

# Estimating the Port of Melbourne's equity beta

Port of Melbourne

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## 1. Introduction and summary

### 1.1 Introduction

#### 1.1.1 The Brief

My name is Jeffrey John Balchin of Unit 1, 19-35 Gertrude Street, Fitzroy, Victoria. I have been requested by Johnson Winter & Slattery as solicitors for the Port of Melbourne (or “PoM”) to provide an expert report relating to the systematic risk of the Port of Melbourne (or “PoM”). This issue emerged following the PoM’s May, 2019 submission<sup>1</sup> to the Essential Services Commission (ESC) of Victoria, which included a report by Synergies Economic Consulting (Synergies).<sup>2</sup> The ESC and its adviser Frontier Economics (Frontier) were critical of the comparator selection method adopted by Synergies, proposing that the filtering approach it applied would bias the beta estimate upwards.<sup>3</sup>

Point 2 of the engagement letter from PoM’s legal adviser, which is dated 14 May, 2020, requires me to prepare an expert report that:<sup>4</sup>

- a) *Provides [my] opinion as to the appropriate (for the purposes of clause 4.1.1(a) of the Pricing Order) approach to constructing a comparator set (including the use of any filtering methodologies) to derive an equity beta estimate to be used in the Sharpe-Linter Capital Asset Pricing Model to determine a weighted average cost of capital for PoM.*
- b) *Reviews and provides [my] opinion as to the ESC’s and its expert’s comments in relation to the approach adopted by PoM in PoM’s TCS for 2019-20 (a copy of which, including Appendix N thereto, is Attachment B to this letter) to derive the equity beta, as set out in:*
  - i. *the ESC’s Interim Commentary on the 2019-20 TCS, dated 16 December 2019, a copy of which is Attachment C to this letter; and*
  - ii. *the report of Frontier Economics prepared for the ESC dated 12 December 2019 and entitled Issues in Cost of Capital Estimation for the Port of Melbourne, a copy of which is Attachment D to this letter.*
- c) *In light of [my] response to questions (a) and (b), provides [my] opinion as to the appropriate point estimate or range for the equity beta applicable to PoM.*

To assist me in my task I have been provided with the following reports:

- The Port of Melbourne’s 2019-2020 Tariff Compliance Statement dated 31 May, 2019
- The report by Synergies dated May, 2019

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<sup>1</sup> Port of Melbourne (31 May 2019), 2019-2020 Tariff Compliance Statement – General Statement.

<sup>2</sup> Synergies (May, 2019) *Determining a WACC estimate for Port of Melbourne*, A report prepared in the context of the Pricing Order for the 2019-20 Tariff Compliance Statement.

<sup>3</sup> Frontier Economics (12 December, 2019) *Issues in cost of capital estimation for the Port of Melbourne*, prepared for the Essential Services Commission.

<sup>4</sup> Johnson Winter and Slattery, (14 May, 2020), *re: Port of Melbourne, Letter addressed to Mr Jeff Balchin, Managing Director, Incenta Economic Consulting*, attached as Appendix J to this report.

- The report by Frontier dated 12 December, 2019, and
- The Essential Services Commission’s *Interim commentary – Port of Melbourne tariff compliance statement 2019-20* dated 16 December, 2019.<sup>5</sup>

I have also been provided with:

- a spreadsheet copy of the PoM Regulatory Model
- a spreadsheet containing PoM trade data dating back to 1989/90, and
- a copy of the June 2018 Private Placement Memorandum titled, “US\$300 million Senior Secured Notes, Due 2025-2033, Lonsdale Finance Pty Limited.”

### **1.1.2 Qualifications**

I am the Managing Director of Incenta Economics Consulting, a firm that specialises in advising in relation to economic regulation issues in the infrastructure sector and prior to that I was a Principal at PricewaterhouseCoopers and prior to that a director at the Allen Consulting Group. I have over 25 years of experience in relation to economic regulation and pricing issues across the electricity, gas, ports, airports, water and rail sectors in Australia and New Zealand, having advised governments, regulators and major corporations on issues including the development of regulatory frameworks, regulatory price reviews and with respect to the negotiation of charges for unregulated infrastructure services. As part of this, I have had extensive experience advising regulators, regulated entities and major customers about the application of finance principles to economic regulation, including the estimation of betas and benchmark gearing for use as inputs into the estimated weighted average cost of capital for the relevant activities.

I have been assisted in producing this report by my colleague, Dr Michael Lawriwsky. While the report throughout refers to “we” or “our”, I am solely responsible for its contents.

Our full curricula vitae are provided in Appendix K to this report.

## **1.2 Summary of conclusions**

### **1.2.1 Methodological issues**

Our conclusions on methodological issues are as follows:

- We think that the assembly of a set of comparables requires a more fulsome first-principles assessment of relative risk, as well as a deeper assessment of the activities of the candidate firms than appears to have been conducted by either of Synergies or Frontier, noting that this is a particular issue for ports, where operations are very heterogeneous and the entities owning ports tend to be quite diversified.

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<sup>5</sup> Essential Services Commission (16 December, 2019), *Interim commentary – Port of Melbourne tariff compliance statement 2019-20*.

- We disagree with the application of a statistical significance threshold for beta estimates, but also think that it is essential for a size criterion to apply to potential comparators (there is substantial overlap in the effect of the different filters).
- We think that the sample should be extended beyond developed countries where this restriction yields an insufficient sample of ports (or other relevant industry sector), and note that there is relevant regulatory precedent for this.<sup>6</sup> We do not think that it is practicable or reasonable to seek to adjust beta estimates taken from other countries to make them applicable to Australia, including where betas are derived for firms in developing countries.
  - We also note that it is not straightforward and is somewhat arbitrary to apply a split between developed and developing countries. For example, Hong Kong, Slovenia and Greece – which are all potential sources of ports comparable entities – are classified differently under different classification systems. Moreover, there are many examples of ports whose equity securities are listed on the share market of one country but that have their major operations in another, which poses issues for classification (e.g., all of the Hong Kong-listed ports have their major operations in mainland China).

In addition, we have identified three further factors that are relevant to whether a firm should be included in the set of comparable entities, namely whether:

- there are two entities that represent substantially the same activities (i.e., through cross-ownership), in which case we recommend including the most relevant of the two entities in order to avoid duplicating comparable entities,
- the firm has been subject to a transaction (e.g., takeover) that may have introduced bias to the beta estimate, or
- the firm's major operations are in a different market to the market in which its equity securities are listed, and the market returns of the two markets are substantially unaligned (which may cause a material bias to a beta estimate).<sup>7</sup>

## 1.2.2 Selection of comparable entities for the Port

We conclude from our first-principles analysis that comparable entities from the ports, freight rail, airports and toll-road sectors provide insight into the appropriate asset beta for a port's prescribed services, and more specifically that:

- the set of comparable port entities would provide a basis for estimating the beta for the Port's prescribed services

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<sup>6</sup> The New Zealand Commerce Commission's practice when estimating the asset beta for the airports is to apply a sample that includes foreign firms from any countries and includes a number of airports from China and other developing countries.

<sup>7</sup> The Chinese, Hong Kong and Singapore share markets move closely together, and so no material bias would arise from including the firms whose key operations are in China but that are listed in Hong Kong or Singapore. However, we recommend not including the entity whose main operations are in Russia but that is listed in the UK, as the Russian and UK share markets move largely independently (this applies to Global Ports Investments).

- the Port would be expected to have a lower asset beta than freight rail
- the Port would be expected to have a higher asset beta than toll-roads
- the Port would be expected to have a similar or higher asset beta to airports.

We have constructed sets of comparable entities for each of these sectors, which have:

- 18 ports
- 8 freight rail entities
- 24 airports, and
- 31 toll-roads.

### **1.2.3 Deriving an equity beta for the Port of Melbourne**

#### ***Method***

We derive the asset beta for the Port by:

- Estimating the asset beta for our four sets of comparables (i.e., ports, freight rail, airports, toll-roads), and cross-checking the asset beta that we derive for the ports sample against the other sets of comparable entities noting the expected relativities between industries that were discussed above
- Examining the specific systematic risk characteristics of the Port of Melbourne compared with those of the comparator group, and positioning the asset beta for the Port within the ports comparator group, and again cross-checking against the asset betas for the other sets of comparables
- Determining the benchmark gearing level for the port comparator group, and
- Calculating the equity beta based on the parameters that have been determined.

#### ***Asset beta for the port comparator group***

How we have estimated the asset betas

We have applied the following choices when estimating asset betas for the comparable entities:

- by applying the standard Harris-Pringle method for adjusting betas for leverage
- using periods of 5-years and 10-years to 31 December 2019, with a preference for the application of the longer analysis period



- using monthly return intervals, reflecting our view that these are likely to provide more reliable estimates of asset betas, especially for more complex businesses like ports<sup>8</sup>
- applying gearing that is measured as the average gearing level (employing the market value of equity and book value of net debt) over the period for which betas are estimated, and
- using beta estimates (raw betas) from the Bloomberg service, including the use the default home index identified by Bloomberg.<sup>9</sup>

Our results

Our results, displayed in Table 1.1, are broadly in agreement with the expectations noted above. Placing reliance on the average beta estimated using monthly return intervals over a 10 year period we find the asset beta for ports:

- is 0.85, which is only slightly lower than for freight railways (0.86)
- is higher than for airports (0.67), and
- is much higher than for toll-roads (0.58).

**Table 1.1: Asset betas for port and other industry comparator groups to 31 December, 2019 using monthly return data**

Industry	No. of comparators		5 yr asset beta	10yr asset beta
<b>Rail</b>	<b>8</b>	<b>Average</b>	<b>0.90</b>	<b>0.86</b>
		Median	0.93	0.90
<b>Ports</b>	<b>18</b>	<b>Average</b>	<b>0.86</b>	<b>0.85</b>
		Median	0.84	0.88
<b>Airports</b>	<b>24</b>	<b>Average</b>	<b>0.74</b>	<b>0.67</b>
		Median	0.67	0.58
<b>Tollroads</b>	<b>31</b>	<b>Average</b>	<b>0.60</b>	<b>0.58</b>
		Median	0.57	0.54

Source: Bloomberg and Incenta analysis

<sup>8</sup> Our estimates simply apply returns measured to the end of each month, which is typically the default for beta estimation services. We agree, however, that more reliable beta estimates may be possible by varying the end-day for the return interval and averaging the resulting betas (as this would avoid any possible bias that may result from returns being tied to calendar months), although in our past analysis on the sectors of focus here we have not found the difference between the sets of betas to be material, or that any direction of difference to be predictable.

<sup>9</sup> The Bloomberg service applies a number of simplifications to its estimation of betas; however, a number of advisers (including us) have previously found that the simplifications that Bloomberg applies do not have a material effect on the beta estimates.

## Application to the Port

Our next step was to determine an asset beta specific to the characteristics of the Port of Melbourne for which purpose the PoM provided us with additional data via its legal adviser.<sup>10</sup> We examined:

- Low beta ports – We found that two ports in the sample had relatively low betas (Port of Tauranga (0.51) and Hutchison Port Holdings Trust, or HPHT (0.53)). The low betas of these ports were found to be linked to the nature of the cargo (Port of Tauranga is commodity and export container oriented) or to particularly stable and resilient cash flows (HPHT).
- Other systematic risk factors relative to the Port of Melbourne – We also looked at the Port of Melbourne’s characteristics compared to the port comparators in relation to:
  - Operating leverage – we found that the Port of Melbourne has approximately the same degree of operating leverage as the port comparator sample<sup>11</sup>
  - Systematic volatility of cash flows – while cargo volumes at the Port of Melbourne appear to be much more sensitive to the economy than those at the Port of Tauranga and HPHT, particularly during the global financial crisis, the Port of Melbourne’s cargo traffic has been less pro-cyclical than many of the Asian businesses in the comparator group.
  - Systematic risk of other operations – the operating cost at a pure-play landlord port is relatively low (and is approximately 2.8 per cent for the Port of Melbourne) compared to assets that are owned and managed.<sup>12</sup> Ports often undertake other operations (which increase the operating expenses) – such as stevedoring – and many Asian ports are engaged in commodity trading (thus introducing a COGS expense).<sup>13</sup> We find that there is a statistically significant positive relationship between asset beta and the relative importance of operating expenses and COGS in the cost structure, suggesting that these other activities raise the asset beta compared to a landlord-only port, and which is relevant to a number of the ports in our sample.<sup>14</sup>

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<sup>10</sup> This comprised a spreadsheet copy of the PoM Regulatory Model, a spreadsheet containing PoM trade data dating back to 1989/90, and a copy of the June 2018 *Private Placement Memorandum* titled, “US\$300 million Senior Secured Notes, Due 2025-2033, Lonsdale Finance Pty Limited.”

<sup>11</sup> Our operating leverage measures are based on our estimate of the relationship between changes in earnings (EBITDA) and revenue.

<sup>12</sup> This estimate is based on the Regulatory Model indicating that for the last 5 years PoM’s operating cost has been approximately \$130 million per annum, while its Regulated Asset Base (RAB) has been approximately \$4,650 million.

<sup>13</sup> COGS refers to “cost of goods sold”.

<sup>14</sup> We note, however, that many ports also have substantial interests in commercial property, the asset beta for which tends to be very low (from past work that we have undertaken, this tends to be in the order of 0.30 for properties operating with long term leases). This factor means that the asset beta for the prescribed service would be expected to be higher than the asset beta for what we have identified as the typical landlord port operations (i.e., excluding trading activities but including commercial property). However, in the time we have had, we have not been able to locate sufficiently comparable information across the ports comparator group that would permit us to judge the magnitude of this activity, and hence permitted an adjustment, and consequently our estimated asset beta may be considered to be conservative.

Taking account of these factors, we consider that the Port of Melbourne's specific systematic risk characteristics imply an asset beta that is lower than the average of the ports sample, with our recommendation being a range of 0.70 to 0.80, and a midpoint of 0.75 (i.e., a midpoint of 0.10 below the average for the port comparator group). This positions the Port of Melbourne below the rail comparator group, above the airports comparator group, and well above the toll-roads comparator group, which we believe is justified based on first principles and the additional analysis we have undertaken.

***Benchmark gearing for a port asset***

We have adopted the same position as the New Zealand Commerce Commission (e.g. in its airports decision), which mechanistically applies the gearing observed for the comparator group used to estimate asset beta. We found the 5-year average (median) net debt-gearing to be 25 per cent (23 per cent) and the 10-year average (median) net debt-gearing to be 25 per cent (28 per cent), which in our view indicates that a benchmark gearing level of 25 per cent is appropriate.

***Port of Melbourne equity beta***

Based on the parameters discussed above, in our view the Port of Melbourne is likely to have:

- An asset beta of 0.75 (point estimate) within a range of 0.70 to 0.80
- A benchmark gearing level of 25 per cent, and
- An equity beta point estimate of **1.0** within a range of 0.93 to 1.07.

## 2. Methodological issues

### 2.1 Introduction

There are four key methodological issues that we have identified from the various reports and the ESC's commentary relevant to the derivation of a set of comparable entities.

- First, the extent of “first principles” analysis of risk and further close analysis of potential comparable entities that should be undertaken when establishing the set of comparables.
- Secondly, whether potentially comparable entities should be eliminated where the estimated beta does not pass stated statistical significance / confidence criteria.
- Thirdly, whether a threshold for firms related to their size should be applied.
- Fourthly, whether the set of comparable entities should be restricted to developed countries only, and if so, whether the FTSE country classification (and, specifically, the “developed” classification) is the appropriate criterion.

We address these in turn.

### 2.2 Application of first-principles and other analysis when deriving the set of comparable entities

In our view, an essential part of establishing the set of comparable entities for an activity (in this case, the prescribed services provided by the port) is a comprehensive assessment of the drivers of the systematic risk for that activity. The seminal work of Associate Professor Martin Lally (2000) is often cited in this regard. This analysis should include an assessment of several factors, including:<sup>15</sup>

- The extent to which the volume of sales / revenue of the activity is associated with movements in the market overall, and the factors that would cause this association to increase or decrease
- The extent of capital intensity of the activity and, related to this, the extent of operating leverage
- The extent to which the activity in question may have market power and the nature of any regulation that may apply where such power exists, and
- The commercial arrangements for the supply of the relevant goods or services, including the nature of any contracting that is entered into with purchasers and the nature of the charges that are applied for the services.

The conclusions of this first-principles assessment would then be used to:

- identify the sectors – and firms within a sector – that may have a similar extent of systematic risk, and

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<sup>15</sup> Martin T. Lally (2000), *The cost of equity capital and its estimation*, Volume 3 in T.J. Brailsford and R.W. Faff (Eds.), McGraw Hill Companies Inc., (Sydney).

- guide the assessment of how the relative risk of the activities in question may compare to the risk of the set or sets of comparable entities.

This first-principles analysis should be informed with relevant supporting empirical analysis to the extent that this is possible. Whilst Associate Professor Lally's (2000) monograph discussed the factors and principles at work, he also referred to empirical studies that supported hypotheses about how systematic risk is related to such factors, for example:<sup>16</sup>

*Rosenberg and Guy (1976b, table 2) document statistically significant differences in industry betas after allowing for various firm-specific characteristics and these differences accord with intuition about the elasticity of demand. For example, telephone services and energy suppliers have particularly low betas while travel and recreation are particularly high.*

A second essential step in the assembly of a set of comparable entities is to undertake analysis of the candidate firms to gain an understanding that is as thorough as possible of the relative risk of the entity in question. The particular factors that are most important should be those that are identified as part of the first-principles analysis, but would be expected to include:

- the precise activities each entity in question undertakes – noting that betas are estimated for share-market listed entities, which typically undertake multiple activities – and confirmation that the vast majority of the entity's activities are those that are a target for the comparables analysis,
- the nature of the demand for the services of the entity in question – for example, in relation to ports, differences in the degree of systematic risk would be expected depending on the nature of the freight that is carried as well as the relative mix of imports and exports,
- the extent to which the activities that are undertaken coincide with the country in which the entity is share-market-listed, and
- the form of regulation – if any – that is applied to some or all of the activities / services of the entity in question.

We observe that, to a much greater extent than other sectors that economic regulators typically deal with, port-type entities require close examination when establishing a set of comparable entities given the diverse nature of ports (including diversity in the nature of freight carried) and the breadth of activities that is typical of the entities that own ports. In our experience, it is essential when undertaking this analysis to extend beyond the short (and often imprecise) descriptors contained in the Bloomberg or Thomson Reuters databases also to consider, amongst other things:

- aggregate financial data for the entity and segment information, from which further insight into the nature of the activities and the relative significance of the target activity can be gleaned, and
- annual reports, company presentations and/or brokers reports.

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<sup>16</sup> Martin T. Lally (2000), *The cost of equity capital and its estimation*, Volume 3 in T.J. Brailsford and R.W. Faff (Eds.), McGraw Hill Companies Inc., (Sydney).p.27, citing Rosenberg, B. and Guy, J. (July-Aug, 1976), "Prediction of Beta from Investment Fundamentals", *Financial Analysts Journal*, pp.62-70.

### 2.3 Should a statistical significance / confidence threshold be applied?

We do not agree with either Synergies or Frontier that it is appropriate to apply a statistical significance or statistical confidence threshold when forming the set of comparable entities.

We note that low statistical precision is common when undertaking empirical estimation of beta estimates. A particular issue is that the underlying economic returns of individual securities are very “noisy” and can often include a small number of unusual events that may have a material impact on beta estimates. In addition, since the beta of a stock is expected to explain a small proportion of the variation in its returns a low correlation coefficient is predicted by theory – this merely reflects the fact that firm-specific events will affect a firm’s returns, but not its beta (and cost of capital). Thus, we agree that dealing with the low precision of individual estimates when deriving a beta for an activity is a key issue.

However, we do not think that excluding firms based on statistical significance criteria is the most appropriate means of addressing this challenge.

First, we agree with the ESC’s observation that the thresholds proposed ( $R^2$  or t-statistic) contain a bias in favour of removing lower beta estimates. We further note that Frontier’s proposed alternative statistical screen does not address the ESC’s concerns. We further note that where a proposal has been made to a regulator to adopt a screen based on statistical significance this has in all cases to our knowledge not been accepted (e.g., by the Australian Energy Regulator (AER) based on advice by McKenzie and Partington 2012).<sup>17</sup> When we advised the Queensland Competition Authority (QCA) with respect to the Gladstone Area Water Board we similarly disagreed with Synergies’ application of a statistical screen, and noted that when a firm size (market capitalisation) screen of USD200 million was applied (see below) the beta estimate of every firm in the sample had a t-Statistic greater than 2 (indicating confidence at approximately the 95 per cent level).<sup>18</sup>

Secondly, in our view, there are better methods for improving the statistical confidence of the overall beta estimates than by omitting firms based on statistical criteria.

The most common means of addressing the imprecision in individual beta estimates – and the one that is also adopted by Synergies and Frontier – is to have regard to a set of comparable entities that is as large as possible, which has the effect of improving the statistical precision of the overall result.<sup>19</sup> In our view, the preferred mechanism for improving the statistical precision of the overall result is to increase the number of comparable entities where this is possible, including by extending the analysis to other countries where valid comparators exist (this is addressed further below).

<sup>17</sup> Michael McKenzie and Graham Partington (3 April, 2012), *Report to the AER: Estimation of the equity beta (conceptual and econometric issues)*, p.16.

<sup>18</sup> Incenta (May, 2015), *WACC parameters for GAWB Price Monitoring Investigation 2015-20 – Final Report*, Report for the Queensland Competition Authority, p.17.

<sup>19</sup> The standard error of the average beta from a sample will be lower than the average of each of the estimates’ standard errors (the only exception to this is where the errors across the various estimates – which reflect firm-specific factors – are perfectly correlated, which would be a highly unusual outcome).

Moreover, even where it is not possible to improve the size of the sample of comparables, the potential for biases to arise from individual beta estimates (which themselves are typically a function of a small number of unusual events for the firm in question) can be reduced by:

- interpreting the overall results in a way that is less susceptible to outlier estimates (e.g., considering median values and interquartile ranges alongside the mean of the sample), and / or
- applying estimation techniques that address the possible presence of outlier observations (e.g., “cleaning” extreme return observations before estimating betas).

Having said that, we observe that many of the beta estimates that both Synergies and Frontier eliminated on statistical confidence grounds would be eliminated by us as well on the basis of their size, which we discuss next.

## 2.4 Should a size-related threshold be applied?

In our view, it is appropriate for there to be a minimum size limit on the firms that are included in the set of comparable entities. Our reasons for this are that:

- Very small firms are often much less liquid than larger firms, which may cause biases in beta estimation,
- The activities of small firms may be more opaque to investors than large firms (noting that equity analysts tend to publish reports only on larger firms), which may also cause bias in beta estimation (such opacity is likely to be of particular concern for port owning entities given the heterogeneous nature of the activity of different ports), and
- It would be very unlikely in any event that a small firm could perform activities that are comparable to a major container port.

The application of a minimum size threshold to firms has substantial precedent amongst regulators and advisers to them.<sup>20</sup>

We further note that an effect of excluding small firms from the sample is that many of the firms with the least precise beta estimates are also excluded, and in a manner that is not biased towards excluding low beta firms.

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<sup>20</sup> The NZCC (20 December, 2016), *Input methodologies review decisions: Topic 4: Cost of capital issues*, at page 63 (paragraph 280) applied a USD100 million threshold on electricity industry comparator firms for beta analysis. In Australia, CEPA advising the QCA applied a USD100 million threshold to filter international water businesses for beta analysis. See, CEPA, (18 December, 2019) *Advice on an appropriate asset beta, capital structure, credit rating, and debt risk premium for GAWB’s 2020-2025 pricing period*, Report for the Queensland Competition Authority, p.10. Previously Incenta, as an adviser to the QCA also applied a size filter of USD100 million and noted the screening benefit of a USD200 million threshold was that all beta estimates above that level had a t-Statistic above 2. See, Incenta, (May, 2015), *WACC parameters for GAWB Price Monitoring Investigation 2015-20 – Final Report*, Report for the Queensland Competition Authority, p.17.



## 2.5 Should the set of comparable entities be restricted to developed countries only?

The objective when establishing the beta for an activity (i.e., the port's prescribed services) is to derive the sensitivity between the economic returns to that activity to movements in the economic returns to the *Australian* market. Clearly, therefore, in the best of all worlds, the set of comparable entities would include only Australian firms. However, it is impracticable to limit the sample in this manner given that there are very few listed Australian infrastructure firms (none of which own/operate ports), and most of those are within the heavily regulated sector. Accordingly, there is no alternative but to also take account of beta estimates for firms that operate and are listed outside of Australia.

However, there are a number of factors that could imply that a beta estimated for a different market may under- or over-state the beta for a firm operating and listed in Australia, including:

- the relative composition of the different markets – for example, if the overseas market contains a greater proportion of the more market-sensitive activities, then the overseas beta for the target activity may understate the equivalent beta in Australia
- the sensitivity to market movements of the various sectors – for example, if key sectors in the overseas market are more market-sensitive than the same sectors in Australia, then again the overseas beta for the target activity may understate the equivalent beta in Australia, and
- the degree of market gearing – for example, if the overseas market is more highly geared on average, then the overseas beta for the target activity may understate the equivalent beta in Australia.

There is no comprehensive method for adjusting for all of these (and other possible) sources of bias in beta estimates. Whilst a theoretical adjustment exists for market gearing, making this adjustment in isolation may increase bias rather than reducing it and, consistent with this, such an adjustment has never been applied by a regulator, even when including developing countries.

The standard approach amongst regulators – which we support – is to limit the set of comparable entities to developed countries where this nonetheless results in a reasonable set of comparable entities.<sup>21</sup> Restricting the sample in this manner is assumed – albeit without proof – to limit the potential for overseas betas to be inappropriate for the domestic setting. However, where restricting the sample in this manner leads to an insufficient number of comparators, then there is regulatory precedent – which we support – for extending the sample to include developing countries (this precedent being in the form of the Commerce Commission of New Zealand's (NZCC) asset beta estimate for airports). In addition, for the reasons set out below, we do not believe it is practicable or reasonable to seek to adjust beta estimates taken from other countries to make them applicable to Australia, including betas that derived for firms in developing countries.

Attempting to apply an arbitrary split between developed and developing countries is fraught with difficulty. Hong Kong, Slovenia and Greece are all potential sources of ports comparable entities but

<sup>21</sup> For example, a sample of more than 60 close comparable entities for regulated energy network activities can be derived by restricting the sample to Australian, New Zealand, US and UK firms (see Appendix H below).



are classified differently under alternate classification systems. Furthermore, there are port equity securities listed on the share market of one country that have a major part, or all their major operations in another. For example, all the Hong Kong-listed ports have their major operations in mainland China.

In the case of ports, in our view, it is necessary and appropriate to also include comparable entities from developing countries in the sample, as there would otherwise be too few comparators to work with. This was the approach adopted by the NZCC when considering the beta of airports. In both its 2010 and 2016 reviews of airport betas the NZCC included both developed and developing country comparators and did not discuss this matter as an issue.<sup>22</sup>

In addition, Grant Samuel, the dominant Australian business undertaking independent expert reports for mergers and acquisition transactions, included both developed and developing comparators in its sample when assessing the sale of Euroports, a UK-based container and general cargo port asset.<sup>23</sup> In this connection we also note that Grant Samuel’s independent expert report drew a distinction between the cost-base regulated Dalrymple Bay Coal Terminal (DBCT), which it included with “utility operations”, and the container and general cargo port mentioned above, which was placed in the “fee for service operations” group along with WestNet Rail.<sup>24</sup> This was an issue that was considered by the QCA when making its determination about the asset beta of Aurizon Network.<sup>25</sup>

We observe here that, whilst there may be a greater potential for bias being introduced by the inclusion of developing country firms, there are no grounds for forming an *a priori* view that developing port country betas would overstate the beta for equivalent activities in Australia, noting that:

- a number of key sectors in developing countries would be expected to be more market-sensitive than the equivalent sectors in Australia (for example, the consumer discretionary sector, reflecting the fact that lower income levels implies a higher income elasticity of demand), which may imply that the betas for other activities (e.g., a port) may be downward biased compared to the beta for the same activity in Australia
- in relation to ports in particular, ports in developing countries tend to be more export focussed than in developed countries (and the Port of Melbourne in particular), which would limit the extent to which higher domestic demand sensitivity may bias upwards the beta for the same activity in Australia, and
- potentially acting in the opposite direction, firms in developing countries on average tend to have a lower level of gearing than in Australia.<sup>26</sup>

<sup>22</sup> The NZCC (20 December, 2016), and NZCC (December, 2010) *Input Methodologies (Airport Services)*, Reasons Paper.

<sup>23</sup> Grant Samuel & Associates Pty Limited (24 September, 2010), *Proposal from Brookfield Infrastructure Partners L.P.*, Letter to the directors of Prime Infrastructure Holdings Limited.

<sup>24</sup> Grant Samuel & Associates Pty Limited (24 September, 2010), *Proposal from Brookfield Infrastructure Partners L.P.*, Letter to the directors of Prime Infrastructure Holdings Limited, p.8.

<sup>25</sup> QCA (April, 2016), *Final Decision, Aurizon Network 2014 Access Undertaking – Volume IV – Maximum Allowable Revenue*, pp.258-261.

<sup>26</sup> We used the Bloomberg Watchlist function (e.g. AS51 Index WATC) to download market gearing data for a number of relevant stock markets, and found that Australia’s AS51 Index (S&P/ASX 200 Index) had the highest net debt gearing of 40.5 per cent as at 31 December, 2019. In descending order other

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relevant stock market gearing levels tested were: Shenzhen Stock Exchange Index (SZBSHR Index) 29 per cent; Bombay Stock Exchange (SENSEX Index) 25.7 per cent; New Zealand Stock Exchange (NZSE Index) 24.5 per cent; Singapore Stock Market Index (STI Index) 23.5 per cent; and UK Stock Market FTSE 100 Index (FTSE Index) 18 per cent.

### 3. Application of our preferred approach to selecting comparable entities

#### 3.1 Introduction

In this chapter we undertake a first principles analysis of the systematic risk of landlord container ports and use this to guide the selection of comparator groups. Based on our analysis we identify the aspects of listed ports that are most relevant to the selection of ports comparators, and we also conclude that an a priori view is possible about the relativities between asset betas for ports and other key infrastructure sectors (freight rail, airports and toll-roads), which we recommend being used to cross-check the estimated beta for ports.

Applying our preferred approach to comparator selection we determine a sample of 18 port comparators, and in addition identify 8 railway comparators, 24 airport comparators and 31 toll-road comparators. These businesses and their market identifiers are listed in Appendix A.

#### 3.2 First principles analysis

##### 3.2.1 Introduction

Table 3.1 below summarises our views on the first principal factors that are indicative of systematic risk faced by the owner/owner-operator of a container port, and for three other industry sectors that we believe are useful calibrators of relative systematic risks (i.e. railways, airports and toll-roads).

**Table 3.1: Summary of first principles analysis factors for the rail, container port, airport and toll-road industries**

	Rail (Class 1)	Port owner/owner-operator	Airport	Tollroad
Market Power	Some competitive pressure from alternative carriers and transport modes	Competitive pressure only at margins of hinterland	Little competitive pressure on longer hauls	Competitive pressure from parallel roads and alternative transport modes
Regulation	Rate of return monitoring only	Varies - generally monitoring with scope for ex post review and intervention	Varies - generally monitoring with scope for ex post review and intervention	Price regulated without periodic reviews - tolls often capped at CPI with potential to regulate
Nature of customer	Commercial and industrial customers	Commercial and industrial customers	Commercial and domestic passengers	Commercial and private vehicles
Income elasticity of demand	High	High	High	Medium to low
Revenue risk	Sensitive to economy	Sensitive to economy	Sensitive to economy	Less sensitive to economy
Operating leverage	High	Medium	Medium	Low
Contracting	1-3 year contracts	None (Stvedores have contracts)	None	None
Real options	Have capacity to expand	Have capacity to expand	Have capacity to expand	Have capacity to expand
Stranding risk	Low	Low	Low	Potential by-pass

Source: *Incenta*

We discuss further our consideration of these factors below.

### 3.2.2 Factors that are likely to affect systematic risk

#### *Market power*

All of the industry sectors that we have reviewed enjoy a degree of market power. Competition affects them only at the margins, or for a segment of their total operations. This is particularly the case for port and airport owners, who generally enjoy market dominance within a captured hinterland, and may experience effective competition in only some segments, or at the fringes of their hinterland regions. Rail and toll-road operators can experience greater or lesser degrees of competition for some segments of their markets from alternative transport modes (in the case of railways) and parallel roads in the case of toll-roads.

In the case of ports, a recent phenomenon has been the continued concentration of the major world shipping alliances motivated by low profitability and excess capacity, which has created fewer negotiating parties and increasing countervailing power to the ports. This in turn has created an impetus for alliances between ports.

Having said that, the influence of market power / competition on systematic risk is not well established, and as a result we view this factor as a relatively neutral influence on the relative systematic risks of the four sectors considered.

#### *Regulation*

The fact that there are some competitive influences on the four industry sectors considered here means that heavy handed regulation is rare among them. In most countries, regulation takes the form of monitoring combined with the threat of regulation, although there are some (particularly in the developing world) where port authorities or national regulatory bodies do (or recently have) established port tariff rates.

Where revenue cap or price cap regulation has been imposed on businesses (such as energy and water distribution and transmission) with a high degree of market power this has had a buffering effect on cash flows, and a consequently a lower asset beta is observed. We would not expect the regulatory regimes typical of ports and the other sectors that we analyse as comparators, and the context of those sectors, to imply a material buffering of cash flows.<sup>27</sup>

#### *Nature of the customer / product*

It is expected that industrial and commercial customers will be more sensitive to the economic cycle than residential customers. Ports and railways depend exclusively on industrial and commercial customers, while airports and toll-roads are more heavily dependent on residential customers.

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<sup>27</sup> The buffering of cash flow for regulated utilities arises where a regulator sets prices that are materially lower than what the firm would (and could) charge if unregulated, and structures the regulatory regime to materially shield the regulated business from market risk (i.e., where prices are reviewed periodically and reset mechanistically at an updated estimate of cost and, in many cases, a revenue cap is applied). Clearly, a pre-requisite for any material buffering of cash flows is that the firm in question has very substantial market power as this is needed to generate the headroom between a cost-based regulated price and the price that could be borne in the market given potential competition that is required for the structure of the regulatory regime to define the systematic risk for the asset in question.

When considering the systematic risk of railways, ports and airports it is important to understand the composition of cargo / passengers, because this will have a profound influence on relative degrees of systematic risk:

- Ports – The cargo carried by ports has an important influence on the relative systematic risk of alternative ports. For example:
  - Import containers that contain highly discretionary consumption goods will exhibit a high degree of pro-cyclicality, and therefore result in a higher level of systematic risk.
  - Export containers (even if they are comprised of discretionary items) are likely to have a lower level of systematic risk when returns are measured against the domestic market, because the cyclicality of export markets will not be perfectly aligned.
  - Imports and exports of energy (e.g. LNG, crude oil, LPG, coal) can have a relatively low systematic risk, as the price element that creates systematic risks for miners /producers does not affect ports unless the loading rate is tied to the energy commodity’s price.
  - Imports and exports of basic agricultural goods (as bulk cargo, break bulk or in containers) are necessities whose pricing and consumption is determined by random weather patterns, and as a result will show little if any relationship to the economic cycle.
  - Imports and exports of motor vehicles will show similar patterns to imports and exports of discretionary items via containers, except with even greater pro-cyclicality.
- Rail – Railings by the North American Class 1 railways indicate that there is a hierarchy of sensitivity to the economic cycle that mirrors the situation observed for ports:
  - Automotive traffic (most sensitive)
  - Intermodal
  - Coal
  - Industrial agricultural products
  - Agricultural goods for domestic consumption
- Airports – With respect to airports the key factors relate to the nature of the customers (passengers):
  - Domestic discretionary and business passengers are expected to have the greatest sensitivity to the economic cycle
  - International discretionary and business passengers are expected to have a lower sensitivity to the economic cycle.
  - Other (non-airside) revenue streams at an airport have alternate impacts on the degree of systematic risk relative to landing charges include:

- retail at stores, which is expected to be highly pro-cyclical, and
- rentals from property, which is expected to exhibit low cyclical.

***Income elasticity of demand / revenue risk***

Income elasticity of demand and the revenue risk that this entails is a very important determinant of systematic risk. Income elasticity of demand is likely to be higher for industrial and commercial customers and contributes to the observations made above with respect to the nature of the customer / product. Whilst it would be difficult to summarise the various income elasticities pertinent to the four industry groups, we can obtain some appreciation of relative sensitivities by examining the falls in Return on Assets (ROA) observed during the global financial crisis.

In Table 3.2 we find that in terms of the median decline in ROA, ports were badly affected during the global financial crisis, with a 28.7 per cent fall in ROA during calendar 2009 from the 2008 value. While the ROA declines in ports, rail and airports were relatively large and relatively similar, the fall in toll-roads ROA’s was much more muted (7.5 per cent).

**Table 3.2: Median fall in ROA between 2008 and 2009 (global financial crisis)**

Industry	No. of comparators	ROA 2008-09
Rail	8	-26.6%
Ports	18	-28.7%
Airports	24	-17.3%
Tollroads	31	-7.5%

*Source: Bloomberg and Incenta analysis*

Revenue risk is likely to be relatively higher in the ports, rail and airports industries than in the toll-roads industry. Other things being equal we should therefore expect to see the lowest level of systematic risk in the toll-roads industry. In other words, on the basis of revenue risk, the toll-roads industry is likely to define a lower bound for the systematic risk faced by the PoM.<sup>28</sup>

***Operating leverage***

Other things being equal, the profit variability of firms with highly pro-cyclical revenue streams that also have a high degree of operating leverage will be amplified, resulting in a higher asset beta. With respect to operating leverage, Lally noted that:<sup>29</sup>

<sup>28</sup> In an earlier report for the QCA we showed that the EBIT of commercial ports was much more sensitive to economic shocks than toll-roads and had a much higher average asset beta. See Incenta (March, 2016) *DBCT 2015 DAU: Review of WACC parameters*, Report for the Queensland Competition Authority, Table ES.1, p.7, and Figure 3.5, p 34.

<sup>29</sup> Martin T Lally (2000), *The cost of equity capital and its estimation*, Volume 3 of T.J. Brailsford and R.W. Faff (Eds.), McGraw-Hill Companies Inc., (Sydney), p.28. Professor Lally did not, however, emphasise that for a higher beta there in addition needs to be a high “sensitivity [of] own demand” through the economic cycle for this factor to have a material influence on beta.

*firms with greater operating leverage (higher fixed costs to total operating costs) should have greater sensitivity to real GNP shocks because their cash flows will be more sensitive to own demand, and hence to real GNP shocks.*

Empirical measurement of operating leverage is difficult. One approach is to examine the ratio of operating costs (Opex) to total gross non-current assets of the firm, which is a crude approach given that the fixed component of operating costs will vary by firm. However, a low Opex/Gross Non-current Assets ratio is one indicator that operating leverage may be low. Since many businesses in the industry samples also have other activities for which a Cost of Goods Sold (COGS) is recorded, which may also indicate a higher level of operating leverage, we have calculated a second measure, which is (Opex + COGS) / Gross Non-current Assets. In Table 3.3 below we find that on the second measure the operating leverage is relatively similar for the ports, rail and airports industries, but lower for tollroads.

**Table 3.3: Operating Leverage – proxied by Operating Cost (+ COGS) / Gross Non-current Assets, 2010-2019**

Industry	No. of comparators	Opex / Gross Non-current Assets		(Opex + GOGS) / Gross Non-current Assets	
		Average	Median	Average	Median
Rail	8	14%	17%	19%	19%
Ports	12	5%	3%	19%	15%
Airports	24	12%	13%	16%	16%
Tollroads	31	3%	2%	12%	11%

Source: Bloomberg and Incenta analysis.

The most commonly used formula to represent operating leverage is:

$$\text{Degree of Operating Leverage} = \frac{\% \Delta EBITDA}{\% \Delta Q}$$

Where,  $\Delta EBITDA$  is the change in Operating Income Before Interest, Tax, and Depreciation and Amortisation, and  $\Delta Q$  is the change in the number of units sold. Empirical estimation of the relationship shown in the expression above can be achieved through estimating the  $\gamma_1$  coefficient in a regression of the form:<sup>30</sup>

$$\ln EBITDA = \gamma_0 + \gamma_1 \ln Sales + \mu$$

In Table 3.4 below we show the  $\gamma_1$  coefficients with pooled regressions run over the period 2006 to 2010, with a higher coefficient indicating higher operating leverage - that earnings (EBITDA) is more sensitive to a change in sales (quantity).<sup>31</sup> This is the period that includes the global financial crisis of 2008-09.

<sup>30</sup> See, for example, Xue Zhang, (15 August, 2012), *The Role of Operating Leverage in Asset Pricing*, Master's Thesis in Finance, Tilburg University.

<sup>31</sup> A pooled regression was undertaken, pooling all the observations from each comparator and undertaking a single regression for the combined sample of EBITDA / Sales revenue observations.

**Table 3.4: Operating Leverage – proxied by coefficient ( $\gamma_1$ ) on the natural logarithm of sales from a regression of the natural logarithm of EBITDA against the natural logarithm of sales, 2007-18**

Period	Rail	Ports	Airports	Tollroads	Regulated Energy
2007-2010	1.04	1.05	0.97	0.97	0.87
2011-2014	1.00	1.01	0.98	0.97	0.91
2015-2018	0.94	0.97	1.01	0.93	0.91
<b>Average</b>	<b>0.99</b>	<b>1.01</b>	<b>0.99</b>	<b>0.96</b>	<b>0.90</b>

Source: Bloomberg and Incenta analysis

Table 3.4 shows that the estimated operating leverage using this approach was reasonably similar for rail, ports and airports during the whole period, with toll-roads slightly lower. By contrast we find materially lower operating leverage for a comparator group of 69 cost-based regulated energy businesses, and they had materially lower operating leverage over the whole period.<sup>32</sup> During the period including the global financial crisis (2007-2010) ports had the highest operating leverage coefficient (1.05), with rail having the second highest (1.04), while airports and toll-roads both had coefficients of 0.97. All operating leverage coefficients are highly statistically significant.

### **Contracting**

Contracting plays no role in toll-roads, airports or ports, although within ports stevedores will normally have contracts with shipping lines. While railways have short term contracts (normally 1-3 years and up to 5 years for coal) these do not provide much protection against variation in revenue as a consequence of economic shocks, and hence are unlikely to affect asset betas in a material way.

### **Real options**

Real options can impact beta as cyclical movements in the economy are likely to have disproportionate influence on the viability of new expansion plans.<sup>33</sup> In heavily regulated industries (such as energy and water transmission and distribution) real options are unlikely to have much influence on beta since the expansions are also heavily regulated and the ability to earn super-normal profits is largely related to the sharing of efficiency gains. All industry sectors considered in Table 3.3 above have real growth options that can be utilised if economic conditions favour them. Hence, this factor is likely to contribute to a relatively higher asset beta for firms in those industries compared to energy and water transmission and distribution.

### **Stranding risk**

The ports and airport industries have relatively low stranding risk based on hinterlands they dominate. Similarly, the Class 1 railways tend to dominate certain trade routes.<sup>34</sup> We would expect toll-roads to

<sup>32</sup> This sample of regulated energy businesses was used in a previous report for the QCA. See Incenta (March, 2016), *DBCT 2015 DAU: Review of WACC parameters*. The 69 members of the regulated energy businesses comparator group are listed in Appendix H below.

<sup>33</sup> See Martin T Lally (2000), *The cost of equity capital and its estimation*, Volume 3 of T.J. Brailsford and R.W. Faff (Eds.), McGraw-Hill Companies Inc. (Sydney), p. 28, which cites empirical evidence supporting a positive relationship between growth options and beta.

<sup>34</sup> There has been greater risk of stranding for some Class 1 railways in the last decade owing to the fracking revolution, which has driven the cost of gas below the cost of coal and caused coal railings to fall materially (i.e. competition from gas pipelines).



have greater, but still relatively minor, stranding risk as they are sometimes vulnerable to by-pass (e.g. construction of competing parallel toll-roads).

### ***Covid-19 pandemic***

The Covid-19 pandemic has had a dramatic effect on share market indexes and on the share price of transport-related infrastructure, which has increased market gearing. During such times, prices may not provide reasonable long-term valuations, and it is possible that the estimation of an asset beta, particularly if it uses 5 years of data, may not provide the best estimate of underlying systematic risk. For this reason, our empirical analysis has in the main been undertaken up to 31 December, 2019, which is the last quarterly date that does not include a material influence of the pandemic.

### **3.2.3 Implications of our first principles analysis**

We draw the following implications about the assembly of a set of comparable entities – and the application of that set – when estimating the beta for the Port of Melbourne’s prescribed services.

First, in terms of establishing the set of direct comparators for the Port, we observe that for:

- *The asset owner* – our discussion of a number of the first-principles factors assume that we are focussing attention upon entities that own (in an economic sense) the principal assets of ports – and hence are major infrastructure investors – rather than merely operating port assets or providing other services, and in our view it is important to maintain this focus. We describe in chapter 4 how we have sought to restrict the sample to the infrastructure owners, but in summary this was done in part through examination of a variety of sources that describe the operations of the relevant entities, and partly through examination of the financial statements of the entities and selecting those that are consistent with being an infrastructure owner.
- *Trades at the port* – different types of freight will have a different relationship to the business cycle, and so we consider it important to:
  - focus attention to ports whose main activity relates to containers, which in a practical sense means excluding ports whose main freight comprises agricultural or minerals commodities, and
  - when applying the betas from the comparator group to the Port, take account of the potential for the freight handled at different ports to have a different response to business cycles, and
- *Non-port activities* – our first-principles analysis assumes that the entity in question is a pure-play operation, which is seldom (if ever) the case. Given this, in our view it is important to:
  - restrict attention to entities for which the port activity is the dominant activity, and
  - when applying the betas from the comparator group to the Port, take account of the potential for the non-port activities to cause the estimated beta to diverge from the beta for the target pure-play operation.

In relation to the use of betas from the other major infrastructure sectors that we have identified to cross-check the beta derived for the Port, our conclusions are as follows:

- First, that toll-roads are likely to have a lesser sensitivity to the economic cycle and so can be expected to have a relatively lower level of systematic risk compared with the other three industries (a relatively low sensitivity to the market cycle and relatively lower operating leverage).
- Secondly, while railways are likely to have a similar level of (relatively high) operating leverage to ports they may be expected to exhibit a slightly higher systematic risk to ports (and airports), due to that industry’s relatively sensitive revenue stream.
- Thirdly, we would expect the asset beta for airports to be similar to the beta for ports, although potentially marginally lower given that:
  - many of the listed airport entities undertake substantial (low-risk) commercial property activities,
  - a material component of the passenger traffic in some airports may not move closely with domestic economic conditions (i.e., travel decisions of foreign tourists would reflect economic conditions in country of origin, which may not move in tandem with domestic economic conditions), and
  - airports appear to have slightly lower sensitivity to the economic cycle and a slightly lower operating leverage (specifically, during the global financial crisis).

### **3.3 Our selection of comparators**

#### **3.3.1 Our method**

We are concerned that the comparator selection methods applied by Synergies and Frontier appear to have been primarily constrained to reliance on the short summary of operations contained in Bloomberg. The businesses that fall into broad industry classifications such as “Marine Ports and Services” are highly diverse, reflecting the numerous activities that are associated with ports. Only a relatively small number of these businesses is a port owner or port owner-operator, which are the businesses that are valid comparators for the PoM.

Our approach to comparator selection consisted of several levels of inquiry:

- First, as displayed in Table 3.5 below, we selected the industry classification categories in each system that are likely to contain the target port owner/owner-operator businesses that are our concern. For ports (and the other industry groups) we obtained the identifiers (Bloomberg tickers and ISINs) for each of the businesses. We compiled a raw list of 1,420 businesses in this way.<sup>35</sup>

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<sup>35</sup> At this stage we had not yet classified the businesses into rail, port, airport or toll-road categories

**Table 3.5: Industry categories providing raw comparator samples by Industry classification system**

Industry classification system	Ports	Railways	Airports	Tollroads
Global Industrial Classification System (GICS)	Transportation infrastructure - Marine ports and services	Highways and railroads	Transportation infrastructure - Airport services	Highways and railroads
Bloomberg Industrial Classification System (BICS)	Transport services - ports and airports	Transportation and logistics - rail freight	Transport services - ports and airports	Infrastructure construction - highway bridge tunnel concessions
Industry Classification Benchmark (ICB)	Industrial transportation - transportation services	Industrial transportation - railroads	Industrial transportation - transportation services	Industrial transportation - transportation services
Thomson Reuters Business Classification (TRBC)	Marine port services	Highways and railroads	Airport operators and services	Highways and railroads

Source: Bloomberg, Thomson Reuters and Incenta analysis

- Secondly, we applied a screening based on firm size, separating businesses with a market capitalisation of more than USD200 million as at 31 December 2019. This resulted in a remaining sample of 280 businesses that included potential comparators from all four target comparator groups.<sup>36</sup>
  - For the ports comparator group we later considered the sensitivity of applying a USD100 million threshold but found only 3 additional potential port businesses that had free float in excess of USD100 million, which on closer investigation could not be included as port comparators.<sup>37</sup> There were several other potential port comparator businesses that all had free floats well below USD100 million (see the eight point below).<sup>38</sup> This reinforced our view that the \$200 million market capitalisation threshold is appropriate. Our view is that if the port business is not substantial, serving a substantial hinterland, it cannot provide a reasonable comparator for PoM’s operations, and the application of a market capitalisation threshold is a way to achieve that.
- Thirdly, we separated the businesses into a tentative industry classification (i.e. ports, rail, airports and toll-roads) based on three high level industry classifications (GICS, BICS and TRBC) shown in Table 3.5, and the description of operations obtained from Bloomberg. For rail, airports and toll-roads it was easier to identify potentially appropriate comparators, however additional filters were applied to all four target industries.
- Fourthly, we eliminated port businesses where landlord port operations appear to constitute less than 60 per cent of value of the business, and for the other industries eliminated businesses where 60 per cent of the value of the business was not in railways, airports or toll-roads. This is a matter of judgement, but we did not want to make the hurdle so high that no ports would be selected under the filter.

<sup>36</sup> We applied an end date (for example, of a 5-year beta estimation period) of 31 December, 2019 for the reasons discussed above.

<sup>37</sup> The 3 businesses with a free float in excess of USD100 million were Sebang Co Ltd (004360 KS Equity), a stevedoring and inland container transport business; Eroad Ltd (ERD NZ Equity) a transport technology business; and Dredging Corp of India Ltd (DCIL IN Equity), a dredging company in India.

<sup>38</sup> Businesses below USD200 million in equity capitalisation that could potentially have qualified on the basis of port activities but had less than USD100 million in free float (showing Ticker and Free Float in USD million) were: China Infrastructure & Logistics Group Ltd (1719 HK Equity, 41.3), Nusantara Pelabuhan Handal TBK PT (PORT IJ Equity, 20.9), Pakistan International Container Terminal Ltd (PICT PA Equity, 19.6), and Suria Capital Holdings Bhd (SURIA MK Equity, 38.8).

- Fifthly, for ports we eliminated port businesses where containers account for less than approximately 20 per cent of the cargo, such as in pure bulk resource terminals (e.g. coal or LNG terminals) terminals mainly for agricultural exports, or Ro-Ro (motor vehicle) terminals.
- Sixthly, for all industries we eliminated businesses where more than 40 per cent of the activity was subject to cost-based regulation (e.g. Aurizon Network was eliminated from the railway comparator group in this way). Again, this is a matter of judgement, given our view that cost-based regulation will buffer cash flows and reduce systematic risk much more so than we think is likely to occur for a container port from the form of regulation that is typically applied to those activities (including in relation to the Port of Melbourne).
- Seventhly, as required we analysed each business in each of the industry categories individually based on:<sup>39</sup>
  - Bloomberg’s segments analysis for each business (revenues by line of business) that required further analysis, although some segments / descriptions were more useful / descriptive than others,
  - Comparative financial indicators such as EBITDA Margin (EBITDA/Revenue), value of assets per employee (where available), and operating cost to total assets ratio (Opex/Gross Non-current Assets, and Opex plus COGS/Gross Non-current Assets) in order to distinguish between those firms whose dominant activity is the ownership, or ownership and operation of infrastructure assets from those whose principal activities are as operators or other types of services, like stevedoring and goods trading,<sup>40</sup> and
  - Reviewing annual reports, investor presentations, and / or investment banking analyst reports on the businesses to obtain a more in-depth analysis of the business and whether its operations correspond with the target activity.
- Eighthly, we addressed the market liquidity of the sample by reviewing:
  - The value of the “free float” of the stock – the “free float” is that component of the stock that is not “locked” and presumed not to be available for sale because it is held by a government or by the key strategic shareholder or consortium.<sup>41</sup> We excluded comparators with a free float of less than USD100 million at 31 December, 2019 on grounds that they would tend to have lower liquidity.

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<sup>39</sup> We also excluded businesses that were doubles of the same actual business (e.g. through share ownership or class of shares).

<sup>40</sup> The simple adjustment that we made to the usual EBITDA Margin that is reported by Bloomberg (“EBITDA\_MARGIN\_ADJUSTED”) was to subtract COGS (“IS\_COG\_AND\_SERVICES\_SOLD”) from Revenue (“SALES\_REV\_TURN”) to calculate an “Adjusted Revenue”, and then derive our “Adjusted EBITDA Margin” by dividing Bloomberg’s EBITDA (“EBITDA”) by Adjusted Revenue. This will provide only an approximation of the EBITDA Margin without the non-infrastructure activities as it ignores both the Opex associated with COGS and the profit margin on those activities that should be subtracted from Bloomberg’s EBITDA. However, we expect that the influence of these other factors will be small relative to the elimination of COGS.

<sup>41</sup> We used the Bloomberg identifier “EQY\_FREE\_FLOAT\_PCT” to determine the free float. We found that in one case the Bloomberg free float was out of date, and that in several cases the value was missing. Our estimates were inserted in those cases.

- The Bloomberg liquidity measure – this is a centile measure of relative liquidity, measuring a stock’s liquidity in trading against the universe of stocks. Values range from 1 to 100, where 100 is more liquid and 50 would indicate the median (50<sup>th</sup> centile).<sup>42</sup>
- Ninthly, we scanned for takeover bids or other like changes of control, as estimates of systematic risk can be distorted by such events. Almost all of the final sample of port comparators are owned by a sovereign government, a regional council, another port owner/operator, or sponsor (private individual or consortium of investors). In short, port shares are tightly held, and the only two cases of changes of control that we observed were the port privatisations in Greece.<sup>43</sup>
- Tenthly, we compared the market(s) in which the firm in question had its major operations to the market in which its equity securities were listed (and hence would provide the reference market portfolio for the estimation of beta) and identified whether this mismatch had the potential to cause a material bias to the beta estimate. Where the market of operation and market of listing are reasonably aligned (i.e., one market against the other has a beta of close to unity) then a material bias would not be expected; however, where the markets move largely independently, then the risk of a material bias in beta estimate exists (this potential is discussed in more detail in Appendix D). We excluded firms whose market of operation and listing were different and where those markets were not reasonably aligned (i.e. had a market-to-market beta coefficient of less than 0.75).
- Eleventhly, we required businesses to be generating positive revenue (i.e. be operational).
- Twelfthly, we required businesses to have 36 monthly share price observations when calculated back from 31 December, 2019, which would constitute 60 per cent of the number of observations required to undertake a 5-year beta estimate with monthly observations.<sup>44</sup>

### 3.3.2 Our ports comparator group

Using the method described above we derived a sample of 18 ports, further details of which are provided in Appendix A, Appendix B, and Table G.1 of Appendix G. These were the port

<sup>42</sup> The Bloomberg identifier is “LQA\_LIQUIDITY\_SCORE”. Bloomberg describes the indicator in the following terms: This normalized score compares the expected average liquidation cost for a range of volumes, assuming a one-day liquidation horizon. The Liquidity Score reflects the security's centile rank [among the universe of securities in the same class] and is represented with a relative value between 1 and 100. A score of 100 is the most liquid, with the lowest average liquidation cost for a range of volumes.”

<sup>43</sup> The privatisations of the Greek government’s controlling shares in Piraeus Port Authority SA (PPA GA Equity) and Thessaloniki Port Authority SA (OLTH GA Equity) are discussed in Appendix C below.

<sup>44</sup> We have applied this filter before. See Incenta (April, 2019) *Estimating Queensland Rail’s WACC for the 2020 DAU*, Report for the Queensland Commerce Commission, p.15. We note that IPART has recently rejected a proposal to rely on only 36 months of data and will now only consider comparators that have 60 months of data. See IPART (March, 2020) *Estimating Equity Beta for the Weighted Average Cost of Capital*, pp.2 and 5. In our ports sample 2 of the 18 comparators would have been removed under this rule (Qingdao Port International Co Ltd, 6198 HK Equity, and Beibuwan Port Co Ltd, 000582 CH Equity) and their removal would only marginally reduce the average asset beta of the ports comparator group from 0.85 to 0.83.

comparators left after removing from the raw ports sample (after the USD200 million market capitalisation filter):<sup>45</sup>

- 14 duplicate, delisted or OTC businesses (Appendix Table G.5)<sup>46</sup>
- 26 businesses that we excluded outright as not being appropriate comparators (operations are not comparable to a landlord port) (Appendix Table G.4)
- 20 businesses that we considered in more detail but excluded for not being appropriate comparators (operations are not comparable to a landlord port) (Appendix Table G.3), and
- 8 port businesses that we believe should be considered for future inclusion in a port comparator sample, but have been excluded as they did not (at 31 December, 2019) have sufficient price data (at least 36 monthly observations) or did not have a free float of at least USD100 million (Appendix Table G.2).

Table 3.6 below shows how our ports sample differs from the samples derived or supported by Synergies and Frontier.

Frontier considered that Synergies' railway comparators should be included as rail freight rather than port comparators and excluded Aurizon Holdings specifically as it is not a rail freight carrier. We agree with Frontier on its point that it is preferable to divide the rail freight comparators from the ports comparators when deriving the asset beta for a container port, albeit having regard to both (as we discuss elsewhere). We also agree with Frontier that Aurizon Holdings should be excluded from the rail freight comparator group since it is primarily a coal transport business that is subject to *ex ante* cost-based price regulation with a revenue cap. We do not agree with the suggested inclusions for the rail freight group that were made by Frontier and have excluded them for not being reflective of rail freight operations. Getlink (Eurotunnel) we included as a toll-roads comparator. Like Synergies, we consider that railway businesses are important for calibrating the systematic risk of port businesses.<sup>47</sup> In particular, we believe that in the case of the ports sector, railway businesses are an important reference point, as are the other sectors we have identified (i.e. airports and toll-roads). Hence, we have included the remaining Synergies railway comparators in our railways comparator group along with two other businesses (Daqin Railway and Rumo SA).

<sup>45</sup> Details and certain financial characteristics of the selected comparators and rejected businesses are provided in Appendix G.

<sup>46</sup> OTC companies are those listed Over-The-Counter in the US, with limited liquidity.

<sup>47</sup> We have previously held the view that commercial ports and railways, both on first principles and empirically, appear to be exposed to similar levels of systematic risk, and we remain of that view. See Incenta (March, 2016), *DBCT 2015 DAU: Review of WACC parameters*, Report for the Queensland Competition Authority,

**Table 3.6: Analysis of port comparator selections: Synergies, Frontier and Incenta**

Synergies sample	Frontier suggestions	Incenta reason for non-inclusion	Incenta sample
<b>Rail entities:</b>			
CSX	Rail freight not port		CSX
Genesee & Wyoming Inc	Rail freight not port		Genesee & Wyoming Inc
Kansas City Southern	Rail freight not port		Kansas City Southern
Union Pacific Corporation	Rail freight not port		Union Pacific Corporation
Canadian National Railway Company	Rail freight not port		Canadian National Railway Company
Canadian Pacific Railway Limited	Rail freight not port		Canadian Pacific Railway Limited
Aurizon Holdings	Eliminate - not rail freight	Mostly regulated coal transport	
	Add Knighthawk (Canada)	Air cargo carrier. Market cap less than \$1m	
	Add Pioneer Railcorp (United States)	Acquired and delisted July 2019	
	Add Getlink (France)		Include in tollroads sample
	Add Gold Bond Group	Cargo handling and storage	
			Daqin Railway
			Rumo SA
<b>Port entities</b>			
Port of Tauranga			Port of Tauranga
Qube	Eliminate - logistics	Stevedoring, logistics intermodal	
Hamberger Hafen und Logistik	Eliminate - logistics	Logistics and container terminal operation	
Sakurajima Futo Kaisha	Eliminate - transportation & warehousing	Marine transport & warehousing	
Rinko Corporation	Eliminate - transportation & real estate	Marine transport & warehousing	
Dongbang Transport Logistics	Eliminate - logistics	Stevedoring container storage / warehousing	
China Merchants Port Holding Company			China Merchants Port Holding Company
COSCO Shipping Ports			COSCO Shipping Ports
Dalian Port	Eliminate - not FTSE developed		Dalian Port
Hutchinson Port Holdings Trust			Hutchinson Port Holdings Trust
Global Ports Investments		Operates in Russia but listed in UK	
	Add Marsden Maritime Holdings	Operates a marina port	
	Add Xinghua Port Holdings	Stevedoring, warehousing port services	
	Add Global Ports Holdings	Cruise port operator	
	Add Ocean Wilsons Holdings	Investments in tow age lighterage, stevedoring	
			Adani Ports
			Gujarat Pipavav Port
			Rizhao Port Co Ltd
			Luka Koper
			Tianjin Port Development Holdings
			Xiamen International Port
			Yingkou Port Liability Co Ltd
			Societe d'Exploitation des Ports
			Jiangsu Lianyungang Port Co Ltd
			Shanghai International Port Group Co Ltd
			Ningbo Zhoushan Port Co Ltd
			Qingdao Port International Co Ltd
			Beibuan Port Co Ltd

Source: Synergies, Frontier and Incenta

We agree with Synergies that the Port of Tauranga is a useful benchmark that should be in the comparator sample, although we consider that its beta estimate is likely to provide an underestimate of the PoM’s systematic risk. This is because the Port of Tauranga is mainly an export port, with a



major component of exports being woodchips, with only approximately half of its throughput being containers (which are also weighted to exports). As shown in Appendix B, the asset beta of Port of Tauranga has risen in tandem with the share of containers and the import component of its throughput. We discuss this further in section 4.3.2 below.

In agreement with Frontier we have not included in our sample a number of stevedoring and logistics operators at ports as they do not undertake the core function of port owner/owner-operator that is our focus. Prominent among these is Qube Holdings, which is the other Australian comparator included by Synergies. Our reason for not including it is that its main activities are stevedoring (in a joint venture with Patricks), logistics and intermodal activity.<sup>48</sup> Whilst its revenues would be highly correlated with those of Australian ports including the PoM, it does not have the same capital intensity and operating cost characteristics. This issue is considered in more detail in Appendix E below.

As set out in Table 3.6, we have not agreed with any of Frontier's suggested additions to the ports comparator group as they do not reflect the target port characteristics (see column titled 'Incenta reasons for non-inclusion').<sup>49</sup> In summary, we agree with 5 of the port selections made by Synergies and have included additional 13 port businesses that we consider will reflect the target characteristics to greater or lesser degrees.

Appendix B sets out the list of comparable entities that we have identified for the ports sector and the three other relevant sectors (i.e., freight rail, airports and toll-roads). In Appendix D and Appendix E we provide further discussion of some entities that we decided to exclude from the sample.

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<sup>48</sup> See for example, J.P.Morgan (9 May, 2018), *Qube Holdings – 'Don't give up the ship' ... returns on the horizon*.

<sup>49</sup> As noted in Table 3.6 we have not included: Global Ports Investments because it is listed in London but operates in Russia (and there is no material relationship between the UK and Russian stock markets); Marsden Maritime Holdings (MMH NZ Equity) because it operates a marina port in New Zealand that does not reflect PoM's characteristics; Xinghua Port Holdings (1990 HK Equity) because, while it is a port operator, it is both small (USD103 million capitalisation) and does not have the appropriate freight-type characteristics (most of its throughput is pulp, paper, and logs, with some steel and only a few containers); Global Ports Holdings (GPH LN Equity) because it is a cruise port, which does not reflect PoM's operations; and Ocean Wilsons (OCN LN Equity) because it is listed in London but operates in Bermuda and Brazil, and its operations are towage, stevedoring, shipbuilding and tug boats, rather than a majority port owner / owner-operator.



## 4. Estimating Port of Melbourne’s beta

### 4.1 Introduction

In this chapter we provide an estimate of the reasonable range for the Port of Melbourne’s asset and equity betas, and a point estimate for the equity beta. We have approached this task in the following way:

- First, we derive an appropriate asset beta estimate for ports generally, taking account of our first principles analysis and the relativities that are observed between the industry groups identified in chapter 3
- Secondly, we determine a range and point estimate for the asset beta of the Port of Melbourne by examining its specific systematic risk characteristics relative to the port comparator group that was identified in chapter 3
- Thirdly, we determine the benchmark gearing level of a port based on the gearing levels observed for the port comparator group, and
- Finally, we apply judgement to estimate an equity beta range and point estimate for the Port of Melbourne.

Using this approach, we estimate an asset beta of 0.75 and an equity beta point estimate of **1.0** for the Port of Melbourne within a range of 0.93 to 1.07 based on an observed benchmark gearing level of 25 per cent.

### 4.2 Estimating the asset betas for the comparator groups

#### 4.2.1 Asset beta estimation methodology

We have applied a relatively standard approach to estimate asset betas by using the Harris-Pringle formula, relying on Bloomberg data, and estimating monthly betas over 5-year and 10-year periods ending 31 December, 2019.

#### *Deriving asset betas from equity betas*

To estimate the asset betas of the comparator groups we have applied the Harris-Pringle formula that is used by a number of Australian regulators including the AER:

$$\beta_a = \frac{\beta_e}{(1 - G)}$$

Where,

$\beta_a$  is the asset beta

$\beta_e$  is the equity beta

G is the Net Gearing (i.e. Net Debt / (Net Debt + Market Capitalisation))<sup>50</sup>

### ***Bloomberg data***

We obtained the Net Debt and Market Capitalisation values for the comparator businesses using Bloomberg, as at 31 December each year, and averaged the net gearing over each year and for the whole estimation period. In keeping with the practice of several regulators we obtained the raw (i.e. unadjusted) equity beta calculated by Bloomberg measured against the default home index of each listed business using the estimation periods and return windows discussed below.

We have estimated betas up for the 10 (and 5) year period up to 31 December, 2019. Although we could have calculated betas to 31 March, 2020, we have provided these estimates only as a sensitivity in Appendix I below. As noted in chapter 3 above, our view is that there is the potential for the Covid-19 pandemic to have caused a change to estimates of asset betas that is not indicative of the underlying (and expected) degree of systematic risk (this is an issue that we expect to be the subject of future analysis and debate, much like the effect of the dot-com boom and bust between 1998 and 2002).

### ***Estimation period***

Regulatory practice often considers 5 or 10-year estimation periods for asset betas, and in the case of the NZCC an average of two successive 5-year estimation periods. Our preference is to place most reliance on 10-year beta estimates, as this is likely to result in less volatility in the estimates over time, which promotes stability. However, we have also calculated beta estimates over a 5-year period. The AER's adviser, Professor Olan Henry, advocated the use of as long a period of data as was available in the case of regulated energy transmission and distribution businesses.<sup>51</sup> We disagree with this view, however. Over a period of several decades the systematic risk fundamentals of businesses and even industries can evolve due to technological and / or market changes. We consider that a 10-year estimation period balances issues of stability against the possibility of such long-term changes.

### ***Return window***

While regulatory practice is mixed, we prefer to rely on a return window of one month (i.e. monthly betas). Weekly data were used by Professor Henry, in 2008 and 2009, and again in 2014.<sup>52</sup> Henry believed that monthly returns should be used as a robustness check. The AER has regard to both monthly and weekly data and does not consider one to be superior to the other.<sup>53</sup> The Economic Regulation Authority of Western Australia (ERAWA) applies weekly return intervals based on

<sup>50</sup> As noted below, we calculate the average net debt gearing over each year to 31 December, and then calculate the average gearing over the period of the beta estimate (5 or 10 years). We treat negative net debt as zero net debt, which we consider to be a conservative approach in that it should produce a lower asset beta estimate. However, such instances were relatively few, and a relatively small value compared with the market capitalisation.

<sup>51</sup> Olan T Henry (April, 2014), *Estimating  $\beta$ : An update*, University of Liverpool Management School; and Olan T Henry (23 April, 2009), *Estimating  $\beta$* , Report for the Australian Regulator; and Olan T. Henry (November, 2008), *Econometric advice and beta estimation*.

<sup>52</sup> Olan T Henry (April, 2014), *Estimating  $\beta$ : An update*, University of Liverpool Management School; and Olan T Henry (23 April, 2009), *Estimating  $\beta$* , Report for the Australian Regulator.

<sup>53</sup> AER (October, 2013), *Better Regulation: Equity Beta Issues Paper*.

Professor Henry’s advice to the AER.<sup>54</sup> The NZCC on the other hand, uses the average of monthly and weekly beta estimates for the two most recent successive 5-year periods.<sup>55</sup>

We consider that recent empirical evidence casts doubt on the view that weekly returns are superior just because they produce lower standard errors. Gilbert *et al.* (2014) show that differences between betas estimated on low (monthly and quarterly) and high (daily and weekly) frequencies can be explained by proxies for the “opacity” of firms’ business and financial affairs.<sup>56</sup>

Opacity, or opaqueness, generates uncertainty about the impact of news that has systematic risk consequences will have on the share price. Opacity slows the speed at which such news can influence stock price and therefore, beta. With a high frequency return window, the beta of an opaque firm will not fully incorporate the latest news, whilst at lower frequencies all firms are likely to have all the relevant systematic information impounded into returns. That is, lower frequency betas, for example those calculated based on monthly data are expected to provide more accurate estimates, especially where opacity is expected.

Gregory *et al.* (2016) repeated the Gilbert *et al.* (2014) analysis for the UK and some other countries, with the addition of further explanatory variables.<sup>57</sup> Their findings showed that high frequency beta estimates were systematically lower than low frequency betas, with the differences being due to factors known to vary with systematic risk, including opacity (measured in terms of abnormal accruals), firm size, relative illiquidity, and the Book Equity / Market Equity ratio.<sup>58</sup>

Taking account of these research findings we place reliance on monthly returns.

## 4.2.2 Estimated asset betas for the comparator groups

The average and median asset beta estimates for the four industry groups are shown in Table 4.1 below. In general, we find there to be relatively little difference between the 5-year and 10-year estimates with the exception of airports, which appears lower on a 10-year view. We consider the relativities of the average (and median) asset beta estimates to be roughly in line with expectations. The results show that on average:

- Rail businesses have the highest asset beta, which is 0.86

<sup>54</sup> Economic Regulation Authority (December, 2013), *Explanatory Statement for the Rate of Return Guideline*, p. 189.

<sup>55</sup> Commerce Commission New Zealand (16 June, 2016), *Input Methodologies review draft decisions, Topic paper 4: Cost of capital issues*, p.63. Equal weight was given to four estimates: the most recent 5 year monthly and weekly beta estimates, and the previous 5 year monthly and weekly estimates.

<sup>56</sup> Gilbert, T., Hrdlicka, C., Kalodimos, J. and Siegel, S. (2014), ‘Daily Data is Bad for Beta: Opacity and Frequency-Dependent Betas,’ *Review of Asset Pricing Studies*, Vol. 4 (1), pp.78-117. We note that IPART (March, 2020) has recently decided to rely solely on weekly interval data, but does not appear to have considered questions of opacity and research findings associated with the use of more frequent data intervals.

<sup>57</sup> Gregory, A., Hua, S. and Tharyan, R. (2018), “In Search of Beta”, *British Accounting Review*, Vol.50, Issue 4, pp.425-441.

<sup>58</sup> Gregory, A., Hua, S. and Tharyan, R. (2018), “In Search of Beta”, *British Accounting Review*, Vol.50, Issue 4, pp.425-441, Table 1 reported that the weighted average monthly beta for 4,355 (2,208) listed UK (Australian) businesses was 1.028 (1.028), while the weighted average of weekly betas for the same stocks was 0.843 (0.908).

- The port comparators have a slightly lower asset beta of 0.85
- Airports have an asset beta of 0.67, and
- Toll-roads have an asset beta of 0.58.

**Table 4.1: Asset betas for port and other industry comparator groups to 31 December, 2019 using monthly return data**

Industry	No. of comparators		5 yr asset beta	10yr asset beta
<b>Rail</b>	<b>8</b>	<b>Average</b>	<b>0.90</b>	<b>0.86</b>
		Median	0.93	0.90
<b>Ports</b>	<b>18</b>	<b>Average</b>	<b>0.86</b>	<b>0.85</b>
		Median	0.84	0.88
<b>Airports</b>	<b>24</b>	<b>Average</b>	<b>0.74</b>	<b>0.67</b>
		Median	0.67	0.58
<b>Tollroads</b>	<b>31</b>	<b>Average</b>	<b>0.60</b>	<b>0.58</b>
		Median	0.57	0.54

Source: Bloomberg and Incenta analysis

Based on our first principles analysis we expected toll-roads to have the lowest asset beta among this group of industries. We also expected the asset beta of ports to be no lower than that of airports, and probably not higher than that of freight railways. This leads us to conclude that the port sample has an asset beta of 0.85, is close to the asset beta of railways, and is unlikely to be as low as the estimate for airports (0.67).

The sensitivities we calculated for were as follows:

- Weekly asset beta estimates for the same periods (in Appendix I below) show that the estimates for railways and ports are slightly lower, but still close (0.82 and 0.80 respectively), while the estimate for airports is higher (at 0.74) it remains below railways and ports, and toll-roads are slightly lower at 0.54; and
- Estimating monthly betas for ports to 31 March, 2020, we find the average asset beta increases marginally by 0.02 (10 year beta), while the weekly asset beta increases by 0.04 (10-year beta).

As discussed above, we do not place much weight on estimates based on weekly data. While the estimates are relatively resilient to the dramatic effects of the pandemic in the first quarter of 2020, we believe it is more prudent to rely on beta estimates up to 31 December, 2019.

## 4.3 Applying the estimated asset betas to the context of the Port of Melbourne

### 4.3.1 Introduction

As shown in Table 4.2 below, while the average asset beta of the ports in the comparator group is approximately 0.85, individual businesses have 10-year asset betas ranging from 0.51 (Port of Tauranga) to 1.14 (Ningbo Zhoushan Port Co Ltd). In this section we review further evidence to determine where the asset beta of the Port of Melbourne is likely to lie relative to the comparator set.

**Table 4.2: Ports comparator group – individual asset betas to 31 December, 2019, using monthly data**

Company name	Ticker	Index	5 year asset beta	10 year asset beta
Ningbo Zhoushan Port Co Ltd	601018 CH Equity	China	1.40	1.14
Qingdao Port International Co Ltd	6198 HK Equity	Hong Kong	1.20	1.09
Societe d'Exploitation des Ports	MSA MC Equity	Morocco	1.07	1.07
Gujarat Pipavav Port Ltd	GPPV IN Equity	India	1.09	0.96
Luka Koper	LKPG SV Equity	Slovenia	0.66	0.95
Shanghai International Port Group Co Ltd	600018 CH Equity	China	0.87	0.92
Jiangsu Lianyungang Port Co Ltd	601008 CH Equity	China	0.90	0.90
Beibuwan Port Co Ltd	000582 CH Equity	China	0.85	0.89
Xiamen International Port Co Ltd	3378 HK Equity	Hong Kong	0.83	0.88
Adani Ports & Special Economic Zone Ltd	ADSEZ IN Equity	India	1.21	0.87
Yingkou Port Liability Co Ltd	600317 CH Equity	China	1.04	0.81
China Merchants Port Holdings Co Ltd	144 HK Equity	Hong Kong	0.77	0.80
Rizhao Port Co Ltd	600017 CH Equity	China	0.80	0.78
Tianjin Port Development Holdings Ltd	3382 HK Equity	Hong Kong	0.76	0.74
Dalian Port	2880 HK Equity	Hong Kong	0.77	0.74
COSCO SHIPPING Ports Ltd	1199 HK Equity	Hong Kong	0.38	0.73
Hutchison Port Holdings Trust	HPHT SP Equity	Singapore	0.47	0.53
Port of Tauranga Ltd	POT NZ Equity	New Zealand	0.45	0.51
<b>Average</b>			<b>0.86</b>	<b>0.85</b>
<b>Median</b>			<b>0.84</b>	<b>0.88</b>

Source: Bloomberg and Incenta analysis

### 4.3.2 Distinguished from the relatively low asset beta ports

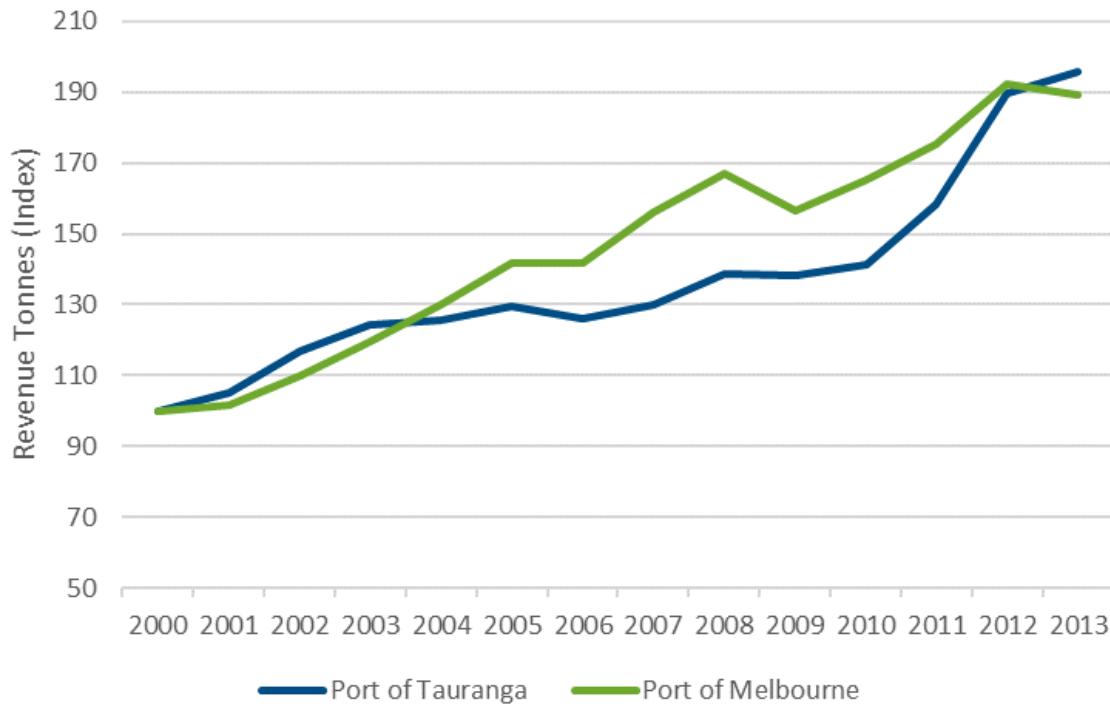
Most ports in the comparator group have 10-year asset betas higher than approximately 0.75, with two ports conspicuously below that level at 0.51 and 0.53. Asset betas at these levels are closer to those of relatively mature toll-roads, and well below the average for airports. We believe there are specific reasons that these two ports have relatively low asset betas relative to other ports:

#### ***Port of Tauranga (POT NZ Equity)***

In Appendix B below we provide a detailed analysis of the Port of Tauranga's (POT) beta over the period that it went from being almost exclusively a commodities export port to a major container port in New Zealand. We also note that since POT's container traffic is mainly exports, its throughput is relatively resilient to its domestic market. During the global financial crisis exports of containers from POT did not fall. These factors indicate a relatively low asset beta should be observed.

In Figure 4.1 below we show that during the global financial crisis the total volume of cargo passing through the Port of Melbourne was much more responsive to the global boom in international trade that continued up to 2008, and was more sensitive to the financial crisis of 2008-09. While tonnage at the Port of Melbourne declined by 6.2 per cent, the decline was only 0.05 per cent in the Port of Tauranga. During this period, we saw that some container ports (like HPHT discussed further below) didn't decline at all, while TEUs of non-HPHT Hong Kong Ports declined by 14 per cent between 2008 and 2009.

Figure 4.1: Index of revenue tonnes – Port of Melbourne vs Port of Tauranga



Source: Bloomberg, Port of Melbourne and Incenta analysis

**Hutchison Port Holdings Trust (HPHT SP Equity)**

We also describe HPHT in Appendix B as a relatively mature container port business that is resilient to economic shocks relative to its peers in Hong Kong and mainland China. HPHT has a trust structure that enables it to make regular distributions even if there are no accounting profits. JP Morgan described it as “the delta’s pearl”, a mature port business capable of delivering resilient and consistent performance, despite some migration of factories from its well-connected hinterland.<sup>59</sup> As shown in Table 4.3, that resilience was well demonstrated during the global financial crisis, as HPHT had a 5 per cent growth in TEUs when other Hong Kong ports suffered a 14 per cent decline.

<sup>59</sup> JP Morgan (25 April, 2011), *Hutchinson Port Holdings Trust, The delta’s pearl*, p.1.

Table 4.3: Container throughput performance by ports in the Hong Kong region, 2000-2010

Year	HIT	COSCO-HIT	Total HPHT	Other HK Ports
2000	5,308	1,293	6,601	11,603
2001	4,959	1,193	6,152	11,285
2002	5,188	1,399	6,587	11,892
2003	5,020	1,372	6,392	12,070
2004	5,922	1,530	7,452	13,425
2005	6,132	1,678	7,810	14,284
2006	6,657	1,578	8,235	16,048
2007	7,231	1,741	8,972	17,322
2008	7,427	1,664	9,091	17,726
2009	8,126	1,378	9,504	15,159
2010	9,466	1,574	11,040	17,098
Per cent change 2008-09	9%	-17%	5%	-14%

Source: JP Morgan (25 April, 2011), p.18. Note: In 000s of TEU.

In summary, the characteristics of the two ports discussed above mean that they are likely to underestimate the beta for the Port of Melbourne. However, there are other port businesses in the comparator group with characteristics that are likely to result in high betas, and to over-estimate the asset beta of the Port of Melbourne.

### 4.3.3 Other systematic risk factors

In this section we consider other systematic risk factors that could cause Port of Melbourne's asset beta to differ from that of the average firm in the port comparators sample. In doing so we are applying the same principle as that applied by the NZCC in respect of airports, where it reduced the estimate for prescribed services by 0.05 to 0.60 on grounds that the raw asset beta estimate of 0.65 was higher due to the higher systematic risk of non-prescribed operations.<sup>60</sup>

#### Regulation

Our analysis of the set of port comparators suggests that, while we were not able to find information on all of the comparators,<sup>61</sup> most are subject to a form of regulation that we describe as monitoring combined with the threat of regulatory intervention, although there are cases where prices are directly controlled. Compared to these arrangements, we would not expect the regulatory regime that applies to the Port of Melbourne's prescribed services would be likely to imply a material change to systematic risk. We say this for the following reasons.

<sup>60</sup> NZCC (20 December, 2016). Whilst we agree with the NZCC that judgment needs to be applied, we believe that in the case of airports its downward adjustment was on balance incorrect. That is, we consider that the often significant non-regulated property assets of airports are likely to materially reduce systematic risk, while the unregulated retail operations are likely to have only marginally higher systematic risk than the regulated (airside) activities.

<sup>61</sup> Given that major container ports are important facilitators of trade and commerce and frequently possess a moderate to high degree of market power, we would be surprised if many of the comparable entities were considered by investors to be not subject to any form of regulation, even if that just took the form of a risk of regulatory intervention if prices were seen as unreasonable.



First, the regulatory regime that applies to the Port of Melbourne is one of *ex post* review against principles rather than an *ex ante* price determination, which is therefore similar to most of the regimes that we have identified.<sup>62</sup>

Secondly, whilst the Port of Melbourne regime has more specificity about the principles the regulator is required to apply and, specifically requires a cost-based assessment of prices to take place, we would expect that any regulator that sought to test the reasonableness of prices would use the cost of service as an important guide to this. Accordingly, this aspect is unlikely to distinguish the Port of Melbourne from the comparators.

Thirdly, as an addition to the last point, whilst the Port of Melbourne is required to demonstrate that its prices meet cost-based principles, for the first 20 years prices levels are subject to an independent constraint – the Tariff Adjustment Limit (TAL) – which we understand is likely to bind for most or all of this period. Whilst under-recoveries that are caused by the TAL during this period can be carried-forward (albeit, subject to a requirement for depreciation to be non-negative), this means that any “buffering” effect on cash flows would only occur via adjustments to the RAB that is applied to test prices after the TAL no longer applies or binds. We think that investors would discount heavily any “buffering” effect that was delivered with such a lag given the delay and myriad of events that could occur in the intervening period that may affect its recovery.

Fourthly, as we discussed in section 3.2.2 above, for regulation to provide a material buffering of cash flows, the facility in question needs to have substantial market power such that the regulator can determine the allocation of risk between customers and suppliers without being constrained by the market (i.e., in the form of competition). However, whilst most ports have a degree of market power, all face a degree of competition and risk associated with technological developments, which limits the capacity for a regulatory regime to buffer cash flows. Accordingly, we would not expect the prospect of regulation, or its application, to provide a material buffering of cash flows and associated material reduction to systematic risk.

In summary, we believe that regulation is not a factor that would distinguish the Port of Melbourne’s systematic risk relative to the port businesses that have been included in the port comparator group.

### ***Operating leverage***

Our first principles analysis indicated that the operating leverage of the port comparator group was relatively high but not as high as that of Class 1 railways. On an Opex / Gross Non-current Assets basis Port of Melbourne’s operating leverage is approximately the same as the median of the port comparator group (currently an average of 9.3 per cent and median of 2.7 per cent), and both these numbers are low. We consider that the responsiveness of EBITDA to a change in revenue is a better guide to operating leverage, however for the Port of Melbourne we only have this data for the period 2013 to 2018.

For the 2013-18 period the operating leverage of the port comparator group was 0.96 (based on the regression of the natural logarithm of EBITDA over Revenue). The operating leverage number

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<sup>62</sup> A distinguishing feature of the PoM regulatory regime is that some of the inputs that could be subject to dispute, such as the RAB, have been locked into the Pricing Order. This could be expected to reduce risk to the owners of the Port, however this is a regulatory risk and is therefore unlikely to be systematic in nature.



obtained for Port of Melbourne was 0.88,<sup>63</sup> which is relatively close to the value derived for the group as a whole. We therefore conclude, based on the limited data available, that the Port of Melbourne has operating leverage that is close to the average of the port comparator group.<sup>64</sup>

### ***Systematic volatility of cash flows***

As noted above, operating leverage will only translate into a higher asset beta if there is sufficient systematic volatility of cash flows. The Port of Melbourne has a high proportion of container trade and a relatively high proportion of that trade is imports, which have higher systematic volatility as they often represent discretionary consumption goods. In cyclical economic downturns (upturns) domestic consumption of discretionary items falls (rises), while exports may follow the economic cycles of a diverse group of nations and be fuelled by some comparative advantage (such as a falling currency).

In our view the systematic volatility of the Port of Melbourne's cash flows suggest that its asset beta is likely to lie below the average of many Asian-based ports,<sup>65</sup> but also well above the asset betas observed for ports such as the Port of Tauranga and HPHT.

### ***Systematic risk of other operations***

Another factor that is likely to impinge on the closeness, from a systematic risk point of view, of the comparator group to the Port of Melbourne is the other activities that are undertaken by ports that do not match the prescribed services at the Port of Melbourne. We consider that a reasonable proxy for these other activities is provided by the ratio of (Opex + COGS) / Gross Non-current Assets. A pure landlord port will not have a Cost of Goods Sold (COGS) item, but there are a number of Asian and other ports that have a low Opex / Gross Non-current Assets ratio and a high Opex plus COGS / Gross Non-current Assets ratio,<sup>66</sup> which is due to them undertaking non-landlord port operations. The Port of Melbourne's comparative ratio is approximately 2.8 per cent.<sup>67</sup> As other activities are added to a port's operations they may be on a fee-for-service basis (adding to Opex), or trading operations (adding a COGS element). A common example is stevedoring operations at the port, which the Port of Melbourne sub-contracts to three operators.

In Figure 4.2 below we show a regression of asset beta against the ratio of (Opex + COGS) / Gross Non-current Assets together with the scatter of observations for the port comparator group. The

<sup>63</sup> The estimate for Port of Melbourne is less reliable as it is based on only 6 observations (and so has a wide confidence interval).

<sup>64</sup> We also ran regressions over the same 7 year period for 14 of the 18 port comparators for which similar EBITDA and revenue data were available and found that PoM's operating leverage coefficient was higher than for the 6 lowest coefficient ports, but lower than the 8 highest.

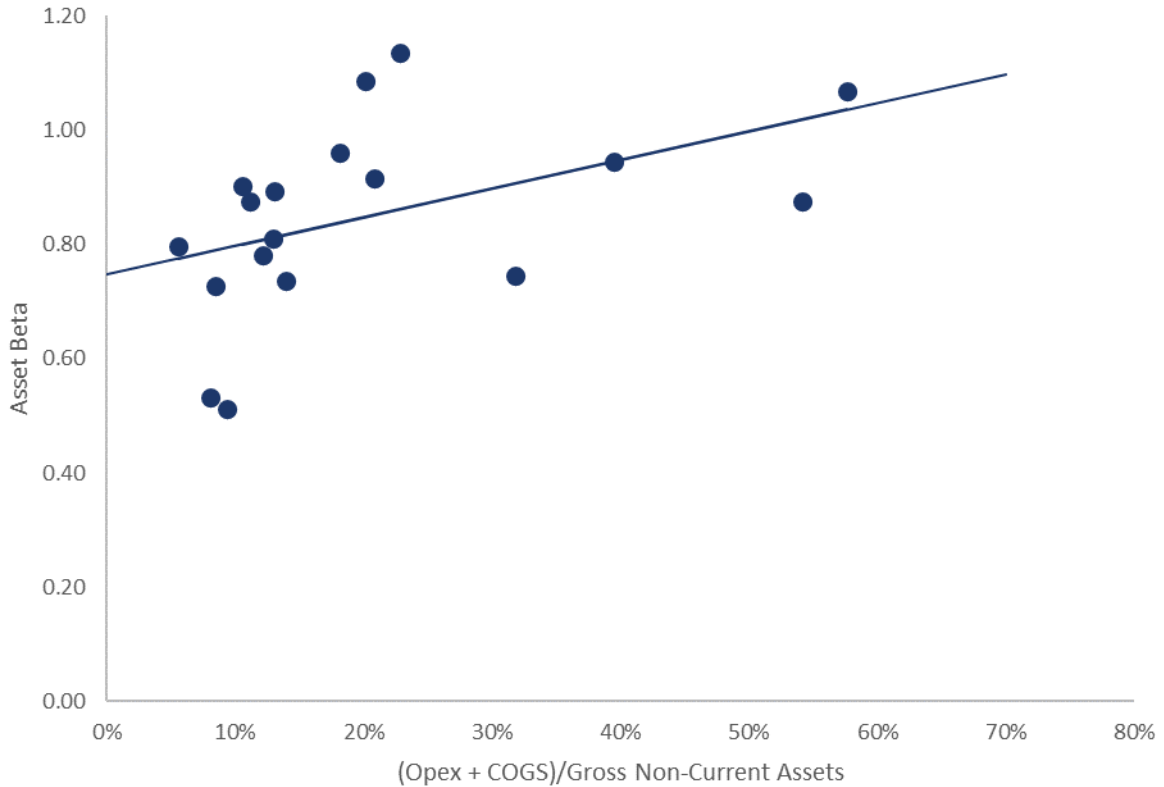
<sup>65</sup> We would also note that at an aggregate level, the total China TEU traffic fell by 6.7 per cent during 2008-09 (see Bloomberg's CNIFSCITT Index), which is close to the fall recorded at the Port of Melbourne.

<sup>66</sup> In Table 3.3 above we found that over the last 10 years the median Opex / Gross Non-current Assets ratio and Opex plus COGS / Gross Non-current Assets ratios of the port comparator group were 3 per cent and 15 per cent respectively.

<sup>67</sup> This estimate is based on the Regulatory Model indicating that for the last 5 years PoM's operating cost has been approximately \$130 million per annum, while its Regulated Asset Base (RAB) has been approximately \$4,650 million.

regression is statistically significant,<sup>68</sup> and indicates an upward slope. That is, on balance, the addition of other activities outside strict landlord port operations appears to increase the asset beta (i.e. have greater systematic risk than the landlord port operations).

**Figure 4.3: Port comparator group – asset beta regressed against (Opex + COGS) / Gross Non-Current Asset**



Source: Bloomberg and Incenta analysis

Based on this analysis we would expect the Port of Melbourne’s systematic risk to be somewhat lower than the average for the comparator group.<sup>69</sup>

#### 4.3.4 Our conclusions in relation to the asset beta for the Port of Melbourne

Based on our analysis of systematic risk factors in section 4.4 above, our first principles analysis and empirical estimates for other industry sectors, our view is that the asset beta of the Port of Melbourne should be:

<sup>68</sup> The regression equation is Asset beta = 0.747 + 0.501 (Opex + COGS)/Non-current Assets, where both coefficients are highly statistically significant (t-Statistics of 12.185 and 2.080 respectively) with an adjusted R<sup>2</sup> of 0.164. We note that whilst statistical significance is achieved in this case, asset betas are subject to considerable estimation error and are therefore not ideal as a dependent variable.

<sup>69</sup> We note that within time constraints we have not been able to incorporate an analysis of landholdings that often accompany port operations and could also bias the asset beta analysis. We would expect landholdings and the steady rental streams that flow from them to bias observed betas downward.

- Well above the asset beta of 0.58 observed for toll-roads
- Well above the asset betas of 0.51 and 0.53 for Port of Tauranga and HPHT respectively, due to the particular resilience of their cash flows
- Above the asset beta observed for airports (0.67), but
- Below the average asset beta of much of the comparator group because many have cash flows that are more highly pro-cyclical than Port of Melbourne's (in part due to the pro-cyclical volatility of throughput, and also to the ancillary operations such as stevedoring and commodity trading that many port businesses engage in).

Taking account of these factors our judgement is that an asset beta of 0.75 is the most appropriate point estimate of the Port of Melbourne's asset beta, within a range of 0.70 to 0.80.

### **4.3.5 Benchmark gearing for a port asset and equity beta**

#### ***Benchmark gearing***

Our view is that in most cases it is best to apply a mechanistic approach to determine the benchmark gearing. If an asset beta is derived from a given comparator group it is best to re-gear to the average of that comparator group, which avoids any issues of re-gearing to a level of gearing above or below the average. This is the approach that has been taken by the NZCC, in particular during its review of airport betas.<sup>70</sup>

Table 4.4 displays the 5-year and 10-year gearing of the port comparator group. This shows that the 5-year average (median) net-gearing is 25 per cent (23 per cent) and the 10-year average (median) net-gearing is 25 per cent (28 per cent). We consider that these results indicate that a gearing level of 25 per cent is the appropriate benchmark to apply to the Port of Melbourne.

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<sup>70</sup> NZCC (20 December, 2016), *Input methodologies review decisions: Topic 4: Cost of capital issues*.

Table 4.4: Gearing levels (Net Debt) for the port comparator group

Company name	Ticker	Country	Gearing (Net Debt)	
			5 year	10 year
Adani Ports & Special Economic Zone Ltd	ADSEZIN Equity	India	21%	23%
China Merchants Port Holdings Co Ltd	144 HK Equity	Hong Kong	26%	23%
COSCO SHIPPING Ports Ltd	1199 HK Equity	Hong Kong	31%	28%
Dalian Port	2880 HK Equity	Hong Kong	20%	27%
Gujarat Pipavav Port Ltd	GPPV IN Equity	India	0%	0%
Hutchison Port Holdings Trust	HPHT SP Equity	Singapore	50%	44%
Luka Koper	LKPG SV Equity	Slovenia	16%	35%
Port of Tauranga Ltd	POTNZ Equity	New Zealand	11%	12%
Rizhao Port Co Ltd	600017 CH Equity	China	32%	29%
Tianjin Port Development Holdings Ltd	3382 HK Equity	Hong Kong	49%	48%
Xiamen International Port Co Ltd	3378 HK Equity	Hong Kong	49%	31%
Yingkou Port Liability Co Ltd	600317 CH Equity	China	7%	23%
Societe d'Exploitation des Ports	MSA MC Equity	Morocco	0%	0%
Jiangsu Lianyungang Port Co Ltd	601008 CH Equity	China	36%	30%
Shanghai International Port Group Co Ltd	600018 CH Equity	China	12%	12%
Ningbo Zhoushan Port Co Ltd	601018 CH Equity	China	12%	12%
Qingdao Port International Co Ltd	6198 HK Equity	Hong Kong	18%	17%
Beibuwan Port Co Ltd	000582 CH Equity	China	0%	0%
<b>Grand Average</b>			<b>25%</b>	<b>25%</b>
<b>Grand Median</b>			<b>23%</b>	<b>28%</b>

Source: Bloomberg and Incenta analysis

#### **Equity beta estimate for the Port of Melbourne**

Taking account of the findings set out above, our view is that the Port of Melbourne:

- Has an asset beta of 0.75 (point estimate) within a range of 0.70 to 0.80
- The benchmark gearing level is 25 per cent, and
- Therefore, the equity beta point estimate is **1.0** within a range of 0.93 to 1.07.

## 5. Declarations

As Appendix J to this report I have attached a copy of Johnson Winter & Slattery’s letter, and I confirm that I have read and understood Attachments E and F of that letter, which are copies of: Form 44A to the Supreme Court (General Civil Procedure) Rules 2015, the Expert Witness Code of Conduct (Code of Conduct); and Victorian Civil & Administrative Tribunal Practice Note – PNVCAT2, Expert Evidence (Practice Note), and confirm that in the course of preparing this report and throughout the course of my engagement by PoM I agree to be bound by them.

I have made all the inquiries which I believe are desirable and appropriate (save for any matters identified explicitly in the report) and confirm that no matters of significance which I regard as relevant have, to my knowledge, been withheld from this report.



Jeffrey John Balchin

28 May, 2020

## A. List of comparator businesses

Ticker	Name	Country	Ticker	Name	Country
<b>Ports</b>			<b>Rail</b>		
ADSEZ IN Equity	Adani Ports & Special Economic Zone Ltd	India	CNR CN Equity	Canadian National Railway Co	Canada
144 HK Equity	China Merchants Port Holdings Co Ltd	Hong Kong	CP CN Equity	Canadian Pacific Railway Ltd	Canada
1199 HK Equity	COSCO SHIPPING Ports Ltd	Hong Kong	UNP US Equity	Union Pacific Corp	United States
2880 HK Equity	Dalian Port	Hong Kong	CSX US Equity	CSX Corp	United States
GPPV IN Equity	Gujarat Pipavav Port Ltd	Hong Kong	NSC US Equity	Norfolk Southern Corp	United States
HPHT SP Equity	Hutchison Port Holdings Trust	Singapore	KSU US Equity	Kansas City Southern	United States
LKPG SV Equity	Luka Koper	Slovenia	601006 CH Equity	Daqin Railway Co Ltd	Mainland China
POT NZ Equity	Port of Tauranga Ltd	New Zealand	RAIL3 BZ Equity	Rumo SA	Brazil
600017 CH Equity	Rizhao Port Co Ltd	Mainland China			
3382 HK Equity	Tianjin Port Development Holdings Ltd	Hong Kong			
3378 HK Equity	Xiamen International Port Co Ltd	Hong Kong			
600317 CH Equity	Yingkou Port Liability Co Ltd	Mainland China			
MSA MC Equity	Societe d'Exploitation des Ports	Morocco			
601008 CH Equity	Jiangsu Lianyungang Port Co Ltd	Mainland China			
600018 CH Equity	Shanghai International Port Group Co Ltd	Mainland China			
601018 CH Equity	Ningbo Zhoushan Port Co Ltd	Mainland China			
6198 HK Equity	Qingdao Port International Co Ltd	Hong Kong			
000582 CH Equity	Beibuwan Port Co Ltd	Mainland China			
<b>Airports</b>			<b>Tollroads</b>		
AOT TB Equity	Airports of Thailand PCL	Thailand	ATL IM Equity	Atlanta SpA	Italy
AENA SM Equity	Aena SME SA	Spain	BEM TB Equity	Bangkok Expressway & Metro PCL	Thailand
600009 CH Equity	Shanghai International Airport Co Ltd	Mainland China	CCRO3 BZ Equity	CCR SA	Brazil
FRA GR Equity	Fraport AG Frankfurt Airport Services Worldwide	Germany	JSMR IJ Equity	Jasa Marga Persero Tbk PT	Indonesia
ADP FP Equity	Aeroports de Paris	France	ECOR3 BZ Equity	EcoRodovias Infraestrutura e Logistica SA	Brazil
000089 CH Equity	Shenzhen Airport Co Ltd	Mainland China	GET FP Equity	Getlink SE	France
694 HK Equity	Beijing Capital International Airport Co Ltd	Hong Kong	PINFRA* MM Equity	Promotora y Operadora de Infraestructura SAB de CV	Mexico
GAPB MM Equity	Grupo Aeroportuario del Pacifico SAB de CV	Mexico	TCL AU Equity	Transurban Group	Australia
ASURB MM Equity	Grupo Aeroportuario del Sureste SAB de CV	Mexico	600548 CH Equity	Shenzhen Expressway Co Ltd	Mainland China
MAHB MK Equity	Malaysia Airports Holdings Bhd	Malaysia	ALX AU Equity	Atlas Arteria Ltd	Australia
FHZN SW Equity	Flughafen Zurich AG	Switzerland	ATIM Equity	ASTM SpA	Italy
OMAB MM Equity	Grupo Aeroportuario del Centro Norte SAB de CV	Mexico	152 HK Equity	Shenzhen International Holdings Ltd	Hong Kong
SYD AU Equity	Sydney Airport	Australia	177 HK Equity	Jiangsu Expressway Co Ltd	Hong Kong
TAVHL TI Equity	TAV Havalimanlari Holding AS	Turkey	576 HK Equity	Zhejiang Expressway Co Ltd	Hong Kong
AIA NZ Equity	Auckland International Airport Ltd	New Zealand	000429 CH Equity	Guangdong Provincial Expressway Development Co Ltd	Mainland China
FLU AV Equity	Flughafen Wien AG	Austria	995 HK Equity	Anhui Expressway Co Ltd	Hong Kong
ACV VN Equity	Airports Corp of Vietnam JSC	Vietnam	1062 HK Equity	Yuexiu Transport Infrastructure Ltd	Hong Kong
GMRI IN Equity	GMR Infrastructure Ltd	India	LTK MK Equity	Lingkar Trans Kota Holdings Bhd	Malaysia
600897 CH Equity	Xiamen International Airport Co Ltd	Mainland China	IDEALB1 MM Equity	Impulsora del Desarrollo y el Empleo en America Latina SAB de CV	Mexico
357 HK Equity	Hainan Meilan International Airport Co Ltd	Hong Kong	600350 CH Equity	Shandong Hi-speed Co Ltd	Mainland China
ADB IM Equity	Aeroporto Guglielmo Marconi Di Bologna SpA	Italy	107 HK Equity	Sichuan Expressway Co Ltd	Hong Kong
KBHL DC Equity	Kobenhavns Lufthavne	Denmark	ALEATIC* MM Equity	ALEATICA SAB de CV	Mexico
MIA MV Equity	Malta International Airport PLC	Malta	600033 CH Equity	Fujian Expressway Development Co Ltd	Mainland China
AERO SG Equity	Aerodrom Nikola Tesla AD Beograd	Serbia	600020 CH Equity	Henan Zhongyuan Expressway Co Ltd	Mainland China
			600269 CH Equity	Jiangxi Ganyue Expressway Co Ltd	Mainland China
			000828 CH Equity	Dongguan Development Holdings Co Ltd	Mainland China
			600035 CH Equity	Hubei Chufan Smart Communication Co Ltd	Mainland China
			600368 CH Equity	Guangxi Wuzhou Communications Co Ltd	Mainland China
			601188 CH Equity	Heilongjiang Transportation Development Co Ltd	Mainland China
			601518 CH Equity	Jilin Expressway Co Ltd	Mainland China
			CMNP IJ Equity	Citra Marga Nusaphala Persada Tbk PT	Indonesia

Source: Bloomberg and Incenta analysis

## B. Selected port comparators

In this appendix we set out in greater detail our reasons for including the 18 port entities that we have selected as appropriate comparators for PoM. Our selections do not imply that we consider each selected business provides an accurate reflection of the systematic risk of PoM. For example, in this appendix we show how estimates of the Port of Tauranga's (POT) asset beta have been tied to the composition of its cargo throughput (i.e. containers vs bulk commodities and the relativity of imports vs exports orientation). We can be relatively certain that including POT in the list of comparators will bias the overall estimate downwards relative to the asset beta that PoM's characteristics would suggest is appropriate. Other ports in the sample exhibit characteristics that would tend to bias the estimate upwards.

### ***Adani Ports & Special Economic Zone Ltd (ADSEZ IN Equity)***

#### Overview

Adani Ports and Special Economic Zone Limited (Adani Ports), located on the west coast of India is an India-based port infrastructure company. The Company develops, operates and maintains port and port-based related infrastructure facilities in India.

#### Composition of cargo / activities

Port operations account for 86 per cent of Adani Ports' EBITDA. Other activities include: the Multi product Special Economic Zone (SEZ) (9.4 per cent of EBITDA); logistics; and a coal terminal at Abbot Point in Australia. Adani Ports operates 10 ports/terminals located in five states of India: Gujarat, Goa, Andhra Pradesh, Tamil Nadu and Odisha. Cargo handled at the company's ports include bulk, containers and crude oil.

**Table B.1: Adani Ports – Composition of cargo throughput, 2014 to 2019, per cent**

Cargo type	2014	2015	2016	2017	2018	2019
Coal	40	47	41	37	33	33
Containers	32	29	32	37	41	41
Crude	18	10	12	12	11	12
Other	10	14	15	15	15	14
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>

Source: Adani 2019 Annual Report, p.10.

Unlike China, India's container trade is predominantly (75 per cent) comprised of imported goods.<sup>71</sup> JP Morgan has noted that since the 1980s the elasticity of India's ports cargo growth to real GDP growth has been 1.3x, but over the last 10 years the elasticity has declined to 0.7x, which may indicate that the Indian market is maturing relative to more developed countries.<sup>72</sup> However, as shown in Table B.1 above, containers accounted for only 32 per cent to 41 per cent of the throughput at Adani Ports over the period since 2014 suggesting less income-sensitive cargoes than other Indian ports.

<sup>71</sup> J.P. Morgan (23 March, 2020), *Adani Ports and Special Economic Zone – Stay Anchored*, p.3

<sup>72</sup> J.P. Morgan (23 March, 2020), *Adani Ports and Special Economic Zone – Stay Anchored*, p.1.

#### Form of regulation

We have not sighted a discussion of a regulatory framework applicable to Adani Ports.

#### Key financial characteristics

Adani Ports has a large market capitalisation (USD10.4 billion at 31 December 2019) with a free float capitalisation of USD3 billion. It is rated as highly liquid by Bloomberg's liquidity index (78<sup>th</sup> centile)<sup>73</sup> and Bloomberg reports that Adani Ports is covered by 26 institutional analysts. It has an Adjusted EBITDA Margin of 65 per cent indicating a large capital investment, and its Opex/Gross Non-Current Assets (Opex + COGS/Gross Non-Current Assets) ratio is 11 (11) per cent.

#### Other issues relevant to beta estimation

Adani Ports is 39.34 per cent owned by Gautam S Adani.

#### Conclusion on first principles

On the basis of its lower import container component relative to PoM we should expect a lower asset beta at Adani Ports. On the other hand, Adani's coal and crude oil cargoes are also likely to be relatively pro-cyclical to the extent they are linked to economic activity.

### ***China Merchants Port Holding Company (144 HK Equity)***

#### Overview

China Merchants Port Holding Company (CMPHC) is a major port investment holding company with operations in mainland China, Hong Kong and Taiwan. CMPHC is one of the world's largest container port owner/operators, and by 2016 the containers handled by CMPHC's ports numbered 71.93 million in China and 16.96 million in the rest of the world, including in Europe, Central and South America and Africa.

#### Composition of cargo / activities

The company has consciously concentrated and expanded its activities in ports and retreating from some peripheral activities. In 2016 its port operations accounted for 93 per cent of assets and for 100 per cent of its profit. Approximately 80 per cent of its operations were based in mainland China, Hong Kong or Taiwan.

#### Form of regulation

Cargo loading charges in China are subject to regulation by the Chinese National Development and Reform Commission's (NDRC).

#### Key financial characteristics

CMPHC has a large market capitalisation (USD5.8 billion at 31 December 2019) with a free float capitalisation of USD2.1 billion. It is rated as highly liquid by Bloomberg's liquidity index (76<sup>th</sup>

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<sup>73</sup> Bloomberg liquidity measure from 25 May, 2020 was used for all comparator firms.



centile) and Bloomberg reports that the company is covered by 9 institutional analysts. It has a high Adjusted EBITDA Margin of 94 per cent reflecting its large capital investment, and its Opex/Gross Non-Current Assets (Opex + COGS/Gross Non-Current Assets) ratio is 2 (6) per cent.

Other issues relevant to beta estimation

CMPHC is 81.8 per cent owned by the China mainland listed China Merchant Ports Group Limited (201872 CH Equity), which in turn is majority owned by the Chinese Government.

CMPHC has built up and now owns a majority stake in Dalian Port (PDA) Company Ltd-H (2880 HK Equity), which is also listed in Hong Kong (see below). We also considered including China Merchants Ports Group Limited in the sample of comparators. It has the same Managing Director as CMPHC (Mr Bai Jingtao), a large degree of overlap in operations with CMPHC, and is its major shareholder. China Merchants Ports Group Limited also has a larger free float (68.4 per cent) than CMPHC (36.5 per cent).<sup>74</sup> We do not think that both CMPHC and China Merchants Ports Group Limited should be included because they have a large degree of overlap and so this would be a double-count. Since the majority of the China Merchants Ports Group Limited market capitalisation is derived from its shareholding in CMPHC, which is closer to the operations we believe the latter should be included.

In addition, CMPHC has the following desirable characteristics:

- Since it is listed in Hong Kong, there are at least 9 market analysts following the stock compared to none for the China listed entity;<sup>75</sup> and
- Whilst operations are mainly on the Chinese mainland rather than in Hong Kong, the main Chinese and Hong Kong market indices are reasonably highly related.<sup>76</sup>

Conclusion on first principles

With most of its operations in port assets in port operations handling containers and a volatility dampening effect coming from its non-China region activity, we would expect the asset beta of this business to reasonably reflect the systematic risk faced by PoM.

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<sup>74</sup> The “free float” of a listed company refers to the percentage of the stock that may be considered tradeable in the normal course of trading. Non-tradeable stock is usually held by a party such as a sponsor (e.g. company founder) or government shareholder.

<sup>75</sup> Bloomberg’s liquidity score (LQA\_LIQUIDITY\_SCORE) is measured “on a scale of 1 to 100 (100 being most liquid) that summarizes the relative liquidity of an instrument in the covered universe. Liquidity in this sense is the ability to sell a security at the lowest cost for a comparable range of volumes.”

<sup>76</sup> Over the last 5 years the “beta” (estimated by monthly returns) of the Shenzhen Stock Exchange B Share Index (SZBSHR Index) against the Hong Kong (HSI Index) is 0.81.

## ***COSCO SHIPPING Ports Ltd (1199 HK Equity)***

### Overview

COSCO SHIPPING Ports Ltd (CSP) is one of the largest port owner-operators in China, with a portfolio of terminals that cover five main port regions in Mainland China, Hong Kong and Taiwan, as well as other overseas hub ports.

### Composition of cargo / activities

As at 31 December 2016, CSP operated and managed 180 berths at 30 ports worldwide, of which 158 (88 per cent) were for containers, with a combined annual handling capacity of approximately 97.3 million twenty-foot equivalent containers (TEUs). In March 2016 the business transformed itself into a pure terminals operator, which involved the disposal of Florens Container Holdings Ltd, which was a container leasing, management and sale business. When this process concluded OCBC Investment Research stated:<sup>77</sup>

*We like CSP for its business model as a pure play ports operator, as it eliminates potential drag on earnings from unrelated businesses.*

In outlining the risks faced by CSP, OCBC Investment Research noted:<sup>78</sup>

*Earnings derived from port operations are highly dependent in volume given the high fixed costs. Hence, in a weak global economic environment, not only will volume fall, tariffs may also decline due to lower demand.*

Of CSP's 97.3 million container handling capacity, 75.9 per cent is located in mainland China, Hong Kong or Taiwan.<sup>79</sup>

### Form of regulation

Another risk referred to by OCBC Investment Research related to the 2017 NDRC's competition review, which resulted in cuts to container handling charges at four Chinese ports: Shanghai (-19.4 per cent), Tianjin (-11.3 per cent), Ningbo-Zhoushan (-21 per cent) and Qingdao (-16.5 per cent). It noted that these cuts would only affect one segment of CSP's operations.<sup>80</sup>

### Key financial characteristics

CSP had a market capitalisation of USD2.6 billion at 31 December 2019, with a free float capitalisation of USD1.4 billion. It is rated as highly liquid by Bloomberg's liquidity index (60<sup>th</sup> centile) and Bloomberg reports that the company is covered by 11 institutional analysts. It has an

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<sup>77</sup> OCBC Investment Research (6 December, 2017), *COSCO SHIPPING PORTS – Undervalued Pure-Play Port Operator*, p.5.

<sup>78</sup> OCBC Investment Research (6 December, 2017), *COSCO SHIPPING PORTS – Undervalued Pure-Play Port Operator*, p.6.

<sup>79</sup> OCBC Investment Research (6 December, 2017), *COSCO SHIPPING PORTS – Undervalued Pure-Play Port Operator*, p.2.

<sup>80</sup> OCBC Investment Research (6 December, 2017), *COSCO SHIPPING PORTS – Undervalued Pure-Play Port Operator*, p.6.

Adjusted EBITDA Margin of 99 per cent reflecting its capital investment, and its Opex/Gross Non-Current Assets (Opex + COGS/Gross Non-Current Assets) ratio is 1 (8) per cent.

Other issues relevant to beta estimation

CSP's largest shareholder (China COSCO Hong Kong Limited) is owned by COSCO SHIPPING Corporation, which is a member of Ocean Alliance, together with Evergreen Line, CMA CGM, and OOCL.

Conclusion on first principles

With most of CSP's operations in port assets in port operations handling containers and a volatility dampening effect coming from its non-China region activity, we would expect the asset beta of this business to reasonably reflect the systematic risk faced by PoM.

### ***Dalian Port (PDA) Co Ltd-H (2880 HK Equity)***

Overview

Dalian Port (Dalian) is located at the tip of the Liaodong Peninsula in northern China but is listed on the Hong Kong market. It was a pioneer in China's container trade.

Composition of cargo / activities

As shown in Table B.2 below, Dalian's container segment delivers only 40.9 per cent of revenue and 43.7 per cent of gross profit. Compared with the target firm it is relatively heavily dependent on its crude oil segment, and has a lucrative value-added services segment that offers tugging, tallying and railway services. It has a presence in fast growing regions of China.

**Table B.2: Dalian Port - Segmental cargo throughput, 2018.**

Segment	Share of Revenue	Share of Gross Profit	Tonnes	Units	Unit values
Crude oil segment	17.7%	19.1%	5,806,200		
Container segment	40.9%	43.7%		11,107,000	TEUs
Automobiles	3.5%	0.6%		826,319	Automobiles
Bulk and general cargo	14.4%	16.1%	68,390,000		
Bulk grain	5.8%	-0.7%	5,905,000		
Passengers and Ro-Ro	2.6%	3.3%		3,920,000	Passengers
				979,000	Ro-Ro units
Value Added Services	13.8%	18.4%			Tugging, tallying, railway

*Source: Dalian Port 2018 Annual Report, pp.19-30.*

Form of regulation

Cargo loading charges in China are subject to regulation by the Chinese National Development and Reform Commission's (NDRC).

#### Key financial characteristics

Dalian had a market capitalisation of USD2.9 billion at 31 December 2019, with a free float capitalisation of USD0.97 billion. Its stock liquidity is rated at the 42<sup>nd</sup> centile by Bloomberg, and Bloomberg reports that the company is not covered by institutional analysts, but Drewry Maritime Research has produced a research report on the business.<sup>81</sup> It has an Adjusted EBITDA Margin of 62 per cent reflecting its capital investment, and its Opex/Gross Non-Current Assets (Opex + COGS/Gross Non-Current Assets) ratio is 3 (14) per cent.

#### Other issues relevant to beta estimation

As noted above, China Merchants Port Holding Company (CMPHC) owns a majority (66.62 per cent) stake in Dalian Port, and so we have considered whether both companies should be included in a sample of comparators. Our view is that CMPHC is a materially larger and broader business than Dalian Port, and so including both ports does not result in the Dalian port effectively being included twice. The market capitalisations at 31 December, 2019 were USD5,835.9 million and USD2,897.6 million respectively, so that CMPHC's investment in Dalian represented only approximately one third of its market capitalisation. In addition, while Dalian's free float is only 33.4 per cent, this represents a market value of USD967.1 million. Bloomberg's liquidity score places Dalian Port just above the median for stocks (53).

#### Conclusion on first principles

Taking account of Dalian Port's operations, cargo shares and market liquidity we believe it should be included as a comparator. Its container segments is lower than PoM's, but it has a high crude oil segment that could result in additional pro-cyclical volatility and result in a higher asset beta.

#### ***Gujarat Pipavav Port Ltd (GPPV IN Equity)***

##### Overview

Gujarat Pipavav (GP) was India's first port in the private sector. It is located in Rajula Saurashtra, Gujarat on the West Coast of India. Owned 43 per cent by A.P. Moller-Maersk Group, GP is operated by a world leading terminal operator, APM Terminals.

##### Composition of cargo / activities

GP handles containers, bulk and liquid cargo and Ro-Ro (roll-on roll-off vehicles) and is subject to some competition in the container and bulk trades from other Indian ports (JNPT and Mundra). Container trade accounts for approximately 70 per cent of Gujarat Pipavav's cargo throughput.

##### Form of regulation

We have not sighted material relating to GP's regulatory framework.

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<sup>81</sup> Drewry Equity Maritime Research (2012), *Location is the key advantage – Dalian Port Company*.

#### Key financial characteristics

GP had a market capitalisation of USD599 million at 31 December 2019, with a free float capitalisation of USD341.4 million. It has a relatively low Bloomberg liquidity index (33<sup>rd</sup> centile) but Bloomberg reports that the company is covered by 22 institutional analysts. It has an Adjusted EBITDA Margin of 58 per cent reflecting its capital investment, and its Opex/Gross Non-Current Assets (Opex + COGS/Gross Non-Current Assets) ratio is 18 (18) per cent.

#### Other issues relevant to beta estimation

The firm protects against currency risk by applying dollarization to its tariffs (70 per cent of tariffs are covered in this way).

#### Conclusion on first principles

With a similar proportion of largely import containers to PoM, we would expect the asset beta of this business to reasonably reflect the systematic risk faced by PoM.

### ***Hutchison Port Holdings Trust (HPHT SP Equity)***

#### Overview

Hutchison Port Holdings Trust (HPH Trust) develops, operates and manages deep-water container ports in the Guangdong Province, Hong Kong and Macau in China, which is collectively referred to as the “Pearl River Delta”.

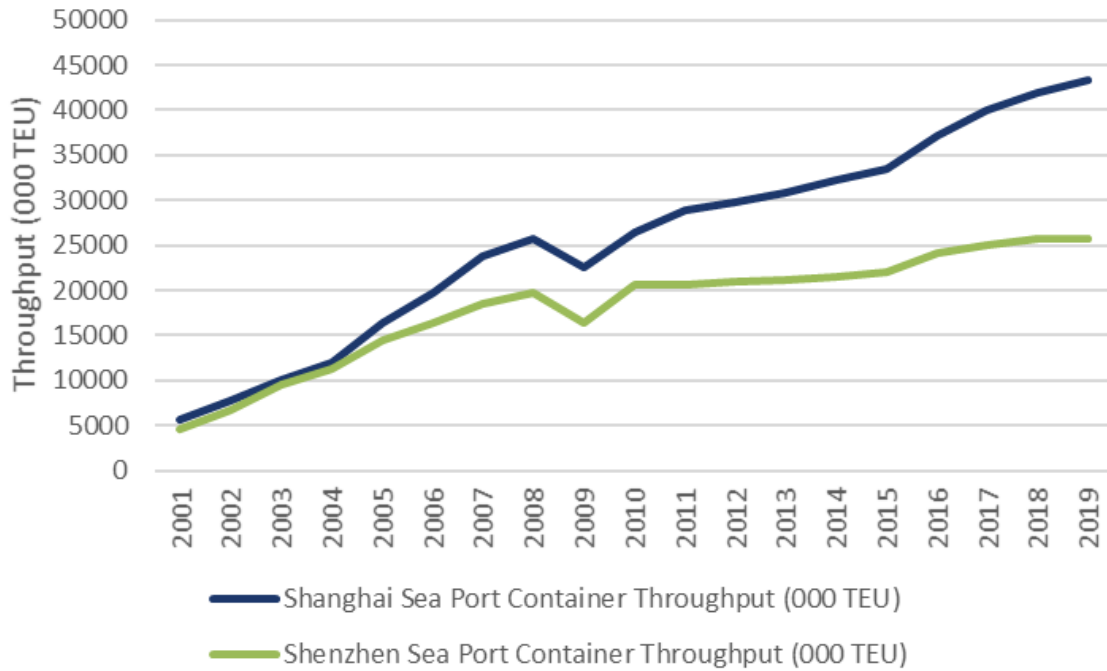
#### Composition of cargo / activities

HPH Trust owns/operates a total of 38 berths spread across 647 hectares of land, and in 2018 delivered a total of approximately 24 million TEUs. Its core operations are:

- Hong Kong – Hongkong International Terminals (“HIT”), COSCO-HIT Terminals (“COSCO-HIT”, which is 50 per cent owned Joint Venture with COSCO SHIPPING Ports Ltd) and
- Mainland China - Yantian International Container Terminals (“YANTIAN”) and Huizhou International Container Terminals (“HICT”).

The core operations are complemented by river port facilities (Jiamen Terminal and Nanhai Terminal) and ancillary services (logistic chain solutions). The revenue split is approximately 35 per cent from Hong Kong and 65 per cent from mainland China.

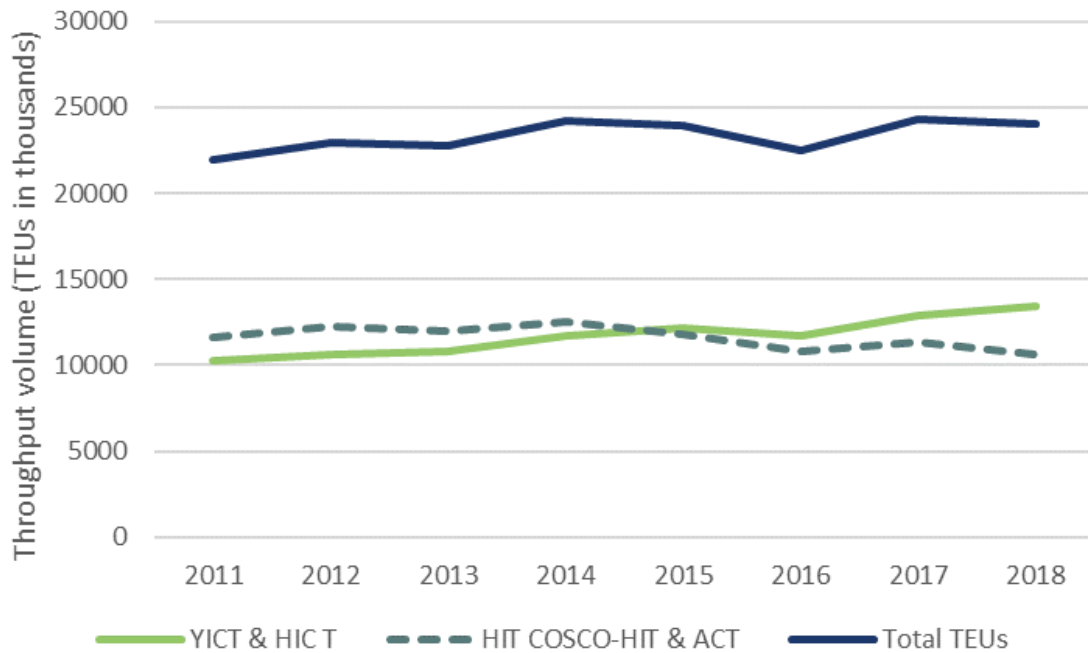
Figure B.1: Throughputs (TEUs) at Shanghai and Shenzhen Sea Ports



Source: Bloomberg

Different port regions in China experience variable performance. Figure B.1 above shows that since the global financial crisis the Shenzhen Sea Port (where a material part of HPH Trust’s activities are based) are growing at a much slower pace than in the Shanghai Sea Port region. HPH Trust’s throughput has grown slower than the Shanghai Sea Port region. As displayed in Figure B.2 below, HPH Trust is a relatively mature port asset. Since 2011 the growth rate of throughput has been only 0.7 per cent per annum (CAGR), due to declining volumes in the Hong Kong region (HIT and COSCO-HIT).

Figure B.2: Hutchison Port Holdings Trust – Throughput volume (TEU in thousands)



Source: HPH Trust (12 February, 2019) Results Presentation, p.10.

The free float in HPH Trust shares is estimated at 72.3 per cent, with the major shareholders being Hutchinson Port Holdings Trust (27.62 per cent) and Temasek Holdings Pty Ltd (The Singapore Government) (14.02 per cent). Bloomberg’s estimate of the stock’s liquidity is close to the median (47). However, as HPH Trust’s activities are all located outside of Singapore, like Global Ports Investments PLC’s (GLPR LI Equity) activities are located outside of the UK (see Appendix F), a question arises about the degree to which the Singapore, Hong Kong and China stock markets are related, as a loose relationship would be expected to reduce the estimate of HPH Trust’s beta estimate against the Singapore market.

Form of regulation

Cargo loading charges in China are subject to regulation by the Chinese National Development and Reform Commission’s (NDRC). HPH Trust’s port operations have also been affected by the tariff cuts announced by the NDRC and JP Morgan has stated that tariff cuts are “one of the key overhangs for the sector”.<sup>82</sup>

Key financial characteristics

HPH Trust had a market capitalisation of USD1.5 billion at 31 December 2019, with a free float capitalisation of USD1.08 billion. Its Bloomberg liquidity index sits just below the median (at the 51<sup>st</sup> centile) and Bloomberg reports that the company is covered by 5 institutional analysts. It has an

<sup>82</sup> J.P. Morgan (15 April, 2018), *Hutchison Port Holdings Trust*, p.1.

Adjusted EBITDA Margin of 85 per cent reflecting its capital investment, and its Opex/Gross Non-Current Assets (Opex + COGS/Gross Non-Current Assets) ratio is 4 (8) per cent.

Other issues relevant to beta estimation

While operations are in Hong Kong and China, HPH Trust is listed on the Singapore stock market (SPI Index). As noted above, the bulk (65 per cent) of HPH Trust's operations are located in mainland China, so the correlation between the Singapore (SPI Index) and China (SZBSHR Index) markets is the key issue. We find that over the past 5 years the (monthly returns) "beta" of the China market against the Singapore market has been 0.73, while the Hong Kong beta against the Singapore market is much higher at 1.10. The weighted beta is 0.86.

Conclusion on first principles

Unlike Global Ports Investments PLC (GLPR LI Equity in Appendix D) we have not excluded HPHT from the sample because of the relatively tight relationship between the Singapore, mainland China and Hong Kong stock markets. However, we might expect some dampening effect on the asset beta measured against the Singapore market. In addition, owing to its maturity HPHT showed remarkable resilience during the global financial crisis, as discussed in section 4.3.2 above.

### ***Luka Koper (LKPG SV Equity)***

Overview

Luka Koper D.D. is a strategically located port in Slovenia at the top of the Adriatic Sea. Alta Invest notes that London based Drewry Maritime Equity Research has estimated Luka Koper has the fastest overall transit time from China to South Germany:<sup>83</sup>

*Not only are they the closest port for the domestic market, their position gives them an additional competitive advantage for Asian exporters since they can deliver cargo through the Adriatic sea to Central and SE Europe instead of sailing through the Mediterranean and Atlantic to ports in the Netherlands or Germany.*

The port stands on 270 hectares of land, with 48.4 hectares of covered storage space and 109.6 hectares of open-air storage space. It comprises 28 berths stretching across 3,282 metres of shoreline.

Composition of cargo / activities

Imports comprise 68 per cent of cargo throughput at Luka Koper, which would tend to make it relatively sensitive to the economic cycle. As shown in Table B.3 below, Luka Koper's cargo is diversified between containers (38 per cent), bulk and break cargo (35 per cent), liquid cargo (16 per cent), general cargo (7 per cent) and vehicles (4 per cent).

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<sup>83</sup> Alta Invest (21 April, 2016) *Luka Koper D.D.*, p.1.



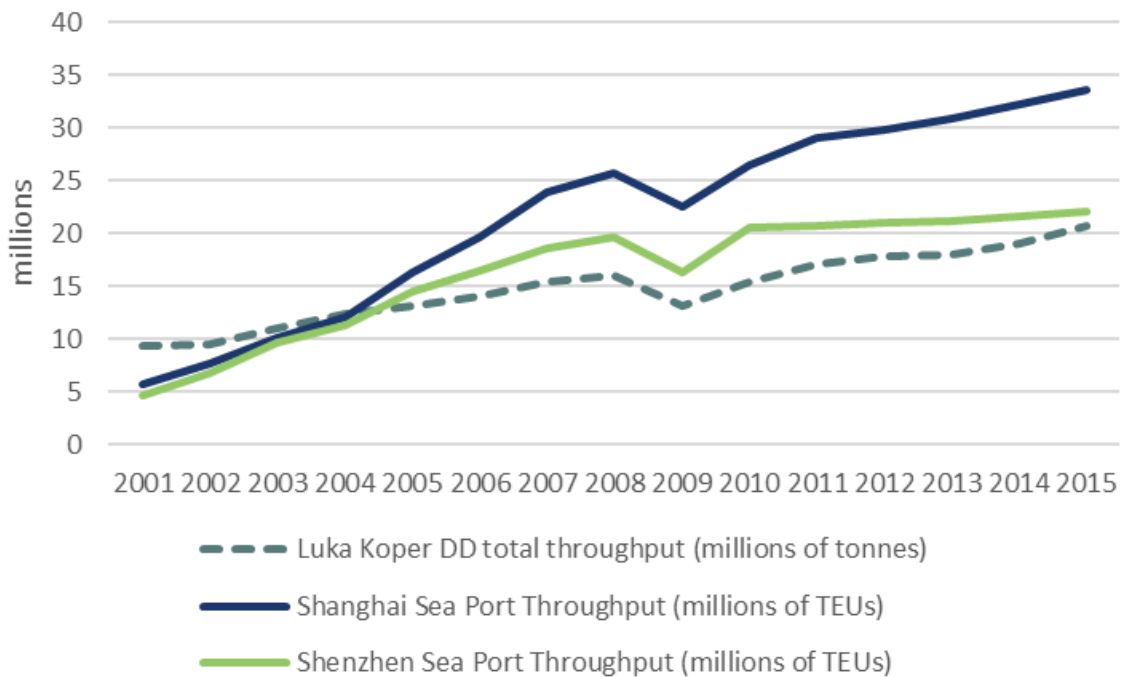
**Table B.3: Luka Koper cargo throughput, 2015**

Cargo type	2015
Container freight	38%
Vehicles	4%
Liquid cargo	16%
Bulk and break bulk cargo	35%
General cargo	7%
Total	100%

Source: *Alta Invest (21 April, 2016), p. 12.*

The share of containers at Luka Koper has grown considerably since 2000, but as shown in Figure B.3, the overall throughput was quite sensitive to the global downturn in trade experienced during the global financial crisis. We have included the container throughputs of some Chinese container ports (in TEUs) for comparison, showing the relative declines in 2008-09. Since the global financial crisis Luka Koper’s throughput has grown faster than the Shenzhen Sea Port region in China. In 2008-09 the throughput declines at Luka Koper were led by the pro-cyclicality of imported bulk and break bulk cargo, and in vehicles.

**Figure B.3: Throughput of Luka Koper D.D. vs selected Chinese container ports, 2001-2015**



Source: *Source: Alta Invest (21 April, 2016), p. 1, and Bloomberg.*

Form of regulation

We have not sighted information regarding regulation of Luka Koper.

#### Key financial characteristics

Luka Koper had a market capitalisation of USD354.7 million at 31 December 2019, with a free float capitalisation of USD105.6 million. Its Bloomberg liquidity index is below the median (at the 29<sup>th</sup> centile) and Bloomberg reports that the company is covered by one institutional analyst. It has an EBITDA Margin of 39 per cent, and its Opex/Gross Non-Current Assets (Opex + COGS/Gross Non-Current Assets) ratio is 39 (39) per cent.

#### Other issues relevant to beta estimation

In assessing the business, the equity analyst Alta Invest raised the question of political risk stemming from the fact that Luka Koper is 51 per cent owned by the Republic of Slovenia, and a further 11.13 per cent is held by the Slovenian sovereign fund. Frequent management changes and aborted plans to merge other businesses into a logistics conglomerate and finance a railway were alluded to. With a free float of only 29.8 per cent, Luka Koper's tradeable market value at 31 December 2019 was very small (and, at USD105.6 million). Luka Koper's Bloomberg liquidity measure is also below the median (at 38).

#### Conclusion on first principles

Luka Koper has a similar import orientation to PoM, which should also make its throughput sensitive to economic growth. Given its import orientation, sensitivity of cargo to economic growth and potential impact of political risk we should expect a relatively high asset beta for Luka Koper. However, we think it should be retained in the sample of comparators owing to some operational similarities to PoM.

### ***Port of Tauranga Ltd (POT NZ Equity)***

#### Overview

Port of Tauranga Limited (POT) is located in the north island of New Zealand, approximately 200 kilometres from Auckland. Activities at the port include the provision of wharf facilities, back up land for the storage and transit of import and export cargo, berthage, cranes, tug and pilotage services for exporters, importers and shipping companies and the leasing of land and buildings. The Group also operates a container terminal and has bulk cargo marshalling operations.

#### Composition of cargo / activities

The composition of cargo (by weight) at the port in 2019 was approximately 50 per cent bulk trade, 14 per cent logs trade, 3 per cent milk trade, and 33 per cent container trade.<sup>84</sup> Commodity trades such as logs can introduce a random (non-cyclical) element that would tend to lower systematic risk.<sup>85</sup>

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<sup>84</sup> Deutsche Bank (25 October 2019), *Port of Tauranga – A weak start to FY20*, p.2.

<sup>85</sup> Deutsche Bank (28 February 2020), *Port of Tauranga – Log-jammed*, p.1, notes that in the previous period most of the decline in trade was caused by an 8.4 per cent reduction in log volumes.

Form of regulation

Ports in New Zealand are not formally subject to regulation, however there is a general ability under the New Zealand Commerce Act to apply monitoring or heavier regulation.

Key financial characteristics

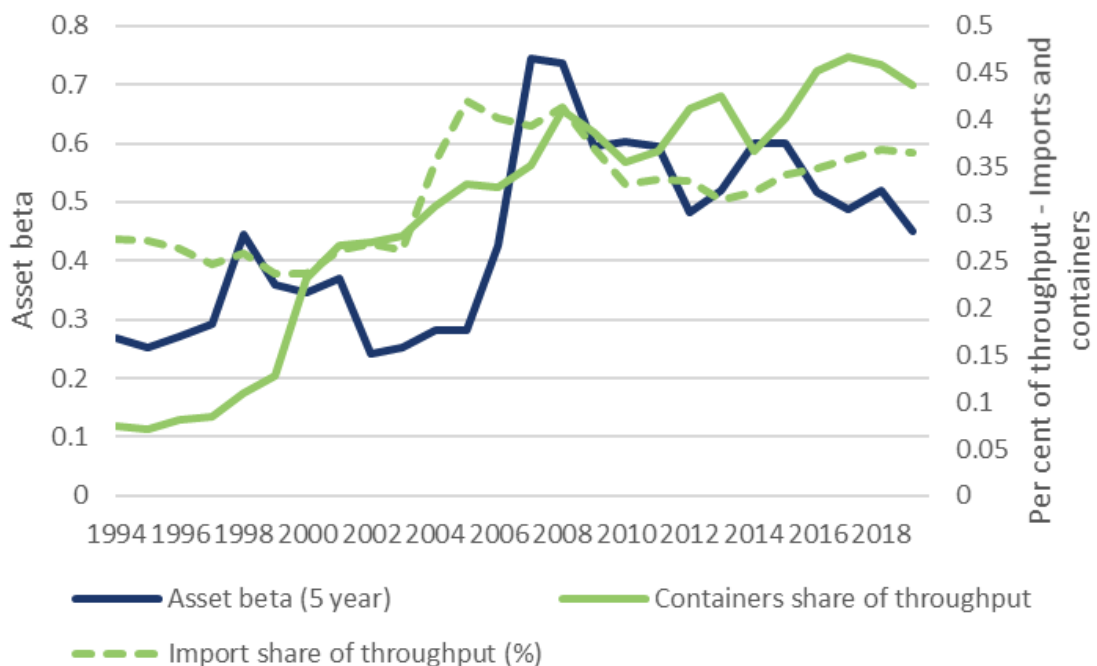
POT had a market capitalisation of USD3.6 billion at 31 December 2019, with a free float capitalisation of USD1.6 billion. Its Bloomberg liquidity index is at the median (68<sup>th</sup> centile) and Bloomberg reports that the company is covered by 6 institutional analysts. It has a high Adjusted EBITDA Margin of 56 per cent reflecting its capital investment, and its Opex/Gross Non-Current Assets (Opex + COGS/Gross Non-Current Assets) ratio is 9 (9) per cent.

Other issues relevant to beta estimation

In Figure B.4 below, we show the sensitivity of estimates of the Port of Tauranga’s (POT) asset beta to the share of containers in its throughput. When the containers share was in the range of 15-20 per cent, the POT asset beta was in a range of 0.30 to 0.40. As the share of containers increased to a range of 35-40 per cent, the POT’s asset beta climbed to a range of 0.50 to 0.60 (with a brief rise to 0.70 during the global financial crisis).

Another factor explaining the rise in POT asset betas is the rise in the import share of throughput which is more sensitive to domestic economic conditions. After peaking at 43 per cent just prior to the global financial crisis, POT’s import share has fallen back to approximately 35 per cent, and the asset beta has been in decline also. Since the POM’s container component is materially higher, at 80 per cent, we would expect it to be exposed to greater systematic risk than POT.

**Figure B.4: Port of Tauranga – asset beta vs share of container trade and import share**



Source: Port of Tauranga, Bloomberg and Incenta analysis

Conclusion on first principles

While the foregoing analysis shows that POT's asset beta estimate is likely to be below that of PoM (owing to composition of cargo), we have retained it in the sample as it provides a low point benchmark, and is an offset to other comparators that may have higher systematic risk fundamentals than PoM.

### **Rizhao Port Co Ltd-A (600017 CH Equity)**

Overview

Rizhao Port Co Ltd (RPC) is 43.58 per cent owned by the Chinese government's Rizhao Port Group Co Ltd, is one of China's largest port companies, and is listed on the Chinese stock market.

Composition of cargo / activities

With a major focus on bulk transportation of coal, iron ore, beans and wood, the port delivered a cargo throughput of 226 million tonnes in 2017. RPC is located on the Wari Rail Line, which is one of the four major rail lines for coal transportation in China. RPC's parent, Rizhao Port Group Co., Ltd. provides iron ore transportation, oil and liquid chemicals transportation, container transportation, coal transportation, and operates building manufacturing, financial businesses. RPC has 4 container berths and 1 million square metres of container storage yards (with a capacity for 6 million TEUs per annum). Approximately 35 per cent of the throughput in 2017 was oil and containers (up from 24 per cent in 2014).<sup>86</sup> Bulk cargo throughput is 60 per cent of revenue.<sup>87</sup> SWS Research has mooted a future integration of RPC's operations with the wider operations of its parent.<sup>88</sup>

Form of regulation

Cargo loading charges in China are subject to regulation by the Chinese National Development and Reform Commission's (NDRC).

Key financial characteristics

RPC had a market capitalisation of USD1.3 billion at 31 December 2019, with a free float capitalisation of USD558 million. Its Bloomberg liquidity index is very high (90<sup>th</sup> centile) and Bloomberg reports that the company is covered by 2 institutional analysts. It has an Adjusted EBITDA Margin of 79 per cent reflecting its capital investment, and its Opex/Gross Non-Current Assets (Opex + COGS/Gross Non-Current Assets) ratio is 1 (12) per cent.

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<sup>86</sup> SWS Research (25 June, 2018), *Rizhao*, p.1.

<sup>87</sup> SWS Research (8 May, 2018), *Rizhao Port – Clear Sailing*.

<sup>88</sup> SWS Research (25 June, 2018), *Rizhao*.

## Conclusion on first principles

Based on the absence of import containers at RPC we should expect it to have a lower asset beta than PoM, however this effect could be outweighed by the degree of pro-cyclicality in its coal and iron ore transportation, consumption of which is linked to growth of the Chinese economy.

### ***Tianjin Port Development Holdings Ltd (3382 HK Equity)***

#### Overview

Tianjin Port Development Holdings (TPDH) owns and operates the port of Tanjin, which is located in northern China at the juncture of the Beijing-Tianjin city belt and the economic circle of the Bohai Rim Region. Whilst listed on the Hong Kong market, the Tianjin Municipality People's Government owns 53.5 per cent of the shares (with a further 21.16 per cent owned by the Tianjin Pharmaceuticals Group).

#### Composition of cargo / activities

The port handles export goods originating in the Beijing, Tianjin and Hebei regions, and bound for international markets (particularly Japan, Korea, the EU and US), including electronics and electrical products, telecom equipment, textiles and garments. Imports mainly come from Korea, Japan, the US and EU, including machinery, equipment and textiles.<sup>89</sup> While containers accounted for roughly 28 per cent of cargo throughput in 2018, this share is growing much faster than non-containerised cargo. Prominent among the non-containerised cargoes at Tianjin are coal, iron ore and oil.

**Table B.4: Tianjin Port – Cargo shares and assets by segment, 2018**

Segment	2018 cargo (million tonnes)	Per cent	2018 Assets (HK\$,000)	Per cent
Containers (consolidated)	77	28%		
non-containerised cargo (consolidated)	196	72%		
<b>Cargo (total)</b>	<b>273</b>	<b>100%</b>	27,243,465	71%
Cargo handling			2,167,785	6%
Sales			8,951,291	23%
<b>Total</b>	<b>546</b>		<b>38,362,541</b>	<b>100%</b>

Source: Tianjin Port Development Holdings Ltd 2019 Annual Report, pp. 4-5, 108.

#### Form of regulation

Cargo loading charges in China are subject to regulation by the Chinese National Development and Reform Commission's (NDRC).

#### Key financial characteristics

TPDH had a market capitalisation of USD625 million at 31 December 2019, with a free float capitalisation of USD158 million. Its Bloomberg liquidity index is very high (89<sup>th</sup> centile) and Bloomberg reports that the company is covered by 2 institutional analysts. It has an Adjusted

<sup>89</sup> Drewry Maritime Equity Research (2011), *Benefiting from container trade – Tianjin Port Development*, p.7.

EBITDA Margin of 60 per cent, and its Opex/Gross Non-Current Assets (Opex + COGS/Gross Non-Current Assets) ratio is 4 (32) per cent.

Other issues relevant to beta estimation

In 2011 Drewry considered that:

*Tianjin port faces very little competition from neighbouring ports for its immediate hinterland of Tianjin, Beijing and Hebei province... Given limited competition and the strong growth potential for container traffic, we believe that container handling will remain its focus area and will drive the future growth for the company.*

Drewry saw intense competition for TPDH's coal loading operation among neighbouring Bohai Rim coal loading ports, but still expected the port to reach 135.6 million tonnes of steaming coal imports by 2017.<sup>90</sup>

As noted in connection with other Hong Kong listed businesses with a majority or all of their operations located in mainland China, there is a question of whether this will artificially reduce estimates of systematic risk. We find that the beta coefficient of the China market (SZBSHR Index) against the Hong Kong (HSI Index) is 0.81 measured over the past 5 years, which we consider is high enough to not exclude TPDH from the comparator sample.

Conclusion on first principles

Containers are a smaller portion of total cargo than at PoM, and there is a potential dampening of beta through operations being removed from the listing market, which we think will not be material. Hence, we consider that TPDH should provide a reasonable comparator for PoM's asset beta.

### ***Xiamen International Port Co Ltd (3378 HK Equity)***

Overview

Xiamen International Port Co Limited (XIPC) is listed in Hong Kong but owns and operates 33 berths designated for containers and bulk/general cargoes in Xiamen, mainland China. Most of its operations are at the following six terminals in the Taiwan Strait:

- Haitan Terminal in the Dongdu port area
- Songyu Terminal
- Haicang berths 1 and 2
- Hairun Terminal
- Xinhaida Terminal

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<sup>90</sup> Drewry Maritime Equity Research (2011), *Benefiting from container trade – Tianjin Port Development*, p.8.

Apart from the 33 berths owned by XIPC, it leases and operates berths in the Haicang, Haixiang and Haitong port areas, and the Qingzhou operating area in Fuzhou.

#### Composition of cargo / activities

Table B.5 below shows that in 2018 approximately three quarters of the assets of Xiamen were engaged in landlord-port/landlord port-operator activities, with the container component comprising 76 per cent of the total cargo, and bulk/general cargo comprising 24 per cent. In 2018 XIPC's container throughput was 8.8 million TEUs. As shown in Table B.5, XIPC also operates ancillary port businesses, most notably including comprehensive port logistics services and a merchandise trading business trading in coal, steel, chemical products, refined sugar, stones etc.).

Guotai Junan Securities, one of the largest investment banks in mainland China believes that “XIPC is a key player among domestic ports and the competition [to attract shipping lines] will remain intense.”<sup>91</sup>

**Table B.5: Xiamen International Port – Assets by segment at 31 December, 2018**

Segment	RMB (000)	Per cent of total	Per cent of cargo
Container loading and unloading and storage	11,556,575	58%	76%
Bulk / general cargo loading & unloading	3,749,907	19%	24%
Comprehensive port logistics services	2,591,340	13%	
Manufacturing & selling of building materials	232,339	1%	
Trading business of merchandise	1,894,103	9%	
<b>Total</b>	<b>20,024,264</b>	<b>100%</b>	<b>100%</b>

Source: Xiamen International Port Co Ltd, 2018 Annual Report, p.211.

#### Form of regulation

Cargo loading charges in China are subject to regulation by the Chinese National Development and Reform Commission's (NDRC).

#### Key financial characteristics

XIPC had a market capitalisation of USD406 million at 31 December 2019, with a free float capitalisation of USD349 million. Its Bloomberg liquidity index is below the median (43<sup>rd</sup> centile) and Bloomberg reports that the company is covered by one institutional analyst. It has an EBITDA Margin of 75 per cent, and its Opex/Gross Non-Current Assets (Opex + COGS/Gross Non-Current Assets) ratio is 2 (54) per cent. US-based Black Rock, one of the world's largest institutional investors is among its main shareholders.

<sup>91</sup> Guotai Junan International (29 November, 2016), *Xiamen International Port – Broadening Shipping Network, Enhancing Service Quality, Upgrade to 'Accumulate'*, p. 2.

Other issues relevant to beta estimation

We again note that whilst XIPC's operations are all located in mainland China, the China market (SZBSHR Index) beta measured against the Hong Kong market (HSI Index) is 0.81 over the last 5 years. Hence, we do not expect there to be a material dampening influence on beta.

Conclusion on first principles

XIPC's lower container cargo component relative to PoM and its listing in Hong Kong could introduce a downward bias; however, its trading operations (9 per cent of assets) could introduce an offsetting upward bias. We therefore consider that XIPC will provide a reasonable comparator for PoM.

### ***Yingkou Port Liability Co-A (600317 CH Equity)***

Overview

The Yingkou Port Liability Co A (YPL) is an international seaport in Yingkou, Liaoning, north-east China. It is the second-largest port in northeast China and the tenth-largest in China. There are two separate dockland areas:

- Yingkou old port at the mouth of the Daliao River, and
- Bayuquan port located on the Bohai Sea.

Composition of cargo / activities

YPL is a major import facility for north-eastern China and parts of Mongolia with an annual trade volume of more than 21 million tons through 27 berths. The port's main cargoes are grain and sugar, timber, oil tar, coal, steel and minerals and vehicle imports. In 2018, it was listed 25<sup>th</sup> among the top 50 container ports in the world, with 6.5 million TEUs.<sup>92</sup>

Form of regulation

Cargo loading charges in China are subject to regulation by the Chinese National Development and Reform Commission's (NDRC).

Key financial characteristics

YPL had a market capitalisation of USD2.4 billion at 31 December 2019, with a free float capitalisation of USD414 million. Its Bloomberg liquidity index is very high (87<sup>th</sup> centile) and Bloomberg reports that the company is not covered by an institutional analyst. It has an Adjusted EBITDA Margin of 81 per cent reflects its capital intensity, and its Opex/Gross Non-Current Assets (Opex + COGS/Gross Non-Current Assets) ratio is 2 (13) per cent.

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<sup>92</sup> World Shipping Council ([www.worldshippingcouncil.org](http://www.worldshippingcouncil.org)), *Top 50 Container Ports*.



#### Conclusion on first principles

Whilst the cargo mix of YPL includes grain sugar and timber that may have a relatively low sensitivity to the economic cycle, it also handles coal, steel, minerals and vehicles that are likely to be pro-cyclical. We therefore consider it may contribute to the derivation of a reasonable comparators for PoM's asset beta.

#### ***Jiangsu Lianyungang Port Co Ltd (601008 CH equity)***

##### Overview

Jiangsu Lianyungang Port Co Ltd (JLP) is a port located in northern China, situated close to South Korea and Japan. Majority owned by the Chinese government it has been listed on the Shanghai market since 2007.

##### Composition of cargo / activities

Operations at JLP include container terminals, bulk and break bulk terminals (handling chemicals, fertilizer, sulfur, molten sulfur, alumina, palm oil, alcohol, acetic acid, logs, timber, coke, coal and iron ore, and general cargo), an oil / liquids terminal, and port services.

##### Form of regulation

Cargo loading charges in China are subject to regulation by the Chinese National Development and Reform Commission's (NDRC).

##### Key financial characteristics

JLP had a market capitalisation of USD608 million at 31 December 2019, with a free float capitalisation of USD276 million. Its Bloomberg liquidity index is very high (88<sup>th</sup> centile) and Bloomberg reports that the company is not covered by institutional analysts. It has an EBITDA Margin of 55 per cent reflects its capital intensity, and its Opex/Gross Non-Current Assets (Opex + COGS/Gross Non-Current Assets) ratio is 3 (11) per cent.

#### Conclusion on first principles

We consider JLP is an appropriate comparator for PoM.

#### ***Societe d'Exploitation des Ports (MSA MC Equity) – Marsa Maroc***

##### Overview

Societe d'Exploitation des Ports, also known as Marsa Maroc (MM) is the main port operator in Morocco, which is 60 per cent owned by the Kingdom of Morocco, and in 2017 had a 46 per cent share of the Moroccan port sector.

## Composition of cargo / activities

A recent company presentation by Marsa Maroc summarised its cargo traffic with the following table.<sup>93</sup> Container traffic has been growing over time, but not as quickly as previously anticipated.

**Table B.6: Marsa Maroc – cargo traffic in 2018 and 2019**

Cargo	2018	2019
Solid and miscellaneous bulk	50%	48%
Liquid bulk	24%	25%
Containers	25%	26%
Roll-on-Roll-Off	1%	1%

Source: Marsa Maroc

## Form of regulation

In 2006 the Moroccan port sector was reformed, with functions split between the National Port Agency (ANP), whose role is to “ensure that port infrastructure is optimised and competitive, by fostering healthy competition between the various operators”, adopting the role of concessionary,<sup>94</sup> with a concessionaire taking risk and operating the business.

## Key financial characteristics

MM had a market capitalisation of USD1.59 billion at 31 December 2019, with a free float capitalisation of USD583 million. Its Bloomberg liquidity index is higher than the median (60<sup>th</sup> centile) and Bloomberg reports that the company is covered by 3 institutional analysts. It has an Adjusted EBITDA Margin of 47 per cent, which is relatively low for the industry. Its Opex/Gross Non-Current Assets (Opex + COGS/Gross Non-Current Assets) ratio is 58 (58) per cent.<sup>95</sup>

## Other issues relevant to beta estimation

MM operates 10 port concession contracts in Morocco with expiry dates between 2046 and 2056.

## Conclusion on first principles

While we consider MM to be a valid comparator for PoM, albeit with a much lower container share, it is also in a relatively immature market, and for that reason might be expected to indicate a higher asset beta than PoM.

<sup>93</sup> Marsa Maroc (June, 2019), *Realisations a Fin Juin 2019 du Groupe Marsa Maroc*, p.8.

<sup>94</sup> CFG Bank (16 January, 2017), *Coverage initiation, Marsa Maroc – The ‘Dockers’ intending to win over the Casablanca market*, p.3.

<sup>95</sup> We suspect that this ratio is overstated due to the accounting treatment of MM’s concession contracts.

### **Shanghai International Port Group Co Ltd (600018 CH Equity)**

#### Overview

Shanghai International Port Group (SIPG) is a critically important transport hub for the Yangtze River Delta, and China’s main gateway for foreign trade. Shipping routes connect through major domestic cities along the Yangtze River to ports around the world.

#### Composition of cargo / activities

SIPG’s operations can be divided into the following:<sup>96</sup>

- *General cargo* – in 2017 SIPG achieved cargo throughput of 561 million tonnes
- *Containers* - in 2017 SIPG achieved container throughput of 40.2 million TEUs
- *Property development* – SIPG has three real estate projects in Shanghai.
- *Other investments* – SIPG has equity interests in Postal Savings Bank of China (601658 CH Equity), Bank of Shanghai (601229 CH Equity), and Orient Overseas International Ltd (316 HK Equity).

Revenue shares are shown in Table B.7 below.

**Table B.7: Shanghai International Port Group – Revenue, 2019**

Cargo	2019 Revenue USDBn	Per cent
General cargo operations	20.1	46%
Container cargo	13.5	31%
Property development	5.0	11%
Port operation services	2.3	5%
Other (including banking)	2.7	6%
<b>Total</b>	<b>43.6</b>	<b>100%</b>

*Source: Bloomberg*

#### Form of regulation

Cargo loading charges in China are subject to regulation by the Chinese National Development and Reform Commission’s (NDRC).

#### Key financial characteristics

SIPG had a market capitalisation of USD19.2 billion at 31 December 2019, with a free float capitalisation of USD2 billion. Its Bloomberg liquidity index is very high (96<sup>th</sup> centile) and Bloomberg reports that the company is covered by 8 institutional analysts. It has an Adjusted

<sup>96</sup> SWS Research (28 March, 2018), *Shanghai International Port Group*, p.1.

EBITDA Margin of 75 per cent reflecting its capital intensity, and its Opex/Gross Non-Current Assets (Opex + COGS/Gross Non-Current Assets) ratio is 3 (21) per cent.

Conclusion on first principles

SIPG is an appropriate comparator for PoM, albeit its container share of cargo is lower than at the PoM. On the other hand, SIPG is involved in other investments, some of which (like property development) could have higher systematic risk.

### ***Ningbo Zhoushan Port Co Ltd (601018 CH Equity)***

Overview

Ningbo Zhoushan Port Co Ltd (NZZP) is located in Ningbo and Zhoushan, on the coast of the East China Sea, in Zhejiang province south of Hangzhou Bay. The port lies near Jiaying and Shanghai, at the crossroads of the north-south inland and coastal shipping route, the Chinese interior, and the Yangtze River to the north. The port includes Beilun (the seaport), Zhenhai (the estuary port), and old Ningbo harbor (an inland river port).

Composition of cargo / activities

The port has 16,779 employees and its cargo throughput includes a large component of minerals, coal and crude oil.

**Table B.8: Ningbo Zhoushan Port - cargo throughput, 2017**

Cargo	Million tonnes	Per cent
Minerals	132	25%
Coal	43.6	8%
Crude oil	72	14%
Liquid chemical	9.8	2%
Grain	6.6	1%
Containers (26m TEUs)	260	50%
<b>Total</b>	<b>524.0</b>	<b>100%</b>

Source: SWS Research (3 April, 2018) *Ningbo Zhoushan Port*, p.1 Note: Containers assumed to weigh 10 tonnes each.

Form of regulation

Cargo loading charges in China are subject to regulation by the Chinese National Development and Reform Commission's (NDRC).

Key financial characteristics

NZZP had a market capitalisation of USD7.2 billion at 31 December 2019, with a free float capitalisation of USD1.1 billion. Its Bloomberg liquidity index is very high (90<sup>th</sup> centile) and Bloomberg reports that the company is covered by 4 institutional analysts. It has an Adjusted

EBITDA Margin of 66 per cent reflecting its capital intensity, and its Opex/Gross Non-Current Assets (Opex + COGS/Gross Non-Current Assets) ratio is 3 (23) per cent.

Conclusion on first principles

We consider NZP to be a valid comparator for PoM, albeit with a much lower container share, and a greater reliance on coal and mineral cargoes.

### ***Qingdao Port International Co Ltd (6198 HK Equity)***

Overview

Qindao Port International Co Ltd (QPI) is situated on the Yellow Sea near Qingdao, in the Shandong Province, China. It is listed on the Hong Kong stock market and is minority owned by the Chinese government.

Composition of cargo / activities

The composition of cargo in revenue terms is shown in Table B.9 below. We expect that the EBITDA Margin, and hence the value of the port’s container, dry and liquid bulk services are proportionately higher than the revenue.

**Table B.9: Qindao Port International – Revenue by activity, 2018 and 2019**

Cargo	2019 (USDm)	Per cent	2018 (USDm)	Per cent
Containers	141.9	19%	138.2	20%
Metal ore, coal and other cargo	63.9	8%	62.8	9%
Liquid bulk	183.3	24%	117.6	17%
Logistics and port value added services	207.1	27%	222.0	33%
Port ancilliary services	79.8	11%	71.6	11%
Financial services	80.7	11%	63.2	9%
<b>Total</b>	<b>756.6</b>	<b>100%</b>	<b>675.4</b>	<b>100%</b>

Source: *Qindao Port International Co Ltd, Annual Report (2019), p.24.*

Form of regulation

Cargo loading charges in China are subject to regulation by the Chinese National Development and Reform Commission’s (NDRC).

Key financial characteristics

QPI had a market capitalisation of USD6.1 billion at 31 December 2019, with a free float capitalisation of USD5.7 billion. Its Bloomberg liquidity index is close to the median (49<sup>th</sup> centile) and Bloomberg reports that the company is covered by 2 institutional analysts. It has an Adjusted EBITDA Margin of 75 per cent reflecting its capital intensity, and its Opex/Gross Non-Current Assets (Opex + COGS/Gross Non-Current Assets) ratio is 2 (20) per cent.

## Conclusion on first principles

We consider NZP to be a valid comparator for PoM, albeit with a much lower container share, and a greater reliance on dry and liquid bulk cargoes.

**Beibu Gulf Port Co Ltd (000582 CH equity)**

## Overview

Beibu Gulf Port Co Ltd (BPC) (formerly Beibuwan Port Co Ltd) is the main gateway port in Southwestern China and one of the 20 major coastal hub ports in China. Located in Guangxi province, China, Reuters describes BPC as follows:

*Beibu Gulf Port Co., Ltd., formerly Beibuwan Port Co.,Ltd., is a China-based company principally engaged in the provision of port services.*

## Composition of cargo / activities

Reuters describes the operations as:

*The Company operates its businesses through bulk cargo and container handling, stockpiling, tug boat and port management, logistics agent, merchandise trading and cargo transportation, among others. The Company mainly operates its business in domestic market.*

**Table B.10 Beibu Gulf Port – Revenue by business, 2019**

Activity	2019 Revenue CNY millions	Per cent
Handling Storage	4,275.00	89%
Tug & Port Administration	436.48	9%
Other Business	38.13	1%
Cargo	32.83	1%
Logistics Agency	9.41	0%
<b>Total</b>	<b>4791.9</b>	<b>100%</b>

When Cosco Shipping Ports took up its 4.34 per cent stake Beibu Gulf Port, in 2019, *Port News* wrote that:<sup>97</sup>

*Total throughput of Beibu Gulf Port achieved for the 9 months of 2018 amounted to approximately 13.485 million tons, an increase of 13.68% year-on-year. The container throughput increased significantly by 30.17% year-on-year to approximately 2,186,300 TEUs.*

## Form of regulation

Cargo loading charges in China are subject to regulation by the Chinese National Development and Reform Commission's (NDRC).

<sup>97</sup> Port News (1 March, 2019) "Cosco Shipping Ports Takes 4.34% Stake in Beibu Gulf Port".

Key financial characteristics

BPC had a market capitalisation of USD2.1 billion at 31 December 2019, with a free float capitalisation of USD294 million. Its Bloomberg liquidity index is very high (81<sup>st</sup> centile) and Bloomberg reports that the company is not covered by an institutional analyst. It has an Adjusted EBITDA Margin of 77 per cent reflecting its capital intensity, and its Opex/Gross Non-Current Assets (Opex + COGS/Gross Non-Current Assets) ratio is 2 (13) per cent.

Conclusion on first principles

We consider BPC to be a valid comparator for PoM, albeit with a much lower container share, and a greater reliance on coal and other cargo.

## C. Port owner/operators excluded due to insufficient free float or price data

In this appendix we discuss those port owners / operators that we consider should ideally be included as comparators, but have insufficient free float (USD100 million) or do not have enough monthly market observations to calculate a 5-year beta up to 31 December, 2019. That is, the entities that do not have at least 36 valid monthly observations up to that date. These are cases where an M&A process, such as privatisation invalidates market observations, or the business has only recently been listed.

### *Napier Port Holdings Ltd (NPH NZ Equity)*

#### Overview

Napier Port Holdings (NPH) is the trade gateway to the Hawkes Bay region of the north island of New Zealand. NPH is 55 per cent owned by the Hawkes Bay Regional Investment Corp Ltd on behalf of the regional council. The geography of the region means that the region's export trade is mainly captured by the port. The company was floated on the New Zealand stock market in August, 2019.

#### Composition of cargo / activities

As shown in Table C.1 below, the trade was dominated by the export of logs, with vegetables, fruit, meat and fish and other products being exported in containers. Cruise ship visits (of which there were 87 in 2018) comprise only 3 per cent of revenue, with exports of food in containers accounting for most of the revenue.

**Table C.1: Napier Port Holdings - Trade, cargo and revenue shares, 2018**

Trade split	Per cent	Export cargo split	Per cent	Revenue split	Per cent
Export containers	32%	Logs	58%	Containers	63%
Import containers	7%	Paper products	10%	Bulk	32%
Import bulk	14%	Processed woodchips	6%	Cruise ships	3%
Export bulk	47%	Vegetables and fruit	12%	Other	2%
		Meat and fish	5%		
		Other	9%		
<b>Total</b>	<b>100%</b>	<b>Total</b>	<b>100%</b>	<b>Total</b>	<b>100%</b>

Source: Deutsche Bank (17 September, 2019), p.4

#### Form of regulation

Ports in New Zealand are not formally subject to regulation, however there is a general ability under the New Zealand Commerce Act to apply monitoring or heavier regulation.

#### Key financial characteristics

NPH had a market capitalisation of USD561 million at 31 December 2019, with a free float capitalisation of USD252 million. Its Bloomberg liquidity index is above the median (61<sup>st</sup> centile) and Bloomberg reports that the company is covered by 3 institutional analysts. It has an Adjusted



EBITDA Margin of 42 per cent, and its Opex/Gross Non-Current Assets (Opex + COGS/Gross Non-Current Assets) ratio is 17 (17) per cent.

Other issues relevant to beta estimation

Given that the majority of NPH's trade is export of agricultural produce, we should expect to find very little sensitivity to the economic cycle. Looking back this appeared to be the case during the global financial crisis. Between 2008 and 2009, when discretionary container trade and motor vehicle trade fell throughout the world, NPH's trade rose appreciably.<sup>98</sup>

Conclusion on first principles

In the long run we would expect the asset beta of NPH to be relatively low owing to its agricultural exports cargo, however other factors such as its relatively low Adjusted EBITDA Margin or its higher than average operating costs would tend to have the opposite effect of raising asset beta. This business should be considered as a potential comparator after 2022.<sup>99</sup>

### ***Piraeus Port Authority SA (PPA GA Equity)***

Overview

Piraeus Port Authority S.A. (PPA) manages the Piraeus harbour based on a concession agreement with the Greek Government. It is the main coastal port connecting mainland Greece to the Greek islands, the main cruise port service in the country, the major container port and the main motor vehicles terminal.

Composition of cargo / activities

With a throughput of 4.9 million TEU, in 2018 it was ranked 6<sup>th</sup> among the top 15 container ports in Europe.

Form of regulation

We have not sighted materials discussing NPH's regulatory framework.

Key financial characteristics

PPA had a market capitalisation of USD613 million at 31 December 2019, with a free float capitalisation of USD128 million. Its Bloomberg liquidity index is above the median (68<sup>th</sup> centile) and Bloomberg reports that the company is covered by 3 institutional analysts. It has an Adjusted EBITDA Margin of 86 per cent reflecting its capital intensity, and its Opex/Gross Non-Current Assets (Opex + COGS/Gross Non-Current Assets) ratio is 5 (19) per cent.

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<sup>98</sup> Deutsche Bank (17 September, 2019) *Napier Port – Fortified*, p.14.

<sup>99</sup> The timing may also depend on whether and how many months in 2020 are excluded in future due to the current coronavirus pandemic. Given the lack of market knowledge and uncertainty around the IPO time, betas are often higher just after listing, which could delay the time that it would be appropriate to introduce NPH into the comparator sample.

Other issues relevant to beta estimation

By 2015 the Greek debt crisis (2010-) forced a privatisation process to be commenced, with government owned ports being offered for sale. Figure C.1 displays PPA’s (and the Thessaloniki Port Authority’s (TPA)) share price behaviour since 2002/3 compared with the Athens Stock Exchange Large Cap Index (FTASE Index). It can be seen that through the global financial crisis of 2008-09, and through the beginning of the Greek debt crisis (2010-), PPA (and TPA) shares tracked the FTSAE Index. Since approximately 2014 to 2015 that nexus is not as apparent. A major reason for this divergence is the overhang created by an uncertain privatisation process that played out over two years.

Cosco Shipping Group purchased its stake in PPA in January, 2016, and a Greek court approved the sale in March 2016. While the bid process was underway movements in the share price were not associated with the fundamental performance of the business but by news relating to the sale process and the potential impacts of the new owners. Since returns during a sale / M&A process are likely to be affected by non-operational factors, we recommend that for this comparator only share price data after March 2016 be included, which implies that it could not be included in a comparator group that estimated 5-year betas up to December 2019.

**Figure C.1: Piraeus Port Authority and Thessaloniki and Port Authority share prices vs FTASE Index**



Source: Bloomberg and Incenta analysis

The company’s major contract is with the Greek State, “for the concession to the exclusive right of use and exploitation of port zone land, buildings and facilities of Piraeus Port (“Concession agreement with the Greek State”) granted to the Company until 13/2/2052, in exchange of an annual percentage payment based on Company’s income with a minimum annual fee of €3.5 million.”<sup>100</sup>

Conclusion on first principles

This port should be considered as a comparator when sufficient data are available in future.

### **Thessaloniki Port Authority (OLTH GA Equity)**

Overview

The Thessaloniki Port Authority (TPA) has a deep natural harbour and is located in the Bay of Thermaikos, on the north eastern Mediterranean Sea, near the centre of the city of Thessaloniki. The port occupies an area of 1.5 million square metres, the port zone is 3.5 kilometres across, and assets include 6 piers spread across a 6200 metre quay.

Composition of cargo / activities

Table C.2 shows the recent range of operations at TPA, which is weighted towards container cargo (64 per cent), with other port bulk and liquid cargoes accounting for 33 per cent of revenue.

**Table C.2: Thessaloniki – Segmental revenue shares, 2018**

Operations	2018 Revenue (USD millions)	Per cent
Container terminal	44.2	64.0%
Conventional port	22.9	33.2%
Passengers	1.4	2.0%
Utilisation of spaces	1.7	2.5%
<b>Total</b>	<b>69.1</b>	<b>100.0%</b>

Source: Bloomberg and Incenta analysis

Form of regulation

We have not sighted materials discussing TPA’s regulatory framework.

Key financial characteristics

TPA had a market capitalisation of USD293 million at 31 December 2019, with a free float capitalisation of USD97 million. Its Bloomberg liquidity index is at the median (60<sup>th</sup> centile) and Bloomberg reports that the company is not covered by institutional analysts.<sup>101</sup> It has an Adjusted

<sup>100</sup> Piraeus Port Authority, *Annual Report 2019*, p.89.

<sup>101</sup> While Bloomberg does not record institutional coverage, we found a Merit Securities report from 12 September 2018, which is cited above.

EBITDA Margin of 81 per cent reflecting its capital intensity, and its Opex/Gross Non-Current Assets (Opex + COGS/Gross Non-Current Assets) ratio is 6 (20) per cent.

Other issues relevant to beta estimation

Owing to the Greek debt crisis, in mid-2015 a sale process for the government's stake in TPA was begun. In TPA's case the process didn't conclude until April 2017, when the South Europe Gateway Thessaloniki Ltd consortium comprised of Deutsche Invest Equity Partners GmbH, Belterra Investments Ltd and Terminal Link SAS purchased the Greek government's 67 per cent stake.<sup>102</sup>

Conclusion on first principles

We do not recommend using this comparator at present owing to the sale / privatisation process that took place. We recommend including price data only after April, 2017.<sup>103</sup> It should be considered as a comparator when sufficient market data are available.

### ***Guangzhou Port Co Ltd (601228 CH Equity)***

Overview

Guangzhou Port Co Ltd (GPC) is the largest comprehensive hub port in South China, possessing 56 berths, 16 bouys and 23 anchorages with capacity ranging from 10,000 tons to 300,000 tons. Along the Pearl River there are 7 terminal / stevedoring companies engaged in container traffic, most being partnerships between GPC and stevedoring groups like APM Terminals and COSCO Pacific.

Composition of cargo / activities

In 2015, GPC handled 388 million tons of cargo and 15.03 million TEUs. In addition, GPC is South China's:

- largest loading/discharging port for automobiles,
- largest fuel import base,
- largest foreign grain import base, and
- largest foreign steel import port.

Form of regulation

Cargo loading charges in China are subject to regulation by the Chinese National Development and Reform Commission's (NDRC).

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<sup>102</sup> Athens News Agency (25 April, 2017) *Consortium pays 1.1 bln euros to buy 67 pct of Thessaloniki Port.*

<sup>103</sup> With a minimum of 36 monthly observations this implies that TPA should not be included in a sample of comparators until after April, 2020.

#### Key financial characteristics

GPC had a market capitalisation of USD3.4 billion at 31 December 2019, with a free float capitalisation of USD378 million. Its Bloomberg liquidity index is very high (89<sup>th</sup> centile) and Bloomberg reports that the company is not covered by institutional analysts. It has an Adjusted EBITDA Margin of 62 per cent reflecting its capital intensity, and its Opex/Gross Non-Current Assets (Opex + COGS/Gross Non-Current Assets) ratio is 3 (19) per cent.

#### Conclusion on first principles

GPC is an appropriate comparator for PoM when sufficient data become available. Its container component is smaller than at PoM, and other cargoes such as grain imports and steel imports may offset to reduce its sensitivity to the domestic Chinese economic cycle.

### ***Alexandria Container and Cargo Handling Co (ALCN EY Equity)***

#### Overview

Alexandria Container and Cargo Handling Co (ALCN) is almost wholly owned by the Egyptian government. At the Port of Alexandria, ALCN has a competing terminal operator, Alexandria International Container Terminals (AICT) which is owned by Hutchison Ports. In the past few years ALCN has been applying most of its capex to a channel deepening project at its berth 96, which while not increasing capacity should raise asset utilisation.

#### Composition of cargo / activities

ALCN specialises in container handling, with volumes fluctuating between approximately 500,000 and 1.25 million TEUs per annum since 2012/13.<sup>104</sup> One of the factors contributing to the variability of ALCN's TEU throughput is that there is a weighting towards agricultural exports, and therefore a seasonal spike in April-July each year.<sup>105</sup>

#### Form of regulation

ALCN is subject to direct / side by side competition. As noted by CI Capital:<sup>106</sup>

*ALCN historically enjoyed a strong pricing power, reflected in its ability to raise its EGP revenue/TEU by a FY10/11-16/17 CAGR of 32%... As of 2017, however, with the decline in imports and price cuts implemented by its competitor, AICT, ALCN had to cut its tariff twice during the year.*

#### Key financial characteristics

ALCN had a market capitalisation of USD1.1 billion at 31 December 2019, with a free float capitalisation of USD53 million. Its Bloomberg liquidity index is below median (40<sup>th</sup> centile) and Bloomberg reports that the company is covered by 4 institutional analysts. It has an Adjusted

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<sup>104</sup> CI Capital (27 August, 2018), *Alexandria Container & Cargo Handling (ALCN)*, p.3.

<sup>105</sup> Pharos (18 May, 2020), *Alexandria Containers and Cargo Handling – Global Dynamics Hit Operations*, p.2.

<sup>106</sup> CI Capital (27 August, 2018), *Alexandria Container & Cargo Handling (ALCN)*, p.4.

EBITDA Margin of 91 per cent reflecting its capital intensity, and its Opex/Gross Non-Current Assets (Opex + COGS/Gross Non-Current Assets) ratio is 9 (49) per cent, which indicates a high degree of other costs and revenues.

Conclusion on first principles

ALCN is a container terminal operator whose shares are closely held. We have not included it as a comparator as it did not have a USD100 million free float for 36 months up to 31 December, 2019. The other issue is that this is a single purpose operator, and its cost structure is a high proportion of assets (75 per cent), which is much higher than the average of the ports in our comparator group. Another candidate port with a similarly high cost structure is APM Terminals (see below). ACCH should nevertheless be considered as a comparator when the free float rises above USD100 million.

### ***Kingston Wharves Ltd (KWJA Equity)***

Overview

Kingston Wharves (KW) is one of the leading and most experienced cargo terminal operators in the Caribbean, with principal activities including the operation of public wharves, security services and the provision and installation of cold storage facilities.

Composition of cargo / activities

The 2020 Annual Report divides operations into two groups:<sup>107</sup>

- Terminal operations - Operation of public wharves and stevedoring of vessels (72 per cent).
- Logistics Services - Operation of warehousing and logistics facilities, security services, rental of and repairs to cold storage facilities and property rental (28 per cent).

The 9 berth Multi-cargo terminal provides handling services for breakbulk cargo (lumber, steel, containers and motor vehicles), and dry and liquid bulk cargo (oil, grain, cement and others)

Form of regulation

According to Sagicor Investments, “The wharfage rates and penal charges billed to customers by the company are subject to regulation by the Port Authority of Jamaica.”<sup>108</sup>

Key financial characteristics

KW had a market capitalisation of USD661 million at 31 December 2019, with a free float capitalisation of USD52 million. Its Bloomberg liquidity index is relatively low (27<sup>th</sup> centile) and Bloomberg reports that the company is not covered by institutional analysts.<sup>109</sup> It has an Adjusted

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<sup>107</sup> Kingston Wharves (2020) *Annual Report*, p.16.

<sup>108</sup> Sagicor Investments (January, 2014), *Kingston Wharves – Company Analysis*, p.1.

<sup>109</sup> There was some coverage previously. See Sagicor Investments (January, 2014), *Kingston Wharves – Company Analysis*.

EBITDA Margin of 83 per cent reflecting its capital intensity, and its Opex/Gross Non-Current Assets (Opex + COGS/Gross Non-Current Assets) ratio is 3 (13) per cent.

Conclusion on first principles

KW should be considered as a comparator if its free float rises above USD100 million.

### ***Salalah Port Services Co SAOG (SPSI OM Equity)***

Overview

Salalah Port Services (SPS) is one of the largest multi-purpose ports in the Middle East, a leading container transshipment port, and the gateway port for containerized, bulk and general cargo for the Dhofar region that was created under a 30-year concession agreement with the Government of Oman. SPS is managed by APM Terminals, a leading port developer and operator with a global network of 78 terminals.

Composition of cargo / activities

In 2019 record breaking volumes were achieved for both container and general cargo terminal handling 4.109 Million TEUs and 16.278 Million MT respectively. Regarding general cargo, SPS is the largest single global exporter of gypsum in the world, but also significant limestone.<sup>110</sup> Other general cargo commodities include methanol, fuel, and bagged material (mainly cement). The Container Terminal is highly reliant on container transshipment business, primarily from Maersk (which owns APM Terminals).

Form of regulation

We have not sighted material relating to any regulatory oversight of the port.

Key financial characteristics

SPS had a market capitalisation of USD280 million at 31 December 2019, with a free float capitalisation of USD63 million. Bloomberg does not record a liquidity index number and reports that the company is not covered by institutional analysts. It has an Adjusted EBITDA Margin of 34 per cent which is unusually low for a port business, and its Opex/Gross Non-Current Assets (Opex + COGS/Gross Non-Current Assets) ratio is 11 (28) per cent.

Conclusion on first principles

SPS should be considered as a comparator if its free float rises above USD100 million.

### ***APM Terminals Bahrain BSC (APMTB BI Equity)***

Overview

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<sup>110</sup> Port of Salalah (2019) *Management Discussion and Analysis Report, 2019*, p.1.

APM Terminals (APM Bahrain), located in Bahrain, is majority owned (64 per cent) and operated by APM Terminals B.V., one of the largest container port operators in the world. The Prospectus noted that the company had been carrying on its business for 12 years:<sup>111</sup>

*Initially it undertook port operations at Mina Salman Port and, since April 2009, has been the exclusive port operator of Khalifa Bin Salman Port (“KBSP”) in Bahrain. The Company is a private port operating company established after successfully tendering for the 25 year Concession with the Government of Bahrain. This provides the Company with the exclusive rights to utilise the leased port facility and operate, manage and develop the Khalifa Bin Salman Port until 31 March 2034 after which it may be extended by mutual agreement.*

Composition of cargo / activities

The company’s website details the following activities:

*Container Terminal*

*Serving as an alternate gateway for the eastern province & KSA, we support trade in Bahrain by serving as a gateway to the upper gulf.*

*General Cargo*

*Our General Cargo terminal handles a diverse range of vessel types from dhows to five-star cruise vessels to a variety of bulk and break-bulk vessels, RORO and livestock. We provide landside operations including LCL/FCL stations, containerization of cargo, vehicle storage and long/short term storage solutions.*

*Break Bulk & Project Cargo*

*We handle various break-bulk and project cargo with unparalleled industry experience. We can handle OOG cargo with safe working load up to 65 tons / 100 tons with cargo beam.*

*Ro-ro and passenger facilities*

*Our Roll-on Roll-off (RoRo) terminal can handle everything from tractors, buses and trucks to oversized cargo loaded on special flatbed, mafi or lowboy trailers. We also specialise in new or used vehicle import and export and related services.*

*Cruise Terminal*

*During the 2017-2018 season, the terminal is expected to welcome over 100,000 visitors via its cruise terminal; a growth of 24% over the previous year. APM Terminals works closely with the Ports and Maritime Authority, Tourism Authority, Customs and Immigration departments to ensure the smooth handling of passengers. The focus is on ensuring a good arrival and departure experience to the passengers*

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<sup>111</sup> APM Terminals (29 October, 2018), Prospectus - APM Terminals Bahrain BSC.



*by giving the terminal a new look and feel including complementary Wi-fi during their stay at the passenger terminal.*

*Marine Services*

*In addition to the services detailed about, we also handle:*

- *Full Container Loads (FCL)*
- *Less-than Container Loads (LCL)*
- *Livestock*
- *Domestic Export/Import*
- *Transshipment*
- *Pilotage*
- *Towage*
- *Mooring*

Form of regulation

We have not sighted information relating to any regulatory framework at APM Bahrain.

Key financial characteristics

APM Bahrain had a market capitalisation of USD312 million at 31 December 2019, with a free float capitalisation of USD112 million. Its Bloomberg liquidity index is relatively low (20<sup>th</sup> centile) and Bloomberg reports that the company is covered by one institutional analyst. It has an Adjusted EBITDA Margin of 54 per cent reflecting its capital intensity, and its Opex/Gross Non-Current Assets (Opex + COGS/Gross Non-Current Assets) ratio is 48 (91) per cent which is relatively high for ports.

Other issues relevant to beta estimation

The IPO was oversubscribed, and the shares performed well up to 31 December 2019, when the company had a market capitalisation of USD312 million. With a free float of 36 per cent this provides a marketable component greater than USD100 million. However, liquidity is very low (only 20) based on the Bloomberg measure, and since the business has only been listed since 3 January, 2019 it doesn't have sufficient monthly observations to estimate a beta.

Conclusion on first principles

This business has a cost structure that could imply vertical integration of activities or diversification. Nevertheless, in our view it should be considered as a potential comparator when sufficient market data become available.

## **D. Selected port owner / operators that we excluded due to the listing market being unrelated to the operating market**

In this appendix we provide further information on two port businesses that we considered to come close as comparators on grounds of their port-related activity, but which we recommend excluding from further analysis due to their activities being remote from their listing market. As noted in the main body of the report (section 3.3.1), we excluded businesses where the beta of the listing market was less than 0.75 when measured against the market where operations are undertaken. A discussion of the theory that lies behind this intuition is provided in Appendix F below.

### ***DP World (DPW DU Equity)***

#### Overview

DP World is headquartered in Dubai, United Arab Emirates, and specialises in cargo logistics, port terminal operations, maritime services and free trade zones. It was formed in 2005 by the merger of Dubai Ports Authority and Dubai Ports International.

#### Composition of cargo / activities

In 2019 DP World's consolidated throughput was 39.9 million container TEUs and its marine and inland terminals were present in over 40 countries. Until 2016, DP World was primarily a global ports operator, but it has since diversified operations through numerous acquisitions, partly in response to the growing power of merging shipping alliances.<sup>112</sup> In 2019:<sup>113</sup>

- Ports and Terminals accounted for 65 (75) per cent of revenue (EBITDA),
- Parks and Economic Zones accounted for 10 (15) per cent of revenue (EBITDA); and
- Logistics and Maritime accounted for 25 (10) per cent of revenue (EBITDA).

#### Form of regulation

DP World is diversified across many countries and subject to a range of regulatory frameworks.

#### Key financial characteristics

DP World had a market capitalisation of USD10.9 billion at 31 December 2019, with a free float capitalisation of USD2.1 billion. Its Bloomberg liquidity index is very high (98<sup>th</sup> centile) and Bloomberg reports that the company is covered by 8 institutional analysts. It has an Adjusted EBITDA Margin of 92 per cent reflecting its capital intensity, and its Opex/Gross Non-Current Assets (Opex + COGS/Gross Non-Current Assets) ratio is 3 (14) per cent.

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<sup>112</sup> Drewry Maritime Financial Research (12 December, 2018), *DP World – Fundamentals drive growth amid non-core expansion*, p.1.

<sup>113</sup> DP World, 2019 *Annual Report*.

## Other issues relevant to beta estimation

DP World is relatively unique among listed ports in the extent of its diversification across countries and regions in the world. DP World's beta would be estimated against the Dubai Financial Market General Index (DFMGI Index), which is not likely to be closely related to market movements in the countries of its actual operations. As a result, we would expect a beta estimate for DP World conducted against the DFMGI market index would tend to under-estimate the beta of the target port business.

In Table D.1 we test the degree to which Dubai's DFMGI Index is aligned with the markets in which DP World operates. The 2019 shares of total assets for each of the three major zones of operations in the world are used as the base. Within these zones several markets are used (divided equally) to represent the operations / relevant stock markets in each zone. The DFMGI Index's (monthly) beta against each of the relevant stock markets was calculated for the 5 years up to 31 December, 2019, and multiplied by the relevant country weights. The resulting weighted average beta of the stock markets against the Dubai market is 0.41, which we consider to be too low to provide a valid comparator for PoM.

**Table D.1: Estimated weighted correlation of Dubai DFMGI Index and markets where DP World's operating assets are located**

Zone of operations	Zone share of assets	Country share	Country Index	Market Beta against DFMGI	Weighted Beta
<b>ASIA PACIFIC INDIA:</b>					
2019 share of total assets	12.1%				
China		6.0%	SZBSHR Index	0.501	0.030
India		6.0%	SENSEX Index	0.233	0.014
<b>AUSTRALIA &amp; AMERICAS:</b>					
2019 share of total assets	17.3%				
Australia		5.8%	AS51 Index	0.183	0.011
Canada		5.8%	SPTSX Index	0.202	0.012
Chile		5.8%	IPSA Index	0.233	0.013
<b>MIDDLE EAST EUROPE AFRICA:</b>					
2019 share of total assets	70.6%				
Dubai		23.5%	DFMGI Index	1.000	0.235
UK		23.5%	UKX Index	0.258	0.061
Germany		23.5%	DAX Index	0.154	0.036
<i>Total weights</i>	<i>100.0%</i>	<i>100.0%</i>			
<b>Weighted correlation</b>					<b>0.412</b>

Source: DP World 2019 Annual Report, Bloomberg and Incenta analysis.

## Conclusion on first principles

Based solely on DP World's operating characteristics we would have recommended inclusion of DP World in the comparator sample.<sup>114</sup> However, given the diversified markets of its operation and the low degree of alignment between those markets, we do not think DP World's asset beta will provide a valid comparator for a port with PoM's characteristics.

## ***Global Ports Investments PLC (GLPR LI Equity)***

### Overview

Global Ports Investments PLC (GPI) provides terminal operator services. The A.P. Moller-Maersk Group's world leading terminal operator APM Terminals owns 30.75 per cent of GPI, with another 30.75 per cent being owned by the Delo Group, a privately owned Moscow-based transport and logistics company.

### Composition of cargo / activities

The Company offers import and export logistics operations including oil products, container and other cargo operations. GPI operates ports and terminals in Finland, Estonia and Russia. It accounts for 28 per cent of Russian container industry volumes, and over 50 per cent of Russian container traffic going through the Baltic Basin. The business has recently expanded operations into coal handling, although this is expected to account for only 1 million tons per annum.

### Form of regulation

We have not sighted material relating to GPI's regulatory framework.

### Key financial characteristics

GPI had a market capitalisation of USD726 million at 31 December 2019, with a free float capitalisation of USD280 million. Its Bloomberg liquidity index is below the median (32<sup>nd</sup> centile) and Bloomberg reports that the company is covered by 6 institutional analysts. It has an Adjusted EBITDA Margin of 83 per cent reflecting its capital intensity, and its Opex/Gross Non-Current Assets (Opex + COGS/Gross Non-Current Assets) ratio is 5 (11) per cent.

### Other issues relevant to beta estimation

While operating in Russia and the Baltic countries, GPI is listed on the London stock market, whose movement will be reflective of economic conditions in the UK rather than in Russia. To the degree that there is only a low correlation between the Russian and UK stock markets, a beta estimate for GPI calculated against the UK market is likely to underestimate its beta against the Russian market, which will be a major driver of GPI's returns. The beta of the main Russian stock market index (IMOEX Index) against the UK stock market (UKX Index) has been only 0.11 in the past 5 years.

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<sup>114</sup> This would relate to systematic risk estimation using periods up to 31 December, 2019. At some point DP World's continuing diversification drive could make it an unsuitable comparator on operational grounds.

#### Conclusion on first principles

Given the above issues with estimation of beta for GPI we decided not to include it in the list of comparators. Whilst GPI's operating characteristics would suggest that it should have a relatively high asset beta relative to PoM if measured against the Russian market (its "true" asset beta),<sup>115</sup> we expect that the beta that is estimated against the London market would be under-estimated relative to its true asset beta.

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<sup>115</sup> For example, J.P. Morgan Cazenove applies an asset beta of 1.0 to GPI: J.P. Morgan Cazenove (24 January, 2019), *Global Ports – Market share edges up a mere 0.5pp in 2018 despite heavy price cuts; Reiterate UW*, p.4.

## E. Port logistics firms excluded as comparators

In this appendix we give further consideration to logistics firms, some of which have been suggested as comparators for PoM by Synergies or Frontier, but that we have excluded.

### ***Qube Holdings Ltd (QUB AU Equity)***

Overview

Bloomberg describes Qube Holdings Ltd (Qube) as follows:

*Qube Holdings Ltd. is a logistics company. The Group operates in divisions covering Automotive, Bulk and General Stevedoring, Landside Logistics and Strategic Development Assets.*

Composition of cargo / activities

The Qube 2019 Annual Report describes the company's main operating divisions as follows:<sup>116</sup>

#### ***Operating Division***

*Logistics provides a broad range of services relating to the import and export of mainly containerised cargo as well as outsourced industrial logistics services across heavy transport, mobile crane and renewable energy industries. The services currently provided include the physical and documentary processes and tasks of the import/export supply chain such as road and rail transport of containers to and from ports, operation of container parks, customs and quarantine services, warehousing, intermodal terminals, international freight forwarding, provision of lifting services or equipment and bulk rail haulage for rural commodities. The business operates nationally with strategic locations near the ports in key capital cities.*

#### ***Infrastructure & Property (including Strategic Assets)***

*This division currently comprises the Moorebank Logistics Park Project, AAT, the Minto properties and the Strategic Assets division which comprises a non-controlling interest in the Quattro Grain joint venture 47.2% and TQ Holdings Pty Limited, a 50% joint venture with Japanese petroleum group JXTG Group.*

#### ***Patrick***

*Qube owns a 50% interest in Patrick with the other 50% owned by Brookfield and its managed funds. Patrick is an established national operator providing container stevedoring services in the Australian market with operations in the four largest container terminal ports in Australia*

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<sup>116</sup> Qube, (2019), Annual Report.

#### Form of regulation

Qube is not subject to economic regulation.

#### Key financial characteristics

Qube had a market capitalisation of USD3.1 billion at 31 December 2019, with a free float capitalisation of USD3 billion. Its Bloomberg liquidity index is above the median (62<sup>nd</sup> centile) and Bloomberg reports that the company is covered by 10 institutional analysts. It has an Adjusted EBITDA Margin of 17 per cent, and its Opex/Gross Non-Current Assets (Opex + COGS/Gross Non-Current Assets) ratio is 31 (31) per cent.

#### Other issues relevant to beta estimation

Qube closely interacts with ports, and in the case of Patrick performs port stevedoring functions, as do the operations of other logistic companies in other countries which we have also excluded as comparators. As noted by JP Morgan, one of Qube's key risks is "lower-than-expected container and bulk volumes through Australian ports."<sup>117</sup> Qube's revenues are clearly tied to the same revenue drivers as the major ports of Australia. However, the cost structure of Qube is different to that of landlord ports. Qube has more fixed operating costs and a much lower Adjusted EBITDA margin of 17 per cent against the landlord ports average of 70 per cent. Qube is therefore likely to have a materially higher operating leverage impact than a benchmark landlord port.

#### Conclusion on first principles

Based on the analysis above we do not consider Qube Holdings Ltd (Qube) to be an appropriate comparator for PoM.

### ***Hamberger Hafen und Logistik (HHFA GR Equity)***

#### Overview

The Company Description for Hamburger Hafen und Logistik (HHL) provided by Bloomberg is:

*Hamburger Hafen und Logistik AG (HHLA) provides services to the port in the European North Range. The Company's container terminals, transport systems, and logistic services provide a network between overseas port and European hinterland.*

#### Composition of cargo / activities

Bloomberg reports the 2019 composition of activities at HHL as follows:

- *Geographic segments:* Germany USD867.0 million (62.7 per cent), European Union USD471.1 million (34.1 per cent), and Rest of the World USD44.6 million (3.2 per cent)
- *Product segments:* Container (58 per cent), Intermodal (35.5 per cent), Logistics (3.7 per cent), Real Estate (2.8 per cent).

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<sup>117</sup> JPMorgan, (9 May, 2018), *Qube Holdings – 'Don't give up the ship' ... returns on the horizon*, p.14.

Form of regulation

Not subject to economic regulation.

Key financial characteristics

HHL had a market capitalisation of USD2billion at 31 December 2019, with a free float capitalisation of USD633 million. Its Bloomberg liquidity index is above the median (61<sup>st</sup> centile) and Bloomberg reports that the company is not covered by 4 institutional analysts. It has an Adjusted EBITDA Margin of 26 per cent, and its Opex/Gross Non-Current Assets (Opex + COGS/Gross Non-Current Assets) ratio is 42 (42) per cent.

Other issues relevant to beta estimation

The HHL logistic / intermodal network extends from the ports of Rotterdam, Bremerhaven, and Hamburg in north-west Europe to Trieste and Koper on the Adriatic Sea in the south. In between the network encompasses a number of European countries. Like Qube, HHL has more fixed operating costs and a much lower Adjusted EBITDA margin of 26 per cent than landlord ports (average of 70 per cent).

Conclusion on first principles

Based on the analysis above we do not consider HHL to be an appropriate comparator for PoM.

### ***Eurokai (EUK2 GR Equity)***

Overview

Bloomberg's description of Eurokai's activities is as follows:

*Eurokai GmbH & Co. KGaA operates container handling facilities, primarily in continental Europe. The Company operates container terminals in Bremerhaven, Hamburg, La Spezia and Gioia Tauro in Italy, and Lisbon. Eurokai is also active in sea container transportation between terminals, repair and storage of containers and distribution and storage of goods.*

Composition of cargo / activities

Eurokai specialises in container handling. In 2019, according to the Annual Report, 11.65 million containers were handled, with the following geographical breakdown:

- Germany, 7.6 million TEU (65.2 per cent)
- Italy, 1.9 million TEU (16.4 per cent)
- Morocco, 1.5 million TEU (13.1 per cent)
- Cyprus, 0.14 million TEU (1.2 per cent)
- Russia, 0.06 million TEU (0.5 per cent)



Form of regulation

Not subject to economic regulation.

Key financial characteristics

Eurokai had a market capitalisation of USD514 million at 31 December 2019, with a free float capitalisation of USD386 million. Its Bloomberg liquidity index is well below the median (16<sup>th</sup> centile) and Bloomberg reports that the company is not covered by institutional analysts. It has an Adjusted EBITDA Margin of 21 per cent, and its Opex/Gross Non-Current Assets (Opex + COGS/Gross Non-Current Assets) ratio is 38 (38) per cent.

Other issues relevant to beta estimation

Eurokai's Adjusted EBITDA margin of 21 per cent is slightly higher than Qube's (17 per cent), which and slightly lower than HHL's (26 per cent), and all of them are much lower than the average for landlord ports (70 per cent). It is therefore a fundamentally different business to a landlord port. Where a landlord port depends on deriving a return on its material asset stock, logistics businesses like Eurokai, Qube and HHL are much more dependent on their (logistical) service operations.

Conclusion on first principles

Based on the analysis above we do not consider HHL to be an appropriate comparator for PoM.

## F. Effect of market of listing on estimated beta

As noted above, where the main operations of firms are in a different market to which their equity securities are listed, the beta that is estimated may not accurately reflect the relationship between the economic returns to the firm in question and the returns to the market in which it operates.

This outcome is obvious where the economic returns of assets in the two markets are assumed to be completely unrelated. Macro-economic shocks in a firm's country of operation may have a large effect on both the share price of the firm in question and on the stock market overall – and so the firm's beta against its market of operation may be high. However, if the returns between the two markets are unrelated, the macroeconomic shocks would not have any effect on the overall returns in the market in which the firm is listed, and so its measured beta would be zero.

More generally, whether – and to what extent – the differences between a firm's market of operation and the market in which its equity securities are listed cause the estimated beta to diverge from the true relationship between the firm's returns and the returns in the market in which it operates depends on the relationship between the overall returns on the two markets. To the extent that the returns to the two markets tend to move closely together, then differences between the market of operation and market of listing would not be expected to have a large impact on the estimated beta; however, to the extent that the markets move largely independently, then a more material impact on the beta estimate may be expected.

To demonstrate this, assume the following notation:

- $ER_{Operations}$  – means the excess returns (i.e., market risk premium) in the market in which the entity operates
- $ER_{Listing}$  – means the excess returns (i.e., market risk premium) in the market in which the entity is listed
- $ER_{Asset}$  – means the excess returns (i.e., risk premium) to the entity in question.

The objective is to estimate the beta for the firm against its own market, which is given by the following expression:

$$\beta = \frac{Cov(ER_{Asset}, ER_{Operations})}{Var(ER_{Operations})}$$

However, what would be estimated in practice is:

$$\beta^* = \frac{Cov(ER_{Asset}, ER_{Listing})}{Var(ER_{Listing})}$$

If it is assumed for simplicity that the two markets move mechanistically together, then it will follow that:

$$ER_{Operations} = \gamma ER_{Listing}$$

Substituting this back into the expression for  $\beta^*$  yields:

$$\begin{aligned}
 \beta^* &= \frac{\text{Cov}\left(ER_{\text{Asset}}, \frac{1}{\gamma} ER_{\text{Operations}}\right)}{\text{Var}\left(\frac{1}{\gamma} ER_{\text{Operations}}\right)} \\
 &= \frac{\frac{1}{\gamma} \text{Cov}(ER_{\text{Asset}}, ER_{\text{Operations}})}{\left(\frac{1}{\gamma}\right)^2 \text{Var}(ER_{\text{Operations}})} \\
 \therefore \beta^* &= \gamma\beta
 \end{aligned}$$

Thus, if the overall returns in the market of operations moves less than one-for-one with returns in the market of listing, then the beta estimate will be biased downwards compared to the objective.

In reality, the assumptions that markets move together mechanistically is incorrect, as any two sets of markets will be subject to material idiosyncratic events. The effect of recognising this error is that the relationship between the returns in the two markets (i.e., the beta of one market against the other) will determine the direction and degree of error in the beta estimate when averaged across all firms, although the error will vary across individual firms' beta estimates.

Accordingly, when assessing the comparability of firms, the above considerations imply that there is a material risk of error to beta estimates for firms whose main operations are in different markets to where they operate and where the returns in those two markets are not reasonably closely related.

## G. Selection of ports sample

Tables G.1 to G.5 list some financial characteristics of the businesses that were considered for inclusion in the ports sample, as well as the fundamental reasons for their exclusion where the port was excluded.

**Table G.1 Final ports sample used in beta analysis**

Ticker	Company name	Market Cap \$USDm	Free float %	Free float Mkt Cap \$USDm	Country of main listing	EBITDA Margin	Adjusted EBITDA Margin	Number of employees	\$m Gross Fixed Assets / employee	Opex/ Gross Fixed Non-Curr Assets	Opex+GOCS/ Gross Fixed Non-Curr Assets	Incenta Comments
ADSEZ IN Equity	Adani Ports & Special Economic Zone Ltd	10,441	30%	3,089	India	65%	65%	1,210	5,538,417	11%	11%	Include
144 HK Equity	China Merchants Port Holdings Co Ltd	5,836	37%	2,174	Hong Kong	46%	94%	9,149	1,956,367	2%	6%	Include
1199 HK Equity	COSCO SHIPPING Ports Ltd	2,590	53%	1,365	Hong Kong	36%	99%	n.a.	n.a.	1%	8%	Include
2880 HK Equity	Dalian Port	2,898	33%	967	Hong Kong	27%	62%	6,819	736,924	3%	14%	Include
GPPV IN Equity	Gujarat Pipavav Port Ltd	599	57%	341	India	58%	58%	492	682,642	18%	18%	Include
HPHT SP Equity	Hutchison Port Holdings Trust	1,498	72%	1,084	Singapore	57%	85%	3,600	3,381,580	4%	8%	Include
LKPG SV Equity	Luka Koper	355	30%	106	Slovenia	39%	39%	3,600	141,769	39%	39%	Include
POTNZ Equity	Port of Tauranga Ltd	3,647	44%	1,594	New Zealand	56%	56%	1,242	970,591	9%	9%	Include
600017 CH Equity	Rizhao Port Co Ltd	1,285	43%	558	China	34%	79%	208	18,711,856	1%	12%	Include
3382 HK Equity	Tianjin Port Development Holdings Ltd	625	25%	158	Hong Kong	17%	60%	5,114	1,041,749	4%	32%	Include
3378 HK Equity	Xiamen International Port Co Ltd	406	86%	349	Hong Kong	14%	75%	n.a.	n.a.	2%	54%	Include
600317 CH Equity	Yingkou Port Liability Co Ltd	2,370	17%	414	China	45%	81%	8,300	337,683	2%	13%	Include
MSA MC Equity	Societe d'Exploitation des Ports	1,590	37%	583	Morocco	47%	47%	7,451	49,219	58%	58%	Include
601008 CH Equity	Jiangsu Liaryungang Port Co Ltd	608	45%	276	China	26%	55%	4,842	265,021	3%	11%	Include
600018 CH Equity	Shanghai International Port Group Co Ltd	19,202	11%	2,038	China	33%	75%	14,650	1,233,764	3%	21%	Include
601018 CH Equity	Ningbo Zhoushan Port Co Ltd	7,189	16%	1,124	China	26%	66%	16,779	597,071	3%	23%	Include
6198 HK Equity	Qingdao Port International Co Ltd	6,100	93%	5,672	Hong Kong	32%	75%	8,738	623,644	2%	20%	Include
000582 CH Equity	Beibuwan Port Co Ltd	2,101	14%	294	China	43%	77%	7,197	365,694	2%	13%	Include
Average		3,852	41%	1,233		39.0%	69.2%	6,212	2,289,625	9.3%	20.6%	
Median		2,236	37%	775		37.6%	70.1%	5,967	709,783	2.7%	13.5%	

Source: Bloomberg and Incenta analysis

**Table G.2: Port comparators that should be considered in future**

Ticker	Company name	Market Cap \$USDm	Free float %	Free float Mkt Cap \$USDm	Country of main listing	EBITDA Margin	Adjusted EBITDA Margin	Number of employees	\$m Gross Fixed Assets / employee	Opex/ Gross Fixed Non-Curr Assets	Opex+GOCS/ Gross Fixed Non-Curr Assets	Incenta Comments
601228 CH Equity	Guangzhou Port Co Ltd	3,406	11%	378	China	27%	62%	9,060	517,170	3%	19%	Sufficient data
ALCN EY Equity	Alexandria Containers & Goods	1,061	5%	53	Egypt	63%	91%	n.a.	n.a.	9%	49%	Free float >\$100m
KW JA Equity	Kingston Wharves Ltd	661	8%	52	Jamaica	44%	83%	n.a.	n.a.	3%	13%	Free float >\$100m
NPH NZ Equity	Napier Port Holdings Ltd	561	45%	252	New Zealand	42%	42%	n.a.	n.a.	17%	17%	Sufficient data
PPA GA Equity	Piraeus Port Authority SA	613	21%	128	Greece	43%	86%	1,016	543,659	5%	19%	Sufficient data
SPSI OM Equity	Salalah Port Services Co SAOG	280	23%	63	Oman	18%	34%	22,000	18,878	11%	28%	Free float >\$100m
APMTB BI Equity	APM Terminals Bahrain BSC	312	36%	112	Bahrain	37%	54%	n.a.	n.a.	48%	91%	Sufficient data
OLTH GA Equity	Thessaloniki Port Authority SA	293	33%	97	Greece	46%	81%	422	480,219	6%	20%	Sufficient data
Average		898	31%	759		40.1%	66.7%	8,125	389,982	13%	32%	
Median		587	28%	190		42.6%	71.6%	5,038	498,694	7%	20%	

Source: Bloomberg and Incenta analysis

**Table G.3: Businesses excluded in second round as not being suitable port comparators**

Ticker	Company name	Market Cap \$USDm	Free float %	Free float Mkt Cap \$USDm	Country of main listing	EBITDA Margin	Adjusted EBITDA Margin	Number of employees	\$m Gross Fixed Assets / employee	Opex/ Gross Fixed Non-Curr Assets	Opex+GOCS/ Gross Fixed Non-Curr Assets	Incenta Comments
BPH MK Equity	Bintulu Port Holdings Bhd	500	9%	47	Malaysia	62%	63%	n.a.	n.a.	142%	148%	Mainly LNG, containers 6% of cargo
201872 CH Equity	China Merchants Port Group Co Ltd	4,506	68%	3,081	China	44%	69%	9,568	2,002,789	2%	5%	Overlap with 144HK Equity
DPW DU Equity	DP World PLC	10,873	20%	2,126	Dubai	46%	92%	n.a.	n.a.	3%	14%	Operations divorced from listing mkt
EUK2 GR Equity	Eurokai GmbH & Co KGaA	514	75%	386	Germany	21%	21%	1,965	489,512	38%	38%	Logistics
GLPR LI Equity	Global Ports Investments PLC	726	39%	280	UK	64%	83%	n.a.	n.a.	5%	11%	Operations divorced from listing mkt
HHFA GR Equity	Hamburger Hafen und Logistik AG	2,005	32%	633	Germany	26%	26%	5,937	537,178	42%	42%	Logistics
ICT PM Equity	International Container Term. Serv. Inc	2,924	50%	1,471	Philippines	55%	55%	7,870	570,313	21%	21%	Operations divorced from listing mkt
LGTA CN Equity	Logistec Corp	392	21%	83	Canada	10%	10%	2,700	155,966	104%	104%	Logistics
NMTP RM Equity	Novorossiysk Comm. Sea Port PJSC	2,228	19%	432	Russia	69%	69%	n.a.	n.a.	17%	17%	Containers 4% of total cargo
PUERTO CI Equity	Puertos y Logística SA	398	6%	22	Chile	35%	97%	1,128	568,778	4%	19%	Operations divorced from listing mkt
3369 HK Equity	Qinhuangdao Port Co Ltd	2,335	78%	1,823	Hong Kong	37%	59%	11,674	411,185	5%	13%	Almost no container trade
QUB AU Equity	Qube Holdings Ltd	3,141	97%	3,048	Australia	17%	17%	n.a.	n.a.	31%	31%	Logistics
PAS KH Equity	Sihanoukville Autonomous Port	409	100%	409	Cambodia	34%	34%	n.a.	n.a.	10%	10%	Stevedoring
601000 CH Equity	TangShan Port Group Co Ltd	2,213	37%	809	China	23%	66%	4,017	798,337	3%	34%	Mainly coal port
WPRTS MK Equity	Westports Holdings Bhd	3,510	13%	457	Malaysia	62%	98%	n.a.	n.a.	3%	13%	Mainly transshipment port
WTE CN Equity	Westshore Terminals Investment Corp	1,008	67%	674	Canada	57%	98%	n.a.	n.a.	2%	18%	Coal terminal, no containers
002492 CH Equity	Zhuhai Winbase Intl Chem Tank Term.	343	44%	152	China	56%	76%	513	480,777	3%	7%	Warehousing
600190 CH Equity	Jinzhou Port Co Ltd - A	851	22%	190	China	15%	57%	1,549	1,698,405	0%	25%	Port services are minority
TSM11 ET Equity	Tallinna Sadam AS	481	100%	481	Estonia	57%	57%	496	1,979,330	10%	10%	Most revenue from passengers
VENTANA CI Equity	Puerto Ventanas SA	237	20%	47	Chile	30%	77%	964	438,104	4%	27%	Rail is half of revenue
Average		1,980	46%	832		40.9%	61.2%	4,033	844,190	22%	30%	
Median		929	38%	457		40.3%	64.6%	2,343	552,978	5%	18%	

Source: Bloomberg and Incenta analysis

**Table G.4: Businesses excluded in first round as not being suitable port comparators**

Ticker	Company name	Market Cap \$USDm	Free float %	Free float Mkt Cap \$USDm	Country of main listing	EBITDA Margin	Adjusted EBITDA Margin	Number of employees	\$m Gross Fixed Assets / employee	Opex/ Gross Fixed Assets	Opex+GOCS/ Gross Fixed Non-Curr Assets	Incenta Comments
9301 JP Equity	Mitsubishi Logistics Corp	1,759	71%	1,258	Japan	11%	59%	4,463	1,387,976	2%	28%	Logistics
600717 CH Equity	Tianjin Port Co Ltd	1,812	40%	717	China	16%	48%	7,917	677,975	4%	28%	Majority cargo handling/logistics
600575 CH Equity	Huaihe Energy Group Co Ltd	1,434	32%	456	China	15%	58%	8,048	395,097	3%	42%	Logistics
9364 JP Equity	Kanigumi Co Ltd	2,219	79%	1,754	Japan	13%	56%	4,079	1,178,791	3%	43%	Transportation services
FSJ LN Equity	James Fisher & Sons PLC	1,352	99%	1,342	UK	16%	44%	2,783	247,821	21%	90%	Transportation services
9303 JP Equity	Sumitomo Warehouse Co Ltd/The	913	68%	622	Japan	9%	46%	4,044	979,621	2%	37%	Warehousing & transportation
002930 CH Equity	Guangdong Great River Smarter Logistics	736	33%	244	China	65%	80%	614	763,687	2%	4%	Warehousing
ATI PM Equity	Asian Terminals Inc	692	65%	453	Philippines	62%	62%	n.a.	n.a.	23%	23%	Handling and warehousing
000507 CH Equity	Zhuhai Port Co Ltd	671	57%	382	China	17%	51%	2,898	313,474	4%	34%	Logistics
600279 CH Equity	Chongqing Gangjiu Co Ltd	632	31%	198	China	7%	39%	2,160	449,643	3%	84%	Stevedoring
SMSAAM CI Equity	Sociedad Matriz SAAM SA	605	46%	277	Chile	29%	61%	n.a.	n.a.	5%	25%	Transport & logistics
STBP3 BZ Equity	Santos Brasil Participacoes SA	523	69%	361	Brazil	21%	46%	3,026	228,101	8%	28%	Stevedoring
2607 TT Equity	Evergreen Intrl Storage & Transport Corp	436	43%	187	Taiwan	39%	158%	1,363	1,112,696	1%	13%	Transportation services
002040 CH Equity	Nanjing Port Co Ltd	426	30%	129	China	52%	79%	1,132	597,057	3%	8%	Transport services
MMC MK Equity	MMC Corp Bhd	423	15%	63	China	24%	61%	n.a.	n.a.	5%	18%	Free float / Transport & logistics
517 HK Equity	COSCO SHIPPING Intl Hong Kong	421	34%	143	Hong Kong	2%	11%	876	197,705	37%	631%	Trading company
WSON33 BZ Equity	Wilson Sons Ltd	420	n.a.	420	Brazil	35%	38%	n.a.	n.a.	27%	30%	Transport and logistics
EUK3 GR Equity	Eurokai GmbH & Co KGaA	389	100%	389	Germany	21%	21%	1,985	489,512	38%	38%	Logistics
SISCO AB Equity	Saudi Industrial Services Co	383	80%	305	Saudi Arabia	43%	94%	n.a.	n.a.	5%	16%	Services
9357 JP Equity	Meiko Trans Co Ltd	322	58%	188	Japan	10%	36%	1,727	635,658	8%	50%	Transport services
9066 JP Equity	Nissin Corp	317	82%	260	Japan	4%	16%	6,066	173,314	25%	167%	Transport services
PORT PM Equity	Globalport 900 Inc	312	11%	34	Philippines	17%	17%	n.a.	n.a.	5%	5%	Free float / Suspended
OCN LN Equity	Ocean Wilsons Holdings Ltd	304	36%	109	UK	34%	36%	4,103	288,324	27%	30%	Port ancillary services
NKHP RM Equity	Novorossiysk Grain Plant PJSC	214	49%	105	Russia	31%	72%	n.a.	n.a.	12%	107%	Grain handling & trading
GMD VN Equity	Gemadep Corp	208	81%	168	Vietnam	33%	63%	1,481	298,719	4%	17%	Transportation services
NMDC UH Equity	National Marine Dredging Co	204	41%	84	Abu Dhabi	17%	72%	n.a.	n.a.	4%	38%	Dredging services
Average		697	54%	201		24.7%	54.8%	3,265	446,787	11%	63%	
Median		431	46%	178		19.0%	53.3%	2,841	298,719	5%	30%	

Source: Bloomberg and Incenta analysis

**Table G.5: Businesses excluded as duplicates, delisted or traded OTC**

Ticker	Company name	Market Cap \$USDm	Free float %	Free float Mkt Cap \$USDm	Country of main listing	EBITDA Margin	Adjusted EBITDA Margin	Number of employees	\$m Gross Fixed Assets / employee	Opex/ Gross Fixed Assets	Opex+GOCS/ Gross Fixed Non-Curr Assets	Incenta Comments
WTSHF US Equity	Westshore Terminals Investment Corp	662	65%	430	US	57%	96%	n.a.	n.a.	2%	23%	OTC / Duplicate
601298 CH Equity	Qingdao Port International Co Ltd	4,961	8%	418	China	32%	75%	8,611	632,842	2%	25%	Duplicate
601880 CH Equity	Dalian Port PDA Co Ltd	2,350	28%	649	China	27%	62%	6,819	736,924	3%	19%	Duplicate
601326 CH Equity	Qinhuangdao Port Co Ltd	1,961	13%	248	China	37%	59%	11,674	411,185	5%	19%	Duplicate
000905 CH Equity	Xiamen Port Development Co Ltd	540	36%	195	China	4%	27%	4,971	206,486	4%	212%	Duplicate
CSPKF US Equity	COSCO SHIPPING Ports Ltd	1,739	53%	916	US	36%	99%	n.a.	n.a.	1%	9%	OTC / Duplicate
HCTPF US Equity	Hutchison Port Holdings Trust	915	72%	662	US	57%	85%	3,600	3,381,582	4%	9%	OTC / Duplicate
ICTEF US Equity	International Container Term. Services	4,005	50%	2,015	US	55%	55%	7,870	570,313	21%	23%	OTC / Duplicate
CWAAF US Equity	China Merchants Port Group Co Ltd	3,655	n.a.	3,655	China	44%	69%	9,568	2,002,786	2%	6%	Delisted
XMINIF US Equity	Xiamen International Port Co Ltd	243	n.a.	243	China	14%	75%	7,451	411,054	2%	69%	Delisted
LTKBF US Equity	Logistec Corp	283	89%	252	US	10%	10%	2,700	147,715	109%	138%	OTC / Logistics
HHULF US Equity	Hamburger Hafen und Logistik AG	1,204	32%	380	US	26%	26%	5,937	537,178	42%	80%	OTC / Logistic
900952 CH Equity	Jinzhou Port Co Ltd - B	789	100%	789	China	15%	57%	1,549	1,698,405	0%	29%	Duplicate
WSON LX Equity	Wilson Sons Ltd	775	42%	324	Luxembourg	35%	38%	n.a.	n.a.	27%	46%	Transport and logistics
Average		1,360	50%	798		30.2%	60.5%	5,595	976,043	14%	51%	
Median		775	47%	424		31.5%	62.0%	5,454	570,313	4%	29%	

Source: Bloomberg and Incenta analysis

## H. Regulated energy businesses comparator group

Table H.1: Regulated energy businesses comparator group

Company name	Ticker	Company name	Ticker
ALLETE Inc	ALE US Equity	National Fuel Gas Co	NFG US Equity
Alliant Energy Corp	LNT US Equity	National Grid PLC	NG/ LN Equity
Ameren Corp	AEE US Equity	New Jersey Resources Corp	NJR US Equity
American Electric Power Co Inc	AEP US Equity	NextEra Energy Inc	NEE US Equity
APA Group	APA AU Equity	NiSource Inc	Ni US Equity
Atco Ltd/Canada	ACO/X CN Equity	Northwest Natural Holding Co	NWN US Equity
Atmos Energy Corp	ATO US Equity	NorthWestern Corp	NWE US Equity
AusNet Services	SPN AU Equity	NV Energy Inc	NVE US Equity
Australian Gas Networks Ltd	ENV AU Equity	OGE Energy Corp	OGE US Equity
Avista Corp	AVA US Equity	Pepco Holdings LLC	POM US Equity
Canadian Utilities Ltd	CU CN Equity	PG&E Corp	PCG US Equity
CenterPoint Energy Inc	CNP US Equity	Piedmont Natural Gas Co Inc	PNY US Equity
Centrica PLC	CNA LN Equity	Pinnacle West Capital Corp	PNW US Equity
Chesapeake Utilities Corp	CPK US Equity	Portland General Electric Co	POR US Equity
Cleco Corporate Holdings LLC	CNL US Equity	PPL Corp	PPL US Equity
CMS Energy Corp	CMS US Equity	Public Service Enterprise Group Inc	PEG US Equity
Consolidated Edison Inc	ED US Equity	SCANA Corp	SCG US Equity
Dominion Energy Inc	D US Equity	Sempra Energy	SRE US Equity
DTE Energy Co	DTE US Equity	South Jersey Industries Inc	SJI US Equity
DUET Group	DUE AU Equity	Southern Co Gas	GAS US Equity
Duke Energy Corp	DUK US Equity	Southern Co/The	SO US Equity
Edison International	EIX US Equity	Southwest Gas Holdings Inc	SWX US Equity
El Paso Electric Co	EE US Equity	Spark Infrastructure Group	SKI AU Equity
Emera Inc	EMA CN Equity	Spire Inc	LG US Equity
Empire District Electric Co/The	EDE US Equity	TC Energy Corp	TRP CN Equity
Energy Corp	ETR US Equity	TC PipeLines LP	TCP US Equity
Evergy Kansas Central Inc	WR US Equity	UIL Holdings Corp/Old	UIL US Equity
Eversource Energy	NU US Equity	United Utilities Group PLC	UU/ LN Equity
FirstEnergy Corp	FE US Equity	UNS Energy Corp	UNS US Equity
Fortis Inc/Canada	FTS CN Equity	Vector Ltd	VCT NZ Equity
Great Plains Energy Inc	GXP US Equity	Vectren Corp	VVC US Equity
IDACORP Inc	IDA US Equity	WEC Energy Group Inc	WEC US Equity
Integrus Energy Group Inc	TEG US Equity	WGL Holdings Inc	WGL US Equity
ITC Holdings Corp	ITC US Equity	Xcel Energy Inc	XEL US Equity
MGE Energy Inc	MGEE US Equity		

Source: Bloomberg and Incenta (31 March, 2016).

## I. Asset beta sensitivities

In this appendix we show some sensitivities to the asset beta estimates provided in the text, which are monthly interval estimates to 31 January, 2019. Below we show the results if asset beta was estimated based on weekly return intervals, or up 30 March, 2020.

**Table I.1: Asset betas for port and other industry comparator groups to 31 December, 2019 using weekly return data**

Industry	No. of comparators	Weekly returns	5 yr asset beta	10yr asset beta
<b>Rail</b>	<b>8</b>	<b>Average</b>	<b>0.80</b>	<b>0.82</b>
		Median	0.71	0.79
<b>Ports</b>	<b>18</b>	<b>Average</b>	<b>0.83</b>	<b>0.80</b>
		Median	0.77	0.77
<b>Airports</b>	<b>24</b>	<b>Average</b>	<b>0.85</b>	<b>0.74</b>
		Median	0.77	0.72
<b>Tollroads</b>	<b>31</b>	<b>Average</b>	<b>0.56</b>	<b>0.54</b>
		Median	0.54	0.51

*Source: Bloomberg and Incenta analysis*

**Table I.2: Asset betas for port and other industry comparator groups to 30 March, 2020 using monthly and weekly return data**

Industry	No. of comparators	Monthly returns	5 yr asset beta	10yr asset beta
<b>Ports</b>	<b>18</b>	<b>Average (Monthly)</b>	<b>0.90</b>	<b>0.87</b>
		Median (Monthly)	0.87	0.84
<b>Ports</b>	<b>18</b>	<b>Average (Weekly)</b>	<b>0.87</b>	<b>0.84</b>
		Median (Weekly)	0.88	0.80

*Source: Bloomberg and Incenta analysis*



## **J. Engagement letter**

# JOHNSON WINTER & SLATTERY

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**DocID:** 77165557.1

14 May 2020

Mr Jeff Balchin  
Managing Director  
Incenta Economic Consulting  
Unit 1, 19-35 Gertrude Street  
FITZROY VIC 3065

**BY EMAIL**

Dear Mr Balchin

## **Port of Melbourne**

We act for the Port of Melbourne (**PoM**) in relation to the preparation of its Tariff Compliance Statement (**TCS**) for 2020-21 for submission to the Essential Services Commission of Victoria (**ESC**) by 31 May 2020. The TCS is required to be provided to the ESC pursuant to a Pricing Order made under the *Port Management Act 1995 (Vic)* (**PMA**).

PoM wishes to engage you to prepare an expert report in connection with the TCS. This letter sets out the matters which PoM wishes you to address in your report and the requirements with which the report must comply.

### **1 Background and framework**

PoM is subject to a form of “compliance” regulation under a Pricing Order made by the Governor in Council under section 49A of the PMA. A copy of the Pricing Order is attached to this letter as **Attachment A**.

The ESC is responsible for overseeing a number of economic regulatory functions applicable to PoM, including monitoring and reporting on PoM’s compliance with the Pricing Order.

Clause 2.1.1(a) of the Pricing Order provides that Prescribed Service Tariffs are to be set so as to allow the Port Licence Holder (that is, PoM) a reasonable opportunity to recover the efficient cost of providing all Prescribed Services, determined by application of an accrual building block methodology. Prescribed Services provided by PoM include shipping channels, wharves and berthing facilities.

Pursuant to clause 4.1.1 of the Pricing Order, the accrual building block methodology applied by PoM must comprise:

- (a) an allowance to recover a return on its capital base, commensurate with that which would be required by a benchmark efficient entity with a similar degree of risk as that which applies to PoM in respect of the provision of the Prescribed Services;

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- (b) an allowance to recover the return of its capital base; and
- (c) an allowance to recover its forecast operating expenses, commensurate with that which would be required by a prudent service provider acting efficiently; less
- (d) an indexation allowance.

Clause 4.3.1 of the Pricing Order also requires that, in determining a rate of return on capital for the purposes of clause 4.1.1.(a), PoM “*must use one or a combination of well accepted approaches that distinguish the cost of equity and debt, and so derive a weighted average cost of capital*”. This must be determined on a pre-tax, nominal basis (clause 4.3.2).

The objectives of the regulatory regime, as set out in section 48 of the PMA, are:

- (a) to promote efficient use of, and investment in, the provision of prescribed services for the long-term interests of users and Victorian consumers; and
- (b) to protect the interests of users of prescribed services by ensuring that prescribed prices are fair and reasonable whilst having regard to the level of competition in, and efficiency of, the regulated industry; and
- (c) to allow a provider of prescribed services a reasonable opportunity to recover the efficient costs of providing prescribed services, including a return commensurate with the risks involved; and
- (d) to facilitate and promote competition—
  - (i) between ports; and
  - (ii) between shippers; and
  - (iii) between other persons conducting other commercial activities in ports; and
- (e) to eliminate resource allocation distortions by prohibiting a State sponsored port operator from providing a relevant service at a price lower than the competitively neutral price for that service.

As set out in section 8 of the *Essential Services Commission Act 2001* (Vic) (**ESC Act**):

- (a) in performing its functions and exercising its powers, the objective of the ESC is to promote the long term interests of Victorian consumers (the **objective**); and
- (b) in performing its functions and exercising its powers in relation to essential services, the ESC must, in seeking to achieve the objective, have regard to the price, quality and reliability of essential services.

## 2 Terms of Reference

Having regard to the background and regulatory framework discussed above, PoM wishes to engage you to prepare an expert report which:

- (a) Provides your opinion as to the appropriate (for the purposes of clause 4.1.1(a) of the Pricing Order) approach to constructing a comparator set (including the use of any filtering methodologies) to derive an equity beta estimate to be used in the Sharpe-Linter Capital Asset Pricing Model to determine a weighted average cost of capital for PoM.
- (b) Reviews and provides your opinion as to the ESC’s and its expert’s comments in relation to the approach adopted by PoM in PoM’s TCS for 2019-20 (a copy of which, including Appendix N thereto, is **Attachment B** to this letter) to derive the equity beta, as set out in:

- (i) the ESC's Interim Commentary on the 2019-20 TCS, dated 16 December 2019, a copy of which is **Attachment C** to this letter; and
  - (ii) the report of Frontier Economics prepared for the ESC dated 12 December 2019 and entitled *Issues in Cost of Capital Estimation for the Port of Melbourne*, a copy of which is **Attachment D** to this letter.
- (c) In light of your response to questions (a) and (b), provides your opinion as to the appropriate point estimate or range for the equity beta applicable to PoM.

It is intended that your report will be submitted to the ESC with PoM's 2020-21 TCS. The report may be provided by the ESC to its own advisors. The report may also be considered by an appeal body, court or tribunal in the event that a relevant proceeding is commenced under the ESC Act.

The report will be reviewed by PoM's legal advisers and will be used by them to provide legal advice as to its respective rights under the Pricing Order and the PMA.

### **3 Compliance with the Expert Witness Code of Conduct**

Attached to this letter, as **Attachments E and F**, are copies of:

- Form 44A to the *Supreme Court (General Civil Procedure) Rules 2015*, the Expert Witness Code of Conduct (**Code of Conduct**); and
- Victorian Civil & Administrative Tribunal Practice Note – PNVCAT2, *Expert Evidence* (**Practice Note**).

Please read and familiarise yourself with the Code of Conduct and the Practice Note and comply with them at all times in preparing your report and in the course of your engagement by PoM. Your report should contain a statement to the effect that the author of the report has read the Code of Conduct and the Practice Notice and agreed to be bound by them.

Your report must also clearly state your opinion(s) and the reasons for them and include the information and declarations required specifically by clause 3 of the Code of Conduct and clause 11 of the Practice Note.

Please also attach a copy of this letter of instruction to the report.

Yours faithfully



## **K. Curricula Vitae**

# Jeff Balchin

## Managing Director

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## Overview

Jeff is the Managing Director of Incenta Economic Consulting. Jeff has over 25 years of experience in relation to economic regulation issues across the electricity, gas, ports, airports, rail, water and telecommunications sectors in Australia and New Zealand. He has advised governments, regulators and major corporations on issues including the development of regulatory frameworks, regulatory price reviews and issues around the introduction and measurement of competition (including franchise bidding). His particular specialities have been on the application of finance principles to economic regulation, the design of incentive compatible regulation and efficient tariff structures and the drafting and economic interpretation of regulatory instruments.

In addition, Jeff has substantial experience with the application of economic and finance principles to pricing and investment appraisal and associated commercial disputes in unregulated infrastructure and non-infrastructure markets. He has also assisted with applying economic principles to transfer pricing.

Jeff has undertaken a number of expert witness assignments.

## Past positions

Jeff previously was a Principal at PwC in its economics and policy team for almost 4 years, prior to that a director and partner at the Allen Consulting Group for over 13 years, and prior to that he held a number of policy positions in the Commonwealth Government. In this latter role, he was on the secretariat of the Gas Reform Task Force (1995-1996), where he played a lead role in the development of the National Gas Code.

## Relevant experience

### A. Economic regulation of network / monopoly activities

#### *Assistance to parties during price reviews/negotiations*

- Economic regulation of ultrafast broadband (Client: Chorus NZ, 2016-ongoing) – have been advising Chorus on a range of issues associated with transitioning its ultrafast broadband activities from one that is regulated via a concession contract to a building block approach, including the valuation of assets, cost of capital issues including the treatment of stranded asset risk, treatment of its concessional government financing, issues with forecasting expenditure and the design of incentive schemes, and financial modelling issues.
- Price review for aeronautical services (Client: Christchurch International Airport Limited, 2015-18) – provided economic advice on a range of economic issues associated with setting infrastructure prices, including appropriate depreciation methods, acceptable rate of return and calculation of implied returns, techniques for forecasting expenditure and tariff structures. I was also responsible for the overall financial modelling that fed into the calculation of prices.
- Compliance with new regulatory regime for non-scheduled pipelines (Client: Epic SA, 2017-18) – assisted Epic SA to respond to the new regulatory regime for non-scheduled pipelines, which included advice on the economic meaning of the new regulatory requirements, modelling of an

initial regulatory asset value that best complied with the regime requirements, advice on the weighted average cost of capital and assistance with determining a price that best complied with the regime requirements.

- Regulatory valuation of telecommunications local loop assets (Client: Chorus NZ, 2014) – prepared a report advising on the appropriate valuation of local loop assets for the purpose of deriving a TSLRIC price for unbundled local loop access and provided subsequent ongoing advice on the application of different methods.
- Cost allocation (Client: BHP, 2014-2016) – prepared two reports on the economic principles behind allocating costs between regulated and unregulated services during the review of tariffs for the Goldfields Gas Pipeline.
- Depreciation and financeability (Client: AGN, 2015-16) – prepared a series of reports on the use of depreciation to manage financeability issues, and its justification within the relevant legal instruments. Also advised in relation to the acceleration of depreciation for “replaced” assets.
- Depreciation and risk management (Client: ENA, 2015) – prepared a report on how depreciation could be used as a stranding-risk management tool, which included a discussion of regulatory precedents and articulation of how this role for depreciation is consistent with economic principles and the relevant legal instruments.
- AER WACC Review (Client: ENA, 2011-12) – prepared expert reports on a range of matters, including the appropriate term of the risk free rate, the appropriate term of debt and a critical assessment of the ERA’s (then) method for deriving the debt risk premium.
- Design of incentives for operating expenditure efficiency (Client: ElectraNet, 2012-13) – provided expert advice on the detailed application of the incentive arrangements for operating expenditure, including the link between the incentive scheme and the forecasting method.
- Regulatory depreciation (Client: APA, 2012-13) – provided expert reports on the economic principles relevant to the depreciation method that is applied to set gas transmission charges.
- Regulatory cost of debt (Clients: Powerlink, ElectraNet and Victorian gas distributors 2011-2012) – provided a series of reports addressing how the benchmark cost of debt should be established pursuant to the National Electricity Rules and on the appropriate benchmark allowance for debt and equity raising costs.
- Real cost escalation (Client: Energex, 2009-10) – advised Energex on appropriate escalators to apply to forecasts of operating and capital expenditure over the regulatory period.
- Strategic advice, Victorian electricity distribution review and NSW gas distribution review (Client: Jemena Electricity Networks, 2009-2011) – retained as strategic adviser during the review and also provided advice on a range of technical regulatory economic issues, including on regulatory finance matters, service incentives, party contracts, allocation of costs between regulated and unregulated activities and forecasting of expenditure.
- Regulatory cost of debt (Client: Powercor Australia Limited, 2009-2010) – provided a series of reports addressing how the benchmark cost of debt should be established pursuant to the National Electricity Rules.
- Service incentive scheme (Client: Powercor Australia Limited, 2010) – assisted Powercor to quantify the financial effect that would have flowed if the former service performance incentive scheme had continued. Also prepared an expert report pointing to a material inconsistency in how

the AER intended to close out the old scheme and the parameters for the new service performance incentive scheme, which was accepted by the AER.

- Input methodologies for NZ regulated businesses (Clients: Powerco NZ and Christchurch International Airport, 2009-2012) – advised in relation to the Commerce Commission’s development of input methodologies, focussing asset valuation, the regulatory cost of capital, the use of productivity trends in regulation and the design of incentive-compatible regulation. Also assisted in briefing counsel in subsequent reviews.
- Commercial negotiation of landing charges (Client: Virgin Blue, 2009-2012) – economic advice to Virgin Blue during its commercial negotiation of landing charges to a number of major and secondary airports.
- Equity Betas for Regulated Electricity Transmission Activities (Client: Grid Australia, APIA, ENA, 2008) – Prepared a report presenting empirical evidence on the equity betas for regulated Australian electricity transmission and distribution businesses for the AER’s five yearly review of WACC parameters for these industries. The report demonstrated the implications of a number of different estimation techniques and the reliability of the resulting estimates. Also prepared a joint paper with the law firm, Gilbert+Tobin, providing an economic and legal interpretation of the relevant (unique) statutory guidance for the review.
- Economic Principles for the Setting of Airside Charges (Client: Christchurch International Airport Limited, 2008-2013) – Provided advice on a range of economic issues relating to its resetting of charges for airside services, including the valuation of assets and treatment of revaluations, certain inputs to the cost of capital (beta and the debt margin) and the efficiency of prices over time and the implications for the depreciation of assets and measured accounting profit.
- Treatment of Inflation and Depreciation when Setting Landing Charges (Client: Virgin Blue, 2007-2008) – Provided advice on Adelaide Airport’s proposed approach for setting landing charges for Adelaide Airport, where a key issue was how it proposed to deal with inflation and the implications for the path of prices over time. The advice also addressed the different formulae that are available for deriving an annual revenue requirement and the requirements for the different formulae to be applied consistently.
- Application of the Grid Investment Test to the Auckland 400kV Upgrade (Client: Electricity Commission of New Zealand, 2006) - As part of a team, undertook a review of the Commission’s process for reviewing Transpower’s proposed Auckland 400kV upgrade project and undertook a peer review of the Commission’s application of the Grid Investment Test.
- Appropriate Treatment of Taxation when Measuring Regulatory Profit (Client: Powerco New Zealand, 2005-2006) - Prepared a series of statements on how taxation should be treated when measuring realised and projected regulatory profit.
- Application of Directlink for Regulated Status (Client: Directlink, 2003-2004) – Prepared advice on the economic efficiency of the conversion of an unregulated (entrepreneurial) interconnector to a regulated interconnector and how the asset should be valued for pricing purposes.
- Principles for the ‘Stranding’ of Assets by Regulators (Client: the Independent Pricing and Regulatory Tribunal, NSW, 2005) - Prepared a report discussing the relevant economic principles for a regulator in deciding whether to ‘strand’ assets for regulatory purposes (that is, to deny any further return on assets that are partially or unutilised).
- Principles for Determining Regulatory Depreciation Allowances (Client: the Independent Pricing and Regulatory Tribunal, NSW, 2003) - Prepared a report discussing the relevant economic and other principles for determining depreciation for the purpose of price regulation, and its application



to electricity distribution. An important issue addressed was the distinction between accounting and regulatory (economic) objectives for depreciation.

- Methodology for Updating the Regulatory Value of Electricity Transmission Assets (Client: the Australian Competition and Consumer Commission, 2003) - Prepared a report assessing the relative merits of two options for updating the regulatory value of electricity transmission assets at a price review - which are to reset the value at the estimated 'depreciated optimised replacement cost' value, or to take the previous regulatory value and deduct depreciation and add the capital expenditure undertaken during the intervening period (the 'rolling-forward' method). This paper was commissioned as part of the ACCC's review of its Draft Statement of Regulatory Principles for electricity transmission regulation.
- Application of Murraylink for Regulated Status (Client: Murraylink Transmission Company, 2003) – Prepared advice on the economic efficiency of the conversion of an unregulated (entrepreneurial) interconnector to a regulated interconnector and how the asset should be valued for pricing purposes.
- Proxy Beta for Regulated Gas Transmission Activities (Client: the Australian Competition and Consumer Commission, 2002) - Prepared a report presenting the available empirical evidence on the 'beta' (which is a measure of risk) of regulated gas transmission activities. This evidence included beta estimates for listed firms in Australia, as well as those from the United States, Canada and the United Kingdom. The report also included a discussion of empirical issues associated with estimating betas, and issues to be considered when using such estimates as an input into setting regulated charges.
- Treatment of Working Capital when setting Regulated Charges (Client: the Australian Competition and Consumer Commission, 2002) - Prepared a report assessing whether it would be appropriate to include an explicit (additional) allowance in the benchmark revenue requirement in respect of working capital when setting regulated charges.
- Pricing Principles for the South West Pipeline (Client: Esso Australia, 2001) - As part of a team, prepared a report describing the pricing principles that should apply to the South West Pipeline (this gas transmission pipeline was a new asset, linking the existing system to a new storage facility and additional gas producers).
- Likely Regulatory Outcome for the Price for Using a Port (Client: MIM, 2000) - Provided advice on the outcome that could be expected were the dispute over the price for the use of a major port to be resolved by an economic regulator. The main issue of contention was the valuation of the port assets (for regulatory purposes) given that the installed infrastructure was excess to requirements, and the mine had a short remaining life.
- Relevance of 'Asymmetric Events' in the Setting of Regulated Charges (Client: TransGrid, 1999) - In conjunction with William M Mercer, prepared a report (which was submitted to the Australian Competition and Consumer Commission) discussing the relevance of downside (asymmetric) events when setting regulated charges, and quantifying the expected cost of those events.

#### *Major roles for regulators*

- Review of financeability test (Client: IPART, 2018) – provided advice to IPART in relation to the financial metrics and target ratios that IPART proposed to use as part of its financeability test, which was released to stakeholders during the consultation process.
- Aurizon Network price review (Client: Queensland Competition Authority, 2018-19) – advised the QCA on the appropriate rate of return (discount rate) for the Aurizon Network business as in the

previous review, and also advised the QCA with respect to the assessment of financeability for a regulated business and the appropriate measures to ameliorate financeability concerns.

- Aurizon Network price review (Client: Queensland Competition Authority, 2013-2014) – advised the QCA on the appropriate rate of return (discount rate) for the Aurizon Network business, which included an assessment of the relative risk of Aurizon Network compared to other infrastructure sectors, advice on the appropriate benchmark gearing level and on the benchmark debt interest rate.
- Victorian Gas Distribution Price Review (Client: the Essential Services Commission, Vic, 2006-2008) - Provided advice to the Essential Service Commission in relation to its review of gas distribution access arrangements on the treatment of outsourcing arrangements, finance issues, incentive design and other economic issues.
- Envestra Gas Distribution Price Review (Client: the Essential Services Commission, SA, 2006) - Provided advice on several finance related issues (including ‘return on assets’ issues and the financial effect of Envestra’s invoicing policy), and the treatment of major outsourcing contracts when setting regulated charges.
- DBCT price review (Client: QCA, Qld, 2004-2006) – advice on a number of finance related issues, including the calculation of IDC for a DORC valuation, cost of debt and equity beta.
- Victorian Electricity Distribution Price Review (Client: the Essential Services Commission, Vic, 2003-2005) - Provided advice to the Essential Service Commission on a range of economic issues related to current review of electricity distribution charges, including issues related to finance, forecasting of expenditure and the design of incentive arrangements for productive efficiency and service delivery. Was a member of the Steering Committee advising on strategic regulatory issues.
- Victorian Water Price Review (Client: the Essential Services Commission, Vic, 2003-2005) - Provided advice to the Essential Services Commission on the issues associated with extending economic regulation to the various elements of the Victorian water sector. Was a member of the Steering Committee advising on strategic regulatory issues, and also provided advice on specific issues, most notably the determination of the initial regulatory values for the water businesses and the role of developer charges.
- ETSA Electricity Distribution Price Review (Client: the Essential Services Commission, SA, 2002-2005) - Provided advice on the ‘return on assets’ issues associated with the review of ETSA’s regulated distribution charges, including the preparation of consultation papers. The issues covered include the valuation of assets for regulatory purposes and cost of capital issues. Also engaged as a quality assurance adviser on other consultation papers produced as part of the price review.
- Victorian Gas Distribution Price Review (Client: the Essential Services Commission, Vic, 2001-2002) - Economic adviser to the Essential Services Commission during its assessment of the price caps and other terms and conditions of access for the three Victorian gas distributors. Was responsible for all issues associated with capital financing (including analysis of the cost of capital and assessment of risk generally, and asset valuation), and supervised the financial modelling and derivation of regulated charges. Also advised on a number of other issues, including the design of incentive arrangements, the form of regulation for extensions to unreticulated townships, and the principles for determining charges for new customers connecting to the system.
- ETSA Electricity Distribution Price Review (Client: the South Australian Independent Industry Regulator, 2000-2001) - As part of a team, prepared a series of reports proposing a framework for the review. The particular focus was on the design of incentives to encourage cost reduction and

service improvement, and how such incentives can assist the regulator to meet its statutory obligations. Currently retained to provide commentary on the consultation papers being produced by the regulator, including strategic or detailed advice as appropriate.

- Dampier to Bunbury Natural Gas Pipeline Access Arrangement Review (Client: the Independent Gas Pipelines Access Regulator, WA, 2000-2002) - Provided economic advice to the Office of the Independent Regulator during its continuing assessment of the regulated charges and other terms and conditions of access for the gas pipeline, including a review of all parts of the draft decision, with particular focus on the sections addressing the cost of capital (and assessment of risk generally), asset valuation and financial modelling. Represented the Office on these matters at a public forum, and provided strategic advice to the Independent Regulator on the draft decision.
- Goldfield Gas Pipeline Access Arrangement Review (Client: the Independent Gas Pipelines Access Regulator, WA, 2000-2004) - Provided economic advice to the Office of the Independent Regulator during its continuing assessment of the regulated charges and other terms and conditions of access for the gas pipeline, including a review of all parts of the draft decision, with particular focus on the sections addressing the cost of capital (and assessment of risk generally), asset valuation and financial modelling. Represented the Office on these matters at a public forum, and provided strategic advice to the Independent Regulator on the draft decision.
- Victorian Electricity Distribution Price Review (Client: the Office of the Regulator General, Vic, 1999-2000) - Economic adviser to the Office of the Regulator General during its review of the price caps for the five Victorian electricity distributors. Had responsibility for all issues associated with capital financing, including analysis of the cost of capital (and assessment of risk generally) and asset valuation, and supervised the financial modelling and derivation of regulated charges. Also advised on a range of other issues, including the design of incentive regulation for cost reduction and service improvement, and the principles for determining charges for new customers connecting to the system.
- Victorian Ports Corporation and Channels Authority Price Review (Client: the Office of the Regulator General, Vic, 2000) - Advised on the finance related issues (cost of capital and the assessment of risk generally, and asset valuation), financial modelling (and the derivation of regulated charges), and on the form of control set over prices. Principal author of the sections of the draft and final decision documents addressing the finance related and price control issues.
- AlintaGas Gas Distribution Access Arrangement Review (Client: the Independent Gas Pipelines Access Regulator, WA, 1999-2000) - Provided economic advice to the Office of the Independent Regulator during its assessment of the regulated charges and other terms and conditions of access for the gas pipeline. This advice included providing a report assessing the cost of capital associated with the regulated activities, overall review of all parts of the draft and final decisions, with particular focus on the sections addressing the cost of capital (and assessment of risk generally), asset valuation and financial modelling. Also provided strategic advice to the Independent Regulator on the draft and final decisions.
- Parmelia Gas Pipeline Access Arrangement Review (Client: the Independent Gas Pipelines Access Regulator, WA, 1999-2000) - Provided economic advice to the Office of the Independent Regulator during its assessment of the regulated charges and other terms and conditions of access for the gas pipeline, including a review of all parts of the draft and final decisions, with particular focus on the sections addressing the cost of capital (and assessment of risk generally), asset valuation and financial modelling. Also provided strategic advice to the Independent Regulator on the draft and final decisions.
- Victorian Gas Distribution Price Review (Client: the Office of the Regulator General, Vic, 1998) - Economic adviser to the Office of the Regulator General during its assessment of the price caps

and other terms and conditions of access for the three Victorian gas distributors. Major issues addressed included the valuation of assets for regulatory purposes, cost of capital financing and financial modelling. Principal author of the draft and final decision documents.

### *Development/Review of Regulatory Frameworks*

- Pricing principles for non-scheduled pipelines (Client: Gas Market Reform Group, 2017) – provided advice to the Group on the range of principles that could be specified for an arbitrator if called to arbitrate a dispute on a non-scheduled pipeline, and the relative merits of the different options.
- Review of the Australian energy economic regulation (Client: Energy Networks Association, 2010-2012) – assisting the owners of energy infrastructure to engage in the current wide-ranging review of the regime for economic regulation of energy infrastructure. Advice has focussed in particular on the setting of the regulatory WACC and on the regime of financial incentives for capital expenditure efficiency, and included strategic and analytical advice, preparation of expert reports and assistance with ENA submissions.
- Review of the Australian electricity transmission framework (Client: Grid Australia, 2010-2013) – assisting the owners of electricity transmission assets to participate in the wide-ranging review of the framework for electricity transmission in the national electricity market, covering such matters as planning arrangements, the form of regulation for non-core services and generator capacity rights and charging. Has included analytical advice on policy choices, facilitation of industry positions and articulation of positions in submissions.
- Implications of greenhouse policy for the electricity and gas regulatory frameworks (Client: the Australian Energy Market Commission, 2008-2009) – Provided advice to the AEMC in its review of whether changes to the electricity and gas regulatory frameworks is warranted in light of the proposed introduction of a carbon permit trading scheme and an expanded renewables obligation. Issues addressed include the framework for electricity connections, the efficiency of the management of congestion and locational signals (including transmission pricing) for generators and the appropriate specification of a cost benefit test for transmission upgrades in light of the two policy initiatives.
- Economic incentives under the energy network regulatory regimes for demand side participation (Client: Australian Energy market Commission, 2006) – Provided advice to the AEMC on the incentives provided by the network regulatory regime for demand side participation, including the effect of the form of price control (price cap vs. revenue cap), the cost-efficiency arrangements, the treatment of losses and the regime for setting reliability standards.
- Implications of greenhouse policy for the electricity and gas regulatory frameworks (Client: the Australian Energy Market Commission, 2008) - Provided advice to the AEMC in its review of whether changes to the electricity and gas regulatory frameworks is warranted in light of the proposed introduction of a carbon permit trading scheme and an expanded renewables obligation. Issues addressed include the framework for electricity connections, the efficiency of the management of congestion and locational signals for generators and the appropriate specification of a cost benefit test for transmission upgrades in light of the two policy initiatives.
- Application of a ‘total factor productivity’ form of regulation (Client: the Victorian Department of Primary Industries, 2008) - Assisted the Department to develop a proposed amendment to the regulatory regime for electricity regulation to permit (but not mandate) a total factor productivity approach to setting price caps – that is, to reset prices to cost at the start of the new regulatory period and to use total factor productivity as an input to set the rate of change in prices over the period.

- Expert Panel on Energy Access Pricing (Client: Ministerial Council on Energy, 2005-2006) - Assisted the Expert Panel in its review of the appropriate scope for commonality of access pricing regulation across the electricity and gas, transmission and distribution sectors. The report recommended best practice approaches to the appropriate forms of regulation, the principles to guide the development of detailed regulatory rules and regulatory assessments, the procedures for the conduct of regulatory reviews and information gathering powers.
- Productivity Commission Review of Airport Pricing (Client: Virgin Blue, 2006) - Prepared two reports for Virgin Blue for submission to the Commission's review, addressing the economic interpretation of the review principles, asset valuation, required rates of return for airports and the efficiency effects of airport charges and presented the findings to a public forum.
- AEMC Review of the Rules for Setting Transmission Prices (Client: Transmission Network Owners, 2005-2006) - Advised a coalition comprising all of the major electricity transmission network owners during the new Australian Energy Market Commission's review of the rules under which transmission prices are determined. Prepared advice on a number of issues and assisted the owners to draft their submissions to the AEMC's various papers.
- Advice on Energy Policy Reform Issues (Client: Victorian Department of Infrastructure/Primary Industries, 2003-2009) - advice to the Department regarding on issues relating to the transition to national energy market arrangements, cross ownership rules for the energy sector, the reform of the cost benefit test for electricity transmission investments and the scope for light handed regulation in gas transmission.
- Productivity Commission Review of the National Gas Code (Client: BHPBilliton, 2003-2004) - Produced two submissions to the review, with the important issues including the appropriate form of regulation for the monopoly gas transmission assets (including the role of incentive regulation), the requirement for ring fencing arrangements, and the presentation of evidence on the impact of regulation on the industry since the introduction of the Code.
- Development of the National Third Party Access Code for Natural Gas Pipeline Systems Code (Client: commenced while a Commonwealth Public Servant, after 1996 the Commonwealth Government, 1994-1997) - Was involved in the development of the new legal framework for the economic regulation of gas transmission and distribution systems, with advice spanning the overall form of regulation to apply to the infrastructure and the appropriate pricing principles (including the valuation of assets for regulatory purposes and the use of incentive regulation), ring fencing arrangements between monopoly and potentially contestable activities, and whether upstream infrastructure should be included within the regime.

### *Licensing / Franchise Bidding*

- Competitive Tender for Gas Distribution and Retail in Tasmania (Client: the Office of the Tasmanian Energy Regulator, 2001-2002) - Economic adviser to the Office during its oversight of the use of a competitive tender process to select a gas distributor/retailer for Tasmania, and simultaneously to set the regulated charges for an initial period.
- Issuing of a Licence for Powercor Australia to Distribute Electricity in the Docklands (Client: the Office of the Regulator General, Vic, 1999) - Economic adviser to the Office during its assessment of whether a second distribution licence should be awarded for electricity distribution in the Docklands area (a distribution licence for the area was already held by CitiPower, and at that time, no area in the state had multiple licensees). The main issue concerned the scope for using 'competition for the market' to discipline the price and service offerings for an activity that would be a monopoly once the assets were installed.



### *Assessments of the degree and prospects for competition / need for regulation*

- Assessment of the merits of the coverage test in the gas regulatory regime (Client: AEMC, 2015) – advised the AEMC on whether the test contained in the gas regime for determining whether pipelines should be regulated is fit for the intended purpose, which included a detailed review of the coverage / declaration decisions to date.
- Pilbara electricity networks (Client: Public Utility Office, 2014) – provided advice to the Office on whether the applications for declaration of the Pilbara electricity networks would meet the coverage test.
- Transmission connection assets (Client: Grid Australia, 2012) – prepared an assessment of the degree of competition in the provision of transmission connection assets, which included advice on the market within which the service is provided and an assessment of the degree of rivalry (including the prospects for entry) in that market.
- South East network (Client: Kimberley Clarke, 2011) – advised whether the gas pipeline from which it is supplied would pass the threshold for regulation.
- Pilbara rail access (Client: BHP Billiton) – assisted in the preparation of expert evidence on whether the Pilbara rail infrastructure passed the test for declaration of essential infrastructure, with specific focus on the analysis of whether there would be a promotion of competition in other markets from the granting of access.
- Need for regulation of gas transmission pipelines (Client: SA Government) – advised as to whether the Moomba to Adelaide pipeline was likely to pass the threshold required for regulation under the Gas Code, focussing upon an assessment of the degree of competition for its services.

## **B. Pricing in non-infrastructure markets**

### *Assessment of competition in energy retail markets*

- Assessment of retail competition in Victoria and South Australia (Client: Australian Energy Market Commission) – assisted the Commission to quantify and interpret information on margins for retailers and to draw inferences about the level of competition. Also provided a peer review of the Commission’s overall assessment of the level of competition, including the Commission’s overall analytical framework and the other indicators it considered.

### *Default/transitional regulated prices for retail functions*

- ACT transitional tariff review (Client: ICRC, ACT, 2010) – advised the regulator on an appropriate method to derive a benchmark wholesale electricity purchase cost for an electricity retailer, including the relationship between the wholesale cost and hedging strategy.
- South Australian default gas retail price review (Client: the Essential Services Commission, SA, (2007-2008) – derived estimates of the benchmark operating costs for a gas retailer and the margin that should be allowed. This latter exercise included a bottom-up estimate of the financing costs incurred by a gas retail business.
- South Australian default electricity retail price review (Client: the Essential Services Commission, SA, 2007) - estimated the wholesale electricity purchase cost for the default electricity retail supplier in South Australia. The project involved the development of a model for deriving an optimal portfolio of hedging contracts for a prudent and efficient retailer, and the estimate of the expected cost incurred with that portfolio.

- South Australian default gas retail price review (Client: the Essential Services Commission, SA, 2005) - As part of a team, advised the regulator on the cost of purchasing gas transmission services for a prudent and efficient SA gas retailer, where the transmission options included the use of the Moomba Adelaide Pipeline and SEAGas Pipeline, connecting a number of gas production sources.

### *Market Design*

- Options for the Development of the Australian Gas Wholesale Market (Client: the Ministerial Committee on Energy, 2005) - As part of a team, assessed the relative merits of various options for enhancing the operation of the Australian gas wholesale markets, including by further dissemination of information (through the creation of bulletin boards) and the management of retailer imbalances and creation of price transparency (by creating short term trading markets for gas).
- Review of the Victorian Gas Market (Client: the Australian Gas Users Group, 2000-2001) - As part of a team, reviewed the merits (or otherwise) of the Victorian gas market. The main issues of contention included the costs associated with operating a centralised market compared to the potential benefits, and the potential long term cost associated with having a non-commercial system operator.
- Development of the Market and System Operation Rules for the Victorian Gas Market (Client: Gas and Fuel Corporation, 1996) - Assisted with the design of the ‘market rules’ for the Victorian gas market. The objective of the market rules was to create a spot market for trading in gas during a particular day, and to use that market to facilitate the efficient operation of the system.

### *Transfer pricing*

- Application of a netback calculation for infrastructure under the Minerals Resource Rent Tax (Client: BHPB, 2011-2013) – advised on how the arms-length price for the use of downstream infrastructure should be determined, including the valuation of assets, weighted average cost of capital and on the implications for the price of incentive compatible contracts.

### *Pricing strategy*

- Pricing for telephone directory services (Sensis, 2012) – as part of a team, advised on how margins could be maximised for the telephone directory business in the context of falling print advertising and a very competitive digital market, informed by the application of econometric techniques.
- Effectiveness of promotional strategies (Target, 2011-2012) – as part of a team, applied econometric techniques to assess the effectiveness of Target’s promotional strategies, with tools developed for management to improve profitability.
- Optimal pricing (Client: Coles, 2011-2012) – applied econometric techniques to assist Coles to set relativities of prices within “like” products and developed a method to test the effectiveness of promotional strategies.

## **C. Regulatory due diligence and other finance work**

- Sale of Port of Melbourne (Client: a consortium of investors, 2011-12) – Prepared a regulatory due diligence report for potential acquirer of the asset, including a review of the financial modelling of future pricing decisions.
- Sale of TransGrid (Client: a consortium of investors, 2011-12) – Prepared a regulatory due diligence report for potential acquirer of the asset, including a review of the financial modelling of future pricing decisions.

- Sale of the Sydney Desalination Plant (Client: a consortium of investors, 2011-12) – Prepared a regulatory due diligence report for potential acquirer of the asset, including a review of the financial modelling of future pricing decisions.
- Sale of the Abbot Point Coal Terminal port (Client: a consortium of investors / debt providers, 2010-11) – Prepared a regulatory due diligence report for potential acquirer of the asset, including a review of the financial modelling of future pricing decisions.
- Private Port Development (Client: Major Australian Bank, 2008) - Prepared a report on the relative merits of different governance and financing arrangements for a proposed major port development that would serve multiple port users.
- Sale of Allgas gas distribution network (Client: confidential, 2006) – Prepared a regulatory due diligence report for potential acquirer of the asset.
- Review of Capital Structure (Client: major Victorian water entity, 2003) - Prepared a report (for the Board) advising on the optimal capital structure for a particular Victorian water entity, taking account of the likely impact of cost-based regulation.

#### **D. Expert Witness Roles**

- Tax consequences of customer contributions (Client: VPN, 2017-19) – Provided expert evidence about the regulatory treatment of customer contributions and related matters for a dispute in the Federal Court with the Tax Commissioner about whether these contributions should be assessed as income.
- Goldfields gas pipeline price review (Client: BHP, 2017) – Provided expert evidence to the judicial review on the economic principles around whether a “true-up” is permitted when there is a delay in the commencement of a regulatory period under the National Gas Rules.
- Goldfields gas pipeline price review (Client: BHP, 2014) – Provided an expert report on economic principles associated with the allocation of costs between regulated and unregulated assets.
- Kapuni gas contract dispute (Client: Vector, 2013-2015) – Provided expert evidence for the arbitration addressing a number of economic issues with determining a fair and reasonable price for the (raw) Kapuni gas, including the overall economic interpretation of the bargain, an appropriate netback price for gas processing, retail margins, value of gas flexibility and interpretation of discovered gas supply arrangements.
- Abbot Point Coal Terminal Pricing Arbitration (Client: Adani, 2013) – Prepared a number of expert reports for the arbitration on economic issues arising from the application of the cost-based formula in the pricing agreement, including the economic meaning of key terms, the valuation of assets (and specifically the role and calculation of interest during construction), the quantification of transaction costs of raising finance and the calculation of the required rate of return (most notably, the benchmark cost of debt finance).
- New Zealand Input Methodologies (Clients: Powerco and Christchurch International Airport Limited, 2009-2012) – Prepared expert report for both clients on a range of economic issues, including the valuation of assets, weighted average cost of capital, cost allocation, the regulatory treatment of taxation and interpretation of the new purpose statement in the Commerce Act. Appeared as an expert before the Commerce Commission in the key conferences held during the review. Also assisted the clients in their subsequent merit reviews of the Commission’s decision.



- Victorian gas market dispute resolution panel (Client: VENCORP, 2008) – Prepared a report and was cross examined in relation to the operation of the Victorian gas market in the presence of supply outages.
- Consultation on Major Airport Capital Expenditure Judicial Review (Client: Christchurch International Airport, 2008) - Prepared an affidavit for a judicial review on whether the airport consulted appropriately on its proposed terminal development. Addressed the rationale, from the point of view of economics, of separating the decision of ‘what to build’ from the question of ‘how to price’ in relation to new infrastructure.
- New Zealand Commerce Commission Draft Decision on Gas Distribution Charges (Client: Powerco, 2007-2008) - Prepared an expert statement about the valuation of assets for regulatory purposes, with a focus on the treatment of revaluation gains, and a memorandum about the treatment of taxation for regulatory purposes and appeared before the Commerce Commission.
- Sydney Airport Domestic Landing Change Arbitration (Client: Virgin Blue, 2007) - Prepared two expert reports on the economic issues associated with the structure of landing charges (note: the evidence was filed, but the parties reached agreement before the case was heard).
- New Zealand Commerce Commission Gas Price Control Decision – Judicial Review to the High Court (Client: Powerco, 2006) - Provided four affidavits on the regulatory economic issues associated with the calculation of the allowance for taxation for a regulatory purpose, addressing in particular the need for consistency in assumptions across different regulatory calculations.
- Victorian Electricity Distribution Price Review – Appeal to the ESC Appeal Panel: Service Incentive Risk (Client: the Essential Services Commission, Vic, 2005-2006) - Prepared expert evidence on the workings of the ESC’s service incentive scheme and the question of whether the scheme was likely to deliver a windfall gain or loss to the distributors (note: the evidence was filed, but the appellant withdrew this ground of appeal prior to the case being heard).
- Victorian Electricity Distribution Price Review – Appeal to the ESC Appeal Panel: Price Rebalancing (Client: the Essential Services Commission, Vic, 2005-2006) - Prepared expert evidence on the workings of the ESC’s tariff basket form of price control, with a particular focus on the ability of the electricity distributors to rebalance prices and the financial effect of the introduction of ‘time of use’ prices in this context (note: the evidence was filed, but the appellant withdrew this ground of appeal prior to the case being heard).
- New Zealand Commerce Commission Review of Information Provision and Asset Valuation (Client: Powerco New Zealand, 2005) - Appeared before the Commerce Commission for Powerco New Zealand on several matters related to the appropriate measurement of profit for regulatory purposes related to its electricity distribution business, most notably the treatment of taxation in the context of an incentive regulation regime.
- Duke Gas Pipeline (Qld) Access Arrangement Review – Appeal to the Australian Competition Tribunal (Client: the Australia Competition and Consumer Commission, 2002) - Prepared expert evidence on the question of whether concerns of economic efficiency are relevant to the non price terms and conditions of access (note: the evidence was not filed as the appellant withdrew its evidence prior to the case being heard).
- Victorian Electricity Distribution Price Review – Appeal to the ORG Appeal Panel: Rural Risk (Client: the Office of the Regulator General, Vic, 2000) - Provided expert evidence (written and oral) to the ORG Appeal Panel on the question of whether the distribution of electricity in the predominantly rural areas carried greater risk than the distribution of electricity in the predominantly urban areas.

- Victorian Electricity Distribution Price Review – Appeal to the ORG Appeal Panel: Inflation Risk (Client: the Office of the Regulator General, Vic, 2000) - Provided expert evidence (written and oral) to the ORG Appeal Panel on the implications of inflation risk for the cost of capital associated with the distribution activities.

### **Qualifications and memberships**

- Bachelor Economics (First Class Honours) University of Adelaide
- CEDA National Prize for Economic Development

## Michael Lawriwsky

*Executive Director, Incenta Economic Consulting*

### Overview:

Michael is an Executive Director at Incenta Economic Consulting. His career has spanned regulatory consulting, investment banking, academia, economic policy advice and expert witness roles.

Previously he was a director – corporate finance at ANZ Investment Bank, a director at PricewaterhouseCoopers and a partner in the Allen Consulting Group. Prior to that he was a Professor of Commerce at La Trobe University.

As an M&A executive Michael advised on bids with an enterprise value exceeding \$30 billion in the Australian energy and transport sectors. He has also been involved in regulatory and market reforms over a wide a range of businesses spanning energy (gas and electricity distribution and generation), transport (airlines, airports, ports and rail), telecommunication, water transmission and distribution, gaming and wagering. As an M&A executive he participated in a number of issues of debt, equity and hybrid security instruments.

Valuations, industry analysis and cost of capital (debt and equity) assessment for both M&A and regulatory purposes have been Michael’s focus over several decades of experience. He has provided expert opinions to clients including corporates and corporate bidders, government departments, regulators, and the Australian Taxation Office.

### A. Relevant experience by sector:

#### *Ports:*

- *Dalrymple Bay Coal Terminal* - Review of WACC parameters for the Queensland Competition Authority’s assessment of DBCT’s 2015 DAU.
- *Port of Melbourne* - Regulatory adviser to the Lonsdale Consortium comprising QIC, GIP, OMERS and Australian Government Future Fund. Advised on the new regulatory framework established for the port, and a range of other issues, notably a rigorous regulatory cost of capital analysis that was used as a basis for forming opinions on the expected future revenue stream.
- *Abbot Point* – Adviser to Adani on the long-term cost of capital.
- *Abbot Point* – Adviser to Adani on aspects of its contract with shippers in a price arbitration.
- *Abbot Point* – Adviser on shadow regulatory matters to a syndicate bidding for the Abbot Point coal loading terminal.
- *WICET* – Adviser to Wiggins Coal Export Terminal on a range of issues, including: merits of the Industry-led model against alternatives; Cost of capital relative to other structures; Port Handling Charge (PHC) Pricing Principles; benchmarking to competition issues; proposed expansion principles; and stranded assets risk

- *Port of Brisbane* – Regulatory adviser to Q Ports Holdings consortium partners (comprising Industry Funds Management, Global Infrastructure Partners, QIC Global Infrastructure and Tawreed Investments), which won this bid and was awarded ‘Best Privatisation Deal’ and ‘Asian Infrastructure of the Year’ awards (lead advisor, Macquarie Bank). Advice centred on regulatory aspects including channel valuation and incorporation into the RAB, and valuation of development land. A key consideration was the pricing circumstances under which explicit regulation could be expected.
- *Port of Melbourne Corporation* – Engaged by the POMC to review of the key metrics it used in developing its pricing model, including the appropriate WACC, modelling term and terminal value calculation, and a commentary on the appropriateness of the ESCV’s concept of profit used to define the rate of return.
- *Pilbara ports* – Adviser to BHP Billiton on the Pilbara ports from a real options perspective.
- *Port of Brisbane* – Strategic adviser to the Port of Brisbane Corporation, including a review of strategic options to achieve growth and efficiency of operations, benchmarking of relative efficiency, and a valuation of the port’s operations.
- *Ports of Portland and Geelong* – Advice to the Strang/Hastings consortium on cost of capital to the ANZ Investment Bank team advising the bidding consortium.
- *Port of Napier (NZ)* – Reviewer of the valuation of the port by the ANZ Investment Bank Auckland office.

***Rail and road:***

- *Queensland Rail* – Adviser to the Queensland Competition Authority on the asset beta, benchmark gearing, and credit rating of Queensland Rail for the 2020 DAU.
- *Aurizon Network* – Adviser to the Queensland Competition Authority on Aurizon Network’s WACC for the 2017 DAU, including capital structure, asset beta, equity beta, credit rating and cost of debt parameters.
- *Carmichael Mine rail link to Abbot Point* – Advice to the Port of Newcastle on regulatory and competition aspects of the proposed dedicated Carmichael Mine-Abbot Point rail link.
- *Missing Link* – Adviser to the Queensland Competition Authority on cost of capital implications of the Missing link railway line.
- *Victorian rail infrastructure assets* - Adviser to Stagecoach plc on cost of capital issues relating to bidding for rail infrastructure assets in Victoria.
- *Adelaide-Darwin railway* – Adviser on regulatory issues to the ANZ Investment Bank project finance team in relation to this financing.
- *Victorian Department of Transport* – Adviser on new techniques for attracting private sector capital to the roads sector.

- *Tulla-Calder freeway extension* – Adviser to the Victorian Auditor General’s Office on the terms of the cost of capital for the financing of the Tulla-Calder freeway extension.

***Airports:***

- *Christchurch International Airport Limited* – (on-going) Provision of ongoing advice to CIAL on regulatory matters and negotiations with the regulator and airports. Topics covered asset valuation and depreciation, impact of capital expenditure programs and regulatory cost of capital issues.
- *New Zealand Airports Association* – Analysis of airport betas for negotiations with airlines and the Commerce Commission.
- *Virgin airlines* – Adviser to Virgin Airlines on cost of capital issues for negotiations with airports on landing charges.
- *Federal Airports Corporation* – Directed a seven-month regulatory modelling, valuation and capital structure analysis of all 22 airports as part of the Capital Structure Review commissioned by the Department of Transport/Department of Treasury.
- *Brisbane International Airport* – Lead financial adviser to the Port of Brisbane Corporation in the course of the successful Schiphol/CBA/POBC bid in 1997.
- *Christchurch International Airport Limited* – Adviser to the airport with respect to its negotiations with the NZ Commerce Commission on the cost of capital and implications for landing charges.

***Aviation and tourism:***

- *Tourism Victoria* – Adviser on commercial issues surrounding the proposed Werribee Theme Park.
- *Travel Compensation Fund* – Michael led a team which reviewed the TCF’s revenue model and proposed a new risk-based revenue model.
- *Department of Transport and Regional Services* – Adviser to DoTRS in connection with financial issues associated with the proposed Air New Zealand/Ansett takeover in connection with the FIRB review.
- *Qantas Airlines* – Provided float valuation and pricing when ANZ Securities was a joint Lead Manager of the initial float process.
- *Australian Airlines* – Prepared a valuation and analysis for the purchase of the airline for a private consortium prior to the merger with Qantas.
- *Indian Airlines* – Member of an ANZ Bank advisory panel (based in London, Mumbai and Melbourne) that was mandated to sell a 26% stake in the Indian Government-owned domestic/international airline.
- *Compass Airlines* – Contributed to the preparation of an Information Memorandum for an initial private equity raising to fund Compass Airlines (prior to the float by JB Were).

***Gas networks and pipelines:***

- *MAPS and SEPS* - Provision of advice to Epic Energy on the application of the pricing principles under the new arbitration regime for uncovered pipelines. The project covered both the Moomba to Adelaide Pipeline System (MAPS) and the South East Pipeline System (SEPS).
- *First Gas Ltd* - Engaged by First Gas Limited to provide a response to the New Zealand Commerce Commission's draft decision on the asset beta for gas pipelines, which was part of its Input Methodologies (IMs) Review.
- *Alternative sources to estimate the cost of equity* – Adviser to Energy Networks Association on the relative merits of potential alternative sources of information to estimate the cost of equity.
- *Term of the risk-free rate* – Adviser to Energy Networks Association an assessment of the appropriate term for the risk-free rate when estimating the cost of equity.
- *Cost of debt for gas transmission* – Adviser to Jemena Gas Networks on the appropriate methodology to estimate the cost of debt in relation for gas transmission assets. This is part of the WACC proposal for a gas network revenue determination.
- *Cost of capital for gas distribution* - Adviser to the Essential Services Commission (Victoria) on cost of capital issues associated with the 2007-2008 Gas Price Review.
- *Allgas* – Adviser to ANZ Infrastructure Services with respect to modelling assumptions it applied in bidding for Allgas Limited.
- *Equity beta for gas distribution* - Adviser to the Queensland Competition Authority on cost of capital issues (including beta) in relation to Queensland gas distribution assets.
- *Prepayment of network charges* - Adviser to the Queensland Competition Authority on the prepayment of network charges by Envestra.
- *Cost of capital and working capital (prepayment) for gas distributors* (Clients: ESCOSA and Queensland Competition Authority) adviser on cost of capital and working capital (prepayment) issues relating to Envestra's 2006 access arrangements in South Australia and Queensland respectively.
- *Gas utility credit rating* - Adviser to the ACCC on differentials between BBB and BBB+ for a gas utility in connection with an appeal lodged by the East Australia Pipeline Limited.
- *ACCC* – Engaged by the ACCC to prepare a report on a review of studies comparing international regulatory determinations, which was included as Appendix G of ACCC's submission to Productivity Commission Review of the National Gas Code.
- *Review of the National Gas Code* - Adviser to BHP Billiton, writing its submission in response to the Draft Report of the Productivity Commission Review of the National Gas Code.
- *Gas and Fuel (Gascor)* – Adviser to the company in relation to the potential purchase of the Wagga Wagga Gas Company from the City of Wagga Wagga.

- *Gas and Fuel (Gascor)* – Mandated to critique Gascor’s weighted average cost of capital calculation used in regulatory tariff setting.
- *The USA Gas Utility market* – Authored this ANZ Securities monograph examining the regulatory structure and market reforms introduced into the US gas industry and implications for Australia.
- *Gas and Fuel Corporation* – Co-authored this ANZ Securities monograph.

***Electricity networks:***

- *Energy Networks Association* – Engaged to assess the appropriate benchmark term of debt.
- *Powerlink* – Adviser to Powerlink on regulatory cost of capital including beta, debt risk premium and on equity and debt raising transaction costs.
- *Aurora Energy* – Provided advice to Aurora Energy, writing their debt risk premium submission to the Australian Energy Regulator
- *CitiPower and Powercor* - Advisor on the appropriate methodology to estimate the cost of debt in relation for electricity distribution assets, as part of the WACC proposal for an electricity network revenue determination.
- *Independent Market Operator WA* – Adviser to the Western Australian wholesale electricity market operator, the Independent Market operator, proposing the methodology to be used to calculate to estimate Allowance For Funds Used During Construction, and the WACC to be applied in the determination of the maximum reserve price for generation capacity.
- *Energy Networks Association, APIA and Grid Australia* – Adviser on the AER review of WACC parameters for electricity transmission and distribution network service providers.
- *Retail credit support arrangements* – Advised the Essential Services Commission of Victoria on new arrangements for credit support by electricity retailers.
- *ETSA Utilities* – Adviser to the Essential Services Commission of South Australia on cost of capital issues.
- *Energex and Energon* – Adviser to the Queensland Competition Authority on cost of capital issues relating to the 2005 access arrangements of these companies.
- *Electricity Commission of Papua New Guinea (PNG Power)* – Lead financial/strategic adviser to the PNG Government on the corporatisation/privatisation of PNG Power, managing a team of investment bankers, lawyers, accountants and regulatory consultants.
- *Electricity Trust of South Australia (ETSA)* – Lead financial adviser to Edison Mission Energy in their bid for this \$3.5 billion electricity distribution and retailing company, particularly in relation to regulation, valuation, financial modelling and capital structure.



- *Pacific Gas and Electric Company* – Lead financial adviser in bids for four electricity distribution/retailing companies totalling \$5.5 billion (*United Energy, Powercor, Citipower, Eastern Energy*).
- *Electro Power Limited (NZ)* – Adviser to the company’s board in its merger negotiations with the contiguous Central Power Limited, including valuation and capital structure issues.

**Energy:**

- *Snowy Hydro* – Michael led a team undertaking a comprehensive valuation analysis of Snowy Hydro, including a cost of capital update.
- *Snowy Hydro* – Adviser to the Snowy Hydro on cost of capital (on-going annual review).
- *Southern Electric International (US)* – Advised on cost of capital with respect to Australian electricity generation assets.
- *Energy Developments Limited* – Contributed to float valuation and pricing for this independent power project underwritten by ANZ Securities.
- *Loy Yang A* – Coordinated a sell-down of \$30 million of equity in Horizon Energy Investments to institutional investors.
- *Southern Hydro Limited* – Established a consortium of bidders for this privatisation (*Pacific Hydro, Hyder Investments and Hastings Funds Management*) and directed financial due diligence/valuation. Including capital structure determination.
- *Electro Power Limited (NZ)* – Analysed of the rate of return on investment which would be required by investors in the Gateway Electronic Monitoring System (“GEMS”) – a “smart meter” technology.

**Media and Telecommunications:**

- *Chorus (NZ)* - Adviser on credit and systematic risk issues relevant to Chorus’s Crown-funded “debt” and “equity” securities used to construct its fibre optic (UFB) network.
- *Chorus (NZ)* – Provision of ongoing advice on regulatory issues including asset valuation, and cost of capital in relation to the development of a new post 2020 regulatory framework covering the UFB rollout.
- *Telstra* – Advised Telstra on the risk impacts of the NBN-Telstra deal, and its implications for the regulatory cost of capital for the fixed copper loop network.
- *AGL* – Adviser to AGL with respect to the acquisition of a \$40 million equity interest in Comindico, including an overview of financial modelling and coordination of production of due diligence report.
- *John Fairfax Group* - Valuation of the company that was used by the Banking Syndicate in its decision to take control under debt covenants.



- *Austereo* – Reviewer of valuations of the Austereo radio licences for the Board of Directors.
- *Australian Tax Office* – Adviser to the ATO on the valuation of shares in a UK media company.

***Water networks and pipelines:***

- *Gladstone Area Water Board* – adviser to the Queensland Competition Authority on the assessment of costs of capital parameters for the 2005 and 2015 GAWB price reviews.
- *New South Wales water businesses* – adviser to the Independent Pricing and Regulatory Tribunal of New South Wales, reviewing its approach to testing the financeability of regulatory determinations for water businesses.
- *Melbourne Water* – adviser to the Essential Services Commission of Victoria on the reasonableness of Melbourne Water’s cost of debt proposal, which included a trailing average cost of debt method.
- *Yarra Valley Water* – Advised Yarra Valley Water on the impact of form of price control on the cost of capital and consumers’ risk.
- *Sydney Desalination Plant* – Advised on regulatory matters to a bidder for the Sydney Desalination Plant.
- *Melbourne Water* – Adviser to Melbourne Water on its financial strategy, including capital structure, dividend policy and financial benchmarks.
- *SA Water* – Adviser to SA Water on its capital structure review and review of dividend policy.
- *SA Water* – Adviser to SA Water on commercialisation, and dividend policy in negotiations with the SA Treasury.
- *Auckland City Council (NZ)* – Advice to the Auckland City Council on the corporatisation of water and waste-water assets.
- *Gippsland Water* – Adviser on pricing policy with respect to future capital funding requirements.
- *South Gippsland Water* – Engaged by South Gippsland Water to prepare a benchmarking analysis of corporate performance relative to peers.
- *United Water* – Engaged by United Water to advise on the potential for listing on the stock exchange pursuant to requirements under the United Water Management Contract

***General regulatory assignments:***

- *Debt estimation methodology* – Provided estimates of the cost of debt to the Queensland Competition Authority.
- *Debt and equity transaction costs* – Advised the ACCC on debt and equity transaction costs that could be applied in regulatory determinations.

- *International evidence on regulatory rates of return* – Adviser to the ACCC on rates of return provided internationally by regulators.
- *Exceptional circumstances* – Adviser to the Queensland Competition Authority on appropriate regulatory responses to exceptional circumstances.
- *Monte Carlo analysis* – Adviser to a regulatory agency assessing the efficacy of Monte Carlo analysis as a potential methodology that could be employed in cost of capital studies for regulatory purposes.

***Construction and industrial:***

- *Adroyal* – Engaged to prepare a takeover analysis of a potential target.
- *Astec* – Engaged to prepare an independent valuation of the asphalt and quarrying operations to identify a carrying value in the books of the Standard Rods Group.
- *GWA International* – Engaged to undertake preparations for the re-floating of 60% of the Anderson family’s interest.
- *Expert’s Report on Futuris Corporation* – Prepared an Expert’s Report to the stakeholders of Air International Group Limited, an automotive air conditioner manufacturer, on the takeover offer by Keratin Holdings Pty Ltd (a wholly owned subsidiary of Futuris Corporation).

***Resources:***

- *Review of hostile takeover* – Adviser and expert witness to a party potentially seeking damages in a large hostile takeover bid of a major resources company, involving analysis of bid documents, internal communications, presentations and valuation/modelling analysis.
- *Ashton Mining* – Adviser to Ashton Mining Limited on the implementation of its 1999-2000 5% share buy-back and prepared a report on capital management options for the Board of Directors.
- *MIM Holdings* – Participated in a comprehensive strategy report recommending divestment of non-core assets, debt reduction and restructure of shareholdings.

***Health:***

- *Victorian Auditor General’s Office* – Engaged by VAGO to undertake a performance audit of the \$1 billion Royal Melbourne Children’s Hospital.
- *Department of Health (Victoria)* – Analysis of the proposed user cost of capital approach to funding hospitals

***Financial instruments:***

- *Initial Public Offerings* – Involved in the preparations for initial listing of several companies, including Qantas, Energy Developments, Tabcorp and TAB Limited.

- *Debt-equity swap instrument* – Marketing of a debt-equity swap instrument that would loosen debt covenant constraints on businesses, thereby creating greater financial flexibility.
- *Venture Stores* - Development of a debt-equity swap for the creditors of the troubled retailer.
- *Gunns Limited* – Scenario analysis and market costings for a converting preference share for Gunns Limited.
- *Acquisition debt proposal* – Preparation of a proposal to Standard & Poor’s for a credit rating to support debt issuance in relation to the acquisition of ETSA Utilities.

**Other:**

- *Infrastructure Partnerships Australia - Public Private Partnerships* – Michael led a team that produced a report assessing the relative timing and construction cost efficiency of PPPs vs traditional procurement methods.
- *Property Council of Australia* – assessment of the scope and capacity of the Victorian Government to fund public infrastructure through increased public debt.
- *Financial software developer* – Advised a financial software developer on merger and IPO options.
- *Queensland Cane Growers’ Association* – Advised the Association on the formula for the division of revenues between growers and millers and developed a new formula for negotiations with the millers.
- *Godfrey Pembroke Financial Services* – Valuation of Godfrey Pembroke Financial Services Pty Ltd for FAI Insurances Limited..
- *Colonial Mutual Property Trust* – Advice on the fair terms for a merger of three listed and two unlisted property trusts.

**B. Expert witness roles**

- *ACCC* – Expert opinion on financial aspects of the proposed merger of TPG and Vodafone for the Federal Court case hearing the matter.
- *Ferrier Hodgson* – Expert opinion on the conduct of an investment bank advising on a multi-billion dollar merger transaction, which destroyed substantial shareholder value and resulted in a default of banking covenants.
- *Essential Services Commission of Victoria* – Relative bias in the yields of indexed Commonwealth Government Securities when used as a proxy for the CAPM risk free rate.
- *Australian Taxation Office* - Commerciality of AAPT’s financial arrangements.
- *Australian Taxation Office* - Statement on the financial arrangements of Futuris Corporation Limited.

## C. Regulatory and policy roles

- *International Air Services Commission* - Between 1997 and 2007 Michael was a part-time Commissioner, and for a time Acting Chair of the International Air Services Commission. The IASC was established in 1992 as an independent body regulating new entrant airlines and allocating capacity to Australian international airlines with an objective of strengthening competition.
- *Review of Business Programs (Mortimer Report)* - In November 1996 the Minister for Industry, Science and Tourism appointed Dr. Lawriwsky to the Review of Business Programs under the leadership of Mr. David Mortimer (Mortimer Report). This was a major review of Government support programs for business with a 15-person secretarial staff. The process included public forums, stakeholder interviews with key government and business groups and analysis of numerous submissions. The report led to the formation of Invest Australia.

## D. Qualifications and memberships

- Ph.D. B.Ec. (Hons) (University of Adelaide)
- Adjunct Professor, School of Business, La Trobe University.
- Ex-officio member (formerly a Trustee) of the Risk and Audit Committee, Shrine of Remembrance, Melbourne