

## MEMO

**TO:** Charles Spillane, Auckland Airport  
**DATE:** November 30, 2012  
**FROM:** James Mellsop and Will Taylor  
**SUBJECT:** Asset values in the Commission's IRR analysis of Wellington Airport

### 1. Introduction and conclusions

In its 2 November 2012 draft section 56G review report for Wellington Airport (“**the Draft Report**”), the Commerce Commission adopted an internal rate of return (“**IRR**”) analysis to assess profitability. Because the opening and closing asset values are critical inputs into this analysis, you have asked us to comment on the values chosen by the Commission.

It is important to reflect on what the opening and closing asset values in a “truncated” IRR analysis represent. When an IRR is used for a profitability assessment, the opening value is the asset base that a return is “allowed” to be earned on (and of), while the closing value is an assumption about the net present value of cash flows beyond the “truncated” period being analysed.

If the Commission’s objective is to assess whether PSE2 returns are in excess of what would be observed in a workably competitive market, and the Commission believes the input methodologies (“**the IMs**”) are the best approximation of workably competitive market outcomes, then the MVEU closing value adopted by the Commission is not appropriate. This is because the MVEU closing value represents an assumption that Wellington Airport will earn excessive returns *beyond* PSE2, the effect of which is to bias the assessment of returns *in* PSE2. Put another way, the Commission is assuming that Wellington Airport “misbehaves” in the future - this may or may not be right, but the point is that this assumption biases the Commission towards a finding that Wellington Airport is “misbehaving” now.

In the remainder of this note we briefly outline the “truncated” IRR concept of investment evaluation and what the terminal/closing value represents (section 2) and then discuss the implications of this for the closing value in the profitability assessment of Wellington Airport (section 3).

## 2. Truncated IRR and closing values in concept

The **IRR** is the discount rate that sets the net present value (“**NPV**”) of a stream of cash flows equal to zero. If the IRR of a project is greater than or equal to WACC, then the project has a positive NPV and should proceed.<sup>1</sup>

As a *cash flow* concept, assumptions about asset values are typically not required for IRR analysis. It is only when IRR is not applied to the entire life of the asset that assumptions about asset values are required. When IRR is applied to a segment of an asset's life, this is what is known as a “truncated” IRR analysis. Under a truncated IRR analysis, because the analysis does not span the lifetime of the asset, a closing or “terminal” value is required to capture the cash flows that fall outside the period being directly analysed.

For example, consider a project with a life of 10 years, but an IRR analysis that only spans the first 5 years of the project. In this situation we could forecast cash flows for the first 5 years of the project and then capture the value of the project's cash flows beyond those 5 years through the terminal value. This would be a single year 6<sup>2</sup> lump-sum “cash (in)flow” representing an assumption about the firm's cash flows beyond year 5. This would be done so that a project is not incorrectly turned down simply because the analysis is cut off part way through the asset's life. This could occur if, for example, large upfront capital expenditure meant that an assessment of only 5 years of cash flows would yield a negative NPV (i.e., IRR less than WACC). But if the analysis was extended for the full 10 years or a terminal value was included at the end of the 5 years, the NPV might become positive.<sup>3</sup>

The key point is that the terminal value in an IRR analysis represents an assumption about cash flows in the period *beyond* that being analysed, i.e., terminal values are a way of incorporating value outside the period under consideration into the analysis of the period in question. This is a critical point when IRR is applied to profitability analysis, as the terminal value can result in expected profits outside the period of analysis impacting the assessment of profits in the period being analysed. We explore this issue further in the next section.

## 3. Effect of using MVEU for closing

As illustrated in the previous section, the terminal value in a truncated IRR analysis is an assumption about *future* cash flows, which in the case of airports will be heavily dependent on future pricing behaviour. In other words, the closing asset base in the Commission's IRR analysis reflects an assumption about future behaviour. This implies a potential problem with the Commission's IRR analysis: **an assumption about future behavior influences the analysis of**

---

<sup>1</sup> Ignoring for present purposes the potential role of real options.

<sup>2</sup> Beginning of year 6/end of year 5.

<sup>3</sup> An alternative way to deal with the issue of truncation is to annualize the capex into a yearly lease payment.

**current behavior.** If the purpose of the analysis is to determine whether excess returns are expected over PSE2, it is inappropriate for an assumption about post-PSE2 behavior to bias the finding in any direction.

To illustrate this, we have built a simple building blocks model (“**BBM**”) of an asset that costs \$100, has a WACC of 10% and depreciates over 10 years on a straight-line basis. Revenues are derived to give NPV=0 over the life of the asset and the truncated IRR is calculated for the first 5 years. Figure 1 below shows the revenues derived from the BBM, the 5-year IRR if the closing value is the depreciated asset base at the end of year 5, and the 5-year IRR if the closing value is arbitrarily scaled up by 20%. This demonstrates that holding actual forecast cash flows over the 5 years constant, simply increasing the assumed closing value increases IRR above WACC even though the cash flows are consistent with NPV=0. Put another way, this amounts to an assumption that the cash flows in years 1 to 5 are consistent with NPV=0, but that the cash flows in years 6 to 10 are not.

**Figure 1**  
**Effect of closing value on IRR**

<b>10 YEAR BBM</b>										
Year	1	2	3	4	5	6	7	8	9	10
Opening RAB	100	90	80	70	60	50	40	30	20	10
Depreciation	10	10	10	10	10	10	10	10	10	10
WACC	10	9	8	7	6	5	4	3	2	1
Closing RAB	90	80	70	60	50	40	30	20	10	0
Revenue	20	19	18	17	16	15	14	13	12	11
<b>WACC</b>	<b>10%</b>									
<b>10 Year NPV</b>	<b>0.00</b>									
<b>5 year IRR using year 5 BBM closing value</b>										
Year	0	1	2	3	4	5				
Revenue		20	19	18	17	16				
Opening value	(100.00)									
Closing value						50.00				
IRR cashflows	(100.00)	20.00	19.00	18.00	17.00	66.00				
<b>5 Year IRR</b>		<b>10.0%</b>								
<b>NPV @ 10% WACC</b>		<b>0.00</b>								
<b>5 year IRR using 20% higher closing value</b>										
Year	0	1	2	3	4	5				
Revenue		20	19	18	17	16				
Opening value	(100.00)									
Closing value						60.00				
IRR cashflows	(100.00)	20.00	19.00	18.00	17.00	76.00				
<b>5 Year IRR</b>		<b>11.9%</b>								
<b>NPV @ 10% WACC</b>		<b>6.21</b>								

The Commission's approach in the Draft Report is to take an IM compliant asset base for the opening asset value and the MVEU pricing asset base for the closing value. Effectively this means a return is *allowed* to be earned on (and of) the IM compliant MVAU asset base and it is *assumed* that in PSE3 and beyond prices will be set to recover an MVEU asset base.

Since MVEU is MVAU plus conversion costs in the present context, then by definition this means the Commission is *assuming* that the airport will receive an excessive return equal to the difference between MVAU and MVEU in PSE3 and beyond. This assumed post-PSE2 excessive return is then included in an analysis of PSE2 profitability. Put another way, the Commission is assuming that Wellington Airport "misbehaves" in the future - this may or may not be right, but the point is

that this assumption biases the Commission towards a finding that Wellington Airport is "misbehaving" now.

We conclude by re-emphasising how dependent the truncated IRR approach is on the closing value, which is in turn a function of assumptions about future pricing behaviour. The Commission's assumption about Wellington Airport's future pricing behaviour biases the IRR results regarding current pricing behaviour.