THE HASHEMITE KINGDOM OF JORDAN
TELECOMMUNICATIONS REGULATORY COMMISSION

REGULATORY DECISION
ON
THE WEIGHTED AVERAGE COST OF CAPITAL
FOR JORDANIAN TELECOM OPERATORS

Board of Commissioners Decision No. (1-3/2017) issued on 22 February 2017

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1 Introduction

On January 28th, 2008 TRC released its Determination (No. 5-4/2008) on the WACC Principles and the WACC calculations presented in this decision are consistent with these principles.

TRC originally published a consultation paper on 1 September 2016, requesting inputs from stakeholders on several consultation questions regarding the estimation of the WACC. Following formal responses to the public consultation paper, TRC conducted a workshop with all operators on 23 November 2016, presenting its approach to estimating the WACC for Jordanian telecom operators and providing its initial response to the operators' comments. TRC's full response to the operator comments and queries is set out in the Explanatory Memorandum published on 22 February 2017

Based upon the theory and principles discussed in the document above, TRC has estimated the input parameters as well as the final WACC for efficient fixed and mobile operators in Jordan.

In this final decision, TRC provides its final estimates of the WACC for efficient fixed and mobile operators in Jordan.

For each input parameter (the risk free rate (1), equity risk premium (2), beta (3), cost of debt (4) and gearing (5)), this decision sets out the methodology to calculate the final estimate. The results on input parameters are then used to obtain the WACC estimates.

2 Definitions

Risk-free rate	The rate required by investors to compensate them for investing in a risk-free investment, whose returns exhibit zero co-movement with the market.
Equity risk premium	The premium above the risk-free rate required by investors to invest in the market portfolio.
Beta	The degree of co-movement between an investment's returns and the returns of the market portfolio. This parameter captures the riskiness of an investment under the CAPM.
Cost of debt	The return required by investors for investing in the debt raised by a company or entity.
Gearing	The capital structure of an asset or company, defined as the debt divided by the sum of debt and equity.

3 Methodology for Estimating WACC

2.1 Overall Methodology

TRC hereunder sets regulated prices for a range of services provided by Jordanian telecoms operators. These regulated prices are an output of TRC's regulatory cost models, which calculate the cost of providing particular services, based on efficient operating and capital costs.

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.

The Capital Asset Pricing Model (CAPM) was adopted to estimate the cost of equity based on theory and in accordance with TRC Principles.[1] The CAPM has been the workhorse model in international telecoms and utility regulation, and is the approach prescribed by TRC's 2008 WACC Principles.

Under the CAPM, the cost of equity for a particular company or activity is calculated as follows:

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

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 its 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.

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

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.

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):

$$Cost\ of\ Debt = \%\ Embedded\ Debt * Cost\ of\ Embedded\ Debt + \%\ New\ Debt * Cost\ of\ New\ Debt$$

2.2 Total Market Return

The TRC hereunder estimates the TMR using long-run historical data on observed market returns. 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.[2] Table 3.1 shows the averages for the US over the period 1900 to 2015, both as an arithmetic mean and as a geometric mean.

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

Arithmetic mean	Geometric mean
8.3%	6.4%

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

The theoretical literature argues that the arithmetic mean 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 mean is considered to be appropriate. Therefore a TMR of 8.3% is adopted for a developed market.

2.3 The Risk Free Rate

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.[3] 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 mean	Geometric mean
2.5%	2.0%

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

The real risk-free rate obtained is 2.5% based on the arithmetic mean, consistent with the approach for the TMR.

[2] Dimson, Marsh, Staunton (2016), Credit Suisse Global Investment Return Sourcebook 2016, p 15.

[3] Dimson, Marsh, Staunton (2015, 2016), Credit Suisse Global Investment Return Sourcebooks, p 15.

2.4 Country Risk Premium

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. To estimate the CRP, the TRC has chosen to use Credit Default Swap (CDS) spreads from the CDS market.

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.[4] Jordan's current sovereign credit rating is B1, as rated by Moody's.[5] Since default spreads are not available for Jordan itself, Professor Damodaran uses the average default spread for the rating class B1.[6]

As the recent increase in the CRP estimate was, at least in part, 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. In line with this argument, the TRC uses the average default spread over the period 2011 to 2016, which is 3.9%.

The use of a five-year average places some probability on the scenario of return to strong Jordanian economic growth and less political instability within the region, as well as probability on the scenario of continued political instability.

2.5 Beta

To estimate the beta for comparators, TRC uses the local market in which the comparator is based as the reference index, uses daily data, a 2-year estimation window and the Miller formula for levering the beta.

The TRC estimates the beta for the fixed market based on the beta for Jordan Telecom Company, which is 0.50 as of 10 July 2013, the day before changes in the market led to a spike in beta estimates. 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 11 European comparators is 0.56, as shown below.

[4] Damodaran (2015), Equity Risk Premiums (ERP): Determinants, Estimation and Implications – The 2015 Edition, p. 58, 59.

[5] Moody's Website (2016), https://www.moodys.com/credit-ratings/Jordan-Government-of-credit-rating-600018522.

[6] 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.

Table 3.3
2Y Asset Beta of International Fixed Line Comparators

Fixed Operator	2Y Asset Beta	5Y Asset Beta
BT	0.74	0.70
TalkTalk	0.61	0.54
Sky	0.58	0.54
Colt	0.29	0.40
Telefonica	0.56	0.45
Deutsche Telekom	0.50	0.34
Belgacom	0.59	0.40
Telecom Italia	0.42	0.29
Orange	0.58	0.39
Iliad	0.73	0.42
Swisscom	0.50	0.31
Average	**0.56**	**0.43**

Source: Bloomberg

The TRC uses the 2-year average beta of international comparators as the upper bound for the beta estimate for efficient operators. The final range for the asset beta range for the efficient fixed operator is 0.50 to 0.56.

TRC considers that the beta for an efficient fixed operator is the same as that of an efficient mobile operator based on empirical evidence of regional comparators and the fact that the income elasticity of demand for mobile services has converged to that of fixed services in recent years, as mobile telecommunication has become more ubiquitous. As a consequence of this development, the two types of telecom services face a similarly inelastic demand and hence similar systematic risk.

The only additional factor to consider for the beta of Jordanian mobile operators is 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 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:

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

TRC calculates a multiplier of 1.6 using data on Jordanian operators' cost structure. This multiplier is applied to the asset beta estimate for the efficient fixed operator to calculate the beta for an efficient mobile operator. This approach results in a final range of 0.80 – 0.89 for the asset beta of efficient mobile operators in Jordan.

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.

2.6 Gearing

In order to estimate the gearing of an efficient fixed line operator, the TRC considers the gearing of European fixed line operators, shown below.

Table 3.4
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
Average	**33%**	**BBB/BBB+**

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

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.

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.

To calculate the gearing of an efficient mobile operator, TRC uses the average gearing of the European mobile operators used to estimate the betas, shown below.

Table 3.5
Asset Beta Estimates for Mobile Operators in Europe

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

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

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.

2.7 Cost of Debt

TRC calculates the cost of debt based on the weighted average of the cost of embedded debt and new debt

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.

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. Using the five-year nominal yield of the US telecoms index, the TRC estimates a nominal cost of embedded debt of 3.9%. Applying the average US inflation rate over this period of 1.7% and adding a country risk premium estimate of 3.9%,[7] the TRC estimates a real cost of embedded debt for efficient operators of 6.1%.

In order to calculate the cost of new debt, 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 has added the 6-month average debt spread of 1.7% to the risk-free rate estimate of 2.5%, plus a country risk premium of 3.9%, to calculate a cost of new debt for an efficient Jordanian operator of 8.1%.

The weights on the cost of embedded and new debt are determined as follows:

[7] The average US inflation over the five-year period is calculated using annual inflation reported by the World Bank from 2011 to 2015.

- Calculate asset lives: First calculate the average asset life in years for Jordanian operators, using information provided in the annual reports of each of the operators.
- Weight on new debt: Assuming a four-year regulatory period, one can then divide four by the average asset life, which is a proxy for the proportion of new debt that will have to be raised during the four-year regulatory period ahead?
- Weight on embedded debt: This is the difference between 100% and the weight on the cost of new debt.

Applying the above methodology, the TRC calculates a weight of 29% on the cost of new debt and 71% for the cost of embedded debt.

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 telecoms operator to be 6.7%.

4 WACC Estimates

The estimations of the WACC for efficient fixed and mobile activities are presented as in Table 4.6. 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 4.6
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%	*Calc.*
CRP	3.9%	3.9%	3.9%	3.9%	5-year 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	*Calc.*
Cost of Equity (Real, post-tax)	10.7%	11.2%	13.2%	14.0%	*Calc.*
Cost of Debt (Real, pre-tax)	6.7%	6.7%	6.7%	6.7%	Benchmarked on cost of debt index + country risk premium
WACC (Real, pre-tax)	11.7%	12.1%	14.0%	14.7%	*Calc.*
WACC (Real, vanilla)	9.4%	9.7%	11.1%	11.6%	*Calc.*

The TRC hereby estimates a real pre-tax WACC of 11.7% to 12.1% for an efficient fixed line operator in Jordan and 14.0% to 14.7% 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.

Taking the mid-point of the range for each type of network, the average of low and high values are:

- a real pre-tax WACC of 11.9% is estimated for an efficient fixed line Jordanian operator.
- a real pre-tax WACC of 14.3% is estimated for an efficient mobile Jordanian operator.