns
<b>C) Estimation Window</b> (Time horizon over which beta is estimated)	Two years	Trade-off between reflecting current systematic risk and a more reliable/less volatile estimate when using longer-run average
<b>D) Levering the beta</b>	<b>Miller: <math>\beta_e = \beta_a / (1 + D/E)</math>:</b> The Miller formula assumes that the capital structure of the firm is constant, i.e. the firm pursues a target capital structure and rebalances it towards its target	TRC sets a notional capital structure for an efficient company in its regulated markets and thereby implicitly assumes that an efficient company pursues a target capital structure equivalent to the gearing assumption.

### Reference Index

14. Beta estimates depend on the choice of the reference index against which the co-variance of the companies' returns is measured. For the Jordanian listed companies, the most relevant reference index is the local Jordanian stock market index (Amman Stock Exchange General Index). The choice of reference index depends on an investor's probable market portfolio. Investors tend to exhibit a degree of 'home bias' in favouring stocks in their home market. Therefore, the Amman Stock Exchange General Index is the most appropriate reference index for measuring the betas of the Jordanian telecommunications companies.

### Data Frequency

15. If betas are calculated using empirical estimates of listed companies, the estimates will depend on whether returns are calculated using daily, weekly or monthly stock prices. The choice of data frequency depends on the trade-off between the statistical robustness of the beta estimates and the liquidity of the underlying stock price.
16. On the one hand, a higher frequency of data observations leads to a greater number of observations, resulting to empirical estimates that are more likely to be statistically robust and unbiased. Using daily returns over monthly returns can result in around 23 times more observations (depending on the number of working days in a month), leading to greater reliability of estimates. On the other hand, for a stock that is not frequently traded, and is illiquid, daily stock returns are likely to exhibit serial correlation, where the returns on successive days are not independent. This is likely to weaken the efficiency of the beta estimates.

17. The TRC finds that JTG's stock and the Amman Stock Exchange General Index are sufficiently liquid to use daily data for estimating the beta.

### Estimation Window

18. Since the risk profile under the CAPM can change over time, the time horizon over which the beta is measured can be a key driver of the beta estimate. A short-run average is more likely to reflect current systematic risk and may be more appropriate if the regulatory system has changed recently such that estimates of the beta based on long-run data may not reflect the current regulatory regime.
19. On the other hand, a long-run average provides two key benefits:
- Greater reliability of beta estimate: Using a long-term average provides more data points for estimating the beta than using a short-run average. This increases the statistical reliability of the beta estimate and makes it less likely that the beta estimate is biased.
  - Less volatile beta estimate: Using a long-term average means the beta estimate is less affected by single one-off market events. The beta estimate exhibits less volatility than a short-run estimate, providing greater regulatory stability and certainty.
20. For the Jordanian telecommunications sector, the TRC considers that a two-year estimation window provides the appropriate balance of the two factors above.

### Levering the Beta

21. The systematic risk of a company is measured by the asset beta of the firm, which takes into account all the assets of the firm. Unlike the equity beta, the asset beta is not affected by the firm's particular capital structure. The asset beta is estimated by 'de-levering' the equity beta for the listed companies, using each company's gearing. The asset beta must then be 'levered' back to an equity beta using the gearing assumption for the sector as whole. In levering the beta, two different formulae can be used:
- Miller:  $\beta_e = \beta_a / (1 + D/E)$
  - Modigliani-Miller:  $\beta_e = \beta_a / (1 + \{1 - \text{Tax Rate}\} * D/E)$
22. The Miller formula assumes that the capital structure of the firm is constant, or in other words the firm pursues a target capital structure and it rebalances its debt and equity constantly towards its target.<sup>19</sup> By contrast, the Modigliani-Miller formula assumes that the debt level of the firm is constant, whilst the capital structure can change.
23. Since the TRC sets a notional capital structure for an efficient company in any of its regulated markets, it implicitly assumes that an efficient company pursues a target capital structure equivalent to the gearing assumption. Under this approach, the Miller formula is more appropriate for levering the beta.

### 5.6 Fixed Operator Beta

24. Over the past five years, around 43 per cent of Jordan Telecom Group's revenues came from fixed operations (i.e. Jordan Telecom Company), with a similar share coming from mobile operations and the remainder from other activities.<sup>20</sup>
25. Figure 5.2 below shows the one-year rolling asset betas for Jordan Telecom Group and hence provides more information about the evolution of the asset beta in the recent past. The sharp increase in the asset beta starting in July 2013 appears to be a consequence of

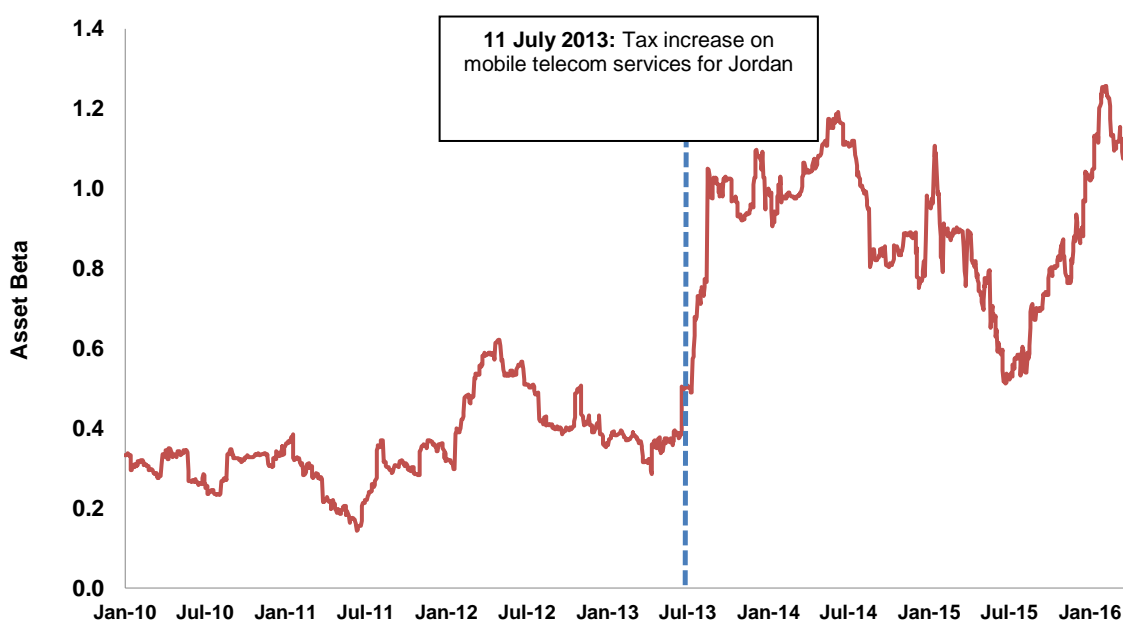
<sup>19</sup> Fernandez, P (May 2006): "Levered and Unlevered Beta", IESE Business School WP no 488, p1.

<sup>20</sup> See Jordan Telecom Group's income statements over the period 2011-2016.



the doubling of the special tax rate on mobile telecom services, levied on end consumers. Although this appears to have an effect on the market's perception of risk, the volatility in the beta estimate suggests that the market has not yet fully stabilised its assessment of the impact of this tax change. Given this volatility in the beta estimate following July 2013, this period of data is excluded for Jordan Telecom Group.

**Figure 5.2**  
**1Y Rolling Asset Beta for Jordan Telecom Group**



Source: Bloomberg.

26. Table 5.2 below shows the asset betas of JTG over different estimation windows as on 10 July 2013, i.e. the day before the increase in special tax on mobile telecom services was announced in Jordan.

**Table 5.2**  
**Asset Beta Estimates for JTG as on 10 July 2013 over Different Estimation Windows**

	2 Year	5 Year	10 Year
Jordan Telecom Group	0.50	0.51	0.56
Standard Deviation	0.08	0.03	0.03

Sources: Bloomberg.

27. The final estimate for the beta of Jordan Telecom Company is based on the two-year rolling asset beta as on 10 July 2013, which is 0.50.<sup>21</sup>
28. In addition, the TRC uses European telecoms comparators with significant fixed shares in their operations to inform the beta estimate. The average of the two-year rolling averages of the set of 13 European comparators is 0.56. The TRC uses this as the upper bound for the beta estimate for efficient operators. The final range for the asset beta of JTG's fixed

<sup>21</sup> The beta for Jordan Telecom Group is estimated against the Amman Stock Exchange. We have checked whether the Amman Stock Exchange represents a diversified stock market, since any sign of non-diversification would imply the beta estimate is not a true reflection of the systematic risk against a market index. The Amman stock exchange contains 100 companies, and no one sector represents more than 20% of the stock market. We therefore consider that the beta estimate against the Amman stock exchange provides a suitable measure of systematic risk.

operations is therefore 0.50, and the asset beta range for the efficient fixed operator is 0.50 to 0.56.

## 5.7 Mobile Operator Beta

29. For the mobile business of Jordan Telecom Group, Orange Jordan, the beta estimate should reflect the fact that mobile operators are subject to a revenue share. The TRC calculates a beta multiplier which represents the additional systematic risk that mobile operator face due to the revenue share, compared to fixed operators. This multiplier is calculated based on a simple model which compares the proportional impact of volume shocks on profits in worlds with and without revenue share. Specifically, the multiplier is the ratio of the proportional impacts of volume shocks for the two states of the world:<sup>22</sup>

$$\text{Beta multiplier} = \frac{\frac{\text{Change in profits due to volume shock}_{\text{revenue share}}}{\text{Pre - shock profits}_{\text{revenue share}}}}{\frac{\text{Change in profits due to volume shock}_{\text{no revenue share}}}{\text{Pre - shock profits}_{\text{no revenue share}}}}$$

30. Profits are calculated as revenues minus variable and fixed costs, multiplied by one minus the tax rate. This is equivalent to a free cash flow (FCF) analysis under the simplifying assumption that capex equals to depreciation.<sup>23</sup> Volume shocks affect both revenues and variable costs, but not fixed costs as these are incurred regardless of sales volume. Revenue shares only affect revenues.
31. In order to calculate this multiplier, there needs to be assumptions about the proportion of variable and fixed costs. The TRC bases the assumptions on the averages of Orange Jordan's, Zain Group's and Batelco Group's variable and fixed cost shares in 2014.<sup>24</sup> On average, variable costs amounted to around 34 per cent of revenues, whereas fixed costs amounted to around 45 per cent of revenues in this year. Based on these shares, the 24 percent corporate tax, and the 10 per cent revenue share on mobile operations, a multiplier of 1.6 is calculated; which is applied to the asset beta estimate for Jordan Telecom Company. This approach results in a final estimate of 0.80 for the asset beta for JTG's mobile operations.

## 5.8 Conclusion on Beta

32. For Jordan Telecom Company, i.e. JTG's fixed business, the TRC proposes an asset beta of 0.50. This is based on JTG's asset beta prior to the doubling of the special tax rate for mobile telecom services levied by end consumers in 2013. For each of the three Jordanian mobile businesses, the TRC proposes an asset beta of 0.80 based on the beta multiplier derived from the effect of revenue shares on the volatility of profits.
33. This approach to estimating the beta for the efficient operators is similar to that for the Jordanian operators, since the TRC finds no evidence that efficiency should result in

<sup>22</sup> Note that this multiplier is a measure of the volatility of the profits, which is constant in the size of the volume shock. It increases with the size of the revenue shares and with costs, as the proportional change in profits is larger where the base profit is smaller due to higher costs.

<sup>23</sup> There is a general view that FCF gives a clearer view of a company's ability to generate cash, and thus profits, than net income. This is because net income can more easily be manipulated through different accounting treatments. FCF is calculated as EBIT\*(1-tax rate) + Depreciation/Amortisation – Change in Net Working Capital – Capital Expenditure & Goodwill. Under the assumption that the amount of Capital Expenditure and Goodwill equals to the amount of Depreciation and Amortisation, and assuming that Net Working Capital is constant, the FCF formula simplifies to EBIT\*(1-tax rate), where EBIT essentially equals to revenues minus operating expenses (fixed and variable) and depreciation.

<sup>24</sup> Based on the annual accounts of Orange Jordan, Zain Group, and Batelco Group for the financial year 2014. Note that these shares have not changed materially compared to the financial year 2013.

changes to systematic risk. For the efficient operators, the TRC also makes use of evidence for international comparators to take account of wider evidence for efficient fixed line operators. The final asset beta estimates are summarised below.

**Table 5.3**  
**Asset Beta Estimates for Fixed and Mobile Operators**

	Fixed	Mobile
Jordanian Operators	0.50	0.80
Efficient Operators	0.50 – 0.56	0.80 – 0.89

34. For the purpose of estimating the cost of equity, the asset beta must be converted into an equity beta to take account of an operator that finances itself partly with debt. The equity beta can be calculated using the Miller formula set out above.
35. The above formula is applied to the asset beta estimates for each operator using the gearing estimates described in section 6. This provides the equity beta estimates used to calculate the cost of equity.

Q6: Do stakeholders agree with the proposed estimation technique for the beta, particularly on data frequency, estimation window, reference index and levering?

Q7: Do stakeholders agree with the view that the beta for fixed and mobile operators should be equal, with the exception of the revenue share impact? Please justify your response.

Q8: Do stakeholders agree with the proposed revenue share adjustment for mobile operators?

Q9: Do stakeholders agree with the view that the beta for efficient operators should not be different from that of the actual Jordanian operators?

## 6 Gearing – Input Parameter 5

1. In this section, the TRC estimates the gearing for an efficient operator. The gearing is used in two instances in the final WACC calculation:
  - *Re-levering the asset beta:* The asset beta estimated in section 5 represents the beta for an all-equity firm. To convert this into the beta for a firm with debt in its capital structure, the equity beta is re-levered, taking account of the gearing.
  - *Weights on cost of debt and equity:* The gearing is used to determine the weights on the cost of equity and debt to determine the final weighted average cost of capital.
2. The gearing estimate must reflect market values of equity and debt, instead of book values. This is because market values represent a fairer valuation of the capital structure of the firm, and is used by the firm to inform its investment decisions. By using the market values of the debt and equity to calculate the gearing, the regulatory framework is more likely to mimic efficient market outcomes.
3. The TRC’s review of the capital structure of the Jordanian telecom operators shows there are substantial difficulties in establishing their actual gearing. All of the Jordanian operators are owned by multinational operators, and the capital structure of the Jordanian operating entity alone may not capture a true reflection of the operators’ actual access to debt financing. Moreover, the inclusion of the capital structure of the holding companies that own the Jordanian operators is also problematic, since there is no method to establish which portion of the holding company’s capital is allocated to the Jordanian operator.
4. Due to these difficulties in using the actual capital structure of the Jordanian operators, the TRC estimates the gearing using the efficient level of gearing, based on the gearing observed for comparator companies. The ability to identify comparators who have gearing observable at the operating company level allows to calculate an efficient level of gearing for a fixed line or mobile operator, independent of the way in which holding companies may allocate debt between their operating companies for accounting purposes.

### 6.1 Fixed Line Gearing

5. In order to estimate the gearing of an efficient fixed line operator, the TRC considers the gearing of European fixed line operators. The gearing of these operators is observable at the operating company level and reflects the actual capital structure decision of the operating company. In addition, since these operators provide services in markets where the regulator promotes an efficient outcome, the gearing of these operators is likely to provide a reliable estimate for the efficient level of gearing.

Table 6.1 shows the gearing of the European fixed line operators used to inform the beta estimate, and their gearing.

**Table 6.1**  
**Asset Beta Estimates for Fixed Operators in Europe**

Fixed Operator	2Y Gearing	Latest Credit Rating
BT	21%	BBB/BBB+
TalkTalk	18%	N/A
Sky	27%	BBB
Colt	N/A	N/A
Telefonica	51%	BBB

Deutsche Telekom	45%	BBB+
Belgacom	20%	A
Telecom Italia	66%	BB+
Orange	49%	BBB+
Iliad	10%	N/A
Swisscom	24%	A
<b>Average</b>	<b>33%</b>	<b>BBB/BBB+</b>

*Source: Bloomberg, Company website credit rating information. Note: All credit ratings are from S&P.*

6. The average gearing of the European fixed line operators over the last two years is 33%, consistent with an average credit rating of BBB / BBB+. This credit rating represents an investment-grade status, ensuring the companies do not risk a high probability of financial distress.
7. The Jordanian sovereign credit rating is currently BB- from S&P, lower than the credit rating of the European comparators listed above. By selecting European comparators, the TRC is not assuming that the efficient credit rating for Jordanian operators is the same as that for European operators.
8. Instead, the TRC is assuming that the credit rating of the Jordanian operators will be as close to the Jordan sovereign credit rating as the European operators' credit rating is to their sovereign ratings. By doing so, the gearing assumption is consistent with the level of country risk in Jordan.
9. The TRC therefore concludes on an efficient gearing assumption for fixed line operators of 33%, based on the 2-year average gearing for the European fixed line operators.

## **6.2 Mobile Gearing**

10. The TRC has adopted a similar approach to determining the efficient level of gearing for mobile operators as for the fixed line operators, by considering the average gearing of the European mobile operators used to estimate the betas.
11. The gearing of these mobile comparators is shown in Table 6.2 below.

**Table 6.2**  
**Asset Beta Estimates for Mobile Operators in Europe**

<b>Mobile Operator</b>	<b>2Y Gearing</b>	<b>Latest Credit Rating</b>
Vodafone Group Plc.	37%	BBB+
Mobistar	33%	N/A
KPN	46%	BBB-
Telenor	23%	A
Tele2	19%	N/A
<b>Average</b>	<b>32%</b>	<b>BBB+</b>

*Source: Bloomberg, Company website credit rating information. Note: All credit ratings are from S&P.*

12. The 2-year average gearing of the mobile operators above is 32%, consistent with an average credit rating of BBB+. This is equivalent to an investment-grade status, ensuring the companies do not risk a high probability of financial distress. The TRC uses this as the gearing estimate for mobile operators.

Q10: Do stakeholders agree with the approach of estimating the efficient level of gearing based on the gearing of international comparators? Please justify your response.

Q11: Do stakeholders agree with adopting a 2-year average to estimate the gearing? Please justify your response.

## 7 The Cost of Debt – Input Parameter 4

1. The TRC favours estimating the cost of debt based on the cost of debt for an efficient operator rather than the actual operators. By referring to an efficient operator, the regulatory framework provides incentives for companies to pursue a capital structure closer in line with the level determined by the regulator, closer to the efficient level determined by international comparators.
2. In contrast to estimating the actual debt cost for the Jordanian operators, the cost of debt for efficient operators is intended to remunerate an investor for the risk associated with financing efficient debt costs. An efficient level of debt costs is one that relates to a company with an optimal capital structure. As noted in section 6, an optimal capital structure is one that balances the benefits of the interest tax shield against the costs of financial distress from having higher debt. Therefore, an efficient cost of debt is one that relates to a company that has an optimal capital structure.
3. In section 6, the TRC determined that the optimal capital structure for a fixed and mobile operator is BBB. Consequently, the TRC calculates the cost of debt for efficient operators with reference to BBB-rated companies.
4. Moreover, the TRC has reviewed bonds issued by mobile and fixed Middle Eastern telecom companies,<sup>25</sup> which serve as comparators for Jordanian telecoms operators. The risk of this set of Middle Eastern comparator bonds is captured by a credit rating of BBB, which is an investment-grade credit rating. Although some Middle Eastern telecom bonds have a higher credit rating, the BBB-rated index is used in order to capture the risk of all the comparators, i.e. the TRC takes a conservative approach.
5. In order to address the challenges noted with using the actual cost of debt, the cost of debt can be calculated as a weighted average of the cost of embedded (i.e. existing) debt and new debt issued over the next regulatory period. In other words, the cost of debt remunerates a company for all the debt it expects to hold over the regulatory period including existing debt it expects to continue to hold, and new debt it expects to issue. The cost of debt can then be written as follows:  
$$\text{Cost of debt} = \text{Weight}_{\text{New}} * \text{Cost of New Debt} + \text{Weight}_{\text{Embedded}} * \text{Cost of Embedded Debt}$$
6. By taking account of both embedded and new debt, the cost of debt does not prevent companies from under-recovering debt costs on any new debt issued over the regulatory period. Moreover, by calculating the cost of debt with reference to an efficient credit rating, companies face an incentive to pursue an optimal capital structure, since any debt issued at a suboptimal level will not be remunerated in the allowed cost of debt. This method thereby induces companies to minimise debt costs to the efficient level.
7. A second issue with calculating the efficient cost of debt relates to the inclusion of a country risk premium. As discussed in section 4, the TRC has included a CRP in the cost of equity, as equity investors in Jordanian operators may be unable to diversify internationally, exposing them to Jordan-specific country risk. The same issue is relevant to debt investors in Jordan, depending on whether they are able to access international debt capital markets.
8. This calculation of the cost of embedded debt for the Jordanian operators demonstrates that the Jordanian operators are operating companies under larger international groups, and debt is issued at the group level. This enables the operating companies to benefit from the financing costs at the group level. The evidence from this review suggests that the debt

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<sup>25</sup> TRC review has been restricted to only bullet bonds, which expire on maturity. Bonds with other features may result in a different cost of debt to a bond that expires at maturity. For example, callable bonds can be redeemed prior to the maturity date, implying that the issuer has to face a higher cost of debt because investors face a risk that their cash flows are terminated prior to the termination date. Such bonds are excluded from the review since there is no evidence that any of the Jordanian operators issue bonds with such features.

costs at the group level may be much lower than that of standalone Jordanian operators, since they are able to access international debt capital markets. For example, Batelco Group (group that owns Umniah Mobile) has issued a bond that trades on the Irish exchange, where investors are not exposed to Jordanian country risk. Similarly, Jordan Telecom Group appears to benefit from issuing debt at the Orange (France) since some of its issued debt is French government loans, which is also not exposed to Jordanian country risk. This supports estimating a cost of debt for efficient operators that does not include any allowance for country risk because the Jordanian operators are able to take advantage of issuing debt in markets where the cost of debt is significantly lower. The TRC has therefore not included any country risk premium in the cost of debt for efficient Jordanian operators.

9. Finally, the TRC estimates the same cost of debt for an efficient fixed operator as for an efficient mobile operator. This follows from section 6, where the same gearing is estimated for an efficient fixed operator as for an efficient mobile operator. In addition, the analysis on beta risks for fixed and mobile operators highlights minimal difference in underlying systematic business risk, again supporting the same cost of debt for both types of operator (see section 5).

### 7.1 Cost of Embedded Debt

10. To estimate the cost of embedded debt for an efficient operator, the TRC has identified a debt index constructed of bonds with a BBB rating, in line with the rating that reflects an optimal capital structure in the section above. The advantage of using an index instead of individual corporate bonds is that the index contains a wide selection of bonds, implying that it is more likely to be liquid than an individual corporate bond. This reduction in liquidity means that cost of debt derived from an index is a more reliable measure of the market's pricing of default risk than an estimate based on a singular bond.
11. The estimate of the cost of embedded debt is based on an index of US telecom bonds with BBB rating. The TRC has selected the BofA Merrill Lynch US Telecommunications (BBB) index with a remaining life time of 9-15 years. Similar indices are used in UK utility regulation to set the cost of debt for price controls, including Ofgem when it adopted a debt indexation approach to recover efficient debt costs.<sup>26</sup> This US telecoms index is directly available from Bloomberg and compiles the yields on bonds issued by telecoms operators that are rated BBB. While telecom operators issue debt for a range of maturities, a maturity of 9-15 years is in line with the average asset life for telecom operators, including the Jordanian operators.<sup>27</sup>
12. A further choice relates to the appropriate period of data over which average nominal yield is calculated. When estimating the cost of embedded debt, operators should be remunerated for existing debt costs, which may have been issued at varying times. Given the long maturity of most telecoms assets, some debt instruments may have been issued a number of years ago, and therefore short-term average yields may not capture the full debt costs faced by the operators.

Table 7.1: shows the average nominal debt yield for the US telecoms index over a range of different averaging periods.

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<sup>26</sup> Ofgem (25 November 2014): "Cost of debt indexation model 31 October 2014".

<sup>27</sup> Zain Group reports an average asset life of 13 years, Jordan Telecom Group an asset life of 15 years and Batelco Group and asset life of 14 years.



**Table 7.1**  
**Nominal Yields for US Telecoms Index**

Averaging Period	Average Nominal Yield for Index
1-Year	3.9%
2-Year	3.8%
Max Data (close to 5-Year)	4.1%

*Source: Bloomberg*

13. The TRC has selected the five-year average yield of US telecoms index as an estimate of the embedded debt cost. A five-year average represents a long period of data to capture the long period of time over which operators may have issued their current debt instruments. A time period shorted than five years risks not remunerating operators for debt issued at times when interest rates were higher than they are currently.
14. Using the five-year nominal yield of the US telecoms index, the TRC estimates a nominal cost of embedded debt of 4.1%. Applying the average US inflation rate over this period of 1.7% and adding a country risk premium estimate of 3.6%,<sup>28</sup> the TRC estimates a real cost of embedded debt for efficient operators of 5.9%.

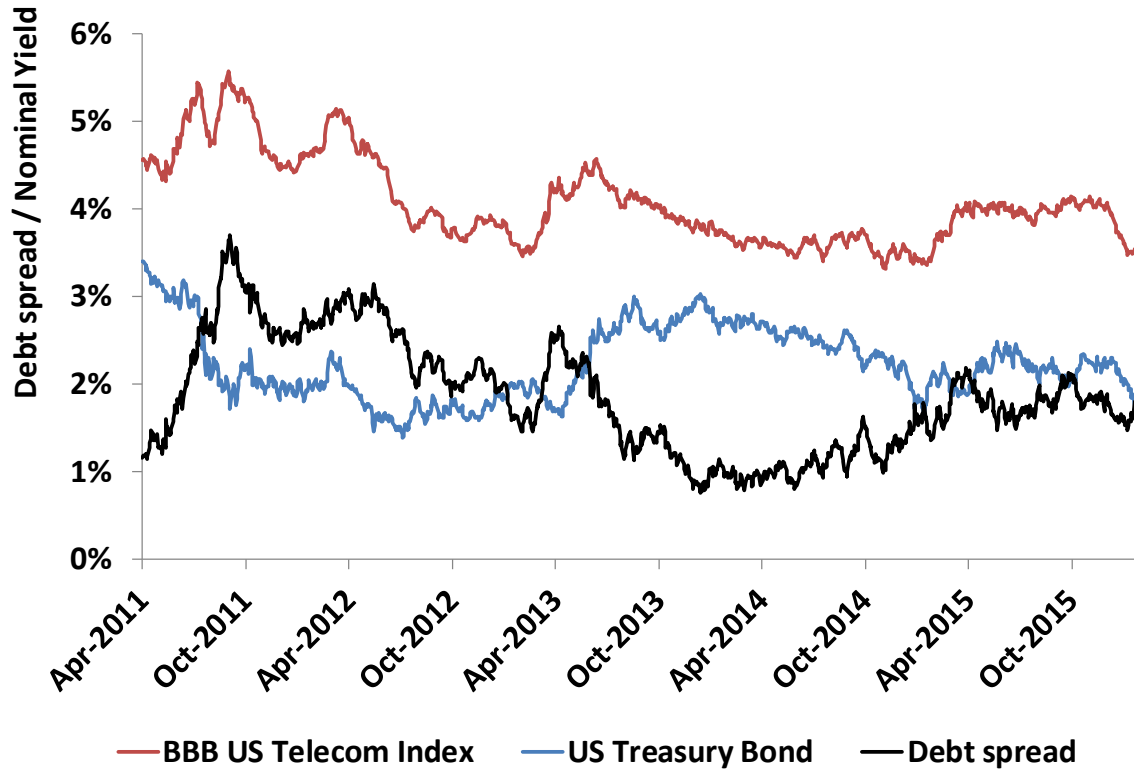
## 7.2 Cost of New Debt

15. The cost of new debt is intended to remunerate operators for efficient debt issuances over the next regulatory period. This ensures operators receive a fair return for all efficient debt issuances over a regulatory period, instead of only on historical debt issuances.
16. In contrast to estimating the cost of embedded debt, the cost of new debt is unknown prior to the start of the regulatory period, since by definition, these issuances have not yet occurred. To estimate the cost of new debt, one must establish market expectations of the cost of new debt over the next regulatory period by following a two-stage process:
  - Use forward-looking risk-free rate estimate: Section 3 described the risk-free rate estimate, which was based on long-run historical data in the US. Since the risk-free rate is expected to be relatively stable over the long-run, by using long-run historical data, the TRC reflected market expectations that the risk-free rate would revert to the long-run level over the next regulatory period. Consequently, the risk-free rate estimate was forward-looking to the upcoming regulatory period, and therefore one can start with this risk-free rate to estimate the cost of new debt.
  - Add a corporate debt spread: In order to reflect the additional risk of an efficient telecoms operator defaulting over and above a risk-free asset, one must include a corporate debt spread. This spread should reflect the additional premium that an efficient telecoms operator would pay when issuing debt over an upcoming regulatory period.
17. In order to estimate the debt spread, the TRC refers to the same US telecoms index used to estimate the cost of embedded debt. The debt spread is defined as the difference between the yield to maturity of this index and the US risk-free rate, as proxied by the yield to maturity on 10-year US treasury bonds. The TRC assumes that efficient Jordanian telecom companies face the same debt spread as US telecom companies as long as they have the same creditworthiness, which is a reasonable assumption given that Jordanian operators have in practice been able to issue debt in international capital markets.

<sup>28</sup> The average US inflation over the five-year period is calculated using annual inflation reported by the World Bank from 2011 to 2015.

18. Figure 7.1 shows the spreads of the US telecoms index over the 10-year US Treasury Bond.<sup>29</sup>

**Figure 7.1**  
**Debt Spreads for BBB-rated US Telecom Debt Index**



Source: Datastream Factset

19. Figure 7.1 highlights that the corporate debt spread (black line) has declined from highs in 2011 to its current level at around 1.8%. The corporate debt spread must reflect forward-looking expectations, and hence, in this case, a short-term average debt spread may be a more suitable averaging period than a long-term average.
20. The TRC has therefore added the 1-year average debt spread of 1.8% to the risk-free rate estimate of 2.5%, plus a country risk premium of 3.6%, to calculate a cost of new debt for an efficient Jordanian operator of 7.9%.

### 7.3 Weights on Embedded and New Debt

21. The final stage of calculating the cost of debt is to identify appropriate weights for the cost of embedded debt and new debt. This proportion depends on how much debt efficient operators will issue over the next regulatory period relative to their current debt levels. Since this is unknown prior to the commencement of the regulatory period, the TRC estimates weights based on the average asset life of Jordanian operators and the length of the regulatory period.
22. The weights on the cost of embedded and new debt are determined as follows:

<sup>29</sup> The TRC has selected a 10-year US Treasury bond to match the 9-15 year maturity of the US telecoms index. No comparable US Treasury bond index with 9-15 years maturity is available. It is noted that if the US Treasury bond curve is upward-sloping, as per normal market conditions, and the average maturity of the US telecoms index is greater than 10 years, then the selected indices may slightly overestimate the actual corporate debt spread.

- Calculate asset lives: First calculate the average asset life in years for each operator, using information provided in the annual reports of each of the operators. The major asset types are buildings and telecom equipment. The average asset life for each operator is calculated as a weighted average, whereas the weights are based on the amounts of the respective asset types reported in the balance sheets.
- Weight on new debt: Assuming a five-year regulatory period, one can then divide five by the average asset life, which is a proxy for the proportion of new debt that will have to be raised during the five-year regulatory period ahead. This calculation assumes that an efficient operator will re-issue all its existing debt over its full asset life, as the existing debt matures.
- Weight on embedded debt: This is the difference between 100 per cent and the weight on the cost of new debt.

23. Applying the above methodology, the TRC calculates a weight of 36% on the cost of new debt and 64% for the cost of embedded debt.<sup>30</sup>

#### 7.4 Conclusion on Cost of Debt

24. The final cost of debt estimate for an efficient Jordanian telecoms operator is presented in Table 7.2 below. Based on the estimates of the cost of embedded debt and cost of new debt, and applying the relevant weightings, the TRC calculates the real cost of debt for an efficient Jordanian operator to be 3.0%.

**Table 7.2**  
**Cost of Debt Estimate for Efficient Operators**

	Weight	Estimate	Approach
Cost of Embedded Debt	64%	5.9%	5-year average yield on US 9-15Y BBB telecoms index, deflated with US inflation over same period + country risk premium
Cost of New Debt	36%	7.9%	US risk-free rate estimate + Corporate debt spread based on 1-year average difference between US telecoms index and 10Y US Treasury bond + country risk premium
<b>Cost of Debt (Real)</b>	<b>100%</b>	<b>6.6%</b>	

25. This estimate of the cost of debt is above the actual cost of debt for the Jordanian operators (see section 7). The difference between these estimates suggests that the Jordanian operators have an excessively low cost of debt, deviating from an optimal capital structure. If the gearing of the Jordanian operators is too low, they will have low costs of financial distress, but will not be taking advantage of the benefits of the interest tax shield. Therefore, the current capital structure of the Jordanian operators may be suboptimal, particularly in comparison to the capital structure pursued by international telecoms comparators, who typically have a credit rating of BBB.

26. The TRC favours estimating the cost of debt based on the cost of debt for an efficient operator rather than the actual operators. By referring to an efficient operator, the regulatory framework provides incentives for companies to pursue a capital structure closer in line with the level determined by the regulator, closer to the efficient level determined by international comparators.

<sup>30</sup> Zain Group reports an average asset life of 13 years, Jordan Telecom Group an asset life of 15 years and Batelco Group and asset life of 14 years.

Q12: Do stakeholders agree with the use of debt indices to calculate the efficient cost of debt instead of using the operators' actual debt costs? Please justify your response.

Q13: Do stakeholders agree with the approach used in calculating the cost of embedded debt?

Q14: Do stakeholders agree with the approach used in calculating the cost of new debt?

Q15: Do stakeholders agree with calculation of the weights on the cost of new and embedded debt?

## **8 WACC Estimates**

27. In this section, estimates of the WACC for efficient fixed and mobile activities are presented as in Table 8.1. As discussed in previous sections, the use of the efficient parameters ensures operators have an incentive to optimise towards an efficient market outcome, and to be consistent with other cost calculation TRC principles setting the WACC rates will be based on this approach.

**Table 8.1**  
**WACC Estimates for Efficient Fixed and Mobile Operators**

	Fixed		Mobile		
	Low	High	Low	High	
Gearing	33%	33%	32%	32%	2Y Avg Gearing of European Comparators
Tax	24%	24%	24%	24%	Jordan corporate tax rate
Risk-free Rate	2.5%	2.5%	2.5%	2.5%	Long-run US returns on bonds
ERP	5.8%	5.8%	5.8%	5.8%	Long-run US return on equity over bonds
TMR	8.3%	8.3%	8.3%	8.3%	<i>Calc.</i>
CRP	3.6%	3.6%	3.6%	3.6%	Long-run average of credit default swap spreads
Asset Beta	0.50	0.56	0.80	0.89	Benchmarked on JTG beta/European comparators + Adjustment for mobile revenue share
Equity Beta	0.75	0.84	1.18	1.31	<i>Calc.</i>
<b>Cost of Equity (Real, post-tax)</b>	10.4%	10.9%	12.9%	13.7%	<i>Calc.</i>
<b>Cost of Debt (Real, pre-tax)</b>	6.6%	6.6%	6.6%	6.6%	Benchmarked on cost of debt index + country risk premium
<b>WACC (Real, pre-tax)</b>	11.4%	11.8%	13.7%	14.4%	<i>Calc.</i>
<b>WACC (Real, vanilla)</b>	9.2%	9.5%	10.9%	11.4%	<i>Calc.</i>
<b>WACC (Real, post-tax)</b>	8.6%	9.0%	10.4%	10.9%	<i>Calc.</i>
Inflation	2.0%	2.0%	2.0%	2.0%	<i>Jordan long-run inflation</i>
<b>WACC (Nominal, pre-tax)</b>	13.6%	14.1%	15.9%	16.6%	<i>Calc.</i>
<b>WACC (Nominal, vanilla)</b>	11.3%	11.7%	13.1%	13.7%	<i>Calc.</i>
<b>WACC (Nominal, post-tax)</b>	10.8%	11.2%	12.6%	13.1%	<i>Calc.</i>

28. The TRC estimates a real pre-tax WACC of 11.4% to 11.8% for an efficient fixed line operator in Jordan and 13.7% to 14.4% for an efficient mobile operator. The range for each type of activity reflects the range of uncertainty in the beta estimates, which are derived from a range of different data sources.
29. Taking the mid-point of the range for each type of network, the average of low and high values:
- a real pre-tax WACC of 11.6% is estimated for an efficient fixed line Jordanian operator.
  - a real pre-tax WACC of 14.0% is estimated for an efficient mobile Jordanian operator.

Q16: Do stakeholders agree with the use of mid-point of the WACC range as the final estimate? Please justify your response.

## 9 Expected Results for Implementation of New WACC Rates

1. The new WACC rate calculated by the TRC will be implemented in TRC's cost models in order to set prices for various regulated services. The WACC is implemented in the cost model to allow investors in the company to recover their investment cost including the opportunity cost of capital employed.
2. The WACC rate calculated in section 9 represents the efficient WACC for investing in fixed line and mobile activities in Jordan. By selecting the efficient WACC, the TRC wishes to remunerate investors only for the efficient level of costs, including financing costs. If instead of the efficient WACC, the TRC chose to set a different WACC, for example the actual WACC of the operators, there is a risk that regulated prices are set at a level that remunerates investors for inefficient costs. Specifically, by setting the cost of debt and gearing based on an efficient company's financial structure, the TRC has ensured that investors are only remunerated for efficient debt investments.
3. Moreover, by setting prices at a level based on the efficient WACC, the TRC believes it will promote competition in the Jordanian telecoms market. Potential new entrants will view the efficient WACC as a signal that any new investments in the Jordanian telecoms market based on efficient costs will be rewarded with a fair rate of return at the WACC.
4. The TRC has ensured that the WACC is calculated based on a 'standalone' efficient operator, which is not necessarily owned by wider international holding companies. This ensures that Jordanian investors are able to invest in a standalone operator, and will be remunerated accordingly. By adopting this approach of considering a standalone operator, the TRC has ensured that the regulatory framework is not biased against small operators or operators that are not owned by larger holding companies.
5. The TRC expects that the new WACC rates will enhance competition and thereby potentially lower consumer prices for various telecoms services in real terms. This is consistent with the TRC's mission statement of ensuring advanced high quality ICT services are available to all at an affordable price.
6. In addition, the TRC believes the new WACC rates will encourage sustainable investment in the Jordanian telecoms market. In the coming years, Jordanian operators may wish to undertake significant investments in expanding their networks, including investments in Fibre-to-the-Home and 5G networks. In order for operators to have confidence that they will recover the cost of their investments, they must receive a fair rate of return for providing regulated services. The TRC believes that setting the efficient WACC calculated above will ensure that operators are able to invest in their networks.
7. The TRC also notes that any WACC set above the efficient level is unlikely to promote sustainable levels of investment. For example, if the WACC is set too high, operators face an incentive to over-invest in their networks, diverting resources away from more efficient use of funds.
8. Overall, the TRC believes that the implementation of the new WACC rates will achieve its objective of developing an open regulatory environment that promotes fairness, competition and investment.

## 10 Consultation Instructions

The TRC seeks input from interested parties on the issues raised in this Public Consultation document. Interested parties are encouraged to submit comments to the TRC on any issues in this document and, in particular, answers the questions indicated on or before 30 days of the publishing date. All comments of the interested parties will be taken into account in the formulation of the TRC's final decisions. The questions for which TRC requests a response are summarised below:

Consultation Question	Page
<b>Q1:</b> Do stakeholders agree with estimating the cost of debt based on the weighted average of embedded and new debt costs? Please justify your response.	4
<b>Q2:</b> Do stakeholders agree with adopting a long-run historical approach to estimating the TMR and risk-free rate?	7
<b>Q3:</b> Do stakeholders agree with the adoption of the arithmetic mean to calculate the total market return and risk-free rate?	7
<b>Q4:</b> Do stakeholders agree about the use of CDS spreads to estimate the country risk premium?	9
<b>Q5:</b> Do stakeholders agree with taking a long-run average of CDS spreads to estimate the country risk premium?	9
<b>Q6:</b> Do stakeholders agree with the proposed estimation technique for the beta, particularly on data frequency, estimation window, reference index and levering?	17
<b>Q7:</b> Do stakeholders agree with the view that the beta for fixed and mobile operators should be equal, with the exception of the revenue share impact? Please justify your response.	17
<b>Q8:</b> Do stakeholders agree with the proposed revenue share adjustment for mobile operators?	17
<b>Q9:</b> Do stakeholders agree with the view that the beta for efficient operators should not be different from that of the actual Jordanian operators?	17
<b>Q10:</b> Do stakeholders agree with the approach of estimating the efficient level of gearing based on the gearing of international comparators? Please justify your response.	20
<b>Q11:</b> Do stakeholders agree with adopting a 2-year average to estimate the gearing? Please justify your response.	20
<b>Q12:</b> Do stakeholders agree with the use of debt indices to calculate the efficient cost of debt instead of using the operators' actual debt costs? Please justify your response.	27
<b>Q13:</b> Do stakeholders agree with the approach used in calculating the cost of embedded debt?	27
<b>Q14:</b> Do stakeholders agree with the approach used in calculating the cost of new	27



Consultation Question	Page
debt?	
<b>Q15:</b> Do stakeholders agree with calculation of the weights on the cost of new and embedded debt?	<b>27</b>
<b>Q16:</b> Do stakeholders agree with the use of mid-point of the WACC range as the final estimate? Please justify your response.	<b>29</b>

The TRC will post the comments of all parties on its web site. Interested parties will have an additional 15 days of the publishing date to provide input on any issues that are raised in the comments of other parties.

A party submitting material that it believes is confidential must identify such material separately. Parties may submit a response to the TRC that is confidential and, in that case, must provide another submission that will be posted on the TRC website. The TRC takes no responsibility for parties failing to provide and label such documents as instructed.

All communications with the TRC in connection with this Consultation Paper should be addressed as follows:

**CEO  
Telecommunications Regulatory Commission  
P.O. Box 850967  
Amman 11185  
Jordan  
Telephone: +962 6 550 11 20/6  
Facsimile: +962 6 586 36 41/2**

**Email: [WACC@trc.gov.jo](mailto:WACC@trc.gov.jo)**

Electronic submissions should be in Microsoft Word or Adobe Acrobat format.

**Note:**

This is a Public Consultation document. As such, the TRC notes that none of the text presented or comments made in this Consultation document necessarily will be contained in the final determination. Submissions received by the TRC as a result of this Public Consultation will provide valuable information in helping the TRC to develop its position, but the TRC is under no obligation to adopt the positions urged by any party or parties.