Determining the risk free rate for regulated companies

Comments on paper by Associate Professor Lally

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1 Introduction

In his paper written for the ACCC[1], Associate Professor Martin Lally argues that the appropriate practice for setting the risk free rate under the Capital Asset Pricing Model (CAPM) is to match the maturity of the bond rate used to estimate the risk free rate with the duration of the regulatory period in question.

In this paper we analyse this assertion, from a number of perspectives:

- the role of capital structure in business finance;
- standard practice in relation to debt maturity in commercial settings;
- the implications of regulation;
- the impact of relaxing some of the assumptions made by Associate Professor Lally; and
- more generally an appropriate test for determining bond maturity in regulated settings.

2 Role of capital structure

The appropriate capital structure of a company is a determination that every company must make. When the company's management makes the capital structure decision, it should seek to maximise the value of the firm with its choice. That is, it should seek the best possible (i.e., optimal) capital structure for the company. In addition to the amount of debt and equity, the company will need to decide on the structure of its debt capital. One of the most important

[1] M. Lally, Determining the Risk Free Rate for Regulated Companies, School of Economics and Finance, Victoria University of Wellington, August 2002.

decisions on the structure of debt capital is the maturity of the debt, i.e., how long until the debt has to be repaid. To a large degree, management of capital structure is a process of risk management for the company with an important component of the risk being related to interest rates.

In a given situation there are a number of considerations that will affect the choice of maturity. These include the company's competitive environment, the timing and variability of the company's operating costs, future expectations concerning the company's operations and, in particular, the structure and useful lives of the company's assets.

3 Debt maturity in a competitive environment

In a competitive environment, a company investing in long-lived assets such as plant and equipment will generally finance those assets with debt of maturities similar to the life of the assets. This allows the company to service its debt from the revenue generated by the assets without being exposed to uncertainty about the interest rate that it faces on its debt. While both the assets and debt will generally have some potential to be liquidated before maturity, it is normally the intention of management to keep both in place through to the end of their lives. The firm may have short-term debt for a number of reasons including to provide flexibility, but this does not invalidate the observation that the maturity of the major part of debt generally approximates the life of the company's assets.

That this is common practice can be easily seen. Mortgage financing of commercial buildings typically provides this concordance of maturities.[2] Financial leases also inherently follow this rule.

Brigham and Gapenski discuss the maturity issue and conclude as follows:[3]

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[2] Debt maturities seldom extend beyond 30 years, while the life of a building may exceed that substantially. But mortgage financing is usually as long lived as is available, and that is usually 30 years.

> "**For all these reasons, the best all-around financing strategy is to match debt maturities with asset maturities.** In recognition of this fact, firms generally do place great emphasis on maturity matching, and this factor often dominates the debt portion of the financing decision." (emphasis is in the original text)

Ross, Westerfield and Jaffe make the same point and emphasise the issue of interest rate risk:[4]

> Firms may also hedge interest-rate risk by matching liabilities with assets. This ability to hedge follows from our discussion of duration.

Shapiro and Balbirer make a similar point: [5]

> As a time-honored guide to setting financial policy, the matching strategy is based on the idea that firms should match the maturity of the fund source with the maturity of the asset being financed.

4 Effect of regulation on optimal bond maturity

Against the consideration of standard business practice, it is necessary to consider whether the impact of regulation alters a company's choice of optimal debt maturity, as implied by Associate Professor Lally.

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3 E. Brigham and L. Gapenski, Intermediate Financial Management (5th ed), 1996 (The Dryden Press, Fort Worth), p 544.

4 S. Ross, R. Westerfield and J. Jaffe, Corporate Finance (5th ed.), 1999 (Irwin/McGraw-Hill), p 666.

5 A. Shapiro and S. Balbirer, Modern Corporate Finance, 2000 (Prentice-Hall, Upper Saddle River, New Jersey), p 84.

Associate Professor Lally assumes a regulatory environment where "the only source of uncertainty is in future real interest rates."[6] In his example, it is optimal for the business to finance its debt based on maturity equivalent to the duration of the regulatory period (i.e., one year). By structuring its debt on this basis, the *ex-ante* value of future cashflows to the business matches the initial capital investment. Structuring debt on another basis would result in higher debt financing costs to the business, assuming there is an upward sloping yield curve and the costs of debt re-issuance do not outweigh the savings in interest costs.[7]

In his example, because the optimal setting of debt maturity for the regulated company is to align with the regulatory cycle, it is appropriate for the regulator to set the maturity of the risk free rate in the CAPM and WACC to align with the regulatory cycle.

It is important to notice that the sequence should be from a regulatory structure to the optimal setting by the company. Once it is clear what is optimal for the company, then the setting of the maturity in estimating the WACC can be determined. In Associate Professor Lally's example it is the interest rate certainty over the period that drives the optimal decision on maturity of debt for the company, not the amount of the rate or how the rate is set. Then, given that in this environment the optimal decision for the firm is to fix maturity at the regulatory period, the regulator should also set the interest rate using the regulatory cycle.

However, the regulated environment described by Associate Professor Lally is extreme. Although he makes no attempt to relate his set of assumptions to an actual regulatory environment, at best it would be consistent with very strict rate of return regulation – in that businesses exactly earn the WACC set by the regulator. This is due to his assumptions that:

- output that will be sold is known with certainty;

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6 Ibid, p5.

7 Lally's analysis assumes there are no transactions costs of refinancing debt at each regulatory period. If these costs are large, the optimal refinancing period may change (be lengthened) even with Lally's other assumptions.

- there is no uncertainty over operating costs;
- there is no regulatory risk;[8] and
- the only risk facing the business is the impact of interest rate fluctuations on output prices.

However, his assumed regulatory arrangements ensure that the regulated entity is not exposed to interest rate risk given that changes in interest rates are used to adjust final product prices, ensuring that the business earns exactly the WACC.

5 Applicability of Lally's results to other regulatory settings

In his paper, Associate Professor Lally does not consider whether his assumptions are consistent with any extant form of regulation. In that sense, he makes no attempt to determine whether his analysis has any relevance to actual regulatory policy. As we note above, if his contrived assumptions can be extrapolated to any regulatory environment, it would be to a stringent form of rate of return regulation.

It is important to note that his results will generally not hold if his key assumptions are relaxed. In the remainder of this section, we will examine a few of his important assumptions.

Associate Professor Lally assumes there are minimal transactions costs to reissuing debt. However, as the ratio of the length of the regulatory period to the longest trading bond shortens, transactions costs will become increasingly important – even if all the other

8 Associate Professor Lally does not state this assumption, but it is necessary to his analysis. The regulated firm must have certainty that the regulatory regime will be stable for the life of the assets.

assumptions hold. Taken to its limit, his result implies that if the regulator were to set prices on a daily basis, then the appropriate policy for the business would be to structure debt based on the overnight rate, which is clearly absurd. This point can be illustrated with another analogy. A business would not be expected to structure its debt holdings based on the fact that investors review investments frequently, and in many cases on a daily basis. As noted by Hathaway:

> Imagine you were running a 10-year bond portfolio and every 30 days you valued that portfolio. You would go to the market and use the prevailing 10-year bond rate. You certainly would not use the prevailing short rate to value that bond portfolio. So the interest rate you use has got nothing to do with the review period; the rate you use is the rate consistent with the life of the asset and particularly the risk in your equity risk premium. Anything else gives you an inconsistency.[9]

An additional assumption is that operating costs are known with certainty. If uncertainty over costs and trade-offs between operating and capital expenditure are introduced the key result is unlikely to hold. Suppose that the business is considering undertaking capital expenditure on an asset with a life of 10 years, which is expected to reduce operating costs over that same 10-year period. The regulatory period is one year. When the investment decision is being made the most appropriate means of discounting the savings in operating costs 10 years into the future would be with a discount rate based on the 10-year bond, not a one-year bond corresponding to the length of the regulatory period. Setting the discount rate based on a one-year bond would distort the decision over whether to undertake the capital investment in the first place or continue to incur higher operating expenditure.

Similarly, where final demand is uncertain it can no longer be concluded that the *ex-ante* returns to the business will equal *ex-post* returns with certainty simply by structuring debt to mature at the expiry of the regulatory period.

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9 N. Hathaway, Transcript of Public Forum held by ACCC and ORG on the Weighted Average Cost of Capital in the Victorian Gas Access Arrangements, 3 July 1998, p80.

Contrary to the hypothetical regulatory environment illustrated by Associate Professor Lally, regulatory risk is a fact of life in most regulatory frameworks – a point widely accepted by regulators in Australia and stated in the recent Productivity Commission report on the National Access Regime:

> In seeking to reduce access prices that are inefficiently high, the ACCC must have regard to the following principles: (a) that the access prices…(ii) include a return on investment commensurate with the regulatory and commercial risks involved.[10]

Given that there may be a large number of regulatory reviews and changes in regulators over the life of an asset, an investor cannot be confident that the regulatory framework will be unchanging. Even if all of Associate Professor Lally's other assumptions are met, as the regulatory uncertainty increases, the business will be less willing to structure its debt based on the regulatory period and will rationally revert to standard commercial practice of matching debt maturity with asset life.

No regulatory environment in Australia currently looks like that described by Associate Professor Lally. Once we enter a world where investment in long-term assets is not a riskless activity it is critical to consider the opportunity cost of the investment and the fact that investors are financing a long-term investment for which the majority of the value is in future regulatory periods. In such an environment it hard to avoid the conclusion that it is best to adopt the standard commercial practice of matching the term of risk free rate with the life of the asset.

We have provided four different circumstances, consistent with regulatory environments in Australia, where Associate Professor Lally's result and conclusions will not hold. In our view, the onus of proof should now be on Associate Professor Lally to demonstrate that his results hold if his assumptions are relaxed to be consistent with an actual regulatory setting before they are used as part of any regulatory decision-making.

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10 Productivity Commission, Review of the National Access Regime, Inquiry Report No17, September 2002, p332.

6 Conclusion

In our opinion, the approach adopted by Associate Professor Lally is fundamentally flawed. His conclusions are valid under such a restrictive set of assumptions as to be meaningless.

Any regulator should set the bond maturity based on what is the optimal decision for the company given the regulatory environment it faces. In determining this optimal decision, what is needed for the benefit of both regulators and regulated companies is a test (or set of tests) of the regulatory environment that can be applied to a wide range of cases to determine if the environment is sufficiently structured to justify over-riding the normal commercial practice of matching debt maturity to the duration of assets.

The perspective should be to consider if the regulatory cycle imposes such a significant externality on the income producing flow of the assets that the regulatory cycle should become the maturity for a company's debt. Will the *ex ante* ROR closely approximate the *ex post* ROR on a consistent and predictable basis?

Associate Professor Lally has not demonstrated that his results can be applied beyond the restrictive and extreme regulatory environment he characterises. As a result his paper provides no justification for moving away from standard commercial practice of matching the term of the risk free rate with the life of assets.