Consumer Reference Group

Response to Schmalensee statement in ENA (Attachment A) submission to draft gas rate of return instrument

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1   ISSUE

This submission discusses the Statement of Professor Schmalensee which was submitted by the ENA as Attachment A to their submission to the ERA draft gas rate of return instrument. The Statement was also lodged with the AER.

Professor Schmalensee was asked by the ENA to answer two questions:[1]

1. Do you agree with the characterization of Schmalensee (1989) that appears in Lally (2021)?
2. If an economic regulator seeks to reach "*an unbiased estimate of the expected efficient return, consistent with the relevant risks involved in providing regulated network services*" to be applied over a defined regulatory period, does Schmalensee (1989) have any implications for the way that return should be estimated?

Schmalensee concluded:[2]

> "Dr. Lally (2021) cites Schmalensee (1989) for the proposition that the NPV=0 condition is satisfied only if the regulator sets allowed rates of return in one particular way. Dr. Lally is simply wrong. Schmalensee (1989) shows that, properly computed, NPV=0 holds *however* the allowed rates of return are determined. Economic efficiency of course, requires that the allowed rate of return is always commensurate with the return that investors require."

Schmalensee also took issue with the AER's interpretation of the Lally proposition.[3]

The CRG[4] presented considerable material in relation to the Lally framework[5] and the AER[6] explanation and use of that framework and considers that there is a need to respond to various points made by Professor Schmalensee.

The CRG considers that the present value frameworks used by both Lally and Schmalensee are essentially the same in the sense the NPV=0 condition will be satisfied provided the allowed rates of return are used in both setting capital charges each period and in determining the discount rate. The CRG considers that both Lally and Schmalensee do that in their mathematical derivations.

However, the key issue is to determine what the allowed rate of return should be to help ensure economic efficiency. This is a separate matter and the CRG agrees that additional information is needed to establish an appropriate allowed rate of return. However, the CRG notes that the specific return that is allowed must relate to the period of the pay-off which in the ERA regulatory context is the regulatory period. The 1989 Schmalensee framework defined allowed returns and the cost of capital as potentially differing for each period of the allowed cash flows,

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[1] Schmalensee 2022, p. 1.
[2] Ibid, p. 11.
[3] AER 2022, pp. 103-104 and 109-110 and Schmalensee 2022, pp. 9-10.
[4] CRG 2022, pp. 3-17.
[5] Lally 2022.
[6] AER 2022.

but the length of the periods were not defined.[7] However, in the context, the periods relate to when the regulator allows price resets to ensure the appropriate period-specific cost of capital is realised.

The following section: presents a recap of the CRG submission to the ERA Draft instrument; discusses the Schmalensee 2022 statement and the Lally and AER material relevant to responding to Schmalensee's statement and then discusses related considerations in relation to determining a rate of return required to provide appropriate incentives for efficient investment

2   TERM OF THE RETURN ON FOR EQUITY

2.1   RECAP

As explained in the CRG submission to the ERA Draft instrument,[8] the CRG considers that a five-year term is required to satisfy the NPV=0 principle because the five-year term, with subsequent resetting of prices every five years is the relevant pay-off period in valuing regulatory returns and ensuring that investors receive sufficient revenue to cover their efficient costs. If a ten-year term is used when prices are reset for every five-year regulatory period (or close to five years), the NPV=0 condition will not be met for every regulatory period and hence not met over the expected economic life of the assets at the time of investment.

To be clear the preference for a term that matches the regulatory period is based on ensuring that the NPV=0 principle is **expected** to be achieved in each regulatory period i.e., that prices are set for each regulatory period consistent with **expected** revenues in present value terms being just equal to **expected** efficient costs in present value terms. It does not require certainty of recovery of relevant costs but just that over a series of regulatory periods investors can expect prices to be reset consistent with demand and cost conditions to ensure they can expect to recover their efficient costs i.e. continuation of the regulatory arrangements consistent with such expectations.

2.2   THE SCHMALENSEE STATEMENT

Various submissions have challenged the validity of the Lally analysis of the NPV=0 principle and the interpretation of a paper by Schmalensee.   The ENA asked Professor Schmalensee to evaluate Lally's characterisation of his 1989 paper and estimation of an appropriate return in a regulatory context.[9] Schmalensee does not agree with Lally's characterisation of Schmalensee 1989 paper that "the term to which the allowed cost of capital relates matches the term of the regulatory cycle". Schmalensee presents his view as follows:[10]

> "Schmalensee (1989) certainly does not "show" that the term of the allowed return must match the term of the regulatory cycle. Efficient regulation generally requires that the allowed rate of return must be consistent with the return required by investors – however they determine it

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[7] Schmalensee 1989, p. 294.
[8] CRG 2022.
[9] Schmalensee 2022.
[10] Ibid, p. 8.

The CRG considers that both Lally and Schmalensee have shown that provided the allowed rate of return is the same as the discount rate used by investors then the NPV=0 condition will be met. Lally may have mischaracterised his interpretation of Schmalensee's presentation in his description, to the extent that additional information is needed to conclude the appropriate term should match the term of the regulatory cycle. But as argued by both Lally and the AER (see below) it would seem that the appropriate terms should represent the pay-off period which is in effect the regulatory period.

The CRG considers that both Lally and Schmalensee are using the same present value framework although the different notation is a bit confusing and Lally presents his derivation in a two period framework by working backwards from the second period.

The CRG contends that the frameworks presented in the Lally 2021 paper for the AER and Lally 2022 paper for the ERA are the same.

Schmalensee defines the NPV of the regulated entity in a two period special case as represented in his equation 6:[11]

$$(6) \ NPV_R = -I + \frac{X_1}{(1+\rho_1)} + \frac{X_2}{(1+\rho_1)(1+\rho_2)} = -I + \frac{\rho_1 I + D_1}{(1+\rho_1)} + \frac{\rho_2 (I-D_1) + (I-D_1)}{(1+\rho_1)(1+\rho_2)}$$

Where:

NPV_R is the net present value of the regulated investment,
X_t is the net cash flow in period t,
ρ_I is allowed rate of return which is assumed to be appropriate given capital market conditions,
D_t is allowed depreciation in period t.

This equation simply defines the cash flows in each period as a provision for an allowed return and deprecation which in the second period means recovery of the residual value.

Focussing on the third panel, as noted by Schmalensee, this can be shown to be zero by simply multiplying both sides by $(1+\rho_1)(1+\rho_2)$ and collecting terms involving I and D_1.

Note that his will be true for any values of the allowed rate of return but that from an economic efficiency perspective the allowed rate of return should be what is required to provide appropriate incentives for efficient investment.

Schmalensee then refers to the two period analysis in Lally and in the above notation defines the following equations referred to in Schmalensee's interpretation of Lally.

The discounted value of period 2's revenues at the start of the period are:

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[11] Schmalensee 2022,, p. 6.

$$(7) \qquad V_1 = \frac{\rho_2(I - D_1) + (I - D_1)}{(1 + r_2)}$$

where r_2 is "the one-year cost of equity prevailing at time 1"

Equation (7) above corresponds to equation (1) in Lally (2021 and 2022).

Schmalensee then presents Lally's computation of the value of the regulated asset at time zero:

$$(8) \qquad V_0 = \frac{[\rho_1 I + D_1] + E(V_1)}{(1 + r_1)} = \frac{\rho_1 I + D_1}{(1 + r_1)} + \frac{\rho_2(I - D_1) + (I - D_1)}{(1 + r_1)(1 + r_2)}$$

where r_1 is "the one-year cost of equity prevailing at time [zero]."

The middle panel of equation (8) above corresponds to equation (2) in Lally (2021 and 2022).

The third panel in equation (8) is obtained by substituting for V_1, in the second panel of (8) from (7).

If the *rs* and *ps* are equal then (7) can be shown as: $V_1 = I - D_1$ and (8) can be shown to be:

$$(8') \qquad V_0 = \frac{[\rho_1 I + D_1] + E(V_1)}{(1 + r_1)} = \frac{[\rho_1 I + D_1] + (I - D_1)}{(1 + r_1)}$$

And with the *rs* and ρs being equal and re-arranging and collecting terms, $V_0 = I$ which means NPV=0.

Alternatively for (8), set the *rs* equal to the ρs and multiply both sides by $(1 + \rho_1)(1 + \rho_2)$ and collect terms involving I and D_1 and then NPV=0 as per (6).

Schmalensee critiques Lally for not explaining why the *rs* are the appropriate discount rates rather than the market costs of capital, the ρs as specified in equation (6) above and Schmalensee (1989). The CRG, however, considers that the *rs* do in fact represent the market cost of capital and that the ρs represent the allowed cost of capital by the regulator and this is specified in the Lally framework. Lally refers to the ρs as the allowed cost of capital and the *rs* at the one year prevailing cost of equity. The CRG considers that there is an assumption that in the two period model the one year prevailing cost of equity is the relevant market determined cost of capital relevant to the particular investment but applied to a two period example.

Schmalensee also takes issue with the AER's two period example, noting in relation to the AER two period example, that when period two arrives the allowed return is changed in the numerator but not in the denominator and that he has no idea how this can be defended.[12]

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[12] Ibid, pp. 9-10.

The CRG notes that the AER was using the example to show the implications of using the assumptions made in some submissions when there is insistence on a 10 year term when prices are reset over a shorter period and one calculates the NPV at time zero.

The AER explains this as follows:[13]

> "The above example is not based on Dr Lally's modelling approach and instead assumes the modelling assumptions consistent with the valuation practices described in stakeholder submissions.[195] The example demonstrates that, even under those assumptions, setting the allowed rate of return on equity to the expected return required by investors over a longer period than the time between resets would not generally satisfy the NPV=0 condition."

Schmalensee also criticises the AER by assuming the r_1 is unaffected by regulatory decisions.[14] However, this can be addressed by selecting an r that is consistent with the required cost of capital ρ, which is the aim of economic regulation by the AER and the ERA.

Based on the above analysis the CRG considers the present value frameworks of both Lally and Schmalensee are equivalent in terms of their interpretation and that the appropriate allowed return should be the best estimate of the cost of capital to ensure appropriate incentives for economically efficient investment. The latter requires separate information but the basic framework does specify a return commensurate with the pay-off period and this consideration may have contributed to Lally's characterisation that Schmalensee objects to.

2.3 DETERMIING AN ALLOWED RETURN

The key issue then is to determine what is the appropriate return to ensure efficient investment incentives when setting prices.

The CRG agrees that, as a mathematical matter, the NPV=0 calculation can be met for any arbitrary discount rate if the same discount rate is used to set allowed returns in the numerator each period and then represented in the denominator to calculate a present value. This means that separate information needs to be used to interpret and apply the present value model.

The CRG also agrees that the allowed rate of return should equal the investors true cost of capital over the relevant time horizon. Lally interprets the relevant time horizon as the regulatory period. Schmalensee does not agree with this interpretation and argues the cost of capital should be whatever investors require for efficient investment.

The CRG considers that with prices being reset at the start of every regulatory period and assuming the regulator can credibly commit to continuing to roll forward the regulatory asset base after recovery of relevant depreciation and with a commitment to a return on capital that will promote efficient regulation, then the pay-off period for the appropriate return is the regulatory period.

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[13] AER 2022, p. 110.
[14] Schmalensee 2022, p. 9.

As Lally notes:[15]

> "In regulatory decisions, the primary consideration should be that the NPV = 0 test be satisfied, or else regulated businesses are over or under compensated. As shown in section 2.1, this requires matching the term of the regulatory allowance for the cost of equity to the term of the discount rate, and the term of the discount rate must match the term of the payoffs being discounted (five years) by definition of a discount rate."

This proposition has also been expressed by the AER as follows:[16]

> "By definition, the expected return is linked to the period over which it is expected to be received."

Schmalensee, in his 1989 paper, defines the rate of return in is framework as the cost of capital in period t and under certainty, as just the one-period interest rate in period t.[17] However he also notes that:[18]

> "To the extent that bonds are issued to finance specific large investments, so that the yield to maturity at the time the debt is issued reflects expected short-term rates over the investment's lifetime, this provides some weak defense for using the embedded cost of long-term debt, rather than its current yield, along with historical average costs of equity capital, to compute the allowed rate of return."

In his 2022 statement Schmalensee notes:[19]

> "It is a general principle that the allowed cost of capital should be an estimate of the relevant efficient expected return demanded by investors."

This 'general principle' is not in contention. What is in contention is why a term longer than the regulatory period is needed if a term matching the regulatory period can be shown to be sufficient to provide incentives for efficient investment given the nature of the regulatory arrangements, including the resetting of prices and provisions for recovery of the cost of investment over its economic life. In this respect, the CRG considers that the Schmalensee framework needs to be evaluated recognising the nature of the regulatory arrangements that are in place and are reasonably expected to continue.

The point is that with the building blocks model used by the AER and ERA investors receive a return of and return on capital during the regulatory period and the regulatory base at the end of the regulatory period is then rolled forward to the next regulatory period. The payoff in terms of profits relates to a series of regulatory periods. There is good assurance of recovery of long lived investments given the monopoly nature of the assets and regulatory practice and precedent. In relation to uncertainty, relevant (non-diversifiable) risk should be reflected in the equity beta parameter and not in the selection of a long term for the allowed return on equity.

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[15] Lally 2022, p. 28.
[16] AER 2022, p. 105.
[17] Schmalensee 1989, p. 294.
[18] Ibis, p. 296.
[19] Schmalensee 2022, p.7.

An additional consideration that may help to resolve this matter is to check whether the regulatory arrangements have been efficacious in promoting efficient investment. The CRG has noted the relevance of checking investment and actual profit outcomes, and the impact of the totality of the regulatory arrangements. In support of this view, the CRG notes the AER Independent Panel's key recommendation was also to check the efficacy of the regulatory arrangements[20]; and the ERA Independent Panel considered there was a need for the ERA to make more clear how it has directly engaged with an argument raised by the Consumer Reference Group (CRG) that the ERA needs to consider how the rate of return methodology in conjunction with other aspects of the regulatory arrangements are likely to impact on risk, return and the realisation of the economic efficiency criteria.[21]

The CRG provided further detail supporting a term for the return on equity matching the regulatory period in its September 2022 submission.[22]

[20] CRG 2022, p.44-4.
[21] Ibid, p.45-46.
[22] CRG 2022.

3 REFERENCES

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