

Follow-up to issues in relation to appropriate term of the allowed return on equity raised at the first Concurrent Evidence Session

Dinesh Kumareswaran

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1. Introduction

Two issues were raised during the first Concurrent Evidence Session (10 February 2022) that I was unable to explore properly with the other participants during the time available. This brief note outlines my thoughts on those issues, and invites other participants to respond to the matters raised herein, so that the AER Board may have the full benefit of the experts' views on the 'term' issue to assist their deliberations.

2. Should equity invested in a regulated asset be valued like a bond?

Dr Lally argues that the equity invested in a regulated asset should be valued in the same way as a bond maturing in N years, because the AER's task is to set the regulated cash flows over just the forthcoming N -year regulatory period.

The critical assumption that Dr Lally appears to make is that when setting allowances for any given regulatory period, the expected value of the firm at the end of the regulatory cycle is equal to the book value of the assets at that time (i.e., the depreciated RAB). That is, the payoffs over each regulatory period are assumed to be:

- The regulated cash flows over the regulatory period; plus
- The expected present value of the firm beyond the upcoming regulatory period, which is assumed to be equal to "the regulatory asset book value [at the end of the regulatory period], which is known now."¹

This allows Dr Lally to ignore any cash flows beyond the upcoming regulatory period, thus collapsing the valuation problem for a regulated firm to the exercise of valuing a five-year bond.

I say that, notwithstanding the periodic resetting of allowances by the regulator, the equity invested in a regulated asset should be valued like equity invested in any other firm. There is nothing special about the five-year resetting of allowed revenues that means equity in a regulated business should be valued differently to equity invested in any other business.

¹ Lally, M., *The appropriate term for the allowed cost of capital*, 9 April 2021, p. 19.

The cash flows to equity investors in a regulated asset are expected to occur over an indefinite horizon (i.e., the investment is viewed as a long-term investment)—just like the cash flows to equity in an unregulated asset. Therefore, equity-holders in regulated and unregulated assets value their assets by forecasting cash flows over the long-term and discounting those cash flows using a long-term discount rate.

Dr Lally essentially argues that in the case of a regulated firm, there is no need for the discount rate to reflect any cash flows beyond the forthcoming regulatory period because one can form an expectation of the value of the firm at the end of each regulatory period, which encapsulates the value of all cash flows that are expected to arise thereafter.

Why is this also not true for an unregulated firm? Specifically, why could an investor in an unregulated firm not:

- Pick some arbitrary future horizon—say the next five years;
- Determine the expected payoffs over that five-year horizon as:
 - The forecast net cash flows over the upcoming five years; plus
 - The expected value of the assets at the end of the next five years; and
- Value their investment by computing the present value of the expected payoffs over the next five years using a five-year discount rate?

As Dr Lally (2021, pp. 18-19) recognises, unregulated firms are not valued in this way. Rather, investors value unregulated firms by forecasting a set of cash flows out to infinity and then choosing a long-term (typically-10 year) discount rate to compute the expected present value of those cash flows.

To ensure that I have not misrepresented Dr Lally, I reproduce below verbatim his description of the valuation process for an unregulated firm:²

In conducting valuations of unregulated businesses, the set of future cash flows extends out to infinity. Typical practice in Australia is to use one cost of capital, rather than a cost of capital for each of these future cash flows. Denoting this singular cost of capital as k and the cash flows to be discounted as C_1 in the first year, C_2 in the second year etc, the value now (V_0) of the business is the expected cash flows discounted using k as follows:

² Lally, M., *The appropriate term for the allowed cost of capital*, 9 April 2021, pp. 18-19.

$$V_0 = \frac{E(C_1)}{1+k} + \frac{E(C_2)}{(1+k)^2} + \dots \quad (5)$$

The valuer's task is to choose the single discount rate k , from which the value V_0 then follows. The usual choice for that single discount rate typically embodies the ten-year risk-free rate because the cash flows extend to infinity and the ten-year risk-free rate is the longest available term in Australia.

Two questions arise from the analysis above. Since an investor in any unregulated firm could restrict their focus to the expected payoffs over just the next (arbitrarily chosen) N years by forming an expectation today of the value of the firm beyond year N :

- Should unregulated firms also be valued in the way Dr Lally considers regulated firms should be valued (i.e., by discounting the expected N -period payoffs using an N -year rate)?
- Alternatively, if it is appropriate to value unregulated firms using the method described in the excerpt from Dr Lally's report, why should regulated firms be valued any differently?

3. Consistency of reasoning in relation to the cost of equity and the cost of debt

Towards the end of the first Concurrent Evidence Session, I asked Dr Lally why he considers it appropriate for the discount rate used to value regulated cash flows to reflect a 10-year cost of debt if the use of a five-year regulatory period requires the use of a five-year cost of equity. On the face of it, this appears to be an inconsistency that requires explanation.

To recap Dr Lally's mathematical example, he considers an unregulated firm that exists for two regulatory periods (each lasting one year), and which has no opex, capex or tax obligations.

Dr Lally presents the following expression for the expected value of the firm at time 1:

$$V_1 = \frac{E(REV_2)}{1+k_{12}} = \frac{[A - DEP_1]k_1 + (A - DEP_1)}{1+k_{12}} = \frac{(A - DEP_1)(1+k_1)}{1+k_{12}}, \quad (1)$$

and the following expression for the value of the firm at time 0:

$$V_0 = \frac{E(REV_2) + E(V_1)}{1+k_{01}} = \frac{[Ak_0 + DEP_1] + E(V_1)}{1+k_{01}}. \quad (2)$$

For simplicity, Dr Lally's example focusses on a firm that is 100% equity-financed.

In a note dated 14 February 2022, Dr Lally modifies his numerical example to incorporate debt.³ In doing so, he defines V_0 and V_1 to be the value of equity (rather than the value of the whole firm) at time 0 and time 1, respectively. This allows Dr Lally's modified example to focus exclusively on the cash flows to equity holders.

Under this formulation, the cash flows in the numerator include (amongst other things) a cost of debt allowance, efficient interest payments and a regulatory allowance for debt repayments. Since the allowed return on debt is assumed to equal the interest payments of an efficient business, and since the allowance for the repayment of debt is assumed to match the efficient debt portion of the firm's RAB, all the cash flows related to debt (i.e., interest and principal) in the numerator cancel out, leaving just the cash flows to equity. Dr Lally then discounts these cash flows using the cost of equity to obtain the value of equity invested in the firm.

However, the question at hand is: why treat the return on debt differently to the return on equity? That question is not addressed by restricting the analysis to the valuation of equity alone. It is more instructive to treat V_0 and V_1 as enterprise values, rather than equity values, because in order for the NPV = 0 condition to be truly met, the expected value of the whole firm must equal the opening RAB.

Under that formulation:

- V_1 and V_0 (when defined as enterprise values) must be determined by discounting the regulatory cash flows using an appropriate Weighted Average Cost of Capital (not just the cost of equity) for each period—since the enterprise as a whole is financed using a combination of debt and equity; and
- The allowed rate of return in each regulatory period should reflect an allowed return on debt as well as an allowed return on equity (as per Dr Lally's modified example).

Assuming, as Dr Lally does in his modified example, that the regulator and the firm adopt the same efficient gearing level, G , the general expression for the value of the firm at time 1 may be written:

$$V_1 = \frac{(A - DEP_1)[1 + k_{e1}(1 - G) + k_{d1}G]}{1 + k_{e12}(1 - G) + k_{d12}G}, \quad (3)$$

where:

- k_{e1} and k_{d1} are the allowed return on equity and allowed return on debt, respectively, in regulatory period 2; and
- k_{e12} and k_{d12} are the cost of equity and cost of debt, respectively, adopted by the investor in regulatory period 2.

It is clear that if $k_{e1} = k_{e12}$, then $V_1 = A - DEP_1$ only if $k_{d1} = k_{d12}$.

³ Lally, M., *Expert session 1: further notes*, 14 February 2022.

If that holds, and once again assuming that the regulator and the firm adopt the same efficient gearing level, then the general expression for the value of the firm at time 0 is:

$$V_0 = \frac{A[1 + k_{e0}(1 - G) + k_{d0}G]}{1 + k_{e01}(1 - G) + k_{d01}G} \quad (4)$$

where:

- k_{e0} and k_{d0} are the allowed return on equity and allowed return on debt, respectively, in regulatory period 1; and
- k_{e01} and k_{d01} are the cost of equity and cost of debt, respectively, adopted by the investor in regulatory period 1.

It is clear that if $k_{e0} = k_{e01}$, then $V_0 = A$ (i.e., the NPV = 0 condition is met) only if $k_{d1} = k_{d12}$.

Equations (3) and (4) show that the value of the firm (as opposed to the value of equity invested in the firm) depends on the cost of debt. As noted above, in order for the NPV = 0 condition to be truly satisfied, the expected value of the whole firm should equal the opening RAB.

Dr Lally argues that since the regulatory cash flows in his mathematical example are one-year cash flows, a one-year cost of equity should be used to discount those cash flows. That is, the present value is determined without considering any payoffs beyond the end of the current regulatory period.

Should this rule also apply for the cost of debt?

- If a 10-year cost of debt (rather than one with a term that matches the length of the regulatory period) is acceptable, why is it unacceptable to use a 10-year cost of equity in the same present value formula (i.e., equations (3) and (4))?
- According to Dr Lally, the key factor that should determine the term of the discount rate is the frequency with which regulatory allowances are reset. Under the AER's trailing average approach, the return on debt allowance is reset annually. Does this imply that a one-year cost of debt should be used when valuing a firm regulated using an annually-updating return on debt allowance? If not, why not?

My view is that internal consistency and the NPV = 0 condition are both maintained by setting the regulatory allowance on the basis of evidence of the returns that investors actually require. This is the approach the AER has consistently followed in the past (e.g., the 2013 Rate of Return Guideline and the 2018 RORI). The approach of setting the return on debt allowance to reflect the market cost of debt should also apply to equity.