Mass market new entrant retail costs and retail margin

RESPONSE TO QUERIES ON THE DRAFT REPORT RAISED BY RETAILERS AND TREASURY

PREPARED FOR THE INDEPENDENT PRICING AND REGULATORY TRIBUNAL

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Introduction

On 20 December 2006 the Independent Pricing and Regulatory Tribunal (IPART) released a draft report prepared by Frontier Economics and Strategic Finance Group: SFG Consulting entitled *Mass market new entrant retail costs and retail margin*. Section 5 of that report relates to estimation of the appropriate profit margin for electricity retailers. We estimated retail margins using three approaches – an expected returns approach, a bottom-up approach and by benchmarking against determinations by IPART and regulators in other jurisdictions.

In this note we provide additional explanation of the expected returns approach to estimating retail margin stemming from communications and discussions with the incumbent retailers.

The theory underlying the expected returns approach is that expected returns on investment, the variation in those returns resulting from economic conditions (that is, systematic risk), and the required margin, are inter-dependent. Our reasoning is as follows:

- For firms or investors considering an acquisition, value is typically estimated as the present value of expected future cash flows. Hence, value is derived from estimates of expected profit margin and the likely variation of potential profits in response to economic conditions (that is, systematic risk). *Margin and risk are inputs into the process, while value is an outcome.*
- In a typical regulatory setting, this thought process is reversed. The regulator uses a fixed estimate of value (such as the Depreciation Optimised Replacement Cost) and performs an analysis of costs and systematic risk, in order to derive a revenue stream (and consequently a profit margin). *This means that, in a standard regulatory setting, value and risk are the inputs into the process, while the margin is an outcome.*
- The standard regulatory process relies upon the assumption that the regulatory asset base is the same as the present value of expected cash flows we would observe in a competitive market. In the present case of an electricity retailer, there is considerable uncertainty over the appropriate asset base, given that a large proportion of value is derived from intangible assets – the customer base. While this approach was adopted by Integral and used as one of our three techniques for estimating the retail margin, we constructed an approach which avoids the imprecision with which the asset base is likely to be measured.
- Our approach is to estimate profit margin and value *simultaneously* for a representative firm. The objective is to determine the margin which generates variation in potential returns consistent with the systematic risk assumption. *This means that estimate of systematic risk is an input into the process while value and margin are both outputs.*

That is, we do examine an approach that begins with an assumed value of the asset base and uses a building block approach to determine an appropriate return (and therefore margin) on this asset base. We also examine an approach (the expected returns method) that simultaneously estimates the value of the asset base, the required margin, and the risk of cash flows to the business. The results from our expected returns approach indicate that the appropriate retail margin is consistent with, but slightly higher than, the margin proposed by Integral Energy using the bottom-up approach.

This note continues in two parts. The first part is devoted to three conceptual issues, specifically: (1) the relationship between value, discount rate and margin; (2) how the ranges for margin presented in Table 9 of our report should be interpreted; and (3) whether asymmetric risks and asymmetric consequences of incorrect cost and margin estimates have been considered. The second part is devoted to a series of specific questions raised by the incumbent electricity retailers and NSW Treasury.

Conceptual issues

THE RELATIONSHIP BETWEEN VALUE, DISCOUNT RATE AND MARGIN

As introduced above, the standard regulatory approach to estimating a regulated price starts with an estimate of the regulated asset base (often estimated as Depreciated Optimised Replacement Cost). The regulator then estimates a discount rate (or required return) in order to derive a stream of cash flows which have a present value equal to that asset base. Value and discount rate are inputs into the process and the regulated price and expected cash flows (and by extension the regulated margin) are outputs of the process. In the simplest case where expected cash flows are a constant perpetuity, the regulator relies upon the equation below:

$$\begin{array}{l}\text{Value} \times \text{Discount rate} = \text{Expected cash flows} \\ \text{Inputs} \qquad\qquad\qquad\qquad \rightarrow \text{Output}\end{array}$$

This equation runs in a different direction for firms and investors considering a potential acquisition. They make an estimate of value after forecasting the expected cash flows and discounting those at the estimated cost of capital (required return). Again for the simplest case where the expected cash flows are a level perpetuity, we have the same equation re-arranged so that expected cash flows and discount rate are an input into the process and value is an outcome:

$$\begin{array}{l}\dfrac{\text{Expected cash flows}}{\text{Discount rate}} = \text{Value} \\ \text{Inputs} \qquad\qquad\qquad \rightarrow \text{Output}\end{array}$$

In the case of an electricity retailer, we are presented with a situation in which the regulated entity has a substantial proportion of assets comprised of its customer base, whose value is difficult to quantify. This is the very reason why the Tribunal has not simply implemented the standard regulatory approach applied to electricity distribution assets, which are largely tangible and for which a DORC value can be estimated. The expected returns approach treats the estimate of systematic risk as an input into the process and simultaneously estimates margin and value for a representative firm. Similar to the equations presented above, our approach can be conceptualised as follows for a simple formulation where expected cash flows are a level perpetuity:

$$\text{Discount rate} = \frac{\text{Expected cash flows}}{\text{Value}}$$
$$\text{Input} \qquad \rightarrow \text{Outputs}$$

Underpinning the discount rate assumption is an estimate of systematic risk – how returns on investment are expected to vary in response to changes in economic conditions. Positive systematic risk is consistent with returns on investment moving, on average, in the same direction as the market portfolio of all risky assets. That is, returns are higher when general economic conditions are better. Consequently, we have modelled how the cash flows of a MMNE would be expected to change in cases where the economy performed better or worse than expected, conditional upon an assumed retail margin for the expected cash flows. The concept is that the systematic risk of returns on investment measured using cash flows and value (the right-hand side of the equation) must be the same as the systematic risk of returns upon which the discount rate is derived (the left-hand side of the equation).

Using this equation we can describe why we don't necessarily observe a direct positive relationship between discount rate and expected cash flows:

- If value is held constant (as in the standard regulatory setting) an increase in the discount rate necessarily implies an increase in expected cash flows. This relationship also holds in all of our modelling;
- In contrast, if expected cash flows are held constant (as in the acquisition case) an increase in the discount rate necessarily implies a decrease in value.
- In the case where neither expected cash flows nor value are held constant (as in the present case) it does not necessarily hold that expected cash flows or value will increase or decrease. That is, if systematic risk is higher asset values are lower, other things being equal. But other things are not equal here because cash flows (and margin) must be higher to compensate for the increased risk. Thus the net effect is ambiguous. Our approach is to examine combinations of asset value and margin that are consistent with the estimated systematic risk (internal consistency), and then to benchmark these asset values and margins against external benchmarks (external consistency).

In the analysis already released, we have presented reasonable ranges for profit margins which account for imprecision in the estimates of particular inputs including the discount rate. Interpretation of these reasonable ranges is discussed in the following section. The reasonable range we have used for the discount rate is 6.8 – 9.4 percent in real pre-tax terms with a mid-point of 8.1 percent. If we isolate the effect of the discount rate, *and hold value for the representative firm constant at $536 million*, we observe a positive relationship between discount rate and profit margin. Specifically, the margins corresponding to these lower and upper bounds are as follows (where the lower discount rate corresponds to the lower margin; note that the correspondence between the lower bounds presented here and in Table 9 of our report are coincidental):

- EBIT margin of 3.5 – 5.1%;
- EBITDA margin of 4.4 – 6.0%;
- Net margin of 7.7 – 9.2%; and
- Gross margin of 15.0 – 16.6%.

Note that these figures hold the value of the MMNE constant and examine sensitivity to changes in the assumed WACC. That is, these ranges show sensitivity to WACC, other things equal.

For comparison purposes, if we isolate the effect of the discount rate but *ensure that the systematic risk of modelled returns is consistent with the systematic risk of returns assumed in the discount rate* (that is, if we implement our expected returns approach and simultaneously solve for enterprise value and margin), we observe an inverse relationship between discount rate and profit margin. Specifically, the margins corresponding to the lower and upper bounds are as follows (where the lower discount rate corresponds to the higher margin):

- EBIT margin of 4.8 – 4.0%;
- EBITDA margin of 5.7 – 5.0%;
- Net margin of 9.0 – 8.3%; and
- Gross margin of 16.4 – 15.7%.

What happens in this analysis is that an increase in required returns reduces the present value of cash flows. The lower enterprise value then requires lower average cash flows to provide the required return. A very low required return results in a higher enterprise value, which in turn requires higher cash flows (and consequently margin) to provide an expected return sufficient to compensate for the systematic risk that was assumed in arriving at the required return in the first place.

Note that this sensitivity analysis does not incorporate the impact of alternative discout rate assumptions on energy costs. But considering that energy costs are assumed to be a volume-related costs, this is not expected to greatly affect the figures presented above.

In sum, if a particular enterprise value and required return are assumed a bottom-up approach can be used to determine an appropriate retail margin. We examine and implement this approach in our report. One issue with this approach is that the resulting systematic risk of net cash flows (based on the margin that is an outcome of this analysis) need not be consistent with the systematic risk that is assumed when estimating the required return. The expected return approach ensures that internal consistency is preserved. We then benchmark the outputs of our expected returns approach (value per customer, margin, risk, return) against industry benchmarks to ensure external consistency.

The implementation of our expected returns approach indicates that an increase in required returns (relative to the base case) reduces enterprise value and consequently value per customer. This lower customer value then requires a lower cash flow in order to provide an adequate return. We do note that the range of margins that comes out of the expected returns approach is consistent with (but slightly higher) than regulated returns in prior regulatory determinations and the outcomes of the bottom-up approach.

INTERPRETATION OF THE REASONABLE RANGES PRESENTED IN TABLE 9

We estimated reasonable ranges for retail margins based on variation in four parameters: (1) discount rate; (2) the proportion of volume-related costs; (3) the standard deviation of equity market returns; and (4) the standard deviation of annual GDP growth. We incorporated high, medium and low case assumptions for each parameter, which resulted in 81 scenarios. The ranges presented in Table 9 are derived from the middle third of margins resulting from this scenario analysis.

These ranges provide guidance for interpreting the results in light of the imprecision with which these parameters are estimated. Based upon the ranges assumed for these parameters, it is reasonably likely that an appropriate regulated margin falls within the ranges presented in Table 9. These ranges should not be interpreted as the lower and upper bound for the margins we expect the businesses to earn in any given year. That is, we have presented a range within which an appropriate regulated retail margin might be drawn. In any given year, the actual retail margin earned by a MMNE will be affected by many variables such as volume and energy and other costs. The range we have presented for the appropriate regulated retail margin is not designed to capture year-to-year variation in these variables. Rather the range that is presented reflects uncertainty in the estimation of an appropriate target or expected retail margin – one that would be appropriate if earned on average over time.

ASYMMETRIC RISKS AND THE ASYMMETRIC CONSQUENCES OF MIS-ESTIMATION

The word *asymmetry* is used in two contexts in submissions to regulators and in regulatory decisions. Some firms have a distribution of expected cash flows which is asymmetric, such that there is not an equal chance of high or low realised cash flows. Discounted cash flow valuation relies upon discounting *expected* cash flows at a risk-adjusted discount rate, where the expected cash flows are a probability-weighted average of all possible cash flows. Hence, where the distribution of potential cash flows is asymmetric there is a difference between the most likely cash flows and the expected cash flows. Integral Energy submitted that the retail margin should contain an allowance for asymmetric risks in the order of 1 – 3%. Its base case estimate assumed an allowance of 0.7% for energy purchase risks and 1.3% for other asymmetric risks.

Asymmetric energy purchase risks are accounted for in estimated energy costs – our energy cost estimates are expected values, which account for the probability of adverse events. Examples of asymmetric risk not necessarily related to energy costs identified by Integral Energy include billing malfunctions and restructuring costs driven by changes in legislation.

However, it is not clear that the distribution of expected cash flows as a result of these company- or industry-specific factors will necessarily be asymmetric. For example, workplace relations laws can result in higher or lower wages, or increases or decreases in productivity. A billing system failure is likely to have adverse consequences, but the failure of a competitor's billing system is likely to have positive consequences as dissatisfied customers switch retailers.

Given the lack of a robust framework for determining the direction and magnitude of any asymmetric risks, these are not incorporated into margin estimates. This should not be interpreted as saying that factors which are difficult to quantify should be ignored. If the distribution of potential cash flows is asymmetric on the downside, and most likely cash flows are used for setting regulated prices, then expected cash flows will be insufficient for the firm to earn a reasonable return on investment. Rather, we are saying that it is unclear whether the distribution of potential cash flows is, indeed, asymmetric.

Furthermore, it is important that any allowance for asymmetric risks is not implicitly accounted for in both the operating cost allowance *and* the margin. For instance, firms manage their operations with a sufficient degree of flexibility to account for a large number of adverse events – they take out insurance contracts and redundant computer systems are used in the event of system failure.

The other context for the use of asymmetry in a regulatory context is the argument that there are relatively greater adverse consequences to setting regulated prices too low (a disincentive to invest), compared to the adverse consequences of setting regulated prices too high (overinvestment and above-normal prices for consumers who would otherwise save or spend the excess in other industries). Evaluation of these asymmetric consequences is outside the scope of our margin estimates. But the reasonable ranges presented provide the regulator with boundaries for making a determination if it concluded that there were asymmetric consequences of mis-estimation.

The margin ranges presented in Table 9 account for imprecision in a number of estimated parameters, as outlined above. Whether the Tribunal adopts a regulated margin at the mid-point of this range, at the upper or lower end, or even outside this range, are contingent upon its view as to any asymmetric consequences of mis-estimation.

Modeling details

In this section we address a number of specific queries raised by electricity retailers and NSW Treasury.

ROUNDING OF VALUES IN OUR REPORT

In most instances in the margin section of the report, we present results to two or three significant digits. This presentation is designed so as not too convey an undue level of precision in the results. For instance, it would be unreasonable to assert that the appropriate EBITDA margin is within the range of 4.41 – 6.43 percent. Our range of 2.0 percent is intended to convey the precision with which the results can be interpreted. To then express this as a range of 2.02 percent would convey little information to the reader and may suggest a false level of precision – given the statistical uncertainty of parameter estimates, it is simply impossible to sensibly distinguish between margin estimates that differ only at the second decimal place.

The values reported in Table 9 are internally consistent once rounding is taken into account. For example, the reported EBIT figure of $36 million in the base case is the rounded value of $36.4 million. Assuming 5 million MWh this equates to $7.28 per MWh which is rounded to $7.30. Assuming 900,000 customers this equates to $40.44 per customer, which is rounded to $40 per customer. There is a small inconsistency in presentation in terms of $/Mwh figures being rounded to either one or two decimal places. We will ensure consistency of presentation in the final report.

ASSUMPTIONS AND PARAMETER INPUTS

We clarify the following assumptions and parameter inputs used in our modeling:

- **GDP growth, volume growth and return on equity markets** – We assume that, in the event of a one standard deviation (2%) increase in GDP growth, there is a one standard deviation (2%) increase in volume growth and that the return on equity markets is one standard deviation (15%) above expectations. These are expected values. It is not the case that GDP growth, volume growth and equity market returns are related in precisely this way in every year. This relationship is consistent with historical data. Our binomial-tree modeling assumes that GDP growth, volume growth, equity market returns and cash flows can move to levels above or below expected values in each period. This means that, by the end of year ten, there are 11 potential profit cash flows, associated with 11 potential levels of GDP, volume and compound equity returns.
- **Energy and retail costs and their relationship with the proportion of volume-related costs** – In Table 7 on page 44, we present our computation of the proportion of volume-related costs. The inputs to this table include energy and retail costs which have been derived from the estimates presented earlier in the report.

  Energy costs are input as $52/MWh, but adjusted to the scale of the representative firm with 900,000 customers producing 5 million MWh for the purposes of reporting $/customer and $m figures. The figure of $52/MWh is based on our estimate of the market-based cost of energy. In particular, the $52/MWh is derived as follows:

1. for each year from 2007/08 to 2009/10 we took the estimate of the energy cost for each of the three retailers that was derived from the mid-range price forecast and was entailed by the elbow point on the efficient frontier;
2. for each year from 2007/08 to 2009/10 we determined the average across retailers of these energy costs, weighted by the energy sales of the retailers;
3. we then averaged the weighted averages for 2007/08, 2008/09 and 2009/10, and used this value as the assumed energy cost per MWh that a MMNE would face.

Importantly, the energy costs that we used in (1) included allowances for green energy, NEM-related fees and FRC fees.

Retail costs are estimated at $70 per customer but with a similar adjustment for reporting $/MWh and $m figures.

- **Depreciation** – For the representative firm, we report depreciation of $2/MWh (which is $1.61/Mwh to the second decimal place.) For each of the three forecast years we estimated the volume weighted depreciation expected by the three incumbent retailers according to their submitted data. We then took an average of these real depreciation amounts over the three-year period. The assumed level of depreciation does not affect our cash flow modeling because we assume that the representative firm spends an amount of cash equal to depreciation in order to maintain operations. In other words, the firm is in steady state. Depreciation is, however, used to derive the alternative margin levels presented in Table 9 (that is, the difference between the EBIT margin and the EBITDA margin is attributed to depreciation).
- **Valuation –** The base case valuation of the representative firm is $536 million which equates to $595 per customer assuming 900,000 customers. The expected pre-tax cash flows are $36.38 million in Year 0 terms. These expected pre-tax cash flows are expected to grow at the same rate as inflation in nominal terms because the firm is spending enough cash to maintain its physical asset base and its customer base (via customer acquisition costs). Hence, we have a growing perpetuity of expected cash flows. With a growing perpetuity the net present value equation which equates nominal cash flows with a nominal discount rate is as follows and results in a value of $536 million (in this instance the nominal after-tax discount rate happens to be the same as the real pre-tax discount rate of 8.1%):

$$\text{Value} = \frac{EBIT \times (1-\tau) \times (1+g)}{WACC - g} = \frac{36.38 \times 0.7 \times 1.032}{0.081 - 0.032} = \$536\text{m.}$$

- **Book-to-market equity ratio and book-to-market assets ratio** – The term *book-to-market equity ratio* is the ratio of book value of equity to market value of equity. The term *book-to-market assets ratio* is the ratio of the book value of assets to market value of assets. Firms with low book values relative to market values are often termed *growth* firms, because their market value incorporates an expectation of high cash flow growth, whereas the book value reflects an estimate of capital which has previously been invested in tangible assets. For benchmarking purposes, we assumed the book value of assets is $440 per customer for the MMNE. This is approximately the average book value of assets per customers submitted by the retailers for the three forecast years. Hence, with an assumption of 900,000 customers, the book value of the representative firm is $396 million. Expressed as a ratio of the market value estimate of $536 million, the book-to-market assets ratio is 0.74 (396/536).

We also computed the book-to-market equity ratio under the assumption that leverage was 35% (the mid-point assumption for WACC computations). With leverage of 35%, the market value of debt is assumed to be $188 million. Subtracting the value of debt from the market value of assets results in a market value of equity figure of $348 million. Subtracting the value of debt from the book value of assets results in a book value of equity figure of $208 million. Hence, the book-to-market equity ratio is 0.60m (208/438). In performing these calculations the market value of debt is assumed to be equal to the book value of debt, which is quite standard.

- **Return on capital benchmarking** – At the top of page 52 we compare the implied return on capital figure from our modeling of 6.4 percent to the mean return on capital of 6.7 percent for 89 US-listed utilities (within a 90 percent confidence interval of 6.2 – 7.3 percent). An assumption which underlies our estimated cost of capital is that a retail electricity firm has a higher cost of capital than a diversified energy firm, in which part of the assets comprise generation and distribution assets. This higher cost of capital is due to the higher systematic risk of retail businesses relative to distribution business and the fact that retail business can support relatively less debt financing due to the less tangible nature of their asset base. Hence we would expect to observe higher return on capital figures for a pure retail business, compared to a sample of diversified utilities. However, it is important that the benchmarking exercise be done on an aggregate basis with reference to all available data including return on capital of domestic comparables, customer values, and EBITDA margins. The comparison with the return on capital of US-listed firms (which is only one part of a wider benchmarking exercise) suggests that the results are within a reasonable range. That is, we do not impose the constraint that our estimated return on capital must be higher than that observed for US utilities. Rather, we compare our estimate with US utilities as one part of a wider benchmarking exercise.