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Workshop notes

Overview of Cost of Capital for State Owned Enterprises

August 2012

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Economics Consulting in Utilities and Infrastructure

slEconomics is a boutique economics consulting firm providing specialised advice to governments, regulators and corporate clients in the area of utilities and infrastructure. We are based in Sydney Australia and have an international network of associates to bring global experience to local initiatives.

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Introduction: Session 1

- The aim of this presentation is to provide a high level overview of the cost of capital within the context of regulated state owned enterprises within South Africa.
- In doing so, our discussion primarily focuses on the broad determinants of the cost of capital – albeit with some use of benchmark data to illustrate discussion points.
- *An overview of selected issues related to methodology and estimation techniques used in calculation of the regulatory cost of capital is provided in a companion presentation to this workshop document.*

Outline of presentation	
1.	**Risk, return and the cost of capital**
2.	**Determinants of the cost of capital**
2.1	**Key determinants - cost of debt**
2.2	**Key determinants - cost of equity**

Risk , return, and the cost of capital

- Generally speaking, the cost of capital can be defined as the *expected* rate of return that investors require based on alternative risk / return investment opportunities.
- This fundamental relationship of risk and return provides that the market based cost of capital will vary across investments according to the comparative risk profile of *that investment*.
- With this in mind, it is general practice to adjust for risk when estimating the cost of capital applying to a particular business or industry sector.

A few questions to consider when looking at regulated state owned enterprises:

- Are regulated state owned utilities risky (i.e. financial return to shareholder, social return to constituents)?
- Is the cost of capital *inherently* less for a state owned enterprise than for the private sector? What caveats might apply?
- Are fundamental principles of risk / return as relevant to state owned enterprises as private sector investment?
  - Do enterprise and/or sector risk characteristics matter? E.g. Does the risk adjusted cost of capital vary across different state owned enterprises?

Risk and return as applied to state owned enterprises

- Return on public sector investment (whether looking at pure financial metrics or benefits achieved from social programmes is inherently uncertain.
  - Regulated utilities earnings can be highly volatile (e.g. Eskom 2009, ACSA 2011).
  - NB. Similarly, one cannot know the outcome of a given social program at the time of allocating funds.
- We appreciate that there is the view that state owned enterprises may not require the risk adjusted commercial rate of return that a privately held enterprise would need, and that the social benefits provided negates the need for a direct financial return on government investment.
  - Indeed, one might look at the provision of social services or corporate social investment as providing a return on investment in terms of the benefits it confers to the community. In this case one might assess the notional return (perhaps with expected net benefits to the community as a proxy) as compared to alternative investments (e.g. investing in programmes providing the greatest benefit to constituents).
  - For sectors where the user pays principle applies the logic for comparing expected returns to risk adjusted (i.e. benchmarked) investment alternatives appears to us as even more persuasive.

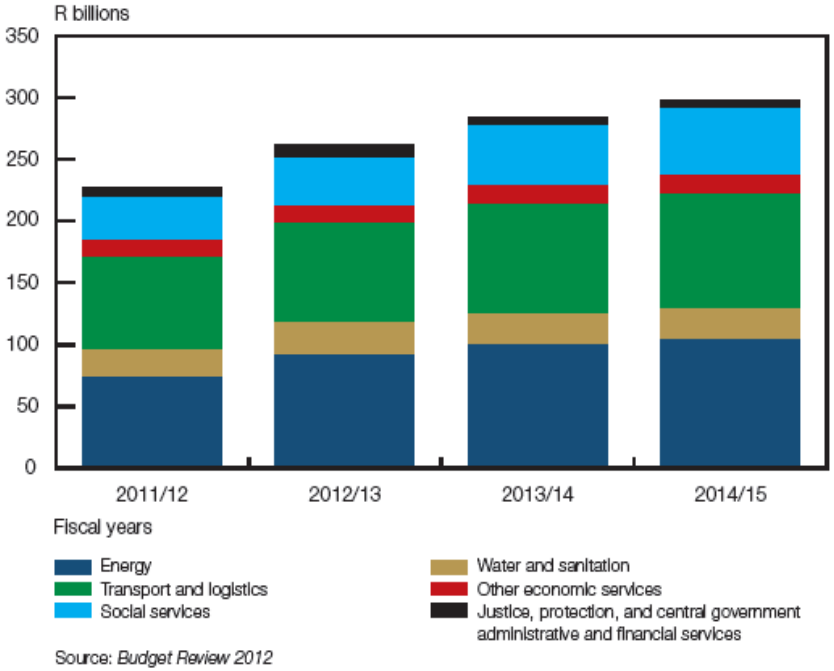
Opportunity cost of capital

- There is a school of thought that there is an underlying *opportunity cost of capital*, and investment choices are ideally made on the basis of a rate of return that reflects this cost. i.e.
  - **In a user pays environment** the cost of capital plays important **price signaling** roles, and **frees up scarce public funds** for other uses.
    - Indeed, the case can be made that applying a truly cost reflective cost of capital is of greater importance for state owned enterprises than for private sector investment as they may not have the full range of market signals (i.e. investment constraints) that a private sector enterprise would have in making investment decisions. For example:
      - *For services provided on a user pays basis* investment in new capacity should be aligned to consumers' 'willingness to pay' for the costs of the additional services provided.
      - Similarly, where the regulated cost of capital is less than its true opportunity cost that service becomes underpriced and consumers naturally demand more (i.e. greater capacity) than they otherwise would have under more cost reflective pricing.
    - For state owned enterprises acting within a user pays environment, return on investment frees up scarce funds for those areas where government policy is to provide direct subsidies (e.g. health, education, welfare, etc)

Implications for pubic sector infrastructure investment

- With South Africa' s budgeted public sector infrastructure spending of roughly R845 billion from 2012/13 to 2014/15 and some R3,2 trillion worth of large-scale projects under consideration or in progress* the rate of return has important implications for funding and investment of public sector infrastructure.

Public-sector infrastructure expenditure by function



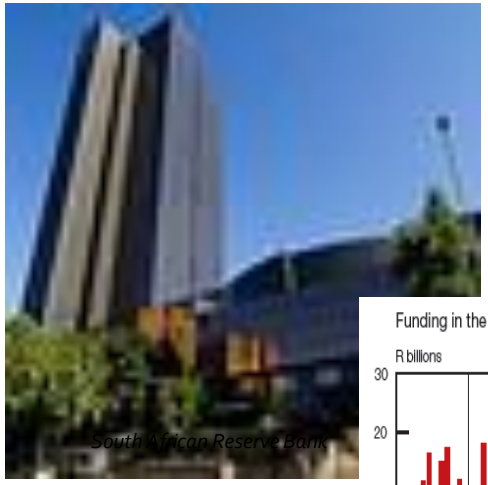
Source: *Budget Review 2012*

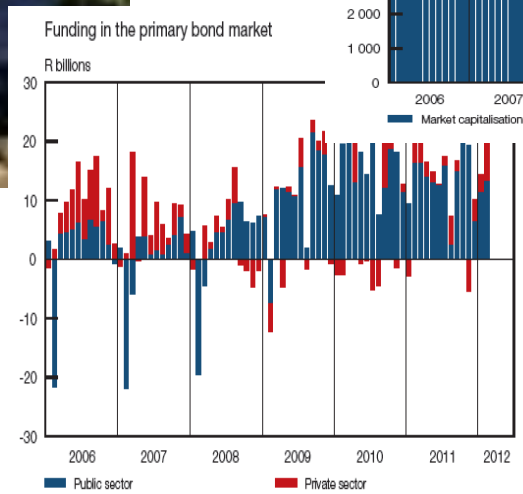
Government borrowings (R billion)	2011/12	2012/13	2013/14	2014/15
Public sector borrowing requirement	213,9	235,1	225,3	200,8
General government borrowing	145,7	158,2	147,8	126,7
Non-financial public enterprises	68,2	75,9	77,6	74,1

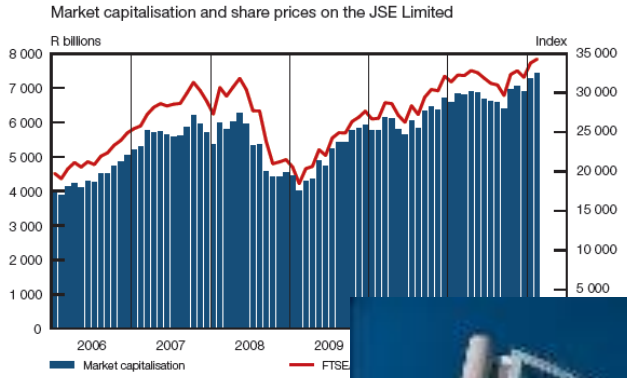
Borrowings for public sector enterprises represents a significant proportion of total public sector requirements and has a measurable impact on the sovereign rating and cost of borrowings.

** Source: South African Reserve Bank, Quarterly Bulletin March 2012*

Determinants of the cost of capital







The Weighted Average Cost of Capital

- It is general practice to calculate a firm's cost of capital by reference to its risk adjusted cost of debt and equity — i.e. its **Weighted Average Cost of Capital (WACC).**
- The cost of capital is calculated as a weighted average having regard to the relative proportions of debt and equity maintained by the business in its overall capital structure (and associated tax implications).

Leaving aside important aspects of tax for the moment, the weighted average cost of capital is:*

(Cost of debt (%) x Proportion of debt to total capital (%)) + (Cost of equity (%) x Proportion of equity to total capital (%))

<u>Questions</u>

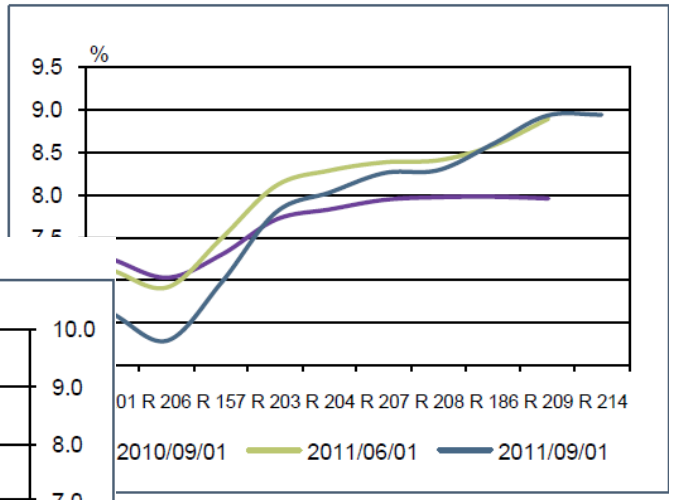
•Why does the cost of debt and equity differ?

•Does the difference remain when looking at state owned enterprises?

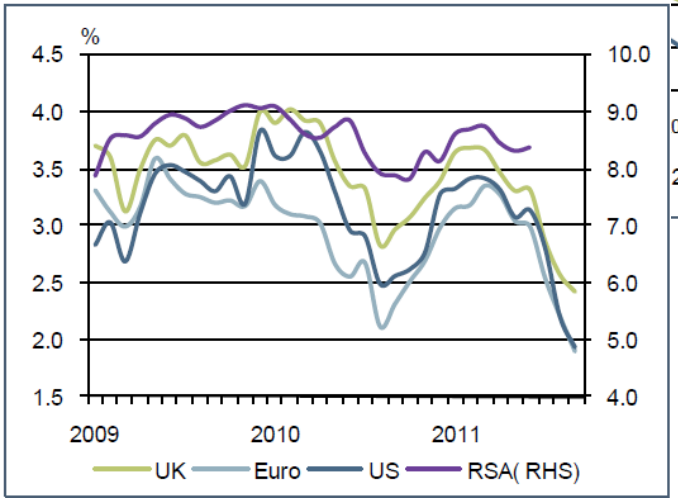
* Please see our companion dcument to this presentation for an overview of how tax is accounted for in the WACC .

The cost of debt

Government yield curve



10-year Benchmark yield movements



Key determinants of the cost of debt

- Without meaning to understate the complexities of debt markets and the many forms of debt instruments used in practice by a large public enterprise – from a conceptual standpoint the cost of debt is often broken down to two basic components:

The cost of debt = risk free rate + debt premium

- Viewed this way one could think of a **company's cost of debt as a premium on the domestic government bond rate**.* The company debt premium is determined by factors such as:
  - the issuer's credit rating;
  - whether debt is guaranteed by the sovereign;
  - whether denominated in local or foreign currency (e.g. sovereign risk, hedging costs, etc);
  - the amount of debt required (liquidity premium);
  - the severity of covenants agreed;
  - the maturity of the debt;
  - etc.

<u>In regard to the first two factors above</u>

- What determines the credit rating for regulated utilities?
- Are government guarantees cost free?

* The term 'risk free' is a relative measure where for practical purposes government bond rates are often the most risk free asset class available to investors. Of course, even government bonds carry risk as seen in global capital markets .

Credit ratings for regulated utilities

- Moody's provides its approach to rating regulated utilities in which it sets out the following 4 key rating factor and weighting in its assessment as shown below.*
- While this methodology applies most directly to private sector utilities, it indicates the basis for setting a *stand alone* credit rating for state owned enterprises. **(NB**. Moody's assesses Eskom's implied credit rating in the document cited here).

Moody's Rating Factor Weighting - Regulated Utilities

Broad Rating Factors	Weighting
Regulatory Framework	25%
Ability to Recover Costs and Earn Returns	25%
Diversification	10%
Financial Strength, Liquidity and Key Financial Metrics	40%

Factors cited by Moody's

- Predictability of regulatory decision making; the level of political intervention in the regulatory process, and the strength of the regulator's authority over regulatory issues.
- Supportive regulatory environments and cost recovery mechanisms.
- Historic and projected financial performance as assessed by standard credit metrics.

** Source: Moody's Rating Methodology, Regulated Electric and Gas Utilities August 2009*

Credit rating metrics

- On a stand alone basis, credit ratings agencies such as Moody's apply up to a 40% weighting financial strength and liquidity as measured by standard financial ratios.
- Moody's rating methodology for regulated utilities presents a mapping of key financial ratios to implied credit rating that provides a good example of key metrics and associated threshold values.

Moody's Key Financial Metrics*

	Aaa	Aa	A	Baa	Ba	B
CFO pre-WC + Interest/Interest	> 8.0x	6.0x - 8.0x	4.5x - 6.0x	2.7x - 4.5x	1.5x - 2.7x	< 1.5x
CFO pre-WC/ Debt	> 40%	30% - 40%	22% - 30%	13% - 22%	5% - 13%	< 5%
CFO pre-WC - Dividends/ Debt	> 35%	25% - 35%	17% - 25%	9% - 17%	0% - 9%	< 0%
Debt/ Capitalization	< 25%	25% - 35%	35% - 45%	45% - 55%	55% - 65%	> 65%
Debt/RAV	< 30%	30% – 45%	45% - 60%	60% - 75%	75% - 90%	> 90%

Source: Adapted from Moody's Rating Methodology, Regulated Electric and Gas Utilities August 2009

**Please see our annexure for definitions of Moody's credit metrics*

Government guarantees and the cost of debt

Theory

- Government guarantees can support the amount of borrowings a state owned corporation is able to source and the yield required by debt providers.
- However, a government's cost of capital is not independent on the level of support provided to state owned enterprises in the form of **direct guarantees** and/or associated **contingent liabilities**.
  - For example, where government is either **legally obligated** to service the debt of a wholly-owned entity in the case of default – or there is a **strong expectation** of the same by debt providers – the availability of funds is reduced and the cost is greater than it otherwise would have been

And practice

- The relevance of contingent liabilities is illustrated by recent actions pertaining to SANRAL, whereby in an affidavit to the Constitutional Court of South Africa (21 May 2012) the Minister for Finance stated that if SANRAL was to default on its outstanding loans there would be:
  - "considerable risk of negative consequences for the South African Government's capacity to raise funds from capital markets. The credit rating of SANRAL in the money markets will in the first instance be severely affected , since it raises money by issuing bonds. The **credit rating of South Africa would also be impacted** on negatively, since SANRAL is a wholly government-owned. entity and its standing affects the Government's standing." (emphasis added)

The cost of equity

Stock Exchange Building

Equity returns and risk

- Equity securities are substantively different from debt securities:
  - Debt securities (e.g. bonds) in their 'vanilla form'* provide a legal contract inclusive of a **fixed payment in terms of principal and interest** as specified on issuance.
  - Equity securities (e.g. shares) are a **claim on the *current and future* earnings and assets** of an entity (which in the long run can be thought of as the stream of future dividends).
- Some practical implications being that:
  - Bond holding enjoys limited downside risk so long as debt is not defaulted on, but does not enjoy the upside obtained by equity holders when an investment (e.g. company) does better than expected.
  - In its 'vanilla form' equity holders are not provided security over its the initial investment (NB. the security pertains to the stream of future earnings – not invested capital)
    - I.e. the stream of future earnings is not contractually quantified .

** We refer to 'vanilla forms' of debt and equity securities as in practice there are numerous hybrid instruments that mix various characteristics of debt an equity.*

Determinants of the the cost of equity

- There is a deep body of literature in regard to theory of equity returns, and there are a number of ways in which to estimate the cost of equity for a give investment or firm (e.g. **Dividend Growth Model; Arbitrage Pricing Model; Fama French 3 factor Model; Capital Asset Pricing Model, mufti-factor model**).
  - While it would be an overstatement to conclude that there is a consensus view on approach - the Capital Asset Pricing Model (CAPM) is used extensively by financial markets practitioners and regulators in estimation of the risk adjusted expected return on (or cost of) equity.
  - The CAPM is based on the premise that investors are able to diversify across investments such that they receive a basic rate of return (risk free rate) plus a risk premium which accounts for any 'non-diversifiable' risk that they take on for a given investment. The standard form of the CAPM is:

Return on equity = Risk Free Rate + ße * Market Risk Premium

- Where the:
  - **Risk Free Rate** is typically defined the same as for the cost of debt.
  - **Market Risk Premium** (MRP) is the premium above the risk free rate attached to equity returns.
  - **ße,** (the equity beta) measures the correlation between the asset's risk to that of the overall market.

- Without debating the pros and cons of the CAPM (of which we support) it provides us with a conceptual starting point for the purposes of this discussion.

The equity risk premium

- The equity risk premium – or equivalently referred to as the Market Risk Premium (MRP) is the difference between the market return on a broad based portfolio and risk free rate of return. i.e.
  - It is the return in addition to the risk free rate that investors demand to hold a market portfolio of risky assets.
  - Intuitively speaking, it represents the premium which equity investors require in order to invest in (higher risk) equity rather than (lower risk) government bonds.

- There are well respected published estimates of the MRP for RSA and other countries covering over 100 years of actual returns; as well as survey data and implied market values .
  - We have taken one set of results provided by the London Business School to illustrate the values one gets when using historical data, and as compared to countries such as the UK and US. (Please see our annexure for a brief discussion of estimation methodology.)

Equity (market) risk premium relative to bonds: selected countries 1900-2010

Country	Geometric mean	Arithmetic mean	Min	Year	Max	Year
South Africa	5.5%	7.2%	-34.3%	2008	70.9%	1979
United Kingdom	3.9%	5.2%	-38.4%	2008	80.8%	1975
United States	4.4%	6.4%	-50.1%	2008	57.2%	1933

Source: Dimson, Marsh and Staunton, London Business School 19 July 2011 (Revised: 7 October 2011).

Relative risk and cost of equity for a regulated utility

- Under the CAPM, the equity beta (βe) is a measure of the systematic (i.e. non-diversifiable) risk of a particular investment ***relative to a diversified portfolio of assets*** (with stock market indexes typically used as a proxy for a diversified portfolio).
- A practical implication of the CAPM is that a βe of more than one would imply that a firm has a higher level of systematic risk (i.e. is relatively more risky) than the market average, and if less than one is relatively less risky than the market average.

- While estimated values are often debated, the CAPM and concept of the equity beta is often utilised in estimating relative risk and cost of equity for regulated utilities:
  - Empirical research indicates that **regulated utilities generally demonstrate non-diversifiable risk** and in a CAPM framework require a premium to the risk free rate of return (i.e. government bonds).
  - However, direct estimation techniques require observable movements in share prices which are not available for state owned enterprises (i.e. not listed). In this case practitioners often use comparator firms that are considered to have similar (relative) risk characteristics to a state owned enterprise.
  - Similar regulatory frameworks would be one key factor that one would ideally focus on in benchmarking beta values for a state owned enterprises..

The impact of gearing on the equity beta

- **As gearing increases, so does the level of risk to equity holders** (i.e an implication of the Modigliani-Miller theorem). This is accounted for in the levered Equity Beta.
- When benchmarking betas from proxy companies that have various levels of gearing it is common to first adjust to the delevered Asset Beta, and then relever at the relevant level of gearing for the regulated utility to get the levered Equity Beta.
- This also takes into consideration tax rates and the implied tax shield, and impact on return on equity when applying as part of a CAPM approach.
- One often used transformation approach is as specified in the Hamada Equation shown below.

Equity Beta = Asset Beta of proxy companies x [1 + (1- tax rate) (Debt/Equity)]

- A worked example is shown below using the parameters specified by NERSA in its MYPD 2 decision.

Equity beta = 0.489 x [1 + (1-0.28)(0.60/0.40)] = 1.01 :

Asset beta = 0.489
Tax rate = 0.28
Debt = 0.60
Equity = 0.40

Illustrative equity and asset beta values

Industry	Number of Firms	Average Equity Beta	Average Asset Beta
Air Transport	36	1.21	1.02
Biotechnology	158	1.03	0.91
Building Materials	45	1.50	0.82
Coal	20	1.53	1.22
Electric Util. (Central)	21	0.75	0.47
Electric Utility (East)	21	0.70	0.48
Electric Utility (West)	14	0.75	0.47
Engineering & Const	25	1.22	1.12
Homebuilding	23	1.45	0.74
Maritime	52	1.40	0.53
Metals & Mining (Div.)	73	1.33	1.18
Natural Gas Utility	22	0.66	0.45
Petroleum	20	1.18	1.04
Petroleum (Producing)	176	1.34	1.10
Precious Metals	84	1.15	1.07
Railroad	12	1.44	1.21
Restaurant	63	1.27	1.15
Retail (Hardlines)	75	1.77	1.49
Retail Automotive	20	1.37	1.09
Steel	32	1.68	1.23
Telecom. Utility	25	0.88	0.52
Water Utility	11	0.66	0.43
Wireless Networking	57	1.27	1.03

Source: Table adapted from Damodaran Online using data from ValueLIne as of 2012

- The table across illustrates estimated equity and asset betas for a cross- section of US industries. A couple of points that we would like to highlight by way of this research is that:
  - Whether looking at asset or equity betas one can see that industries such as coal; metals and mining; rail; retail; and steel are relatively more affected by movements in the market portfolio (i.e. have higher beta values) than industries such as utilities.
  - The asset betas for electric utilities of 0.47 and 0.48 are coincidently almost identical to the values used by NERSA for MYPD 2 – although the equity betas calculated here are considerably smaller than NERSA's Equity beta of 1.01. The difference in equity betas in this case is primarily due to the average gearing of the US sample of electric utilities (as of January 2012) being considerably less than that assumed for MYPD 2, which was set at 60% debt and 40% equity.
- One should be careful in comparing levered equity betas across firm with different levels of gearing!

Practical implications of the return on equity and financial viability

- The return on equity provides the opportunity for a **positive flow of earnings**. Without this component, revenues would just cover operating costs and debt finance costs, and there would be no ability for the shareholder to reinvest equity returns for the financing of capital additions.

- There is also a **flow-on effect to debt financing** of capital expenditures as well, as capital markets will not generally provide debt funding to a firm that can only meet operating and debt finance costs.

  - i.e. There must be some expectation of a return on equity so as to provide a cushion and off-set any possible adverse financial outcomes that could develop for a period of time potentially leading to default on borrowings.

  - Within the context of stand alone credit ratings an interest coverage ratio of 1 is roughly equivalent to the situation of just covering operating and debt finance costs. To place this in perspective, Moody's would look for an interest coverage ratio of at least 2.7 for the lowest investment grade rating .

- **Ultimately, the return on equity is a key determinant in attracting capital .**

  - Few, if any governments have the ability to perpetually fund highly capital intensive industries such a electricity, transport and water. Inadequate returns to state enterprises serve to intensify government funding constraints and are difficult to sustainable in the long run.

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