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Regulated rates of return

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Introduction

- How does a trailing average estimate of the cost of debt and equity capital impact on risks and investment incentives?

- Lower risk and correct investment incentives are consistent with lower cost, reliable energy supply.
  - If risks increase, higher cost of capital could lead to low investment or high prices.
  - If incentives are distorted, we could observe *too little* investment (leading to lower reliability) or *too much* investment (leading to higher prices) or a switch from *capital to operating costs* (leading to higher prices).

- Analysis is independent of the specification of the benchmark.
  - No imprecision in the measurement of the benchmark.
  - No term structure.
  - The benchmark debate concerns the level of the return, not the impact of a trailing average versus prevailing cost of funds approach.

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Method

- Simulate monthly cost of debt and equity capital 10,000 times over:
  - 10 years prior to the determination; and
  - Expectations of those returns for 100 years subsequent to the determination.
  - Equity value at the determination will be determined by expectations for the cost of capital and regulated returns in the future.

- Returns:
  - Risk-free rate is mean-reverting to 6.0%.
  - Debt risk premium is inversely related to the risk-free rate and averages 2.6%.
  - Equity risk premium moves in line with the debt risk premium and averages 6.0%.

- Risk metrics:
  - Return on equity
  - Change in equity value
  - Total returns = return on equity + change in equity value

- Incentive metrics:
  - Difference between regulated return and the prevailing WACC.
  - How long before returns expected to converge to within 0.5%?
  - What is the average difference in returns when outside ±0.5%.

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Descriptive statistics

- Dispersion of returns for both debt and equity falls by:
  - 18% if a 5-year trailing average is computed; and
  - 40% if a 10-year trailing average is computed.
- For the cost of equity (mean = 12%), standard deviations are:
  - Of the prevailing cost of funds: 4.5%
  - As a 5-year trailing average: 3.6%
  - As a 10-year trailing average: 2.7%
- For the cost of debt (mean = 8.6%), standard deviations are:
  - Of the prevailing cost of funds: 4.3%
  - As a 5-year trailing average: 3.5%
  - As a 10-year trailing average: 2.6%.
- This occurs because the cost of capital *is* variable, not because the *measurement* is imprecise.
- We know that adopting a trailing average approach to regulated returns will lead to less dispersion of potential prices.
- The issue is, how will this alter risks and incentives?

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Divergence between prevailing cost of debt and trailing average

- Material divergence between the trailing average cost of debt and the prevailing cost of funds. Standard deviations of:
  - 3.0% for 5 year average; and
  - 3.4% for 10 year average.
- The firm is concerned with tracking error. How closely can the firm align its borrowing costs with the debt component of the regulated return?
- If the firm goes to the market once per year instead of every month, what is the risk? The standard deviation of the average returns difference is:
  - Over 5 years: Total cost of debt 0.4%; Debt risk premium 0.2%
  - Over 10 years: Total cost of debt 0.3%; Debt risk premium 0.1%

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Specifications of regulated returns and borrowing

1. Debt & equity set at prevailing cost of funds. Hedging feasible.
2. Debt set at 5-yr trailing average. Firm borrows over 5 years.
3. Debt set at 10-yr trailing average. Firm borrows over 10 years.
4. Debt & equity set at 5-yr trailing average. Firm borrows over 5 yrs.
5. Debt & equity set at 10-yr trailing average. Firm borrows over 10 yrs.
6. Debt & equity set at prevailing cost of funds. Firm borrows over 5 yrs.
7. Debt & equity set at prevailing cost of funds. Firm borrows over 10 yrs.

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Cash flow risk – return on equity (%)

- Infeasible to consider that a single-asset business would finance over time and not hedge against risk in the regulated return (Specifications 6 & 7).
  - If a firm borrows over 5 years, the standard deviation of return on equity is 6.9%. Over 10 yrs it is 7.7%.
- Cash flow risks are the same regardless of whether the debt component is:
  - The prevailing cost of debt, and the firm can lock in finance at this rate (Specification 1); or
  - A trailing average, and the firm borrows over the same time period (Specifications 2 & 3).
  - Standard deviation is 4.5%.
- Cash flow volatility reduces when a trailing average is applied to both debt and equity (Specifications 4 & 5).
  - Standard deviation falls to 3.6% for 10 years and 2.7% for 5 years.

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Value risk – change in equity value (%)

- Value is determined by the present value of expected cash flows. It will reflect the prevailing cost of funds and expectations for future discount rates.
- Smoothing the cash flow profile with a trailing average increases exposure to changing discount rates.
- Value risk is zero when:
  - Regulated return is prevailing cost of funds and the firm can match the borrowing rate (spec. 1);
- Value risk is small when:
  - Debt component is a trailing average and the firm borrows over time (spec. 2 & 3)
  - Standard deviation is 1.4%
- Value risk is large when:
  - Equity component is a trailing average (spec. 4 & 5).
    Standard deviations of 9.3 & 11.3%; or
  - Regulated return is the prevailing cost of funds and the firm borrows over time (spec. 6 & 7).
    Standard deviations of 9.6% and 11.4%.

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Total risk – Total return to equity (%)

- Value risk is minimised when:
    - Regulated return is prevailing cost of funds and the firm can match the borrowing rate (spec. 1).
    - Standard deviation is 4.5%.

- Small incremental increase in total risk when:
    - Debt component is a trailing average and the firm borrows over time (spec. 2 & 3)
    - Standard deviation is 4.9%.

- Large incremental increase in risk when:
    - Equity component is a trailing average (specifications 4 & 5).
    - Standard deviations of 11.2% and 12.5%.

- Very large incremental increase in risk when:
    - Regulated return is prevailing cost of funds and the firm borrows over time (specifications 6 & 7).
    - Standard deviations of 15.1% and 17.7%.

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Incentive implications

- Lower volatility of the regulated rate of returns will distort investment incentives.
- Even if the only objective is reliable energy supply, firms will alter project selection amongst alternatives to maximise net present value.
- Difference between regulated return and WACC is material:
  – Applied to debt, standard deviation of 1.3 – 1.4%.
  – Applied to equity, standard deviation of 2.5 – 2.9%.
- Expected time before convergence is material.
  – Applied to debt:
    - 62 – 69% of cases with difference >0.5%
    - Extending for 1.0 – 1.2 periods with
    - Average difference of 1.3 – 1.4%.
  – Applied to equity:
    - 80 – 85% of cases with difference >0.5%
    - Extending for 1.1 – 1.3 periods with
    - Average difference of 2.2 – 2.3%.

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Conclusion

- **Under the prevailing cost of funds approach:**
  - In the absence of refinancing risk, current approach minimises volatility of equity returns and does not distort incentives.
  - If the firm borrows over a prior period, risks are substantial.
  - Clear incentive for the firm to borrow and hedge in a manner consistent with the debt component of the regulated return.
  - Arguable that a business comprised of a large, single asset will find this challenging.

- **If the debt component of the regulated return is set as a trailing average:**
  - Small increase in volatility of returns to equity holders: Same cash flow risk but more risk of capital loss.
  - Investment incentives are distorted. In one third of cases, difference between WACC and regulated return of >1.3%.

- **If the trailing average is extended to the equity component:**
  - Equity risks increase substantially. Cash flow risk is minimised but more than offset by large increase in volatility of equity values.
  - Distortions to incentives increase substantially. In one third of cases, difference between WACC and regulated return >2.5%.

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Conclusion

- Internal consistency of debt and equity components:
  - At first glance, conceptual appeal to applying a consistent, trailing average approach to debt and equity components.
  - This only makes sense if the rationale is purely to provide a pass-through of returns on past investments.
  - Regulation is designed to encourage firms to make investments at each point in time which guarantee reliable energy supply.
  - If a trailing average is applied to equity, the risks to equity holders increase and there are more incentive distortions.
  - Neither of these outcomes will encourage investment in reliable energy supply.

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Conclusion

- If there is substantial risk to some firms (in particular large, single-asset firms) associated with attempting to match borrowing costs with the prevailing cost of funds, then a trailing average approach to debt has merit.
- Otherwise, the regulatory framework itself would influence the size and asset mix of firms. There may be other industry reasons why different sorts of firms succeed and others fail. But the form of regulation should not determine the industry composition.
- However, if incentive effects are not accounted for, there is sufficient divergence between regulated returns and the cost of capital to distort investment decisions.

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