

Port of Melbourne



2018 - 2019 TARIFF COMPLIANCE STATEMENT

GENERAL STATEMENT

31 May 2018

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Abbreviations and acronyms

Abbreviation / acronym	Description
A	Actual
ABBM	Accrual building block methodology
ARR	Aggregate Revenue Requirement
BEE	Benchmark Efficient Entity
BIS Oxford Economics	BIS Oxford
Capex	Capital expenditure
CPI	Consumer Price Index
DAFF	Department of Agriculture, Fisheries and Forestry
ECR	Efficient Cost Recovery
EDI	Electronic Data Interchange
EMT	Executive Management Team
ESC	Essential Services Commission of Victoria
F	Forecast
LOLO	Lift on and lift off charge
Opex	Operating expenses
PCP	Port Capacity Project
PDS	Port Development Strategy
PMA	<i>Port Management Act 1995</i> (Vic)
PoM	Port of Melbourne
RAS	Rail Access Strategy
RTS	Reference Tariff Schedule
SoRA	Statement of Regulatory Approach
TAL	Tariffs Adjustment Limit
Tariffs	Tariffs for Prescribed Services
TCS	Tariff Compliance Statement
TEU	Twenty-foot Equivalent Unit
THC	Terminal Handling Charge
VBS	Vehicle Booking System
WACC	Weighted Average Cost of Capital
WATI	Weighted Average Tariff Increase

Supporting documents

The table below lists the supporting documents that are incorporated within, and form a part of, Port of Melbourne’s (PoM)¹ 2018-19 Tariff Compliance Statement (TCS).

Table i: 2018-19 TCS supporting documents

Appendix	Title
A	PoM, 2018-19 Reference Tariff Schedule (RTS)
B	PoM, Regulatory model
C	Synergies Economic Consulting, Determining a WACC estimate for Port of Melbourne, April 2018
D	PoM, Contracts with Port Users
E	PoM, Port User and other stakeholder consultation
F	PoM, Overview Paper: Expenditure, Cost Allocation, Depreciation, Performance Standards and Avoidable Costs
G	PoM, Compliance with Pricing Order - Cross-Reference Table
H	BIS Oxford Economics, Port of Melbourne Trade Forecasts – Forecasts to FY 19, April 2018
I	PoM, WACC: Submission on well accepted approaches, 31 May 2018
J	PoM’s regulatory brochure
K	PoM’s regulatory deep-dive workshop presentation
L	Letter from PoM explaining time-based berth hire fees
M	PoM, Cost allocation model

¹The PoM Consolidated Group. The PoM Group shareholders comprise QIC, Future Fund, Global Infrastructure Partners (GIP) and OMERS.

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1. Executive summary

This is PoM’s 2018-19 TCS to the Essential Services Commission of Victoria (ESC) for the period 1 July 2018 to 30 June 2019 (2018-19).

In the past year, PoM has broadened and deepened its engagement with Port Users and other stakeholders - being anyone who is exposed to, and or impacted by the port - to understand better their views and priorities. This included engagement with a wide group of other stakeholders from industry, government and across the community. PoM has considered the views and priorities raised by Port Users and other stakeholders and, where relevant, incorporated their feedback into this TCS.

The key positions in this TCS are:

- a one-year regulatory period
- a weighted average increase in Prescribed Services Tariffs (tariffs) of 0.9 per cent from 2017-18
- tariffs for full outbound container wharfage services will decrease by 2.5 per cent from 2017-18, while all other tariffs will increase by the Tariffs Adjustment Limit (TAL) of 1.9 per cent, being the annual change in the Consumer Price Index (CPI) to March
- no tariff re-balancing currently proposed. All tariffs (except tariffs for full outbound container wharfage services) have been adjusted by the same percentage adjustment (1.9 per cent). There are no new or discontinued tariffs, and
- PoM will not recover its full efficient costs of providing Prescribed Services in the 2018-19 regulatory period because the forecast Prescribed Services revenue for 2018-19 (which is subject to the TAL) is less than the Aggregate Revenue Requirement (ARR) (calculated based on the accrual building block methodology (ABBM)).

Table 1 shows that the forecast 2018-19 Prescribed Services revenue of \$371.2 million is \$812.8 million below the ARR of \$1,184.0 million. It also shows that 2018-19 Prescribed Services Revenue is \$30.1 million higher than the forecast Prescribed Services revenue for 2017-18 and \$38.1 million higher than the actual 2016-17 Prescribed Services revenue.

Table 1: ARR and Prescribed Services revenue (subject to the TAL), \$ Million Nominal

	2016-17 (A)	2017-18 (F)	2018-19 (F)
Aggregate Revenue Requirement (ARR)			
Return on capital	481.9	499.8	519.3
Return of capital	297.6	511.8	645.1
Operating expenses (opex)	134.0	128.4	127.8
Indexation allowance	(80.8)	(112.7)	(108.2)
Total ARR	832.7	1,027.4	1,184.0
Prescribed Services revenue (subject to the TAL)			
Weighted Average Tariff Increase (%)	n.a.	1.1	0.9
Tariffs Adjustment Limit (%)	n.a.	2.1	1.9
Total Prescribed Services revenueⁱ	333.1	341.1	371.2
Under-recovery of ARR	(499.5)	(686.3)	(812.8)

i. Prescribed Services revenue includes revenue from Prescribed Services in PoM’s Reference Tariff Schedule and contracts with Port Users for Prescribed Services.

Table 2 shows the forecast closing 2017-18 capital base, as at 30 June 2018, which becomes the opening 2018-19 capital base, as at 1 July 2018. The forecast closing 2017-18 capital base of \$4,479.8 million, submitted in PoM’s 2017-18 TCS, has been adjusted for 2016-17 actual values and is therefore \$4,475.4 million.

While depreciation is typically deducted from the opening capital base, PoM has set straight-line depreciation to zero and deferred its recovery to future years because, as shown in Table 1 above, in 2017-18 and 2018-19 forecast Prescribed Services revenue (subject to the TAL) is below the ARR. This is recognised by adding back deferred depreciation. This is discussed in sections 7.1.1 and 7.1.4.

Table 2: Capital Base 2017-18 and 2018-19, \$ Million Nominal

	2017-18 (F)	2018-19 (F)
Opening Capital Base (1 July)	4,299.6	4,475.4
Plus Indexation Allowance	112.7	108.2
Plus Efficient Capex	67.6	67.7
Less Depreciation	(511.8)	(645.1)
Plus Deferred Depreciation	511.8	645.1
Closing Capital Base (30 June) as per 2017-18 TCS	4,479.8	n.a
Adjustment for 2016-17 actual values	(4.4)	n.a
Closing Capital Base (30 June) reflecting 2016-17 actual values	4,475.4	4,651.3

This TCS contains the following financial information:

- 2016-17 – actual and forecast values. The forecast values were submitted in PoM’s 2017-18 TCS.
- 2017-18 – forecast values that were submitted in PoM’s 2017-18 TCS. Actual information will be provided in PoM’s next TCS because at the time of submitting this TSC PoM does not have a full year of actual information.
- 2018-19 – forecast values only.

All financial information provided in this TCS is denominated in nominal dollars (referred to as “current price terms” in clause 8.1.1 of the Pricing Order), unless stated otherwise and the numbers in the tables may not add due to rounding. All clause references are to the Pricing Order, unless otherwise stated, and capitalised terms that are not otherwise defined, have the meaning given in the Pricing Order.

2. About PoM's 2018-19 TCS

PoM is required to submit an annual TCS to the ESC by no later than 31 May each year² that demonstrates how its tariffs for the upcoming financial year comply with the Pricing Order.

This is the second annual TCS that PoM has submitted to the ESC. The positions in this TCS are largely in line with the 2017-18 TCS. PoM has actively considered feedback received from the ESC over the last 12 months in formulating its positions. Any changes in positions are explicitly identified and explained.

Specifically, in preparing this TCS, PoM has addressed:

- clause 7.1.2 of the Pricing Order
- the ESC's follow up questions (Information Requests) on PoM's 2017-18 TCS
- the ESC's Interim Commentary on PoM's 2017-18 TCS³, and
- the ESC's Statement of Regulatory Approach (SoRA)⁴ and associated Feedback Paper⁵.

Clause 7.1.2 of the Pricing Order provides that PoM's TCS must:

- set out its tariffs for the upcoming financial year
- detail the basis of any adjustments to (i.e. re-balancing of) tariffs, including any new or discontinued tariffs
- explain and justify the cost blocks included in the ABBM and the basis on which the WACC has been estimated
- provide information on contracts with Port Users
- describe how PoM has consulted with and incorporated feedback from Port Users
- explain how tariffs for the upcoming financial year comply with the Pricing Order, including the pricing principles and cost allocation principles
- contain any further supporting information determined by the ESC in accordance with clause 9 of the Pricing Order, and
- comply with the information requirements in clause 8.

Appendix G provides a compliance checklist that provides a cross-reference to where in this TCS the requirements of clause 7 have been addressed. Section 10 of this TCS details where the views and positions outlined in the ESC's Interim Commentary, SoRA and associated Feedback Paper are addressed.

2.1 Regulatory context

PoM operates under a regulatory framework, which came into effect on 1 July 2016. The regulatory framework is set out in the:

- *Port Management Act 1995* (Vic) (PMA), and
- Pricing Order issued by the Governor-in-Council, and made pursuant to section 49A of the PMA.

The Pricing Order relates to Prescribed Services only. These include channel services, berthing services, short-term storage and cargo marshalling facility services and other services that allow access or use of certain port infrastructure⁶.

² Under clause 7.1.1(a) of the Pricing Order

³ ESC, 2017-18 Port of Melbourne tariff compliance statement: interim commentary, 9 November 2017 (Interim Commentary)

⁴ ESC, Statement of Regulatory Approach – version 1.0: Port of Melbourne pricing order, December 2017 (SoRA)

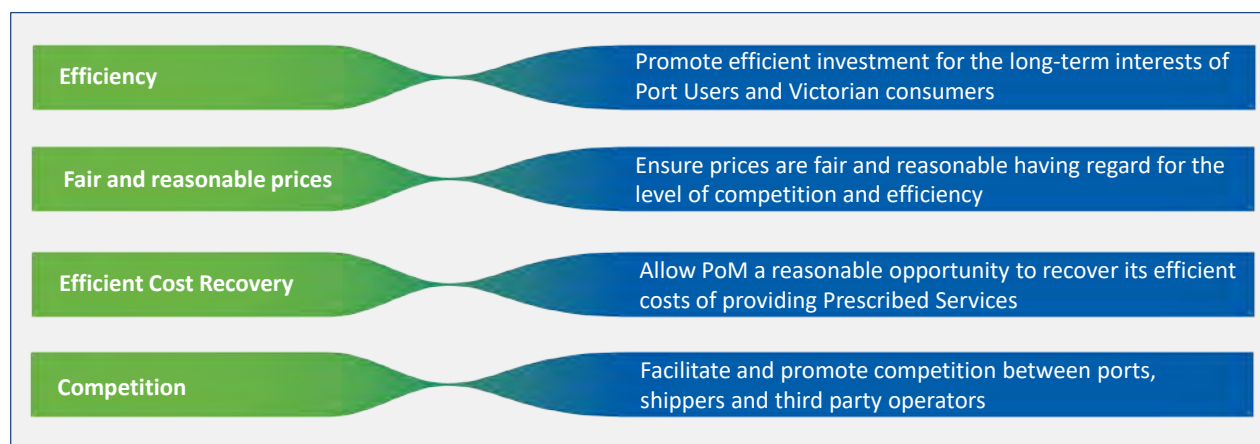
⁵ ESC, Feedback on consultation and other matters: Statement of Regulatory Approach version 1.0: Port of Melbourne pricing order, December 2017 (Feedback Paper)

⁶ Prescribed Services are defined in section 49(1)(c) of the PMA

PoM provides various non-Prescribed Services, including leasing of space and facilities on port land. Charges for non-Prescribed Services are not subject to the Pricing Order⁷ and are not dealt with in this TCS.

Section 48 of the PMA sets out the objectives of the regulatory framework, which are summarised in Figure 1.

Figure 1: Objectives of the regulatory framework

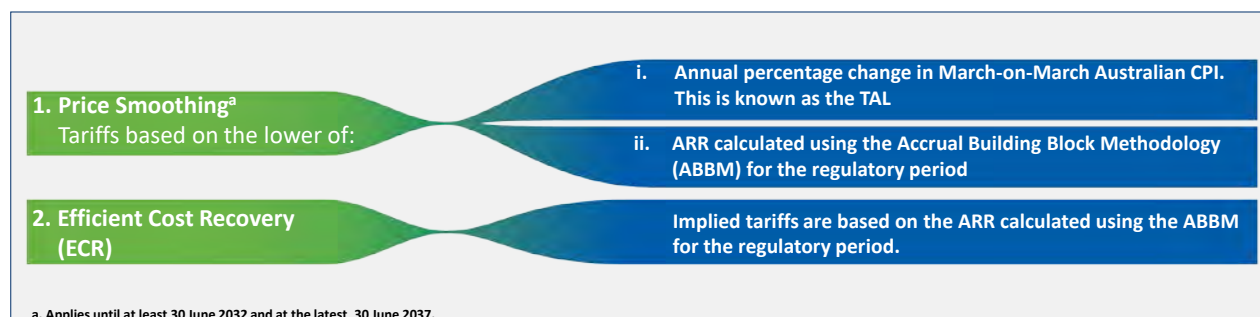


The Pricing Order:

- details the pricing principles and regulatory mechanisms that govern how PoM must set its tariffs for Prescribed Services, and
- requires PoM to demonstrate how its tariffs for the upcoming financial year comply with the Pricing Order.

There are two key pricing principles under the Pricing Order summarised in Figure 2.

Figure 2: Key pricing principles



PoM currently expects that tariffs (except for full outbound container wharfage services) will be subject to price smoothing through the application of the TAL and will therefore change in line with the annual increase in CPI until at least 30 June 2032 and at the latest 30 June 2037. This is because tariffs implied by the ABBM are expected to be higher than tariffs subject to the TAL over this period (TAL period). Price smoothing provides greater certainty and predictability in tariffs for Port Users.

PoM must submit a TCS to the ESC by 31 May each year that explains how its tariffs comply with the Pricing Order.

The ESC will undertake a formal public compliance inquiry every five years⁸ that will include findings on whether there has been any non-compliance and to the extent there has been, whether any such non-compliance is “significant and sustained”. The ESC’s first formal compliance review will be undertaken in 2022 for the 2017-2021 review period⁹. The outcomes of the compliance inquiry must be reported to the ESC Minister within six months of each five-yearly review period.

⁷ Fees and charges for some non-prescribed services are contained in the Other Fee Schedule of the RTS. Charges for certain other non-prescribed services, such as leasing of space and facilities, are based on commercial agreements.

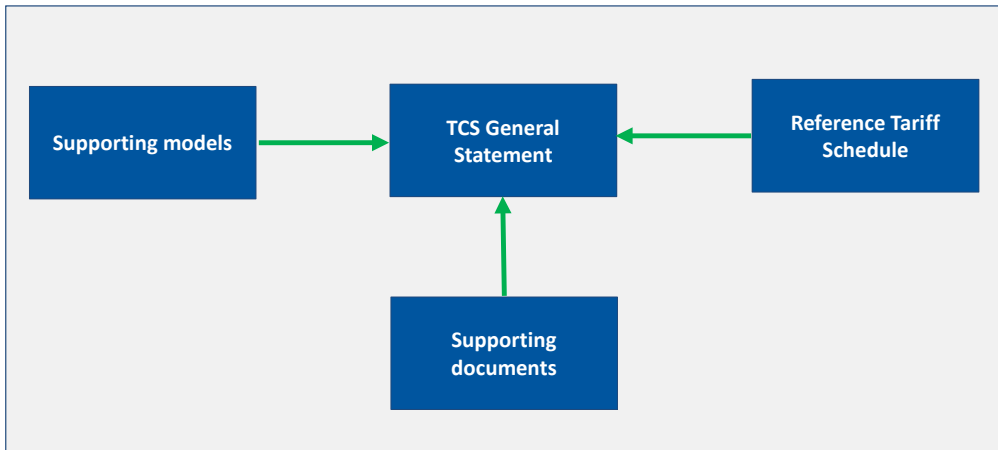
⁸ Under Division 2A of the PMA, s.49I(1)

⁹ The Commission must complete the inquiry no later than six months after a review period – clause 49I of the PMA

2.2 Structure of PoM’s 2018-19 TCS

PoM’s 2018-19 TCS is structured as follows to be as clear and accessible as possible to the ESC, Port Users and other stakeholders.

Figure 3: 2018-19 TCS document structure



The full list of supporting documents and models comprising PoM’s 2018-19 TCS is listed in Table i.

2.3 Next steps and stakeholder feedback

Having a better understanding of Port Users and other stakeholders’ views and feedback is important for PoM to continue to meet their needs and expectations now and into the future. PoM welcomes feedback through any of the following channels:

Channel	Details
Phone	+61 1300 857 662
Post	GPO Box 2149 Melbourne VIC 3001 Australia
Online	http://www.portofmelbourne.com/contact-us

PoM will continue to engage with Port Users and other stakeholders as part of its business as usual processes as discussed in section 4.

3. Historical performance

3.1 PoM's 2016-17 performance

Given the May 31 submission timeline for the TCS, PoM does not have a full year of actual information for 2017-18 at the time of submitting this TCS – PoM will provide this information in next year's 2019-20 TCS. PoM is therefore providing actual information for 2016-17 only.

Table 3 compares PoM's 2016-17 forecast revenue, capex and opex for Prescribed Services with actual 2016-17 outcomes.

Table 3: Comparison of 2016-17 forecast and actual revenue, capex and opex, \$ Million

	2016-17 (F)	2016-17 (A)	Difference (%)	Difference (\$)
Revenue	328.4	333.1	1.4	4.7
Capex	68.7	72.4	5.3	3.6
Opex	135.4	134.0	(1.1)	(1.4)

Table 4 compares PoM's 2016-17 forecast volumes with actual volumes.

Table 4: Comparison of 2016-17 forecast and actual volumes

Trades	Units (Million)	2016-17 (F)	2016-17 (A)	Difference (absolute)	Difference (%)
Containers - import	TEU	1.25	1.25	0.00	0.0
Containers – export		0.88	0.90	0.02	2.0
Containers - empty		0.57	0.55	(0.02)	(2.4)
Dry bulk	Revenue tonnes	4.05	4.30	0.25	6.1
Liquid bulk		2.37	2.60	0.23	9.6
Motor vehicles		6.90	6.82	(0.08)	(1.2)
Breakbulk		2.39	2.69	0.30	12.9
Chanel – Melbourne	Gross tons	107.81	111.03	3.22	3.0
Chanel – Shared		120.52	124.59	4.07	3.3

Table 3 and Table 4 show that the difference between 2016-17 forecast and actual information is not significant and falls within PoM's expected range of variance for such forecasts. This supports the robustness of PoM's forecasting capability.

3.2 ESC's feedback on PoM's 2017-18 TCS

The ESC has provided informal feedback on PoM's 2017-18 TCS through the following documents:

- Interim Commentary, and
- the SoRA and associated Feedback Paper.

The ESC has also engaged with PoM through periodic meetings to discuss key matters.

This informal feedback is intended to promote transparency and predictability in the application of the regime and provide broad guidance on the ESC's views and expectations. It is also intended to inform the ESC's five-yearly public review of PoM's compliance with the Pricing Order¹⁰. The ESC's Interim Commentary states:

"This will benefit the formal five-yearly review process by providing opportunities for stakeholders, including the port, to be aware of key issues or concerns in advance of formal inquiries. This will also allow the port to refine the information it provides over time to assist the port to demonstrate compliance ahead of our inquiry"¹¹.

PoM welcomes the ESC providing feedback in this way. It is important for PoM to understand any issues or concerns the ESC has about PoM's approach and positions so that PoM can respond to these including by refining or further justifying its positions and approach, where necessary, throughout the review period.

The ESC's Interim Commentary provided the ESC's high-level views on three key areas:

- the WACC
- the length of the regulatory period, and
- treatment of deferred depreciation.

The SoRA provided more detail on the ESC's views and expectations on a broader range of matters. Section 10 consolidates the views and positions raised in the ESC's Interim Commentary and SoRA into a single list of positions and provides a cross-reference to where they are addressed in this TCS.

The ESC's feedback highlights the overall alignment between the ESC's and PoM's views on what constitutes compliance with the Pricing Order and how best to demonstrate compliance. A key difference between the ESC's and PoM's interpretation of the Pricing Order relates to the WACC and in particular what constitutes "well accepted approaches". This matter is addressed in **Appendix I**.

The ESC has not issued PoM with a Supporting Information Determination under clause 9 of the Pricing Order because PoM has provided all necessary information for the ESC to review PoM's 2017-18 TCS and develop its preliminary views.

¹⁰ The public review will occur in 2022 for the 2017 to 2021 review period. The public review must be conducted within six months after five yearly each review period.

¹¹ ESC, 2017-18 Port of Melbourne tariff compliance statement Interim Commentary, (Interim Commentary) 9 November 2017, p.4

4. What Port Users and other stakeholders are telling PoM

PoM has built on its 2017-18 consultation program to undertake deeper and broader engagement with Port Users and other stakeholders to prepare this 2018-19 TCS.

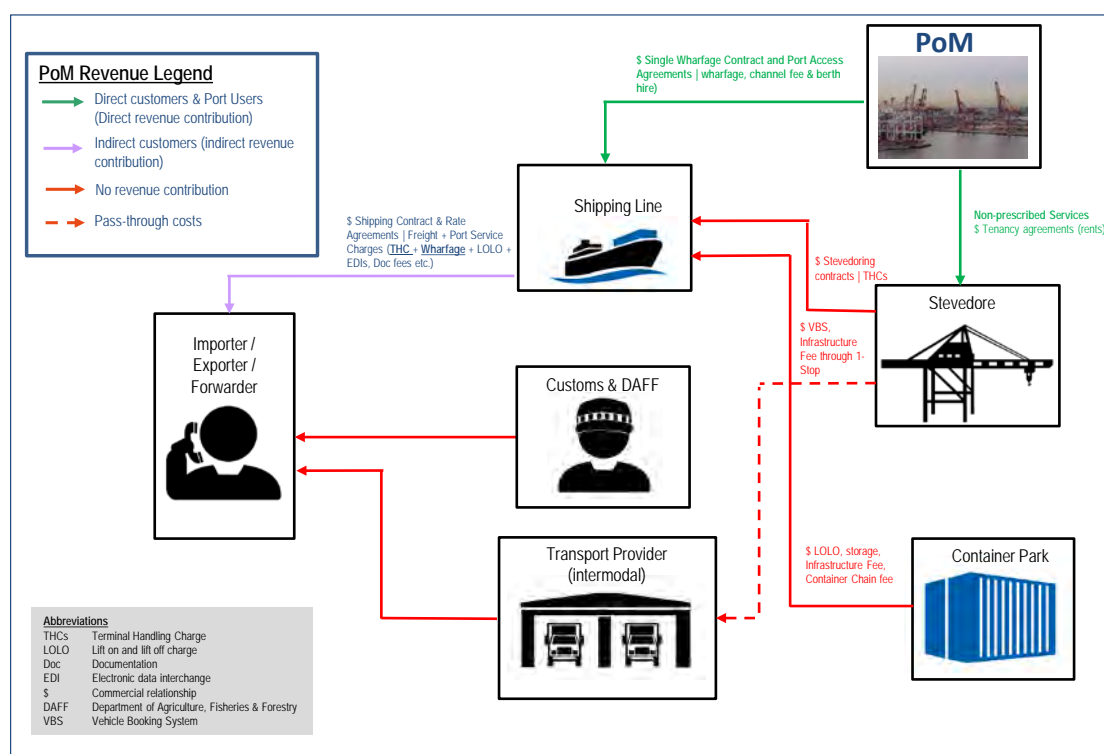
4.1 PoM’s Port Users and other stakeholders

PoM’s stakeholders include direct Port Users and indirect Port Users (together referred to as Port Users) and other stakeholders:

- **Direct Port Users** have a direct commercial relationship with PoM, such as shipping lines and stevedores.
- **Indirect Port Users** have an indirect commercial relationship with PoM, such as importers, exporters, freight-forwarders, logistic providers and others in the logistic supply chain.
- **Other stakeholders** are exposed to, and or impacted by, the port, such as the Victorian community, local residents, industry associations, the Victorian, Tasmanian and Federal Governments, Victorian local governments and any other interested parties.

Figure 4 shows PoM’s relationship with Port Users.

Figure 4: PoM’s relationship with Port Users and supply chain



4.2 PoM’s commitment to engagement

While clause 7.1.2(d) of the Pricing Order provides a clear regulatory imperative for PoM to engage with Port Users, PoM recognises that best practice engagement should be business-led and an on-going part of its day-to-day operations, rather than a means to an end. PoM is working to achieve this outcome. This is because PoM considers that understanding the key concerns and priorities of Port Users and other stakeholders is fundamental to:

- good business planning and decision making, and
- operating the port in a manner that is consistent with the long-term interests of Port Users and Victorian consumers.

It is important that Port Users and other stakeholders understand the regulatory framework under which PoM operates. This will assist them to participate in the regulatory process so that they can share their views and feedback. PoM has therefore:

- upgraded its website to provide more information about the regulatory framework. Between February and April 2018, there have been 172 unique page views of the regulatory web-page. This demonstrates that Port Users and other stakeholders are becoming aware of information that PoM is providing and are accessing it
- published a regulatory brochure, which explains the regulatory framework and the basis for setting tariffs. This is provided at **Appendix J** and is also available on PoM’s website
- raised awareness of the regulatory framework in its day-to-day dealings with Port Users and other stakeholders during which PoM has referred to its website, including the regulatory brochure, as sources of information about the regulatory framework
- provided a high-level overview of the key aspects of the regulatory framework in all of its engagement sessions. **Appendix E** provides a log of PoM’s engagement activities from July 2017 to May 2018
- held deep-dive regulatory workshops in Melbourne and Sydney to facilitate detailed discussions with interested Port Users and other stakeholders about the regulatory regime and key proposed positions underpinning PoM’s 2018-19 TCS. The workshop presentation is provided at **Appendix K**, and
- sought feedback on a number of key issues from attendees at the deep-dive regulatory workshops through an on-line survey.

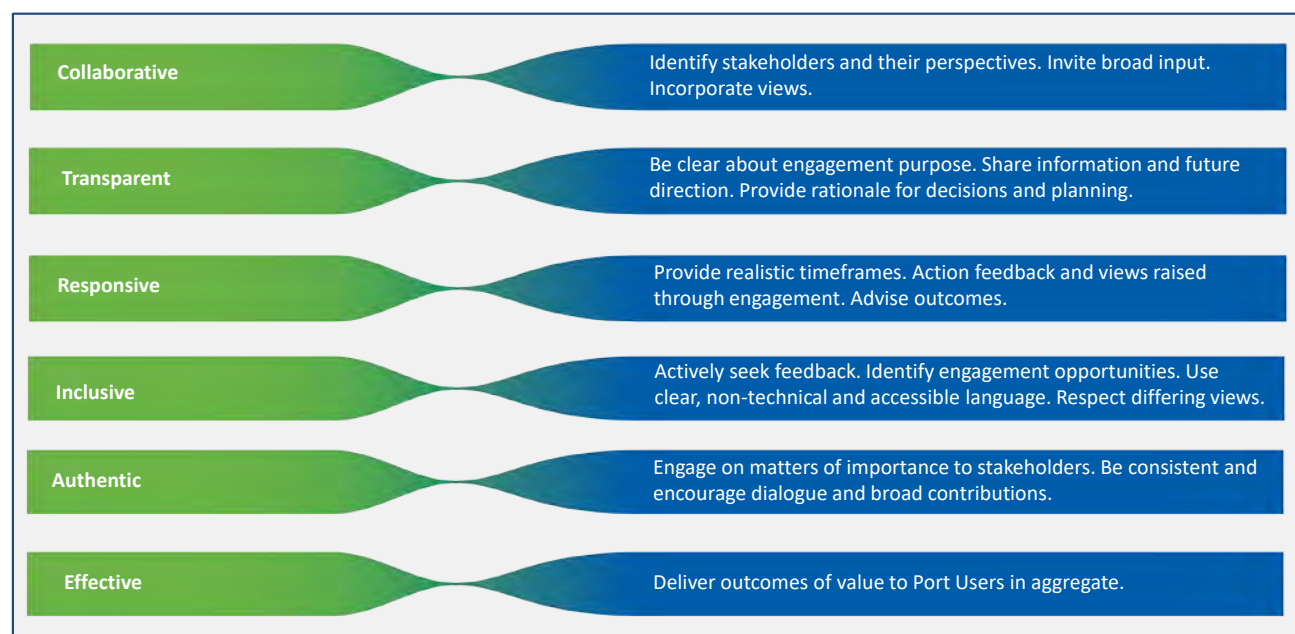
4.3 Importance of two-way engagement

PoM recognises that engagement needs to be two-way to be meaningful. Accordingly, the key objective of PoM’s engagement is to establish open communications with Port Users and other stakeholders, in order to:

- provide accessible, relevant and transparent information on PoM’s priority investments and future direction and
- understand, discuss and address Port Users and other stakeholders’ business needs, insights and requirements on key matters to ensure that we are meeting their expectations now and into the future.

Figure 5 sets out PoM’s core engagement principles that underpin and characterise its approach to consultation.

Figure 5: PoM’s engagement principles



PoM has applied these core principles in developing and conducting its engagement activities to foster genuine and meaningful discussions with Port Users and other stakeholders.

4.4 What PoM has done

Appendix E includes a log of the engagement activities PoM undertook between July 2017 and May 2018. There were 24 engagement sessions held over this period in Victoria, NSW and Tasmania, including in regional centres such as Wagga Wagga, Griffith and Burnie.

In developing these activities, PoM considered the different interests and levels of knowledge of Port Users and other stakeholders and therefore the most suitable engagement channels. This led to a tailored, multi-channel and integrated consultation approach that covered a range of topics at different levels of detail to gain a more sophisticated knowledge of Port Users and other stakeholders’ perspectives. PoM’s Executive Management Team (EMT) led the engagement and encouraged Port Users and other stakeholders to engage on any matter of importance to them. The ESC attended some of these engagement activities.

As shown in Figure 6, PoM discussed a broad range of topics during these engagement activities.

Figure 6: PoM’s engagement overview

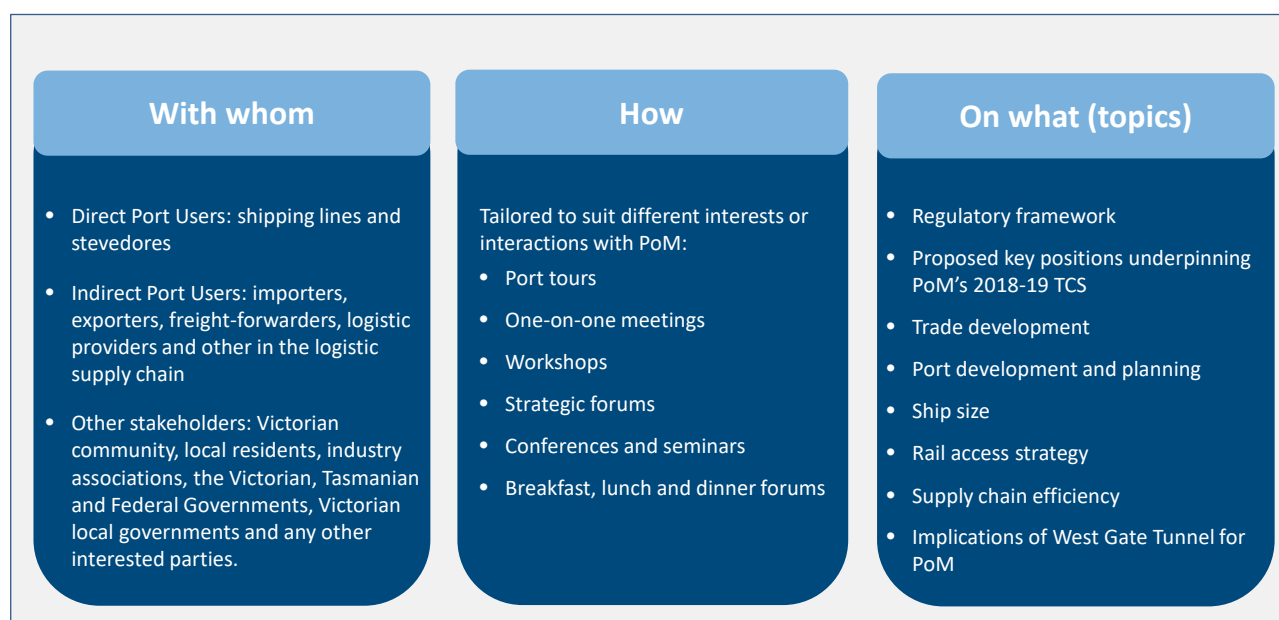


Table 5 shows that the engagement activities informing the development of PoM’s 2018-19 TCS involved a significantly wider group of Port Users and other stakeholders from industry, government and across the community, than those informing its 2017-18 TCS.

Table 5: Invitations, acceptances and attendance - engagement activities for PoM’s 2017-18 TCS and 2018-19 TCS

Port Users and other Stakeholders	2017-18 TCS	2018-19 TCS
Invited to participate	171	655
Accepted invitations	84	533
Attended the engagement activities	68	452

PoM was grateful that several industry associations participated in the engagement activities that are able to further communicate with their numerous members on the matters discussed at the engagement activities. This promotes greater reach of PoM’s engagement activities.

4.5 Key findings of PoM's engagement

Table 6 summarises what PoM heard from Port Users and other stakeholders and the PoM's responses.

Table 6: Summary – Port Users and other stakeholder's feedback and PoM's responses (including actions)

Topic	Port Users' and other Stakeholders' feedback	PoM's response	Queries raised	Actions for PoM	Actions Addressed	Actions to be completed / ongoing
Tariffs	<ul style="list-style-type: none"> Requested information to better understand PoM's tariffs. Queried whether infrastructure and channel deepening fees still apply as they continue to be listed on some freight forwarders' invoices. 	<ul style="list-style-type: none"> Explained the basis and rationale for existing and future tariffs and committed to undertaking a review and making future changes (including rebalancing options), where appropriate. Will publish a "know your bill" fact sheet that confirms what PoM's charges do and do not include. 	7	10	5	5
Ship size	<ul style="list-style-type: none"> Supported the port's role in accommodating larger container vessels. 	<ul style="list-style-type: none"> Explained current and future work to accommodate larger container vessels. 	1	1		1
On-port rail access	<ul style="list-style-type: none"> Supported alternatives to road transport and encouraged an open-access regime for the port rail network. 	<ul style="list-style-type: none"> Explained the objectives of, and the timeframes for developing, its Rail Access Strategy. 	1	2	1	1
Efficient future investment	<ul style="list-style-type: none"> Queried whether the regulatory framework would promote "gold plating". Queried PoM's incentives to invest if it cannot recover its efficient costs. 	<ul style="list-style-type: none"> Explained the protections built into the regulatory framework for Port Users. Explained that new investment requires Port Users' support and suitable arrangements being established for cost recovery. 	2	2	1	1
Communication	<ul style="list-style-type: none"> Encouraged open communication about certain matters that can impact the port's operations. 	<ul style="list-style-type: none"> Reviewed relevant engagement and communication activities, processes and protocols and made improvements where necessary. Will continue to review and refine as required. 	3	5	4	1
Total			14	20	11	9

Appendix E expands on the matters raised by Port Users and other stakeholders and provides further detail on PoM's responses to this feedback including the relevant actions that it has taken, or is taking, to support its responses.

4.6 How PoM will continue its engagement activity

As demonstrated over the past year, PoM greatly values the relationships it has with Port Users and other stakeholders and is committed to collaborating with them to better understand their needs and expectations. This will assist PoM to make decisions that focus on the best possible outcomes for the long-term interests of Port Users and Victorian consumers.

As PoM prepares its 2019-20 TCS over the next 12 months, and in subsequent years, PoM will continue to engage with Port Users and other stakeholders about matters such as performance standards, larger container vessels and on-port-rail access. This engagement will be underpinned by the engagement principles outlined in Figure 5 above, which will encourage genuine listening and responsiveness.

With the help of Port Users and other stakeholders, PoM will continue to improve its engagement capability and effectiveness by:

- understanding the priority matters Port Users and other stakeholders want to talk about and establishing open, transparent and inclusive processes in which to discuss them
- reviewing the engagement practices and process initiatives undertaken by other Australian and international ports and infrastructure industries, such as water, energy and telecommunications so PoM can learn from them
- continuing to build the capacity of Port Users and other stakeholders to participate in the regulatory process
- continuing to provide clear, easy to understand communication materials that explain complex issues. This will assist in making these issues tangible to ensure feedback is meaningful
- reviewing PoM's engagement activities, practices and evaluation framework to ensure that they remain valuable and relevant
- seeking feedback from Port Users and other stakeholders, verbally and through formal channels, on whether recent engagement activities and practices provide the right opportunities for them to input into PoM's decision making processes, and
- re-affirming PoM's commitment to engage with Port Users and other stakeholders on an ongoing basis.

PoM will share the details of its engagement activities with Port Users and other stakeholders on an ongoing basis.

5. The length of the regulatory period

Under clause 13 of the Pricing Order, PoM must nominate the regulatory period for the purposes of calculating Prescribed Services revenue (subject to the TAL) and the ABBM, as well as the associated tariffs.

Consistent with its 2017-18 arrangements, PoM has nominated a one-year regulatory period for 2018-19.

At this early stage of the application of the regime, a one-year regulatory period remains the best option for Port Users and PoM. This is because a longer regulatory period requires robust long-term expenditure forecasts across the regulatory period. PoM is in the process of developing, in conjunction with Port Users, strategies and performance standards, which will be critical to inform these forecasts:

- **Port Development Strategy (PDS)** – a public exhibition draft PDS is due to the Minister for Ports by 31 December 2018. This will set out PoM’s long-term (approximately 30 years through to 2050) vision for the growth and development of the port. It will contain a range of feasible future port development concepts to address current and emerging strategic issues, such as continued trade growth, trends in ship size growth and landside transport issues and opportunities, including on-dock rail. Key drivers of these emerging issues are continued population and economic growth, industry and market sector changes, agricultural climatic conditions and international commodity prices for exports.
- **Rail Access Strategy (RAS)** – this is due to the Victorian Government in October 2019¹². The RAS will set out on-dock rail terminal infrastructure options for the movement of freight into and out of the port that provide viable, cost effective and sustainable alternatives to road transport. This is becoming a critical issue as the population and trade volumes continue to grow driving both road congestion and high road transport costs. Efficiency of the port interface is essential to promote investment in efficiency and productivity across the broader port supply chain.
- **Performance standards** – these outcome measures will allow the ESC, Port Users and other stakeholders to assess whether PoM is meeting service outcomes in an efficient, consistent and timely manner. They also facilitate assessment of whether cost savings are driven by a reduction in service quality or productivity, innovation and efficiency. PoM is currently consulting Port Users and other stakeholders on the level of performance it currently provides. The current draft of these performance standards is provided at **Appendix F**.

PoM has undertaken, and will continue to undertake, detailed and broad consultation with industry, government and the community on its PDS and RAS to test and refine these strategies and make sure that they are aligned and meet the needs of different stakeholders. The feasible options presented will take account of factors including cost, community and environmental impacts, planning considerations and technical feasibility. In summary, PoM will use the following forums to consult stakeholders on the development of its RAS and PDS:

- industry – workshops and meeting, discussions on key areas of interest, collaboration
- State and Commonwealth Government – meetings and briefings to discuss specific issues, opportunities and or draft documents, and
- local community and the general public – public exhibition of PDS terms of reference and draft PDS documentation.

PoM considers that it is more appropriate to propose a longer regulatory period once it settles positions on the PDS, RAS and performance standards, as they are critical to determining the future investment and performance outcomes that PoM will undertake to meet Port Users and other stakeholders’ long-term needs. PoM will consult Port Users on the benefits and practicalities of applying longer regulatory periods in the future once these three initiatives are settled.

¹² In accordance with section 91Q of the PMA and clause 27 of the Port Lease

6. 2018-19 trade volume forecasts

PoM engaged BIS Oxford Economics (BIS Oxford) to forecast its 2018-19 trade volumes. BIS Oxford uses economic modelling to derive the forecasts for the following cargo types: containers; dry bulk; liquid bulk; motor vehicles; breakbulk; and wheeled units. Forecasts are further prepared in terms of trade segments (exports, imports, domestic trade and international trade) where appropriate. PoM forecasts channel fee volumes by applying historical correlations between ship tonnage and trade volumes to BIS Oxford's forecast trade volumes.

In 2017-18, PoM has experienced higher than anticipated growth in its trade volumes for the nine months ending 31 March 2018. For example, full container import (excluding Bass Strait) growth was 8.1 per cent and full container exports (excluding Bass Strait) was 11.4 per cent. This above trend growth is reflective of general positive economic activity and population growth in Victoria.

BIS Oxford is forecasting that annual trade growth in 2018-19 will return to be in line with longer term trends.

6.1 BIS Oxford forecasting methodology

BIS explains in **Attachment H**, titled *"BIS Oxford Economics, Port of Melbourne Trade Forecasts – Forecasts to FY 19"*, the following approach to forecasting each cargo type:

Step 1 – For containerised trade only, acknowledge the common characteristics between major Australian container terminals:

- Being the only container terminal servicing the State at present
- Imports being the dominant full container trade
- Strong growth between 1990 and mid 2000 with slower growth since the global financial crisis.

These common characteristics inform trade analysis. In particular, for containerised imports, the outlook tends to track the national macroeconomic outlook with state-specific demand factors. For containerised exports, BIS Oxford overlays the national production outlook with local specialisation from within PoM.

Step 2 – For each commodity, identify the macroeconomic or industry drivers.

Step 3 – Explain any variances (sudden shifts in volumes) from the macroeconomic or industry drivers. These variances, which may reflect a change in modal choice, port facilities or local production factors, are examined to explain any variances.

Step 4 – Apply macroeconomic drivers. Once the relationship between the trade volumes and macroeconomic drivers are established, and future structural changes are identified, the forecast trade volumes reflect the macroeconomic outlook. The macro-economic drivers include: Victorian, Tasmanian and Australian population growth; Victorian and Australian domestic final demand; Victorian, Tasmanian and Australian retail growth; Victorian machinery and equipment investment growth; Australian building (dwelling and non-dwelling) construction.

Attachment H provides further information on BIS Oxford's trade forecasts including the macroeconomic or industry drivers used to forecast each cargo type and trade segment.

7. 2018-19 ARR and Prescribed Services revenue (subject to the TAL)

The price smoothing pricing principle requires PoM to set its tariffs based on the lower of those implied by the ARR or those subject to the TAL until at least 30 June 2032 and at the latest, 30 June 2037. The Pricing Order requires that:

(i) In relation to the ARR:

“Prescribed Service Tariffs must be set so as to allow the Port Licence Holder a reasonable opportunity to recover the efficient cost of providing all Prescribed Services determined by application of an accrual building block methodology of the type described in clause 4” (see clause 2.1.1(a)).

Clause 2.1.5 goes on to say that *“...a Port Licence Holder will not be in breach of this Order if it sets actual tariffs for Prescribed Services at a level that is lower than permitted under clause 2.1.1(a) in any relevant period”.*

(ii) In relation to the TAL:

“in addition to complying with clause 2, the Weighted Average Tariff Increase implied by the Prescribed Service Tariffs set by the Port Licence Holder in respect of any Financial Year commencing on or after 1 July 2017 must not exceed the Tariffs Adjustment Limit” (see clause 3.1.1)

This section compares the ARR (calculated under the ABBM) with Prescribed Services revenue (subject to the TAL).

7.1 2018-19 ARR (calculated under the ABBM)

PoM has calculated the ARR in accordance with the ABBM described in clauses 4 and 2.1.1 of the Pricing Order and using PoM’s regulatory model provided at **Appendix B**. In accordance with clause 2.2.1 of the Pricing Order, PoM confirms that it has used the same ABBM and parameters for both Dedicated and Shared Channels.

Figure 7: ABBM approach

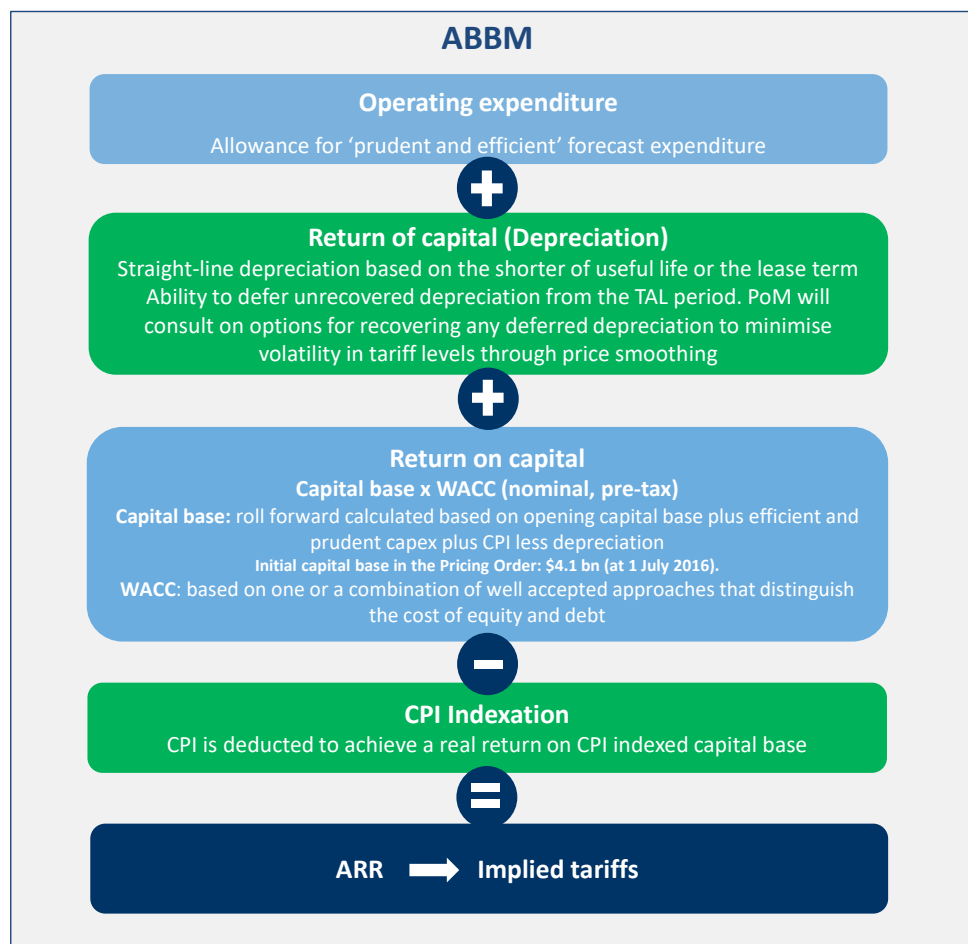


Table 7 sets out 2018-19 ARR (calculated using the ABBM).

Table 7: ARR, \$ Million

	2018-19 (F)
Return on capital	519.3
Return of capital	645.1
Operating expenses (opex)	127.8
Indexation allowance	(108.2)
ARR	1,184.0

The ABBM inputs, and the calculation of each cost block comprising the ABBM, are discussed below.

7.1.1 Capital base

PoM has determined the forecast rolled forward values of its capital base, at 1 July 2017, to be \$4,299.6 million and, at 1 July 2018, to be \$4,475.4 million in accordance with clause 4.2.1 of the Pricing Order by:

- adding indexation in accordance with clauses 4.2.1(b) and 4.6.1(a) of the Pricing Order. Clause 4.6.1(a) provides that opening capital base must be indexed by the percentage change in CPI¹³ for the relevant financial year
- adding prudent and efficient capex in accordance with clause 4.2.1(c) and 4.6.1(b) of the Pricing Order. Clause 4.6.1(b) provides that capex is indexed by half a year's inflation¹⁴ (i.e. one half of the percentage change in CPI) for the relevant financial year. This assumes capex is incurred mid-year or halfway through the financial year, and
- deducting depreciation (i.e. the return of capital allowance). However, because in 2017-18 and 2018-19 PoM's Prescribed Services revenue (subject to the TAL) is below the ARR, as shown in Table 1 above, PoM has used the alternative depreciation methodology, which involves setting straight-line depreciation to zero and deferring its recovery to future years. This is recognised by adding back "deferred depreciation". This is discussed in 7.1.4.

The forecast closing 2017-18 capital base of \$4,479.8 million submitted in PoM's 2017-18 TCS has been adjusted for 2016-17 actual values and is therefore \$4,475.4 million.

Table 8 sets out PoM's forecast closing capital base as at 30 June 2018 and 30 June 2019.

Table 8: Capital Base 2017-18 and 2018-19, \$ Million

	2017-18 (F)	2018-19 (F)
Opening Capital Base (1 July)	4,299.6	4,475.4
Plus Indexation Allowance	112.7	108.2
Plus Efficient Capex	67.6	67.7
Less Depreciation	(511.8)	(645.1)
Plus Deferred Depreciation	511.8	645.1

¹³ PoM has used the June all capital cities CPI for the relevant Financial Year in accordance with clause 4.6 of the Pricing Order

¹⁴ PoM has used the June all capital cities CPI for the relevant Financial Year in accordance with clause 4.6 of the Pricing Order

	2017-18 (F)	2018-19 (F)
Closing Capital Base (30 June)	4,479.8	n.a
Adjustment for 2016-17 actual values	(4.4)	n.a
Closing Capital Base (30 June) reflecting 2016-17 actual values	4,475.4	4,651.3

Appendix B, PoM’s regulatory model, provides further details on the capital base roll forward.

7.1.2 Capex

Table 9 sets out PoM’s 2018-19 forecast capex for Prescribed Services. Expenditure on wharves and channels are the largest categories of capex comprising 75 per cent of total capex.

Appendix F explains the method that has been used to prepare PoM’s 2018-19 capex forecast and why the forecast is prudent and efficient. It also explains the basis on which capex has been allocated between Prescribed Services and shared or non-Prescribed Services.

Table 9: Forecast 2018-19 capex, \$ Million

Capex category	2018-19 (F)
Port Capacity Project (PCP)	0.0
Channel	12.9
Wharves	38.0
Road	4.1
Rail	5.9
Plant	3.4
Other	3.5
Total	67.7

7.1.3 Rate of return on capital

The rate of return on capital (referred to as the WACC) aims to compensate PoM’s debt and equity holders for the opportunity cost of either lending or investing their funds in the port.

The Pricing Order provides that the return on capital, required to calculate the ARR under the ABBM, should be:

An allowance to recover a return on its capital base, commensurate with that which would be required by a benchmark efficient entity providing services with a similar degree of risk as which applies to the Port Licence Holder in regards to the provision of Prescribed Services (clause 4.1.1(a) of the Pricing Order).

It goes on to add:

in determining a rate of return on capital for the purposes of clause 4.1.1(a) the Port Licence Holder 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 (clause 4.3.1 of the Pricing Order).

In summary, the key Pricing Order requirements relating to the WACC are that it must be:

- calculated on a pre-tax nominal basis
- commensurate with that required by a benchmark efficient entity (BEE) with a similar degree of risk to PoM in providing Prescribed Services, and
- estimated using one or a combination of well-accepted approaches that distinguish the cost of equity and debt.

These requirements must be interpreted in accordance with the objectives of the regulatory regime discussed in Figure 1. Critical to promoting the regulatory objectives is:

- the need for efficient investment in the long-term interests of Port Users and Victorian Consumers, and
- providing a reasonable opportunity for PoM to recover its efficient costs (i.e. the costs that would be incurred by an efficient business in a workably competitive market).

The pre-tax nominal WACC formula is expressed in Figure 8:

Figure 8: pre-tax nominal formula

$$\frac{R_e}{(1 - t_c [1 - \gamma])} * \frac{E}{E + D} + R_d \frac{D}{E + D}$$

Where:

R_e = post-tax return on equity

R_d = pre-tax return on debt

D = proportion of debt within the assumed capital structure

E = proportion of equity within the assumed capital structure

t = corporate tax rate

γ = gamma (value of imputation credits)

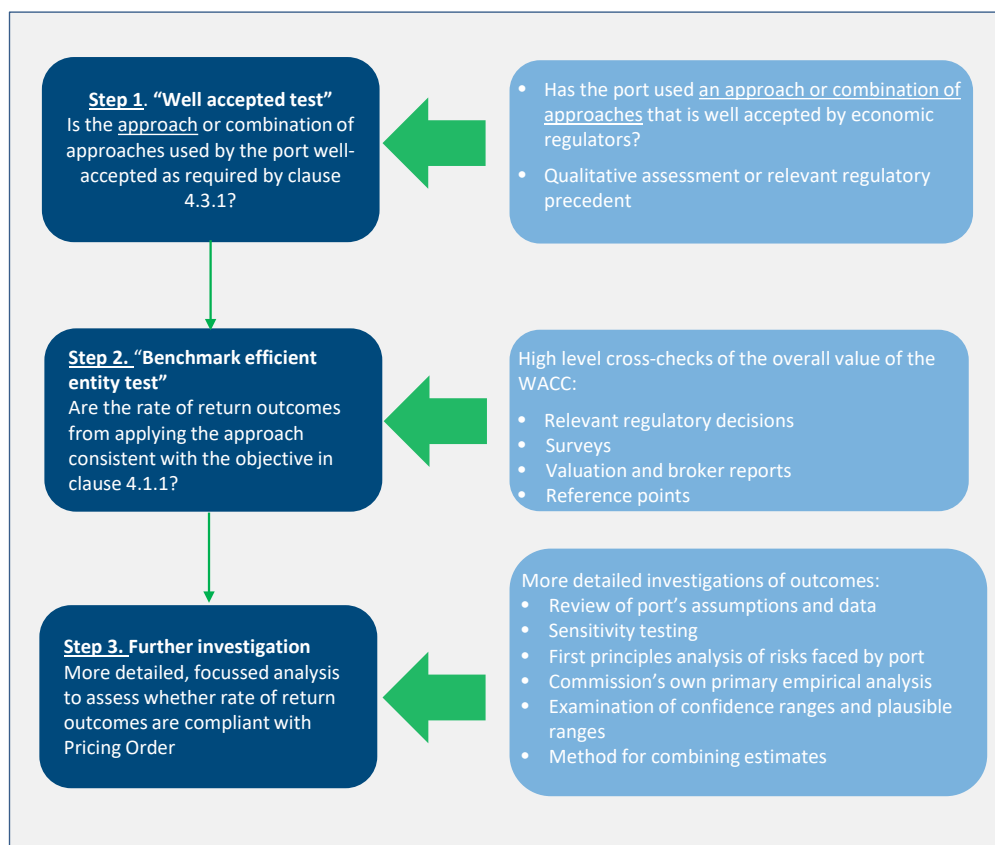
PoM has estimated its pre-tax nominal WACC¹⁵ for 2018-19 to be 11.52 per cent based on a pre-tax return on debt of 5.37 per cent, a pre-tax return on equity of 14.16 per cent and gearing of 30 per cent. This compares to its 2017-18 pre-tax nominal WACC of 11.54 per cent calculated using the same formula.

Table 10 below explains that PoM has made limited modifications to its approach to calculating its 2018-19 WACC, compared to the approach that it used to calculate its 2017-18 WACC. In particular, PoM has commenced a trailing average approach to estimate the return on debt because this is more consistent with the debt management practices of a BEE. PoM has also made minor modifications to address the ESC's feedback in its Interim Commentary and SoRA, such as removing the US\$100 million market capitalisation BEE threshold.

The ESC's SoRA sets out a three-step WACC Compliance Assessment Test that is replicated in Figure 9. This Test details the ESC's views on how PoM should demonstrate compliance with the Pricing Order requirements relating to the WACC.

¹⁵ Clause 4.3.2 of the Pricing Order requires the rate of return to be calculated on a pre-tax nominal basis

Figure 9: ESC WACC Compliance Test



As shown in Figure 9, the three steps are as follows:

- **Step 1** – The "well accepted" test is a qualitative assessment of whether the approach or combination of approaches used to estimate the WACC are well accepted.
- **Step 2** – The BEE test is a quantitative assessment focusing on the reasonableness of the overall value and whether it is commensurate with the value required by the BEE with a similar degree of risk.
- **Step 3** – The further investigation test involves investigating the reasonableness of individual parameter values.

In principle, PoM supports the intent of the WACC Compliance Assessment Test as being a useful tool to apply the Pricing Order requirements. However, PoM has strong concerns with the ESC's interpretation of "well-accepted approaches" in relation to estimating the WACC, in particular the return on equity component. The "well accepted" test is the first step in the ESC's WACC Compliance Assessment Test. PoM has outlined its position on this matter in **Appendix I**.

In summary, PoM considers that the ESC's interpretation of "well accepted", which requires that for the approach or combination of approaches to be "well accepted" it/they must be used by at least one regulator (Australian or international), or a review body overseeing the decisions made by economic regulators:

- is not consistent with the requirements of the Pricing Order or the objectives of the regulatory regime
- is beyond the intent of the Pricing Order. The Pricing Order does not contemplate the ESC constraining PoM from considering approaches that are well accepted by other relevant parties including financial and academic communities, and
- unduly restricts PoM's discretion intended by the regime by removing flexibility that is and should be built into the Pricing Order.

Based on expert legal and regulatory advice, PoM considers "well accepted approaches" is not confined to economic regulators and includes also those approaches used by financial and academic communities.

PoM is also concerned about the “gateway” nature of the ESC’s WACC Compliance Assessment Test. PoM considers that to determine whether PoM’s WACC estimate satisfies the Pricing Order and the objectives of the regulatory regime, it must consider the outcomes of all three steps together. PoM is concerned that the current “gateway” nature of the test, which means that progressing to step two is conditional on satisfying step one, could result in unintended practical consequences. For example, the ESC could potentially find PoM’s WACC estimate is not compliant with the Pricing Order based on the outcome of step one alone whereas consideration of the outcomes of all three steps could result in the ESC finding that overall PoM’s WACC estimate is compliant with the Pricing Order. PoM considers that the ESC should have regard to the outcomes of all three steps in undertaking its compliance assessment in relation to its WACC estimate.

An expert report from Synergies Economic Consulting titled “*Determining a WACC estimate for Port of Melbourne*” is provided at **Appendix C**. This sets out PoM’s 2018-19 pre-tax nominal WACC, the detailed calculations underpinning the WACC and how PoM’s 2018-19 WACC satisfies the ESC’s WACC Assessment Test.

PoM’s approach to calculating the 2018-19 WACC

Table 10 overviews the key components of the WACC formula and PoM’s approach to estimating each of these components for the purposes of its 2018-19 WACC. Further detail is provided at **Appendix C**.

Table 10: Pre-tax nominal rate of return

Element	Definition and estimation approach	Consistent with 2017-18 approach
Return on equity (pre-tax)	<p>The return on equity is the return required by shareholders when providing equity capital. There is no immediate and direct means for observing, on an ex ante basis, what investors require by way of equity returns. Accordingly, estimates of the rate of return on equity have to be derived from market data and other evidence, making use, in general, of asset pricing models and other methods.</p> <p>PoM has adopted the equal weighting of three well accepted approaches: Sharpe-Lintner Capital Asset Pricing Model (SL CAPM); Black CAPM; Fama French Model (FFM) (the multi-model approach). This is because there are no substantive grounds to favour one approach over the other.</p> <p>Based on expert legal and regulatory advice, PoM considers that these approaches are well-accepted within the meaning of the Pricing Order for estimating the cost of equity.</p>	Yes – no change
Return on debt (pre-tax)	<p>The return on debt is the required yield (or interest) on issued debt.</p> <p>The cost of debt is the sum of the risk-free rate (Rf) and an estimate of the debt risk premium (DRP) consistent with the risk profile of the BEE.</p> <p>In its 2017-18 TCS, PoM estimated its return on debt using the “on-the-day approach,” which was appropriate for the first TCS given the recent lease transaction. For the 2018-19 TCS, PoM has commenced a 10-year trailing average approach, which places 90 per cent weight on the 2017 and 10 per cent on the 2018 on-the-day estimates. In each subsequent year, 10 per cent of the return on debt estimate will be refreshed with the prevailing on-the day estimate for the given year. This method will result in less volatility over time and is more consistent with the debt management practices of a BEE. The trailing average approach is well accepted and is applied by more than one Australian economic regulator.</p>	Transition to the trailing average approach
Capital structure (gearing)	<p>The capital structure (gearing) is needed to distinguish the relative proportion of equity and debt in the financing arrangements of a BEE.</p> <p>PoM has assumed a benchmark gearing ratio of 30 per cent based on the mid-point of domestic and international comparator entities’ capital structures, which range from 20 per cent (based on the average and median of listed comparators) to 42 per cent (average and median of the acquisition comparators).</p>	Yes – no change
Gamma	Gamma is an estimate of the expected proportion of company tax which is returned to	Yes – no change

Element	Definition and estimation approach	Consistent with 2017-18 approach
	<p>investors as a tax credit through utilisation of imputation credits.</p> <p>PoM has calculated gamma based on an equal weighting of the estimates derived from three well-accepted approaches: finance theory; an equity ownership approach; and the market valuation studies.</p>	

Table 11 details the parameter estimates calculated for each element of its 2018-19 WACC. Figure 8 above shows the pre-tax nominal WACC formula, which comprises the pre-tax return on equity plus the pre-tax return on debt, where:

$$Re = \text{Return on equity (pre-tax)} = \text{Return on equity (post-tax)} \div (1 - \text{corporate tax} \times (1 - \text{gamma})), \text{ where}$$

$$\text{Return on equity (post-tax)} = (\text{Market Risk Premium} \times \text{Equity Beta}) + \text{Risk Free Rate}$$

$$E / (D+E) = (\text{share of equity}) (1 - \text{gearing})$$

Plus

$$Rd = \text{Pre-tax return on debt} = \text{Risk free rate} + \text{Debt risk premium} + \text{Debt raising costs}$$

$$D / (E+D) = (\text{share of debt}) (\text{gearing})$$

The return on equity in Table 11 is based on the multi-model approach rather than the direct application of the numbers in this table using the above formula. A more detailed discussion of the parameters relevant to the WACC estimate is at **Appendix C**.

Table 11: Cost of capital parameters values underpinning PoM's 2018-19 WACC estimate

Element	2018-19 (F)
Return on equity (pre-tax) (Re)	14.16%
Market risk premium	7.71%
Equity beta	1.00
Risk free rate	2.74%
Corporate tax (t _c)	30%
Gamma (γ)	0.25
Return on debt (pre-tax) (Rd)	5.37%
Risk free rate	2.74%
Debt risk premium	2.53%
Debt raising costs	0.10%
Capital structure (gearing)	
Share of debt (D/(E+D))	30%
Share of equity (E/(E+D))	70%
Pre-Tax Nominal WACC	11.52%

7.1.4 Depreciation and economic asset lives

Table 12 shows the economic lives for new capex. PoM's asset categories and economic lives are the same as those set out in its 2017-18 TCS, with the exception of the following modifications which have been introduced to more accurately reflect the diversity of PoM's assets and their associated asset lives. PoM has:

- broken channels down further into the following categories: Melbourne channel; Melbourne channel over dredge; shared channels and shared channel over dredge. The over dredge categories, which contain expenditure for maintenance dredging activities including dredging, sweeping, water injection, material transport and placement, bunding, capping and associated environmental testing and monitoring functions, have been assigned a three year life, and
- broken plant down further into: buildings, utilities, civil and minor-capital works. Plant now largely contains expenditure related to IT and survey equipment and therefore the life has been reduced to 10 years to better reflect the life of these assets.

PoM must depreciate its assets over a period no shorter than the economic life or the remaining term of the lease (whichever is shorter).

Table 12: Economic lives for new capex

Asset category	Economic lives for new capex
Melbourne Channel	50
Melbourne Channel Over Dredge	3
Shared Channels	50
Shared Channel Over Dredge	3
Channel Service Protection	40
Roads	20
Rail	30
Buildings	25
Wharves	25
Plant	10
PCP - Wharves	50
PCP - Civil	30
Navigational Aids	25
Utilities	30
Civil	40
Minor capital works	25

To calculate its forecast straight-line depreciation, PoM has used the capital base values described in section 7.1.1 and the economic and average remaining asset lives.

PoM has also used the alternative depreciation methodology permitted by clause 4.4.2(a) of the Pricing Order, rather than straight-line depreciation under clause 4.4.1 of the Pricing Order. This is because the application of the TAL

prevents PoM increasing tariffs to the level whereby PoM could recover its ARR (calculated under the ABBM) with the application of straight-line depreciation. On this basis, in accordance with clause 4.4.2(a) of the Pricing Order, PoM has applied the alternative depreciation methodology, which only applies depreciation to the extent that revenue from Prescribed Services (subject to the TAL) exceeds the ARR excluding the depreciation allowance. Given that in 2018-19 PoM's forecast Prescribed Services revenue (subject to the TAL) is below the ARR, PoM has set 2018-19 straight-line depreciation to zero and deferred its recovery to future years. This method complies with the Pricing Order provisions relating to depreciation, including clause 4.4.3, which requires that the depreciation allowance is not below zero.

PoM's forecast straight-line depreciation is set out in Table 8. PoM's regulatory model, provided at **Appendix B**, contains the depreciation calculations and **Appendix F** contains further information on PoM's depreciation methodology.

As requested, PoM has also provided the ESC with a calculation schedule which demonstrates that its methods for calculating deferred and straight-line depreciation only recover depreciation once. This means that the amount by which each asset, or group of assets, is depreciated over the depreciation period does not exceed the value of the asset, or group of assets, at the time of its or their inclusion in the capital base.

Given this is only the second year of the regulatory regime (and the TAL period), PoM cannot, at this stage, provide a precise indication as to the timing and approach to recovering its deferred depreciation. PoM acknowledges that this is a matter of keen interest for Port Users and it is also of significant importance to PoM. Factors that will affect the amount of deferred depreciation include:

- future import volumes that are driven by domestic demand, population growth and the value of the Australian dollar, levels of domestic manufacturing and the location of domestic manufacturing (imports are primarily driven by domestic consumption)
- future export volumes that are driven by the economic growth of Victoria's trading partners (exports are primarily driven by foreign demand for Victorian products)
- the level of new capital investment during the TAL period such as for example to accommodate larger ships or enable on-port rail access, and
- the length of the TAL period.

PoM will consult Port Users on options for recovering any deferred depreciation to minimise volatility in tariff levels through price smoothing closer to the end of the TAL period, if deferred depreciation is yet to be recovered at such time. PoM will continue to engage with Port Users on the key principles underpinning its approach to recovering deferred depreciation in the future, including its commitment to smooth prices.

7.1.5 Opex

Table 13 sets out PoM's 2018-19 forecast opex for Prescribed Services. Around 78 per cent of PoM's 2018-19 forecast opex is non-controllable and relates to two items – the Port Licence Fee and the Cost Contribution Amount. These items are required by, and calculated in accordance with the relevant requirements in, the PMA¹⁶ and the Port Concession Deed¹⁷ respectively and are deemed to be prudent and efficient under clause 4.5 of the Pricing Order. As a result, only 22 per cent, or \$27.8 million, is controllable by PoM.

Appendix F explains the method that has been used to prepare PoM's 2018-19 opex forecast and why the forecast is prudent and efficient. It also explains the basis on which opex has been allocated between Prescribed Services and shared or non-Prescribed Services.

¹⁶ The Port Licence Fee has been calculated in accordance with sections 44K and 44J of the PMA

¹⁷ The Cost Contribution Amount has been calculated in accordance with clause 27.1 of the Port Concession Deed

Table 13: Forecast 2018-19 opex, \$ Million

Opex categories	2018-19 (F)
Port Licence Fee	84.4
Cost Contribution Amount	15.6
Labour	10.0
Repairs and Maintenance	4.0
Other	13.8
Total	127.8

7.1.6 Indexation allowance

The indexation building block, as required under clause 4.1.1(d) of the Pricing Order, impacts the overall ABBM by its inclusion as a negative building block. This deduction from the ABBM is made to maintain a real rate of return given that a nominal rate of return, discussed in section 7.1.3, is applied to an inflation-adjusted capital base¹⁸, discussed in section 7.1.1. The indexation building block is the sum of the following as disused in section 7.1.1 above:

- the indexation of the opening capital base (clause 4.6.1(a) of the Pricing Order), and
- half a year’s inflation on capex (clause 4.6.1(b) of the Pricing Order).

PoM has used the June all capital cities CPI in accordance with clause 4.6 of the Pricing Order to calculate the indexation allowance. The detailed calculations are contained in PoM’s regulatory model provided at **Appendix B**.

Table 14: Indexation allowance, \$ Million

	2018-19 (F)
Indexation Allowance	108.2

7.2 Prescribed Services revenue (subject to the TAL)

The TAL is defined by the Pricing Order as “...the percentage change in CPI between the March quarter immediately preceding the relevant Financial Year and the March quarter in the Financial Year two years preceding the relevant Financial Year.”

The 2018-19 TAL is based on the percentage change in the 2017 March quarter¹⁹ and 2018 March quarter CPI²⁰ (All Groups Index Number, weighted average of eight capital cities published by the Australian Bureau of Statistics) and is 1.9 per cent.

The 2018-19 Prescribed Services revenue is derived by applying the TAL of 1.9 per cent to the tariffs set out in PoM’s 2017-18 RTS (other than full outward containerised wharfage tariffs, which are decreased by 2.5 per cent), multiplying these tariffs by the 2018-19 forecast trade volumes prepared by BIS Oxford and PoM, in relation to channel volumes only (discussed in section 6 and **Appendix H**) and then adding forecast 2018-19 revenue from contracts with Port Users for Prescribed Services (see **Appendix D**).

¹⁸ The capital base includes an allowance for indexation

¹⁹ Twelve month March quarter CPI.

²⁰ This is consistent with the TAL as defined in the Definitions section of the Pricing Order being “the percentage change in CPI between the March quarter immediately preceding the relevant Financial Year and the March quarter in the Financial Year two years preceding the relevant Financial Year.”

The Weighted Average Tariff Increase (WATI), which is the weighted average rate of change in all tariffs (including full outward containerised wharfage tariffs) calculated using weightings based on its 2016-17 audited revenue, is 0.9 per cent. The WATI does not include revenue from contracts with Port Users for Prescribed Services.

7.3 Comparison of the ARR and Prescribed Services revenue (subject to the TAL)

Table 15 compares the 2018-19 ARR (calculated under the ABBM) and Prescribed Services revenue (subject to the TAL).

Table 15: Comparison of 2018-19 ARR Prescribed Services (subject to the TAL), \$ Million

	2018-19
ARR	1,184.0
Prescribed Services revenue	371.2
Under-recovery of ARR	(812.8)

Table 15 shows that the 2018-19 Prescribed Services revenue (subject to the TAL) of \$371.2 million is \$812.8 million below the ARR of \$1,184.0 million. This means that PoM's efficient costs of providing Prescribed Services are more than its forecast Prescribed Services revenue in that year. Further discussion of this in terms of PoM's ability to satisfy the "efficient cost recovery" Pricing Principle is in section 9.

8. PoM's 2018-19 Tariffs

As outlined in section 7.2, the forecast 2018-19 Prescribed Services revenue (subject to the TAL) is lower than the ARR (calculated under the ABBM). PoM's 2018-19 tariffs are, therefore, subject to the TAL and PoM also confirms that it has:

- increased its tariffs by a WATI of 0.9 per cent from 2017-18
- not rebalanced its tariffs. All tariffs (except tariffs for full outbound container wharfage services) have been adjusted by the same percentage adjustment (i.e. the TAL of 1.9 per cent) consistent with clause 3.2.1 of the Pricing Order. There are no new or discontinued tariffs
- complied with the Export Pricing Decision for full outbound container wharfage services in accordance with clause 2.3.1 of the Pricing Order. In particular, PoM's 2018-19 "full outward containerised wharfage tariff" shows a 2.5 per cent reduction to \$95.80 from the \$98.26 level that applied for 2017-18, and
- included contract revenue in its Prescribed Services revenue (subject to the TAL) and the ARR but not in the WATI calculation.

PoM's 2018-19 tariffs are set out in the RTS provided at **Appendix A** of this TCS and are effective from 1 July 2018.

8.1 Upper and lower Bounds

Clause 2.1.1 of the Pricing Order requires that revenue for each Prescribed Service Bundle should be on or between the upper bound (clause 2.1.1(b)(i)), which represents the stand-alone cost of providing each Prescribed Service Bundle, and the lower bound (clause 2.1.1(b)(ii)), which represents the avoidable cost of not providing the Prescribed Service Bundle. This is commonly known as the "efficient pricing band".

Consistent with its 2017-18 TCS, PoM has not sought to estimate the stand alone cost for providing each Prescribed Service Bundle. This is because, regardless of what the stand alone cost for providing each Prescribed Service Bundle might be, PoM would be in compliance with clause 2.1.1(b)(i) of the Pricing Order during the period in which clause 3.1.1 applies and any subsequent increase to any Initial Prescribed Service Tariff (as may be varied from time to time due to the acceptance of a Final Rebalancing Application under clause 3.2.18) does not exceed the TAL.

For example, if the revenue for each Prescribed Service Bundle was below the stand alone cost of providing that Prescribed Service Bundle, then PoM would be in direct compliance with clause 2.1.1(b)(i). On the other hand, if the revenue for each Prescribed Service Bundle was above the stand alone cost of providing that Prescribed Service Bundle, then in accordance with clause 2.1.4 of the Pricing Order, the upper bound principle in clause 2.1.1(b)(i) would not apply as clause 3.1.1 applies and the subsequent increase in Initial Prescribed Service Tariffs for 2018-19 does not exceed the TAL. PoM will therefore be in compliance with the upper bound principle in clause 2.1.1(b)(i) for the 2018-19 regulatory period.

PoM has demonstrated that its forecast revenue for each Prescribed Service Bundle is greater than its estimated average annual short-term avoidable costs of not providing the relevant Prescribed Service Bundle. **Appendix F** provides further information on PoM's avoidable costs.

9. Efficient Cost Recovery (ECR)

The ECR is required to promote the objectives of the regulatory regime, which include:

- that PoM should have a reasonable opportunity to recover its efficient costs of providing Prescribed Services, including a return commensurate with the risks involved, and
- to promote efficient investment for the long-term interests of Port Users and Victorian consumers.

Clause 2.1.1(a) of the Pricing Order reinforces these objectives through the ECR principle which requires:

Prescribed Service Tariffs must be set so as:

- (a) *to allow the Port Licence Holder a reasonable opportunity to recover the efficient cost of providing all Prescribed Services determined by application of an accrual building block methodology of the type described in clause 4 (Aggregate Revenue Requirement)*

Importantly, there is no express qualifier on this principle in relation to the application of the TAL. This means that the principle that PoM should have a "reasonable opportunity" to recover its efficient costs and commensurate return is independent of the obligation to apply the TAL during the period until at least 2032 and at the latest 2037.

Allowing PoM to recover its efficient costs of, and commensurate return on, investment is important to avoid compounding PoM's under-recovery of its efficient costs and having a higher capital base and tariffs at the end of the TAL period. These matters are particularly important because the Pricing Order constrains the depreciation period to the end of the lease.

PoM is also required to promote efficient investment. It is not reasonable to expect that any port operator (whether regulated or unregulated) would undertake investment where it is not commercially sustainable, due to an inability to recover efficient costs and commensurate return.

PoM's previous and current TCS show that because PoM's tariffs are subject to the TAL in 2017-18 and 2018-19, PoM will not recover its efficient and prudent costs of providing Prescribed Services as calculated by the ABBM in these years. Current analysis also indicates that PoM will not recover its efficient costs and commensurate return of providing Prescribed Services for the remainder of the TAL period (until at least 30 June 2032 and at the latest 30 June 2037).

Recent consultation with Port Users indicates that some Port Users support significant new investment to accommodate larger ships and establish on-port rail infrastructure. PoM is still consulting with Port Users to better understand their requirements in relation to their future investment needs and priorities. The outcomes of this consultation will be reflected (as potential feasible investment options) in PoM's RAS and PDS which will present PoM's long-term vision for the growth and development of the port. Section 5 provides further detail on PoM's PDS and RAS.

PoM will engage on the scope and timing of the investment with the ESC, the Victorian Government, Port Users and other stakeholders, and will seek to explore options, with the ESC and Port Users, for recovering its efficient costs of this investment during the TAL period.

10. Summary of ESC’s views and positions – Interim Commentary and SoRA

Table 16 provides a consolidated list of the ESC’s views and positions, in its Interim Commentary and SoRA, on what PoM should include in its TCS to demonstrate Compliance with the Pricing Order.

Table 16 also:

- shows, with two exceptions, that the TCS addresses the information required by the ESC, and
- provides a cross-reference to where in PoM’s 2018-19 TCS the ESC’s views and positions are addressed.

Table 16: The ESC’s views and position in its SoRA and Interim Commentary

No.	Issue and requirements	Addressed	TCS cross-reference
(i) WATI			
•	Provide visible formulae and identify data sources	✓	Actioned. See Appendix B, regulatory model.
	For existing tariffs – use audited revenues from the most recent financial year (i.e. T-2)	✓	In the absence of audited revenue at the detailed commodity level, PoM has relied on audited 2016-17 volumes (at the commodity level), which is the best available information it has to calculate the WATI. PoM has: <ul style="list-style-type: none"> (i) confirmed these volumes by multiplying them by the 2016-17 tariffs and reconciling the total resultant revenue against total revenue in the audited PoM Unit Trust accounts; and (ii) applied the audited 2016-17 volumes to its 2017-18 and 2018-19 tariffs respectively to calculate the weighted average revenue in each year. See section 7.2 of PoM’s 2018-19 TCS General Statement and Appendix B, regulatory model.
	For new tariffs – use estimated demand to derive the associated revenue	N/A	No new tariffs in 2018-19.
	Round tariffs to four decimal places.	✗	Not actioned. Consistent with tariff rounding in the Pricing Order Schedule (Initial Prescribed Service Tariffs) and PoM’s 2017-18 RTS, PoM has rounded its tariffs to either two or four decimal places. For example, wharfage fees are rounded to two decimal places, whereas channel fees are rounded to four decimal places. Further, rounding wharfage fees to two decimal places is consistent with PoM’s invoicing practices which are based on two decimal places.
(ii) Contract revenue			
•	Exclude contract revenue from the WATI	✓	Actioned. See section 7.2 of PoM’s 2018-19 TCS General Statement and Appendix B, regulatory model.

No.	Issue and requirements	Addressed	TCS cross-reference
	<ul style="list-style-type: none"> Include contract revenue in the ARR 	✓	Actioned. See section 7.2 of PoM’s 2018-19 TCS General Statement and Appendix B, regulatory model.
	<ul style="list-style-type: none"> Only enter into contracts for Prescribed Services, on different terms to the RTS, subject to: <ul style="list-style-type: none"> firstly offering to provide Prescribed Services in accordance with its RTS PoM being able to reasonably recover its efficient costs of providing the services. 	✓	Actioned. See section 7.2 of PoM’s 2018-19 TCS General Statement and Appendix D, Contracts with Port Users. PoM’s RTS is a standing offer available on its website to all Port Users that have not negotiated and entered into a separate agreement with PoM.
	<ul style="list-style-type: none"> Contract prices must reflect the efficient cost recovery principles in clause 2.1.1(b) of the Pricing Order. This requires prices to be no lower than the avoidable costs of not providing, and no higher than the standalone cost of providing Prescribed Services 	✓	Actioned. See Appendix D, Contracts with Port Users.
(iii) Export pricing decision			
	Comply with the export pricing decision	✓	Actioned. See section 8 of PoM’s 2018-19 TCS General Statement and Appendix B, regulatory model
(iv) Stakeholder engagement			
	Demonstrate that PoM has “consulted effectively with port users”		
	<ul style="list-style-type: none"> Explain the following: <ul style="list-style-type: none"> the nature of the consultation process the issues raised and feedback received how port users’ views have been taken into account. 	✓	
	<ul style="list-style-type: none"> Consultation topics should address: <ul style="list-style-type: none"> the drivers and levels of costs and proposed service level performance standards the approach to setting prices matters affecting the long-term interests of port users including future prices PoM’s compliance with the Pricing Order. 	✓	Actioned. See section 8 of PoM’s 2018-19 TCS General Statement and Appendix E, Port User and other stakeholder Consultation. Also, see Appendix J, PoM’s Regulatory Brochure, Appendix K, PoM’s regulatory deep-dive workshop presentation and Appendix L, Letter from PoM explaining time-based berth hire fees.
	<ul style="list-style-type: none"> The consultation approach must be: <ul style="list-style-type: none"> tailored to suit the topics and audience accessible – has a clear purpose, instruction and information inclusive – provides a fair and reasonable opportunity for participation focused on priority matters. 	✓	
(v) Forecasts and information provision			
	<ul style="list-style-type: none"> Forecasts / estimates must be transparent, replicable and supported by (i.e. be able to traced back to) primary information 	✓	Actioned.
	<ul style="list-style-type: none"> Explain the forecasting methodology 	✓	<ul style="list-style-type: none"> Capex and Opex – see section Appendix F (sections 2 and 3)
	<ul style="list-style-type: none"> Explain the assumptions underpinning its forecasting methodology 	✓	<ul style="list-style-type: none"> Trade volumes – see section 6 of PoM’s 2018-19 TCS General Statement and Appendix H, BIS Oxford Economics 2018-19 Trade Volume Forecasts.
	<ul style="list-style-type: none"> Provide the data underlying the forecasts 	✓	

No.	Issue and requirements	Addressed	TCS cross-reference
	<ul style="list-style-type: none"> Provide attestations verifying that the forecasts and estimates are fit-for-purpose²¹ 	✘	Not directly addressed. However, the 2018-19 capex and opex forecasts are based on PoM’s internal budget, which is approved by PoM’s Board of Directors. Attestations are not required under the Pricing Order.
	<ul style="list-style-type: none"> Provide any consultants’ reports including models and data underpinning the consultants’ forecasts, where PoM’s forecasts are based on consultants’ reports. 	✔	Actioned. <ul style="list-style-type: none"> Capex and opex – prepared internally by PoM Trade volumes – prepared by BIS Oxford Economics. See Appendix H, <i>BIS Oxford Economics 2018-19 Trade Volume Forecasts</i>
(vi) Capital base roll forward			
	<ul style="list-style-type: none"> Submit the capital base roll-forward model as part of the TCS 	✔	Actioned. See Appendix B
	<ul style="list-style-type: none"> The capital base roll-forward model must: <ul style="list-style-type: none"> be unlocked and include all formulae underlying the calculations (these should be visible). account for asset disposals and capital contributions by deducting these from the capital base (or confirm zero value where no disposals or contributions have occurred). deduct either actual or forecast depreciation – the ESC expects PoM to nominate whether it has used forecast or actual depreciation to roll forward the capital base at the beginning of each regulatory period and consistently apply this approach throughout the regulatory period. treat capex as “mid-year”²² and net of capital contributions. 	✔	Actioned. See Appendix B
		✔	Actioned. See Appendix B
		✔	Actioned. See Appendix B. PoM has deducted actual depreciation for 2017-18 to roll forward the capital base
		✔	Actioned. See Appendix B
(vii) Capex			
	<ul style="list-style-type: none"> Capex forecast must be based on: <ul style="list-style-type: none"> robust asset planning, management and governance sound forecasting methodologies including: <ul style="list-style-type: none"> market tested costs and transparent cost escalators where relevant robust asset planning, management and governance transparent contingency allowances efficient contractual agreements which manage delivery risk. Provide the following (proportionate to the materiality and lumpiness): 	✔	Actioned. See section 3 of Appendix F
		✔	
		✔	
		✔	
		✔	

²¹ See pp. 22-23 of the ESC’s Feedback Paper, which states that the information supported by attestation can improve compliance monitoring by (i) ensuring key decision makers are aware of the data underpinning the tariff compliance statement and have approved the information for submission and (ii) providing confidence to the ESC and other stakeholders that they can immediately rely on the information (i.e. it reduces the need for the ESC to test and verify the accuracy of the underlying data)

²² Capex is assumed to occur halfway through the financial year. This means PoM earns a half year WACC allowance in the first year of the regulatory period.

No.	Issue and requirements	Addressed	TCS cross-reference
	<ul style="list-style-type: none"> ○ An overview of investment governance and asset management processes, frameworks and systems 	✓	Actioned. See section 3.2 of Appendix F
	<ul style="list-style-type: none"> ○ PoM’s capitalisation policy 	✓	PoM’s Capitalisation Guideline can be provided on request to the ESC on a confidential basis. See section 3.5 of Appendix F
	<ul style="list-style-type: none"> ○ an explanation of the variance between actual and forecast capex 	✓	Actioned. See section 3.1 of PoM’s 2018-19 TCS General Statement
	<ul style="list-style-type: none"> ○ benchmarking analysis including: trend analysis; productivity assessments; unit rate analysis or activity based costing 	N/A	Not provided because not necessary to support the prudence and efficiency of PoM’s capex.
	<ul style="list-style-type: none"> ○ independent demand and cost escalation forecasts. 	✓	Actioned. Trade volumes – see section 6 of PoM’s 2018-19 TCS General Statement and Appendix H, BIS Oxford Economics 2018-19 Trade Volume Forecasts.
(viii) Performance Standards			
	<ul style="list-style-type: none"> • Provide the service performance outcomes (measures) that forecast / actual capex is intended to deliver. These should be developed in conjunction with port users. 	✓	In progress. See section 4 of Appendix F. PoM is currently consulting Port Users on draft performance standards which are consistent with tariffs subject to the TAL.
(ix) Opex			
	<ul style="list-style-type: none"> • Provide evidence that opex is prudent and efficient - the lowest cost of delivering service outcomes over the regulatory period. 	✓	Actioned. See section 2 of Appendix F.
	<ul style="list-style-type: none"> • Opex must be based on a sound forecasting methodology 	✓	
	<ul style="list-style-type: none"> • Where opex is relatively stable, prudence and efficiency explained by: 	✓	
	<ul style="list-style-type: none"> ○ historical trends - the variance between actual and forecast opex and any step changes in expenditure 	✓	
	<ul style="list-style-type: none"> • Where opex is lumpy, prudence and efficiency explained based on the following (proportionate to the materiality and lumpiness): 	N/A	PoM’s opex is relatively stable – there are no material cost increases. PoM has based its opex forecast on a bottom up build.
	<ul style="list-style-type: none"> ○ any productivity / efficiency improvements 		
	<ul style="list-style-type: none"> ○ market tested costs and transparent cost escalators (labour and materials) where relevant 		
	<ul style="list-style-type: none"> ○ historical trends - the variance between actual and forecast opex and any step changes in expenditure 		
(x) Depreciation			
	<ul style="list-style-type: none"> • For straight-line depreciation, provide: <ul style="list-style-type: none"> ○ the remaining economic asset lives of existing assets ○ the economic lives of new assets ○ a comparison of economic lives with accounting lives and an explanation of any variances ○ the depreciation by asset type (i.e. value attributable to each asset) 	N/A	PoM has applied the alternative depreciation methodology.

No.	Issue and requirements	Addressed	TCS cross-reference
	<ul style="list-style-type: none"> ○ forecast depreciation schedules for the entire (remaining) life of the asset (i.e. remaining asset lives) in the opening capital base. 		
	<ul style="list-style-type: none"> • For the alternative methodology: <ul style="list-style-type: none"> ○ provide depreciation calculations 	✓	Actioned. See Appendix B, regulatory model.
	<ul style="list-style-type: none"> ○ explain how the method is consistent with the Pricing Order and the objectives of the PMA 	✓	Actioned. See section 7.1.4 of PoM's 2018-19 TCS General Statement and section 7 of Appendix F.
	<ul style="list-style-type: none"> ○ evidence / demonstrate that depreciation would not be recovered more than once²³ 	✓	Actioned. Assets are depreciated only once. PoM's full depreciation schedules for its initial capital asset base demonstrate this. See also section 7 of Appendix F and Appendix B, the regulatory model.
	<ul style="list-style-type: none"> ○ explain when PoM intends to recover deferred depreciation (i.e. what are the trigger events) 	✓	Under consideration. Given this is only the second year of the regulatory regime (and the TAL period), PoM cannot at this stage provide a precise indication as to the timing and approach to recovering its deferred depreciation. PoM will consult Port Users on options for recovering any deferred depreciation to minimise volatility in tariff levels through price smoothing closer to the end of the TAL period if deferred depreciation is yet to be recovered at such time. See section 7.1.4 of PoM's 2018-19 TCS General Statement and section 7 of Appendix F.
	<ul style="list-style-type: none"> ○ explain how PoM intends to recover deferred depreciation so as to manage any tariff volatility (i.e. how it will smooth tariffs)²⁴ 	✓	
	<ul style="list-style-type: none"> ○ provide forecast depreciation schedules for the entire (remaining) life of the asset (i.e. remaining asset lives) in the opening capital base 	✓	Actioned. PoM has provided the ESC with depreciation schedules for its initial capital asset base which demonstrate that its methods for calculating deferred and straight-line depreciation only recover depreciation once. See section 7 of Appendix F and Appendix B, the regulatory model.
	<ul style="list-style-type: none"> ○ explain how port users have been consulted on this matter. 	✓	Actioned. See section 8 of PoM's 2018-19 TCS General Statement and Appendix E, Port User and other stakeholder Consultation. Also see Appendix J, PoM's Regulatory Brochure, Appendix K, PoM's regulatory deep-dive workshop presentation.

²³ The ESC expressed concern in its Feedback Paper that PoM's 2017-18 TCS was not clear that depreciation method would only recover costs once as required by clause 4.4.1(c) of the Pricing Order

²⁴ The ESC is concerned that deferring depreciation has the potential to lead to tariff volatility in later regulatory period.

No.	Issue and requirements	Addressed	TCS cross-reference
(xi) Cost Allocation			
	<ul style="list-style-type: none"> Explain how the cost allocation principles have been implemented, including the process for defining, capturing and attributing direct and indirect costs across the different prescribed and non-prescribed services and to each individual prescribed service 	✓	Actioned. See section 5 of Appendix F.
	<ul style="list-style-type: none"> Explain any changes in PoM's cost allocation approach (between regulatory periods) 	✓	Actioned. See section 5 of Appendix F.
	<ul style="list-style-type: none"> Provide the cost allocation calculations (i.e. its models) 	✓	Actioned. See Appendix M.
	<ul style="list-style-type: none"> Provide supporting information / underlying inputs such as costs and revenue data supporting its calculations. 	✓	
(xii) Regulatory Period			
	Explain the following in relation to the choice of the length of the regulatory period:		Actioned. PoM is proposing a one year regulatory period consistent with its 2017-18 TCS. See section: <ul style="list-style-type: none"> 5 of PoM's 2018-19 TCS General Statement, 2.3 of Appendix K, PoM's regulatory deep-dive workshop presentation
	<ul style="list-style-type: none"> the reasons for the length of period chosen and the factors influencing its decision 	✓	
	<ul style="list-style-type: none"> consistency with the objectives of the regime 	✓	
	<ul style="list-style-type: none"> consistency with PoM's previous approach on this matter 	✓	
	<ul style="list-style-type: none"> the benefits for port users (of shorter versus longer periods) 	✓	
	<ul style="list-style-type: none"> the impact on risk and uncertainty and how this is managed 	✓	
	<ul style="list-style-type: none"> the impact on the robustness and accuracy of forecasts and how port users can be confident that the forecasts are robust and accurate 	✓	
	<ul style="list-style-type: none"> port users' views on the length of the regulatory period (and the nature of consultation undertaken) 	✓	
	<ul style="list-style-type: none"> the impact on tariffs – i.e. stability and predictability. 	✓	
(xiii) Return on capital			
	<ul style="list-style-type: none"> Demonstrate compliance with the Pricing Order and the objectives of the regulatory regime 	✓	Actioned. PoM has estimated its 2018-19 WACC using the same approach used to estimate its 2017-18 WACC. See: <ul style="list-style-type: none"> section 7.1.3 of PoM's 2018-19 TCS General Statement Appendix C, Synergies, Determining a WACC estimate for the Port of Melbourne Appendix I, PoM, WACC: Submission on well accepted approaches.
	<ul style="list-style-type: none"> Apply the following three-step WACC compliance test. 	✓	



Determining a WACC estimate for Port of Melbourne

A report prepared in context of the Pricing Order for the 2018-19 Tariff Compliance Statement

May 2018

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Snapshot

The table below provides a short summary of the reasons for the difference between the weighted average cost of capital estimate Synergies has calculated for the 2018-19 Tariff Compliance Statement (TCS) compared to the estimate calculated for the 2017-18 TCS.

Chapter	Element	2017-18 TCS	2018-19 TCS
	WACC estimate	11.54%	11.52%
2	WACC formulation	Pre-tax nominal as required by the Pricing Order	No change
3	One or a combination of well-accepted approaches	PoM presented its views on the meaning of well-accepted in the context of the Pricing Order	Based on engagement with the ESC and the ESC's published SoRA, PoM believes the majority of the 2017-18 TCS is aligned with the view of the ESC. However, this section considers and responds to the guidance provided by the ESC in the SoRA regarding the requirements of the Pricing Order on well-accepted.
4	Benchmark efficient entity (BEE)	45 entities across (i) Marine and Ports Services (22), (ii) Railroads (10) and (iii) Airports (13) GICS classifications	6 additional entities as a result of removing the US\$100m market capitalisation threshold in response to the ESC's commentary (new total comparison set of 51 entities)
5	Capital Structure	30% Represented the mid-point (rounded to the nearest 5%) of the gearing ratios for the 17 investment-grade listed benchmark efficient entities of 22% and the gearing ratios for the 3 privatised Australian ports of 42%	30% No change to approach. Updated median gearing ratio for the 17 investment-grade listed benchmark efficient entities is unchanged at 22% and there have been no new Australian port privatisations
6	Cost of equity approaches	In the absence of any substantive grounds to favour one over the other, an equal weighting of the SL CAPM, Black CAPM and FFM estimation methods	No change to approach
7	SL CAPM	13.66%	13.48% No change to approach, but there has been a slight decrease in the risk-free rate and market risk premium
7.1	Risk-free rate	2.81% 20-day average of the 10-year Australian Government bond yield to 31 March 2017	2.74% No change to approach. Updated to reflect the 20-day period to 31 March 2018
7.2	Beta	0.70 Based on the median (0.68) and average (0.69) 5-year asset betas (rounded to the nearest 0.05) for the 45 comparators, corresponding to an equity beta of 1.00 with 30% gearing. Supported by the 10-year asset beta median (0.75) and average (0.74).	0.70 No change to approach. Median (0.69) and average (0.72) 5-year asset betas for the 51 comparators benchmark efficient entities are largely unchanged as a result of the 6 additional entities and updated data, supporting the same asset beta (rounded to the nearest 0.05). Also supported by the 10-year asset beta median and average of 0.75.
7.3	Market risk premium	7.77% In the absence of any substantive grounds to favour one over the other, a 50:50 weighting of the Ibbotson and Wright MRP methodologies	7.71% No change to methodology, estimates updated for additional year of data. Wright MRP adjusts in line with changes in risk-free rate.

Chapter	Element	2017-18 TCS	2018-19 TCS
8	Black CAPM	13.66%	13.48% No change to approach. Estimate is identical to SL CAPM estimate due to equity beta of 1.00.
	Zero beta premium	3.34% SFG Consulting (2014). Cost of equity in the Black Capital Asset Pricing Model, 22 May	3.34% No change
9	Fama-French Model	15.12%	15.51% Marginally higher than the 2017-18 estimate. A decrease in the HML beta has been offset by increases in the MRP and SMB betas. We have made a slight adjustment to our methodology to improve the robustness of the estimates for companies from countries without country-specific factors. Further details are provided in Chapter 9.
	Market excess returns	0.89 equity beta and 7.77% risk factor premium	1.06 equity beta and 7.71% risk factor premium Calculation of risk factor premium is unchanged. Updated data
	High-minus-low factor	0.29 equity beta and 6.05% risk factor premium	0.11 equity beta and 6.10% risk factor premium Calculation of risk factor premium is unchanged. Updated data
	Small-minus-big factor	0.16 equity beta and 1.77% risk factor premium	0.23 equity beta and 1.93% risk factor premium Calculation of risk factor premium is unchanged. Updated data
10	Return on debt	5.45% 100% weighting to the 'on-the-day' cost of 5.45%	5.37% 90% weighting to the 2017-18 'on-the-day' cost of 5.45% and 10% weighting to the 2018-19 'on-the-day' cost of 4.58%, as weightings are adjusted 10% each year towards a 10-year trailing average approach
10.4	Notional credit rating	BBB	No change
10.7	Debt risk premium	2.54% In the absence of any substantive grounds to favour one source over the other, a 50:50 weighting of the 20-day average on the 10-year RBA and Bloomberg BVAL data series to 31 March 2017	2.53% Based on the trailing average return on debt of 5.37%, a risk-free rate of 2.74%, and debt raising costs of 0.10%
10.8	Debt raising costs	0.10% PwC (2013), p.6	0.10% No change
11	Gamma	0.25 In the absence of any substantive grounds to favour one approach over another, an equal weighting (rounded to the nearest 0.05) of the gamma value implied by finance theory (zero), the equity ownership approach (0.45) and market valuation studies (0.25)	0.25 No change

Executive Summary

The purpose of this report is to provide an estimate of the return on capital for the Port of Melbourne (PoM) for its second regulatory year under the regulatory framework established by the *Port Management Act (Vic) 1995* and Pricing Order.

To determine an estimate of the return on capital that is consistent with the Pricing Order, the key requirement is that the Port Licence Holder (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 (WACC).

This requirement reflects the unique nature of the Pricing Order, which establishes a set of processes for PoM to follow in setting prices for its Prescribed Services that must provide it with a reasonable opportunity to recover revenue in the range of efficient costs. The Pricing Order therefore places the initial onus on PoM to interpret the meaning of the Pricing Order, including the meaning of the phrase “well-accepted” in the context of deriving a WACC estimate. Since the 2017-18 TCS submission, the ESC has provided guidance on its interpretation through its Interim Commentary and Statement of Regulatory Approach (SoRA), which we respond to throughout the report.

WACC formulation

The Pricing Order requires that the WACC must be calculated on a pre-tax nominal basis. The pre-tax nominal formulation adjusts for taxation and dividend imputation in the WACC formula rather than the cash flows of the business and is expressed as follows:

$$\frac{R_e}{(1-t_c[1-\gamma])} * \frac{E}{E+D} + R_d \frac{D}{E+D}$$

Where:

Re = post-tax return on equity

Rd = pre-tax return on debt

D = proportion of debt within the assumed capital structure

E = proportion of equity within the assumed capital structure

t = corporate tax rate

γ = gamma (value of imputation credits)

Benchmark Efficient Entity

In compliance with the Pricing Order, we have identified a benchmark efficient entity (BEE) for POM that is assumed to be in the same industry with the same risk profile as PoM in its provision of Prescribed Services.

The ESC has maintained its view that, for the purposes of defining the BEE, the Prescribed Services are provided by a port in Australia. However, we have found there are insufficient comparable businesses listed in Australia that have similar risks to this assumed BEE. Consequently, it has been necessary for us to follow a well-accepted alternative for such situations that is used by Australian economic regulators and supplement our sample of comparable Australian listed entities with international listed entities with comparable risks. An element of judgement is required in this task.

To this end, we expanded the port and marine services comparator sample to include listed railroads and airports based on a first principles analysis of the typical systematic risks of these businesses and their similarities (in aggregate) to the BEE. We then reviewed the business description for each listed company in our international sample and eliminated companies whose systematic risks did not appear comparable to the BEE.

In the SoRA, the ESC identified differences between the BEE definitions put forward by the ESC and PoM, respectively, which we address in Chapter 4. These positions differ mainly on whether the availability of listed comparators should be reflected in the BEE definition, or whether this should be addressed later in the comparator entity filtering process. The resulting comparator set is likely to be similar under both definitions. In response to commentary from the ESC, we have removed the requirement that the BEE has a market capitalisation of at least \$US100 million. As a result, we have included six additional firms in our comparator set, with no material change in the gearing and beta estimates.

Capital Structure

To inform PoM's benchmark capital structure, we have had regard to the listed comparator set from a first principles analysis perspective, as well as recent Australian port acquisition comparators, including major landlord ports in Australia comparable to PoM.

Our benchmark capital structure range extends from 22% (based on the average and median of investment-grade listed comparators) to 42% (average and median of the acquisition comparators). We have chosen the mid-point of this range which is 30% (rounded down from 32%) consistent with our approach to deriving a point estimate from other estimated ranges.

Combination of well-accepted cost of equity approaches

The ESC has proposed that for an approach to be considered well-accepted, it must be used by at least one economic regulator (or a review body overseeing decisions by economic regulators) to determine the rate of return for the purpose of calculating the ARR using a building block methodology. However, it is not evident that the Pricing Order restricts the definition of well-accepted in this manner. Moreover, this definition precludes the consideration of important evidence from financial practice and academia.

Based on academic recognition and empirical fit analysis, well-established market practice in the finance industry as well as by Australian and international regulators, we consider there are a range of cost of equity models that are well-accepted within the meaning of the Pricing Order for estimating the cost of equity.

We have determined the cost of equity estimate for the BEE for PoM using a combination of the following models:

- Sharpe-Lintner Capital Asset Pricing Model (SL CAPM)
- Black CAPM
- Fama-French Model (FFM)

As each model has its own strengths and weaknesses, and in the absence of any substantive grounds to favour one model over the other, we have adopted an average of the estimates derived from the application of these approaches to produce a cost of equity estimate.

Estimation of cost of equity

SL CAPM

The SL CAPM is expressed as follows:

$$R_e = R_f + \beta_e * [E(R_m) - R_f]$$

Where:

R_f = the risk-free rate of return

$E(R_m)$ = the expected return on the market

$[E(R_m) - R_f]$ = the market risk premium

β_e = equity beta (measures systematic risk)

Our approach to estimating the above parameters is summarised below.

Risk-free rate

The Commonwealth Government bond yield is most commonly used as a proxy for the risk-free rate in Australia by academics, regulators (including by the ESC) and finance practitioners. We have assumed a ten-year term to maturity, balancing the liquidity of available long-term bond instruments in the Australian market, and the long-term nature of the PoM investment.

In general, a commonly used approach to estimate the risk-free rate is to use short averaging periods close to the commencement of each regulatory period. Consistent with this well-accepted approach, our estimates are produced over a twenty-day period to 31 March 2018. As the quoted rates are semi-annual, we have converted them to annual effective rates.¹ The resulting estimate is 2.74%.

Beta

An asset beta of 0.70 has been estimated based on:

- the same set of comparable listed companies that underpinned our gearing assessment (noting that a higher asset beta of 0.75 could be justified on the basis of the 10 year estimates)
- rounding the median asset beta of this set of comparable companies.

Given the gearing estimate of 30%, this asset beta translates into an estimated equity beta of 1.0.

Market risk premium

The market risk premium (MRP) is a function of the difference between the expected equity market return and the risk-free rate of return. It is an inherently forward-looking parameter, which is therefore not directly observable and is difficult to estimate.

Dividend Discount Models (DDM) attempt to address this challenge by estimating the market risk premium by reference to dividend yields, long-term expected dividend growth and a transitional path between these values. However, there is a lack of agreement around the appropriate value for the long-run growth rate in DDMs. As this is a key input in DDM calculations, different estimates can lead to substantial differences in final estimates of the MRP. Any instability generated by fluctuating dividend forecasts, as well as disagreement about the assumed speed at which dividend growth converges to the long-run rate, further compounds the instability of this value.

¹ Annual effective rate = $(1 + \text{semi-annual rate}/2)^2 - 1$

Accordingly, these difficulties with DDMs led us to rely upon historical data using:

- the Ibbotson approach, which calculates the MRP by taking the difference between the long-term observed average return on market and the risk-free rate. This method assumes that the market risk premium remains stable over time, and the overall return on market will fluctuate largely in-step with the risk-free rate of return; and
- the Wright approach, which calculates the MRP by taking the difference between the long term observed average return on market and the current risk-free rate of return. This method assumes that the overall return on equity remains stable over time, and does not fluctuate in-step with the risk-free rate of return.

We provide evidence that both approaches are used by economic regulators in Australia. As each approach has its own strengths and weaknesses, and in the absence of any substantive grounds to favour one over the other, our estimate of the MRP is 7.71% based on simple averaging of both approaches (allowing for the impact of imputation credits, addressed below).

SL CAPM cost of equity

Our estimate of the pre-tax cost of equity for the BEE based on the SL CAPM is 13.48%.

Black CAPM

The Black CAPM augments the SL CAPM by adding what is known as a zero-beta portfolio to the risk-free rate to address the observed tendency of the SL CAPM to understate asset returns for companies with betas less than one.

SFG Consulting has estimated the zero-beta premium to be 3.34%.² The zero-beta return is the sum of risk-free rate and the zero-beta premium. Hence, our SL CAPM estimate can be combined with this zero-beta premium to estimate the Black CAPM return on equity.

Our estimate of the pre-tax return on equity for the BEE based on the Black CAPM is also 13.48%, given our estimated equity beta of 1 (the respective slopes of the SL CAPM and Black CAPM cross at this point estimate).

² SFG Consulting (2014a). Cost of equity in the Black Capital Asset Pricing Model, 22 May.

FFM

The FFM is based on the principle that the empirically observed excess returns to the market can be assessed having regard to the following three explanatory factors:

- the returns on the market as a whole;
- HML (High Minus Low) is the average return on two 'value' portfolios minus the average return on two 'growth' portfolios; and
- SMB (Small Minus Big) is the average return on three small listed entity portfolios minus the average return on three big listed entity portfolios.

The risk-free rate and MRP under the FFM match the values used in the SL CAPM. As for the SL CAPM, the FFM restricts the zero-beta rate to be the risk-free rate.

Table 1 presents our equity betas and associated risk premiums.

Table 1 FFM equity betas and risk factor premiums

Risk factors	Estimated equity betas	Risk factor premiums
Market risk premium	1.06	7.71%
High minus low cap premium	0.11	6.10%
Small minus big premium	0.23	1.93%

Source: Synergies

Our estimate of the pre-tax return on equity for the BEE based on the FFM is 15.51%.

Cost of equity estimates

Table 2 presents the cost of equity estimates from the three approaches.

Table 2 Cost of equity (pre-tax nominal) estimates by approach

SL CAPM	Black CAPM	FFM
13.48%	13.48%	15.51%

Source: Synergies

As each approach has its own strengths and weaknesses, and in the absence of any substantive grounds to favour one over the other, using simple averaging of the three estimates in Table 2 results in an estimated nominal pre-tax cost of equity for the BEE of 14.16%.

Cost of debt

The cost of debt calculation is the sum of the risk-free rate and an estimate of the debt risk premium consistent with the risk profile of the BEE.

This approach is well-accepted in financial markets and by economic regulators in Australia and internationally, underpinned by the concept of credit spreads reflecting different credit and liquidity risks associated with government and corporate bonds respectively.

The return on debt calculation can be expressed as follows:

$$R_d = R_f + \text{DRP} + \text{DRC}$$

Where:

R_f = risk-free rate

DRP = debt risk premium

DRC = debt raising costs

We have used the same risk-free rate estimate as derived in our cost of equity calculation.

For the debt risk premium, we consider that both the Reserve Bank of Australia (RBA) and Bloomberg data series represent an independent, credible and reliable data source for return on debt estimation purposes. Consistent with our approach to estimating cost of equity parameters, in the absence of any substantive grounds to favour one over the other we have calculated a simple average of these comparable series.

An assumption of ten basis points has been used for debt raising costs based on authoritative evidence gathered by PwC of debt raising costs for Australian corporates, based on surveys and interviews with legal firms, banks and credit rating agencies that are involved in the corporate bond raising process.³

Consistent with the approach applied under the Australian national energy framework, we consider that the choice between the on-the-day and trailing average approach to estimating the cost of debt is appropriately made by the regulated entity provided the calculation reflects an efficient benchmark. Both the on-the-day and trailing average approaches are in use by Australian regulators.

In the 2017-18 WACC submission, we applied an on-the-day approach, which was appropriate in the context of the PoM Long Term Lease transaction and the first TCS. This year we have commenced a trailing average approach, which is currently adopted by several Australian regulators. The trailing average calculation places a 90% weighting on the 2017 return on debt estimate, and a 10% weighting on the 2018 return on debt estimate. The present intention is that with each subsequent year, 10% of the 2017 weighting will be refreshed with the prevailing return on debt estimate.

³ PwC (2013). Energy Networks Association: Debt financing costs, June.

This approach is being adopted on the basis of its lower volatility over time, and because it is more consistent with the debt management practices of a benchmark efficient entity. It is also in line with our approach to other WACC parameters, which, where possible, are based on long-term averages. This methodology is also consistent with the approach currently in use by the AER.

Table 3 shows our 2018 on-the-day cost of debt estimate for the BEE of 4.58%, to which a 10% weighting is applied in the trailing average calculation.

Table 3 2018 on-the-day cost of debt estimate for BEE (assuming BBB credit rating)

Averaging period	RBA	Bloomberg	Average
BBB DRP based on 20 days to 31 March 2018	1.77%	1.70%	1.74%
Risk-free rate based on 20 days to 31 March 2018	2.74%	2.74%	2.74%
Debt raising costs	0.10%	0.10%	0.10%
On-the day cost of debt	4.61%	4.54%	4.58%

Source: RBA, Bloomberg, Synergies calculations

This 2018 on-the-day cost of debt estimate is then used as an input in the trailing average calculation, as displayed in Table 4. This results in a cost of debt estimate of 5.37%.

Table 4 Trailing average cost of debt calculation

Time period	Estimate	Weighting
2017 on-the-day cost of debt	5.45%	90%
2018 on-the-day cost of debt	4.58%	10%
Cost of debt	5.37%	

Note: Assuming a risk-free rate of 2.74% and debt raising costs of 0.10%, this implies a DRP of 2.53%

Source: RBA, Bloomberg, Synergies calculations

Gamma

Gamma is a product of the following two inputs that must be estimated:

- the portion of franking credits distributed to investors (the distribution rate); and
- the utilisation value per dollar of franking credits distributed (also referred to as the utilisation rate or 'theta').

In attempting to identify a well-accepted approach to gamma, we have reviewed academic literature, relevant finance industry evidence (particularly from independent expert reports), as well as Australian regulatory practice.

The first well-accepted approach is adopted from the academic literature and indicates that the gamma for a security where the marginal investor is foreign should be zero.

There is also substantial evidence that imputation credits are not considered by independent experts in a valuation context. Australian economic policy makers have also questioned the value of imputation credits in an economy that is small by international standards and characterised by open capital markets.

In contrast to this reasonably consistent view, there are several approaches that have been applied in Australian regulatory practice.

The distribution rate is relatively non-contentious and has settled around 70%. In contrast, the value of theta continues to be highly contentious and in broad terms can be estimated using the following approaches:

- the equity ownership approach, which is the proportion of Australian equity held by Australian residents (given only domestic investors can utilise franking credits), or alternative taxation approach using statistics drawn from the Australian Taxation Office on the utilisation of franking credits – which forms our second well-accepted approach; and
- market value studies, which seek to ascribe the value that investors place on theta using techniques, including dividend ‘drop-off’ studies (i.e. analysing pre and post-dividend share prices) - this forms our third well-accepted approach.

Each of these approaches establishes a broad range of theta values and in turn a gamma value.

The second approach has been applied by some regulators, including the ESC. It provides a theta value of around 0.6 to 0.7 resulting in a gamma value of 0.4 to 0.5 (which we have averaged at 0.45).

In contrast, the third approach relies on a market value estimate of imputation credits and the most authoritative study⁴ supports a theta value of 0.35. In turn, this results in a gamma value of 0.25 (assuming a 70% distribution rate).

Accordingly, we consider these three broad approaches have been well-accepted in the relevant communities of expertise. Consistent with our approach throughout this report, calculating a simple average of the three values (which are zero if based on finance theory, 0.45 if based on a non-market equity ownership approach and 0.25 if based on market valuation studies) results in a gamma estimate of 0.23, which we have rounded to 0.25. This is the same as IPART’s current gamma estimate.

⁴ SFG Consulting (2014b). An appropriate regulatory estimate of gamma, 21 May.

Synergies' WACC estimate

Our pre-tax nominal WACC estimate for the BEE for PoM under the Pricing Order is 11.52%. We consider this value is consistent with the 'well-accepted' guiding principle of the Pricing Order to be applied in determining a WACC estimate and the broader objectives of the Port Management Act. As previously noted, our WACC estimate is based on an average of each of the SL CAPM, Black CAPM and FFM cost of equity estimates in the absence of any substantive grounds to favour one over the other. Table 5 presents all key parameter values for our pre-tax nominal WACC estimate.

Table 5 WACC estimate for PoM

Parameter	2017-18 TCS	2018-19 TCS
Risk-free rate	2.81%	2.74%
Capital structure	30%	30%
Gamma	0.25	0.25
Corporate tax rate	30%	30%
CAPM Parameters		
Market risk premium (MRP)	7.77%	7.71%
Asset beta	0.70	0.70
Equity beta	1.00	1.00
Zero Beta Premium	3.34%	3.34%
Fama-French Model Parameters		
Market risk premium (MRP)	7.77%	7.71%
Value (HML) premium	6.05%	6.10%
Size (SMB) premium	1.77%	1.93%
Asset beta (Market)	0.62	0.74
Asset beta (HML)	0.20	0.08
Asset beta (SMB)	0.11	0.16
Equity beta (Market)	0.89	1.06
Equity beta (HML)	0.29	0.11
Equity beta (SMB)	0.16	0.23
Return on equity (pre-tax)		
SL CAPM	13.66%	13.48%
Black CAPM	13.66%	13.48%
FFM	15.12%	15.51%
Weighted return on equity (pre-tax)	14.14%	14.16%
Debt beta	0.00	0.00
Debt risk premium	2.54%	2.53%

Parameter	2017-18 TCS	2018-19 TCS
Debt raising costs	0.10%	0.10%
Return on debt (pre-tax)	5.45%	5.37%
Pre-tax nominal WACC	11.54%	11.52%

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1 Introduction

Synergies has been engaged by Port of Melbourne (PoM) to provide an opinion on PoM's appropriate weighted average cost of capital (WACC) in accordance with the requirements of the Pricing Order.

The WACC has been estimated in the context of PoM submitting its 2018-19 Tariff Compliance Statement (TCS) to the Essential Services Commission (ESC) under the Pricing Order. For ease of reference, each chapter of this report begins with a very brief description of the relevant parameter values and identifies any changes to the 2017-18 TCS.

The Prescribed Services under the Pricing Order are the relevant services for the assessment of the WACC.

This report is structured as follows:

- Chapter 2 - WACC formulation
- Chapter 3 - discusses the requirements of the Pricing Order and the use of well-accepted approaches
- Chapter 4 - defines the benchmark efficient entity (BEE)
- Chapter 5 - assumed capital structure
- Chapter 6 - analyses alternative well-accepted return on equity models
- Chapter 7 - estimates the return on equity using the SL CAPM
- Chapter 8 - estimates the return on equity using the Black CAPM
- Chapter 9 - estimates the return on equity using the Fama-French Model
- Chapter 10 - estimates the return on debt
- Chapter 11 - estimates the value of gamma
- Chapter 12 - proposes a WACC estimate for the BEE
- Attachment A - presents gearing ratios for our comparable companies set
- Attachment B - presents our full list of asset beta estimates and beta diagnostics
- Attachment C - presents supplementary evidence on our well-accepted return on equity approaches

- Attachment D – presents a detailed first principles analysis used to inform our beta assessment
- Attachment E – summarises Australian regulatory precedent on beta determination
- Attachment F – presents supplementary information on market risk premium estimates
- Attachment G – provides additional detail on the methodology for the listed comparator WACC estimates calculated in Section 12.6.

2 WACC formulation

Chapter overview

This section sets out the pre-tax nominal WACC formulation that we have used as required by the Pricing Order. This formulation is unchanged from the 2017-18 submission.

2.1 Introduction

An infrastructure service provider, such as PoM, requires significant funding to invest in and operate its capital-intensive business. These funds must be raised either from PoM's shareholders or lenders. The sum of the returns required by equity and debt holders – weighted by the proportions of equity and debt used in the capital structure – is often referred to as the weighted average cost of capital (WACC).

Regulatory processes can ascribe an unrealistic degree of precision to the calculation of the rate of return, which has a high degree of subjectivity. This is particularly the case in estimating the return on equity, which is unobservable in the market. The Productivity Commission has previously cautioned the asymmetric consequences of regulatory error as follows:⁵

... the Commission does not subscribe to the view that, in a regulated environment, the community faces a choice between incurring the allocative efficiency costs of over-compensation and (more serious) dynamic costs of under-compensation. Both types of error are likely to influence investment outcomes and therefore have dynamic efficiency implications.

Nonetheless, the Commission accepts that there is a potential asymmetry in effects:

Over-compensation may sometimes result in inefficiencies in the timing of new investment in essential infrastructure (with flow-ons to investment in related markets), and occasionally lead to inefficient investment to by-pass parts of a network. However, it will never preclude socially worthwhile investments from proceeding.

On the other hand, if the truncation of balancing upside profits is expected to be substantial, major investments of considerable benefit to the community could be forgone, again with flow-on effects for investment in related markets.

In the Commission's view, the latter is likely to be a worse outcome. Accordingly, it concurs with the argument that access regulators should be circumspect in their

⁵ Productivity Commission (2001). Review of the National Access Regime, Report No. 17, AusInfo, Canberra, p.83.

attempts to remove monopoly rents perceived to attach to successful infrastructure projects.

Accordingly, the choice of WACC formula has important implications for the cash flows of the investors in PoM as well as to provide PoM the appropriate incentives to continue making efficient investments which are central to achieving the objectives of the *Port Management Act (Vic) 1995* (the Port Management Act).⁶

2.2 Chosen WACC formulation

2.2.1 Post tax nominal WACC

The approach most commonly applied to estimate WACC in Australian regulatory regimes is the post-tax nominal ‘vanilla’ WACC. In other words, the rate of return estimate is expressed as a weighted sum of the returns on equity and debt in inflation-adjusted and after-tax terms. Under the post-tax nominal ‘vanilla’ WACC formula, tax is modelled as a cost in the cash flows rather than forming part of the WACC calculation. It is expressed as follows:

$$\text{Nominal post-tax WACC} = R_e \frac{E}{E + D} + R_d \frac{D}{E + D}$$

Where:

Re = post-tax return on equity

Rd = pre-tax return on debt

D = proportion of debt (gearing) within the assumed capital structure

E = proportion of equity within the assumed capital structure

2.2.2 Pre-tax nominal WACC

In contrast, the Pricing Order requires the WACC formula to be expressed in pre-tax nominal terms. The pre-tax nominal formulation adjusts for taxation and dividend imputation in the WACC formula rather than the cash flows of the business. It is expressed as follows:

$$\text{Nominal pre-tax WACC} = \frac{R_e}{(1 - t_c [1 - \gamma])} * \frac{E}{E + D} + R_d \frac{D}{E + D}$$

⁶ *Port Management Act 1995* (Vic), Section 48.

Where:

R_e = post-tax return on equity

R_d = pre-tax return on debt

D = level of debt within the capital structure

E = level of equity within the capital structure

t = corporate tax rate

γ = gamma (value of imputation credits)

An underlying assumption of the pre-tax nominal WACC formulation is that the BEE will pay the Australian statutory corporate income tax rate of 30%. This is a standard approach across the broader finance community, whether it be in academic literature, the corporate finance industry or incentive-based regulatory frameworks, whereby the cost of capital is established having regard to benchmark efficient costs rather than the actual costs of the regulated entity.

The Federal Government proposes to reduce the corporate tax rate to 25% for all corporate entities by 2026-27.⁷ However, we note that these changes have not yet been legislated. We will continue to monitor developments with the corporate tax rate in future submissions.

In effect, the return required by equity investors is multiplied by this tax wedge, which converts the post-tax return on equity to a pre-tax cost of equity. This value is assumed to provide sufficient revenues to meet the BEE's tax liabilities.

⁷ ATO. (2018). Reducing the corporate tax rate. Available from: <https://www.ato.gov.au/General/New-legislation/In-detail/Direct-taxes/Income-tax-for-businesses/Reducing-the-corporate-tax-rate/> [Accessed 16 May 2018].

3 Use of one or a combination of well-accepted approaches

Chapter overview

This section considers and responds to the guidance provided by the ESC in the SoRA regarding the requirements of the Pricing Order on well-accepted. We present our views on the relevant tests for well-accepted in the context of the Pricing Order.

3.1 Requirements under the Pricing Order

The key provisions in the Pricing Order in regards to the estimation of a WACC for the port are Clauses 3.1, 4.1 and 4.3.

Clause 3.1

The tariffs adjustment limit (TAL) requires the weighted average tariff increase for Prescribed Services to not exceed the percentage change in the Australian Consumer Price Index (CPI) between the March quarter in the preceding financial year and the March quarter in the financial year two years prior. In short, average prices cannot rise faster than CPI during the period in which the TAL applies.

Clause 4.1

Sub-clause 4.1.1 requires that for determining its Annual Revenue Requirement, the Port Licence Holder must apply an accrual building block methodology that, amongst other things, includes an allowance to recover a return on its capital base that is commensurate with a BEE providing services with a similar degree of risk as the Port Licence Holder in regards to the provision of Prescribed Services.

Clause 4.3

In determining the return on capital allowance in accordance with sub-clause 4.3.1, the Port Licence Holder must use one or a combination of well-accepted approaches that distinguish the cost of equity and debt to determine the WACC.

The WACC is to be calculated on a pre-tax nominal basis.

3.2 Interpretation of Pricing Order provisions

The Pricing Order confers important discretions upon the Port Licence Holder in determining the WACC and return on capital allowance.

The key guidance provided in the Pricing Order relates to:

- the use of a BEE with a similar degree of risk to PoM in providing Prescribed Services under the Pricing Order;
- the use of one or a combination of well-accepted approaches that distinguish the cost of equity and debt to determine the WACC; and
- the WACC is to be calculated on a pre-tax nominal basis.

Under the Pricing Order, it is up to the Port Licence Holder to interpret the requirements of the relevant provision and to demonstrate how it complies with the Pricing Order.

As such, the Pricing Order contrasts with the approach adopted in regulatory determination processes in Australia, whereby the relevant regulator ultimately holds deterministic responsibilities on the interpretation of the relevant requirements of the instrument and the assessment of the appropriate parameter values for that determination.

Considering this guidance and the important discretions given to the Port Licence Holder, PoM, in determining its WACC, this report presents and substantiates the estimation of a WACC having regard to relevant estimation methods, asset pricing models, market data and regulatory precedent in accordance with the Pricing Order.

3.3 Overview of ESC commentary

Since PoM completed its 2017-18 TCS submission, the ESC has published a number of commentary documents in relation to WACC. These are as follows:

- Interim Commentary (November 2017)
- Statement of Regulatory Approach (SoRA) (December 2017).

A key theme emerging from these documents is the definition of ‘well-accepted’ in the context of the Port License Holder using ‘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.’⁸ Based on expert legal and regulatory advice, PoM submitted that ‘well-accepted’ encompasses regulatory precedent, financial practitioner evidence and academic literature. The ESC disagreed with this interpretation, rather focussing narrowly on regulatory precedent.

⁸ *Port Management Act 1995* (Vic) Pricing Order, Clause 4.3.1.

The ESC also queries aspects of PoM's definition of the BEE to be used in the context of the Port License Holder's calculation of an allowance to recover a risk-weighted return on its capital base.⁹

The ESC's commentary on WACC estimation issues will be examined in the remainder of this chapter.

3.4 ESC 3-step process for assessing rate of return clauses

The ESC has indicated that it will adopt a three-step compliance assessment framework to assess whether PoM has complied with the requirements of the Pricing Order and the broader objectives of the Port Management Act. Each step is summarised below.

3.4.1 Step 1: Well-accepted test

The first step, "the well-accepted test," relates to clause 4.3.1 and assesses whether the approach or combination of approaches used by PoM to determine the allowed rate of return are "well-accepted."

Step 1 has a narrow focus on approaches applied by regulators, and the ESC intends for this to be a qualitative assessment only, with quantitative evaluation to occur in later steps of the process.

The ESC's preferred criterion for well-accepted is its use by at least one economic regulator to determine the rate of return in calculating the annual revenue requirement under the building block methodology, or by a review body overseeing decisions by economic regulators.

Synergies understands from PoM that the ESC noted it will consider both Australian and international regulatory precedent.¹⁰ However, as we detail in Section 3.5, our view is that 'well-accepted' encompasses regulatory precedent, evidence from financial practitioners, and academic literature.

3.4.2 Step 2: Benchmark efficient entity test

The second step, "the benchmark efficient entity test", relates to clause 4.1.1 of the Pricing Order. Accordingly, this step aims to verify whether the return on capital outcome determined by the port is commensurate with the required rate of return for the BEE.

⁹ *Port Management Act 1995* (Vic) Pricing Order, Clause 4.1.1.

¹⁰ PoM advice provided to Synergies on 18 January 2018.

The assessment will be quantitative with an emphasis on the quantum of the WACC estimate and its reasonableness. This step entails two components.

First, high level cross-checks will be undertaken by the ESC in order to evaluate the reasonableness of the return on equity. Such cross-checks may involve an appraisal of relevant regulatory decisions, surveys, valuation and broker reports, and other reference points. Comparator entities that are adopted must be “efficient” and unlikely to face significant competition, and can include Australian and international regulated and non-regulated entities. At this stage, PoM would be considered in compliance with the Pricing Order if these cross-checks confirm that the submitted rate of return is consistent with that required by the BEE.

Although this is not a requirement of the Pricing Order, we have performed this analysis and provided the results in Section 12.2.2 pursuant to this request by the ESC, demonstrating compliance with this step.

If the cross-checks suggest the return on capital is not commensurate with that required by the BEE, then the ESC would seek to identify which specific components of the WACC are leading to the unreasonable return. This could involve a closer examination of individual parameter estimates, or the way in which individual estimates have been combined to calculate the overall WACC. This is the focus of Step 3.

3.4.3 Step 3: Further investigation

If reached, Step 3 would necessitate more detailed, focussed analysis on the part of the ESC to assess whether the WACC is compliant with the objective of the Pricing Order. The ESC has indicated in its SoRA that this could involve:

- A review of the assumptions and data underpinning PoM’s chosen estimation models or methodologies.
- Sensitivity testing of empirical analysis relied upon by PoM.
- First principles analysis of PoM’s risk profile, comparing these risks to the listed comparator sample to determine whether such risks are higher or lower.
- Empirical implementation of other well-accepted approaches that may lead to different rate of return outcomes.
- Establishment of confidence bands or plausible ranges for the overall WACC, as well as individual parameters.

The ESC has indicated to PoM that it may proceed to Step 3 regardless of the outcomes from Step 2, but the likelihood of a non-compliant finding on the basis of Step 3 alone is very low.

Synergies' approach to the estimation of each WACC parameter for the 2017-18 TCS was, and for the 2018-19 TCS continues to be, in compliance with the guiding principles of this step, as we consider that these naturally form part of a robust WACC estimation process. As such, our interpretation of the Pricing Order is that while the three issues identified by the ESC are relevant to the assessment of PoM's compliance with the 'well-accepted' principle, they need not be applied as a sequential test. This is because the Pricing Order does not establish any such prescription in the WACC estimation process. To this end, throughout our report, we demonstrate how our proposed WACC estimate satisfies ESC's assessment framework. However, we do not agree that the three-step sequential assessment framework is necessarily binding on PoM in the context of the Pricing Order.

3.5 Interpreting a well-accepted approach

As noted above, the ESC has proposed that for an approach to be well-accepted within the meaning of clause 4.3.1, it must be used by:

- (a) at least one economic regulator to determine the rate of return for the purpose of calculating the ARR using a building block methodology or;
- (b) a review body overseeing decisions by economic regulators.

The ESC has also posited that the application of academic and financial market approaches may disregard the regulatory context in which the allowable rate of return is being set.

In contrast, our interpretation of a well-accepted approach is based on the application of the following key principles:

- Consistency with the Port Management Act 1995 objectives.
- The guiding principles espoused by economic regulators to identify acceptable attributes of an approach to assessing the cost of capital.
- That the Pricing Order confers upon PoM an important discretion to the Port Licence Holder to determine the WACC and return on capital allowance, subject to meeting the broader objectives of the Port Management Act.
- Reflecting the design of the Pricing Order, which is drafted in an open way.

Each of these factors is discussed below.

3.5.1 Port Management Act 1995 objectives

The Pricing Order is a regulatory instrument made under section 49A of the *Port Management Act 1995* (the PMA).

Part 3 of the PMA establishes the framework for the regulation of port services, including the objectives to guide interpretation of the Pricing Order. The objectives of most relevance to the estimation of PoM's cost of capital are the following:

- to promote efficient use of, and investment in, the provision of prescribed services for the long-term interests of users and Victorian consumers (s48(1)(a));
- 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 (s48(1)(b)); and
- 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 (s48(1)(c)).

These objectives reflect the intention of all economic regulatory regimes to ensure that efficient outcomes consistent with those found in a workably competitive market are achieved. That is, the Pricing Order is intended to operate as “a surrogate for the rewards and disciplines normally provided by a competitive market.”¹¹

The concept of a well-accepted approach to determining the cost of capital must have regard to these objectives. In broad terms, this means that the cost of capital must be set to promote efficient use of, and investment in, the provision of Prescribed Services in the long-term interests of port users and Victorian consumers.

In our view, these objectives require a broad meaning of “well-accepted” to be adopted that includes not only the approaches accepted by regulators (both Australian and international), but also those approaches adopted by the financial and academic communities.

All these communities ultimately attempt to value businesses in an efficient manner, consistent with the objectives of the regulatory regime. Furthermore, consideration of approaches used in a workably competitive market are clearly relevant to the consideration of how the BEE should be valued given that the efficiencies referred to in

¹¹ *East Australian Pipeline v Australian Competition and Consumer Commission* (2007) 233 CLR 229, para. 81.

the objectives of the regulatory regime are intended to reflect the out-workings of a workably competitive market. The approaches of regulators remain relevant because they represent the regulator’s views of approaches used to achieve the objectives in the market. However, they only form a subset of possible approaches that may be considered “well-accepted”. It is therefore inappropriate to limit the meaning of “well-accepted” to only those approaches adopted by regulators or the more limited subset of Australian regulators.

This is not to say that our proposed WACC methodology is inconsistent with regulatory precedent. Table 6 outlines the evidence from economic regulators in support of the approaches that we have used. However, the case for these approaches is strengthened by having proper regard to academic and financial practitioner evidence.

Table 6 Regulatory precedent for WACC proposal

WACC component	Proposed approach	Use by economic regulators
Risk-free rate	20-day average on 10-year Commonwealth Government bonds	Used by numerous Australian and international regulators
Capital structure	Gearing based on median and average from sample of comparable listed and unlisted entities.	Gearing based on median or average of relevant comparator sample.
Return on equity	Multi-model approach, consisting of:	
	SL CAPM	SL CAPM is widely used by regulators
	Black CAPM	The AER has endorsed the Black CAPM in its Rate of Return Guideline and uses it indirectly to inform the asset beta component of its cost of equity estimate. Also used in US and Canadian regulatory decisions.
	Fama-French Model (FFM)	IPART has announced that it will monitor the FFM over the next 5 years. Endorsement of FFM by NZ Commerce Commission, as well as regulatory use in the UK and US.
Beta	Asset beta based on median and average from sample of comparable listed domestic and international transport entities from multiple sectors	Regulatory decisions have used companies from other transport sectors to inform beta estimates or ranges (e.g. ERA’s use of port comparators for rail WACC determinations). Regulators also rely on overseas comparators if insufficient domestic comparators are available.
Market risk premium	50:50 weighting of Wright and Ibbotson MRP approaches)	Ibbotson MRP in use by various Australian regulators. Both the ERA and QCA have regard to the Wright MRP.
Return on debt	On-the-day approach based on average of RBA and Bloomberg methodologies. Transition to trailing average possible once return on debt history is established.	On-the-day approach in use by the ACCC and QCA; trailing average now in use by AER, IPART and ERA. Trailing average also adopted by Ofgem and NZ Commerce Commission.
Gamma	Based on average of gamma values derived from finance theory, equity ownership approach and market valuation studies.	Typically based on equity ownership approach and/or market valuation studies.

Source: Synergies analysis, various regulatory decisions

3.5.2 Guiding principles for well-accepted approach

The need for a broader interpretation of the well-accepted provision is reinforced by the adoption of valuation and asset pricing models by each of these communities. Regulators have adopted models developed in academia and have also adopted models used by financial practitioners.

In its WACC methodology review released in February 2018, IPART addressed four principles for the determination of an appropriate rate of return. They are as follows:¹²

- WACC methods should produce estimates of the cost of capital that are as reasonably accurate as possible. This will ensure that customers do not pay more than necessary and that the regulated firms will be financially viable and have the incentive to invest in the efficient level of productive assets.
- WACC methods should be relatively stable over time to give stakeholders certainty.
- WACC methods should be predictable and replicable by stakeholders to provide transparency and reduce resources required in each review.
- Incremental improvements should be made where there is sufficient evidence that they increase the accuracy of the cost of capital faced by a benchmark efficient firm.

Similarly, in its December 2013 *Better Regulation – Rate of Return Guideline*, the AER considered that rate of return decisions should use “estimation methods, financial models, market data and other evidence that are, where applicable, reflective of economic and finance principles and market information.”¹³ Furthermore, such approaches should be “informed by sound empirical analysis and robust data” and should be “sufficiently flexible as to allow changing market conditions and new information to be reflected in regulatory outcomes as appropriate.”

In the context of the Pricing Order, including its lack of prescription and scope for differing interpretations of the well-accepted guiding principle, we consider a relevant WACC assessment approach is that it should adhere closely to the regulatory principles identified above (i.e. accuracy, stability, predictability, replicability, transparency) rather than simply reducing to an assessment of whether an aggregate WACC estimate or component parameter estimate is accepted by one or more regulators.

Table 7 (over page), shows how we have applied these criteria to our proposed WACC submission for PoM.

¹² IPART (2018a). Review of our WACC method. February, p.14.

¹³ AER (2013a). Better regulation – rate of return guideline, December, p.6.

Table 7 Application of IPART and AER criteria to PoM WACC submission

Parameter	Accuracy	Stability and predictability	Transparency and replicability	Reflective of economic/financial principles	Flexibility with changing market conditions	Robust data
Risk-free rate	20-day average avoids one-off anomalies whilst capturing recent market conditions	Risk-free rate will change with market conditions, but 20-day average will be a stable estimator of current underlying conditions	RBA dataset is publicly available	10-year government bond corresponds to PoM's long-term investment horizon	20-day average will incorporate changes in market conditions promptly.	RBA is acknowledged as a reliable data source and is frequently used by regulators
Capital structure	Observed gearing of listed firms best proxy for unobservable BEE, supplemented by privatisation evidence	5 and 10-year comparator averages less susceptible to short-term fluctuations	Gearing data from Bloomberg is publicly available	Firms with similar risk profiles to PoM will maintain similar capital structures	Changes in gearing will be incorporated into averages over time.	Bloomberg is a globally-recognised data source
SL CAPM	Empirical shortcomings in SL CAPM imply that it may underestimate the return on equity, particularly for entities with equity betas less than 1	SL CAPM remains stable provided estimates of risk-free rate and MRP are responsive to changes in market conditions	Formula is easy to apply	SL CAPM empirical performance is poor	Changes in return on equity will be driven by changes in risk-free rate, beta and MRP	SL CAPM is a function of the risk-free rate, beta and MRP, all of which are based on robust data
Black CAPM	Use of zero beta premium corrects for low-beta bias of SL CAPM	Relationship between SL CAPM and Black CAPM is well-defined	We have adopted the SFG (2014) zero-beta premium estimate of 3.34%	Low-beta bias is empirically observed	Changes in return on equity will be driven by changes in risk-free rate, beta and MRP	Zero beta premium can be derived from market data
Fama-French Model	FFM accounts for factors not captured by CAPM. Widely recognised	Averaging across all firms in the comparator set reduces the impact of outliers	We have provided an extensive description of our approach	Listed entity size and value premiums have been consistently observed around the world	FFM results in a more rigorous estimate of the return on equity	Professor French's dataset is globally recognised
Beta	Our use of different sectors establishes a reasonable range for PoM's asset beta	Large number of comparator companies and 5/10-year averages/medians reduces impact of outliers	All beta estimates can be replicated via Bloomberg, and we have detailed our de-levering process	Companies with similar risk profiles will tend to share similar exposure to systematic risk	Long-term averages will gradually incorporate changes in companies' exposure to systematic risk	Data on beta is based on observed security returns from Bloomberg, a globally recognised data source

Parameter	Accuracy	Stability and predictability	Transparency and replicability	Reflective of economic/financial principles	Flexibility with changing market conditions	Robust data
Market risk premium (Ibbotson MRP)	Historical averages based on observed market returns; forward-looking approaches sensitive to assumptions	Historical averages fluctuate less than forward-looking estimates	We have detailed our approach to calculating the Ibbotson MRP	Ibbotson MRP captures the stability of the MRP under conventional market conditions, but may be misrepresentative if the risk-free rate deviates from its long-term average	Ibbotson MRP does not adjust in response to risk-free rate – hence our 50:50 weighting with the Wright MRP	Bloomberg is a globally recognised data source, and NERA MRP data is well recognised in Australia
Market risk premium (Wright MRP)	Historical averages based on observed market returns; forward-looking approaches sensitive to assumptions	Historical averages fluctuate less than forward-looking estimates	We have detailed our approach to calculating the Wright MRP	Wright MRP reflects empirical tendency for return on equity to remain relatively stable over time	Wright MRP adjusts in response to risk-free rate	Bloomberg is a globally recognised data source, and NERA MRP data is well recognised in Australia
Return on debt	Short term averages from RBA and Bloomberg will reliably estimate the current return on debt, although the actual return on debt will vary over time with market conditions	Trailing average may offer more stability over the long run, but this does not invalidate the on-the-day approach	RBA and Bloomberg data is publicly available, and we have detailed the adjustments we have made to the raw estimates	On-the-day approach is more intuitive for PoM given recent privatisation, but trailing average may be more viable once return on debt history is established	Return on debt methodology will reflect changes in the risk premium attributable to a BBB credit rating over time. Trailing average may be more representative of actual debt management practices	Historical evidence suggests that neither RBA nor Bloomberg approach has been systematically higher than the other
Gamma	Combination of well-accepted approaches avoids reliance on a single method that may promote over or underestimation of the parameter	Consecutive dividend drop-off studies indicate gamma value of 0.25. Foreign status of marginal investor unlikely to change over investment horizon, implying zero gamma value	Evidence on gamma is well-documented in financial practice and academic journals	Marginal investor is likely to be foreign in Australia given size of domestic market, meaning that imputation credits are valued well below face value	The estimate of gamma is less likely to vary than other parameters over time assuming investors' required post-tax return on equity is stable	Dividend drop-off studies are based on observed market data

Source: Criteria are derived from IPART WACC Methodology (2018) and AER Better regulation – rate of return guideline (2013)

Approaches that meet such a higher-level threshold may also be found in financial or academic sectors. Like regulators, financial practitioners have adopted and adapted models developed in academia. This suggests that regulators themselves are borrowing knowledge and learnings from these other communities. A failure to consider these broader models may result in a failure to achieve the efficiencies referred to in the objectives of the Port Management Act.

Accordingly, consistent with the objectives of the Port Management Act, we have interpreted a well-accepted approach as being an approach accepted/adopted by one or more regulators (both Australian and international), the financial community or academia.

3.5.3 Inappropriate to unduly limit the discretion of PoM

In the Consultation Paper, the ESC describes the Pricing Order as a price compliance regime, which it distinguishes as being lighter handed than a price determination regime. The ESC describes the Pricing Order as:¹⁴

a unique form of regulation best described as a price compliance regime. It represents a more heavy-handed form of regulation than a typical price monitoring regime, but is lighter handed than a price determination regime.

As a “price compliance regime,” the Pricing Order establishes a set of processes for PoM to follow in setting prices for its Prescribed Services that must provide it with a reasonable opportunity to recover revenue in the range of efficient costs. This includes placing a CPI-based cap on prescribed service tariff increases for the first 20 years of the lease term. The Pricing Order therefore places the initial onus on PoM to interpret the meaning of the Pricing Order, including the meaning of the phrase “well-accepted”, such that it meets the objectives of the PMA. This discretion provided to PoM to interpret the meaning of the Pricing Order is intended and important, recognising that the Port License Holder must also demonstrate compliance with the Pricing Order.

In doing so, the Pricing Order provides that, should PoM’s interpretation of it be determined to be wrong, and PoM is properly found to be in significant and sustained non-compliance, the form of regulation can change with a heavier-handed approach implemented in place of the Pricing Order framework.

In our view, these features of the regulatory regime reflect the fact that the Victorian Parliament intended there to be greater discretion afforded to PoM in interpreting the

¹⁴ ESC (2017a). Regulatory approach to the Pricing Order – a consultation paper, May, p.3.

Pricing Order when compared to the more constrained discretion it would have under a conventional price determination regime.

That is, PoM is conferred an important discretion in the first instance when establishing the parameters of the building block model for the purposes of complying with the Pricing Order. As such, it is inappropriate for the ESC to limit PoM's discretion to determine a well-accepted approach to only those approaches accepted in a regulatory setting, provided that the approach meets the objectives of the PMA and otherwise complies with the Pricing Order. For the reasons outlined above, in our view, whilst an approach needs to be suitable for a regulatory setting, the range of options open to PoM under the Pricing Order is not limited to approaches that have been accepted by regulators.

Allowing PoM to determine what a well-accepted approach is using a wide range of models gives the regulatory regime the flexibility necessary to quickly adjust to developments in knowledge and learning by academia and the financial industry in relation to the weighted average cost of capital.

There is no reason to suggest that a breakthrough model developed and accepted in academia, or by the financial community, should not be considered well-accepted for the purposes of the Pricing Order simply because other regulators (who may operate with very different tests and legislative approaches to those contained in the Pricing Order) are yet to adopt it.

Equally, it is respectfully suggested that the adoption of an approach by a regulator to the cost of equity, such as the increments potentially available under the ESC's PREMO approach applied to Victorian water utilities, which have been adopted for wider purposes than simply remunerating past investment, does not legitimise that approach as a well-accepted approach in regulatory circles to the determination of the cost of equity. As such, the Pricing Order does not qualify the meaning of "well-accepted" in the manner inferred by the Commission.

3.5.4 The Pricing Order is drafted in an open way

The language of the Pricing Order does not limit or provide any guidance on the meaning of the phrase "well-accepted" other than that it should be interpreted in a manner consistent with the objectives of the Port Management Act as discussed above and the concept of "a combination of well-accepted approaches" is expressly permitted by the Pricing Order. Accordingly, the phrase should be given its natural meaning.

In our view, the natural meaning of the phrase "well-accepted" is not "well-accepted by Australian regulators or regulators elsewhere". Had this been the case, it would have

been a simple matter for the Pricing Order to be constrained in this way. Hence, it is not appropriate that the meaning of the phrase is circumscribed in the manner suggested by the ESC. Instead, the phrase permits an approach that is well-accepted by global regulators, by the financial community or by academia to also be well-accepted for the purposes of the Pricing Order. Such approaches clearly fall within the broad natural meaning of the phrase “well-accepted” and are therefore contemplated as being able to be used by PoM when determining the weighted average cost of capital. In our view, if a narrower meaning was intended, then the Pricing Order would have been drafted to specify that narrower meaning.

The broad language chosen by the ESC Minister in the Pricing Order, including the express reference to “a combination of well-accepted approaches,” reflects recognition in other regulatory regimes that a range of approaches can be used to inform an assessment of the parameters for the weighted average cost of capital. For example, the AER and ERA were given greater discretion when determining the return on equity and the return on debt for electricity networks and regulated gas pipelines in 2012 following a rule change made by the AEMC. The Pricing Order has been drafted reflecting this trend. However, the Pricing Order is different from the instruments governing the AER and ERA processes in the sense that it confers the discretion on the Port Licence Holder so long as the Port Licence Holder adopts one or a combination of well-accepted approaches and otherwise demonstrates compliance with the Pricing Order. It is therefore submitted that the ESC’s assessment of the Port Licence Holder’s compliance with the Pricing Order should be applied in this context.

3.6 Determining one or a combination of approaches

In considering the component parts of PoM’s weighted average cost of capital, including its cost of equity, cost of debt and WACC parameters, we have canvassed what we believe to be well-accepted approaches. The Pricing Order is silent in terms of how PoM should apply a combination of well-accepted approaches.

We do not identify strong, compelling arguments to give more weight to one well-accepted approach over another, rather where relevant we have applied an equal weighting to each approach in deriving the relevant WACC input. We have done this to provide a transparent, unbiased weighted average cost of capital which avoids the perception of cherry picking one approach over another. We believe that this is consistent with the characteristics of an approach appropriate for a regulatory process as outlined above (i.e. accuracy, stability, predictability, replicability, transparency). Each subsequent period PoM will need to reassess this averaging approach and the fundamental pros and cons of each to substantiate the weights applied based on the evidence available at the time.

It is also important to highlight that the ‘well-accepted’ stipulation is used in reference to the approaches used by PoM, whether alone or in combination, and not to the chosen combination itself. In other words, PoM is required to adopt a ‘combination of well-accepted approaches’ but not necessarily a ‘well-accepted combination of well-accepted approaches.’ In determining a WACC estimate for PoM, where there is a lack of regulatory or other consensus on the appropriate weighting for combinations, we generally opt for an equal weighting of these approaches.

3.6.1 All approaches have practical difficulties

There is some merit in the ESC’s observation that:¹⁵

Some approaches used in academia or by finance practitioners are not well-accepted in Australian regulatory practice and their application can be difficult in practice due to data quality and availability issues or methodological choices.

However, it does not follow that *only* the approaches used by Australian regulators can be applied by PoM when determining the weighted average cost of capital. It is only the application of *some* approaches used in academia and by financial practitioners that are affected by this criticism. Indeed, data quality and availability presents challenges in the application of all cost of equity models, including those favoured in Australian regulatory practice.

Data quality and availability issues and methodological choices do not therefore provide a justification for limiting the meaning of the phrase “well-accepted” approaches to only those approaches accepted by Australian regulators. It requires a case by case assessment.

Furthermore, the cost of equity approaches commonly used in Australian regulatory practice are not without limitation and have often been contentious in application, particularly following the Global Financial Crisis. This confirms that a well-accepted approach to determining the weighted average cost of capital cannot reasonably be constrained to Australian regulatory practice having regard to the range of approaches that could be adopted by PoM and comply with the Pricing Order.

Finally, we do not consider that the practical difficulties in applying some of the approaches used by the financial community and academia to determine the weighted average cost of capital should result in the exclusion of all the approaches used by the financial community and academia. Some of these approaches can be used by PoM and

¹⁵ ESC (2017a), p.41.

many have the same or similar practical difficulties as those used by Australian regulators.

4 Benchmark efficient entity (BEE)

Chapter overview

In response to the ESC's commentary, we have removed the requirement that the BEE must have a market capitalisation of at least \$US100 million. However, we have retained our classification of the BEE as a private sector entity, because public sector entities typically lack the market data required to facilitate WACC analysis.

4.1 Identifying a BEE

Under incentive-based economic regulation, the WACC is set having regard to a BEE with comparable risks to the regulated entity and that is reflective of prevailing conditions in equity and debt markets.

4.1.1 Pricing Order requirements

The Pricing Order is consistent with this approach by requiring that the rate of return allowance be calculated using a 'benchmark efficient entity' with a similar risk profile to PoM in its provision of Prescribed Services (which excludes property-related services). In other words, the WACC estimate should be based on an efficient external benchmark rather than PoM's actual cost of capital.

There is no formal definition of the BEE in the Pricing Order. Consequently, there is a need to identify the key characteristics of such an entity. This involves establishing a conceptual definition of the characteristics of the BEE relevant to WACC estimation. Once defined, it is necessary to gather evidence from actual 'comparator' entities which best resemble the conceptual entity, as a means to inform the benchmark parameters for the cost of equity and the cost of debt.

In its Consultation Paper, the ESC provided its view on the risk profile of PoM and the factors that could be used to identify appropriate comparator entities which best resemble the conceptual BEE.¹⁶

In terms of risk profile, the ESC notes the relevant risk characteristics of the services provided by PoM include that the Prescribed Services:

- relate primarily to the provision of wharfage and channel access services
- are provided by a port that predominantly derives revenue from services to container cargo, with a smaller share of bulk and non-bulk cargoes
- are provided by a port in Australia.

¹⁶ ESC (2017a).

In regards to comparator entities, the ESC recognises there are no publicly-listed ports in Australia. Accordingly, it suggested the following methodology:¹⁷

Consequently, the port will have to determine a comparator set by considering other characteristics of the port's prescribed services, and by making trade-offs between elements of comparability. For example, by including other firms (not ports) that provide similarly risky services or to include overseas ports in the comparator set. Whichever approach is adopted, it is important that a systematic approach to comparator selection be used to avoid 'cherry picking' comparators in each regulatory period.

4.1.2 Australian regulatory precedent

In terms of the conceptual efficient benchmark definition, the Western Australia Economic Regulation Authority (ERA) has provided guidance on its regulatory interpretation as follows:¹⁸

It is desirable that the benchmark not be hypothetical. This means that the benchmark must, as far as possible, reflect achievable financing practices, which reflect the practices of efficient firms exposed to a similar degree of risk as the regulated firm. Importantly, by reflecting achievable efficient financing practices, the benchmark will allow the service provider 'reasonable opportunity' to achieve the efficient parameters determined for the benchmark entity.

Whilst the Pricing Order applies to only one entity (as opposed to a range of regulated businesses as was the case for the ERA), the ERA's approach is consistent with the Pricing Order requirement that the Port Licence Holder be given a reasonable opportunity to recover the efficient cost of providing all Prescribed Services.

The ERA's review also provided useful guidance on the reliance on international comparators in informing the assessment of the risk profile of a BEE, including the degree to which:¹⁹

- foreign investors seek to invest equity in Australian firms, augmenting domestically-sourced investment (in the case of Port of Melbourne, the Lonsdale Consortium involves a number of foreign investors);

¹⁷ ESC (2017a), p.40.

¹⁸ ERA (2015a). Review of the method for estimating the Weighted Average Cost of Capital for the Regulated Railway Networks, Final decision, 18 September, p.20.

¹⁹ ERA (2015a), p.22.

- Australian firms raise capital for their Australian investments on overseas capital markets, to supplement capital raisings in Australia; and
- there is arbitrage between Australia's financial markets and those overseas.

This reflects the broader issue of whether estimation of the BEE's cost of capital should be based solely on domestic parameter values or can also incorporate international parameter values. The ERA has previously commented on this issue as follows:²⁰

Overall, the Authority considers that not strictly adhering to the internal consistency of the estimation method – by basing some estimates on a mix of domestic and international estimates – is reasonable in the circumstances in order to enhance the robustness of the parameter estimates.

In this context, the Authority considers that some parameters are likely to be more independent of jurisdiction than other parameters. For instance, gearing, credit rating and equity beta (notwithstanding differences in, for example, tax treatment) are likely to be more independent of jurisdiction than are the risk-free rate and market risk premium, which will be closely related to country conditions.

Both the ERA and ACCC have used international comparators to ensure the estimation of robust efficient benchmark beta and gearing parameter values for regulated Australian transport entities. Synergies concurs with this approach.

This view has been reflected by the Full Federal Court in its recent judgment in *Australian Energy Regulator v Australian Competition Tribunal (No 2)* where it comments in relation to the BEE:²¹

...The allowed rate of return objective confers on the benchmark its particular, necessary and defining characteristics: it must be efficient and it must face “a similar degree of risk” as that which applies to the particular service provider in question in relation to the provision of standard control services. But the attribution of the relevant “efficiency” (i.e., in respect of financing costs) is to be gauged by the disciplines of a workably competitive market (i.e., an unregulated market).

That is, the Full Federal Court has found that the BEE must face the risks specific to the business it is intended to replicate and the efficiencies possessed by that BEE are those determined by a workably competitive market. If the relevant workably competitive market is an international one, then international comparators should be used.

²⁰ ERA (2015a), p.24.

²¹ *Australian Energy Regulator v Australian Competition Tribunal (No 2)* [2017] FCAFC 79, para. 537.

4.2 ESC definition of BEE

In its SoRA, the ESC reinforced its view from earlier commentary on the characteristics of the BEE, as discussed in the previous section. However, the ESC acknowledged the challenges in identifying a sufficiently large set of comparators in Australia that closely reflect the risk characteristics of the BEE.

The key differences between our previous report and the ESC on the definition of the BEE are summarised in Table 8.

Table 8 Contrasting positions of Synergies 2017 report and the ESC on the BEE

Synergies	ESC
Supplies services equivalent to PoM's Prescribed Services	Primarily supplies wharfage and channel access services
Freight-focused	Predominantly derives revenue from container cargo, smaller share of bulk and non-bulk cargoes
Not necessarily domiciled in Australia	Domiciled in Australia
Private sector provider	Not necessarily private/public ownership, but efficient
Market cap > \$US100m	Unlikely to face significant competition in short to medium term.
Not vertically integrated in relevant supply chain	
Some contestability between ports	

Several points of difference can be drawn from this comparison:

- the ESC has questioned the need for a \$US100m threshold for market capitalisation. We consider entities with less than \$US100m market capitalisation could meet the test of the BEE but should still be subject to the statistically significant filtering process for beta estimation based on available data;
- we consider public sector entities could well form part of the sample of the BEE as suggested by the ESC, but they would fail any filtering process for the purposes of estimating the cost of capital because they cannot sensibly inform the determination since they are not traded;
- our earlier report identified a “freight-focused” entity, whereas the ESC’s characterisation is arguably narrower in that it refers to an entity that derives revenue from container cargo and a smaller share of bulk and non-bulk cargoes;
- we assume the BEE could face some contestability with other ports, in contrast the ESC considers the BEE is unlikely to face significant competition in the short to medium term; and
- our earlier report assumed the BEE is not necessarily domiciled in Australia, whereas the ESC favours an Australia-domiciled BEE.

Each of these points of difference is discussed in the following sections of this chapter.

Market capitalisation threshold

In our 2017 report, we placed a market capitalisation threshold on the size of the BEE, at \$US100 million, in recognition that asset intensity is a relevant consideration for assessing comparability with the Port Licence Holder. The ESC responded that “it is not obvious that size should define the risk characteristics of the BEE.”²²

As a matter of principle, the key question is whether the comparator entity reasonably reflects the risk profile of PoM. We acknowledge that it is an open question whether it is possible for an entity that is substantially smaller in scale compared to PoM to meet this threshold (noting that size and asset intensity are relevant, but not determinative, considerations to the classification of PoM’s BEE, including, for example, operating leverage).

In practice though, we note that firms with small market capitalisations are generally more prone to missing data or statistically insignificant beta estimates. With this in mind and in addressing the ESC’s comments regarding size, we note that the decision to be made is whether these firms are removed from consideration at the BEE definition stage, or through statistical criteria in the subsequent asset beta filtering process.

We therefore acknowledge that the \$US100 million threshold was arbitrary and that each firm should be considered individually in terms of risk characteristics as well as statistical significance. Accordingly, we have included companies whose market capitalisation is less than \$US100 million in the comparator set where appropriate this year. In the context of beta estimation, the majority of these firms (36 of the 48) have statistically insignificant betas or insufficient data with which to generate a robust estimate. Of the 12 statistically valid firms, only 6 have characteristics that signify comparability to PoM.²³ In the airports sample, the only statistically valid firms with a market capitalisation of less than \$US100 million are two aviation service providers in Africa.²⁴

Public or private sector status of the BEE

Another point of difference between the two BEE definitions relates to the public and private sector delineation.

²² ESC (2017b). Feedback on consultation and other matters: Statement of Regulatory Approach version 1.0., December, p.43.

²³ These 6 firms are highlighted in the comparator list in Attachment B. The entities that can be most closely compared with PoM tend to have higher betas than the sample we adopted previously.

²⁴ There are no statistically significant freight railroads with a market capitalization of less than \$US100 million.

The ESC stated that “Synergies did not explain why the BEE should be a private sector provider.”²⁵ Instead, the ESC held that the BEE could be private or public, provided it was ‘efficient.’²⁶ In our view, the key issue is the purpose of the investigation – for example, we agree that for assessments of operating cost, public sector entities may well be relevant comparators.

Accordingly, in principle, Synergies does not object to a definition of the BEE that encompasses both private and public sector owned entities. However, there are significant practical limitations using public-sector entities to inform the cost of capital because of the absence of relevant market data. For example, publicly owned entities, even if they are very similar to the Port Licence Holder, cannot inform the assessment of beta. Even in the case of capital structure, concerns arise regarding the focus on commercial incentives of publicly owned entities.

As such, at least for the purposes of assessing the cost of capital, we maintain that only private sector entities can be considered in the context of the BEE.

Freight-focussed BEE

In practice, we do not perceive material issues in the composition of the trade of comparator ports for the purposes of identifying the BEE. We agree that the BEE should broadly reflect PoM’s freight exposure.

By this reasoning, coal-related entities are not considered relevant to PoM’s BEE. Entities such as Aurizon Network, Dalrymple Bay Coal Terminal and the ARTC Hunter Valley rail network will have different risk profiles due to their narrow exposure to international thermal and coking coal markets, as well as the prevalence of take-or-pay contracts regarding the provision of transport infrastructure services in this sector. Accordingly, whilst freight focused, considerably less weight should be placed on these entities for comparison purposes.

In this regard, the ESC noted the need for trade-offs when sourcing comparators from other sectors (such as rail and airports).

Extent of competition

The prospect of competition from a second port for PoM also received attention from the ESC in the SoRA.

²⁵ ESC (2017b), p.38.

²⁶ ESC (2017b), p.43.

We argued that PoM's BEE should be exposed to some contestability between ports, particularly given the prospect of a second container port being developed in the Melbourne region.²⁷ In contrast, the ESC said that the BEE would be unlikely to face significant competition in the provision of services similar to those of the Prescribed Services.

The ESC considered that, at the present time, it is "highly uncertain whether a second port will be developed in the Melbourne region."²⁸ We contend that the likelihood of the development of a second Melbourne port is considerably more certain than has been characterised by the ESC, although the timing of such a development is uncertain.

The ESC then goes on to state that even if the development of a second port were a reasonable likelihood, the specified timeframe for the port is nearly 40 years away, and is therefore unlikely to exert competitive pressures.

In May 2017, Infrastructure Victoria reported to the Victorian government that a new container report would be required in Melbourne by 2055. However, the Victorian government is yet to formally endorse this timeline, and it has been contended that the construction of the port could be brought forward. Whilst clearly not imminent, the prospect of the development of a new port has material implications for PoM with respect to its return on future investments. PoM must make investment decisions across long-term horizons, and any change in demand for services will affect these investment decisions. Furthermore, PoM is only entitled to compensation for the construction of a second port if it takes place within the next 15 years.²⁹ From that point onwards, a significant barrier to the second port's construction is removed.

The impact of competition on our beta estimation is covered in further detail in the first principles analysis in Section 7.2.5 and in Attachment C of our report.

Domicile of BEE

The ESC has maintained its view that, for the purposes of defining the BEE, the Prescribed Services are provided by a port in Australia. In principle, the assumption of an Australian-domiciled BEE is reasonable given PoM is a Melbourne-based entity with no operations or revenue streams outside of Australia. However, when deriving a WACC estimate for an Australian entity, the practical reality is that there are generally insufficient Australian listed entities to derive robust asset beta and gearing estimates.

²⁷ Further details on the second Melbourne port are presented in Attachment D.

²⁸ ESC (2017b), p.43.

²⁹ *Delivering Victorian Infrastructure (Port of Melbourne Lease Transaction) Act 2016*, Clause 65(2)(a)(ii).

Our BEE assumption reflects this practical reality. In this regard, the need to use comparator entities outside of Australia is acknowledged by the ESC.

4.3 Defining the BEE for PoM

Having regard to the commentary provided by the ESC, we consider that the competing concepts of the BEE are not irreconcilable. The main challenge we (and the ESC) face is that there are relevant practical considerations, such as data limitations and the lack of suitable comparator entities, which need to be recognised, particularly in asset beta estimation.

As such, we propose to substantively retain our position on the BEE definition from the 2017-18 TCS submission. This position is driven in part by what we believe to be the true BEE for PoM, but is primarily based on the practical issue of identifying an appropriate sample of entities to inform WACC estimation.

In response to the ESC's commentary, we have provided additional justification of our asset beta comparator filtering procedure, and the implications that this has for the resulting sample of comparable firms. These are examined in detail in Section 4.4 below and in Chapter 7 of the report.

Given the above considerations, we remain of the view that PoM's BEE that is required to be identified by the Pricing Order, is a freight-focussed private sector provider of services equivalent to the Prescribed Services.

Further, this BEE is not vertically integrated upstream or downstream from the provision of port services consistent with the narrow definition of Prescribed Services. Conceptually, for the purposes of the Pricing Order, the BEE would not earn revenue from sources other than Prescribed Services, which excludes property-related assets and activities.

Ideally, the BEE would have reference to landlord port businesses in Australia and internationally that provide a similar range of services to the Prescribed Services and hence face comparable risks. However, in practice, there are few listed port entities that provide comparable services to construct a sample that reliably estimates a benchmark gearing ratio and equity beta for the BEE. Hence, this has required us to identify transport entities outside of the Australian and international port sector with a comparable risk profile to PoM's Prescribed Services.

The systematic approach we have taken in determining WACC parameter values for the BEE with comparable risks to PoM are discussed in more detail in Chapter 5 (capital structure) and Chapter 6 (return on equity) of our report. The following section provides

an overview of the sectors that we have investigated to source comparable companies for the BEE. These are required in order to generate gearing and beta estimates.

4.4 Listed comparable companies

There are no listed port businesses operating in Australia providing Prescribed Services and there is a very limited number of listed companies that have the same risks as a BEE under the Pricing Order. Moreover, PoM is an international gateway port operating in an inherently global market. Consequently, it is necessary to rely on international comparators that face similar systematic risks as PoM.

The first step in a comparable companies' analysis involves identifying an appropriate set of listed companies with similar cash flow risks.

4.4.1 Comparable Marine Ports and Services

Port-related businesses are categorised as "Marine Ports and Services" under the Global Industry Classification Standard (GICS) classification. However, many of the entities in the Marine Ports and Services category operate primarily as terminal operators or stevedores and do not provide the core infrastructure service that PoM provides.

Further, whilst terminal operators and PoM may have similar market exposure, terminal operators generally have lower fixed capital costs and higher variable costs within their total cost base than a landlord port such as PoM. As discussed in our first principles analysis, this means that these terminal operators' earnings will be less sensitive to sales volumes than PoM.

Consequently, whilst PoM's risk profile is not identical to several of these businesses, there is a strong overlap in market exposure and demand drivers between the entities comprised within the Marine Ports and Services classification and PoM, which warrants their inclusion in our comparable companies set.

4.4.2 Comparable Railroads and Airports

We have also included freight railroad companies in our sample as there are a number of publicly listed firms in this sector with similar infrastructure characteristics and demand drivers to ports. Additionally, major city airports have similar infrastructure characteristics to ports given their (albeit more limited) exposure to domestic cyclical economic conditions, as well as from an operating leverage (high fixed costs in their total cost base) and investment perspective. The strong fixed capital cost and associated cash flow risk exposures represent close comparators from a gearing and beta perspective.

For these reasons, we have included railroads and airports categories in our comparable companies set.

4.4.3 Comparable List Application

Having selected the relevant industry sectors for inclusion in our comparable companies set, we reviewed the business description for each listed company in each relevant sector and eliminated companies that were of limited relevance to PoM's business because there are unlikely to face comparable risks. We separately identified companies that were sufficiently like the BEE from a risk perspective that were operating in OECD and non-OECD countries for analytical purposes.

Using Bloomberg, we have extracted gearing and other relevant data from companies in the following GICS categories:

- Marine Ports and Services
- Railroads
- Airports.

Regarding possible adjustments to empirical beta estimates, the ESC's commentary sought explanation about how specific adjustments to our empirical beta estimates (and to a lesser extent gearing) should be made where the nature of the comparators and their risk characteristics are not strictly equivalent to the benchmark efficient entity (BEE) used to establish PoM's WACC.

In our view, the best response is to argue that caution should always be taken in determining asset beta estimates to avoid applying 'false precision,' especially at a firm level. This includes applying purportedly precise quantitative adjustments to beta estimates derived from the comparator set. Instead, the approach that we have taken is to consider the characteristics of the three industry sectors that comprise the comparator set, with this set establishing a reasonable asset beta range from which a point estimate can be selected and substantiated qualitatively based on differential risk factors.

5 Capital structure

Chapter overview

We have retained our assumed capital structure for PoM of 30% from the 2017-18 submission. This remains within the range of transport regulatory decisions, and evidence from listed comparators indicates no material movement in gearing levels.

5.1 Introduction and background

The Pricing Order requires the cost of debt and equity to be distinguished. This in turn requires the weighting of equity and debt in the rate of return calculation to be established. The purpose of this chapter is to identify an appropriate long-term target gearing ratio for the BEE based on domestic and international entities with comparable risks, and having regard to relevant regulatory precedent.

In a perfect capital market, finance theory provides that the valuation of a firm is unaffected by its capital structure. A higher proportion of debt in the capital structure will increase the weight placed on the return on debt (which is typically lower than the return on equity), but this is offset by an increase in the required return on equity resulting from the higher leverage. However, in practice, the assumptions underpinning a perfect capital market do not hold and as such capital structure can have valuation impacts. Clearly, this is relevant to a consideration of the capital structure applying to a BEE.

The assessment of capital structure (or gearing) in the WACC calculation is therefore based on an assessment of an 'optimal' long-term target capital structure for the BEE given its risk profile and the industry within which it operates.

To achieve consistency with the Pricing Order requires the selection of a benchmark gearing ratio that would apply to an efficient benchmark firm in the same industry with the same risk profile as PoM. However, in practice we see numerous and sometimes disparate factors affecting the capital structure adopted by firms within the same industry (for example, different financing strategies, investment needs, owner preferences, tax treatments).

Consequently, it is reasonable to determine a range to assess the efficient financing of a benchmark entity before choosing a point estimate from within the range based on a qualitative assessment of PoM's risk profile. To inform this range for PoM we begin by looking at relevant regulatory precedent followed by evidence from comparable entities.

5.2 ESC commentary on proposed capital structure for BEE

In its November 2017 interim commentary, the ESC noted that regulators have tended to use gearing levels higher than that assumed by Synergies for the BEE.

It is not clear whether the ESC's comment is referring just to gearing assumption decisions applying to regulated transport entities, or more broadly (for example, also encompassing energy and water utilities).

Energy and water utilities tend to have higher assumed gearing because of the stability of their cash flows in relation to economic activity. However, we consider that energy and water utilities are not suitable comparators for PoM because their risks are not comparable.

Rather, we consider any comparison of gearing levels should focus on assumptions previously approved by Australian regulators for regulated transport entities, which range from 20% for the Pilbara railways up to 60% for Dalrymple Bay Coal Terminal (DBCT). As such, our proposed gearing ratio of 30% sits comfortably within this regulatory range. Even within this regulatory range though, we observe that there are entities with varying risk profiles, in part due to different contractual and regulatory characteristics. For this reason, we have refrained from drawing direct comparisons to the regulatory entities.

The remainder of this chapter explains the basis of our proposed gearing assumption for the BEE.

5.3 Regulatory precedent

Consistent with the other WACC parameters, Australian regulators apply a benchmark capital structure (gearing) that would apply to an efficient benchmark entity in the same industry with the same risk profile. It is based on an 'optimal' long-term target for the regulated entity given its risk profile and the industry within which it operates. This is reflected in relatively stable gearing ratios once established. A similar approach is also used by international regulators.

Under this benchmark approach, the regulated entity's actual gearing level is given limited (and perhaps no) weight. This is consistent with the objective of incentive regulation, which bases costs on efficient benchmark targets. The gearing assumption also influences the notional credit rating assumption used to estimate the return on debt.

Table 9 shows recent regulatory decisions relating to the regulated Australian transport sector. The highest observed gearing assumption is 60% (debt to total value) for Dalrymple Bay Coal Terminal, Australia's most heavily regulated port related asset, and

thus not an ideal comparator for PoM. In contrast, for rail entities, gearing assumptions have generally been lower, including the lowest of 20% for the dedicated iron-ore terminal operated by The Pilbara Infrastructure.

Table 9 Recent Australian regulatory gearing decisions for transport entities

Company	Regulator	Year	Gearing Ratio
Dalrymple Bay Coal Terminal	QCA (Ports)	2016	60%
Dalrymple Bay Coal Terminal	QCA (Ports)	2010	60%
Aurizon Network	QCA (Rail)	2017	55%
Public Transport Authority - passenger	ERA (Rail)	2015	50%
Arc Infrastructure (formerly Brookfield Rail) - freight	ERA (Rail)	2015	25%
The Pilbara Infrastructure – iron ore	ERA (Rail)	2015	20%
V/Line	ESC (Rail)	2012	50%
Pacific National	ESC (Rail)	2012	50%
Vic Track	ESC (Rail)	2012	50%
Metro Trains Melbourne	ESC (Rail)	2011	55%
ARTC (Hunter Valley Coal Network)	ACCC (Rail)	2011 & 2017	52.5%
Queensland Rail	QCA (Rail)	2010	55%
ARTC Interstate Rail Network	ACCC (Rail)	2008	50%

Source: Synergies, various regulatory decisions.

The basis of Australian regulator’s gearing assumption is generally an analysis of internationally comparable companies, an approach we have adopted in our report. Such an approach is also frequently observed in regulatory determinations overseas.

In the context of the PoM and the BEE, we consider the two most relevant regulatory gearing assumptions are for:

- ARTC’s interstate freight network, which currently assumes 50 per cent gearing
- Arc Infrastructure’s freight network, which currently assumes 25 per cent gearing.

ERA’s most recent review of the WACC to apply to Brookfield Rail (now Arc Infrastructure), which was completed in 2015, included an updated review of the gearing levels for a set of comparator firms.³⁰ Its sample included the US Class I railways, as well as a small number of other firms (including Aurizon Holdings). In the review prior to

³⁰ ERA (2015a).

this, finalised in 2008, the gearing of its predecessor (WestNet Rail) was set at 35 per cent. The reduction in gearing that occurred in the most recent review was attributed to the reduction in the average gearing levels of the comparator sample.

In its 2008 decision for ARTC's interstate freight network, the ACCC accepted ARTC's proposed gearing ratio of 50 per cent. The gearing levels of ARTC's sample of firms across the rail, trucking and shipping industries examined at the time were generally higher in the pre-GFC environment than currently observed. However, the average capital structure of the 12 rail companies in ARTC's survey was 27 per cent debt, with the most levered firm holding only 47 per cent debt.³¹ ARTC has applied for gearing of 52.5% in its 2018 undertaking (currently in progress). However, this does not invalidate a gearing level of 30% for PoM, given that ARTC's undertaking for the Interstate network aligns its gearing with its Hunter Valley network. This is particularly evident in the context of the ERA's findings that resulted in the application of a lower gearing level in the most recent review for Arc Infrastructure (formerly Brookfield Rail).

5.4 Metrics

Attachment A contains our comparator set emerging from the above process and categorises the sample by:

- Sector
- OECD/non-OECD status
- Companies that are rated by rating agencies and those that have not been.

Attachment A contains the gearing ratios for each company in the comparator set. We now turn to a consideration of the results of this analysis.

5.5 Gearing range

Determining the appropriate target gearing level is inherently imprecise. The starting point for the analysis is the range of gearing levels maintained by comparable entities which, by definition, must be consistent with one or a combination of well-accepted approaches.

³¹ ACCC (2008). Australian Rail Track Corporation access undertaking – Interstate Rail Network, Final decision, July, p.158.

5.5.1 Empirical Evidence

In determining an appropriate gearing ratio for PoM, it is reasonable to analyse empirical evidence from relevant comparator firms, including the entities that we have also used to estimate beta for the return on equity calculation.

We have examined the average gearing levels maintained by other relevant comparator entities in Australia and internationally (both OECD and non-OECD nations).

Gearing ratios (average and median ratios) for the entities comprising our comparator set and that are rated by ratings agencies as having an investment grade or better (both OECD and non-OECD) are contained in the tables below. We have classified these results by sector in Table 10 below and included the latest available credit ratings where possible.

Table 10 Companies with official investment grade ratings

Company	Country	OECD	Sector	Moody's Credit Rating	S&P Credit Rating	Gearing
China Merchants Port Holding Company	Hong Kong	No	Marine Ports and Services	Baa1	BBB	23%
ADSEZ	India	No	Marine Ports and Services	Baa3	BBB-	22%
Port of Tauranga	New Zealand	Yes	Marine Ports and Services	-	BBB+	4%
Hutchinson Port Holdings Trust	Singapore	No	Marine Ports and Services	Baa1	BBB+	43%
DP World	UAE	No	Marine Ports and Services	Baa2	NR (not rated)	28%
Aurizon Holdings	Australia	Yes	Railroads	Baa1	BBB+	23%
Canadian National Railway Company	Canada	Yes	Railroads	A2	A	12%
Canadian Pacific Railway	Canada	Yes	Railroads	-	BBB+	19%
CSX Corporation	US	Yes	Railroads	Baa1	BBB+	24%
Kansas City Southern	US	Yes	Railroads	Baa3	BBB-	16%
Norfolk Southern Corporation	US	Yes	Railroads	Baa1	BBB+	23%
Union Pacific Corporation	US	Yes	Railroads	A3	A	13%
Sydney Airport	Australia	Yes	Airports	Baa2	NR	38%
Vienna International Airport	Austria	Yes	Airports	Not Rated, but 2015 Annual Report claims position reflect investment grade rating		22%
Paris Airport	France	Yes	Airports	-	A+	29%

Company	Country	OECD	Sector	Moody's Credit Rating	S&P Credit Rating	Gearing
Auckland International Airport Limited	New Zealand	Yes	Airports	-	A-	19%
Zurich Airport	Switzerland	Yes	Airports	-	AA-	17%

Source: Moody's

Amongst companies in our sample with an investment grade rating, the median and average gearing level is 22%. As demonstrated in Attachment A, the average and median gearing ratios are almost identical when considering the full sample of comparable companies. Average and median gearing by industry sector is summarised in Table 11.

Table 11 Gearing averages and ranges by sector

	Overall Average	Overall Median	Overall Minimum	Overall Maximum
Full Sample	22%	19%	0%	64%
	Sector Average	Sector Median	Sector Minimum	Sector Maximum
Marine Ports and Services	24%	23%	0%	64%
Railroads	18%	18%	0%	32%
Airports	20%	17%	7%	40%
OECD	Sector Average	Sector Median	Sector Minimum	Sector Maximum
Marine Ports and Services	25%	19%	0%	64%
Railroads	20%	21%	12%	32%
Airports	22%	19%	7%	40%
Non-OECD	Sector Average	Sector Median	Sector Minimum	Sector Maximum
Marine Ports and Services	23%	23%	0%	56%
Railroads	8%	8%	0%	15%
Airports	9%	9%	7%	12%

Source: Bloomberg

5.5.2 Privatised Australian ports

To evaluate gearing, we have augmented our comparable companies set with private ports from around Australia. The gearing of recently privatised ports also provides a relevant benchmark, while recognising initial gearing levels may not be reflective of longer term gearing levels depending on reported earnings growth.

Further, gearing levels of privatised ports are reflective of the risk profile of the total port business, including lower risk property assets, compared to a gearing level pertaining only to prescribed service assets (as defined for PoM) that, in principle, would be lower.

Table 12 presents the acquisition gearing from four port privatisations (all privatisations other than Flinders Ports). It shows an average initial gearing ratio in excess of 40% for all privatisations.

Table 12 Acquisition Gearing Ratios for Australian Ports

Port	Acquisition Value (\$ million)	Acquisition Debt (drawn) (\$ million)	Acquisition Gearing
Port of Brisbane (2010)	2,100	847	40%
Port Botany / Kembla (2013)	5,070	2,010	40%
Port of Newcastle (2014)	1,750	800	46%
Average			42%

PoM's acquisition gearing ratio is in line with these precedents.³²

5.6 Conclusion

Considering relevant market evidence, we maintain our view that a gearing range of between 20% and 40% is appropriate for the efficient benchmark port entity. The considerations that inform this view are as follows:

- The gearing levels for our comparator sample range between 22% and 42%.
- There are two cases where we have seen gearing levels approved below 50% for Australian regulated entities, which are in the ERA's most recent decisions for rail networks, where it applied 25% gearing for Brookfield Rail (the most relevant comparator for PoM) and 20% for The Pilbara Infrastructure, a dedicated iron ore rail and port infrastructure provider.

The very nature of a gearing range is that a reasonable value may fall anywhere within that range. Furthermore, both the range and the point estimate for a BEE may change over time in response to several factors.

For the purpose of this review, a gearing level of 30% has been retained, which represents the mid-point of the gearing ratios for the investment-grade listed companies of 22% and the gearing ratios for the privatised ports of 42% (after rounding to the nearest 5%).

³² Recognising that these privatised gearing ratios relate to the whole port entity rather than the narrower range of port channel and berthing-related services that are covered by the Prescribed Services definition.

6 Assessing alternative return on equity approaches

Chapter overview

We have not made any changes to the multi-model approach that we adopted in the 2017-18 submission. We present comprehensive evidence that each of these approaches can be considered well-accepted in accordance with the Pricing Order.

6.1 Cost of equity approaches

Four return on equity approaches are described below that we consider are likely to support an estimate of the return on equity commensurate with the requirements of the BEE and the Pricing Order:

- Sharpe-Lintner Capital Asset Pricing Model (SL CAPM) – the SL CAPM expresses the return on equity as the premium required in regards to the undiversifiable risk of holding a portfolio of assets relative to overall market risk (reflected in a beta estimate). The SL CAPM predicts that the variations in mean returns of this portfolio of assets should be entirely explained by variations in the beta estimate.
- Black CAPM – this model is a more broadly based form of CAPM, which adds the excess returns of a zero-beta portfolio to the return earned on the risk-free rate in the SL CAPM formula. If the excess returns of the zero-beta portfolio are estimated to be zero, the Black CAPM reduces to the same formula as the SL CAPM. As per the SL CAPM, the Black CAPM predicts that variations in mean returns should be entirely explained by variations in the beta estimates.
- Fama-French three factor model (FFM) – this model can be considered an extension of the SL CAPM by including two additional explanatory factors: small capitalisation stocks; and high book-to-market value stocks (in addition to the sensitivity of the returns of the asset compared to the overall market return as captured under the SL CAPM).
- Dividend Discount Model (DDM) – this model estimates a return on equity based on a company's stock price and future expected dividend payments. It states that the required return on an asset is dependent on the expected future growth rate in dividends.

These return on equity models are not intended to be an exhaustive list. Rather, we consider that each one satisfies the well-accepted threshold established by the Pricing Order. The next section of our report summarises the strengths and weaknesses of each of these models. Further detail on our four chosen methodologies is provided in Attachment C.

6.2 Sharpe-Lintner and Black CAPM

6.2.1 SL CAPM formulation

The SL CAPM is expressed as follows:

$$R_e = R_f + \beta_e * [E(R_m) - R_f]$$

Where:

R_f = the risk-free rate of return

$E(R_m)$ = the expected return on the market

$[E(R_m) - R_f]$ = the market risk premium

β_e = equity beta (measures systematic risk)

The equity beta measures systematic business risk, as well as the financial risk of a company. This can be contrasted with the asset beta, which reflects only the business risk of a company and can be calculated by de-levering the observed equity beta.

A well-accepted approach of estimating a company's equity beta is taking the asset beta (observed from a comparable set) and then re-levering the asset beta by applying the company's assumed capital structure (in PoM's case, the gearing of a BEE) to finally arrive at an estimated equity beta measurement for the company.

6.2.2 Strengths

The SL CAPM was the original prescription of the CAPM and is the model from which other CAPM-oriented models have evolved. One strength of the SL CAPM is its relative simplicity and intuitive appeal, specifically its underlying theoretical basis regarding the relationship between expected returns and risk in asset portfolio context.

Systematic risk is a useful way to think about risks incorporated into market prices.

Its intuitive appeal has resulted in the use of the SL CAPM in both financial market and regulatory contexts. However, its use in financial market contexts has often been with practitioners making adjustments to individual parameter values, specifically the risk-free rate or market risk premium.

6.2.3 Weaknesses

The main weakness of the SL CAPM is that it generates values of expected returns that have very limited relevance with actual returns (i.e. the method produces a poor fit to the observed data).

Empirical studies published in academic journals demonstrate that the model presents a downwardly biased estimate of the rate of return for the low-beta entities, which signifies that the relationship between beta estimates and average stock returns is too flat in comparison to what we observe. Similarly, companies with high book-to-market ratios (high stock returns) counter the predictions of this model (refer to discussion of the FFM in Section 6.3 below).

The frequency of use of SL CAPM in a regulatory context in Australia has revealed further limitations of the model when applied in a prescriptive, formulaic way, as has been the practice of most Australian regulators over the past decade. These concerns have become more pronounced since the Global Financial Crisis (GFC), when risk-free rates have fallen to historical lows, resulting in low return on equity outcomes when the low risk-free rate is combined with a 'static' long-run average market risk premium (MRP) of 6%, which, at least until the GFC, was the most commonly applied value for the MRP. These concerns were particularly evident when debt margins increased considerably following the GFC at the same time as regulatory allowances for the return on equity reduced because of falling risk-free rates. To our knowledge no logical reason has ever been advanced as to why this would be the case.

The underlying assumptions for the model are also problematic, including that investors can borrow or lend freely at the risk-free rate and investors share the same beliefs about distribution of returns.

6.2.4 Application of SL CAPM

The SL CAPM model is acknowledged by the ESC as meeting the criterion of being well-accepted and we agree with its assessment. However, when applied in practice, the model does encounter significant empirical limitations.

The SL CAPM is used extensively by regulators in Australia and other jurisdictions. Graham and Harvey (2001) surveyed nearly 400 chief financial officers of large US corporations to establish, among other things, what approaches these businesses applied in valuing capital.³³ Brounen, de Jong and Koedijk (2004) broadened this work by extending the survey to businesses in the UK, Netherlands, Germany and France.³⁴ In all, these researchers confirmed the widespread use of CAPM in companies in the US and several European countries (around 60 per cent).

³³ Graham, J. and Harvey, C. (2001). The theory and practice of corporate finance: Evidence from the field. *Journal of Financial Economics*, 60, pp.187-243.

³⁴ Brounen, D., de Jong, A. and Koedijk, C.G. (2004). Corporate finance in Europe: Confronting theory with practice. 2004 Maastricht Meetings Paper No. 2769. Also published in *Financial Management*.

A number of studies have also provided evidence in support of using the SL CAPM. The results from Moyer, McGuigan and Kretlow (2001)³⁵ and Campbell, Lo and Mackinlay (1997)³⁶, for instance, suggest that the SL CAPM is appropriate for examining the pricing of capital assets, evaluation of investment portfolios and event studies of efficient markets. Davis (2011), Handley (2014)³⁷ as well as McKenzie and Partington (2014)³⁸ supported the use of the SL CAPM in reports to the Australian Energy Regulator (AER).³⁹

Two of the earliest and most significant contributions were Black et al. (1972)⁴⁰ and Fama and Macbeth (1973).⁴¹ To investigate the association between beta estimates and average stock returns, Black et al. (1972) used monthly statistics relating to price, dividend, adjusted price and dividend information for all common stocks traded on the New York Stock Exchange for the period between January 1926 and March 1966. Similarly, Fama and Macbeth (1973) used monthly percentage returns for the same data from January 1926 to June 1968. The results from these two studies highlighted that the SL CAPM generated values of expected returns that had a small or zero association with actual returns. Specifically, the findings from these studies suggested that the SL CAPM produced a poor fit to the observed data.

In addition to the study by Black et al. (1972), a 2004 review of the literature concerning CAPM by Fama and French (2004) highlighted that the SL CAPM presented a downwardly biased estimate of the rate of return for the low-beta firms.⁴² This provided an indication that the linear relation between average return and beta is flat compared to SL CAPM predictions, i.e., a shortcoming in the SL CAPM identified as the low beta bias. The authors (Fama and French) concluded that:

³⁵ Moyer, R.C., McGuigan, J.R. and Kretlow, W.J. (2001). *Contemporary financial management*, 8th ed., South-Western, Cincinnati, Ohio.

³⁶ Campbell, Y.J., Lo, A.W. and Mackinlay, A.C. (1997). *The econometrics of financial markets*. Princeton University Press, Princeton, New Jersey.

³⁷ Handley, J. (2014). *Advice on the return on equity*, University of Melbourne, Melbourne.

³⁸ McKenzie, M. and Partington, G. (2014). *Report to the AER Part A: Return on equity*, SIRCA, Sydney, New South Wales.

³⁹ Davis, K. (2011). *Cost of equity issues: A report for the AER*, University of Melbourne, Melbourne.

⁴⁰ Black, F., Jensen, M.C., and Scholes, M. (1972). The capital asset pricing model: Some empirical tests, in *Studies in the Theory of Capital Markets*. Michael C. Jensen, ed. New York: Praeger, pp.79-121.

⁴¹ Fama, E. F. and Macbeth, J. (1973). Risk, return and equilibrium: Empirical tests. *Journal of Political Economy*, 81(3), pp. 607-636.

⁴² Fama, E.F. and French, R.K. (2004). The capital asset pricing model: Theory and evidence. *Journal of Economic Perspectives*, 18(3), pp. 25-46.

The attraction of the CAPM is that it offers powerful and intuitively pleasing predictions about how to measure risk and the relation between expected return and risk. Unfortunately, the empirical record of the model is poor – poor enough to invalidate the way it is used in applications. The CAPM's empirical problems may reflect theoretical failings, the result of many simplifying assumptions. But they may also be caused by difficulties in implementing valid tests of the model.

In the end, we argue that whether the model's problems reflect weaknesses in the theory or in its empirical implementation, the failure of the CAPM in empirical tests implies that most applications of the model are invalid.

Acknowledging that the true market portfolio is unobservable, Shanken (1987) reported empirical evidence that SL CAPM was invalid by generating a multivariate proxy for the true market portfolio.⁴³ Burmeister and McElroy (1988) employed the S&P500 Index as a proxy for the market and also rejected the hypothesis of SL CAPM.⁴⁴ Findings from a number of recent studies are also found to be in line with the findings of these earlier empirical works. Mehrling (2005), for instance, revealed that:⁴⁵

One important consequence of the BJS (a 1972 paper of Fischer Black, Michael Jensen, and Myron Scholes titled *The Capital Asset Pricing Model: Some Empirical Tests*) was to confirm earlier suggestions that low-beta stocks tend to have higher returns and high-beta stocks tend to have lower returns than the theory predicts.

Campbell and Vuolteenaho (2004) revealed that:⁴⁶

It is well known that the CAPM fails to describe average realized stock returns since the early 1960s, if a value-weighted equity index is used as a proxy for the market portfolio. In particular, small stocks and value stocks have delivered higher average returns than their betas can justify. Adding insult to injury, stocks with high past betas have had average returns no higher than stocks of the same size with low past betas.

Da, Guo and Jagannathan (2012) revealed that:⁴⁷

⁴³ Shanken, J. (1987). Multivariate proxies and asset pricing relations. *Journal of Financial Economics*, 18, pp.91-110.

⁴⁴ Burmeister, E. and McElroy, M.B. (1988). Joint estimation of factor sensitivities and risk premia for the Arbitrage Pricing Theory. *Journal of Finance*, 43, pp.721-33.

⁴⁵ Mehrling, P. (2005). *Fischer Black and the revolutionary idea of finance*, Wiley, pp.104–105.

⁴⁶ Campbell, Y. J and Vuolteenaho, T. (2004). Bad beta, good beta. *The American Economic Review*, 94(5), p.1249.

⁴⁷ Da, Z. Guo, R.J. and Jagannathan, R. (2012). CAPM for estimating the cost of equity capital: Interpreting the empirical evidence. *Journal of Financial Economics*, 103(1), pp.204–206.

A variety of managed portfolios constructed using various firm characteristics earn very different returns on average from those predicted by the CAPM. Fama and French make a convincing case that the CAPM fails to describe the cross section of stock returns.

Lewellen and Nagel (2006) respond to suggestions that the unconditional SL CAPM failed due to time-variation in risk and expected returns. This would imply a role for a conditional SL CAPM, which allows for beta to vary over time. However, the authors demonstrated that the conditional SL CAPM performed nearly as poorly as the unconditional SL CAPM, and that time-variation in betas and the equity premium would have to be implausibly large to explain the value premium.⁴⁸

Relevantly for our assessments of acceptance of other approaches besides the SL CAPM, the survey research found that a significant minority of corporations (skewed towards larger companies) modified the SL CAPM by including additional risk factors. In other words, many companies regarded the SL CAPM as insufficient to be used as the sole measure of the cost of equity.

In summary, the SL CAPM's theoretical foundations are attractive but its empirical performance is poor. Accordingly, we consider exclusive reliance upon the SL CAPM is unwarranted given the asymmetric consequences of regulatory error.

6.2.5 Black CAPM formulation

The Black CAPM is expressed as follows:

$$R_e = R_z + \beta_e * [E(R_m) - R_z]$$

Where:

R_z = the rate of return on the zero-beta portfolio (equal to risk-free rate plus zero beta premium)

$E(R_m)$ = the expected return on the market

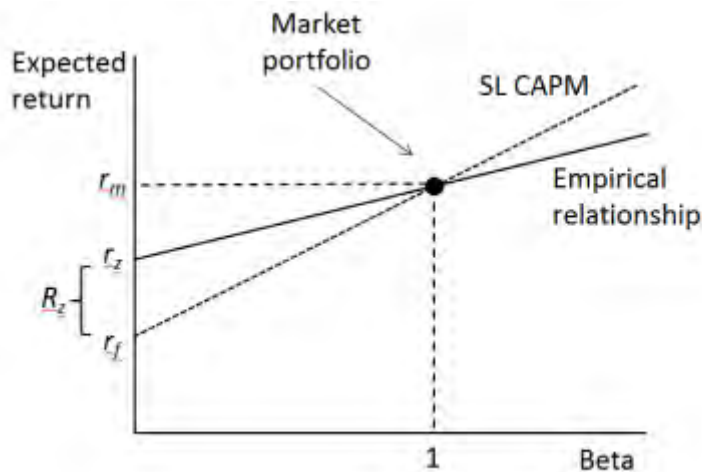
$[E(R_m) - R_z]$ = the zero-beta adjusted market risk premium

β_e = equity beta (measures systematic risk)

⁴⁸ Lewellen, J. and Nagel, D. (2006). The Conditional CAPM does not explain asset-pricing anomalies. *Journal of Financial Economics*, 82, pp.289-314.

The relationship between the SL CAPM and Black CAPM is indicated in Figure 1.⁴⁹ The SL CAPM uses a theoretical lower bound for the intercept (i.e., the intercept cannot possibly be lower than the risk-free rate). In contrast the Black CAPM provides an empirical estimate of the risk-free rate, the zero-beta portfolio. This is reflected in a higher intercept point on the Y-axis, reflecting the zero-beta premium.

Figure 1 Relationship between SL CAPM and Black CAPM



Source: SFG Consulting (2014)

6.2.6 Black CAPM strengths

By construction, the Black CAPM removes the tendency of the SL CAPM to underestimate the returns to low beta assets and over-estimate the returns to high beta assets. There is substantial evidence in Australia and the US demonstrating large zero-beta premiums.

It has less restrictive assumptions than the SL CAPM, with its central prediction being that market betas suffice to explain expected returns and the risk premium for beta is positive (in contrast the SL CAPM assumes the premium per unit of beta is strictly the expected market return minus the risk-free interest rate).

It has been applied in rate of return regulation cases in other jurisdictions, for example in the United States and Canada, where it is sometimes known as the empirical CAPM (ECAPM).

⁴⁹ SFG Consulting (2014c). The required return on equity for regulated gas and electricity network businesses, 27 May, p.22.

6.2.7 Black CAPM weaknesses

While the Black CAPM is intended to address the low beta bias inherent in the SL CAPM, many studies have found that it too fails to produce a statistically significant association between beta estimates and stock returns.

6.2.8 Evolution of model

The purpose of this section is to explain the evolution of the Black CAPM (1972) and its application.⁵⁰ The Black CAPM augments the SL CAPM by adding what is known as a zero-beta portfolio to the risk-free rate to take into account the observed tendency of the SL CAPM to understate asset returns for companies with betas less than one. We have applied the Black CAPM to estimate a return on equity for the benchmark port entity.

A key motivation for modifying SL CAPM is the empirical observation of low beta bias, evidence of which is well documented in academic literature.

6.2.9 Academic research findings

Black, Jensen and Scholes (1972), among others, discovered that the slope in CAPM regressions was flatter than would be implied by SL CAPM. Specifically, the SL CAPM tended to understate asset returns for companies with betas less than one, and overstate asset returns for betas greater than one. One implication of this is that the intercept in these regressions was higher than expected. In the SL CAPM, the intercept takes the form of the risk-free rate. Therefore, the Black CAPM proposes adding the zero-beta premium to the risk-free rate.

A key difference between the SL CAPM and the Black CAPM is that the SL CAPM assumes that investors can borrow and lend at the risk-free rate, which presents difficulties in practice. The Black CAPM does not require this assumption, but instead assumes that investors can short sell risky assets such as stocks. This assumption has its limitations too because investors may be able to short sell only to a certain extent. However, it is not considered to be as limiting an assumption. These differing assumptions thus explain the contrasting formulas for the two models. In the Black CAPM, expected return is equal to the return on a zero-beta asset (an asset with no systematic risk) plus a premium for bearing systematic risk (the SL CAPM equity beta).

⁵⁰ Black, F. (1972). Capital market equilibrium with restricted borrowing. *Journal of Business*, 28(1), pp.444-454.

6.2.10 Acceptance in other spheres

The Black CAPM has gained greater acceptance within a regulatory setting, with the AER stating in its December 2013 *Better regulation – Rate of return guideline* that:⁵¹

‘We account for the Black CAPM because we recognize that there is merit to its theoretical basis, particularly when viewed alongside the standard Sharpe-Lintner CAPM.’

The AER noted that the Black CAPM can be used to inform the equity beta.⁵² This was attributable to the SL CAPM understating and overstating the return on equity for low beta stocks and high beta stocks, respectively.

The AER cited the relaxed assumptions of the Black CAPM compared to the SL CAPM as reasons for consideration, but does caution that even these assumptions may not hold in practice.

In its 2010 final decision relating to network regulation, Ofgem (UK Office of Gas and Electricity Markets) highlighted that although the return on equity will be computed using the CAPM approach, evidence from other models will also be considered.⁵³ Subsequently, Ofgem stated that the CAPM should be “sense-checked by other approaches and evidence.”⁵⁴ This implies that other potential models (e.g. Black CAPM, FFM, DDM) can be used as cross-checks for the analysis of the return on equity.

The Public Service Commission of Maryland (PSCM 2016) was found to consider the Black CAPM as well as a number of other financial models for its determination of return on equity. It should be noted that US regulators typically refer to the Black CAPM as the empirical CAPM (ECAPM) or the zero-beta CAPM. According to PSCM:⁵⁵

The ROE witnesses used various analyses to estimate the appropriate return on equity for BGE’s electric and gas distribution operations, including the DCF model, the IRR/DCF, the traditional CAPM, the ECAPM (Black CAPM), and risk premium methodologies. Although the witnesses argued strongly over the correctness of their competing analyses, we are not willing to rule that there can be only one correct

⁵¹ AER (2013b). *Better regulation – Explanatory statement – Rate of return guideline*, December, p.85.

⁵² AER (2013b), p.58.

⁵³ Ofgem (2010). *RIIO: A new way to regulate energy networks*, Final decision, October, p.40.

⁵⁴ Ofgem (2013). *Strategy decision for the RIIO-ED1 electricity distribution price control*, Financial issues, Supplementary annex, 4 March.

⁵⁵ Public Service Commission of Maryland (2016). *In the matter of the application of Baltimore gas and electric company for adjustments to its electric and gas base rates*, order no. 87591, case no. 9406, June, p.153.

method for calculating an ROE. Neither will we eliminate any particular methodology as unworthy of basing a decision.

The Alberta Utilities Commission (2016) was found to apply an equity risk premium (ERP) approach as its primary method. This approach considered several financial models employed by various experts that participated in its proceeding in order to establish a fair allowed return on equity. Financial models employed by experts were comprised of CAPM, Black CAPM, bond yield plus risk premium model, predictive risk premium model and DDM.⁵⁶

Similarly, a rate of return was computed through a formula-based approach using the ERP method by the Ontario Energy Board (2009). Specifically, the OEB considered various financial models to determine the initial ERP model or cost of equity, i.e., CAPM, Black CAPM, bond yield plus risk premium model, predictive risk premium model and DDM.⁵⁷

The Mississippi Public Service Commission (MPSC 2009) in the US has, in addition, included the Black CAPM as one of the models used for the return on equity determination.⁵⁸ The following regulatory decisions by the New York Public Service Commission provide further evidence to the use of the Black CAPM in US regulatory decisions:

- Public Case Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of Consolidated Edison Company of New York, Inc. for Electric Service; Petition for Approval, Pursuant to Public Service Law, Section 113(2), of a Proposed Allocation of Certain Tax Refunds between Consolidated Edison Company of New York, Inc. and Ratepayers.⁵⁹
- Public Case Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of National Fuel Gas Distribution Corporation for Gas Service.⁶⁰

⁵⁶ Alberta Utilities Commission (2016). 2016 generic cost of capital, Decision 20622-D01-2016, October.

⁵⁷ Ontario Energy Board (2009). Report of the board on the cost of capital for Ontario's regulated utilities, EB-2009-0084, December.

⁵⁸ Mississippi Public Service Commission (2009). Performance evaluation plan - Rate schedule "PEP-5A", Mississippi Power Company, Schedule No. 28.1, January.

⁵⁹ New York PUC 2009, LEXIS 507.

⁶⁰ New York PUC 2007, LEXIS 449; 262 PUR 4th 233.

- Public Case Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of Central Hudson Gas & Electric Corporation for Electric Service; Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of Central Hudson Gas & Electric Corporation for Gas Service.⁶¹

An expert report to the AER by Professor J. Robert Malko from Utah State University also highlighted that the Black CAPM had been presented and considered by many regulatory commissions in the US. This, for instance, included regulatory commissions in California, Colorado, Delaware, Kentucky, Maryland, Michigan, Minnesota, Mississippi, New York, South Dakota, Virginia, Washington and West Virginia.⁶²

6.2.11 Conclusion on the Black CAPM

In summary, the Black CAPM represents a theoretical (and generally an empirical) improvement in the SL CAPM. However, as explored in the following section, its empirical performance is inferior to the Fama French model.

6.3 Fama-French model

This section explains the evolution of the Fama and French (1993) model (FFM) and its application.⁶³ The FFM augments the SL CAPM by considering the impact of size and value premiums, in addition to the market risk premium, on stock returns.

We begin by discussing the motivation for the FFM and its strengths and weaknesses, before examining the support for the model in academic literature and regulatory practice. Furthermore, we provide evidence that financial practitioners make ad hoc size and other risk premium adjustments to the SL CAPM, implicitly adopting the rationale of the FFM. We also explore the FFM's acceptance in other spheres, including its presence in finance curriculum and the 2013 Nobel Prize awarded to Eugene Fama for the development of the model. All of these sources of evidence serve to solidify the well-accepted standing of the FFM.

6.3.1 Emergence and evolution of the FFM

The FFM emerged in response to the poor explanatory power of the SL CAPM. Fama and French observed that high stock returns were associated with smaller listed

⁶¹ New York PUC 2006, LEXIS 227; 251 PUR 4th 20.

⁶² Malko, J.R. (2015). Statement of Dr. J. Robert Malko, June.

⁶³ Fama, E.F. and French, K.R. (1993). Common risk factors in the returns on stocks and bonds. *Journal of Financial Economics*, 33(1), pp.3-56.

companies and listed companies that have a high book to market value ratio. Fama and French demonstrated that when these two additional variables were incorporated into an asset pricing model the explanatory power of the model increased significantly.

The FFM operates on excess returns to the market being assessed having regard to:

- The returns on the market as a whole
- HML (High Minus Low) is the average return on two value portfolios minus the average return on two growth portfolios.
- SMB (Small Minus Big) is the average return on three small portfolios minus the average return on three big portfolios

The FFM is expressed as follows:

$$R_e = R_f + \beta_j * [E(R_m) - R_f] + \beta_k * [HML] + \beta_l * [SMB]$$

Where:

R_f = the risk-free rate of return

$E(R_m)$ = the expected return on the market

$[E(R_m) - R_f]$ = the market risk premium

HML = expected high-minus-low risk premium

SMB = expected small-minus-big risk premium

β_j = market excess returns beta

β_k = high-minus-low factor beta

β_l = small-minus-big factor beta

In contrast to the SL CAPM and the Black CAPM models, the FFM expresses the return on equity based on expected returns and two additional explanatory factors: a size factor (Small Minus Big); and a book-to-market equity factor (High Minus Low).

6.3.2 Strengths

The FFM retains systematic risk as an explanatory factor that explains stock returns consistent with the SL CAPM and Black CAPM.

However, the FFM better explains stock returns in comparison with either the SL CAPM or the Black CAPM. The model mostly and uniformly has statistically significant explanatory power and performs better than the SL and Black CAPM models in terms of goodness of fit (as measured by a higher R^2 value or by measures of forecast error). For instance, Chiah et al. (2016) (see Section 6.3.4) is the most recent Australian study to

directly compare the FFM with the SL CAPM. Using their preferred measure of model fit, they find that the use of the three-factor FFM reduces the average mean absolute forecast error from 1.68 to 1.44 (a 14% reduction) over a 5-year forecast horizon relative to the SL CAPM (the Black CAPM was not evaluated in this particular study). In other words, the better empirical performance of the FFM is such that it is less likely to understate investors' required cost of equity by the incorporation of additional risk factors in the model that are evidently being priced by the market.

FFM posits that multiple risks other than solely market risk are reflected in stock returns and that the high book-to-market and small-cap stock factors are the best available proxies for these risks.

In an Australian context, the size and value premiums in the model have been estimated using market data and delivered results consistent with US studies, particularly in relation to the value premium. This indicates that incorporating the FFM in the determination of the cost of equity estimate for the benchmark port entity, including with the SL and Black CAPMs, would provide a higher degree of confidence that the resulting estimate is robust and reflective of investor expectations.

6.3.3 Weaknesses

As for the SL CAPM, the FFM restricts the zero-beta rate to be the risk-free rate.

The model in the Australian market has sometimes yielded inconclusive results, particularly in respect of the high minus-low explanatory factor, although this may reflect data issues. However, Brailsford, Gaunt and O'Brien (2012) addressed these data issues and developed an Australian FFM that reconciled with US results.⁶⁴

While the model is often employed in academic studies, it is less commonly employed in financial market and regulatory contexts, with practitioners citing challenges relating to data sourcing in some situations. However, as described earlier in this report, this reason alone should not preclude a particular approach from being "well-accepted". Our approach to applying the FFM is described further in Attachment C.

⁶⁴ Brailsford, T., Gaunt, C. and O'Brien, M (2012). The investment value of the value premium. *Pacific-Basin Finance Journal*, 20(3), pp.416-437.

6.3.4 Academic research findings

There is an extensive literature that has built up surrounding the performance of the Fama-French model, along with the empirical existence of size and value premiums. The following is an overview with particular reference to Australian experience.

By the 1980s, empirical evidence was mounting that variations in expected returns were, to a significant extent, unrelated to market betas (well before the Fama French model emerged). Fama and French (2004)⁶⁵ identify Banz (1981) as one of the first papers to uncover a size effect, namely that average returns on smaller cap stocks were higher than those predicted by CAPM.⁶⁶ Meanwhile, Stattman (1980)⁶⁷ and Rosenberg, Reid and Lanstein (1985) observed that stocks with high book-to-market equity ratios experienced returns not captured by their betas associated with market returns.⁶⁸ This was the turning point where research pursued other determinants of market returns, eventually leading to the seminal Fama and French (1993) paper.

There is extensive empirical evidence in support of the Fama and French factors. Davis, Fama and French (2000) show that the value premium, the positive relationship between average returns and book-to-market value of equity, is robust across time.⁶⁹ The estimated US premium between 1929 and 1963 (0.50 per cent per month) is almost identical to the premium between 1963 and 1997 (0.45 per cent per month). The size effect was found to be smaller (0.20 per cent per month) across their entire sample period.

In the Australian context, Gaunt (2004) demonstrates that the three-factor model offers a better explanation of observed Australian stock returns than the conventional SL CAPM.⁷⁰ He employed a longer dataset than earlier Australian contributions that returned mixed findings based on shorter, deficient data. However, in contrast to US findings, the main contributor to explanatory power was the size factor.

Gharghori, Lee and Veeraraghavan (2009) use Australian data from 1992-2005 and find evidence of both size effects and book to market ratio effects. They note that the observed

⁶⁵ Fama, E.F and French, K.R. (2004).

⁶⁶ Banz, R.W. (1981). The relationship between return and market value of common stocks. *Journal of Financial Economics*, 9(1), pp.3-18.

⁶⁷ Stattman, D. (1980). Book values and stock returns. *The Chicago MBA: A Journal of Selected Papers*, 4, pp.25-45.

⁶⁸ Rosenberg, R., Reid, K. and Lanstein, R. (1985). Persuasive evidence of market inefficiency. *Journal of Portfolio Management*, 3(11), pp.9-17.

⁶⁹ Davis, J.L., Fama, E.F. and French, K.R. (2000). Characteristics, covariances and average returns. *Journal of Finance*, 55(1), pp.389-406.

⁷⁰ Gaunt, C. (2004). Size and book to market effects and the Fama-French three factor asset pricing model: evidence from the Australian stockmarket. *Accounting and Finance*, 44(1), pp.27-44.

R-square values are lower than those observed in the original Fama and French (1993) results for the US, but nevertheless provide important explanatory power.⁷¹ This finding built on earlier work by Gharghori, Chan and Faff (2007) which found that Fama-French factors were capturing some form of priced risk.⁷²

O'Brien, Brailsford and Gaunt (2010) consider information on 98% of all listed companies between 1981 and 2005, the most comprehensive dataset employed in the Australian literature.⁷³ The results also present evidence of size and book-to-market ratio effects, indicating that the FFM provides increased explanatory power relative to CAPM.

Brailsford, Gaunt and O'Brien (2012) also find evidence of a value premium in Australia, but uncover less substantive evidence of a size premium.⁷⁴ Key to their investigation is the portfolio formation technique used in the analysis. Many previous studies simply sorted stocks into arbitrary categories with an equal number of stocks. To address this, the authors formed portfolios that better represent realistic investment sets. The impact of book to market ratios is found to be systematic across all size categories. This lends support to the use of the FFM, as it shows that the findings are robust to different dataset assumptions. Abhakorn, Smith and Wickens (2013) find that the value factor, though not the size factor, helps to determine equity returns.⁷⁵

Chiah et al. (2016) and Huynh (2017) employ the most recent datasets.^{76 77} It should be noted that these two papers employ the five-factor model, which adds terms for profitability and level of investment premiums. However, Huynh (2017) in particular observes that the five-factor model offers only marginal improvements on top of the three-factor model. Importantly, the book-to-market factor (HML) or value premium retains its explanatory power in both studies, even with the inclusion of the profitability and investment factors.

⁷¹ Gharghori, P., Lee, R. and Veeraraghavan, M. (2009). Anomalies and stock returns: Australian evidence. *Accounting and Finance*, 49, pp.555-576.

⁷² Gharghori, P., Chan, H. and Faff, R. (2007). Are the Fama-French Factors proxying default risk? *Australian Journal of Management*, 32, pp.223-249.

⁷³ O'Brien, M., Brailsford, T. and Gaunt, C. (2010). Interaction of size, book-to-market and momentum effects in Australia. *Accounting and Finance*, 49(1), pp.197-219.

⁷⁴ Brailsford, T., Gaunt, C. and O'Brien, M (2012). The investment value of the value premium. *Pacific-Basin Finance Journal*, 20(3), pp.416-437.

⁷⁵ Abhakorn, P., Smith, P. and Wickens, M. (2013). What do the Fama-French factors add to CCAPM? Australian National University, Centre for Applied Macroeconomic Analysis, Working Paper 23/2013.

⁷⁶ Chiah, M., Chai, D., Zhong, A. and Li, S. (2016). A better model? An empirical investigation of the Fama-French Five-factor model in Australia. *International Review of Finance*, 16(4), pp.595-638.

⁷⁷ Huynh, T.D. (2017). Explaining anomalies in Australia with a five-factor asset pricing model. *International Review of Finance*.

Chiah et al. (2016) also find that the SMB factor is not statistically significant. That being said, they do not conclude that the size factor is completely redundant; rather, the factor does still appear to bolster the model's capacity to explain empirical returns. This finding is not inconsistent with the results that we have generated for PoM, in which the size premium contributes substantially less to the return on equity relative to the value premium.

To verify the international applications of the FFM, Fama and French (2006) examine value premiums in 14 international markets (Australia, Belgium, Canada, France, Germany, Great Britain, Hong Kong, Italy, Japan, the Netherlands, Singapore, Spain, Sweden and Switzerland) between 1975 and 2004. International returns are found to exhibit statistically and economically significant value premiums.⁷⁸ Furthermore, the magnitudes of the effects are as substantial for the biggest stocks as they are for smaller stocks. Malin and Veeraraghavan (2004) confirmed the presence of a size effect in France, Germany and the United Kingdom, although they found no evidence of a value effect in these markets.⁷⁹

Country-specific studies also provide backing for the use of the FFM. Nwani (2015) presented findings for 100 stocks in the United Kingdom, using monthly data from January 1996 to December 2013.⁸⁰ He detected evidence of a value effect across small and large cap stocks, suggesting that book to market ratios are an important determinant of returns. Daniel, Titman and Wei (2001) study Japanese stock returns between 1975 and 1997. They find that the observed value premium in average stock returns was even stronger in Japan than in the United States.⁸¹ Rossi (2012) investigates the influence of factors for the Italian Stock Exchange between 1989 and 2004 and confirms the presence of a size effect.⁸²

SFG Consulting reviewed leading finance journals to gauge acceptance of the FFM among finance academics.⁸³ They found FFM is routinely applied to estimate required returns in articles published in the *Journal of Finance* and the *Journal of Financial*

⁷⁸ Fama, E.F. and French, K.R. (2006). The value premium and the CAPM. *The Journal of Finance*, 61, pp.2163-2185.

⁷⁹ Malin M. and Veeraraghavan M. (2004). On the Robustness of the Fama and French Multifactor Model: Evidence from France, Germany, and the United Kingdom. *International Journal of Business and Economics*, 3(2), pp.155-176.

⁸⁰ Nwani, C. (2015). An empirical investigation of the Fama-French-Carhart Multifactor Model: UK Evidence. *Journal of Economics and Finance*, 66(1), pp.95-103.

⁸¹ Daniel, K., Titman, S. and Wei, K.C.J. (2001). Explaining the cross-section of stock returns in Japan: Factors or characteristics. *The Journal of Finance*, 56(2), pp.743-766.

⁸² Rossi, F. (2012). The three-factor model: evidence from the Italian stock market. *Research Journal of Finance and Accounting*, 3(9), pp.151-160.

⁸³ SFG Consulting (2014d). The Fama-French model, 13 May, p.19.

Economics which, it was noted, have both received the highest possible ratings for journals from both the Australian Council of Deans and the Australian Research Council. SFG Consulting argued that “the use of the Fama-French factors, for the purpose of estimating the required return on equity, is so widespread in the academic literature, its use as a measure of normal returns has become a matter of course.”⁸⁴

6.3.5 FFM in regulatory practice

We have identified several examples of regulators applying or considering the results of the FFM. The FFM has been recognised as an appropriate model by several eminent economic experts (for example, Professor Stewart Myers and Professor Julian Franks) engaged by the New Zealand Commerce Commission (NZCC).⁸⁵ Moreover, in its 2009 report concerning the estimation of the cost of capital, the NZCC stated that:⁸⁶

Where appropriate (e.g., where reliable data are available and where the models seem amendable to particular industries), the Commission may use evidence based on the Fama-French and DCF (or DDM) models as cross-checks on the CAPM.

In Australia, IPART has expressed a willingness to consider implementation of the FFM in the future. In the February 2018 final report of its WACC methodology review, IPART stated that:⁸⁷

We intend to monitor the FFM over the next five years to examine how it would perform if we adopted it instead of the SL CAPM in our WACC method.

IPART acknowledged the reasoning that the increased explanatory power of the FFM (relative to the SL CAPM) outweighed any theoretical concerns or costs of implementation, stating that:⁸⁸

In our view, this argument is sufficient to warrant estimation and comparison of FFM estimates, but is not sufficient reason to replace the SL CAPM as our model at this stage.

⁸⁴ SFG Consulting (2014d), p.20.

⁸⁵ Franks, J., Lally, M. and Myers, S. (2008). Recommendations to the New Zealand Commerce Commission on an appropriate cost of capital methodology, 18 December.

⁸⁶ New Zealand Commerce Commission (2009). Revised draft guidelines – the Commerce Commission’s approach to estimating the cost of capital, 19 June, p.21.

⁸⁷ IPART (2018a), p.98.

⁸⁸ IPART (2018a), p.98.

These remarks from an Australian economic regulator lend credence to the implementation of a multi-model cost of equity approach. Consistent with IPART's position, PoM does not propose to remove the SL CAPM from consideration entirely; rather, the SL CAPM and FFM (along with the Black CAPM) should be considered together when determining the appropriate cost of equity for the BEE.

There is also regulatory precedent for the use of the FFM in the UK. In 2005, the then Competition Commission (CC) employed the FFM in a liquefied petroleum gas (LPG) inquiry.⁸⁹ The CC was tasked with estimating the appropriate cost of capital for a pure-play LPG supplier. The CC deemed that there was only one relevant listed UK comparator, and sought to determine whether any size premium was warranted. In this particular application of the methodology, neither the size nor value premium was found to be statistically significant. However, this in no way detracts from this example of the FFM being adopted in a regulatory setting. Regardless of whether the Fama-French factors for this specific firm were significant or not, what is clear is that the economic regulator applied and had regard to the FFM as part of its assessment.

The FFM has been used in several regulatory processes throughout the United States. For example, according to Ronald L. Knecht, the Nevada State Controller:⁹⁰

[W]hile there is still some apprehension about the use of the FF3F [Fama-French Three Factor] Model it has been recognised in at least three states, Massachusetts, Delaware and Nevada, when used in conjunction with other models to produce an arithmetic mean as an estimate. This approach ensures that factors that are ignored by one model are adequately addressed. Because the FF3F model is fairly new relative to other models I am not aware of any jurisdiction that has endorsed it exclusively or adopted allowed rates of return based expressly on it. Instead, the tradition in the United States is for regulatory decisions to review (or even just list) all the evidence in the record and then, subjectively balancing the merits and results of all of it, to arrive at a final conclusion as either a range of reasonableness or a point estimate.

As a former and thereby well-experienced energy regulator, Mr Knecht has employed the FFM in several state regulatory proceedings. These include:

- A 2006 hearing conducted by the Public Utilities Commission of Nevada, where the commission accepted his evidence.⁹¹

⁸⁹ UK Competition Commission (2005). Market investigation into supply of bulk liquefied petroleum gas for domestic use: Provisional findings report, August, Appendix K, p.7.

⁹⁰ Knecht, L. R. (2015). Statement, 19 June, para. 4.6, p.3.

⁹¹ Application of Sierra Pacific Power Company for the authority to increase its annual revenue requirement for general rates charged to all classes of electric customers and for relief properly related thereto; Application of Sierra Pacific

- A 2014 expert evidence held before the California Public Utilities Commission, where the commission acknowledged that the FFM had “gained great currency in investment practice.”⁹²

Furthermore, Mr Paul R. Moul, as an expert witness before the Massachusetts Department of Telecommunication, noted the FFM as a useful approach for investigating the association between stock returns and firm size.⁹³ Mr Paul Hunt as an expert witness before the California Public Utilities Commission presented results using both the CAPM and FFM.⁹⁴ Artesian Water Company before the Delaware Public Service Commission highlighted findings from the FFM that was accepted by the Commission without reservation.⁹⁵ In 2007, before the California Public Utilities Commission, Mr Gary Hayes (an expert from San Diego Gas and Electric) also provided expert testimony using the FFM.⁹⁶

The Public Utility Commission of Nevada in the state of Nevada has recognised the use of the FFM in calculating the return on capital estimates. See, for example, the Decisions in Docket No. 05-10003 and Docket No. 05-10004.⁹⁷ In 2006, Mr Knecht acted as a representative on behalf of the Nevada Public Utilities Commission and used the average of a combination of models, comprised of two dividend discount model (DDM) estimates, average of 2 CAPM/FFM and one risk premium estimate, for the calculation of the return on equity.⁹⁸ Mr Knecht, once again, acted as a representative on behalf of

Power Company for approval of new and revised depreciation rates for electric operations based on its 2005 deprecation study, 2005 Nev. PUC LEXIS 91.

⁹² Application of Southern California Edison Company (U338E) for authority to establish its authorised cost of capital for utility operations for 2013 and to reset the annual cost of capital adjustment mechanism 2014 Cal. PUC LEXIS 633.

⁹³ Moul, R. P. (2005). Direct testimony of Paul. R. Moul, Managing Consultant, P. Moul & Associates, Concerning cost of equity, Commonwealth of Massachusetts Department of Telecommunications and Energy, p.50.

⁹⁴ Application of Pacific Gas and Electric Company for Authority to Establish Its Authorized Rate of Return on Common Equity for Electric Utility Generation and Distribution Operations and Gas Distribution for Test Year 2006. (U 39-M); Application of Southern California Edison Company (U 338-E) for Authorized Capital Structure, Rate of Return on Common Equity, Embedded Cost of Debt and Preferred Stock, and Overall Rate of Return for Utility Operations for 2006; Application of San Diego Gas & Electric Company (U 902-M) for Authority to: (i) Increase its Authorized Return on Common Equity, (ii) Adjust its Authorized Capital Structure, (iii) Adjust its Authorized Embedded Costs of Debt and Preferred Stock, (iv) Increase its Overall Rate of Return, and (v) Revise its Electric Distribution and Gas Rates Accordingly, and for Related Substantive and Procedural Relief 2005 Cal. PUC LEXIS 537; 245 P.U.R.4th 442.

⁹⁵ In the matter of the application of Artesian Water Company, Inc., for an increase in water rates 2003 Del. PSC LEXIS 51 at [8]-[11]

⁹⁶ Testimony of Gary G. Hayes on behalf of San Diego Gas and Electric before the California Public Utilities Commission 2007, p.19.

⁹⁷ Decisions in Docket No. 05-10003 and Docket No. 05-10004, April 26, 2006, 2006 Nev. PUC LEXIS 91.

⁹⁸ Application of Sierra Pacific Power Company, 2006 Nev. PUC LEXIS 91 at [63]

the Nevada Public Utilities Commission in 2007, where he examined the return on equity using the FFM.⁹⁹

Sarmentero and Hull (2017) examine FERC's policy regarding return on equity determinations.¹⁰⁰ They identify Opinion No. 551, issued in September 2016 in regard to the Midcontinent Independent System Operator, as having significant implications for FERC's methodological approach.¹⁰¹ They write that:¹⁰²

The CAPM analysis that Opinion No. 551 relied upon used an upward adjustment based on the rationale that differences in investors' required rates of return that are related to firm size are not fully captured by beta.

In the opinion, FERC reinforced its position from an earlier 2015 opinion that "this type of size adjustment is a generally accepted approach to CAPM analyses."¹⁰³ FERC then goes on to explain that the purpose of such an adjustment is to render the CAPM analysis useful in estimating the cost of equity for companies that are smaller than the companies that are typically used to determine the MRP in the CAPM analysis.

Opinion No. 551 is subject to a rehearing of the case, but it does indicate that regulators are increasingly having regards to the merits of additional premiums that augment the CAPM, bringing them more into line with the conventions of financial practitioners.

6.3.6 FFM in financial practice

A measure of implicit acceptance of the FFM in finance industry practice is indicated by the fact that it is routine for industry practitioners to make additional risk adjustments in estimating the SL CAPM. Independent experts consistently estimate the cost of equity to be several percentage points higher than the estimate derived from a simple application of the SL CAPM alone. The point to emphasise here is that it is plainly common practice among finance practitioners to estimate discount rates based on risk factors in addition to systematic risk.

⁹⁹ Application of Nevada Power Company 2007 WL 2171450 (Nev. P.U.C) at [102]; and Application of Sierra Pacific Power Company, 2006 Nev. PUC LEXIS 91 at [63].

¹⁰⁰ Sarmentero Garzon, A.I. & Hull, G.F. (2017). Developments in FERC policy for determining return on equity. *Energy Law Journal*, 38, pp.375-412.

¹⁰¹ Opinion No. 551, *Association of Businesses Advocating Tariff Equity v. Midcontinent Independent System Operator, Inc.*, 156 FERC ¶ 61,234 (2016), rehearing pending.

¹⁰² Sarmentero Garzon, A.I. & Hull, G.F. (2017), p.396.

¹⁰³ Opinion No. 531-B, *Martha Coakley v. Bangor Hydro-Electric Co.*, 150 FERC ¶ 61,165 (2015), order on rehearing.

In this regard, the survey-based research by Graham and Harvey (2001) and Brounen, de Jong and Koedijk (2004) identified that significant minorities of investors adjusted their expectations based on additional risk factors including business size and market to book ratio.¹⁰⁴ Of the more advanced CAPM alternatives in which additional risk factors are included they found that these techniques were used mostly by large companies. In the case of Bancel and Mittoo (2014), the most recent survey, 66% of respondents consider firm size as a risk factor, while more than 45% have regard to price-book ratios (another term for market-to-book ratios) in their valuations.¹⁰⁵

The Ibbotson Stocks, Bonds, Bills, and Inflation Yearbook is an industry data reference for advisors, planners, and brokers seeking to analyse asset class performance and determine the cost of capital in the US. It provides historical return figures such as equity risk premiums and includes a chapter for each of the FFM factors – quantifying the size and value premiums appropriate to specific settings.¹⁰⁶

Evidence from independent expert reports

This section outlines our insights from independent expert reports, both in Australia and in the United States. For Australian reports, we have analysed the Connect 4 database in relation to the use of the Fama-French Model (FFM) and other adjustments to the SL CAPM. The Connect 4 database (provided by Thomson Reuters) contains independent expert reports for companies listed on the ASX. For US reports, we have consulted the EDGAR SEC filings database.

For the Australian sample, Synergies has investigated all 344 independent expert reports relating specifically to acquisitions, takeovers, divestments, demergers and merger schemes over the last five years (1 January 2013 - present).¹⁰⁷ Of these 344 reports, only 151 (44%) made explicit reference to the use of a WACC or discount rate, and of these only 113 (33%) provide a detailed description of their WACC methodology.

Our main findings are as follows:

- Of the 113 reports with detailed WACC calculations, we have identified 32 IE reports that make ad hoc adjustments to the conventional SL CAPM formulation.

¹⁰⁴ Brounen, D., de Jong, A. and Koedijk, C.G. (2004). Note that Brounen et al. collated and included summaries of the data from Graham and Harvey (2001) in their 2004 paper.

¹⁰⁵ Bancel, F. & Mittoo, U.R. (2014). The gap between the theory and practice of corporate valuation: Survey of European experts. *Journal of Applied Corporate Finance*, 26(4), pp.106-117.

¹⁰⁶ See Wiley Publishing (2017). Available from: <http://au.wiley.com/WileyCDA/WileyTitle/productCd-1119316405.html>.

¹⁰⁷ To facilitate an efficient interrogation of the database, we restricted our analysis to acquisitions with a deal size greater than \$AUD10 million.

- a number of these reports apply size and other premiums consistent with the principles of the FFM model.
- Many IE reports adopt risk-free rates well in excess of contemporaneous risk-free rates.

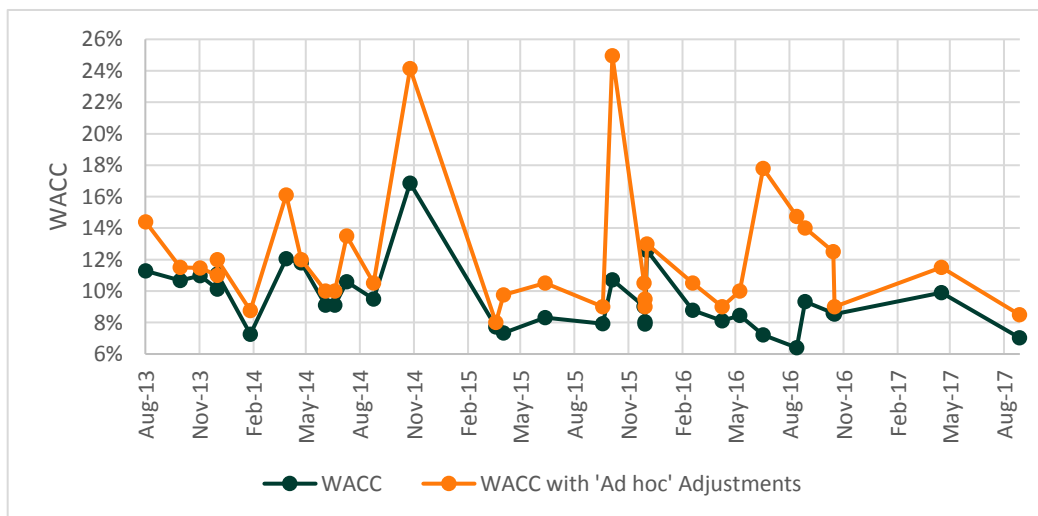
The remainder of this section elaborates on the nature of the risk premiums that we have identified, before discussing discrepancies in the use of risk-free rates.

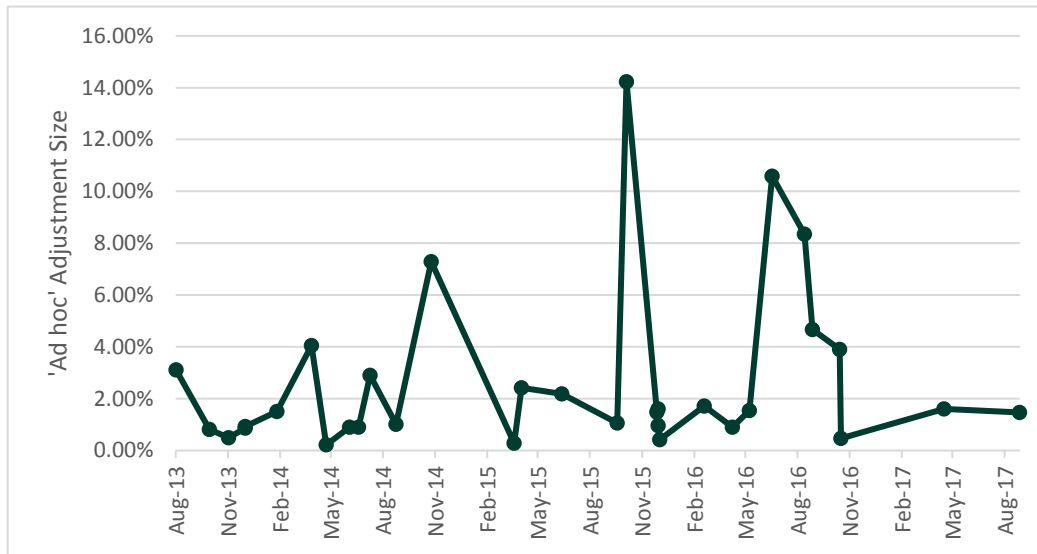
Application of risk premiums

In the 344 independent expert reports that we interrogated, we have not located any formal application of the three-factor Fama-French Model as it is employed in the PoM WACC report. However, we have uncovered evidence that independent experts apply size and other premiums (such as for growth prospects, product execution risk and market-imposed hurdle rates). This is consistent with the underlying rationale of the FFM, which contends that factors other than a firm’s exposure to systematic risk (i.e. its beta with the market) can usefully explain returns.

In cases where size and other risk premiums are applied, the consequences for the resulting WACC are far from immaterial. Figure 2 illustrates the divergence between the actual WACC estimates used in independent expert reports and the WACC estimates in the absence of any ad hoc adjustments for risk premiums. In the upper panel, the orange line denotes the WACC estimate after incorporating the ad hoc premium adjustments, while the dark green line denotes the resulting WACC in the absence of any such adjustments. In the lower panel of Figure 2, we present the magnitude of the ad hoc adjustment, which is in effect the difference between the two lines in the upper panel.

Figure 2 Comparison of WACC estimates with and without ad hoc adjustments





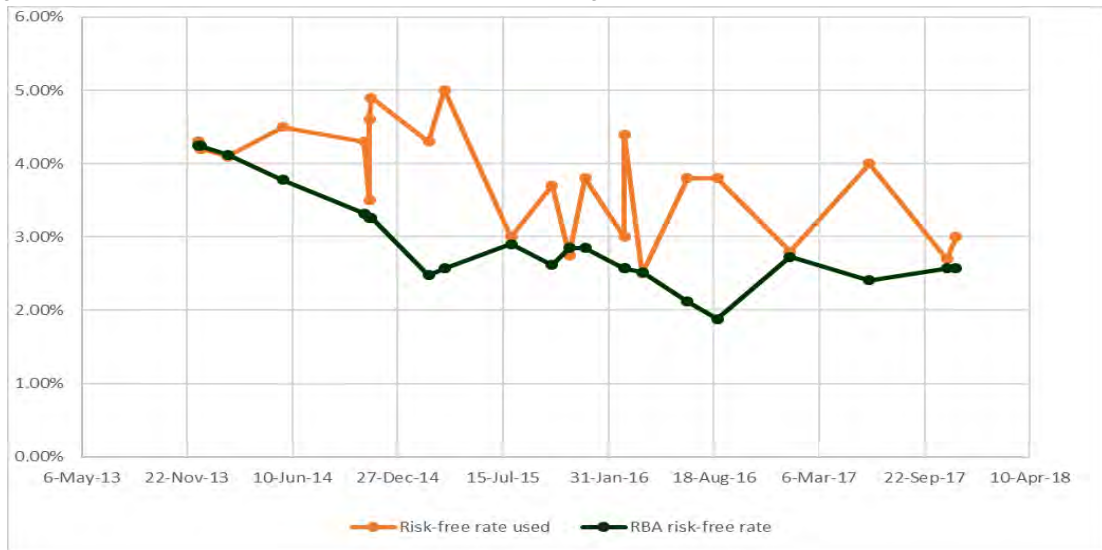
Data source: Connect 4, Synergies calculations

Across the sample, the average size adjustment was 2.65%, while the median was 1.49%. In proportional terms, this causes the ad hoc adjusted WACC estimates to be on average almost a third larger than the unadjusted WACC estimates implied by the CAPM.

Use of higher risk-free rates

In addition to the use of ad hoc premium adjustments, there is also clear evidence that IE reports frequently adopt risk-free rates above the contemporaneous risk-free rate as measured by the RBA. To illustrate this phenomenon, Figure 3 shows the divergence between the risk-free rate adopted in each IE report and the prevailing risk-free rate published by the RBA at the time. This is a significant finding, because it shows that industry practice diverges from the regulatory practice of calculating the risk-free rate based on a short averaging period of contemporaneous data. This will inevitably result in higher WACC estimates than those arising from regulatory processes.

Figure 3 Comparison of risk-free rates with prevailing RBA risk-free rate



Data source: RBA, Connect 4, Synergies calculations

Evidence from US SEC filings

Synergies has also undertaken an interrogation of all SEC filings related to mergers in the US since the beginning of 2017.¹⁰⁸ Over this timeframe, there were 257 such filings, and of these, 23 (approximately 9%) incorporate size premiums into their analysis.¹⁰⁹ Size premiums ranged from 1.0% up to 7.3%. A number of reports made reference to the annually published Duff & Phelps Size Premium.¹¹⁰ Consequently, there is clear evidence that financial practitioners have regard to size premiums when evaluating a firm’s cost of capital. As such, this demonstrates that ad hoc adjustments are indeed made to the conventional CAPM, as typically applied by economic regulators in Australia.

6.3.7 Acceptance in other spheres

When it awarded the 2013 Nobel Prize in Economics to Eugene Fama, the Economic Sciences Prize Committee said that Fama’s extension of the CAPM “greatly improves the explanatory power relative to the single-factor CAPM model.”¹¹¹ The Committee considered asset pricing to be “one of the fields in economics where academic research

¹⁰⁸ The relevant SEC form for mergers is DEFM14A – “Definitive proxy statement relating to a merger, acquisition, or disposition.”

¹⁰⁹ We also uncovered one instance of a book-to-market adjustment.

¹¹⁰ Duff & Phelps Corporation is a global valuation and corporate finance advisor.

¹¹¹ Economic Sciences Prize Committee (2013). Scientific Background on the Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel 2013: Understanding Asset Prices, p.3.

has had the most impact on non-academic practice.”¹¹² It went on to say that “many professional investors use factor models such as the Fama-French model to guide their portfolio decisions”¹¹³ and that “it has become standard to evaluate [investment] performance relative to ‘size’ and ‘value’ benchmarks, rather than simply controlling for overall market returns.”¹¹⁴

The FFM is taught as part of many finance qualifications, including the Chartered Financial Analyst (CFA) certification. As this is the leading professional finance qualification in both Australia and the US, it is noteworthy that course participants are required to be able to both explain and demonstrate the use of both the SL CAPM and the FFM.

6.3.8 Conclusion on Fama-French model

The FFM has clearly demonstrated superior empirical performance in comparison to other asset pricing models. This highlights its importance as a relevant well-accepted model in a regulatory setting, where the long-term interests of consumers are served by ensuring an infrastructure owner is adequately remunerated for its investment. Furthermore, the model has received favourable endorsements from various economic regulators, including most recently by IPART.

6.4 Dividend Discount Model

The DDM is a different construction from the three CAPM models in that it is underpinned by the assumption current stock prices reflect the present value of the expected future cash flows (dividends) that will be paid to investors. In so doing, its value reflects the current risk premium associated with holding the market portfolio.

The DDM is expressed as follows:

$$p = \sum_{t=1}^{\infty} d \frac{(1+g)^t}{(1+r)^t}$$

Where:

p = current stock price

d = dividend

¹¹² Economic Sciences Price Committee (2013), p.42.

¹¹³ Economic Sciences Price Committee (2013), p.43.

¹¹⁴ Economic Sciences Price Committee (2013), p.44.

g = expected dividend growth

r = discount rate/return on equity

The formula can be rearranged to express the return on equity (r) as a function of the stock price and future dividend growth.

6.4.1 Strengths

The DDM is a theoretically strong model because it does not require assumptions to be made regarding what explanatory factors drive expected returns, i.e., this model equates the present value of future dividend cash flows to the current stock price.

Findings from several empirical studies published in academic journals have found outcomes to be in line with the predictions of the model.

Reasonable specifications of the DDM produce estimates of the overall required return on equity that are more stable than the risk-free rate implying a risk premium that tends to partially offset changes in the risk-free rate, so that the estimate of the overall required return does not rise and fall one-for-one with changes in the risk-free rate. This characteristic means the DDM can potentially be used to develop forward-looking estimates of the market risk premium.

The DDM is often applied in financial market and regulatory contexts internationally.

6.4.2 Weaknesses

The model's assumption of constant growth in dividends for all stocks over time is likely to be unrealistic and ignores intertemporal changes in dividend yields. Determining a constant growth assumption is also challenging.

The model is only applicable to mature, stable companies who have a proven track record of paying out dividends consistently. Immature growth stocks or stocks more generally without a track record of paying dividends are not captured in the model.

The DDM is built on the assumption that the only value of a stock is the return on investment it provides through dividends rather than expectations of capital growth, which in practice is unrealistic. We have not pursued the DDM in the current case because of the limited sample of comparable Australian companies to underpin the application of the model. In contrast to the other three cost of equity models that we have examined, the use of overseas comparators for the DDM requires assumptions about key economic inputs (such as long-run growth rates). These may differ from the Australian context, making the estimates derived from the DDM less representative of the

appropriate cost of equity. Previous applications of the DDM have relied heavily upon Australian (and New Zealand) comparators for this reason.

6.5 Choosing a well-accepted cost of equity approach

Based on academic recognition, global regulatory and independent expert practice, we consider the following four models identified in this chapter are well-accepted such that they satisfy the Pricing Order requirements in regards to estimating the rate of return:

- SL CAPM
- Black CAPM
- FFM
- DDM.

Valuation techniques, asset pricing and regulatory practice evolve. Clearly, regulatory precedent in Australia supports the SL CAPM despite a range of known limitations. Given our assessment of strengths and weaknesses of each of the suitable cost of equity models, academic literature and the evidence of global regulatory and financial market practice, we consider it is appropriate to either:

- use values generated from a combination of well-accepted models to estimate the return on equity rather than solely relying on a single model given no single model is compelling in terms of its strengths compared to the other models; or
- if data or other constraints preclude such an approach, to explicitly allow for other approaches to be utilised in the future or to utilise various approaches as a cross check.

The following section explains how we will use a combination of models to estimate the cost of equity rather than solely relying on a single model.

6.5.1 Applying a multi-model approach

We have determined the cost of equity for the benchmark port entity for PoM using a combination of the three well-accepted CAPM models discussed in the preceding sections, with parameters estimated using large datasets, (these being SL CAPM, Black CAPM and FFM). We consider a cost of equity estimate calculated using a combination of these well-accepted approaches will provide a reliable estimate that satisfies all relevant Pricing Order requirements.

The DDM will be applied as a cross-check for the value of our market risk premium estimate. For this regulatory period submission, we have not included the DDM as a standalone well-accepted cost of equity estimate due to the limited comparable set on the Australian Stock Exchange (ASX), which limits the statistical reliability of the results. Instead, we have utilised the DDM as a cross check for our market risk premium estimate (which relies only on a whole of ASX analysis). The DDM contains potentially important (albeit volatile) forward-looking equity market information that can inform an appropriate MRP value.

In light of this, the outstanding methodological issue relates to the relevant weighting to apply to each of the three CAPM models, where the weights, in principle, should broadly reflect the relative strengths and weaknesses of the three models. In our view, it would be reasonable to more heavily weight the FFM than the SL CAPM and Black CAPM given its demonstrably greater predictive power in regards to required market returns. However, recognising this strength is not universally accepted, for simplicity, equal weights of one-third have been applied for each model.

Chapter 7 of our report explains how we have calculated a cost of equity estimate using the SL CAPM model. In Chapters 8 and 9 of our report we present estimates generated by applying the Black CAPM and FFM, respectively.

7 Estimating the return on equity using SL CAPM

Chapter overview		
2018-19 submission	2017-18 submission	Comments
13.48%	13.66%	Our methodology for estimating the SL CAPM pre-tax return on equity is unchanged from the previous submission. However, a decrease in the risk-free rate and market risk premium have resulted in a slightly lower estimate compared to the 2017-18 submission.
SL CAPM parameters		
Risk-free rate: 2.74%	Risk-free rate: 2.81%	The risk-free rate has again been calculated as a 20-day average on 10-year Australian Government bond yields, an approach frequently adopted by economic regulators.
Asset beta: 0.70	Asset beta: 0.70	Our estimate of PoM's asset and equity betas are unchanged from last year's submission. The average and median of the comparator set, across both 5 and 10-year timeframes, reinforces an asset beta of 0.70. This corresponds to an equity beta of 1.00 assuming gearing of 30%.
Equity beta: 1.00	Equity beta: 1.00	
MRP: 7.71%	MRP: 7.77%	Our MRP estimate remains a 50:50 average of the Ibbotson and Wright MRP methodologies, both of which are in use by Australian economic regulators.

7.1 Risk-free rate

The risk-free rate is used in estimating the return on equity and debt. There are three main decisions to be made:

- the proxy used
- the term to maturity
- the averaging period.

7.1.1 Proxy

The Commonwealth Government bond yield is most commonly used as a proxy for the risk-free rate in Australia, including by the ESC.

Concerns have been expressed as to whether it remains the best proxy during highly volatile or uncertain market conditions, where a 'flight to quality' is often observed reflecting increased demand for Commonwealth Government bonds as a safe haven for investors, resulting in a compression of the yield.

However, we consider the Commonwealth Government bond yield remains the best proxy for the risk-free rate in an Australian context. In our view, the downward compression of WACC values that have emerged due to its application in recent years relate more to the rigidity of Australian regulators estimation of the market risk premium than to the risk-free rate itself.

7.1.2 Term to maturity

In an Australian context, the term to maturity most commonly applied for investors in infrastructure with long economic lives is ten years. This is consistent with the long-term forward-looking horizon over which it is assumed investors are forming their return expectations under the SL CAPM.

In Australia, the ten-year bond is the longest liquid maturity currently available. This is also the most commonly used proxy for the risk-free rate in regulatory decisions.

Two Australian regulators, the Queensland Competition Authority (QCA) and WA's Economic Regulation Authority (ERA)¹¹⁵, match the term to maturity with the length of the regulatory period (which we consider is a flawed approach).

We believe the term to maturity should not be set to match the length of the regulatory period. This is because the relevant perspective is not the regulatory period but rather the views of the providers of capital (equity holders and lenders), who will be assessing an investment of this type of infrastructure over a long-term horizon. For PoM, the remainder of the 50-year lease term effectively defines the long-term investment horizon.

We have therefore assumed a ten-year term to maturity, balancing the liquidity of available long-term bond instruments in the Australian market, and the long term nature of the PoM investment.

7.1.3 Averaging period

The length of averaging period for the risk-free rate will depend amongst other things on whether a contemporary rate reflecting current market expectations is preferred to a longer-term average rate that will also incorporate the effects of historical market expectations.

In general, Australian and International corporate finance, academic and regulatory practice uses short averaging periods close to the commencement of each regulatory period.

This is intended to mitigate problems that may occur if there is a spike in yields on-the-day that the rate is applied. It is therefore common practice to average the rate over a short horizon, which typically ranges from between ten and forty days, noting that over such a short horizon the choice of averaging period is likely to be of little consequence. The Independent Pricing and Regulatory Tribunal (IPART) in NSW is the only

¹¹⁵ Except for its determinations for rail access because the use of a 10-year CGS is seen to reflect the requirements of the WA Rail Access Code.

Australian regulator that takes into consideration longer term averages, which it does in conjunction with short term estimates.

We have not provided a detailed outline of the approach to the risk-free rate by overseas regulators, as the calculation is generally uncontentious. The typical approach taken is similar to Australia, in that regulators take a short-term average on government bonds for the given country. We note that in the UK, regulators such as Ofgem and the Competition Markets Authority may also have regard to longer-term averages of government bond yields. This has been in response to recent market conditions, during which the risk-free rate has been deemed to be below its long-run average.

7.1.4 Risk-free rate estimate

Our estimate is based on 10-year Commonwealth Government bond yields and has been produced over a 20-day averaging period to 31 March 2018. As the quoted rates are semi-annual, we have converted them to annual effective rates.¹¹⁶ The resulting estimate is 2.74%.

7.2 Estimating beta

There are three key sources of information for the assessment of an entity's systematic risk, namely:

- Benchmark results from comparable entities
- First principles analysis
- Regulatory precedent.

In undertaking an empirical analysis of beta estimates, reference needs to be made to an appropriate set of listed comparators for whom equity betas can be estimated and we have explained our approach in Chapter 4 of our report. Using share price information for these companies, their equity betas are estimated using regression analysis. As the companies will have different gearing levels (and hence different levels of financial risk), these equity betas must be 'de-levered' to produce an asset beta. This approach is generally applied for the assessment of asset betas under the SL CAPM.

The comparator analysis will typically produce a range of estimates for beta, necessitating an assessment of where PoM's asset beta might sit relative to these other comparators. This assessment is facilitated by a first principles analysis, which is a

¹¹⁶ Annual effective rate = $(1 + \text{semi-annual rate}/2)^2 - 1$

qualitative assessment of PoM's systematic risk profile. This approach analyses the key factors that impact the sensitivity of the firm's returns to movements in the economy or market.

Accordingly, in practice, we see a first principles analysis helping to inform, for a particular firm (in this case, a BEE), where it is likely to sit in the range generated from an empirical assessment. Accordingly, we turn first to an empirical assessment of port related betas and then a first principles assessment of PoM.

Firstly, we consider relevant regulatory precedent.

7.2.1 Relevant regulatory precedent

Six Australian regulators have considered regulated revenues of transport infrastructure:

- ACCC - rail
- IPART - rail
- ERA (WA) - rail
- QCA - rail and coal terminal
- ESC - rail
- ESCOSA - rail.

All regulators have acknowledged the specific challenges the sector presents to identify comparators given the paucity of listed Australian transport entities. However, the ESC and ESCOSA have not engaged in a detailed review of comparable companies for many years and hence they have not been included in this review.

For rail businesses, Australian regulators have generally adopted an international sample of rail and port businesses (ERA for a freight rail network and ACCC for the Interstate network).

These reviews adopt an asset beta in the range we have suggested (0.65 for ARTC and 0.7 for Arc Infrastructure, formerly Brookfield Rail). This aligns with the approach we have adopted and we believe it meets the "well-accepted" threshold.

These approaches (to varying degrees of analysis) conclude that the absence of sufficient Australian transport comparators forces international comparison to ensure robust beta estimates, without the need for the intervening step of a detailed analysis of a broader set of Australian comparators.

Detailed analysis of ERA and ACCC freight rail beta precedent is presented in Attachment E of this report.¹¹⁷

7.2.2 Comparable companies analysis

The first step in a comparable companies analysis involves identifying an appropriate set of listed companies. In defining the BEE, the ESC contends that the Prescribed Services should be provided by a port in Australia. However, as per the discussion in Chapter 4, there are relatively few listed businesses comparable to the BEE operating in Australia. Consequently, it is necessary to rely on international comparators, as well as companies from other transport sectors. This is similar to the approach adopted by regulators in the transport and telecommunications sectors.

The sample includes relevant companies from the Marine Ports and Services classification. Marine ports and terminals are considered a primary comparator set from a first principles analysis due to similar market exposure to container freight trade. With removal of the \$US100 million market capitalisation threshold, we have included six additional firms compared to last year's sample. However, terminal operators are not infrastructure providers providing Prescribed Services.

Freight railroads (in particular, North American Class I railroads) are considered a primary comparator set due to their freight-focussed business model, strong market position and below rail infrastructure services.

Additionally, we included airports in the sample. Despite having different demand drivers to ports, (less driven by cyclical economic drivers), they were close comparators to ports in their core aeronautical infrastructure-related service.

Overall, and notwithstanding the differences noted above, the international sample collectively includes companies with sufficiently comparable systematic risks to PoM that will enable a robust beta estimate to be developed for the BEE.

7.2.3 Beta estimation

Betas have been estimated based on five years of monthly returns, regressed against the relevant domestic share market index using Ordinary Least Squares. We also eliminated any firms with:¹¹⁸

¹¹⁷ On a first principles basis, DBCT, Aurizon and the Hunter Valley and are not relevant comparators for PoM given the nature of the take-or-pay contracts and regulatory regimes in place at those assets (which differ significantly from the Pricing Order).

¹¹⁸ Following beta estimation, we removed a Canadian coal terminal with very high gearing and an asset beta of 1.67 (Westshore Terminals) reducing the average and median asset beta of the sample.

- a t-statistic of less than 2 (this is considered particularly important)
- an R² less than 0.1.

The resulting equity betas were de-levered to produce an asset beta using the Brealey-Myers approach as follows:

$$\beta_e = \beta_a * (1 + D/E)$$

Where

β_e = equity beta

β_a = asset beta

D = proportion of debt within the assumed capital structure

E = proportion of equity within the assumed capital structure

The average gearing levels for each business were calculated using annual data over the five-year period (using the ratio of long-term debt to market value of equity).

Results

The median asset beta across the full sample of comparable companies was 0.69, based on a 5-year sample, while the average was 0.72. We consider a 5-year sample is well-accepted in financial markets and regulatory practice as likely to provide a robust contemporary beta estimate based on a relatively short historical data set that is reflective of contemporary market conditions. As the period of the analysis lengthens a richer data set emerges but the contemporary relevance of the estimates diminishes. Longer sample periods risk incorporating data on market conditions that is no longer relevant to beta estimates.

However, as a robustness check, we also considered average and median betas over 10 years. For this timeframe, the overall median and average beta was 0.75. This highlights the conservatism of our proposed asset beta of 0.7 as the upper bound of the range is at least 0.75.

The full comparator set exhibits a reasonably broad range of relevant and comparable businesses to the BEE. We have calculated the average and median for each sector over a 5-year period, with the estimates presented in Table 13. The full list of beta estimates for each company is presented in Attachment B.

Table 13 **Comparable companies' asset beta summary (5-year period)**

	Overall Average	Overall Median	Overall Minimum	Overall Maximum
Full Sample	0.72	0.69	0.15	1.55
	Sector Average	Sector Median	Sector Minimum	Sector Maximum
Marine Ports and Services	0.70	0.59	0.15	1.55
Railroads	0.84	0.86	0.43	1.15
Airports	0.65	0.69	0.33	1.32
OECD	Sector Average	Sector Median	Sector Minimum	Sector Maximum
Marine Ports and Services	0.65	0.57	0.15	1.19
Railroads	0.83	0.81	0.43	1.15
Airports	0.61	0.40	0.33	1.32
Non-OECD	Sector Average	Sector Median	Sector Minimum	Sector Maximum
Marine Ports and Services	0.74	0.60	0.25	1.55
Railroads	0.86	0.86	0.82	0.91
Airports	0.89	0.89	0.80	0.98

Note: Equity betas were unlevered using the Brealey-Myers approach

Source: Bloomberg

We have also calculated the average and median for each sector over a 10-year period, with the estimates presented in Table 14.

Table 14 **Comparable companies' asset beta summary (10-year period)**

	Overall Average	Overall Median	Overall Minimum	Overall Maximum
Full Sample	0.75	0.75	0.25	1.66
	Sector Average	Sector Median	Sector Minimum	Sector Maximum
Marine Ports and Services	0.75	0.80	0.25	1.61
Railroads	0.87	0.90	0.41	1.66
Airports	0.63	0.64	0.40	0.90
OECD	Sector Average	Sector Median	Sector Minimum	Sector Maximum
Marine Ports and Services	0.62	0.55	0.25	1.03
Railroads	0.79	0.90	0.41	0.99
Airports	0.60	0.51	0.40	0.90
Non-OECD	Sector Average	Sector Median	Sector Minimum	Sector Maximum
Marine Ports and Services	0.84	0.86	0.41	1.61
Railroads	1.21	1.21	0.75	1.66
Airports	0.82	0.82	0.82	0.82

Note: Equity betas were unlevered using the Brealey-Myers approach

Source: Bloomberg

7.2.4 Interpreting the comparator estimates

Within the Marine Ports and Services sector, the 5 year median asset beta across all firms in the sample is 0.59. The median asset beta for Railroads is 0.86, while the median asset

beta for Airports is 0.69.¹¹⁹ These estimates compare with Damodaran (2018) of 0.77 for Transportation and 0.86 for Railroads.¹²⁰

Caution must be exercised in applying these estimates to PoM for several reasons. The most significant issue is the potential differences between PoM and the risk profile of the comparator firms. This includes differences in the activities undertaken by each firm, geographical location, the demand risks faced by each firm (noting that some companies may be diversified across a portfolio of ports) as well as the relative betas of the markets from which each company in the sample is drawn.

As always, it is also important to remain conscious of the susceptibility of beta estimation to error, that is, the risk that the estimated betas do not actually reflect the firm's 'true' beta, particularly in light of the asymmetric consequences of regulatory error. Overall, we believe that these published betas are a reasonable guide to establish a beta for PoM.

7.2.5 First principles analysis

The comparator analysis in Section 7.2.3 produced a range of estimates for beta, which necessitates an assessment of where PoM's equity beta might sit relative to other comparators.

The key objective of the first principles analysis is to inform this decision through qualitatively assessing the sensitivity of the benchmark entity's free cashflows relative to movements in the general economy. It also informs adjustments that may need to be made to empirical estimates from comparator set.

The underlying drivers of demand for PoM's Prescribed Services and hence net cashflows are likely to be strongly correlated to domestic economic activity, driven by fundamentals such as the sensitivity of demand for import and export goods to movements in domestic GDP. In other words, the PoM's revenues and earnings are significantly affected by levels of domestic economic activity.

Given the benchmark beta for PoM is being assessed relative to international comparators, consideration needs to be given as to whether these demand characteristics are likely to be more or less sensitive to domestic economic activity compared to other comparators (relative to their own domestic economies). Overall, we expect that the underlying drivers of demand identified above will generally hold across most major

¹¹⁹ The average asset betas are 0.70 for the Marine Ports and Services sector, 0.84 for the Railroads and 0.65 for Airports.

¹²⁰ Damodaran, A. (2018). Betas by sector (US). Available from: http://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/Betas.html [Accessed 2 April 2018].

container and freight ports and railroads, although demand for airport related services will have a much lower covariance with GDP.

Other issues that may impact on the extent to which the port is exposed to the risk of changes in the demand for port services, such as market power and operating leverage.

To the extent that the Port of Melbourne has greater market power (assuming it was unregulated) than certain comparators, this can be expected to reduce its relative level of systematic risk. It is clear however, that the PoM is not without competition in many of its trades. Even leaving aside the impact of the Pricing Order, PoM's inability to price discriminate means that marginal trades (where it competes with Port Adelaide and Port Botany) become a material competitive constraint on PoM.

Additionally, a key factor in the minds of investors, who will be assessing risk over a long horizon, is the prospect of a second competing port for PoM. In May 2017, Infrastructure Victoria recommended that a new port be constructed at Bay West in 2055, when PoM is expected to reach its capacity of approximately 8 million TEU. Whilst it is true that the development of a second port is not currently imminent, the prospect of a second port brings substitution risk as well as potentially providing PoM's counterparties (shipping, logistics, and, to a certain extent, stevedoring companies) more countervailing power in negotiations.

Moreover, there is clearly scope for the Victorian Government to accelerate the development of a second port towards the second half of PoM's lease period as the State has the ability to bring forward the development of the second port without compensation to PoM. It is necessary to acknowledge that development of a second port is also subject to political considerations, and thus it may not be solely an economic decision. The second airport for Sydney is a prominent example of such factors contributing to the early construction of incremental infrastructure. The Federal Government has committed to the construction of a second Sydney Airport by 2026, despite the existing Sydney Airport asserting that a second airport would not be required until 2045.¹²¹

The highly tangible risks from a second port for PoM are evidenced by the fact that the Victorian Government initially proposed a Port Growth Regime compensation mechanism of 50 years, but ultimately opted for only a 15-year period, as it decided that it was unable to commit to the longer timeframe. Holding all other factors constant, we consider that the impact of a prospective second port should be reflected in a higher value of beta relative to the comparable companies.

¹²¹ NSW Business Chamber (2013). Economic impact of a Western Sydney Airport. August, p.5.

Moreover, PoM has materially higher operating leverage than several of the comparators due to its high fixed capital base as a landlord port, leading to higher systematic risk.

A detailed first principles assessment is contained in Attachment D.

7.2.6 Conclusion: asset beta for PoM

In conclusion:

- the empirical evidence appears to directly support an asset beta estimate of at least 0.7 and up to at least 0.75. The question is whether there are any factors from the first principles analysis that suggest that PoM's systematic risk is different from the average of the sample;
- in this regard, the key differentiator is the prospect of competition from a second port, which increases PoM's exposure to trade flows reflecting domestic and international economic conditions;
- an asset beta of 0.7 is consistent with the most recent regulatory review of a similar freight business in Australia, ARC Infrastructure (formerly Brookfield Rail).¹²²

Overall, we consider that an asset beta value of 0.7 is a reasonable estimate and that an asset beta of 0.75 could be justified from the analysis.

7.3 Market risk premium

7.3.1 Introduction

The market risk premium (MRP) is the amount an investor expects to earn from a diversified portfolio of investments (reflecting the market as a whole) that is above the return earned on a risk-free investment. The key difficulty in estimating the MRP arises from it being an expectation and therefore not being directly observable.

Whilst the MRP is an inherently forward-looking parameter, the difficulty with observing or inferring it from market data means that there is valuable information about its value in historical data (historical averages of excess returns from the market above the relevant risk-free rate).

A range of methods have been developed to estimate the MRP falling broadly into two approaches – historical and forward looking. These are considered in turn. In combining

¹²² ERA (2017). Determination on the 2017 weighted average cost of capital for the freight and urban rail networks, and for Pilbara railways, 6 October.

approaches to determining the MRP we have had regard to the approaches adopted by financial practitioners, academic literature and Australian regulators in their assessment of the MRP.

In the 2017-18 TCS submission, the MRP estimate was based on an arithmetic average of the Ibbotson and Wright historical MRP approaches. Both of these approaches have been accepted by economic regulators in Australia. The Wright MRP is used by both the ERA and the QCA, as detailed in Section 7.3.3.

A remaining consideration is the appropriate weight that should be applied to these two MRP approaches. In current Australian regulatory practice, there is not yet a consensus on the appropriate weightings for these two methods (whether alone or in combination with other approaches). In many instances, as detailed below, the weightings applied to different methodologies are largely at the discretion of economic regulators, and are not completely transparent. Thus, in the absence of any consensus, we have applied a simple 50:50 weight to the two approaches. Given the evidence presented in the following sections, this approach is likely to result in a conservative estimate of the MRP, given current market conditions.

7.3.2 Historical average methodologies

Within the historical average methodologies, there is a range of approaches that can be adopted. However, we consider the most informative measures are at two ends of a spectrum as follows:¹²³

- the Ibbotson approach, which reflects the long term historical average of the difference between the return on the market and the risk-free rate (and has been the preferred method of certain Australian regulators). It assumes that the MRP remains relatively constant through time;
- the Wright approach, which assumes that the overall return on equity remains reasonably stable over time rather than the MRP. It therefore estimates the MRP as the difference between a long-term average of the (real) return on the market and the current risk-free rate. Since the GFC, this approach has gained greater regulatory acceptance.

¹²³ Other methods involve other parameters in the estimation. For example, the Siegel method incorporates inflationary expectations into the analysis. However, in our opinion, this undermines the very strength of historical approaches to the assessment of the MRP.

The post-GFC evidence supports the Wright approach to the determination of the MRP. This point was implicitly made by the Governor of the Reserve Bank of Australia in a speech to the Australian American Association:¹²⁴

But another feature that catches one's eye is that, post-crisis, the earnings yield on listed companies seems to have remained where it has historically been for a long time, even as the return on safe assets has collapsed to be close to zero (Graph 2). This seems to imply that the equity risk premium observed *ex post* has risen even as the risk-free rate has fallen and by about an offsetting amount. Perhaps this is partly explained by more sense of risk attached to future earnings, and/or a lower expected *growth rate* of future earnings.

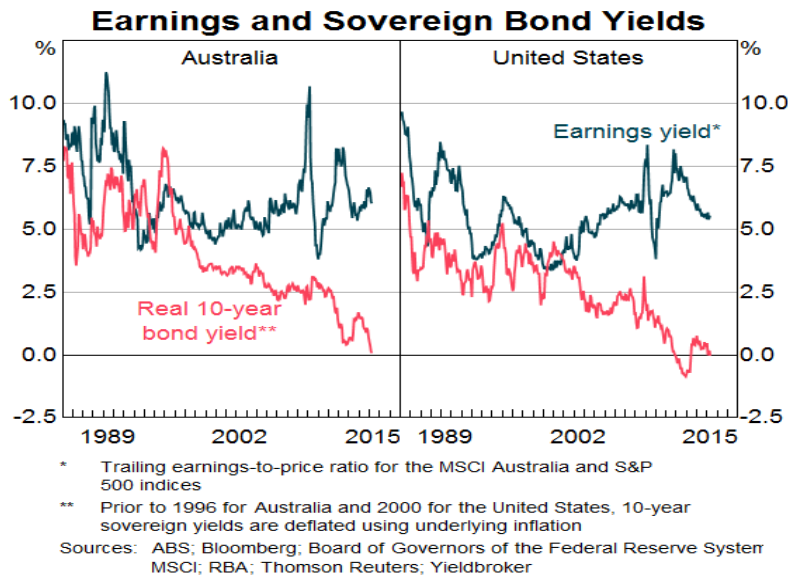
Or it might be explained simply by stickiness in the sorts of 'hurdle rates' that decision makers expect investments to clear. I cannot speak about US corporates, but this would seem to be consistent with the observation that we tend to hear from Australian liaison contacts that the hurdle rates of return that boards of directors apply to investment propositions have not shifted, despite the exceptionally low returns available on low-risk assets.

The possibility that, *de facto*, the risk premium being required by those who make decisions about real capital investment has risen by the same amount that the riskless rates affected by central banks have fallen may help to explain why we observe a pick-up in financial risk-taking, but considerably less effect, so far, on 'real economy' risk-taking.

The graph the Reserve Bank Governor referred to is reproduced in Figure 4.

¹²⁴ Glenn Stevens, Address to The American Australian Association Luncheon, New York, USA – 21 April 2015.

Figure 4 Earnings and sovereign bond yields



Source: RBA

Based on this recent evidence, to the extent that an historical market return informs the MRP (which fundamentally is a forward-looking parameter), the Wright approach should be given more weight than the Ibbotson approach, at least in recent history. Indeed, the fact that the Governor of the Reserve Bank of Australia has specifically commented favourably on the very premise that underpins the Wright approach lends support to its acceptance.

Nevertheless, we have averaged the two approaches here to provide a robust and in our view conservative estimate of the MRP based on historical excess returns.

7.3.3 Regulatory decisions on the MRP

Table 15 summarises the most recent MRP estimates derived by Australian economic regulators. Most regulators have adopted values for the MRP greater than 6%.

Table 15 Most recent MRP estimates applied by Australian regulators

Regulator	Date	Sector	MRP (per cent)
IPART	February 2018	Biannual WACC update	7.6% based on the February 2018 range from 6.0% - 9.1%. Increases to 8.0% once account is taken of uplift to risk-free rate
QCA	December 2017	Rail	7.0% ¹²⁵
ERA	October 2017	Rail	7.2%
ACCC	April 2017	Rail	6%
ESCOSA	June 2016	Water	6%
ESC	July 2016	Water	6%
AER	April 2018	Electricity and Gas	6.5%

Source: Synergies based on Australian regulatory determinations

Key points to note in terms of Australian regulators' recent approved MRPs are as follows:

- IPART derives its feasible MRP range based on long-run averages and current market data. The latter value is derived from the DDM. IPART applies the mid-point of its MRP range. However, IPART's MRP estimate as a margin above the contemporary risk-free rate is greater than its reported value (7.6%) because of the higher risk-free rate assumed in its approach.¹²⁶
- ERA's determination of an MRP range is also based on historical averages (using the Ibbotson and Wright averaging methods) and current market data using the DDM. ERA selects an MRP point estimate from within its range at each regulatory determination based on judgement and has not been transparent about the weighting it applies in reaching this position.
- Until recently, the QCA has applied four main methods to estimate the MRP, being two forms of historical averaging (the Ibbotson and Siegel averaging methods), survey evidence (including independent expert reports) and the Cornell DGM. In its December 2017 UT5 Draft Decision for Aurizon Network, the QCA has also stated that it will now have greater regard to the Wright MRP in its determinations, to which it has previously given only a low weight.¹²⁷
- ESCOSA and ESC appear to solely rely on historical long-term averages based on the Ibbotson averaging approach.

¹²⁵ The QCA's MRP is a 4-year estimate rather than a 10-year estimate.

¹²⁶ IPART (2018b). WACC biannual update, February, p.2.

¹²⁷ QCA (2017). Aurizon Network's 2017 draft access undertaking, December, p.492.

Attachment F provides more details on Australian regulators' estimation of the MRP.

7.3.4 International evidence on estimating the MRP

Ofgem's consultants, Wright and Smithers (2014)¹²⁸, made the following comments in regards to establishing a value for the MRP:

... the [UK's Competition Commission] has given at least some weight to a model in which the expected market return is assumed to have been pulled down by falls in the risk-free rate... We argued against this model, pointing to the lack of any historical stability in the risk-free rate, and hence in estimates of the market equity premium. We believe that recent events have simply added to the weight of evidence against this approach.

A counter-cyclical equity premium is consistent with some more recent academic research, and with recent patterns in observable proxies for risk premiums such as corporate bond spreads. It also has the advantage of providing stability in the regulatory process.

We conclude that there is no plausible case for any further downward adjustment in the assumed market cost of equity based on recent [downward] movements in risk-free rates.

Wright and Smithers conclude:¹²⁹

Thus both historical and more recent evidence point to the same conclusion: in contrast to the stock return there is no evidence of stability in the risk-free rate, at any maturity. As a direct implication, there is no evidence of stability of the market equity premium. Without such evidence, there is no empirical basis for the assumption that falls in risk-free rates should translate to falls in expected market returns.

The US Federal Energy Regulatory Commission (FERC) has adopted a similar stance. It was previously FERC's practice to adjust the return on equity with a 1:1 correspondence between the return on equity and changes in US Treasury bond yields. However, in light of the GFC, they have decided that this methodology may no longer "produce a rational result":¹³⁰

The capital market conditions since the 2008 market collapse and the record in this proceeding have shown that there is not a direct correlation between changes in U.S.

¹²⁸ Wright, S. and Smithers, A. (2014). The cost of equity for regulated companies: A review for Ofgem, p.2.

¹²⁹ Wright, S. and Smithers, A. (2014), p.15.

¹³⁰ Opinion 531, Docket EL11-66-001, FERC, June 2014, pp 77-78.

Treasury bond yields and changes in ROE... U.S. Treasury bond yields do not provide a reliable and consistent metric for tracking changes in ROE.

In support of the Wright approach, the Alberta Utilities Commission acknowledged in 2011 that the market risk premium may be higher than its historic average due to low prevailing interest rates. This decision was supported by regression analysis, which demonstrated that the market return on equity changes by less than changes in the risk-free rate.¹³¹

Dobbs, Koller and Lund (2014) from McKinsey Inc. have also contributed to the debate about the MRP:¹³²

... a “rational expectations” investor who takes a longer-term view should regard today’s ultra-low rates as temporary and therefore likely will not reduce the discount rate used to value future cash flows. Moreover, such investors may assign a higher risk premium in today’s environment. Our conversations with management teams and corporate boards suggest that they take a similar approach when they consider investment hurdle rates. None of those with whom we spoke have lowered the hurdle rates they use to assess potential investment projects, reflecting their view that low rates will not persist indefinitely.

The NZCC calculates a tax-adjusted MRP (TAMRP) based on the median of five different methods: the Ibbotson MRP, two versions of the Siegel approach, a DGM estimate, and surveys.¹³³ As per our analysis in this chapter, we have significant reservations with regard to the use of the Siegel approach and/or surveys, and to a lesser extent with the use of DGM estimates at this point in time given data quality (noting that these approaches are theoretically sound).

7.3.5 Forward looking approaches to the MRP

The MRP is an inherently forward looking concept. Whilst historical approaches to the assessment of the MRP are transparent and relatively straight forward, the assessment of the forward looking MRP is less clear – the very nature of the process involves distilling forecast future expectations of returns. Consequently, there is a range of estimates available that apply several different methods.

¹³¹ Villadsen, B., Vilbert, M.J. and Brown, T. (2012). Survey of Cost of Capital Practices in Canada, 31 May.

¹³² Dobbs, R., Koller, T. and Lund, S. (2014). “What effect has quantitative easing had on your share price?” McKinsey on Finance, Winter (49), p.16.

¹³³ New Zealand Commerce Commission. (2016). Input methodologies review decisions – Topic paper 4: Cost of capital issues, 20 December.

As discussed in Chapter 6 of our report, in theory, the DDM reflects the market price for a security – it equates the present value of expected future dividends to the current price of the relevant security. The approach can equally be applied to estimate the market risk premium.

There are several issues to be addressed in calculating the DDM, whether for an individual security or for the market as a whole. Here, we have applied three well known approaches to the estimation of the MRP:

- Damodaran (2013), a modified two stage method;¹³⁴
- Bank of England (2010), a multi-stage dividend discount model; and¹³⁵
- Gordon Constant Growth Model.

We apply equal weighting to all three sub-models as we think there is sufficient differentiation between assumptions in the models to provide an appropriate estimate when they are averaged.

Table 16 presents the results of these approaches.

Table 16 Forward looking MRP estimates based on DDM (based on a zero gamma)

Methodology	Estimate	Weighting
Damodaran (2013)	7.39%	33%
Bank of England (2010)	7.41%	33%
Gordon Constant Growth Model	7.04%	33%
Weighted Average MRP	7.28%	

A key issue that prevails in the estimation of DDMs is the estimate of the long-run growth rate, to which dividend growth is assumed to converge. For example, the AER’s estimate of long-run growth rate is 4.6%. In contrast, IPART applies a higher long-run growth rate assumption of 5.5%. This value assumes GDP growth of 3% and inflation of 2.5%.

McKenzie and Partington explain the importance of these assumptions in compiling DDM estimates as follows:¹³⁶

¹³⁴ Damodaran, A. (2013). Equity risk premiums (ERP): Determinants, estimation and implications - The 2013 edition, pp.63-73.

¹³⁵ The Bank of England developed another approach in 2002. This approach is one of the methods adopted by IPART on its assessment of the MRP. However, the Bank of England (2002) approach has not been included in our analysis as it was not developed to derive implied MRPs.

¹³⁶ McKenzie, H. and Partington, G. (2011). Equity market risk premium, December, p.25.

Clearly valuation model estimates are sensitive to the assumed growth rate and a major challenge with valuation models is determining the long run expected growth rate. There is no consensus on this rate and all sorts of assumptions are used: the growth rate in GDP; the inflation rate; the interest rate; and so on.

There is a lack of agreement around the appropriate value for the long-run growth rate. As this is a key input in DDM calculations, different estimates can lead to substantial differences in final estimates of the MRP. Any instability generated by fluctuating dividend forecasts, as well as disagreement about the assumed speed at which dividend growth converges to the long-run rate further compounds the instability of this value.

Consequently, our view is that MRP estimates based on forward-looking approaches, while theoretically appealing, tend to be significantly less stable when compared to historical approaches. For this reason, we have not applied a forward-looking MRP derived using the DDM. We have not adjusted the weighted average MRP of 7.28% from Table 16 for dividend imputation; doing so would have increased the MRP.

7.3.6 Estimating MRP using Market Surveys

To varying degrees, Australian regulators have referenced the outcomes of market surveys to support their preferred MRP values.

Lally (2013) notes that “the respondents to these surveys are academics, analysts, and managers rather than investors per se.”¹³⁷ Hence it is unlikely that the overwhelming majority of any of the survey respondents would be employing their estimate of the MRP to reach real-world investment decisions.

The Australian Competition Tribunal has raised concerns about the use of market surveys:¹³⁸

Surveys must be treated with great caution when being used in this context. Consideration must be given at least to the types of questions asked, the wording of those questions, the sample of respondents, the number of respondents, the number of non-respondents and the timing of the survey. Problems in any of these can lead to the survey results being largely valueless or potentially inaccurate.

When presented with survey evidence that contains a high number of non-respondents as well as a small number of respondents in the desired categories of

¹³⁷ Lally, M. (2013). Response to submission on the risk-free rate and the MRP, 22 October, p.23.

¹³⁸ Application by Envestra Ltd (No. 2), ACompT 3, para. 162-163.

expertise, it is dangerous for the AER to place any determinative weight on the results.

In our view, market surveys are not a transparent or robust approach to guiding determination of the MRP and therefore we consider that minimal weight should be attributed to them. Furthermore, the methodologies employed by respondents can depart from the conventional theory and ad hoc adjustments are common.

Attachment F of our report provides more information on market surveys.

7.3.7 Conclusion on the MRP

It is clear that the majority of regulators have acknowledged the limitations of solely relying upon the Ibbotson approach to assess the MRP.

Several regulators (including the ERA and QCA), the Governor of the Reserve Bank and international regulatory bodies and financial experts have explicitly or implicitly adopted the Wright approach to the formulation of the MRP. Clearly, the Wright approach is a well-accepted approach. It is arguable that forward-looking approaches based on the DDM are well-accepted, although in this instance we have used them as a cross-check given their inherent instability and the ongoing disagreement over transition and terminal growth discount rates.

Accordingly, for the purposes of estimating the MRP we have averaged the outcomes of applying the Wright and Ibbotson approaches.

Our simple weighted average estimate of the MRP based on these approaches is a value of 7.71% (assuming a gamma of 0.25) as shown in Table 17.

Table 17 Current Estimates of the MRP

Methodology	Estimate (assuming zero gamma)	Estimate (assuming 0.25 gamma)	Weighting
Ibbotson Historical Excess Returns	6.43%	6.56%	50%
Wright Historical Excess Returns	8.72%	8.86%	50%
Weighted Average MRP	7.58%	7.71%	

Source: Synergies calculations

This MRP value is below the most recent IPART update (7.6%) once account is taken of the higher risk-free rate assumed in its approach (approximately 40 basis points), resulting in an effective MRP of 8.0%.

7.4 SL CAPM estimate

Synergies' SL post-tax CAPM estimate and its underlying input parameter values are presented in Table 18 (assuming a gamma of 0.25 which we address in Chapter 11 of our report).

Table 18 SL CAPM post-tax cost of equity estimate

Parameter	Value
Risk-free rate	2.74%
Gearing	30%
Asset beta	0.7
Equity beta	1.0
MRP	7.71%
SL CAPM	10.45%

Source: Synergies

7.4.1 Pre-tax return on equity

Given the Pricing Order requires that the WACC estimate be expressed in pre-tax nominal terms, the following formula grosses up the post-tax Re for gamma-adjusted corporate tax to generate a pre-tax Re:

$$\text{Pre-tax Re} = \text{Post tax Re} / (1 - t * (1 - \gamma))$$

Where

t = corporate tax rate = 0.3

γ = gamma (refer Chapter 11 of our report)

Substituting the parameter values into the above formula:

$$\text{Pre-tax Re} = 10.45\% / (1 - 0.3 * (1 - 0.25))$$

$$\text{Re} = 10.45\% / 0.775$$

Pre-tax SL CAPM Re = 13.48%

8 Estimating the return on equity using Black CAPM

Chapter overview		
2018-19 submission	2017-18 submission	Comments
13.48%	13.66%	Our methodology for calculating the return on equity using the Black CAPM is unchanged. The pre-tax return on equity from the Black CAPM is identical to that based on the SL CAPM. This is due to PoM's assumed equity beta of 1.00, at which point the two models provide equal estimates.

8.1 Estimating the Black CAPM return on equity

8.1.1 Post-tax return on equity

SFG has estimated the zero-beta premium to be 3.34%. The zero-beta return is the sum of risk-free rate and the zero-beta premium. Hence, our SL CAPM estimate can be combined with this zero-beta premium to estimate the Black CAPM return on equity using the following formula:

$$R_e = R_z + \beta_e * [E(R_m) - R_z]$$

Where

R_z = risk-free rate plus zero beta premium

β_e = beta

$E(R_m)$ = market return

Parameter values:

Zero beta premium = 3.34% (taken from SFG)

Risk-free rate = 2.74% (refer Chapter 7 of our report)

Market return = 10.45% (risk-free rate of 2.74% plus MRP of 7.71% from Chapter 7)

Equity beta of 1.00 (refer Chapter 7 of our report)

Substituting the parameter values into the Black CAPM formula:

$$R_e = (2.74\% + 3.34\%) + 1.00 * (7.71\% - 3.34\%)$$

$$R_e = 6.08\% + 4.37\%$$

Post-tax Black CAPM R_e = 10.45%

8.1.2 Pre-tax return on equity

Given the Pricing Order requires that the WACC estimate be expressed in pre-tax nominal terms, the following formula grosses up the post-tax Re for gamma-adjusted corporate tax to generate a pre-tax Re:

$$\text{Pre-tax Re} = \text{Post tax Re} / (1 - t * (1 - \gamma))$$

Where

t = corporate tax rate = 0.3

γ = gamma = 0.25 (refer Chapter 11 of our report)

Substituting the parameter values into the above formula:

$$\text{Pre-tax Re} = 10.45\% / (1 - 0.3 * (1 - 0.25))$$

$$\text{Re} = 10.45\% / 0.775$$

$$\text{Pre-tax Black CAPM Re} = 13.48\%$$

8.2 Black CAPM estimate

Our estimate of the pre-tax return on equity for the benchmark port entity based on the Black CAPM is 13.48%.

9 Estimating the return on equity using the Fama-French Model

Chapter overview		
2018-19 submission	2017-18 submission	Comments
15.51%	15.12%	The pre-tax return on equity estimate is marginally higher compared to last year's submission. The HML beta is lower, but the MRP and SMB betas have increased. We have made a slight adjustment to our methodology for companies from countries without country-specific factors. Last year, in such instances, we regressed the company's return on global factors from the Ken French database. This year, we have retained the global estimates for the HML and SMB returns, but the market returns for the MRP factor are now based on the given company's local index. As such, the market beta estimate more closely resembles the beta estimate for the CAPM.

The return on equity is calculated as follows:

$$Re = Rf + \beta_j * [E(R_m) - R_f] + \beta_k * [HML] + \beta_l * [SMB]$$

Where:

Rf = the risk-free rate of return

E(Rm) = the expected return on the market

[E(Rm) - Rf] = the market risk premium (Australian estimate: 7.71%)

HML = expected high-minus-low risk premium (Australian estimate: 6.10%)

SMB = expected small-minus-big risk premium (Australian estimate: 1.93%)

β_j = market excess returns beta

β_k = high-minus-low factor beta

β_l = small-minus-big factor beta

Note that the risk-free rate and MRP under this model match the values used in the SL CAPM. As for the SL CAPM, the FFM restricts the zero-beta rate to be the risk-free rate.

Table 19 provides our updated FFM risk factor premium estimates.

Table 19 FFM equity betas and risk factor premiums

Risk factors	Estimated equity betas	Risk factor premiums
Market risk premium	1.06	7.71%
High minus low (HML) premium	0.11	6.10%
Small minus big (SMB) premium	0.23	1.93%

Source: Synergies, Brailsford, T., Gaunt, C. and O'Brien, M (2012)

9.1.1 Post-tax return on equity

As noted in the preceding section, the post-tax FFM formula is as follows

$$Re = R_f + \beta_j * [E(R_m) - R_f] + \beta_k * [HML] + \beta_l * [SMB]$$

Substituting the parameter values into the FFM formula as follows:

$$R_f = 2.74\%$$

$$\beta_j = 1.06$$

$$[E(R_m) - R_f] = 7.71\%$$

$$\beta_k = 0.11$$

$$[HML] = 6.10\%$$

$$\beta_l = 0.23$$

$$[SMB] = 1.93\%$$

$$\text{Post-tax } Re = 2.74\% + ((1.06 * 7.71\%) + (0.11 * 6.10\%) + (0.23 * 1.93\%))$$

$$\text{Post-tax FFM } Re = 12.02\%$$

9.1.2 Pre-tax return on equity

Given the Pricing Order requires that the WACC estimate be expressed in pre-tax nominal terms, the following formula grosses up the post-tax Re for gamma-adjusted corporate tax to generate a pre-tax Re:

$$\text{Pre-tax } Re = \text{Post tax } Re / (1 - t * (1 - \gamma))$$

Where

$$t = \text{corporate tax rate} = 0.3$$

$$\gamma = \text{gamma} = 0.25 \text{ (refer Chapter 11 of our report)}$$

Substituting the parameter values into the above formula:

$$\text{Pre-tax } Re = 12.02\% / (1 - (0.3 * (1 - 0.25)))$$

$$Re = 12.02\% / 0.775$$

$$\text{Pre-tax FFM } Re = 15.51\%$$

9.2 FFM estimate

Our estimate of the pre-tax return on equity based on the FFM is 15.51%, which is higher than the SL CAPM and Black CAPM, reflecting the incorporation of two additional risk factors that, along with systematic overall market risk, explain investors' expected return on equity for the benchmark port entity.

10 Estimating the return on debt

Chapter overview		
2018-19 submission	2017-18 submission	Comments
Risk-free rate: 2.74%	Risk-free rate: 2.81%	The risk-free rate has again been calculated as a 20-day average on 10-year Australian Government bond yields, an approach frequently adopted by economic regulators.
DRP: 2.53%	DRP: 2.54%	This year, the return on debt has been calculated using a trailing average methodology, which places a 90% weighting on the 2017 on-the-day estimate, and a 10% weighting on the 2018 on-the day estimate. Each year, 10% of the weighting on the 2017 on-the-day estimate will be refreshed with the prevailing on-the day estimate for the given year. The trailing average approach is used by several Australian regulators and will result in less volatility over time. Our position on debt raising costs is unchanged.
Debt raising costs: 0.1%	Debt raising costs: 0.1%	
Return on debt: 5.37%	Return on debt: 5.45%	

10.1 Introduction and background

The Pricing Order provides no guidance regarding estimation of the return on debt beyond it being one or a combination of well-accepted approaches. Furthermore, the ESC has not made specific reference to our chosen methodology in any of its commentary. In simple terms, the return on debt calculation is the sum of the risk-free rate and an estimate of the debt risk premium consistent with the risk profile of the benchmark efficient port entity.

This approach is well-accepted in financial markets and by economic regulators in Australia and internationally, underpinned by the concept of credit spreads reflecting credit and liquidity risks associated with government and corporate bonds. A credit spread is the difference in yield (return to the investor) between two bonds of similar maturity but with different credit quality due to the different underlying risks associated with each bond. The difference in yields between a long-term government bond (assumed to be the risk-free rate) and an equivalent term corporate bond is an example of the credit spread concept.

The return on debt calculation can be expressed as follows:

$$R_d = R_f + \text{DRP} + \text{DRC}$$

Where:

R_f = risk-free rate

DRP = debt risk premium

DRC = debt raising costs

An allowance for debt raising costs could be included in the cashflows of the benchmark entity as an opex item rather than included in the R_d formula.

In applying the above return on debt formula, there are several underlying assumptions that are required including in regards to:

- risk-free rate
- notional credit rating assumption
- term to maturity
- debt management approach
- method used to estimate the debt risk premium (DRP)
- assumed debt raising costs.

Each of these parameters is estimated in the sections below after we have summarised well-accepted methodologies regarding estimation of the return on debt.

10.1.1 Implications of ESC commentary for return on debt

The ESC has not made any direct reference to PoM's return on debt methodology in any of its WACC commentary up to this point. As such, the reasonableness of our approach can at present only be assessed against the ESC's broader position on well-accepted, namely acceptance by at least one economic regulator.

In the 2017-18 WACC submission, we applied an on-the-day approach, which was appropriate in the context of the PoM Long Term Lease transaction and the first TCS. This year we have commenced a trailing average approach, which is currently adopted by several Australian regulators. The trailing average calculation places a 90% weighting on the 2017 return on debt estimate, and a 10% weighting on the 2018 return on debt estimate. With each subsequent year, 10% of the 2017 weighting will be refreshed with the prevailing return on debt estimate.

This approach is being adopted on the basis of its lower volatility over time, and because it is more consistent with the debt management practices of a benchmark efficient entity. It is also in line with our approach to other WACC parameters, which, where possible, are based on long-term averages. This methodology is also consistent with the approach currently in use by the AER.

Our methodology for calculating the 2018 on-the-day estimate used in the trailing average calculation is unchanged from last year's submission.

10.2 Well-accepted methodologies

Given the CAPM is intended to reflect expectations as of the day of analysis, it is theoretically correct to base the risk-free rate on the prevailing yield on the date of the valuation. This means that the return on debt is based on prevailing rates, set over a very

short averaging period prior to the point at which prices are reset. It then remains fixed during the regulatory period, with the regulated business managing the risk of interest rate movements.

However, problems may occur if there is a spike in yields on-the-day that the rate is applied. It is therefore now common regulatory practice to average the rate over a short horizon, which typically ranges from between ten and forty days, noting that over such a short horizon the choice of averaging period is likely to be of little consequence. The Independent Pricing and Regulatory Tribunal (IPART) in NSW is the only Australian regulator that has looked at longer term averages, which it does in conjunction with short term estimates.

Until relatively recently, Australian regulators always applied an 'on-the-day' approach to estimate the return on debt. The ACCC is the most recent example, which presented an 'on-the-day' return on debt calculation in its April 2017 HVAU Draft Decision.

Other economic regulators have now accepted the trailing average approach, including the ESC in regard to Melbourne Water, which allowed an immediate transition but based on a data series that excluded the 'GFC years' (2008-09 to 2012-13). This approach emanates from the recognition that in practice, a more efficient debt management strategy may be to maintain a staggered debt maturity profile and progressively refinance debt through time. This in turn means that the return on debt set in the WACC will therefore reflect the cost at which debt was raised or refinanced historically, resulting in a return on debt that reflects historical rates. The trailing average approach involves 'averaging in' a portion of the prevailing return on debt each year.

The ERA has also accepted the trailing average approach in recent gas network decisions,¹³⁹ although based on a 'hybrid' approach, allowing an immediate transition for the DRP and a ten-year transition for the base rate.¹⁴⁰

In its recent decision for SA Water, the Essential Services Commission of South Australia (ESCOSA), determined that it will immediately transition to this approach in the first year of its new regulatory control period.¹⁴¹

¹³⁹ Refer: ATCO Gas Australia, Dampier to Bunbury Pipeline.

¹⁴⁰ The rationale for this is that the benchmark efficient entity can use swap transactions to hedge the base rate component of its return on debt at each regulatory reset. However, it cannot similarly hedge the DRP.

¹⁴¹ ESCOSA (2016). SA Water Regulatory Determination 2016, Final determination, June. In making this conclusion, ESCOSA noted that over the previous ten years, there would have been an immaterial difference had there been a gradual transition to the trailing average compared to the on-the-day approach.

The AER has also now transitioned to a trailing average approach as explained in its Rate of Return Guideline.¹⁴² The 2012 rule changes made by the AEMC allowed for the return on debt to be estimated based on one of: the trailing average approach; the current on-the-day approach; or a hybrid of the two. In its 2013 Rate of Return Guideline, the AER determined that its preferred approach is the trailing average. It has employed a simple averaging approach, which means that each year, one-tenth of the prevailing ten-year bond yield would be ‘averaged in’ to the return on debt estimate.¹⁴³ This means that the regulated return on debt, and hence tariffs, will vary throughout the period.¹⁴⁴ The AER also determined that this must be implemented over a ten-year transition period.¹⁴⁵

The only Australian regulator that has explicitly rejected the trailing average approach is the Queensland Competition Authority (QCA).

It is also informative to consider evidence from regulators overseas in regard to how they determine the appropriate cost of debt. A number of regulators adopt a trailing average methodology.

The NZCC has previously used a prevailing average (i.e., an on the day approach). However, in its 2016 Input Methodologies Review, the NZCC announced that it would move to a five-year historical averaging approach for the debt premium. This change applies only to the debt premium, and a prevailing average will be retained for the risk-free rate. In explaining this change of methodology, the NZCC observed that:¹⁴⁶

Firms can be exposed to any difference between the debt premium paid at the time they issue debt and the debt premium determined during the averaging window prior to the setting of the WACC.

Whereas in Australia most regulators employ data from Bloomberg and/or the RBA, the NZCC constructs a pool of publicly traded corporate bonds that are comparable to the regulated entity in question. The NZCC allows for debt issuance costs of 0.20%.

In the UK, Ofgem bases its cost of debt on Markit iBoxx Non-Financial corporate bond market indices, and applies a 10 year trailing average. The Competition and Markets

¹⁴² AER (2013a), p.28.

¹⁴³ We would consider that a more effective approach would be to adjust the changes in the benchmark debt balance, as this recognises the lumpy capital expenditure profiles that are typical of regulated businesses, that is, in a year when capital expenditure is high, more weight would be given to the prevailing return on debt in that year.

¹⁴⁴ Alternatively, they could be adjusted via a ‘true up’ mechanism at the end.

¹⁴⁵ This is seen as particularly relevant at the current time given the recent contraction in debt margins, that is, the estimate that would be produced using the ‘on-the-day’ approach would be lower than the trailing average, which would reflect the significant expansion in debt margins following the global financial crisis.

¹⁴⁶ New Zealand Commerce Commission. (2016). Input methodologies review decisions – Topic paper 4: Cost of capital issues, 20 December, para. 138.

Authority has regard to evidence from yields and spreads on sterling-denominated corporate bonds issued by energy firms in the UK, along with evidence from spreads on UK corporate bonds more generally.

10.2.1 Synergies' assessment

The application of a long-term trailing average approach is more likely to approximate the debt management practices of an entity that has been subject to deterministic price regulation for a long period, but this does not invalidate the application of the on-the-day approach. This is because a regulated entity could choose to adopt a debt management practice that reflects the on-the-day approach.

Indeed, the Australian energy regulatory framework recognises that the return on debt can be estimated based on either the on-the-day approach or the trailing average approach or a hybrid of the two. This is left to the discretion of the regulated entity notwithstanding the AER's current preference for the trailing average approach.

In the context of the benchmark port entity, we consider that the choice between these approaches should reflect the preferences of the Port Licence Holder. This is because a return on debt for a benchmark efficient entity can be estimated under both the on-the-day and trailing average approaches. Based on the Port Licence Holder's guidance, this year we have transitioned to a trailing average approach, which will place a 90% weighting on the 2017 return on debt estimate, and a 10% weighting on the 2018 return on debt estimate.

10.3 Risk-free rate

As noted in Chapter 7, we have applied an updated estimate of the risk-free rate based on a twenty-day average of the ten-year Commonwealth Government bond yield as at 31 March 2018.

The resulting estimate is 2.74 per cent (annual effective).

10.4 Notional credit rating assumption

A common starting point for the notional credit rating assumption is BBB, or minimum investment grade. The most common notional credit rating assumption applied to regulated entities in Australia is either BBB or BBB+.

It is noted that in practice, this distinction often has no practical consequence given most regulators have estimated the BBB/BBB+ DRP from the broader BBB corporate bond category, which reflects BBB-, BBB+ and BBB bonds.¹⁴⁷

It is also appropriate that the credit rating assumption used for the DRP should be consistent with the gearing assumption.

In Australian regulatory practice, the adoption of an investment grade credit rating for an efficient benchmark entity has not been contentious.

10.5 Term to maturity

Consistent with our risk-free rate calculation for the return on equity, we have assumed a ten-year term to maturity for BBB bonds, the longest available tenor (with appropriate liquidity) in an Australian context.

There are currently two robust data series available with the relevant bond yield information, Reserve Bank of Australia (RBA) and Bloomberg. These series are discussed further in Section 10.7 below.

10.6 Debt management approach

The options that have been adopted by Australian regulators are as follows:

- Risk-free rate based on the 10-year Commonwealth bond yield plus debt margin calculated using the prevailing cost of funds based on a short averaging period close to commencement of the regulatory period.
- Risk-free rate based on the 10-year Commonwealth bond yield plus debt margin calculated using a moving 10-year historical trailing average.
- Some form of hybrid approach, which is based on a 10-year rolling average of the debt risk premium on 10-year corporate bonds added to the 5-year swap rate prevailing close to commencement of (first) regulatory period.

The issue of the best approach to estimating the return on debt is likely to be determined by the debt management strategies of many regulated entities subject to deterministic price setting arrangements. The BEE test does not undermine this approach – rather, the question is what the cost of debt would be for the BEE given its debt management approach.

¹⁴⁷ The exceptions to this are the QCA and the ERA, who both employ their own ‘bespoke’ in house approaches to estimate the DRP.

In the case of the benchmark port entity, we consider that a trailing average approach to estimating the return on debt is now appropriate, as this methodology is more reflective of the debt management practices of a benchmark efficient entity. Unlike last year's first regulatory period, PoM will now have a time series of return on debt estimates that can be used to inform such a calculation.

The remainder of this chapter outlines how we have calculated the 2018 on-the-day return on debt estimate, before detailing how we have weighted this estimate in our trailing average calculation.

10.7 Debt risk premium (DRP)

The DRP is estimated based on the difference between the yield on ten-year BBB corporate bonds and the risk-free rate (averaged over the same twenty-day period).

The key issue is the data source and methodology used to estimate the ten-year BBB corporate bond yield. The majority of Australian regulators use an independent third party data source, being either Bloomberg's BVAL series or the RBA's bond yields for non-financial corporates, with the exception of the QCA and ERA. The latter employ their own in-house methodology that applies an econometric approach. The use of an independent third party data source as they are independent, reputable and robust represents a well-accepted approach.

In its October 2015 decision for Telstra, as well as its April 2017 decision for ARTC, the ACCC applied an average of Bloomberg and RBA estimates. The AER has similarly applied an average of the two in its decisions made under its current Rate of Return Guideline, which specifies that it will continue to use an independent third party data source to estimate the DRP.

10.7.1 RBA series

There are two issues that need to be addressed in the use of the RBA's data:

- *single day end of month estimate*: as the estimates are currently only produced on the last day of each month, there is a risk that this day was 'atypical' or influenced by a one-off event or perturbation in the market. This can be addressed by taking an average of the most recent three month-ends (January, February and March), which has been done previously by the AER¹⁴⁸;

¹⁴⁸ AER (2014a). Ausgrid, Endeavour Energy, Essential Energy, ActewAGL, Transitional Distribution Determination, 2014-15, April; AER (2014b). Transgrid, Transend, Transitional Transmission Determination, 2014-15, March.

- *average tenor less than ten years*: as noted above, to the extent that the 'ten year' estimate reflects an average bond tenor of less than ten years, it is not a ten year estimate. Accordingly, it should be extrapolated to a ten-year estimate. We have done this by using all of the RBA's data (i.e. the three, five, seven and ten-year estimates) to approximate the slope of the RBA's yield curve.

10.7.2 Bloomberg BVAL Curves

Bloomberg provides estimates of BBB-rated Australian corporations under its Bloomberg Valuation service, also referred to as 'BVAL'. The BVAL curves use a proprietary algorithm to derive bond prices which are then used to construct a yield curve. The inputs to the BVAL models include direct observations of bond prices through trading and historical tracking of the bond compared to comparable firms if there is thin data available for the given security. Another method used to address thin trading is that the data can be supplemented using the historical correlation of price movements with observed comparable bonds.

10.8 Debt raising costs

The debt risk premium reflects a premium for credit and liquidity risk. However, it does not include any allowance for the actual costs of raising debt. In practice, an efficient benchmark port entity will incur transaction and administration costs in raising and managing its debt.

10.8.1 Regulatory precedent

PwC has undertaken market research of Australian debt raising transaction costs, which have been applied in an Australian energy economic regulation context.¹⁴⁹ Incenta have subsequently applied PwC's findings in recent energy regulatory processes. PwC's study built on earlier work undertaken by Allen Consulting Group.¹⁵⁰ We regard this collective body of work prepared in an Australian regulatory context to provide the most authoritative evidence of debt raising costs for Australian corporates based on surveys and interviews with legal firms, banks and credit rating agencies that are involved in the corporate bond raising process.

PwC noted that during the past decade a benchmark of 12.5 basis points per annum (bppa), representing direct costs of debt raising, was developed and applied by several

¹⁴⁹ PwC (2013).

¹⁵⁰ Allen Consulting Group (2004). Debt and equity raising transaction costs, Final report, December.

Australian regulators. However, from 2004 the AER applied a methodology based on empirical observations of direct debt raising costs, which resulted in lower benchmark values in the range of 8 to 10 bppa depending on the size of the regulated network business.¹⁵¹

PwC's breakdown of direct debt transaction costs are as follows:

- Legal counsel – Master program – legal costs for the preparation of a Master Program, which becomes the base document for multiple issuances over 10 years;
- Legal counsel – Issuer's – legal fees for the preparation of documents under the Master Program;
- Credit rating agency – Initial credit rating – a fee to establish the credit rating;
- Credit rating agency – Annual surveillance – a rating agency fee for the maintenance of the credit rating each year;
- Credit rating agency – Up front bond issue – a fee charged by the rating agency when a new bond is issued;
- Registrar – Up front – an initial set-up fee charged by a bond registry organisation;
- Registrar – Annual – the annual fee charged by the registry service; and
- Investment bank's out-of-pocket expenses – the fees charged by the agents of a bank for travel, accommodation, venue hire, printing etc.

We consider this full list is relevant for the total benchmark transaction costs that would be prudently incurred by the BEE required to re-finance the debt component of the Prescribed Services Asset Base over each regulatory period. Using the above cost components, PwC derived an estimate for total debt raising transaction costs for Australian bond issues, based on the standard issue size (\$250 million) and benchmark term to maturity (10 years), of 10 bppa. This estimate combines the base arrangement fee with 'other' costs in terms of an equivalent bppa. Accordingly, 10 bppa has been added to our return on debt estimate.

10.9 Cost of debt estimates

We consider that both the RBA and Bloomberg data series represent an independent, credible and reliable data source for return on debt estimation purposes.

¹⁵¹ PwC (2013), p.6.

The different samples used for each series is likely to provide valuable information on the level of and movements in BBB bond yields. This suggests that using an average of two comparable series is likely to be a superior approach to choosing just one where there are no substantive methodological grounds to favour one series over the other.

Consequently, we consider calculating an average of the RBA and BVAL series is appropriate in estimating the cost of debt for the efficient benchmark port entity.

Assuming a risk-free rate of 2.74% and debt raising costs of 10 bppa gives an on-the-day cost of debt estimate for the benchmark efficient port entity of 4.58%. Table 20 indicates this calculation.

Table 20 2018 on-the-day cost of debt calculation

Averaging period	RBA	Bloomberg	Average
BBB DRP based on 20 days to 31 March 2018	1.77%	1.70%	1.74%
Risk-free rate based on 20 days to 31 March 2018	2.74%	2.74%	2.74%
Debt raising costs	0.10%	0.10%	0.10%
2018 on-the-day cost of debt	4.61%	4.54%	4.58%

Source: RBA, Bloomberg, Synergies calculations

This 2018 on-the-debt estimate is then used as an input in the trailing average calculation, as displayed in Table 21.

Table 21 Trailing average cost of debt calculation

Time period	Estimate	Weighting
2017 on-the-day cost of debt	5.45%	90%
2018 on-the-day cost of debt	4.58%	10%
Cost of debt	5.37%	

Note: Assuming a risk-free rate of 2.74% and debt raising costs of 0.10%, this implies a DRP of 2.53%

Source: RBA, Bloomberg, Synergies calculations

Given a risk-free rate of 2.74%, and debt raising costs of 10 bppa, a cost of debt of 5.37% implies a DRP of 2.53%, which is slightly lower than the 2017 DRP estimate of 2.54%.

11 Gamma

Chapter overview		
2018-19 submission	2017-18 submission	Comments
0.25	0.25	We have retained our gamma estimate from 2017-18 based on a three-way average of the gamma value implied by finance theory (zero value), the equity ownership approach (0.45 value) and market valuation studies (0.25 value). In the Australian regulatory setting, IPART has recently reaffirmed its commitment to a gamma value of 0.25.

Gamma (γ) is the value of imputation credits to investors in the BEE, where some part of corporate tax paid by this entity can be claimed as a tax credit against personal income tax. To the extent it can be accessed by investors, it forms part of the assumed equity return to investors.

As discussed in Chapter 2 of our report, the Pricing Order requires that the WACC be determined on a pre-tax nominal basis. This requires tax to be incorporated in the pre-tax nominal WACC formula which, in turn, requires an assumption to be made regarding the value of gamma and assumed required pre-tax return on equity. However, the Pricing Order provides no guidance regarding determination of this value.

Following an introductory section on the components of gamma, the remainder of this chapter discusses gamma in the context of finance theory, practical evidence of dividend imputation systems and Australian regulatory precedent. It highlights that there is a marked difference between market evidence and academic views on the *market* valuation of imputation credits (on the one hand) and the approach adopted by regulators which looks to an average valuation of imputation credits based on ATO data (on the other).

11.1 Introduction and background

Under a dividend imputation system, corporate tax paid prior to the distribution of dividends can be credited against the tax payable on the dividends at a shareholder level. In other words, corporate tax is a prepayment of personal tax withheld at a company level. Under Australia's dividend imputation system, only domestic shareholders can avail themselves of imputation credits.

Gamma is the product of two inputs which must be estimated:

- the proportion of tax paid that has been distributed to shareholders as franking credits (the distribution rate); and
- the value the marginal investor places on \$1 of franking credits, referred to as the value of franking credits (or theta).

Gamma must take a value between zero and one depending on the assumptions made in regards to the distribution rate and theta.

Imputation credits are only available in respect of company tax paid on income subject to Australian taxation. For gamma to equal one all income must be domestically taxable. What is clear is that different shareholders value franking credits differently, as their tax status determines whether their credits can be redeemed.

If the shareholder is an Australian taxpayer, then they are subject to Australian personal income tax and can offset the prepayment of this tax at the corporate level against their own personal liabilities. If they are not subject to Australian personal income tax, such as non-residents and tax-exempt individuals or entities, then the company tax paid cannot be offset, and no additional value is therefore derived. In other words, the value of gamma is zero.

The following section reviews the changes in regulatory opinion on gamma that have occurred in recent years, before proceeding to a review of academic and financial market evidence.

11.2 Evidence on gamma from economic regulators

Determining an appropriate value for gamma has proven highly contentious in economic regulation and most of this debate has played out under the Australian national energy framework. Indeed, it is reasonable to conclude that there is a well-accepted approach to setting a gamma value in an Australian regulatory context but a well-accepted value for imputation credits is yet to emerge.¹⁵²

Historically, most Australian regulators applied a value of 0.5. In its 2009 WACC guidelines review, the *Statement of Regulatory Intent* (SoRI), the AER increased the value of gamma to 0.65. Energex, Ergon Energy and ETSA Utilities (now SA Power Networks) appealed the AER's application of a gamma of 0.65 in their revenue determinations.¹⁵³

In that review, it was accepted that the distribution rate applied should be 0.71 (reflecting the proportion of corporate tax paid that has been distributed to shareholders as franking credits), which is directly observable from Australian tax statistics. A distribution rate of 0.7 has generally been adopted by Australian regulators and is not contentious.

¹⁵² Due to the structural differences in imputation systems elsewhere, we have confined our review to Australia.

¹⁵³ Application by Energex Limited (Gamma) (No 5) [2011] ACompT 9.

In contrast, the key issue of contention in the SoRI process and in subsequent regulatory proceedings is the value of theta (the value of franking credits). As part of the review process, the Tribunal commissioned a 'state of the art' dividend drop-off study¹⁵⁴ from SFG Consulting to estimate theta, which was subject to intense scrutiny. This study arrived at a value of theta of 0.35, which results in a gamma of 0.25. The Tribunal accepted this value and overturned the AER's decision. The AER subsequently applied a value of 0.25 in decisions made under its SoRI.¹⁵⁵

In 2013, the AER completed its review of its WACC guidelines, resulting in the replacement of the SoRI with the Rate of Return Guideline. In that review, the AER reverted to a value of 0.5, which was revised down to 0.4 in subsequent revenue determinations using updated data. This hinged on a review of the 'conceptual definition' of theta and a dismissal of market value studies as being of any relevance in valuing theta.

The AER's approach to gamma was one of the matters successfully appealed by the NSW and ACT network businesses in the most recent revenue determination processes. The Tribunal concluded that the AER's gamma was too high and that the upper bound for the value of theta should be no more than 0.43, which reflects the utilisation rates from ATO tax statistics (which would equate to a gamma of 0.3 at a distribution rate of 0.7). It highlighted that the AER's equity ownership approach arrives at a value that is above this upper bound and therefore "the equity ownership approach overstates the redemption rate."¹⁵⁶ It stated that:¹⁵⁷

Given that two of the three approaches adopted by the AER [the equity ownership approach and tax statistics] are considered no better than upper bounds, it follows that the assessment of theta must rely on market studies. The Tribunal considers that, of the various methodologies for estimating gamma employed by the AER, market value studies are best placed to capture the considerations that investors make in determining the worth of imputation credits to them. [words in brackets added]

The Tribunal remitted the decision back to the AER to remake with guidance consistent with the above quote implying that gamma should be set at a value no higher than 0.3

¹⁵⁴ The dividend drop-off study is one of the most common empirical approaches used to estimate the value of theta. The estimate is based on an analysis of the change in share price following the payment of a dividend. One of the key difficulties with this is attributing the change in share price to the value of the dividend and the value of the franking credit that is attached to it. This leads to the statistical problem of multicollinearity.

¹⁵⁵ A gamma of 0.65 continued to be applied to electricity transmission network businesses because it was prescribed in the National Electricity Rules. The value of gamma is no longer prescribed in the National Electricity Rules.

¹⁵⁶ Applications by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1, para. 1093.

¹⁵⁷ Applications by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1, para. 1096.

based on utilisation rates taken from ATO tax statistics. The AER subsequently made an application for judicial review of this decision to the Federal Court.

The Full Federal Court upheld the AER's judicial review of the Tribunal's decision on theta. The Full Federal Court found that:¹⁵⁸

...the Tribunal assumed other parameters in the WACC calculations were market values that already incorporated investors' tax positions and transactions but that misconstrued the 'post tax' framework [used in the NER]. The rules required gamma to be determined consistently with the return on equity.

Subsequently, a differently constituted Tribunal affirmed the AER's distribution determination for SA Power Networks (SAPN) for its 2015-16 to 2019-20 regulatory control period. The Tribunal concluded that there is no generally accepted theoretical model for explaining the valuation of imputation credits and that the AER had reasonably considered the range of alternative approaches (and diversity of expert views) and made a judgement call. For this reason, the AER did not err in giving greater weight to the utilisation approach rather than market value approach in estimating theta.

Contributing reasons identified by the Tribunal for the difference between the SAPN decision and Ausgrid decision included:

- submissions to the SAPN hearing gave greater attention to the theoretical underpinnings of the prescribed 'vanilla WACC' framework in the NER, including whether an average or marginal investor perspective is the appropriate basis for determining theta;
- the Tribunal agreed with the AER in placing less weight on dividend drop-off studies in the estimation of the value of gamma (contrary to the Tribunal's decision in the Ausgrid appeal) given its view of significant uncertainties in extracting reliable evidence from such studies.

In contrast to the Tribunal's decision in the Ausgrid appeal, the Tribunal in the SAPN case did not find error in the AER's decision to revise its approach to estimating the distribution rate (which changed from 0.7 to 0.77), by using data from listed businesses only. The Tribunal found there is no compelling reason advanced to believe the average unlisted entity is any better or worse than the average listed entity as a proxy for the BEE.

Given this legal precedent, the AER is likely to continue with its equity ownership approach to determining gamma following the Full Federal Court's judgment, which

¹⁵⁸ *Australian Energy Regulator v Australian Competition Tribunal* (No 2) [2017] FCAFC 79, para. 755.

based on data as at 2015 suggests a gamma of 0.4. Central to the Full Federal Court's judgment is the belief that the WACC calculated in accordance with the NER is calculated using face values rather than market values. However, we note that whether the Officer framework used to determine the WACC under the NER adopts face or market values is disputable:¹⁵⁹

Moreover, the AER's reasoning ignores the fact that other parameters in the WACC calculations are market values that already incorporate the effects of the differences in investors' tax positions and transaction costs. As noted by Professor Gray of SFG Consulting, *Estimating gamma for regulatory purposes*, 6 February 2015 at 9:

In my view, gamma is no different from any other WACC parameter in this respect. For example, when estimating beta, the AER uses traded stock prices, which reflect the value of those shares to investors. That value reflects any "personal costs" that the investors bear. There is no process of adjusting share prices to reverse some of the reasons why investors value shares the way they do. The same applies to the traded bond prices that the AER uses to estimate the cost of debt. All of these prices reflect the value to investors – *all* of the considerations that are relevant to how investors value the stock are reflected in the price. [italicised emphasis in the original]

Consequently, there is no inconsistency between the use of market studies to estimate the value of imputation credits and the methods used to calculate other parameters of the costs of debt and equity from market data.

It is true that the estimation of theta under market-based approaches is not without controversy (with measurement and estimation issues arising in part because of the restricted window of analysis). However, all other WACC parameters are set having regard to market values. Accordingly, the assessment of the value of gamma should be informed by approaches assessing market values.

Furthermore, the market value interpretation is more compatible with the concept of the marginal investor, whereas the redemption proportion interpretation relies on the concept of an average investor. In the context of price setting in financial markets, especially in Australia, the former is likely to be a more realistic representation. This approach is consistent with the academic findings and equity market data presented in earlier sections of this chapter.

¹⁵⁹ Applications by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1, para. 1073-4.

Current approaches applied by other Australian economic regulators

Australian economic regulators' positions on gamma remain mixed, with both market and non-market approaches being applied, making it difficult to identify a well-accepted approach in the context of the Pricing Order – in fact two approaches emerge involving non-market (the equity ownership approach) and market-based approaches (market value studies of theta using techniques, such as dividend drop-off studies). It is therefore clear that regulatory precedent involves two distinct approaches.

Table 22 summarises the current status of regulatory precedent.

Table 22 Current Australian regulatory status of gamma

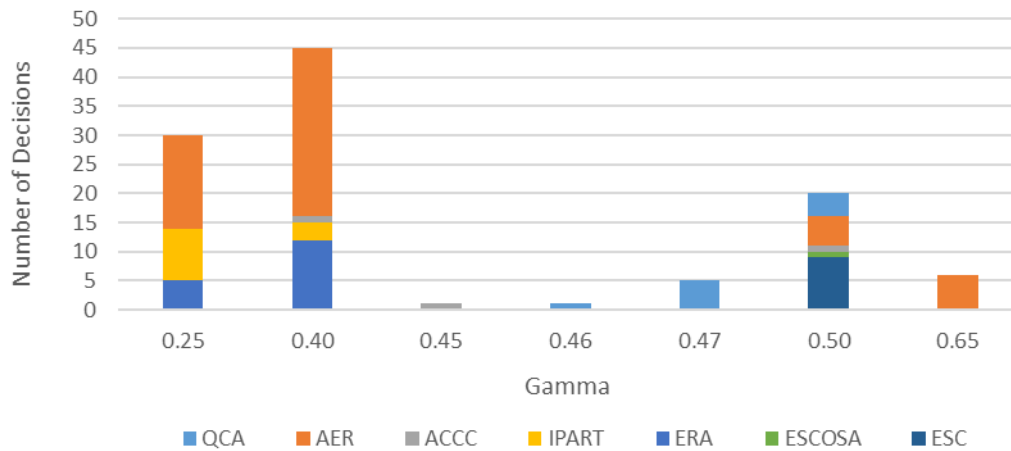
Regulator	Current value applied	Market or non-market approach	Comments
QCA	0.46	Non-market	Recently revised down from 0.47.
AER	0.4	Non-market	A gamma value of 0.5 is specified in the AER's Rate of Return Guideline. However, it has applied a value of 0.4 in all its energy revenue determinations since 2013. Several of these decisions have been subject to merits review. Depending on the out-workings from these merits review processes, there is the potential for different values of gamma to apply across revenue determinations (0.4 and something between 0.25 and 0.4).
ACCC	0.40	Non-market	This was applied in the draft ARTC Hunter Valley Access Undertaking.
IPART	0.25	Market	Arrived at under a specific review of gamma concluded in 2012 ¹⁶⁰ . Re-affirmed in its 2018 WACC methodology review
ERA	0.4 and 0.25	Non-market and market	Has aligned with the AER's approach for the rail entities it regulates. This value was also maintained in its June 2016 Final Decision for the Dampier to Bunbury pipeline. However, in July 2016 the Tribunal overturned a previous ERA decision for ATCO Gas Australia, which resulted in a gamma of 0.25 being applied for this entity.
ESCOSA	0.5	Non-market	As per 2016 Final Decision for SA Water.
ESC	0.5	Non-market	As per most recent Melbourne Water decision. The ESC has not provided its rationale, other than noting in the Guidance Paper that this was consistent with its previous review.

Source: Synergies based on Australian regulatory decisions

Figure 5 shows the diversity of gamma values approved by Australian regulators between 2010 and 2017.

¹⁶⁰ IPART (2012). Review of imputation credits (gamma), Research – Final decision, March.

Figure 5 Australian regulatory gamma decisions



Data source: Synergies based on Australian regulatory decisions

Note: The AER and ESC gamma values are applied across multiple decisions for the energy (AER) and water (ESC) entities that they regulate.

11.3 Finance theory and market evidence

11.3.1 Academic evidence on gamma

It is well-accepted in the academic literature that the gamma for a security where the marginal investor is foreign should be zero. We turn to a consideration of some of the key findings of this literature.

Cannavan et al. (2004) infer the value of imputation tax credits from the prices of derivative securities in Australian retail markets. Their findings are consistent with non-residents being marginal price-setting investors in large Australian firms. They argue that a company's cost of capital is not affected by a dividend imputation system.¹⁶¹ Thus, if an international investor derives no value from imputation credits a company must produce the same return for a marginal stockholder irrespective of the existence of an imputation system. Feuerherdt et al. (2010) extend the analysis to Australian hybrid securities, also finding evidence consistent with a price-setting investor placing no value on franking credits.¹⁶²

¹⁶¹ Cannavan, D., Finn, F. and Gray, S. (2004). The value of dividend imputation tax credits in Australia. *Journal of Financial Economics*, 2, pp.167-197.

¹⁶² Feuerherdt, C., Gray, S. and Hall, J. (2010). The value of imputation credits on Australian hybrid securities. *International Review of Finance*, 10(3), pp.365-401.

Lajbcygier and Wheatley (2012) test whether equity returns are related to imputation credit yields. They find no evidence that the provision of imputation tax credits lowers the return investors require on equity.¹⁶³ Furthermore, using a general equilibrium model, they demonstrate that if the domestic market is small relative to the foreign market, which is the case for Australia, the impact of imputation credits on the domestic equity premium is negligible.

In the SL CAPM, equity markets are presumed to be segmented between domestic and foreign markets to determine the cost of equity for regulated firms. In this sense, imputation-eligible domestic investors make portfolio decisions based on with-imputation credit returns, while ineligible foreign investors make decisions based on without-imputation credit returns. In an open economy, such as Australia, which represents a small proportion of global equity, the returns will be determined largely by the expectations of foreign investors.

Siau, Sault and Warren (2015) employ discounted cash-flow valuation models to assess whether imputation tax credits are capitalised into Australian stock prices. They uncover no clear evidence that imputation credits influence the level of stock prices.¹⁶⁴ This reinforces the notion that credits are not valued by the marginal investor, who in the context of Australia is likely to be an international investor.

In the most recent dividend drop-off study, Cannavan and Gray (2017) employ an extended dataset with improved econometric techniques in order to assess the value of imputation credits.¹⁶⁵ Their results reinforce earlier findings that the market values distributed imputation credits at approximately 35% of the face amount (i.e. $\theta = 0.35$). This estimate of θ is consistent with a value for γ of 0.25, assuming a distribution rate of 70%. Furthermore, IPART makes specific reference to this paper in substantiating its decision to retain a γ estimate of 0.25.¹⁶⁶

Gray and Hall (2006) explicitly derive the relationship between the value of franking credits (γ) and the MRP. With a specific emphasis on Australian regulators, they demonstrate that the typical parameter estimates adopted in practice are incompatible

¹⁶³ Lajbcygier, P. and Wheatley, S.M. (2012). Imputation credits and equity returns. *Economic Record*, 88(283), pp.476-494.

¹⁶⁴ Siau, K.S., Sault, S.J. and Warren, G.J. (2015). Are imputation credits capitalised into stock prices? *Accounting and Finance*, 55, pp.241-277.

¹⁶⁵ Cannavan, D. and Gray, S. (2017). Dividend drop-off estimates of the value of dividend imputation tax credits. *Pacific-Basin Finance Journal*, 46, pp.213-226.

¹⁶⁶ IPART (2018a), p.83.

with this mathematical relationship.¹⁶⁷ If internal consistency within the cost of equity model is to be restored, then at least one of the parameter values needs to be modified. To restore internal consistency, the authors propose that setting gamma equal to zero is the most straightforward way of achieving this. The advantage of this approach is that no further assumptions are required about the magnitude of dividend yields. Alternatively, to support a gamma value greater than zero other parameters would have to assume implausible values.

While not necessarily the most reliable of sources, the authors cite two surveys in support of their findings. Firstly, Truong, Partington and Peat (2005) surveyed 356 listed Australian firms on their corporate finance practices: 85 per cent of respondents indicated that they made no adjustment for the value of franking credits.¹⁶⁸

Additionally, Lonergan (2001) conducted a review of expert valuation reports, finding that 42 of 48 (88 per cent) used the CAPM for their cost of equity calculations without making any adjustments for dividend imputation.¹⁶⁹ Of the six reports that did incorporate it, only one was able to assign any non-negligible value to the company on the basis of franking credits. Although some time has passed since these surveys, there is little indication that these key sentiments have changed.

11.3.2 Summary

Academic research analysing market data indicates strong support for a gamma value of zero based on the assumption that in open capital markets like Australia, the marginal investor will be an international investor who gains no value from imputation credits and hence whose expected return on equity is not affected by the operation of the Australian tax imputation system.

11.3.3 Independent expert valuations

There is also substantial evidence that imputation credits are not valued by independent experts. In a review of market evidence on the cost of equity for Aurizon, Ernst and Young find that “there is no evidence that market practitioners (i.e. independent experts)

¹⁶⁷ Gray, S. and Hall, J. (2006). Relationship between franking credits and the market risk premium. *Accounting and Finance*, 46, pp.405-428.

¹⁶⁸ Truong, G., Partington, G. and Peat, M. (2005). Cost of capital estimation and capital budgeting practice in Australia. AFAANZ Conference, Melbourne, Australia, 3-5 July.

¹⁶⁹ Lonergan, W. (2001). The disappearing returns: Why imputation has not reduced the cost of capital. *Journal of the Securities Institute of Australia*, Issue 1 Autumn, pp.8-17.

take information on imputation credits into account in estimating required rates of returns.”¹⁷⁰

In response to a 2014 AER draft decision for Transgrid, Grant Samuel wrote that:¹⁷¹

We have always made it clear in our reports that we do not believe that day to day market prices of Australian equities incorporate any particular value for franking credits attached to any future income stream and we have never made any adjustment for dividend imputation (in either the cash flows or the discount rate) in any of our 500 plus public valuation reports.

Furthermore, in a 2015 Independent Expert’s Report for Asciano, Grant Samuel puts forward the perspective of financial markets, arguing that:¹⁷²

The evidence gathered to date as to the value of the market attributes to franking credits is insufficient to rely on for valuation purposes. The studies that measure the value attributed to franking credits are based on the immediate value of franking credits distributed and do not address the risk and other issues associated with the ability to utilise them over the longer term. More importantly, Grant Samuel does not believe that such adjustments are widely used by acquirers of assets at present.

Deloitte points to the lack of conclusive evidence on the value of imputation credits:¹⁷³

We have not adjusted the cost of capital or the projected cash flows for the impact of dividend imputation due to the diverse views as to the value of imputation credits and the appropriate method that should be employed to calculate this value. Determining the value of franking credits requires an understanding of shareholders’ personal tax profiles to determine the ability of shareholders to use franking credits to offset personal income. Furthermore, the observed EMRP already includes the value that shareholders ascribe to franking credits in the market as a whole. In our view, the evidence relating to the value that the market ascribes to imputation credits is inconclusive.

¹⁷⁰ Ernst and Young (2016). Market evidence on the cost of equity, 22 November, p.28.

¹⁷¹ Grant Samuel (2015). Response to AER draft decision, 12 January, p.5.

¹⁷² Grant Samuel (2015). Independent Expert’s Report, Asciano, 30 September, p.315.

¹⁷³ Deloitte (2015). Independent Expert’s Report, Energy Developments Limited, 3 September, p.63.

11.3.4 Dividend imputation policy evidence

Australia, Canada, Chile, Mexico and New Zealand are the only five countries in the Organisation for Economic Co-operation and Development (OECD) that operate a full imputation tax system where all corporate tax is credited to domestic shareholders. South Korea and the United Kingdom are operating partial imputation systems. However, as the tax credits provided in these countries are not linked to the amount of corporate tax paid, these are not true imputation tax systems.¹⁷⁴

The broad international trend to removal of dividend imputation systems over the 2000s has also been reflected in tax policy considerations in an Australian context:¹⁷⁵

Dividend imputation continues to deliver benefits for Australia, particularly for smaller firms and those operating in the more closed segments of the economy. However, a continuation of the trend of increased openness, rapid growth in cross-border investment flows and greater capital mobility will reduce the benefits of imputation in the longer term.

For a small, open economy that is increasingly integrated with international capital markets, providing tax relief only on dividends paid to resident shareholders will become less effective in reducing the cost of capital for companies (and hence of reduced benefit in encouraging investment) or in providing a neutral treatment of debt and equity.

These tax policy considerations are consistent with the academic and independent expert evidence in suggesting that international investors should be given a relatively large weighting in determining a gamma value in an Australian context.

11.3.5 Evidence of international investor interest in Australian transport and energy infrastructure

Further to the findings of academic studies discussed in this chapter, this section focusses on the resident and non-resident investor shares of equity held in major Australian transport and energy infrastructure.

Table 23 below shows only the proportion of Institutions & Strategic Holders & Individuals/Insiders. Equity from domestic manager/listed companies has been allocated fully to the domestic category even though some capital may have been foreign – there is no way to discern this from the source data.

¹⁷⁴ Ainsworth A. (2016). Dividend imputation: The international experience. *The Finsia Journal of Applied Finance*, 1, pp.58-63.

¹⁷⁵ Commonwealth Treasury (2010). *Australia's Future Tax System*, Chapter B: Investment and Entity Taxation, p.199.

Table 23 Proportion of equity ownership – Institutions & Strategic Holders & Individuals/Insiders

Company	Ticker	Data		Proportion of Institutions and Strategic Holders & Individuals / Insiders	
		Domestic	Foreign	Domestic	Foreign
Qube Holdings	ASX:QUB	40%	29%	58%	42%
Port of Tauranga	NZSE:POT	56%	3%	96%	4%
Aurizon Holdings	ASX:AZJ	19%	36%	35%	65%
Sydney Airport	ASX:SYD	20%	23%	47%	53%
Auckland International Airport Limited	NZSE:AIA	25%	18%	58%	42%
Transurban	ASX:TCL	21%	22%	49%	51%
Macquarie Atlas Roads	ASX:MQA	30%	34%	47%	53%
DUET	ASX:DUE	23%	33%	41%	59%
Spark	ASX:SKI	21%	25%	45%	55%
APA Group	ASX:APA	23%	29%	44%	56%
Min		19%	3%	35%	4%
Max		56%	36%	96%	65%
Median		23%	27%	47%	53%
Average		28%	25%	52%	48%

Source: Capital IQ

Table 23 indicates the significant proportion of foreign equity ownership of Australian transport and energy infrastructure.

Table 24 presents a similar picture for unlisted infrastructure transactions over the last three years (based on InfraDeals data).

Table 24 Proportion of equity ownership – Unlisted infrastructure transactions

Transaction	Sub-Sector	Date	Equity Providers	Domestic	Foreign
Loy Yang B	Generation	Dec-17	Alinta (Chow Tai Fook Enterprises Limited)	0%	100%
NSW Endeavour Energy	Distribution	May-17	Macquarie Infrastructure, AMP (REST), bcIMC, QIA	57%	43%
DUET	Distribution	Apr-17	CKI	0%	100%
Alinta Energy	Utility	Mar-17	Chow Tai Fook Enterprises Limited	0%	100%
NSW Ausgrid	Distribution	Dec-16	AustralianSuper, IFM	100%	0%
GRail	Rail	Dec-16	G&W, Macquarie Infrastructure	49%	51%
Port of Melbourne	Ports	Oct-16	Future Fund, CIC, OMERS, NPS, CalPERS, GIPA, QIC	31%	69%
Asciano (Pacific National)	Rail	Aug-16	GIP II, CPPIB, CIC, GIC, bcIMC	0%	100%
Asciano (Ports)	Ports	Aug-16	Qube, Brookfield, GIC, bcIMC, QIA	50%	50%

Transaction	Sub-Sector	Date	Equity Providers	Domestic	Foreign
AirportLinkM7	Roads	Apr-16	Transurban, AustralianSuper, ADIA	88%	13%
Pacific Hydro	Renewables	Jan-16	China State Power Investment Corporation	0%	100%
NSW TransGrid	Transmission	Dec-15	Spark, Hastings, CDPQ, ADIA, Wren House	35%	65%
Iona Gas Storage	Energy	Dec-15	QIC, QSuper	100%	0%
Median				43%	57%
Average				47%	53%

Note: Fund managers have been classified based on the location of their head office where their underlying investor details are confidential.

Source: Infradeals

The data in Table 23 and Table 24 highlights at best a 50:50 split between foreign and domestic buyers of major infrastructure assets in Australia. In these circumstances, it is clear the marginal (i.e. price setting) investor is a foreign investor that will be unable to access any value from imputation credits.

It is acknowledged that domestic shareholders derive benefits from dividend imputation. However, in a valuation context, these shareholders are inframarginal – they do not set the relevant price for an infrastructure asset – available evidence suggests the price for a large Australian infrastructure asset is set by foreign investors and the market valuation of imputation credits for these investors is zero. Put another way, it cannot be concluded that the marginal investor in an efficient Australian benchmark entity is anything but a foreign investor who places no value on imputation credits.

11.4 Identifying a well-accepted gamma estimation approach

In attempting to identify a well-accepted approach to gamma, we have reviewed academic literature, relevant finance industry evidence (particularly from independent and expert reports), as well as Australian regulatory practice. This is consistent with our overarching position on the definition of well-accepted applied across our WACC calculations.

The first well-accepted approach is adopted from the academic literature and strongly indicates that the gamma for a security where the marginal investor is foreign should be zero given the marginal investor for the BEE is an international investor and hence, in an Australia context, unable to utilise any accrued imputation credits.

There is also substantial evidence that imputation credits are not considered by independent experts in a valuation context. Australian economic policy makers have also questioned the value of imputation credits in an economy that is small by international standards and characterised by open capital markets.

In contrast to this reasonably consistent view, Australian regulatory precedent is a highly contested area with ongoing disagreement over the value of imputation credits (theta) in the hands of investors, one of the two critical inputs into the gamma calculation.

Consequently, there are several approaches that have been applied in Australian regulatory practice. This has been reflected in a large range of gamma values from 0.25 to 0.65 that have been adopted by Australian regulators in recent years. However, what is common to all these regulatory decisions is the assumption that the marginal investor is either a resident Australian or that the identity of the marginal investor is not relevant to the assessment of the valuation of imputation credits.

In this regard, the distribution rate is relatively non-contentious and has settled around 70%. In contrast, the value of theta continues to be highly contentious and in broad terms can be estimated using the following non-market and market-based approaches:

- the equity ownership approach, which is the proportion of Australian equity held by Australian residents (given only domestic investors can utilise franking credits), or taxation approach using statistics drawn from the Australian Taxation Office on the utilisation of franking credits – which forms our second well-accepted and non-market approach; and
- market value studies, which seek to ascribe the value that investors place on theta using techniques, such as dividend drop-off studies (i.e. pre and post-dividend share prices) - which forms our third well-accepted and market-based approach.

Each of these approaches establishes a broad range of theta values and in turn a gamma value.

The second approach has been applied by some regulators, including the ESC. It provides a theta value of around 0.6 to 0.7 resulting in a gamma value of 0.4 to 0.5 (which we have averaged at 0.45).

The equity ownership approach assumes an investor that is eligible to fully utilise imputation credits they receive has a utilisation rate of 1 (ie they gain 100 percent of the “value” of the imputation credits); whereas an investor that is ineligible to redeem imputation credits has a utilisation rate of 0 (ie they gain no “value” from the imputation credits). However, this approach fails to recognise the potential for individual eligible investors to value imputation credits at less than their nominal dollar value, notwithstanding evidence to the contrary. Moreover, the equity ownership approach does not reflect a market based approach despite every other relevant parameter informing the WACC being based on a market proxy.

In contrast, the third approach relies on a market value estimate of imputation credits. An updated gamma estimate prepared by SFG Consulting that applies the methodology accepted by the Australian Competition Tribunal in 2011 continues to support a theta value of 0.35 and hence a gamma value of 0.25 (assuming a 70% distribution rate).¹⁷⁶

Accordingly, we consider these three broad approaches have been well-accepted in the relevant communities of expertise. On balance, we favour the market valuation approach. However, given the pros and cons of each methodology, we have calculated an average of the three values (which are zero based on finance theory, 0.45 based on an equity ownership approach and 0.25 based on market valuation studies), which results in a gamma value of 0.23, rounded up to 0.25.

We have assigned equal weighting to each approach in the absence of a compelling basis to do otherwise. If we were to depart from this approach, we would ascribe less weight to the equity ownership approach because of its non-market orientation.

11.5 Conclusion

On the balance of the evidence, the issue of the valuation of imputation credits turns on whether a market valuation is adopted or whether a non-market based utilisation of imputation credits approach is adopted. We believe the issue of well-accepted means well-accepted beyond the community of regulatory agencies to embrace relevant assessments of the market value of imputation credits from the academic and finance communities.

Given the above, we consider the only truly well-accepted gamma value within the meaning of the Pricing Order is zero based on academic and contemporary Australian equity market evidence. However, the average of the three well-accepted approaches identified in this chapter recognises the market and non-market approaches to valuing utilisation credits that have emerged in an Australian regulatory context and which reflect the most contentious aspect of the value of gamma calculation.

On these grounds, we consider a gamma value of 0.25 (rounding up from an average of 0.23) for the BEE is reflective of a well-accepted approach and is consistent with the Pricing Order.

¹⁷⁶ SFG Consulting (2014b).

12 Proposed WACC estimate for BEE

The purpose of this chapter is to present the values of the key components of our pre-tax nominal WACC estimate of 11.52% for the BEE.

We also demonstrate that this WACC estimate satisfies the three stage assessment approach set out by ESC to assess compliance of PoM's WACC estimate with the Pricing Order.

12.1 Changes since 2017-18 TCS submission

The changes to our return on equity and debt estimates since the 2017-18 TCS submission reflect changes in market-based parameter values (e.g. risk-free rate, MRP, DRP). Our asset beta, gearing and gamma value assumptions remain unchanged.

12.1.1 Return on equity calculation

The return on equity estimation methodologies used to calculate our return on equity estimate of 14.16% are discussed in Sections 7, 8 and 9 of our report. This compares to a return on equity estimate of 14.14% in the 2017-18 submission.

12.1.2 Return on debt calculation

The underlying components of our return on debt estimate of 5.37% are discussed in Chapter 10 of our report.

12.1.3 WACC estimate

Our pre-tax nominal WACC estimate of 11.52% and its underlying components, based on three well-accepted return on equity models, is presented in Table 25.

Table 25 WACC estimate for PoM

Parameter	2017-18 TCS	2018-19 TCS
Risk-free rate	2.81%	2.74%
Capital structure	30%	30%
Gamma	0.25	0.25
Corporate tax rate	30%	30%
CAPM Parameters		
Market risk premium (MRP)	7.77%	7.71%
Asset beta	0.70	0.70
Equity beta	1.00	1.00
Zero Beta Premium	3.34%	3.34%
Fama-French Model Parameters		
Market risk premium (MRP)	7.77%	7.71%
Value (HML) premium	6.05%	6.10%
Size (SMB) premium	1.77%	1.93%
Asset beta (Market)	0.62	0.74
Asset beta (HML)	0.20	0.08
Asset beta (SMB)	0.11	0.16
Equity beta (Market)	0.89	1.06
Equity beta (HML)	0.29	0.11
Equity beta (SMB)	0.16	0.23
Return on equity (pre-tax)		
SL CAPM	13.66%	13.48%
Black CAPM	13.66%	13.48%
FFM	15.12%	15.51%
Weighted return on equity (pre-tax)	14.14%	14.16%
Debt beta	0.00	0.00
Debt risk premium	2.54%	2.53%
Debt raising costs	0.10%	0.10%
Return on debt (pre-tax)	5.45%	5.37%
Pre-tax nominal WACC	11.54%	11.52%

12.2 Satisfying ESC's compliance assessment framework

This section demonstrates how our proposed WACC estimate for the BEE satisfies the following three stages of ESC's compliance assessment framework:

- use of well-accepted approaches in its development;
- determining the overall reasonableness of the proposed WACC estimate, including having regard to the WACCs of comparable entities; and
- if any concerns arise regarding the proposed WACC estimate, a more detailed, focussed analysis of its basis will be undertaken.

12.2.1 Use of well-accepted approaches

Table 5 in Chapter 3 of our report outlines the evidence from economic regulators in support of the approaches that we have used. However, as detailed in Section 3.5, our view is that 'well-accepted' encompasses regulatory precedent, financial practitioner evidence and academic literature.

12.2.2 Overall reasonableness of proposed WACC estimate

The purpose of this section is to substantiate the reasonableness of our proposed overall WACC estimate. Firstly, we evaluate the WACC margins implied from comparable regulatory decisions identified by the ESC in its Interim Commentary. Whilst the ESC confined its assessment to regulatory decisions, we regard a broader assessment as being relevant. Accordingly, we have generated estimated WACC margins for our listed comparator set using data from Bloomberg on country-specific market risk premiums and risk-free rates, as well as firm-specific information regarding the return on debt. An overview of the methodology for the assessment of the cost of equity is located in Attachment G.

Our main findings highlight the reasonableness of PoM's WACC estimate. In regard to regulatory decisions:

- PoM's WACC margin (pre-tax nominal WACC less the risk-free rate) is situated between the WACC margins adopted by the ERA for Arc Infrastructure and Pilbara Railways.
- While there is no evidence that PoM's WACC margin should be bounded between these two entities over the longer term, we present commentary from the ERA, which demonstrates that such a premise is not unreasonable under current conditions.

In terms of listed comparators, PoM's WACC margin is:

- almost identical to the WACC margin for OECD ports;
- higher than the WACC margin for OECD airports; and
- lower than the WACC margin for Class I railroads.

This aligns with our broader view on PoM's comparator set, namely that airports form the lower bound for PoM's systematic risk exposure, while railroads are likely to represent the upper bound. The estimated WACC margin for the combined set of Class I railroads, OECD ports and airports is within 0.5% of PoM's own WACC margin (and also sits between the WACC margins for Arc Infrastructure and Pilbara Railways), again emphasising the reasonableness of the estimate.

Comparison with other regulatory decisions

This section compares the WACC that we have estimated for PoM with WACC estimates from comparable regulatory decisions.

In undertaking this comparison, we note that precise comparison of WACC decisions is elusive as the risk profile of each regulated entity in the transport sector differs materially.

For example, whilst the ESC included several coal related entities (namely Aurizon, ARTC's Hunter Valley network and DBCT) in its assessment in our view they represent a poor comparator for PoM. It is clear from each regulatory decision on these entities that their contractual and regulatory structure (long term take or pay contracts subject to a revenue cap form of regulation applying) materially influenced the regulator's assessment of the cost of equity. Given the similarity of the risk profiles of these businesses we have aggregated them for the purposes of our analysis.

Moreover, regulators adopt different approaches to the estimation of the cost of capital – with different values being assumed for parameters such as the averaging interval, MRP and gamma. There is inherent uncertainty on the value of these parameters noting that each exerts a significant influence on the regulator's determination of the cost of capital. It is possible regulators balance to some extent the exercise in regulatory discretion in making judgements (and tradeoffs) on these parameters.

Accordingly, we consider attempting a precise reconciliation of PoM's WACC with regulatory decisions is inviting false precision to the analysis and a more relevant insight in terms of PoM's compliance with the Pricing Order can be gained from undertaking a reconciliation on the basis of broad relativities and rankings. It also highlights the benefit

of broadening the perspective of the comparison beyond regulatory decisions for the purposes of this aspect of the ESC's assessment framework.

With these caveats in mind, we consider that adjustments should be made for transparent market based parameters where possible. For example, making adjustments for differences in risk-free rates over time enables a more appropriate comparison of regulatory decisions on the basis of WACC margins (the WACC less the risk-free rate). These calculations are presented in Table 26.

Table 26 WACC margins for transport regulatory decisions

	Pre-tax nominal WACC	Risk-free rate	WACC margin
Coal-related entities	6.51%	1.95%	4.56%
ARTC Interstate Network (2008 Decision)	13.00%	6.39%	6.61%
Arc Infrastructure (2017)	9.58%	2.49%	7.09%
ARTC Interstate Network (2018 Submission)	10.40%	2.78%	7.62%
PoM (2018)	11.52%	2.74%	8.78%
Pilbara railways	12.68%	2.49%	10.19%

Note: Coal-related entities consist of DBCT, Aurizon Network and the ARTC Hunter Valley Coal Network. These decisions were aggregated as the presence of take-or-pay contracts make them less comparable with the BEE.

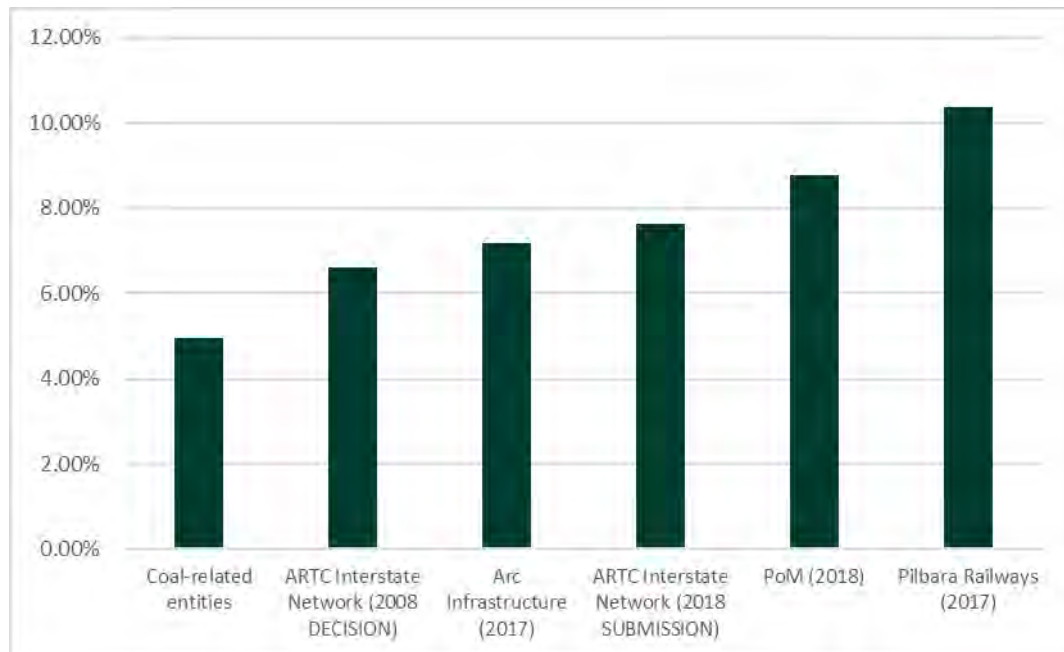
Source: Synergies calculations, various regulatory decisions

These WACC margins are presented in Figure 6.

Noting that the ARTC Interstate Network is still at the submission stage, the closest (although not identical) regulatory comparators for PoM are Arc Infrastructure and Pilbara Railways. This is in contrast to below rail coal assets, which are subject to lower volatility, owing to heavy-handed access arrangements based on revenue caps, which typically result in lower betas. As a result of this, it is to be expected that PoM's WACC margin sits well above such entities.

In essence, PoM's WACC margin sits between that of Arc Infrastructure and Pilbara Railways, which is appropriate given the relative risk profile of the businesses.

Figure 6 WACC margins for transport regulatory decisions



Note: The ARTC Interstate Network Access Undertaking is currently at the submission stage.
Data source: Synergies calculations, various regulatory decisions

In its 2015 decision on WACC, the ERA summarised some aspects of its 2008 WACC decision, where it explicitly recognised that Arc Infrastructure’s (formerly Brookfield Rail) asset beta should sit below that of a business whose revenue source is driven by domestic-based freight operations, such as a Class I Railroad (as opposed to longer term contract-based export bulk mineral hauls) being offset by considerations of operating leverage:¹⁷⁷

In 2008 for the WestNet Rail (now Brookfield Rail) WACC determination, the Authority took the view that the equity beta for the freight network is 1.0. This was also based on the advice of ACG, who recommended a range of 1.0 to 1.15 based on 35 per cent gearing and an asset beta of 0.65 to 0.75. The sample of comparable firms included rail infrastructure businesses in the United States and Canada and listed transport infrastructure services firms in Australia and New Zealand.

ACG’s view was that an assumed asset beta in this range would overstate an asset beta for the freight rail system in Western Australia. This was because the above comparator companies were thought to have a higher proportion of revenues derived from intermodal traffic, which is expected to have a higher beta than the freight rail

¹⁷⁷ ERA (2015a), p.147. Paragraph numbers and footnote references omitted.

system in Western Australia. Accordingly, ACG recommended an asset beta of 0.6 at a 35 per cent gearing level, giving an equity beta of 0.92.

The Authority also acknowledged submissions that the high operating leverage (ratio of variable to fixed costs) of the freight-network business may, all other things being equal, contribute to a relatively high sensitivity of profits to changes in levels of demand and a higher beta value for the freight network business. However, the Authority was of the view that the Western Australian freight network is likely to have a lower beta than the comparators due to the predominance of bulk grain and minerals freight which were found to have asset betas closer to 0.45. Based on this, its view was that there was limited justification to adopt a beta value outside of the range derived from comparator businesses.

In other words, the ERA acknowledged that the the high operating leverage of the freight-network business offset a relatively lower risk profile on account of Brookfield Rail's (as it then was) reliance on export related freight activity. The ERA observed that around 85% of Brookfield Rail's freight task related to the transport of either export commodities or inputs to commodities, such as grain and alumina, with the remainder being accounted for by general freight. Whilst we do not endorse the ERA's approach, it is appropriate we adopt the reasoning for current purposes given we are essentially reconciling our proposed WACC with the outcomes of relevant regulatory processes.¹⁷⁸

In this context, it is noted that PoM exhibits a much higher sensitivity to domestic economic activity than Arc Infrastructure due to its reliance on imports (over 60% in revenue terms) which are inherently correlated with domestic economic activity. Moreover, PoM's cost structure is such that costs vary insignificantly with throughput across a broad range of demand and, in this respect, it varies from rail infrastructure which has a higher level of variable cost due to throughput-driven maintenance and scheduling activities.

Adopting the ERA's logic, the nature of the trade mix and the absence of long term contracts exposes PoM to volume risk to a greater extent than Arc, especially once regard is had to PoM's inability to adjust expenditure in response to volume fluctuations.

Pilbara Railways, being single-commodity focused, is sensitive to fluctuations in commodity prices (specifically iron ore) and does have a concentrated customer base, which amplifies volume risk. However, as detailed in our first principles analysis, PoM is also subject to high levels of systematic volume risk arising from the correlation of

¹⁷⁸ Contract cover may indeed provide revenue certainty and mitigate volatility in the short to medium term. However, this has the consequence of masking underlying systematic risk, effectively crystallising this risk at discrete points in time.

underlying demand with economic activity as well as arising from competitive pressures from other ports (including the Port of Geelong, Port Botany and Port Adelaide), which compete with PoM for import containers, agricultural exports, and various other commodities and raw materials. This is compounded further by the prospects for a second Melbourne port (see Attachment D).

It is clear that both the Pilbara Railways and PoM face material systematic risk. However, it cannot be said that Pilbara Railways sets an upper limit for PoM.

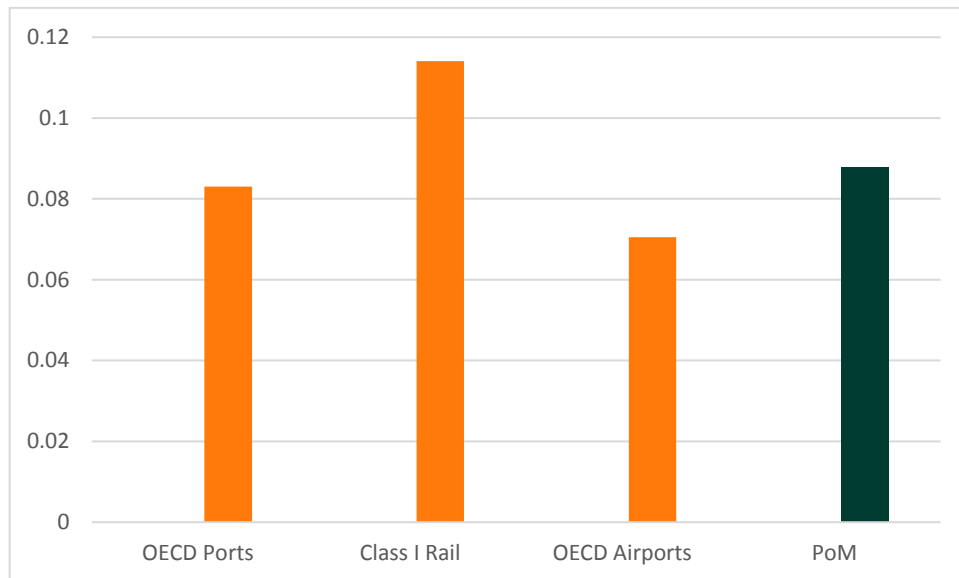
WACC estimates for listed comparators

Regulatory decisions provide a useful reference point for establishing an appropriate WACC range, but it is also important to consider evidence on WACC from listed comparators. In this section, we present WACC estimates for the Class I railroads, OECD ports and OECD airports from our comparator set. The calculations presented here are based on Bloomberg-generated estimates of the return on equity and return on debt. We have supplemented these with Black CAPM and FFM estimates for each of the comparators, so that the calculations are directly comparable with our multi-model approach for PoM. All calculations are expressed as pre-tax nominal estimates using country specific corporate taxation rates.

Figure 7 presents the WACC margins (based on the multi-model approach) for each of the following sectors:

- OECD ports
- Class I rail
- OECD airports
- PoM.

Figure 7 WACC margins (pre-tax nominal WACC less risk-free rate), by sector



Data source: Bloomberg, Synergies calculations

Evidently, PoM’s proposed WACC margin is not inconsistent with the median sector estimates. Summaries of the approach we have taken to derive these comparative WACC margin estimates are set out below. In line with our approach for the gearing and beta analysis, we focus on median values for each sector, rather than seeking to draw comparisons with specific companies. In practice, this may be confounded by varying economic exposures, local market and trade characteristics, a company’s competitive position, differing regulatory regimes and other company specific risk factors. However, estimates for each firm are provided in Attachment G.

The range of WACC margins mirrors the results of the beta analysis in Chapter 7. The WACC margin for Class I railroads forms the upper bound of the listed comparator range, while the OECD airports sample is situated at the lower bound. The WACC margin for the OECD ports sample lies in between these two sectors.

OECD ports

We have included 22 Marine Ports and Services companies in PoM’s comparator set, but only 11 of these are from OECD countries. The median WACC margin is 8.30% which is only slightly lower than PoM’s WACC margin of 8.78%.

North American Class I railroads

The PoM comparator set contains 7 Class I railroads (5 from the US and 2 from Canada). The median WACC margin across the sample is 11.40%. This is well above PoM’s WACC margin, owing in part to the higher asset betas for these companies.

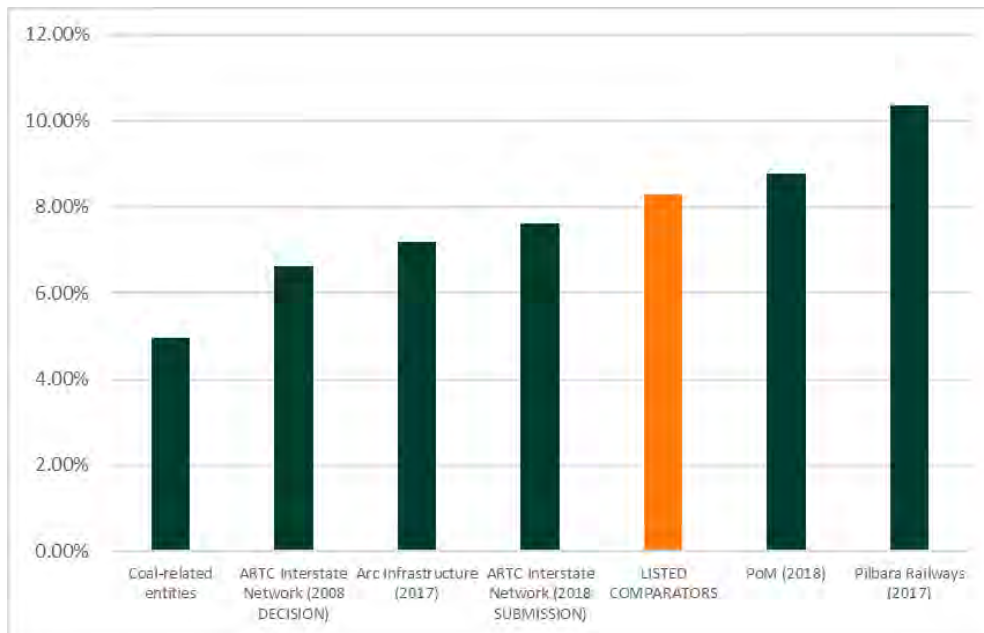
OECD Airports

Of the 13 airports in PoM’s comparator set, 11 are from OECD countries. PoM’s WACC margin (8.78%) is situated above the median of the sample (7.05%).

Comparison of regulatory and listed comparator WACC margins

The WACC margins from regulatory decisions and from listed comparators have both been calculated on a pre-tax nominal basis, which allows for a side by side comparison. The median WACC margin across the three sectors of listed comparators is 8.30%, which is only marginally lower than PoM’s WACC margin (8.78%).

Figure 8 Regulatory and listed comparator WACC margins



Data source: Bloomberg, Synergies calculations

12.2.3 Detailed analysis of proposed WACC estimate

We consider that the preceding sections of this chapter demonstrate that our proposed WACC estimate satisfies the well-accepted and overall reasonableness stages of the ESC’s compliance assessment framework, such that further detailed analysis of the proposed estimate is not required. Additionally, Synergies’ approach to the estimation of the WACC parameters for the 2017-18 TCS was already, and for the 2018-19 TCS continues to be, in compliance with the guiding principles of this step, as we consider that these naturally form part of a robust WACC estimation process.

A Gearing Ratios

The purpose of this attachment is to provide further details on the comparator companies that Synergies has used to develop its gearing and asset beta assumptions for the BEE.

A.1 Characteristics of a benchmark efficient entity

The various determinants of capital structure for port service providers present challenges when defining an ideal capital structure. In defining the BEE, several key characteristics must be considered.

A.1.1 Cash Flow Volatility

PoM is a landlord port as opposed to a port / terminal operator. As such, its business model is characterised by relatively high operating leverage, which is a capital-intensive business model with limited operating elements, and means that it has a large fixed capital base and relatively low variable costs. All things held equal, a business with operating leverage is reflected in greater sensitivity of earnings to changes in sales volumes and revenues compared to entities with low operating leverage.

PoM's historical cash flow profile has been significantly affected by levels of economic activity, which is reflective of the nature of trade activity at the port (e.g. services provided to facilitate import and export trades, which in turn are driven by domestic demand and international trade activity) and the captive trade catchment area which it services (i.e. the majority of trade originating from or destined for Melbourne metropolitan and greater Melbourne regions).

Moreover, there is some contestability in the broader trade catchment areas serviced by PoM and, in the longer term, it is expected the port may be subject to increased competition in the Melbourne market, should the Victorian Government proceed with procuring a second container port as is contemplated in the study completed by Infrastructure Victoria. In its October 2017 *Victorian Infrastructure Plan*, the Victorian Government announced that it would "undertake strategic planning to identify and prioritise future freight investment, including consideration of a second container port."¹⁷⁹

¹⁷⁹ Victorian Government (2017). *Victorian infrastructure plan*, October, p.43.

A.1.2 Investment Needs

Capital investment needs for port infrastructure assets can be characterised as “lumpy,” in the sense that capacity expansions generally can only be undertaken in relatively large increments. This can lead to material variation in capital structure over time in line with the need to upgrade and expand port facilities.

A.1.3 Debt Serviceability

The assessment techniques of credit rating agencies also provide guidance on the characteristics of a BEE. In Moody’s rating methodology for Privately Managed Port Companies, their considerations include, but are not limited to, the following:¹⁸⁰

- Market Position:
 - How large is the port, and to what extent does it form an essential part of the local economy?
 - Does it have an effective monopoly on port services in the region, or is it a major transshipment hub?
 - What is the quality of the connecting road and/or rail infrastructure? Are there any operational restrictions? (For example, unable to accept certain ship types, or other capacity limitations)
- Diversity of Customer Base
 - How exposed is the port to volume variation?
 - How dominant are its main customers?
- Capital Program and Financial Profile
 - How much expansion capital expenditure is planned?
 - What proportion of revenues come from non-core activities?
- Nature of Asset Ownership
 - Are all key port assets held outright in perpetuity and controlled by port management, or are they subject to short term operating leases?
- Key Credit Metrics
 - How does the port perform against key credit metrics, the most important of which are:

¹⁸⁰ Moody’s (2016). Privately managed port companies rating methodology, 15 September.

- funds from operations (FFO) to debt ratio. FFO can be defined as cash flow from operations prior to movements in working capital. A lower FFO/Debt ratio indicates that the firm is more highly leveraged. FFO / Debt is particularly relevant to credit rating agencies – a cashflow-based gearing metric is seen to be more relevant for high cash yielding infrastructure businesses;
- interest coverage ratio is typically defined as the ratio of EBIT to interest payable on debt. As such, it measures a firm’s ability to service its debt. Evaluating the interest coverage ratio of comparable companies provides an indication of the necessary interest cover required for an efficient benchmark entity.

A.2 Comparator Companies

Table 27 lists the 5-year gearing estimates for the 51 comparator companies that emerged from the process set out in Section 5. Comparators with market capitalisations below \$US100 million that have been included for the first time this year are shaded in grey.

Table 27 Gearing for full list of comparators (51 entities)

Company	Country	OECD	Sector	Gearing
Qube Holdings	Australia	Yes	Marine Ports and Services	18%
Port of Tauranga	New Zealand	Yes	Marine Ports and Services	4%
Hamburger Hafen und Logistik	Germany	Yes	Marine Ports and Services	20%
Piraeus Port Authority	Greece	Yes	Marine Ports and Services	18%
Thessaloniki Port Authority	Greece	Yes	Marine Ports and Services	0%
Sociedad Matriz SAAM	Chile	Yes	Marine Ports and Services	19%
Luka Koper	Slovenia	Yes	Marine Ports and Services	33%
Isewan Terminal Service	Japan	Yes	Marine Ports and Services	9%
Sakurajima Futo Kaisha	Japan	Yes	Marine Ports and Services	27%
Rinko Corporation	Japan	Yes	Marine Ports and Services	56%
Dongbang Transport Logistics	South Korea	Yes	Marine Ports and Services	64%
Wilson Sons	Brazil	No	Marine Ports and Services	30%
China Merchants Port Holding Company	Hong Kong	No	Marine Ports and Services	23%
COSCO Shipping Ports	Hong Kong	No	Marine Ports and Services	32%
Dalian Port	Hong Kong	No	Marine Ports and Services	33%
ADSEZ	India	No	Marine Ports and Services	22%

Company	Country	OECD	Sector	Gearing
Asian Terminals	Philippines	No	Marine Ports and Services	0%
International Container Terminal Services	Philippines	No	Marine Ports and Services	23%
Hutchinson Port Holdings Trust	Singapore	No	Marine Ports and Services	43%
Kingston Wharves	Jamaica	No	Marine Ports and Services	10%
Prumo Logistica	Brazil	No	Marine Ports and Services	56%
Global Ports Investments	International	No	Marine Ports and Services	53%
Pakistan International Container Terminal	Pakistan	No	Marine Ports and Services	2%
DP World	UAE	No	Marine Ports and Services	28%
Alexandria Containers & Goods	Egypt	No	Marine Ports and Services	0%
United Arab Stevedoring Company	Egypt	No	Marine Ports and Services	0%
China Container Terminal Corporation	Taiwan	No	Marine Ports and Services	34%
Summit Alliance Port Limited	Bangladesh	No	Marine Ports and Services	10%
Aurizon Holdings	Australia	Yes	Railroads	23%
CSX Corporation	US	Yes	Railroads	24%
Genesee & Wyoming Inc.	US	Yes	Railroads	32%
Kansas City Southern	US	Yes	Railroads	16%
Norfolk Southern Corporation	US	Yes	Railroads	23%
Union Pacific Corporation	US	Yes	Railroads	13%
Canadian National Railway Company	Canada	Yes	Railroads	12%
Canadian Pacific Railway	Canada	Yes	Railroads	19%
Globaltrans Investment	International	No	Railroads	16%
Container Corporation of India Limited	India	No	Railroads	0%
Sydney Airport	Australia	Yes	Airports	38%
Auckland International Airport Limited	New Zealand	Yes	Airports	19%
Copenhagen Airport	Denmark	Yes	Airports	13%
Vienna International Airport	Austria	Yes	Airports	22%
Zurich Airport	Switzerland	Yes	Airports	17%
Frankfurt Airport	Germany	Yes	Airports	40%
Paris Airport	France	Yes	Airports	29%
Grupo Aeroportuario del Centro Norte	Mexico	Yes	Airports	13%

Company	Country	OECD	Sector	Gearing
Airports of Thailand	Thailand	No	Airports	7%
Grupo Aeroportuario del Sureste	Mexico	Yes	Airports	7%
TAV Havalimanlari Holding	Turkey	Yes	Airports	31%
Malta International Airport	Malta	No	Airports	12%
Japan Airport Terminal Co.	Japan	Yes	Airports	17%
			Median	19%
			Average	22%

Source: Bloomberg

Table 28 lists the median and average gearing ratios for our full sample of companies.

We have divided these results by sector and also distinguished between OECD and non-OECD membership. Using the full sample, the median gearing level is 19% and the average gearing level is 22%.

Table 28 Gearing by sector

	Sector Average	Sector Median	Sector Minimum	Sector Maximum
Marine Ports and Services	24%	23%	0%	64%
Railroads	18%	18%	0%	32%
Airports	20%	17%	7%	40%
OECD	Sector Average	Sector Median	Sector Minimum	Sector Maximum
Marine Ports and Services	25%	19%	0%	64%
Railroads	20%	21%	12%	32%
Airports	22%	19%	7%	40%
Non-OECD	Sector Average	Sector Median	Sector Minimum	Sector Maximum
Marine Ports and Services	23%	23%	0%	56%
Railroads	8%	8%	0%	15%
Airports	9%	9%	7%	12%

Source: Bloomberg

B Beta diagnostics

The purpose of this attachment is present estimates that reinforce the robustness of our beta analysis. To this end we present estimates over ten years to complement our primary estimation period of five years. We have estimated portfolio betas for each of the three industry sectors (Marine Ports and Services, Railroads and Airports), and we have also experimented with different monthly starting days for the monthly returns used in our beta estimates. Comparators with market capitalisations below \$US100 million that have been included for the first time this year are shaded in grey.

Table 29 Beta Comparables over 5 and 10 year periods (51 entities)

Comparables	Country	OECD	Sector	5 Yr Asset Beta	10 Year Asset Beta
Qube Holdings	Australia	Yes	Marine Ports and Services	1.19	1.03
Port of Tauranga	New Zealand	Yes	Marine Ports and Services	0.57	0.48
Hamburger Hafen und Logistik	Germany	Yes	Marine Ports and Services	0.56	0.89
Piraeus Port Authority	Greece	Yes	Marine Ports and Services	0.53	0.54
Thessaloniki Port Authority	Greece	Yes	Marine Ports and Services	0.50	0.62
Sociedad Matriz SAAM	Chile	Yes	Marine Ports and Services	0.83	0.88
Luka Koper	Slovenia	Yes	Marine Ports and Services	1.01	0.87
Isewan Terminal Service	Japan	Yes	Marine Ports and Services	0.15	0.25
Sakurajima Futo Kaisha	Japan	Yes	Marine Ports and Services	0.72	0.43
Rinko Corporation	Japan	Yes	Marine Ports and Services	0.39	0.29
Dongbang Transport Logistics	South Korea	Yes	Marine Ports and Services	0.68	0.55
Wilson Sons	Brazil	No	Marine Ports and Services	0.25	0.41
China Merchants Port Holding Company	Hong Kong	No	Marine Ports and Services	0.79	0.85
COSCO Shipping Ports	Hong Kong	No	Marine Ports and Services	0.52	0.86
Dalian Port	Hong Kong	No	Marine Ports and Services	0.81	0.75
ADSEZ	India	No	Marine Ports and Services	1.04	1.03
Asian Terminals	Philippines	No	Marine Ports and Services	0.44	0.60

Comparables	Country	OECD	Sector	5 Yr Asset Beta	10 Year Asset Beta
International Container Terminal Services	Philippines	No	Marine Ports and Services	0.56	0.93
Hutchinson Port Holdings Trust	Singapore	No	Marine Ports and Services	0.48	0.53
Kingston Wharves	Jamaica	No	Marine Ports and Services	1.12	0.98
Prumo Logistica	Brazil	No	Marine Ports and Services	0.42	0.98
Global Ports Investments	International	No	Marine Ports and Services	0.59	0.57
Pakistan International Container Terminal	Pakistan	No	Marine Ports and Services	0.69	0.92
DP World	UAE	No	Marine Ports and Services	0.25	0.44
Alexandria Containers & Goods	Egypt	No	Marine Ports and Services	1.16	0.91
United Arab Shipping Co SAG	Egypt	No	Marine Ports and Services	1.25	1.23
China Container Terminal Corporation	Taiwan	No	Marine Ports and Services	0.60	0.69
Summit Alliance Port Ltd	Bangladesh	No	Marine Ports and Services	1.55	1.61
Aurizon Holdings	Australia	Yes	Railroads	0.43	0.47
CSX Corporation	US	Yes	Railroads	0.91	0.95
Genesee & Wyoming Inc.	US	Yes	Railroads	1.15	0.99
Kansas City Southern	US	Yes	Railroads	0.66	0.97
Norfolk Southern Corporation	US	Yes	Railroads	1.00	0.88
Union Pacific Corporation	US	Yes	Railroads	0.68	0.91
Canadian National Railway Company	Canada	Yes	Railroads	0.71	0.41
Canadian Pacific Railway	Canada	Yes	Railroads	1.08	0.71
Globaltrans Investment	International	No	Railroads	0.82	1.66
Container Corporation of India Limited	India	No	Railroads	0.91	0.75
Sydney Airport	Australia	Yes	Airports	0.36	0.48
Auckland International Airport Limited	New Zealand	Yes	Airports	1.02	0.74

Comparables	Country	OECD	Sector	5 Yr Asset Beta	10 Year Asset Beta
Copenhagen Airport	Denmark	Yes	Airports	0.33	0.49
Vienna International Airport	Austria	Yes	Airports	0.40	0.44
Zurich Airport	Switzerland	Yes	Airports	0.73	0.71
Frankfurt Airport	Germany	Yes	Airports	0.34	0.47
Paris Airport	France	Yes	Airports	0.35	0.51
Grupo Aeroportuario del Centro Norte	Mexico	Yes	Airports	0.83	0.90
Airports of Thailand	Thailand	No	Airports	0.98	0.82
Grupo Aeroportuario del Sureste	Mexico	Yes	Airports	0.69	0.84
TAV Havalimanlari Holding	Turkey	Yes	Airports	0.37	0.40
Malta International Airport	Malta	No	Airports	0.80	0.82
Japan Airport Terminal Co.	Japan	Yes	Airports	1.32	0.64
			Median	0.69	0.75
			Average	0.72	0.75

Source: Bloomberg

B.1 Portfolio Betas

An informative robustness test for our beta estimates is to evaluate the beta for each sector using a value-weighted portfolio of the comparable companies, rather than averaging across the firms in each sector. The returns of each stock in the portfolio were weighted by market capitalisation in each month. In a similar way, the monthly market return was calculated as the weighted average of the monthly returns for each company's home country benchmark. Likewise, each company's gearing ratio was also weighted by its market capitalisation. The results from these estimates are presented in Table 30.

Table 30 Portfolio Asset Beta Estimates

Timeframe	Marine Ports and Services (OECD)	Marine Ports and Services (Non-OECD)	Marine Ports and Services (All companies)	Railroads	Airports
5 Year Portfolio	0.78	0.58	0.60	0.89	0.59
10 Year Portfolio	0.91	0.79	0.83	0.86	0.62

Note: Non-OECD railroad and airport portfolios consist of only two companies each, so these results have not been presented here
Source: Bloomberg, Synergies calculations

As can be seen, the estimates for the Railroads and Airports sectors remain virtually unchanged from our earlier analysis. The principal discrepancy emerged from the non-OECD Marine Ports and Services sub-sample, where the portfolio beta was lower (0.58). This finding can be attributed to the portfolio weights. When weighted by market capitalisation, DP World (Average Market Capitalisation over five years = \$US16.3 billion) accounts for 30% of the sample. In the individual estimations, its asset beta was calculated to be only 0.25. Over ten years, the OECD and non-OECD estimates were closer to each other, as DP World’s asset beta was higher over this timeframe.

For the rail sample and the airports sample, there was virtually no difference between the portfolio asset betas and the average beta across the estimates of the individual companies. The portfolio beta over five years was 0.89 for rail, an increase of 0.05 compared to averaging. The portfolio beta for airports was 0.59, which was slightly lower than averaging across individual beta estimates. Similar results were observed over the ten-year time frame.

B.2 Beta estimates using different monthly starting days

By default, the monthly returns used in our beta analysis are calculated at the end of each month. To add robustness to our beta estimates, we have compiled supporting beta estimates using every other day of the month, and have averaged across these individual estimates. Results over both a five-year and ten-year time frame are displayed in Table 31, and reinforce an asset beta estimate of 0.7.

Table 31 Beta estimates averaged across different starting days

Timeframe	31-day Average	31-day Median
5 Years	0.71	0.70
10 Years	0.74	0.75

Note: To accommodate different month lengths throughout the year, we have also taken averages over 28 days. This causes a difference of only 0.01 in the average for the 10 year estimates, and causes no difference in the 5 year estimates.

Source: Bloomberg, Synergies

The results presented in the table above are based on 31-day averages. If the given starting date falls on a weekend or public holiday in a particular month, we use the most recent trading day as an approximation. For example, where the starting day is set to be the 15th of the month, if the 15th falls on a weekend, the value from the previous trading day is used as an approximation. To accommodate different month lengths throughout the year, we have also taken averages over 28 days. This has virtually no impact on the findings.

B.3 Comparator descriptions

The following three tables present descriptions of the comparators that we have included in our sample. Comparators with market capitalisations below \$US100 million that have been included for the first time this year are shaded in grey.

Table 32 Marine Ports and Services comparators

Company	Country	OECD	Description
Qube Holdings	Australia	Yes	Qube Holdings Ltd. is a logistics company. The Group operates in divisions covering Automotive, Bulk and General Stevedoring, Landside Logistics and Strategic Development Assets.
Port of Tauranga	New Zealand	Yes	Port of Tauranga Limited activities 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.
Hamburger Hafen und Logistik	Germany	Yes	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.
Piraeus Port Authority	Greece	Yes	Piraeus Port Authority SA manages the Piraeus harbor. The Company provides services such as loading and unloading cargo, warehousing, and transportation of cars. It provides electricity, water, and other services. Piraeus Port Authority is responsible for maintaining the port and controlling the movement of ships.
Thessaloniki Port Authority	Greece	Yes	Thessaloniki Port Authority SA manages the Thessaloniki harbor. The Company provides services such as loading and unloading cargo, warehousing, and offers electricity, water, and other services.
Sociedad Matriz SAAM	Chile	Yes	Sociedad Matriz SAAM SA through its subsidiary, operates a ports, towage, and logistics business. The Company serves clients in North and South America.
Luka Koper	Slovenia	Yes	Luka Koper (Port of Koper) operates a cargo port and specialized terminals in Slovenia. The Company offers handling, warehousing, distribution, processing, logistical, and other related services. Luka Koper is the only maritime cargo port in Slovenia located north on the Adriatic Sea.
Isewan Terminal Service	Japan	Yes	Isewan Terminal Service Co., Ltd. mainly provides port-harbor transportation services at Nagoya port. The Company transports steel products, iron ore, industrial machinery, chemical products, and various dry consumer and agricultural goods. Isewan Terminal Service also offers ground transportation and warehousing services.
Wilson Sons	Brazil	No	Wilson Sons Ltd., through subsidiaries, is a provider of integrated port and maritime solutions. The Company provides a set of services to participants in domestic, international trade and oil and gas industry, and has its principal operations divided into: Container Terminals, Oil & Gas Terminals, Towage, Offshore Vessels, Shipyards, Logistics, and Shipping Agency.
China Merchants Port Holding Company	Hong Kong	No	China Merchants Port Holdings Company Limited, through its subsidiaries and associated companies, operates ports, airports, and other container and cargo terminals around the world. The Company also manages toll roads, properties, and assets management.
COSCO Shipping Ports	Hong Kong	No	Cosco Shipping Ports Limited, through its subsidiaries, provides ports services worldwide. The Company operates container terminals, and provides container handling, storage, transportation, management, and stevedoring services.

Company	Country	OECD	Description
Dalian Port	Hong Kong	No	Dalian Port (PDA) Company Limited provides international and domestic cargo handling, transportation, transit, warehousing and other port operations and logistics services. The Company also provides oil and liquid chemicals terminal and related logistics services, tugging, pilotage, cargo handling and information technology services.
ADSEZ	India	No	Adani Ports and Special Economic Zone Limited operates a shipping port on the west coast of India. The Company provides cargo handling, transportation, storage, logistics, and evacuation services to energy, railway, thermal power generation and transmission, agricultural, and logistics industries.
Asian Terminals	Philippines	No	Asian Terminals, Inc. provides general service to the Philippine port terminals. The Company's services include general cargo handling, container terminal handling, stevedoring, and storage management services.
International Container Terminal Services	Philippines	No	International Container Terminal Services, Inc. (ICTSI) develops, manages, and operates container ports and terminals. The Company offers container packing, weighing, storage, inspection, cargo management, and other related services. ICTSI serves customers worldwide.
Hutchinson Port Holdings Trust	Singapore	No	Hutchison Port Holdings Trust is a container port business trust. The Trust invests in, develops, operates, and manages deep-water container ports in the Pearl River Delta. Hutchison Port Holdings also invests in other types of port assets such as river ports, as well as undertake certain port ancillary services that include warehousing and distribution services.
Kingston Wharves	Jamaica	No	Kingston Wharves Ltd receives, stores and delivers cargo through company owned piers. The Company operates in association with Caribbean Freight Forwarders and Custom Brokers Ltd. Kingston operates through its subsidiaries, Kingston Terminal Operators Ltd., Harbour Cold Stores Ltd., Western Storage Ltd., Jamaica Cooling Stores Ltd., and Security Administrators Ltd.
Prumo Logistica	Brazil	No	Prumo Logistica S.A. handles logistic and infrastructure activities related to the portuary sector. The Company constructs, develops and manages port complexes for business trades. Prumo Logistica offers its services throughout Brazil.
Global Ports Investments	International	No	Global Ports Investments PLC provides terminal operator services. The Company offers import and export logistics operations including oil products, container and other cargo operations. Global Ports operates ports and terminals in Finland, Estonia and Russia.
Pakistan International Container Terminal	Pakistan	No	Pakistan International Container Terminal Ltd operates a container shipping facility in Karachi, Pakistan.
DP World	UAE	No	DP World Ltd is a global operator of container and marine terminals. The Company operates marine terminals across six continents, and generates its core revenues from handling cargo containers. DP World was founded in 1972, and operates out of its global headquarters in Dubai, United Arab Emirates.
Alexandria Containers & Goods	Egypt	No	Alexandria Containers & Goods specializes in container handling in Egyptian ports. The Company operates export, import and transit yards, a refer yard, cargo yard, empty container yard, and a container freight station.
Dongbang Transport Logistics	South Korea	Yes	Dongbang Transport Logistics Co., Ltd. provides stevedoring, forwarding, and container storage services at the local ports in South Korea. The Company also offers inland and marine transportation services.
Rinko Corporation	Japan	Yes	Rinko Corporation is a marine transport company based at Niigata Port. The Company also provides truck transportation, warehousing and storage, and freight handling services. Rinko also leases real

Company	Country	OECD	Description
China Container Terminal Corporation	Taiwan	No	estate, sells and repairs construction machinery, and operates customs brokerage. China Container Terminal Corporation operates container terminals. The Company's terminals are located in the ports of Kaohsiung, Taichung, and Keelung in Taiwan.
Sakurajima Futo Kaisha Ltd	Japan	Yes	Sakurajima Futo Kaisha, Ltd. provides marine transportation and warehousing services at the Osaka Bay areas. The Company mainly handles imported raw materials, petroleum products, and frozen food. The Company also provides land transportation, customs clearance, and insurance agency services.
Summit Alliance Port Ltd	Bangladesh	No	Summit Alliance Port Ltd. provide both ICD (Inland Container Depot) and CFS (Container Freight Station) services.
United Arab Shipping Co SAG	Egypt	No	The United Arab Stevedoring Co. operates at ports and harbors. The Company offers cargo handling, shipping, and marine transportation services. United Arab Shipping serves customers in Egypt.

Source: Bloomberg

Table 33 Railroad comparators

Company	Country	OECD	Description
Aurizon Holdings	Australia	Yes	Aurizon Holdings Ltd is a rail freight company. The Company provides coal, bulk and general freight haulage services, operating on the central queensland coal network (CQCN) and including specialized track maintenance and workshop support functions.
CSX Corporation	US	Yes	CSX Corporation is an international freight transportation company. The Company provides rail, intermodal, domestic container-shipping, barging, and contract logistics services around the world. CSX's rail transportation services are provided principally throughout the eastern United States.
Genesee & Wyoming Inc.	US	Yes	Genesee & Wyoming Inc., through its subsidiaries, owns and operates short line and regional freight railroads and provides related rail services. The Company also offers railroad switching and related services to the United States industries with extensive railroad facilities within their complexes. Genesee & Wyoming operates in the United States and Australia.
Kansas City Southern	US	Yes	Kansas City Southern, through its subsidiary, is the holding company for transportation segment subsidiaries and affiliates. The Company operates a railroad system that provides shippers with rail freight services in commercial and industrial markets of the United States and Mexico.
Norfolk Southern Corporation	US	Yes	Norfolk Southern Corporation provides rail transportation services. The Company transports raw materials, intermediate products, and finished goods primarily in the Southeast, East, and Midwest and, via interchange with rail carriers, to and from the rest of the United States. Norfolk Southern also transports overseas freight through several Atlantic and Gulf Coast ports
Union Pacific Corporation	US	Yes	Union Pacific Corporation is a rail transportation company. The Company's railroad hauls a variety of goods, including agricultural, automotive, and chemical products. Union Pacific offers long-haul routes from all major West Coast and Gulf Coast ports to eastern gateways as well as connects with Canada's rail systems and serves the major gateways to Mexico.
Canadian National Railway Company	Canada	Yes	Canadian National Railway Company operates a network of track in Canada and the United States. The Company transports forest products, grain and grain products, coal, sulfur, and fertilizers, intermodal, and automotive products. Canadian National operates a fleet of locomotives and railcars.

Company	Country	OECD	Description
Canadian Pacific Railway	Canada	Yes	Canadian Pacific Railway Limited is a Class 1 transcontinental railway, providing freight and intermodal services over a network in Canada and the United States. The Company's mainline network serves major Canadian ports and cities from Montreal to Vancouver, and key centers in the United States Midwest and Northeast.
Globaltrans Investment	International	No	Globaltrans Investment PLC offers rail freight transportation services in Russia, the CIS countries, and the Baltics. The Company also leases railcars and offers ancillary services to customers in the metals and mining, oil and oil products, and other industries.
Container Corporation of India Limited	India	No	Container Corporation of India Limited supplies railway cargo services, via its fleet of container trains. The Company also provides bonded warehousing services.

Source: Bloomberg

Table 34 Airport comparators

Company	Country	OECD	Description
Sydney Airport	Australia	Yes	Sydney Airport operates the Sydney, Australia airport. The Company develops and maintains the airport infrastructure and leases terminal space to airlines and retailers.
Auckland International Airport Limited	New Zealand	Yes	Auckland International Airport Limited owns and operates the Auckland International Airport. The Airport includes a single runway, an international terminal and two domestic terminals. The Airport also has commercial facilities which includes airfreight operations, car rental services, a commercial banking center and office buildings.
Copenhagen Airport	Denmark	Yes	Kobenhavns Lufthavne A/S (Copenhagen Airports A/S - CPH) owns and operates Kastrup, the international airport in Copenhagen, and Roskilde airport. The Company provides traffic management, maintenance, and security services, as well as manages the Airport Shopping Center and airport projects.
Vienna International Airport	Austria	Yes	Flughafen Wien AG manages, maintains, and operates the Vienna International Airport and the Voslau Airfield. The Company offers terminal services, air-side and land-side cargo handling, and the leasing of store, restaurant, and hotel airport building space to third party operators and businesses.
Zurich Airport	Switzerland	Yes	Flughafen Zurich AG operates the Zurich Airport. The Company constructs, leases, and maintains airport structures and equipment.
Frankfurt Airport	Germany	Yes	Fraport AG Frankfurt Airport Services Worldwide offers airport services. The Company operates the Frankfurt-Main, Frankfurt-Hahn and other German airports, the airport in Lima, Peru, and the international terminal in Antalya, Turkey. Fraport also provides services to domestic and international carriers including traffic, facility and terminal management, ground handling, and security.
Paris Airport	France	Yes	Aéroports de Paris (ADP) manages all the civil airports in the Paris area. The Company also develops and operates light aircraft aerodromes. ADP offers air transport related services, and business services such as office rental.
Grupo Aeroportuario del Centro Norte	Mexico	Yes	Grupo Aeroportuario del Centro Norte, S.A.B. de C.V. (OMA) operates international airports in the northern and central regions of Mexico. The airports serve Monterrey, Acapulco, Mazatlan, Zihuatanejo and several other regional centers and border cities.
Airports of Thailand	Thailand	No	Airports of Thailand Public Company Ltd. operates the Bangkok International Airport (Don Muang) and the New Bangkok International Airport (Suvarnabhumi). The Company also operates provincial airports in Chiang Mai, Chiang Rai, Hat Yai, and Phuket.
Grupo Aeroportuario del Sureste	Mexico	Yes	Grupo Aeroportuario del Sureste S.A.B. de C.V. operates airports in Mexico. The Company holds 50 year concessions, beginning in 1998,

Company	Country	OECD	Description
			to manage airports in Cancun, Cozumel, Merida, Oaxaca, Veracruz, Huatulco, Tapachula, Minatitlan, and Villahermosa.
TAV Havalimanlari Holding	Turkey	Yes	TAV Havalimanlari Holding AS is an airport operator. The Company operates in airports in Turkey, Georgia, Tunisia, Macedonia, Saudi Arabia and Latvia. TAV Havalimanlari provides service in all areas of airport operations such as duty-free, food and beverage, ground handling, IT, security and operations.
Malta International Airport	Malta	No	Malta International Airport PLC operates the Malta International airport.
Japan Airport Terminal Co.	Japan	Yes	Japan Airport Terminal Co., Ltd. constructs, manages and maintains passenger terminals and airport facilities at Haneda airport. The Company also operates parking-lots, souvenir shops, and duty-free stores in both Haneda and Narita airports. Japan Airport Terminal, through its subsidiaries, manages restaurants and in-flight meal services.

Source: Bloomberg

B.4 Excluded comparators

The following tables provide a list of firms that were excluded from our sample, whether because of statistical insignificance, insufficient data, or incompatibility with the BEE.

Table 35 Marine Ports and Services comparators excluded from sample

Firm	Comments
Bremer Lagerhaus-Gesellschaft AG	Statistically insignificant
Eurokai GmbH	Statistically insignificant
Logistec Corporation	Statistically insignificant
Essar Ports	Statistically insignificant
Salalah Port Services Company SAOG	Statistically insignificant
Puerto Ventanas S.A.	Statistically insignificant
Tradia Corporation	Statistically insignificant
Lyttelton Port Company Limited	Statistically insignificant with partially incomplete data
South Port New Zealand Limited	Statistically insignificant
Point Lisas Industrial Port Development Corporation Limited	Statistically insignificant
Namyong Terminal	Negative beta
Mercantile Ports and Logistics Limited (MPL)	Statistically insignificant
Shanghai International Port	Chinese-listed (issues with openness of capital markets)
Ningbo Zhoushan Port Company	Chinese-listed
Kamigumi	Significantly diversified
Tianjin Port Development Holdings	Sale of materials accounts for majority of revenue
Tianjin Port Co.	Chinese-listed

Firm	Comments
Mitsubishi Logistics Corporation	Significant diversification, port and harbour operations only 10% of revenue
Nissin Corporation	28% travel services and real estate, and port services are only a subset of its logistics business
Sumitomo Warehouse Co.	Revenue is substantially diversified
Xiamen Port Development Co.	Chinese-listed
Qingdao Port International Co.	Missing observations
Xiamen International Port Company	Trading business of merchandise accounted for 61.5% of revenue in FY2016.
Guangzhou Port Company Limited	Chinese-listed
Anhui Wanjiang Logistics Group Co	Chinese-listed
COSCO SHIPPING International (Hong Kong)	Shipping
Novorossiysk Commercial Sea Port	Handles mainly crude oil
Tangshan Port Group Co.	Chinese-listed
Qinhuangdao Port Company Limited	Some observations missing
Rizhao Port Co.	Chinese-listed
Sebang	Some diversification
Meiko	Diversification beyond port operations
Yingkou Port Liability	Chinese-listed
Westports Holdings Berhad	Insufficient observations
Ocean Wilsons Holdings	Holding company
Beibuwan Port Co.	Chinese-listed
Touax	Unrelated operations
EMS Seven Seas	Unrelated operations
Jinzhou Port Co.	Chinese-listed
National Marine Dredging Company	Not relevant – dredging
Chongqing Gangjiu Co.	Chinese-listed
Toyo Wharf and Warehouse	Port and harbour operations only 23% of revenue
Shenzhen Chiwan Wharf Holdings	Chinese-listed
Bintulu Port Holdings Berhad	Holding company
Muehlhan	Surface protection solutions
Contracting & Marine Services Company	Services and maintenance
Zhuhai Port Co.	Chinese-listed
Societe d'Exploitation des Ports, dba Marsa Maroc	Missing data
Westshore Terminals	Very high gearing, single commodity exposure

Firm	Comments
Santos Brasil Participacoes S.A.	Missing data
Andino Investment Holding	Statistically insignificant
Braemar Shipping Services	Unrelated operations
Daito Koun	Imports frozen foods
Jiangsu Lianyungang Port Co.	Chinese-listed
Saudi Industrial Services Company (Sisco)	Unrelated services
Gemadept Corporation	Shipping company
Vostochny Port	Missing data
Rinko Corporation	Almost 40% of revenue derived from hotel business, fuel and construction materials, machinery and real estate
Kuwait & Gulf Link Transport Co. (K.S.C)	Unrelated services
Sical Logistics Ltd.	Diversified into trucking and rail
Zhangjiagang Freetrade Science & Technology Group Co.	Chinese-listed
Global Ports Holding Limited	Holding company
Fushiki	Also runs liners
Sinwa Limited	Unrelated - supply, logistics and services
Port of Hai Phong	Missing data
Gujarat Pipavav Port Ltd.	Missing gearing data
China Dredging Environment Protection Holdings	Unrelated – dredging
Puertos y Logistica	Has unrelated subsidiaries - also statistically insignificant
Dredging Corporation of India	Unrelated - dredging
Overseas Commerce Ltd.	Missing data
Novorossiysk Grain Plant PJSC	Missing data
Suria Capital Holdings Berhad	Holding company
Gateway Distriparks Limited	Limited port exposure
Navkar Corporation Limited	Missing data
Portuaria Cabo Froward	Also involved in construction
Gold Bond Group	Holding company
General Silos & Storage	Single commodity exposure
Perak Corporation Berhad	Statistically insignificant
Nanjing Port Co.	Chinese-listed
Zhuhai Winbase International Chemical Tank Terminal Co.	Chinese-listed
Dinh Vu Port Investment & Development	Statistically insignificant
Harbor Star Shipping Services, Inc.	Shipping services, statistically insignificant

Firm	Comments
CIG Yangtze Ports Plc	Missing data
Luka Ploce d.d.	Statistically insignificant
Uljanik Plovidba DD	Very high gearing
Pelayaran Nasional Bina Buana Raya Tbk	Unrelated operations
DaNang Port Joint Stock Company	Very few observations
Globalport 900, Inc.	Incomplete data
Hai An Transport & Stevedoring JSC	Statistically insignificant
Luka Rijeka dd	Primarily support services
Dong Nai Port JSC	Statistically insignificant
Odessos Shiprepair Yard AD	Repair services
VMS Industries Ltd.	Ship dismantling
Comvex SA	Statistically insignificant
Socep S.A.	Statistically insignificant
Starlog Enterprises Ltd	Unrelated operations
exactEarth Ltd.	Satellite data services
Cat Lai Port JSC	Insufficient data
Vietnam Maritime Development JSC	Missing data
PT Indo Straits Tbk	Unrelated operations
Sutton Harbour Holdings	Not directly relevant, statistically insignificant
Camper & Nicholsons Marina Investments	Marinas
Marine Supply and Engineering Service JSC	Unrelated services
PT ICTSI Jasa Prima Tbk	Statistically insignificant
Canal Shipping Agencies Company	Shipping agency
Cia de Remorcage Maritima Coremar SA Constanta	Unrelated services, missing data
Sino-Global Shipping America Ltd.	Shipping agency
Jadroagent D.D.	Shipping agency
Doan Xa Port Joint Stock Company	Statistically insignificant
Western India Shipyard Limited (WISL)	Repair services
Bangpakong Terminal Public Company Limited	Missing data
Taiwan Allied Container Terminal Corp.	Statistically insignificant
Marsden Maritime Holdings Limited	Holding company
The Vegetexco Port JSC	Statistically insignificant
Natura Hue Chem Ltd.	Unrelated operations
C Security Systems AB	Communications and technology

Firm	Comments
JITF Infralogistics Limited	Repair services
Companhia Docas de Imbituba	Missing data, statistically insignificant
Movis Cote d'Ivoire	Ivory Coast
Pakistan International Bulk Terminal Limited	Insufficient observations
Yangtze River Development Limited	Real estate
Quayside Holdings Ltd	Part owner of Port of Tauranga

Source: Bloomberg, Synergies analysis

Table 36 Railroad comparators excluded from sample

Firm	Comments
VTG AG	Statistically insignificant
Center for Cargo Container Traffic TransContainer PJSC	Statistically insignificant
Ferrocarril del Pacifico SA	Statistically insignificant
PCC Intermodal SA	Statistically insignificant
East Japan Railway Company	Passenger, too diversified
Central Japan Railway Company	Diversified, not freight
West Japan Railway Company	Too Diversified
Kintetsu Corp	Too Diversified
Tokyu Corporation	Too Diversified
Daqin Railway Co., Ltd.	Chinese-listed
Hankyu Hanshin Holdings, Inc.	Passenger
MTR Corporation Limited	Public Transport
Nagoya Railroad Co., Ltd.	Passenger
Go-Ahead Group PLC	Buses and Taxis as well
Tobu Railway Co., Ltd.	Passenger
Odakyu Electric Railway Co., Ltd.	Passenger, Diversified
Keio Corporation	Passenger, Diversified
Kyushu Railway Company	Passenger, Diversified
Nishi-Nippon Railroad Co.	Passenger, Diversified
Keikyu Corporation	Passenger, Diversified
Guangshen Railway Company Limited	Chinese-listed
Sotetsu Holdings, Inc.	Passenger, Diversified
Keisei Electric Railway Co., Ltd.	Passenger, Diversified
Nankai Electric Railway Co., Ltd.	Passenger, Diversified
Cosan Logistica SA	Incomplete Data

Firm	Comments
Rumo S.A.	Incomplete Data
Rumo Logistica Operadora Multimodal S.A.	Incomplete Data
PKP Cargo S.A	Incomplete Data
China Railway Tielong Container Logistics Co., Ltd.	Diversified, Chinese-listed
BLS AG	Insignificant, Missing data
China High-Speed Railway Technology Co., Ltd.	China, Maintenance
FNM S.p.A	Holding company, strong public transport emphasis
Kobe Electric Railway Co., Ltd.	Passenger, other diversified services
Berner Oberland-Bahnen AG	Incomplete Data, Mountain Railways
Shin-Keisei Electric Railway Co., Ltd.	Bus, Real Estate
Jungfraubahn Holding AG	Tourism-related
BTS Group Holdings	Public Transport
BVZ Holding AG	Passenger railway
Shanghai Shentong Metro Co. Ltd.	Subway Transit Systems
Keifuku Electric Railroad Co., Ltd.	Diversified
Forestiere Equatoriale	Ivory Coast
Chichibu Railway Co., Ltd.	Passenger and Bus as well as freight
The Central Provinces Railways Co. Ltd.	Construction
Las Vegas Railway Express	Passenger
GMexico Transportes	Insufficient data – listed only in November 2017

Source: Bloomberg, Synergies analysis

Table 37 Airport comparators excluded from sample

Firm	Comments
SAVE SpA	Statistically insignificant
Maman Cargo Terminals and Handling Ltd	Statistically insignificant
Toscana Aeroporti S.p.A.	Statistically insignificant
Aeroporto Guglielmo Marconi Di Bologna SpA	Statistically insignificant
Grupo Aeroportuario del Pacifico	Statistically insignificant
SWISSPORT Tanzania Ltd	Tanzania, Services
Spotlight Capital Holdings Inc	Charter Flights
Sichuan Haite High-tech Co., Ltd.	Chinese-listed
SIA Engineering Co Ltd	Maintenance
Shenzhen Airport Co., Ltd.	Chinese-listed
Shanghai International Airport Co., Ltd.	Chinese-listed

Firm	Comments
Servair Abidjan	Ivory Coast
Saudi Ground Services Company	Ground Services
SATS Ltd	Food and Services
Saker Aviation Services	Maintenance
Safe Bag SPA	Baggage
Noibai Cargo Terminal Services JSC	Cargo Handling
Nigerian Aviation Handling Company Plc	Baggage
Newrest ASL Nigeria	Related Services
Malaysia Airports Holdings Berhad	Holding Company
Macroasia Corporation	Catering
Macquarie Infrastructure Corporation (MIC)	Diversified
Korea Airport Service Co., Ltd.	Diversified
Xiamen International Airport Co., Ltd.	Chinese-listed
United Projects Co for Aviation Services KSCC	Services
ICTS International N.V.	Security
Hong Kong Aircraft Engineering Company Limited	Maintenance
HNA Infrastructure Company Ltd	Diversified
GVK Power & Infrastructure Limited	Unrelated
Guangzhou Hangxin Aviation Technology Co., Ltd.	Chinese-listed
Guangzhou Baiyun International Airport Co., Ltd.	Chinese-listed
Future Generation Investment Company Limited	Diversified
Enav S.p.A.	Navigation
Celebi Hava Servisi A.S.	Baggage, Traffic
PT Cardig Aero Services TBK	Services
Beijing Capital International Airport Company Limited	Significant non-aeronautical diversification
BBA Aviation PLC	Aftermarket
Bangkok Aviation Fuel Services Public Company Limited	Fuel
Avia Solutions Group AB	Fleet Management
Avantair, Inc.	Fractional Ownerships
Airwork Holdings Limited	Not Relevant
AI Airports International Ltd	Development
AGP CORPORATION	Air Con
Aerodrom Nikola Tesla AD Beograd	Insufficient Data
Aena S.A.	Missing Data

Source: Bloomberg, Synergies analysis

C Supplementary information on cost of equity methodologies

The purpose of this attachment is to provide additional detail on the well-accepted cost of equity approaches discussed in Section 6.

C.1 Black CAPM

C.1.1 SFG Consulting's estimate of the zero-beta premium¹⁸¹

SFG quantifies the relationship between realised portfolio returns, market returns and beta, ultimately arriving at an estimate of the zero-beta premium.

Its first step is to form portfolios. Rather than analyse returns on individual stocks, it analyses returns on portfolios of stocks to minimise the “noise” in historical stock returns.

Its second step is to perform a regression of portfolio returns every four weeks on two independent variables – beta × market returns and (1 – beta). SFG demonstrates that the coefficient on the second independent variable (1 – beta) is an estimate of the zero-beta return. To estimate the zero-beta premium, SFG subtracts the average four-weekly risk-free rate over the sample period, measured as the yield to maturity on 10-year government bonds.

Using this two-step process, SFG's estimated return on the zero-beta asset lies between the normal estimate of the risk-free rate of interest and the average market return. The zero-beta premium (the difference between the zero-beta return and the estimate of the risk-free rate) is estimated at 0.239% over four weeks or 3.34% per year.¹⁸²

We consider this estimate is the most robust estimate of this parameter currently available in an Australian context.

C.2 Fama-French Model (FFM)

C.2.1 Beta factors

¹⁸¹ SFG Consulting (2014a).

¹⁸² SFG Consulting (2014a), p.27.

The FFM is based on the principle that excess returns to the market must be assessed having regard to the following three explanatory factors:

- the returns on the market as a whole;
- HML (High Minus Low) is the average return on two value portfolios minus the average return on two growth portfolios; and
- SMB (Small Minus Big) is the average return on three small portfolios minus the average return on three big portfolios.

C.2.2 Estimating the FFM cost of equity

The companies examined in the FFM are the same as those used for the SL CAPM analysis. Estimates of the factor premiums for the US and Japan were sourced from Professor Kenneth French's website, an internationally recognised source.¹⁸³ However, country-specific factors are not available for all firms in our sample. In these instances, we have employed global factor estimates, also acquired from the website of Professor Kenneth French. In a slight modification to last year's methodology, the global factor estimates are used for the SMB and HML returns, but the returns for the market as a whole are now based on the company's local market return, rather than the global market return. We anticipate that this will result in a more robust and stable estimate over time. Moreover, the market beta estimate for the FFM will now more closely resemble the beta estimate for the CAPM.

In the case of Australia, estimates of the factor premiums must also be constructed. For the estimates in this report, we have extended the factor premium dataset to the end of 2017, following the methodology set out in SFG Consulting (2014), which is in turn based on the approach of Brailsford, Gaunt and O'Brien (2012).

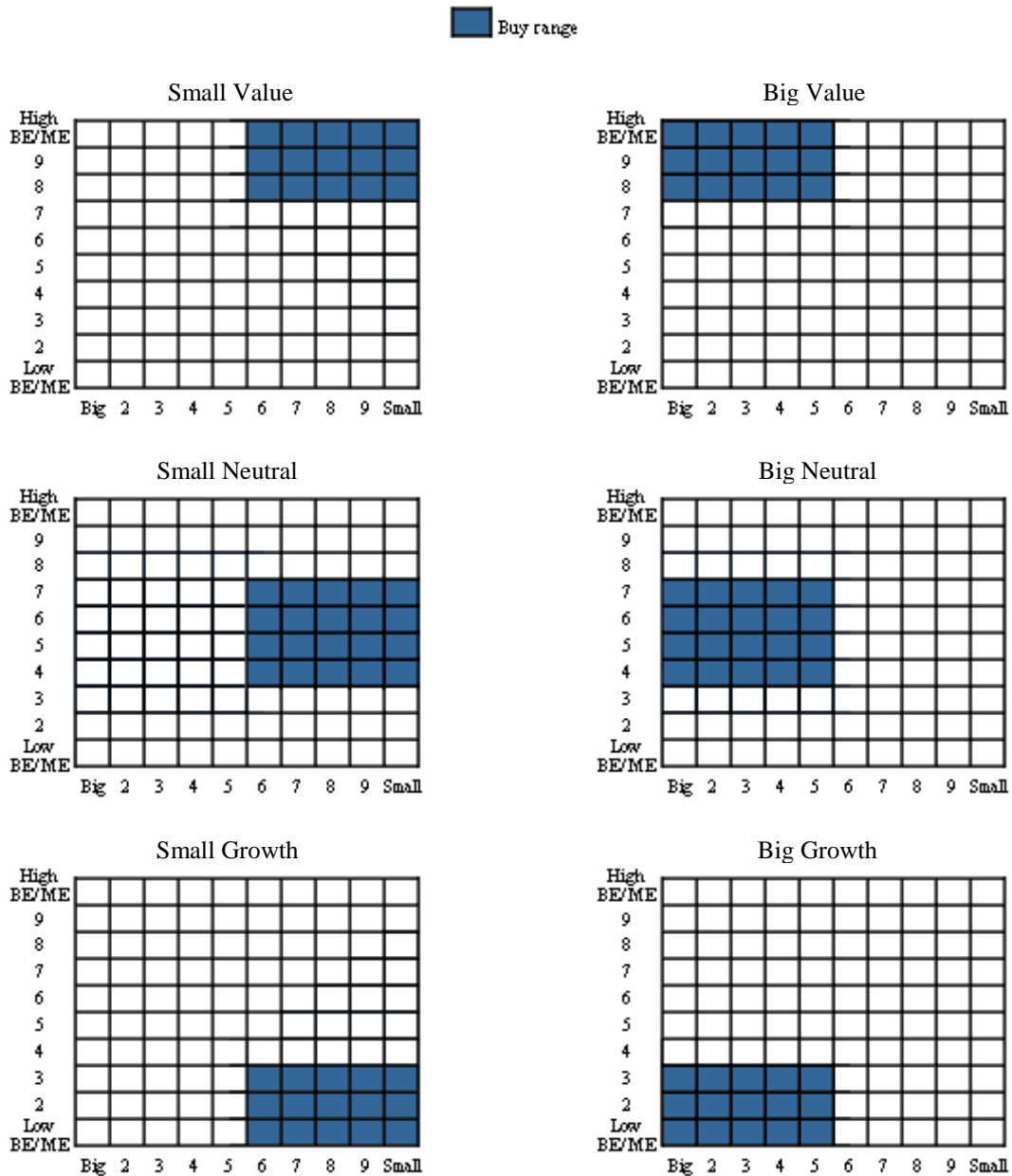
The Australian context requires careful consideration. Estimation of the small-minus-big premium involves construction of SMB portfolios, which partition the sample of firms according to market capitalisation. In Australia, this is complicated by the fact that only a small proportion of stocks can be considered "large cap." Considering this issue, Brailsford, Gaunt and O'Brien (2012) define the large stocks portfolio as the top 90% according to market capitalisation, while the small stocks portfolio comprises the smallest 10% of the market.

In regards to book-to-market ratios, firms are sorted into three categories, partitioned at the 30th and 70th percentiles. Another important consideration is the interaction between

¹⁸³ http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html

size and book-to-market factors. Following SFG Consulting (2014) and Brailsford, Gaunt and O'Brien (2012), our SMB and HML factors have been constructed to be independent of each other. In other words, the small and large stock portfolios have similar book-to-market values of equity, while the high and low book-to-market stocks are of similar size. This enables us to properly identify the true impact of each factor. Figure 9 illustrates the various portfolios that are created in the model.

Figure 9 Buy ranges of Fama French Benchmark portfolios



Data source: http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/Data_Library/bench_m_buy.html

C.2.3 Model specification

Data on monthly returns, market capitalisation and book-to-market ratios for all listed firms in Australia from 1985 to 2017 (including both currently listed and now delisted) were sourced from Datastream.

Once this data was compiled, the monthly returns of each firm over five years (December 2012 to December 2017) were regressed on the monthly measures of the market risk

premium, size premium and value premium for the specific country (or the global premiums if country-specific premiums were not available), using OLS multiple regression. This does not apply to the Australian factor premium data.

These regressions yield estimates of the three Fama-French betas. These betas must then be de-levered using the firm-specific leverage. The unlevered betas are averaged across all firms in the sample, then re-levered using the benchmark port entity's target gearing of 30%.

Table 38 presents our estimated FFM asset betas.

Table 38 Fama-French asset beta estimates, by company

Company	Country	Sector	Beta (MRP)	Beta (HML)	Beta (SMB)
Aurizon Holdings	Australia	Railroads	0.40	0.08	0.04
Sydney Airport	Australia	Airports	0.34	-0.24	0.15
Qube Holdings	Australia	Marine Ports and Services	1.11	0.15	0.07
Vienna International Airport	Austria	Airports	0.38	-0.03	-0.21
Summit Port Alliance Ltd	Bangladesh	Marine Ports and Services	1.54	-0.13	-0.99
Wilson Sons	Brazil	Marine Ports and Services	0.29	-0.03	-0.08
Prumo Logistica	Brazil	Marine Ports and Services	0.37	0.85	0.79
Canadian National Railway Company	Canada	Railroads	0.93	-0.78	-0.88
Canadian Pacific Railway	Canada	Railroads	1.23	-0.29	-0.04
Sociedad Matriz SAAM	Chile	Marine Ports and Services	0.90	0.06	0.74
Copenhagen Airport	Denmark	Airports	0.46	0.87	0.62
Alexandria Containers & Goods	Egypt	Marine Ports and Services	1.12	1.02	-0.80
United Arab Stevedoring Co	Egypt	Marine Ports and Services	1.36	-0.94	0.69
Paris Airport	France	Airports	0.29	-0.62	0.01
Frankfurt Airport	Germany	Airports	0.28	0.08	-0.20
Hamburger Hafen und Logistik	Germany	Marine Ports and Services	0.56	0.64	0.51
Piraeus Port Authority	Greece	Marine Ports and Services	0.61	-0.03	-0.16
Thessaloniki Port Authority	Greece	Marine Ports and Services	0.56	0.48	1.20
China Merchants Port Holding Company	Hong Kong	Marine Ports and Services	0.83	-0.06	0.47

Company	Country	Sector	Beta (MRP)	Beta (HML)	Beta (SMB)
COSCO Shipping Ports	Hong Kong	Marine Ports and Services	0.56	0.32	-0.20
Dalian Port	Hong Kong	Marine Ports and Services	0.87	0.04	-0.08
Container Corporation of India Limited	India	Railroads	0.86	-0.26	0.83
ADSEZ	India	Marine Ports and Services	1.13	0.99	0.51
Kingston Wharves	Jamaica	Marine Ports and Services	1.05	0.02	-0.68
Japan Airport Terminal Co.	Japan	Airports	1.66	-0.13	-0.62
Isewan Terminal Service	Japan	Marine Ports and Services	0.31	-0.02	0.61
Sakurajima Futo Kaisha	Japan	Marine Ports and Services	0.87	1.11	1.41
Rinko Corporation	Japan	Marine Ports and Services	0.44	0.42	0.44
Dongbang Transport Logistics	South Korea	Marine Ports and Services	0.70	-0.06	0.44
Malta International Airport	Malta	Airports	0.81	-0.48	-0.78
Grupo Aeroportuario del Centro Norte	Mexico	Airports	1.02	-0.90	0.20
Grupo Aeroportuario del Sureste	Mexico	Airports	0.55	-0.25	-0.62
Auckland International Airport Limited	New Zealand	Airports	0.94	-0.52	0.35
Port of Tauranga	New Zealand	Marine Ports and Services	0.53	-0.21	-0.21
Pakistan International Container Terminal	Pakistan	Marine Ports and Services	0.61	0.48	-0.89
Asian Terminals	Philippines	Marine Ports and Services	0.75	0.33	-0.06
International Container Terminal Services	Philippines	Marine Ports and Services	0.55	0.46	-0.09
Hutchinson Port Holdings Trust	Singapore	Marine Ports and Services	0.47	-0.23	0.22
Luka Koper	Slovenia	Marine Ports and Services	1.03	0.26	0.90
Zurich Airport	Switzerland	Airports	0.54	-0.37	-0.13
China Container Terminal Corporation	Taiwan	Marine Ports and Services	0.61	0.25	-0.29
Airports of Thailand	Thailand	Airports	1.03	-0.25	0.08
TAV Havalimanlari Holding	Turkey	Airports	0.44	0.45	1.01
DP World	UAE	Marine Ports and Services	0.27	-0.54	-0.24
Globaltrans Investment	International	Railroads	1.12	0.17	1.76

Company	Country	Sector	Beta (MRP)	Beta (HML)	Beta (SMB)
Global Ports Investments	International	Marine Ports and Services	0.64	0.50	0.73
CSX Corporation	US	Railroads	0.97	0.17	0.47
Genesee & Wyoming Inc.	US	Railroads	1.16	0.31	0.50
Kansas City Southern	US	Railroads	0.71	0.33	0.10
Norfolk Southern Corporation	US	Railroads	0.99	0.34	0.41
Union Pacific Corporation	US	Railroads	0.72	0.30	0.35
Average asset betas			0.74	0.08	0.16

Note: The betas presented here have been de-levered using the same debt-to-equity ratios applied in the standard beta analysis

Source: Bloomberg, Synergies Calculations

D Asset beta first principles analysis

D.1 Introduction

The key objective of the first principles analysis is to assess the extent to which the firm's net cashflows (revenues less costs) have some sensitivity to movements in the general economy. Lally identifies a number of factors to be considered here, including: nature of the product or service; nature of the customer; pricing structure; duration of contracts; market power; nature of regulation (if any); growth options; and operating leverage.¹⁸⁴

The first principles analysis is largely contextual and can inform an assessment of where beta might sit within a range (that is, does a factor put upward or downward pressure on the beta for the firm). However, this remains qualitative. Noting the inherent uncertainty in beta estimation, it is not feasible to reliably quantify the impact of a particular factor on beta in isolation of other factors.¹⁸⁵

A number of these factors are also interrelated – that is, the impact of one factor on beta could either be increased or lessened by another factor. Hence, while the impact of each factor can be considered in isolation, the overall assessment will reflect the net impact of the factors in combination. The first two factors are inextricably linked and so will be considered together.

D.2 Nature of the product/nature of the customer

Fundamental to understanding a firm's risk profile is identifying and analysing the demand for its core services. The analysis needs to be extended to the services from which the infrastructure's demand is derived, which in this case, is the demand for accessing and usage of channel and wharf assets by shipping companies and related port users. Other issues that may impact on the extent to which the port is exposed to the risk of changes in the demand for port services, such as market power and the structure of PoM's contracts with its customers, are considered separately.

Availability of substitutes

One of the key drivers of a firm's risk profile is the extent to which the demand for its services is exposed to competition from substitutes.

¹⁸⁴ Lally, M. (2004). The cost of capital for regulated entities, Report prepared for the Queensland Competition Authority.

¹⁸⁵ This would necessitate being able to have two samples, where the firms in the samples are largely identical other than for the relevant factor.

There is clear evidence of contestability given that PoM has lost trade to Adelaide (import containers), Geelong (breakbulk) and Port Botany (agricultural exports). Moreover, PoM competes with Geelong in relation to import crude and refined oil, breakbulk cargo, bulk grain exports, dry bulk import (cement, soda ash and fertiliser). Nevertheless, a significant proportion of PoM's volumes are not contestable, with 87% and 54% of imported and exported containers, respectively, destined for or originating from the Melbourne metropolitan region.¹⁸⁶ However, there is clearly the prospect of competition in the form of the development of a second port serving Melbourne.

In May 2017, Infrastructure Victoria recommended the construction of a new port for Melbourne at Bay West.¹⁸⁷ Infrastructure Victoria's view is that the new port will not be required until 2055, as PoM has a potential capacity of approximately 8 million TEU. Mr Michael Masson, the chief executive of Infrastructure Victoria, has stated that the Bay West port could handle overflow container capacity initially, but it would be well suited to becoming Melbourne's future container port in the long term. Planning for the port is likely to begin 15 years before it is required to be operational. In short, it is possible for the State to bring forward the development of the port if it perceives it to be in the public interest to do so.

As such, given the current attention to the issue, there is no guarantee that the 2055 timeline will be maintained. Political considerations could see the implementation of the second port occur even earlier, which presents considerable risk to PoM. In particular, Infrastructure Victoria has noted that:¹⁸⁸

Increasing capacity at Webb Dock to accept ships larger than around 7,500 TEU could make it difficult for Swanson Dock's capacity to be fully utilised due to its vessel size restrictions. This may prematurely compromise the viability of Swanson Dock, unnecessarily bringing forward the need to invest in additional capacity. This can be managed through deliberate staging of infrastructure investments at Webb Dock as well as upgrades to navigation infrastructure (channels and swing basins) and changes to regulation of navigation.

Moreover, in one of its recommendations, Infrastructure Victoria highlights that further urban development is likely to hinder capacity enhancement within the existing Port of Melbourne footprint:¹⁸⁹

¹⁸⁶ Port of Melbourne Corporation (2009). Port of Melbourne – Management Presentation, p.16.

¹⁸⁷ Ackerman, I, "Go west says IV," *Lloyd's List Australia*, May 25, 2017.

¹⁸⁸ Infrastructure Victoria (2017). Advice on securing Victoria's ports capacity, p.16.

¹⁸⁹ Infrastructure Victoria (2017), p.17.

Maintaining the Port's social licence to operate is an important consideration if capacity expansions are to be sustainably achieved. If the amenity impacts of port related freight services are not effectively managed, the Port of Melbourne may be unable to reach its optimal capacity.

Infrastructure Victoria has recommended that the Victorian Government should monitor key indicators relevant to all Victorian ports that impact planning and publish a report every five years. This report will have the objective of identifying whether PoM has the ability to meet demand for 15 years or more. In the meantime, Infrastructure Victoria has recommended measures to optimise capacity at PoM, through augmentations at Swanson and Webb Dock. Infrastructure Victoria has also recommended that the Victorian Government should not enter into any arrangement that restricts the ability to develop a second port after 2031:¹⁹⁰

There is an initial 15 year period in the Port of Melbourne lease legislation where there cannot be a second port built without compensation to the lessee. There is considerable value in the State retaining the unfettered option under the current terms of the Port of Melbourne lease legislation to develop a second container port after 15 years.

These considerations make it clear that the Victorian Government can act relatively quickly to develop a new port in the future. This will tend to increase the beta for PoM compared to other Australian capital city ports when considering the investment's 50 year lease horizon. It would put Melbourne in the unique position of being the only capital city in Australia with a competing port servicing a similar catchment area (the closest example being in Sydney with the Port of Newcastle, which is very unlikely to become a major container port) noting that Port Botany and Port Kembla are under the same ownership).

Modal substitution is limited. Domestically, there is limited competition from rail for inter-city freight movements given the distances between cities and some inherent inefficiencies in the freight rail network (lack of volume, conflict between passenger and freight networks, different track configurations and double handling charges). There is strong road competition and limited rail competition for intercity freight movements. Air services may compete for small time-sensitive freight, but generally, it is too small and expensive for regular freight movements.

¹⁹⁰ Infrastructure Victoria (2017), p.18.

Income elasticity of demand for port services

The income elasticity of demand is relevant to this assessment given the relationship between incomes (or GDP) and domestic economic activity. For PoM, the relationship is considered strong as demand for port services is inextricably linked to demand for freight goods.

PoM has indicated that demand for container imports is driven by:¹⁹¹

- population growth
- retail activity and consumer confidence
- building investment
- manufacturing industry growth.

Container exports are predominantly driven by local agricultural production and manufacturing industry growth.

All of these factors have a direct correlation with GDP. Accordingly, PoM's revenues and earnings are significantly affected by levels of domestic economic activity.

Exchange rate sensitivities

International trade will be sensitive to exchange rates. This is significant for beta as the exchange rate will be correlated with domestic economic activity.

Market disruption risks

There is a range of market disruption risks for the PoM – these risks have both systematic and non-systematic elements:

- Changes to globalisation
- Reduction in demand due to sharing economy (e.g. Uber)
- Automation of motor vehicles
- 3D printing
- Miniaturisation/Virtualisation
- Reduced manufacturing and exports (e.g. Ford, Toyota)

¹⁹¹ Victorian Ports Corporation (Melbourne) (2016). Reference tariff schedule: Effective 1 July 2016, p.15.

Implications for beta

In general, port revenues can be expected to have a strong correlation with domestic economic activity, driven by fundamentals such as:

- the income elasticity of demand for port services and freight goods
- the sensitivity of international shipping to changes in exchange rates
- the sensitivity of demand for freight transport to domestic GDP
- market disruptions.

Given PoM's beta is being assessed relative to international comparators, consideration needs to be given as to whether these demand characteristics are likely to be more or less sensitive to domestic economic activity compared to other comparators (relative to their own domestic economies). Overall, we expect that the relationships described above will generally hold across most major container and freight ports, noting that the contribution of each to revenues will vary.

D.3 Pricing structure

Pricing structure refers to the extent that the firm's pricing arrangements either mitigate or increase its exposure to systematic risk. For example, if a firm's cost structure comprises fixed and variable costs, an important consideration here will be the extent to which prices have a fixed and variable component that reflect this cost structure.

At the PoM, all fees are levied on a usage basis, which increases its risk profile. Of the major fees levied, the wharfage fee (charged on a per unit quantity, volume or weight basis) underscores that PoM's revenues are significantly affected by levels of economic activity.

Overall, the pricing structure significantly exposes the port to systematic volume risk, although this risk is characteristic of ports globally and is very unlikely to change during the term of the lease.

D.4 Market power

The existence of market power will have a mitigating effect on systematic risk. This assumes that where a firm possesses market power, it is able to exercise that power to its advantage. This in turn is a function of considerations such as the degree of market power held (which in turn will depend on the availability of substitute port facilities of appropriate size and scale), the number of buyers in the market and the extent to which those buyers can exert countervailing power in negotiations.

PoM currently has market power. However, that market power is not without constraints. The regulatory environment restricts the ability of PoM to exert market power. There is clear evidence of contestability that further constrains the PoM's market power, particularly because of its inability to price discriminate which means that the benefits of price competition to capture marginal trades are transmitted across the entire PoM customer base.

Finally, the impact of the second port in the Melbourne region (as described above) clearly constrains PoM's market power. Whilst it is true that the development of a second port is not currently imminent, the prospect of a second port brings substitution risk as well as potentially providing PoM's counterparties (shipping, logistics, and, to a certain extent, stevedoring companies) more countervailing power in negotiations. Moreover, there is clearly scope for the Victorian Government to accelerate the development of a second port towards the second half of PoM's lease period as the State has the ability to bring forward the development of the second port without compensation to PoM. Holding all other factors constant, we consider this should be reflected in a higher value of beta relative to the comparable companies.

This justifies a higher beta for the port relative to comparables that do not face this same competition.

D.5 Form of regulation

The effects of regulation on beta are unclear. In the first instance, regulatory risk is not necessarily in itself systematic as it could be avoided through diversification. However, the issue of relevance here is the extent to which regulation mitigates, or increases, PoM's exposure to systematic volume risk.

Regulation can reduce risk if it increases revenue certainty over a period. Conversely, regulatory risk can be seen as a source of risk to the extent that there is uncertainty as to how it will be applied and/or it reduces the firm's ability to adjust prices in response to changes in costs.

The general practice of Australian regulators is to assume that regulation reduces risk and accordingly will have a dampening effect on beta. However, this is unlikely to be the case for the PoM as it is likely to have its revenues significantly affected by levels of economic activity throughout the lease period.

Accordingly, there is no basis to conclude that the Pricing Order provides revenue certainty (whether during or after the period in which the TAL is in place) or mitigates exposure to systematic risk, particularly when comparing the port against comparables that are either subject to more light handed price monitoring or are unregulated.

Moreover, PoM has not and is never likely to have long term take or pay contracts in place which could mitigate the extent to which its revenues are affected by levels of economic activity.

D.6 Growth options

Growth options refer to the potential to undertake significant new investment, particularly in new areas or products. It is argued that businesses that have a number of valuable growth opportunities in addition to their existing assets will tend to have higher systematic risk compared to firms that have limited growth options.

In the case of PoM, it is likely to undertake a number of capital projects to maintain / upgrade existing assets as well as expand the Port's capacity to service Victoria's increasing freight demand.

D.7 Operating leverage

A high degree of operating leverage will increase the volatility of a firm's returns relative to the market, which can increase its beta.

It is understood that most ports have a relatively high fixed cost base and this is the case in relation to PoM. We would therefore expect PoM to be similar to comparator ports in this regard. However, it could be a distinguishing feature compared to, say, stevedoring services, as they are likely to have lower operating leverage. This means that holding all else constant, this would increase PoM's beta relative to those firms. A second port will materially exacerbate the impact of operating leverage on PoM's cash flow volatility.

E Australian regulatory precedent on beta determination

The purpose of this attachment is to set out the relevant regulatory precedent for the assessment of an asset beta for Australian transport companies whose revenues and earnings are significantly affected by levels of economic activity. It focuses on the ACCC's decision on the interstate network and the relevant ERA decisions (both 2008 and 2015).

E.1 ACCC – ARTC's Interstate network (2008)

In the ACCC's beta assessment of ARTC's interstate network (2008) it determined that the asset betas of Australian trucking, shipping and other non-rail service providers are not suitable proxies for ARTC's asset beta.¹⁹²

Although these firms are observable and have the desirable quality that they are Australian based transport businesses, the systematic risks of these types of transport investments is likely to differ markedly to that of a below rail service provider. For this reason, the ACCC has focussed on non-regulated below rail operators operating overseas to determine whether ARTC's requested beta seems reasonable. In its view, the use of overseas firms was necessitated by the lack of non-regulated below rail operators in Australia to use as proxy companies.

Despite the fact these firms operate overseas, the ACCC identified these companies as the best proxy companies to use to estimate ARTC's exposure to systematic risk. The proxy companies chosen by the ACCC, principally operating in North America, typically have asset betas estimated at over 0.65 under the assumption of a zero debt beta as shown in Table 39 below.

However, the ACCC acknowledged that these operators may operate under slightly different conditions to ARTC, which may slightly increase their systematic risk relative to ARTC. In particular, North American railways may have higher market risk because they often compete with one another due to parallel infrastructure. Despite this, on balance the ACCC considered that North American and other overseas rail operators' asset betas generally support ARTC's argument for an asset beta of 0.65 for its Interstate Rail Network.

The ACCC's chosen beta comparators for ARTC's interstate network are presented in Table 39.

¹⁹² ACCC (2008), p.154.

Table 39 Comparison firms' equity and asset beta estimates

	Equity Beta	D/E ratio %	Asset Beta
Burlington Santa Fe Corporation	0.969	41	0.69
Canadian National Railway Company	0.62	46	0.43
Canadian Pacific Railway Limited	0.793	32	0.60
CSX Corporation	0.822	72	0.48
Genesee & Wyoming Inc	1.54	28	1.21
Kansas City Southern	1.241	72	0.73
RailAmerica	1.498	133	0.65
Union Pacific Company Limited	1.097	38	0.80
Simple Average	1.0725	57.75	0.70

Note: Equity Betas were estimated using Bloomberg using 5 years of monthly data. The debt to equity ratio is the estimated average debt to equity ratio over the beta estimation period and was the debt to equity ratio used for delivering the equity betas. Equity betas were delivered using the Monkhouse formula.

Source: Bloomberg

Finally, the ACCC noted that ARTC operates under some market demand and price constraints due to inter-modal competition. This is the principle reason it operates well below its revenue ceiling on major segments. As such, it bears some market risk and if the economy does badly (or well) ARTC will lose (or gain) business and profits. This is different to a typical regulated business, such as electricity distribution or transmission, that can simply raise prices if demand drops and, therefore, bears far lower market risk.

While the ACCC considered that an asset beta of 0.65 is broadly acceptable for ARTC's interstate network, it noted this conclusion would not necessarily apply to other rail networks nor would it necessarily hold for a future regulatory review in the future.

E.2 ERA – Arc Infrastructure, Pilbara railways and Public Transit Authority

The ERA establishes WACC estimates for Arc Infrastructure (formerly Brookfield Rail), the Pilbara railways and the Public Transit Authority.¹⁹³

The Authority notes that choosing a relevant benchmark sample for these three entities is difficult due to the lack of close comparators of rail infrastructure trading on the Australian Stock Exchange. Only one directly comparable company is available in Australia, Aurizon, which was floated on the ASX in July 2010 as QR National. A single comparable firm leaves the Authority with an insufficient sample on which to estimate regulated cost of capital parameters.

¹⁹³ ERA (2015a).

The Authority is of the view that estimates of asset beta based on benchmark samples should ideally be relevant to the regulated rail businesses in Western Australia. In this context, the Authority considers that two aspects of relevance to a benchmark entity should be considered.

First, estimates of asset beta from the benchmark samples should provide some relevance to the economy in which the BEE is operating (in this case, the Australian economy). Second, these estimates should also provide some relevance to the industry/sector in which the efficient benchmark entity is operating (in this case, the rail industry).

The Authority considers that a benchmark sample including only Australian businesses that are comparable with rail is preferred for the purposes of its empirical studies. However, the Authority's analysis indicates that there are insufficient rail businesses comparators operating in Australia. Given empirical estimates are the only viable option for estimating the asset beta for rail businesses, the Authority is of the view that a benchmark sample including both Australian and developed countries in Europe and America is appropriate.

In this context, the ERA follows the same structured process to determine its beta comparators for each of these regulated entities, which entails first identifying Australian comparators and then due to an insufficiently small sample, extending its search to include the most comparable international entities.

E.2.1 Brookfield Rail (2015)

The Brookfield Rail network in the south-west of Western Australia is a freight rail network that primarily transports commodities such as iron ore, grain, coal, alumina and interstate freight.

The Authority considers that a firm must satisfy the following conditions in order to belong to the Brookfield Rail benchmark sample:

- primarily involved in the transportation of goods across comparable distances;
- located in Australia or a similar developed economy;
- involved in the transportation of similar commodities to those transported on the Brookfield Rail network (that is, bulk goods, but also general freight).

The ERA indicates that it applies the following filters in the Bloomberg terminal using the Equity Screening function, such that the comparator firm must:

- operate in an OECD country that has similar political, economic and geographical similarities to Australia;
- belong to the ICB Subsector: Railroads; and
- provide sufficient pricing data to allow calculation of its equity beta and gearing.

In addition, the Authority has included comparator companies that were included in its previous WACC determinations for the Brookfield Rail network.

The Authority considers that Aurizon is the closest comparator company to the Brookfield Rail network in respect of its Australian operations and transport task. It is also listed. However, the regulatory regime differs between Brookfield and Aurizon in that Brookfield is subject to a negotiate-arbitrate regulatory regime, while the Aurizon network is subject to a revenue cap system. In addition, the use of only one comparator company may not adequately capture the risks faced by the Brookfield Rail network.

The Authority has previously accepted advice that Australian and New Zealand transport companies are relevant to inform the required equity beta, credit rating and gearing for the Brookfield Rail network. However, it considers non-rail operators to be less relevant proxy companies compared to rail network operators. Nevertheless, they provide some information of value, particularly given the small size of the sample, so are retained.

The ERA's beta comparators are presented in the following table.¹⁹⁴ This sample of 11 comparators is reduced from the 15 comparators used in its rate of return decisions prior to 2015. The Authority removed Auckland Airports and Infratil (a NZ investment fund with investments in energy, transport and social infrastructure businesses) from the pre-2015 benchmark sample, as well as Macquarie Infrastructure Group. Aurizon Holdings has been added to the sample.

Table 40 Comparator companies for Brookfield Rail

Company Name	Country	Ticker	Company Description
Genesee & Wyoming	United States	GWR US Equity	Genesee & Wyoming Inc., through its subsidiaries, owns and operates short line and regional freight railroads and provides related rail services. The company also provides railroad switching and related services to United States industries with extensive railroad facilities within their complexes. Genesee operates in the United States and Australia.
Union Pacific Corporation	United States	UNP US Equity	Union Pacific Corporation is a rail transport company. The Company's railroad hauls a variety of goods, including agricultural, automotive, and chemical products. Union Pacific offers long-haul routes from all major West Coast and Gulf Coast ports to eastern gateways as well as connects with Canada's rail systems and serves the major gateways to Mexico.

¹⁹⁴ ERA (2015a).

Company Name	Country	Ticker	Company Description
Norfolk Southern Corporation	United States	NSC US Equity	Norfolk Southern Corporation provides rail transportation services. The Company transports raw materials, intermediate products and finished goods primarily in the Southeast, East and Midwest and, via interchange with rail carriers, to and from the rest of the United States. Norfolk Southern also transports overseas freight through several Atlantic and Gulf Coast ports.
Kansas City Southern	United States	KSU US Equity	Kansas City Southern, through its subsidiary, is the holding company for transportation segment subsidiaries and affiliates. The Company operates a railroad system that provides shippers with rail freight services in commercial and industrial markets of the United States and Mexico.
CSX Corporation	United States	CSX US Equity	CSX Corporation is an international freight transportation company. The Company provides rail, intermodal, domestic container-shipping, barging, and contract logistics services around the world. CSX's rail transportation services are provided principally throughout the eastern United States.
Canadian Pacific Railway	Canada	CP CN Equity	Canadian Pacific Railway Limited is a Class 1 transactional railway, providing freight and intermodal services over a network in Canada and the United States. The Company's mainline network serves major Canadian ports and cities from Montreal to Vancouver, and key centers in the United States Midwest and Northeast.
Canadian National Railway	Canada	CNR CN Equity	Canadian National Railway Company operates a network of track in Canada and the United States. The Company transports forest products, grain and grain products, coal, sulphur, and fertilizers, intermodal, and automotive products. Canadian National operates a fleet of locomotives and rail cars.
Toll Holdings Limited	Australia	TRH NZ Equity	Toll NZ Ltd. Provides freight transport and distribution services. The Company offers transportation, long-haul bulk freight, warehousing and freight forwarding services. Toll NZ also operates passenger and freight transport vehicles that provides relocation and priority delivery services. Toll NZ conducts its business in New Zealand and Internationally.
Aurizon Holdings	Australia	AZJ AU Equity	Aurizon Holdings Ltd. is a rail freight company. The Company provides coal, bulk and general freight haulage services, operating on the Central Queensland Coal Network (CQCN) and including specialised track maintenance and workshop support functions.
Asciano Limited	Australia	AIO AU Equity	Asciano Limited is a provider of essential transport services in the rail and ports and stevedoring industries in Australia and New Zealand. The Company operates container terminals, bulk export facilities and container and bulk rail haulage services.
Port of Tauranga	New Zealand	POT NZ Equity	Port of Tauranga Limited activities 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.

Source: Bloomberg, ERA Analysis.

Finally, the Authority's a priori expectation is that overseas rail operators will possess a higher level of risk, relative to an Australian railway operator, as American and Canadian railway operators for example are expected to face higher degrees of competition from alternative forms of transportation, such as roads. The Authority indicates it will therefore employ significant regulatory discretion when determining appropriate benchmark parameters for the Brookfield Rail network, with a view that its risks are at the lower end of overseas railway operators, and at the higher end of Australian and New Zealand transport companies.

The Authority estimates the asset beta for the Brookfield Rail network as being 0.7. Utilising the estimated gearing of 25 per cent, this corresponds to an equity beta of 0.9.

E.2.2 TPI (2015)

The TPI railway transports iron ore from Fortescue Metal Groups (FMG) Cloud Break iron ore mine in the East Pilbara to TPI's port facilities at Anderson Point, Port Hedland.

Of the three Western Australian rail networks, TPI has the least number of direct comparators. Unlike, the PTA and Brookfield Rail, TPI lacks diversification and exclusively services the mining industry exposing it to the relatively high volatility of minerals markets.

The Authority notes that TPI's reliance on a single commodity – iron ore – transported across one large distance, significantly differentiates it from the Brookfield Rail network. As a consequence, not all of the companies in the Brookfield sample are appropriate as comparators to TPI. The Authority considers that only Aurizon in Australia supplemented by overseas railway operators are able to adequately capture the risks faced by the TPI rail network.

Furthermore, the Authority considers that due to TPI's exposure to only a limited number of potential users in the mining industry, TPI's risks are likely to be at the upper end of those faced by the companies contained in the benchmark sample. At the same time, the Authority considers that the US short-line rail operator Genesee & Wyoming Inc. is likely to be the best comparator for TPI. This is primarily due to Genesee & Wyoming Inc. operating class II/III short railway lines, including a number of similar lines in Australia.

The ERA's beta comparators are presented in Table 41.

Table 41 Comparator companies for TPI Network

Company Name	Country	Ticker	Company Description
Aurizon Holdings	Australia	AZJ AU Equity	Aurizon Holdings Ltd is a rail freight company. The Company provides coal, bulk and general freight haulage services, operating on the Central Queensland Coal Network (CQCN) an including specialised track maintenance and workshop support functions.
Genesee & Wyoming Inc.	United States	GWR US Equity	Genesee & Wyoming Inc., through its subsidiaries, owns and operates short line and regional freight railroads and provides related rail services. The company also provides railroad switching and related services to United States industries with extensive railroad facilities within their complexes. Genesee operates in the United States and Australia.
Union Pacific Corporation	United States	UNP US Equity	Union Pacific Corporation is a rail transportation company. The Company's railroad hauls a variety of goods, including agricultural, automotive, and chemical products. Union Pacific offers long-haul routes from all major West Coast and Gulf Coast ports to eastern gateways as well as connects with Canada's rail systems and serves the major gateways to Mexico.

Company Name	Country	Ticker	Company Description
Norfolk Southern Corporation	United States	NSC US Equity	Norfolk Southern Corporation provides rail transportation services. The Company transports raw materials, intermediate products, and finished goods primarily in the Southeast, East, and Midwest and, via interchange with rail carriers, to and from the rest of the United States. Norfolk Southern also transports overseas freight through several Atlantic and Gulf Coast ports.
Kansas City Southern	United States	KSU US Equity	Kansas City Southern, through its subsidiary, is the holding company for transportation segment subsidiaries and affiliates. The Company operates a railroad system that provides shippers with rail freight services in commercial and industrial markets of the United States and Mexico.
CSX Corporation	United States	CSX US Equity	CSX Corporation is an international freight transportation company. The Company provides rail, intermodal, domestic container-shipping, barging, and contract logistics services around the world. CSX's rail transportation services are provided principally throughout the eastern United States.
Canadian Pacific Railway	Canada	CP CN Equity	Canadian Pacific Railway Limited is a Class 1 transcontinental railway, providing freight and intermodal services over a network in Canada and the United States. The Company's mainline network serves major Canadian ports and cities from Montreal to Vancouver, and key centres in the United States Midwest and Northeast.
Canadian National Railway	Canada	CNR CN Equity	Canadian National Railway Company operates a network of track in Canada and the United States. The Company transports forest products, grain and grain products, coal, sulphur, fertilizers, intermodal, and automotive products. Canadian National operates a fleet of locomotives and railcars.

Source: Bloomberg Terminal, ERA Analysis

The Authority considers that an asset beta of 1.05 reflects the higher risks associated with the returns of the TPI network. When combined with the estimated gearing of 0.2, this results in an equity beta of 1.3.

E.2.3 Public Transit Authority (PTA) (2015)

The Authority considers that a firm must satisfy the following in order to belong to the PTA benchmark sample:

- provide a service similar to passenger rail, for example toll road or commercial passenger transportation companies;
- be located in Australia or a similar OECD economy;
- be mature, hence have limited growth opportunities;
- be of similar size to the PTA.

The Authority has used the Bloomberg terminal in order to identify comparable companies for the PTA. The following filters were applied in the Bloomberg terminal using the Equity Screening function. Selected companies will:

- belong to the OECD;

- provide a reference service similar to that of the PTA (toll roads and/or commercial passenger transportation across suburban areas);
- be well established with limited growth opportunities; and
- have sufficient pricing data in order to estimate equity beta and gearing.

The ERA's beta comparators for the PTA are presented in Table 42.

Table 42 Comparator companies for PTA as returned by Bloomberg

Company Name	Country	Bloomberg Ticker	Company Description
Transurban Group	Australia	TCL AU Equity	Transurban Group is involved in the operation of the Melbourne City Link and the Hills Motorway M2 toll roads. The Group is also involved in developing and operating electronic toll systems.
Atlantia SPA	Italy	ATL IM Equity	Atlantia S.P.A is a holding company with responsibility for portfolio strategies in the transport and communications infrastructures and network sectors.
Vinci SA	France	DG FP Equity	Vinci SA builds roads, offers electrical, mechanical and civil engineering and construction services, and operates toll roads. The Company builds and maintains roads and produces road construction materials, builds electricity and communications networks, installs fire protection and power and ventilation systems, and operates toll highways, bridges, parking garages, and a stadium.
Abertis Infraestructuras S.A	Spain	ABE SM Equity	Abertis Infraestructuras S.A is an international group which manages mobility and telecommunications infrastructures through three business areas: toll roads, telecommunications infrastructure and airports. The group is present in Europe and the Americas.
Macquarie Atlas Roads Group	Australia	MQA AU Equity	Macquarie Atlas Roads Group manages toll roads. The Company operates toll highways in the United Kingdom, France and the United States.

Source: Bloomberg Terminal, ERA Analysis.

Given the low level of systematic risk for the PTA rail network, the Authority considers that an asset beta of 0.3 is appropriate. Utilising the estimated gearing of 50 per cent, this corresponds to an equity beta of 0.6.

E.3 ERA's pre-2015 beta comparators for Brookfield Rail (freight)

Based on advice from Allen Consulting Group, ERA used the following sample of Australian and international beta comparators in its rate of return decisions between 2008 and 2015.¹⁹⁵ A key difference in the comparator set adopted in 2008 relative to 2015 was the inclusion of airports in the former sample.

¹⁹⁵ Allen Consulting Group (2007). Railways (Access) Code 2000: Weighted average cost of capital, 2008 WACC determinations, October, pp.28-29.

Table 43 Relative asset and equity betas of US comparator firms

Company	Country	Raw Equity Beta	Debt/assets ratio	Asset beta
Kansas City Southern	US	1.23	0.70	0.74
Union Pacific Corporation	US	0.81	0.38	0.59
RailAmerica Inc	US	1.61	1.32	0.69
CSX Corporation	US	1.15	0.77	0.65
Burlington Northern Santa Fe	US	1.07	0.43	0.75
Average				0.69

Source: Bloomberg, ACG Analysis

Table 44 Relative asset and equity betas of US comparator firms

Company	Country	Raw Equity Beta	Debt/assets ratio	Asset beta
Canadian Pacific Railway Ltd	Canada	0.956	0.48	0.65
Canadian National Railway Company	Canada	1.023	0.28	0.80
Average				0.73

Source: Bloomberg, ACG Analysis

Table 45 Relative asset and equity betas of Australian comparator transport sector firms

Company	Country	Raw Equity Beta	Debt/assets ratio	Asset beta
Adsteam Marine Limited	Australia	1.238	0.90	0.65
Macquarie Infrastructure Group	Australia	0.745	0.31	0.57
Patrick Corporation Ltd	Australia	1.056	0.07	0.99
Toll Holdings Limited	Australia	0.869	0.22	0.71
Average				0.73

Source: Bloomberg, ACG Analysis

Table 46 Relative asset and equity betas of New Zealand comparator transport sector firms

Company	Country	Raw Equity Beta	Debt/assets ratio	Asset beta
Auckland International Airport Ltd	New Zealand	0.944	0.26	0.75
Infratil Ltd	New Zealand	1.29	0.65	0.78
Port of Tauranga Ltd	New Zealand	0.873	0.31	0.67
Toll NZ Ltd	New Zealand	0.773	0.72	0.45
Average				0.66

Source: Bloomberg, ACG Analysis

F Market risk premium – Supplementary information

The purpose of this attachment is to provide further details of regulatory precedent and market survey evidence in regard to the market risk premium.

F.1 Regulatory decisions on the MRP

Brief summaries of Australian regulators' approaches to estimating the MRP are presented below.

IPART

IPART derives its feasible WACC range from a range based on long run averages and a range based on current market data.

Under this approach, it will still use long run historical averages of the MRP, which it values at between 5.5% and 6.5%, to estimate its long run average WACC range. Its current WACC range reflects the current implied MRP, which is derived from DGM estimates.

In its most recent semi-annual update for February 2018, IPART's range for the MRP extends from 6.0% (mid-point of long term average range) to 9.1% (mid-point of current range), with a mid-point of the two ranges of 7.6%.¹⁹⁶

However, IPART's MRP estimate as a margin above the contemporary risk-free rate is likely to be greater than this reported value because of the higher risk-free rate assumed in its approach (3.3%, due to its 50% weighting on the 10-year risk-free rate estimate).

ERA (WA)

In 2015, the ERA completed a review of the methodology it applies to estimate the WACC for rail networks. In its first Draft Determination for this review released in June 2014, the ERA's assessment of the MRP was primarily informed by historical averages and the DGM.¹⁹⁷ It arrived at a range of 5% to 7.5% and stated that it will apply judgement as to where it will select the point estimate at any point in time. For that Draft Determination, it proposed a value of 6%.

¹⁹⁶ IPART (2018b), p.2.

¹⁹⁷ ERA (2014a). Review of the method for estimating the weighted average cost of capital for the freight and urban rail networks, Draft determination, 5 June.

Subsequently, the ERA fundamentally changed its approach to estimating the MRP for rail networks. In a revised Draft Decision issued in November 2014, it proposed to solely rely on the Wright approach.¹⁹⁸ The ERA further revised its position in the Final Decision issued in September 2015 and took into consideration estimates informed by historical excess returns (Ibbotson and Wright) and DGMs.¹⁹⁹ It stated it is more inclined towards the Wright approach as “a strong indicator for the likely return on equity for the next 50 years, given the statistical evidence for the mean reversion of the return on equity.”²⁰⁰ It arrived at a final estimate of 7.3%.

It took a similar approach in its assessment for ATCO Gas, where it applied an MRP of 7.6%.²⁰¹ It applied an updated value of 7.4% in its most recent determination for the Dampier to Bunbury Pipeline.²⁰² In its June 2015 decision for ATCO, the ERA commented on its approach as follows:²⁰³

Most significantly, the Authority has now concluded that it is not reasonable to constrain the MRP to a fixed range over time. The erratic behavior of the risk-free rate in Australia to date, and more particularly, its pronounced decline in the current economic environment, leads to a situation where the combination of a fixed range for the MRP and prevailing risk-free rate may not result in an outcome which is consistent with the achievement of the average market return on equity over the long run.

The results indicated the market return on equity was stationary [consistent with the Wright approach for estimating the MRP] ... with the analysis supporting a conclusion that the MRP is non-stationary. This finding led the Authority to the important conclusion that the long run historical estimate of 6 per cent could be a poor predictor of the MRP prevailing in future regulatory periods.

We note that the changing values applied by the ERA primarily reflect changes in the DGM estimates, which are more volatile through time (compared with comparatively stable historical excess returns).

¹⁹⁸ ERA (2014b). Review of the method for estimating the weighted average cost of capital for the regulated railway networks, Revised draft decision, 28 November.

¹⁹⁹ ERA (2015a).

²⁰⁰ ERA (2015a), p.145.

²⁰¹ ERA (2015b). Final decision on proposed revisions to the Access Arrangement for the Mid-West and South-West gas distribution systems, Submitted by ATCO Gas Australia Pty Ltd, 30 June.

²⁰² ERA (2016). Final decision on proposed revisions to the Access Arrangement for the Dampier to Bunbury Natural Gas Pipeline 2016-2020, 30 June.

²⁰³ ERA (2015b), p.249.

AER

Under the AER's Rate of Return Guideline, the AER is proposing to estimate the MRP having regard to historical excess returns, DGM estimates, survey evidence and conditioning variables.²⁰⁴ The key difference from previous approaches is that it may place some weight on forward-looking DGM estimates, which could see more variability in the MRP estimate through time. Unlike previously, the AER has not stipulated the value of the MRP in the Guideline but will review it at the time of each revenue determination.

In its Explanatory Statement accompanying its Final Decision on the Guideline²⁰⁵, the AER arrived at a range for the MRP of 5% to 7.5% (with historical averages informing the lower bound and DGM estimates the upper bound). It arrived at a point estimate of 6.5%, which was consistent with its post-GFC uplift previously applied under its Statement of Regulatory Intent. It set out its reasons based on the consideration of the relative strengths and weaknesses of each piece of evidence. It did not stipulate weights but stated that "greatest consideration" was given to historical averages, followed by the DGM estimates and then surveys.²⁰⁶

Unlike previously, the AER has not prescribed the MRP in its guideline, which reflects a view that it is likely to vary through time (although this does not imply that it is considered highly variable or volatile). However, it has consistently applied a MRP of 6.5% in all decisions made under that guideline since it was finalised in December 2013.

QCA

Until recently, the QCA has applied four main methods to estimate the MRP, being three forms of historical averaging (the Ibbotson, Siegel and Wright methods), survey evidence (including independent expert reports) and the Cornell DGM.

It had previously applied equal weights to each approach but similar to the AER, proposes a more flexible approach based on judgement. It concluded that 6.5% was the most appropriate value at the time and it has continued to apply this value in decisions made since then, including its most recent Draft Decision for DBCT, where it rejected DBCT Management's proposed MRP of 8%.²⁰⁷

²⁰⁴ The AER does not explain what it means by 'conditioning variables'.

²⁰⁵ AER (2013b).

²⁰⁶ AER (2013b), p.95.

²⁰⁷ QCA (2016). DBCT Management's 2015 draft access undertaking, Draft decision, April.

However, in its UT5 draft decision for Aurizon Network in December 2017, the QCA approved Aurizon Network's proposed MRP of 7%. The QCA stated that in light of stakeholder submissions, it reviewed its position on the Wright approach and will now give "more regard to estimates from the Wright method".²⁰⁸ In reaching this conclusion, the QCA noted that its analysis suggesting greater stability in the MRP than the return on equity over time was "not determinative, given the limitations identified."²⁰⁹

ESCOSA

In its June 2016 for SA Water, ESCOSA applied a MRP of 6%, expressing a preference for historical excess returns. It considers that the DGM approach is "potentially volatile and unreliable." It also notes that this is the value it has applied to SA Water in previous determinations.

Essential Services Commission (Vic)

The ESC does not have any formal guidelines in place that outline its approach to assessing WACC.

We note that in its June 2016 Melbourne Water decision it applied a MRP of 6%, which was originally contained in a Guidance Paper.²¹⁰ The reasoning behind this was not provided. It reflects a preference for relying on historical excess returns to estimate the MRP.

F.2 Market surveys

Fernandez's surveys

Of the surveys frequently cited by regulators is one conducted by the Spanish academic Pablo Fernandez. Frontier Economics (2016) raises the concern that this source consistently reports an MRP in the range of 6%, regardless of the conditions in financial markets.²¹¹

²⁰⁸ QCA (2017), p.493.

²⁰⁹ QCA (2017), p.493.

²¹⁰ ESC (2015). Melbourne Water 2016 price review, Guidance paper, March. We note that 6% was also applied to Goulburn Murray Water in its June 2016 decision, although for a different reason, which was the need for consistency with the ACCC's Pricing Principles for Price Determinations and Approvals under the Water Charge (Infrastructure) Rules 2010. These Pricing Principles prescribe an MRP of 6%.

²¹¹ Frontier Economics (2016). The market risk premium: Report prepared for Aurizon Network, November.

However, in the 2017 Fernandez et al. survey, the average (median) MRP was estimated to be 7.3% (7.6%) for Australia.²¹² However, in a report for the QCA, Lally (2017) argued that this Australian MRP estimate was higher than any other developed country in the survey (other than Portugal) and that the sample size was relatively small (26 responses, roughly one third of the previous year's responses).²¹³ Thus, there are substantial issues regarding how much weight can be placed on evidence from market surveys.

Respondents were identified as finance and economics professors, analysts and managers of companies obtained from previous correspondence, papers and webs of companies and universities, but there is no further information presented about the specific qualifications of these respondents. The survey does not ask respondents for what purpose they are using their estimate of the MRP.

Lally (2013) notes that "the respondents to these surveys are academics, analysts, and managers rather than investors per se."²¹⁴ Hence it is unlikely that the overwhelming majority of any of the survey respondents would be employing their estimate of the MRP to reach real-world investment decisions.

Another issue relates to response rates. Emails were sent to 22,500 email addresses with 2,396 emails received in reply. Whilst this is probably a reasonable response rate for an international survey, there is no real indication of how the non-response may impact upon the results.

On top of this, there is evidence that many respondents may simply base their estimates on textbooks or historical data, meaning that there is often no real value added compared to other measurements.

Asher and Hickling Surveys

Regulators including the ACCC also rely upon the Asher and Hickling *Equity Risk Premium Surveys*. In a summary of the survey results, Asher and Carruthers (2016) discuss the methods that survey respondents use for determining their MRP estimates:²¹⁵

Most people (52%) used a variety of methods for determining the equity risk premium, with forward looking measures (21%) more prevalent than historical data

²¹² Fernandez, P., Pershin, V. & Acin, I.F. (2017). Discount rate (risk-free rate and market risk premium) used for 41 countries in 2017: a survey.

²¹³ Lally, M. (2017). Review of submissions from Frontier Economics on the WACC for Aurizon Network. 8 November, p.19

²¹⁴ Lally M. (2013), p.23.

²¹⁵ Asher A. and Carruthers, D. (2016). Equity risk premium survey 2015, Actuaries Digital, Available from: <https://www.actuaries.digital/2016/05/26/equity-risk-premium-survey-2015/> [Accessed 4 May 2017].

(17%) for the rest. The methodology for determining the ERP ranged from detailed modelling to “gut feel based on 40 years’ experience”. Gut feel has a bad name in some quarters ... but only time will tell which method proves to be most accurate.

KPMG Australian Valuation Practices Survey

With regard to the *KPMG Australian Valuation Practices Survey*, 40% of participants state that they ‘always’ adjust the CAPM rate of return by a premium, to reflect unique risks that are not modelled in the forecast cash flows.²¹⁶ The remaining 60% report doing this at least ‘sometimes’, while no respondent stated that they ‘never’ make an adjustment. In terms of the methodology used to adjust the CAPM rate of return, 13% of respondents relied solely on the historic equity bond spreads, 26% relied solely on the expected premium, while the majority (61%) used a combination of the two.

The Australian Competition Tribunal has also raised concerns about the use of market surveys:²¹⁷

Surveys must be treated with great caution when being used in this context. Consideration must be given at least to the types of questions asked, the wording of those questions, the sample of respondents, the number of respondents, the number of non-respondents and the timing of the survey. Problems in any of these can lead to the survey results being largely valueless or potentially inaccurate.

When presented with survey evidence that contains a high number of non-respondents as well as a small number of respondents in the desired categories of expertise, it is dangerous for the AER to place any determinative weight on the results.

In a report to Corrs Chambers Westgarth, McKenzie and Partington list several shortcomings associated with surveys:²¹⁸

- Selecting an appropriate survey group that is representative of actual investors.
- Low response rates, and the extent to which survey authors deal with response bias.
- The lack of justification for respondents’ claims
- The effect of question wording on responses – ambiguity can lead to diverse responses

²¹⁶ KPMG (2015). Australian valuation practices survey 2015, May, p.21.

²¹⁷ Application by Envestra Ltd (No 2) [2012], ACompT 3, para. 162-163.

²¹⁸ McKenzie, M. and Partington, G. (2011), p.19.

- How respondents adjust their opinions in relation to changing market conditions

Synergies' view

Based on the above expert opinions, we surmise that surveys need to meet three broad criteria to provide an informed estimate of the MRP:

- they must be timely;
- there must be clarity around what question the respondents were asked to answer; and
- the survey must gauge the market's view of the MRP and not the view of a small, unrepresentative sample.

Whilst open to interpretation, there appear to be very limited circumstances where a survey would meet all three criteria and therefore would be eligible for inclusion in a robust regulatory determination on the MRP.

G Listed comparator WACC methodology

This attachment provides further detail on the methodology for the Bloomberg-generated listed comparator WACC estimates that we presented in Section 12.2.2.

G.1 Country risk premium

Bloomberg calculates country-specific market risk premium estimates. Bloomberg estimates do not provide full transparency, but the country risk premium is calculated as the return on the domestic market less the risk-free rate. The return on equity is therefore calculated as the risk-free rate plus the country risk premium multiplied by the equity beta.

G.2 Return on debt

Bloomberg calculates the return on debt for each company by multiplying the risk-free rate by a debt adjustment factor. The debt adjustment factor is proprietary, but is described by Bloomberg as a debt premium specific to the credit-rating of the company. Because the risk-free rate in Japan and European countries remains low, it appears that this approach may underestimate the true return on debt for these companies. This makes the WACC estimates, especially for the port and airport samples, more conservative in nature.

G.3 Bloomberg-generated WACC estimates

Pre-tax WACC estimates for North American Class I railroads and OECD ports and airports have been calculated using country specific corporate tax rates. We have used our estimated Fama-French betas for each company, as well as our zero-beta premium estimate for the Black CAPM, to generate multi-model WACC estimates for each of the comparators, so that the estimates are directly comparable to our WACC estimate for PoM. PoM's WACC margin is 8.78%, which is below the Class I railroad WACC margin, and similar to the OECD Ports WACC margin.

Table 47 North American Class I railroad WACC estimates

	Bloomberg country risk premium	Bloomberg return on debt	Pre-tax nominal WACC	Risk-free rate	WACC margin
CSX Corporation	7.08%	3.90%	14.25%	2.85%	11.40%
Kansas City Southern	7.08%	4.10%	11.95%	2.85%	9.10%
Genesee & Wyoming	7.08%	4.50%	15.57%	2.85%	12.72%

	Bloomberg country risk premium	Bloomberg return on debt	Pre-tax nominal WACC	Risk-free rate	WACC margin
Norfolk Southern Corporation	7.08%	3.90%	14.31%	2.85%	11.46%
Union Pacific Corporation	7.08%	3.60%	12.52%	2.85%	9.67%
Canadian Pacific Railway	9.34%	3.60%	14.09%	2.14%	11.95%
Canadian National Railway Company	9.34%	3.00%	10.43%	2.14%	8.29%
Average			13.30%		10.66%
Median			14.09%		11.40%

Source: Bloomberg, Synergies calculations

Table 48 OECD Marine Ports and Services WACC estimates

	Bloomberg country risk premium	Bloomberg return on debt	Pre-tax nominal WACC	Risk-free rate	WACC margin
Qube Holdings	6.04%	2.40%	11.08%	2.70%	8.38%
Port of Tauranga	6.01%	2.20%	8.94%	2.86%	6.08%
Hamburger Hafen und Logistik	9.20%	0.50%	9.59%	0.57%	9.02%
Piraeus Port Authority	9.44%	0.50%	7.63%	0.57%	7.06%
Thessaloniki Port Authority	9.44%	0.00%	8.87%	0.57%	8.30%
Sociedad Matriz SAAM	7.47%	3.20%	13.42%	4.55%	8.87%
Luka Koper	12.75%	1.00%	12.60%	0.57%	12.03%
Isewan Terminal Service	10.95%	0.00%	5.94%	0.04%	5.90%
Sakurajima Futo Kaisha	10.95%	0.10%	14.48%	0.04%	14.44%
Rinko Corporation	10.95%	0.00%	6.18%	0.04%	6.14%
Dongbang Transport Logistics	11.61%	2.80%	9.26%	2.64%	6.62%
Average			9.82%		8.44%
Median			9.26%		8.30%

Source: Bloomberg, Synergies calculations

Table 49 OECD airport WACC estimates

	Bloomberg country risk premium	Bloomberg return on debt	Pre-tax nominal WACC	Risk-free rate	WACC margin
Sydney Airport	6.04%	3.30%	6.59%	2.70%	3.89%
Auckland Airport	6.01%	2.80%	10.77%	2.84%	7.93%
Copenhagen Airport	12.45%	1.10%	8.75%	0.63%	8.12%
Vienna Airport	10.67%	0.70%	6.96%	0.78%	6.18%
Zurich Airport	10.47%	0.10%	7.13%	0.08%	7.05%
Frankfurt Airport	9.23%	0.50%	5.59%	0.58%	5.01%
Paris Airports	8.35%	0.60%	5.13%	0.82%	4.31%
Grupo Aeroportuario del Centro Norte (Mexico)	6.96%	7.50%	17.55%	7.55%	10.00%
Grupo Aeroportuario del Sureste (Mexico)	6.96%	8.40%	17.01%	7.55%	9.46%
TAV Havalimanlari Holding (Turkey)	2.33%	9.70%	18.48%	12.78%	5.70%
Japan Airport Terminal Co.	10.78%	0%	12.31%	0.04%	12.27%
Average			10.57%		7.27%
Median			8.75%		7.05%

Source: Bloomberg, Synergies calculations

Port of Melbourne



2018-19 TCS - APPENDIX E

Port User and other stakeholder consultation

31 May 2018

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Abbreviations and acronyms

Abbreviation / acronym	Description
ACCC	Australian Competition and Consumer Commission
DHI	Danish Hydrology Institute
ESC	Essential Services Commission of Victoria
ISO	International Standards Organisation
MUA	Maritime Union of Australia
PoM	Port of Melbourne
RAS	Rail Access Strategy
RTS	Reference Tariff Schedule
TAL	Tariffs Adjustment Limit
TCS	Tariff Compliance Statement
VICT	Victoria International Container Terminal
VPCM	Victorian Ports Corporation (Melbourne) Harbour Master
VTA	Victorian Transport Association
VTS	Vessel Traffic Service

1. Purpose and structure of this document

This document forms part of the Port of Melbourne’s (PoM)¹ 2018-19 Tariff Compliance Statement (TCS) to the Essential Services Commission of Victoria (ESC) for the period 1 July 2018 to 30 June 2019 (2018-19). It:

- lists PoM’s engagement activities from July 2017 to May 2018, and
- summarises what PoM heard from Port Users and other stakeholders in these engagement activities and PoM’s response to this feedback including the relevant actions.

2. PoM’s engagement activities

PoM has built on the consultation activities which informed its 2017-18 TCS to undertake deeper and broader engagement with Port Users and other stakeholders to prepare this 2018-19 TCS.

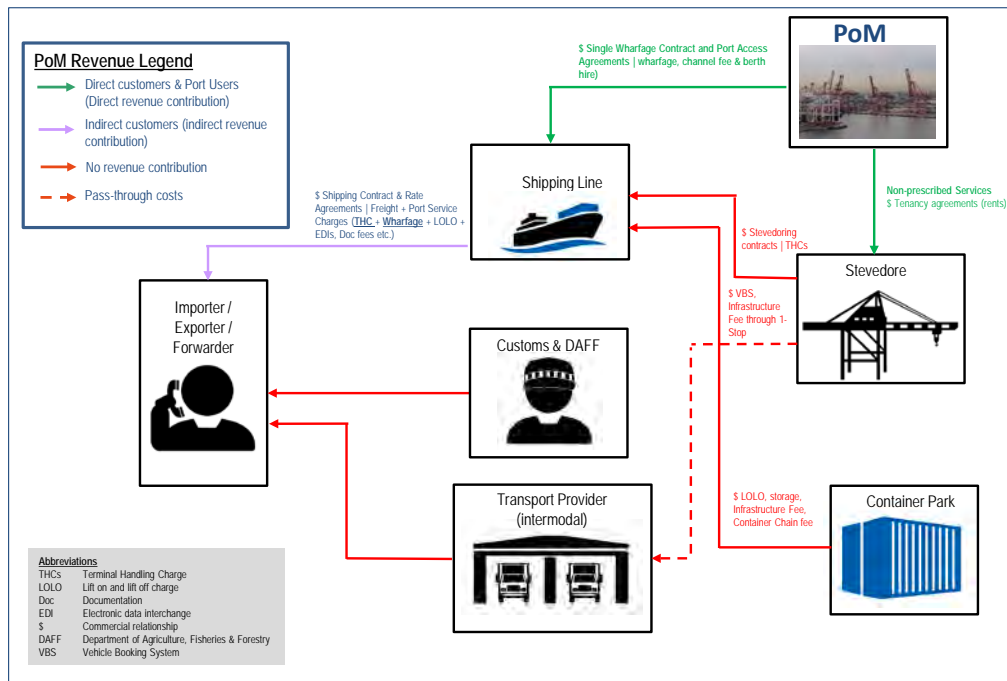
Table 2 sets out the engagement activities PoM undertook between July 2017 to May 2018. There were 24 engagement sessions held over this period in Victoria, NSW and Tasmania, including in regional centres such as Wagga Wagga, Griffith and Burnie.

These engagement sessions were well attended by PoM’s stakeholders, who include direct Port Users and indirect Port Users (together referred to as Port Users) and other stakeholders:

- **Direct Port Users** have a direct commercial relationship with PoM, such as shipping lines and stevedores.
- **Indirect Port Users** have an indirect commercial relationship with PoM, such as importers, exporters, freight-forwarders, logistic providers and others in the logistic supply chain.
- **Other stakeholders** are exposed to, and/or impacted by, the port, such as the Victorian community, local residents, industry associations, the Victorian, Tasmanian and Federal Governments, Victorian local governments and any other interested parties.

Figure 1 shows PoM’s relationship with Port Users.

Figure 1: PoM’s relationship with Port Users and supply chain



¹ The Port of Melbourne Consolidated Group. The PoM Group shareholders comprise QIC, Future Fund, Global Infrastructure Partners (GIP) and OMERS.

Table 1 shows that over the past year, PoM’s engagement activities informing the development of its 2018-19 TCS involved a significantly wider group of Port Users and other stakeholders from industry, government and across the community, than those informing its 2017-18 TCS.

Table 1: Invitations, acceptances and attendance - engagement activities for PoM’s 2017-18 TCS and 2018-19 TCS

Port Users and other Stakeholders	2017-18 TCS	2018-19 TCS
Invited to participate	171	655
Accepted invitations	84	533
Attended the engagement activities	68	452

Table 2 shows that the engagement activities were held in a range of locations such as Victoria, NSW and Tasmania, including in regional centres such as Wagga Wagga, Griffith, Wodonga and Burnie to accommodate the preferences of different Port Users and other stakeholders. It also shows that the activities were well attended by a mix of direct and indirect Port Users and other stakeholders.

PoM was also grateful that several industry associations participated in the engagement activities that are able to further communicate with their numerous members on the matters discussed at the engagement activities. This promotes greater reach of PoM’s engagement activities. As shown in Table 2, 10 engagement activities were attended by industry associations.

Industry associations include:

- Victorian Transport Association
- Ports Australia
- Victorian Economic Chamber of Commerce and Industry
- Customs Broker and Forwarders Council of Australia
- Maritime Industry Australia Limited
- Large Format Retail Association
- Australian Industry Group
- South East Melbourne Manufacturers Alliance
- Australian Horticultural Exporters and Importers Association
- Australian Federation of International Forwarders, and
- Food and Beverages Importers Association.

Table 2: PoM engagement activities July 2017 to May 2018

No.	Engagement Sessions	Location	Attendance by Port User / stakeholder type (%)			No. invited	No. accepted	No. attended	Industry Associations
			Direct	Indirect	Others				
1	Riverina international trade network	Wagga Wagga	-	60	40	30	25	25	
2	Port User one-on-one discussion	Melbourne	100			2	2	2	
3	Port supply chain tour for subject matter experts	Melbourne		80	20	50	50	20	
4	Melbourne Port System Industry Induction	Melbourne	29	71		40	134	134*	
5	Riverina stakeholders engagement	Griffith		95	5	50	50	40	
6	Burnie Chamber of Commerce	Burnie	60	40		12	12	12	
7	Port User CEO port visit	Melbourne		100		1	1	1	1
8	Port User Port visit	Melbourne		100		1	3	3*	
9	Port User Port visit	Melbourne		100		1	2	2*	
10	Launceston Chamber of Commerce	Launceston	60	40		10	10	10	
11	Bass Strait boardroom breakfast engagement	Melbourne	100			6	6	5	
12	Melbourne shipping lines engagement forum	Melbourne	96	4		24	15	8	1
13	Sydney cargo interests - boardroom dinner	Sydney	100			34	12	8	1
14	Sydney shipping lines - boardroom luncheon	Sydney	97	3		32	15	8	1
15	Follow up Port User meeting	Melbourne	100			8	5	5	
16	Importers and exporters - luncheon	Melbourne		100		35	16	12	2

APPENDIX E – PORT USER AND OTHER STAKEHOLDER CONSULTATION

No.	Engagement Sessions	Location	Attendance by Port User / stakeholder type (%)			No. invited	No. accepted	No. attended	Industry Associations
			Direct	Indirect	Others				
17	Non-containerised trade engagement	Melbourne	50	50		36	28	22	1
18	Port Users' Association meeting	Launceston	60	40		15	15	15	1
19	Riverina stakeholders engagement forum	Wagga Wagga & Griffith		84	16	50	44	44	
20	Regulatory deep dive workshop - Melbourne	Melbourne	46	54		107	12	6	1
21	Tasmania stakeholders engagement forum	Hobart & Launceston	3	57	40	32	32	34*	
22	Industry Associations CEOs/Chairs engagement	Melbourne		100		18	18	7	7
23	Albury Wodonga stakeholders engagement	Wodonga		80	20	25	20	26*	
24	Regulatory deep dive workshop - Sydney	Sydney	90	10		36	6	3	1
	Total		36	56	8	655	533	452	-

* In relation to engagement activities 4, 8, 9, 21 and 23, a greater number of Port Users and other stakeholders participated in the activities than were invited, because those who were invited notified their colleagues and other interested parties thereby promoting greater reach of PoM's engagement activities.

3. Feedback from Port Users and other stakeholders and PoM’s response

Table 3 expands on the information presented in Table 5 of PoM’s TCS General Statement by providing further detail on PoM’s responses to the matters raised by Port Users and other stakeholders in the engagement activity listed in Table 2 and the actions that it has taken, or is taking, to support its responses. The matters raised by Port Users and other stakeholders relate to the following topics:

- tariffs
- ship size
- on-port rail access
- efficient levels of future investment, and
- communication.

Table 3: Key feedback from Port Users and other stakeholders

Issue	What we heard	PoM's response	Actions undertaken by PoM	Action date
Tariffs	Port Users had a range of queries regarding Prescribed Service Tariffs (tariffs) and tariff increases and were generally interested in better understanding how PoM sets its tariffs. There was discussion on how predictable and certain tariffs will be in future years.	PoM explained that its regulatory framework outlines out how PoM must set its tariffs and that based on this PoM expects that: <ul style="list-style-type: none"> tariffs for full outbound container wharfage services will decrease by 2.5 per cent per annum until 30 June 2020. tariffs (except for full outbound container wharfage services) will increase by no more than CPI until at least 30 June 2032 and at the latest, 30 June 2037. This provides price greater certainty and transparency to Port Users. 	Action 1 – Addressed during Port User engagement activities.	Completed
	Shipping agents expressed concern about their ability to accurately estimate time-based berth hire fees.	PoM explained that its berth hire fees and lay-up charges are time-based charges and are set out in PoM's Reference Tariff Schedule (RTS). Time based charges deliver better overall outcomes to Port Users because they promote more efficient and equitable outcomes for Port Users than fixed fees. This is because they encourage and reward higher productivity, thereby improving berth capacity and utilisation. In contrast, fixed fees can result in more productive and efficient users bearing an unfair share of berth costs.	Action 2 – PoM wrote a letter to the relevant shipping agent (see Appendix L) that addressed how berth hire fees are calculated and why they deliver better overall outcomes for Port Users and Victorian Consumers compared to fixed fees.	Completed
	A number of Port Users queried whether PoM's tariffs are efficient and in particular support Australia's export markets and overall competitiveness.	PoM intends to review its tariffs in light of best practice pricing principles to assess opportunities for improvements including through selected tariff rebalancing. PoM will consult with Port Users and the ESC in undertaking this review.	Action 3 – PoM will review its tariffs (including rebalancing strategies) and provide an update on the status of this review in its next TCS.	May 2019
	Some shipping lines expressed an industry view that empty containers should not attract wharfage fees because they are not able to directly recover these costs from their customers.	PoM explained that wharfage fees for empty containers are intended to recognise their impact on available capacity at berths and terminals. Like full containers, empty containers are required to be transported, stored, and loaded / discharged from vessels. Wharfage fees are also intended to incentivise full container exports, which is important for supply chain productivity and efficiency. The wharfage fee for empty containers is significantly	Action 4 – Addressed during Port User engagement activities. Action 5 – If the review in Action 3 supports it, PoM will prepare a tariff Rebalancing Application. This would involve significant	Completed May 2019

Issue	What we heard	PoM's response	Actions undertaken by PoM	Action date
		<p>lower than for full containers. This recognises the relatively lower impact of empty containers on berth capacity and infrastructure compared to full containers. The empty container fee² is less than 20 per cent of the full outward container fee³.</p> <p>Wharfage fees for empty containers therefore assist with the efficient and orderly movement of empty containers in the import and export transport cycle.</p> <p>Any changes to wharfage fees for empty containers would need to be considered as part of an overall review of existing tariffs. This could result in PoM submitting a tariff Rebalancing Application to the ESC – this is discussed below.</p>	<p>consultation with the ESC and Port Users. PoM will provide an update on the status of its tariff review in its next TCS.</p>	
	<p>Cargo owners expressed concern that invoices from freight forwarders include PoM-related charges that have been discontinued, such as the infrastructure and channel deepening fees.</p>	<p>PoM explained that it no longer charges an infrastructure or channel deepening fee.</p>	<p>Action 6 – PoM to prepare and publish on its website, by 30 July 2018, a “know your bill” fact sheet that confirms what PoM’s charges do and do not include.</p> <p>Action 7 – PoM to work closely with at least one industry association in preparing the fact sheet.</p>	<p>July 2018</p>
	<p>A number of stakeholders, including the Victorian Transport Association (VTA), raised concerns around the efficiency of stevedore pricing and the impact on the freight supply chain. In particular, they queried whether the recent increase in stevedore charges (the infrastructure charges) which apply to truck or rail operators are due to the increase in PoM’s market rents.</p>	<p>PoM explained that:</p> <ul style="list-style-type: none"> • stevedores set their prices independently of PoM • recent market rent reviews undertaken by PoM are not related to stevedores’ infrastructure charges⁴, and • the Australian Competition and Consumer Commission (ACCC) is responsible for monitoring their prices, costs and profits. <p>PoM noted that in its latest stevedore monitoring report⁵ the ACCC found that a key reason for the increase in stevedores’ infrastructure fees was a strategic decision by</p>	<p>Action 8 – Addressed during Port User engagement activities.</p>	<p>Completed</p>

² Except for those dedicated to Bass Strait cargo, which do not incur a wharfage fee

³ Full and empty container fees are fixed fees charged based on the size of the container represented by Twenty-foot Equivalent Units. Non-standard length containers are calculated based on a pro rata basis.

⁴ PoM undertakes regular market rent reviews pursuant to lease contract provisions. PoM has progressed a number of reviews that were outstanding at the time of acquiring the business in November 2016. The reviews are supported by independent market valuations where appropriate and are subject to ESC review powers under section 53 of the PMA.

⁵ ACCC, Container stevedoring monitoring report 2016-17, October 2017

Issue	What we heard	PoM's response	Actions undertaken by PoM	Action date
		<p>the stevedores to restructure their revenues away from their shipping lines to the transport sector. This is due to the downward pressure, over recent years, on rates for shipping lines which has been driven by a number of factors.</p> <p>PoM also noted that it expects the ACCC's next report will provide further discussion on the drivers and effects of the stevedores' infrastructure fees on the container supply chain.</p> <p>PoM will continue to promote competition between stevedores to facilitate better services and price outcomes for customers.</p>		
	<p>A number of Port Users were interested in understanding the likely impact of deferred depreciation on tariffs post the TAL period.</p>	<p>PoM explained that, at this stage, it does not know the value of deferred depreciation that will need to be recovered at the end of the TAL period because it will be affected by various factors including:</p> <ul style="list-style-type: none"> • future volumes, which are dependent on: <ul style="list-style-type: none"> ○ domestic demand, population growth and the value of the Australian dollar, levels of domestic manufacturing and the location of domestic manufacturing, and ○ economic growth of Victoria's trading partners (exports are driven by foreign demand of Victorian products). • the level of new capital investment undertaken by PoM during the Tariff Adjustment Limit (TAL) period (such as to accommodate larger ships or on-port rail access), and • the duration of the TAL period. <p>Without knowing the value of deferred depreciation at the end of the TAL period, PoM is unable to determine how it will recover it in the post TAL period.</p>	<p>Action 9 – Addressed during Port User engagement activities.</p> <p>Action 10 – PoM to consult with Port Users closer to the end of the TAL period about specific options for recovering deferred depreciation to minimise any volatility in tariff levels through price smoothing. In the meanwhile, PoM will continue to engage with Port Users on the key principles underpinning its approach to recovering deferred depreciation in the future, including its approach to smooth prices.</p>	<p>Completed</p> <p>Ongoing</p>
<p>Ship size</p>	<p>Shipping lines and container terminals expressed strong support for the port accommodating larger container vessels to help them cost effectively meet trade</p>	<p>PoM explained, as set out below, the work that is currently underway and the next steps to accommodate larger container vessels.</p> <p>PoM is undertaking vessel simulation and analysis works</p>	<p>Action 11 – Addressed during Port User engagement activities.</p>	<p>Completed</p>

Issue	What we heard	PoM’s response	Actions undertaken by PoM	Action date
	demand, in light of industry changes ⁶ .	<p>to identify options to safely navigate the maximum size vessels into Swanson Dock within the parameters of the existing built infrastructure and available supporting technology.</p> <p>The simulation program will be undertaken by PoM in conjunction with the Harbour Master from the Victorian Ports Corporation (Melbourne) (VPCM) and Port Phillip Sea Pilots. The program will be undertaken at the Pivot Maritime simulator located at La Trobe University Melbourne. This simulator was selected based on its hydrodynamic input capability and computing speed.</p> <p>To support a broader analysis of the port’s capacity, including utilisation of available draught, PoM has commissioned Danish Hydrology Institute (DHI) to produce a full 3-D Hydrodynamic model of the port.</p> <p>The Yarra River and Swanson Dock components of the analysis are a priority for delivery. The 3-D Hydrodynamic model inputs will be critical for berthing and simulation analysis and will also inform berthing analysis and configuration requirements.</p> <p>This analysis will inform the scope and timing of any future infrastructure development options, which may, for example, include works associated with the Swanson Dock swing basin and Webb Dock “knuckle”.</p>		
On-port rail access	<p>A number of Port Users expressed a strong interest in alternatives to road transport, such as rail, to efficiently respond to growing demand in light of increasing road congestion (which is expected to become worse with population growth) and costs of road transport.</p> <p>Port Users suggested that in order to avoid anti-competitive behaviour, including inefficient pricing, an open-access regime</p>	<p>PoM explained, as set out below, the objectives of, and process for developing, its Rail Access Strategy (RAS).</p> <p>PoM is developing a RAS to deliver an efficient and commercially sustainable port rail outcome. PoM’s RAS will be designed to:</p> <ul style="list-style-type: none"> • support open access • provide a viable alternative to road transport • support efficient use of existing infrastructure • achieve the best value for money across the total 	Action 12 – Addressed during Port User engagement activities.	Completed
			Action 13 – Continue to undertake detailed and broad consultation with industry, government and the community on the RAS to test and refine it and make sure that it	Ongoing

⁶ The general poor financial performance of shipping lines globally has resulted in a significant merger of a number of container lines, resulting in accumulation of trade volumes on larger vessels with less frequent sailing schedules to deliver cost savings to the lines

Issue	What we heard	PoM's response	Actions undertaken by PoM	Action date
	should apply to the on-port rail network.	supply chain. PoM will submit its RAS to the Victorian Government in October 2019 ⁷ .	meets the needs of different stakeholders.	
Efficient levels of future investment	Tasmanian manufacturing importers / exporters queried whether the regulatory regime would result in PoM “gold plating” its network similar to that seen in other regulated industries, such as electricity.	PoM explained the features of the regulatory framework, including the application of the TAL, that will protect Port Users from any gold plating of assets. In particular, PoM explained that the application of the TAL imposes a strong financial incentive on PoM to constrain its capex to prudent and efficient levels. This is because PoM is not able to increase its prices above CPI during the TAL period in order to recover any “unrecovered” return on capital costs ⁸ .	Action 14 – Addressed during Port User engagement activities.	Completed
	Various stakeholders including the VTA are concerned about PoM's incentive to undertake new investment if it is not able to recover the efficient costs of this investment under the regulatory regime.	PoM clarified that in accordance with the requirements under the Port Concession Deed, it will maintain infrastructure condition at current levels in accordance with Good Operating Practice. PoM is also progressing the implementation of the International Organisation for Standardisation (ISO) 55000 certification, which will assist PoM in achieving this. PoM explained that where Port Users support significant new investment, it will: <ul style="list-style-type: none"> engage on the scope and timing of the investment with the ESC, the Victorian Government, Port Users and other stakeholders, and seek to explore options, with the ESC and Port Users, for recovering its efficient costs of this investment during the TAL period. 	Action 15 – Addressed during Port User engagement activities.	Ongoing
Communication	Bass Strait operators found PoM's communication on the industrial activity relating to VICT and the Maritime Union of	PoM strives to provide timely, accurate and accessible information to assist Port Users at all times. PoM's primary objective during the industrial activity was	Action 16 – Addressed during Port User engagement activities.	Completed

⁷ In accordance with section 91Q of the PMA and clause 27 of the Port Lease

⁸ Arising from the shortfall between the TAL and the ABBM revenues.

Issue	What we heard	PoM's response	Actions undertaken by PoM	Action date
	<p>Australia (MUA) in December 2017 could be improved. This would allow them to understand better the extent of the issue and make necessary operational changes to minimise business disruption and the financial impact.</p>	<p>ensuring safety for staff, contractors and the community. During the relevant engagement sessions, PoM explained that limits on its powers prevent it from moving protests off port land. Accordingly, PoM focused on ensuring safety achieving resolution through advocacy and undertook several measures including:</p> <ul style="list-style-type: none"> • negotiating a holding ground for protestors • allowing access buses • providing traffic marshalling and security staff • encouraging and facilitating tenants to work collaboratively to minimise business disruption <p>PoM confirmed that it will undertake a review into what else it could do to minimise disruption on Port Users should similar events occur in the future</p>	<p>Action 17 – PoM to review, by October 2018, what else it could do to minimise disruption on Port Users in the event of any future industrial activity. PoM will provide its response through its ongoing engagement, including day-to-day discussions with Port Users and other stakeholders.</p>	<p>October 2018</p>
	<p>Shipping lines consider that PoM's security requirements relating to the admission of non-notified individuals to berths are inflexible and do not adequately cater for late changes to the attendee list.</p>	<p>PoM to review its security procedures relating to entry of non-notified individuals to berths. PoM has amended its security procedures for admitting non-notified individuals onto a berth. While PoM's preference remains for an updated attendee list to be provided by the agent, security will now take confirmation from the agent (by telephone or message) requesting entry of any non-notified individuals.</p>	<p>Action 18 – PoM reviewed, and amended where relevant, its security procedures. PoM advised relevant Port Users of amendments to its procedures.</p>	<p>Completed</p>
	<p>Shipping lines requested PoM to improve its notification for planned maintenance work and diving at berths.</p>	<p>PoM has well established procedures for notifying Port Users of planned maintenance and diving at berths. These involve notifying Melbourne Vessel Traffic Service (VTS) as diving permits must be issued by VTS. If the vessel is in port, the dive company must also visit the ship and advise of the dive program, necessary controls and safety procedures required.</p>	<p>Action 19 – Addressed during Port User engagement activities. Action 20 – PoM reviewed its Port User's notification for planned maintenance and diving at berths and determined that no changes were required to its notification procedures.</p>	<p>Completed Completed</p>



2018-19 TCS - APPENDIX F

**Overview Paper: expenditure, cost allocation,
service standards, avoidable costs, depreciation
and asset lives**

31 May 2018

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Abbreviations and acronyms

Abbreviation / acronym	Description
A	Actual
ABBM	Accrual building block methodology
AMP	Asset Management Plans
ARTC	Australian Rail Track Corporation
ARR	Aggregate Revenue Requirement
BITRE	Bureau of Infrastructure, Transport and Regional Economics
Capex	Capital expenditure
CCA	Cost Contribution Amount
CPI	Consumer Price Index
CWIP	Capital Work-in Progress
Deloitte	Deloitte Risk Advisory
DELWP	Victorian Department of Environment, Land, Water and Planning
EGM	Executive General Manager
EMP	Environment Management Plan
EMT	Executive Management Team
ESC	Essential Services Commission of Victoria
F	Forecast
GRESB	Global Real Estate Sustainability Benchmark
IRC	Investment Review Committee
ISO	International Standards Organisation
IT	Information technology
KPI	Key Performance Indicator
MTOFSA	Maritime Transport and Offshore Facilities Security Act 2003 (Cth)
MTOFSR	Maritime Transport and Offshore Facilities Security Regulations 2003 (Cth)
Opex	Operating expenses
PCD	Port Concession Deed
PCG	Project Control Group
PCJF	Preliminary Concept Justification Form
PCP	Port Capacity Project
PDIP	Port Development Implementation Plan
PDS	Port Development Strategy
PES	Port Environmental Strategy
PLF	Port Licence Fee

Abbreviation / acronym	Description
PMA	<i>Port Management Act 1995 (Vic)</i>
PoM	Port of Melbourne
PRG	Program Review Group
PWG	Project Working Group
RAS	Rail Access Strategy
SAMP	Strategic Asset Management Plan
SME	Subject Matter Experts
TAL	Tariffs Adjustment Limit
TCS	Tariff Compliance Statement
VPCM	Victorian Ports Corporation (Melbourne) Harbour Master
WSCAM	Wharf Structures' Condition Assessment Manual

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1. Purpose and structure of this document

This document forms part of the Port of Melbourne’s (PoM)¹ 2018-19 Tariff Compliance Statement (TCS) to the Essential Services Commission of Victoria (ESC) for the period 1 July 2018 to 30 June 2019 (2018-19). It sets out:

- the 2018-19 operating expenditure (opex) forecast for Prescribed Services, the method that has been used to prepare the forecast and an explanation of why the forecast is prudent and efficient
- the 2018-19 capital expenditure (capex) forecast for Prescribed Services, the method that has been used to prepare the forecast and an explanation of why the forecast is prudent and efficient
- initial draft performance standards. PoM is currently consulting Port Users on these
- PoM’s cost allocation methodology and how it complies with the Pricing Order
- avoidable costs for each Prescribed Service Bundle, and
- depreciation schedules and asset lives used to calculate depreciation.

This document contains the following financial information:

- 2016-17 – actual values
- 2017-18 – forecast values that were submitted in PoM’s 2017-18 TCS. These values are also shaded blue for ease of reference. Actual information will be provided in PoM’s next TCS because at the time of submitting this TCS PoM does not have a full year of actual information, and
- 2018-19 – forecast values.

All financial information provided in this TCS is denominated in nominal dollars (referred to as “current price terms” in clause 8.1.1 of the Pricing Order), unless stated otherwise and the numbers in the tables may not add due to rounding. All clause references are to the Pricing Order, unless otherwise stated, and capitalised terms that are not otherwise defined, have the meaning given in the Pricing Order.

2. 2018-19 forecast opex

Opex is the operating, maintenance and other non-capex that PoM incurs to provide Prescribed Services. Table 1 shows PoM’s 2018-19 forecast opex compared to its:

- 2017-18 forecast opex submitted to the ESC in its 2017-18 TCS, and
- 2016-17 actual opex.

Table 1: 2016-17 to 2018-19 Prescribed Services opex by category (\$, Million)

Opex categories	2016-17 (A)	2017-18 (F)	2018-19 (F)
Port Licence Fee	81.3	82.5	84.4
Cost Contribution Amount	15.0	15.4	15.6
Insurances, rates and taxes	1.1	0.9	1.0
Labour	13.2	9.6	10.0
Repairs and maintenance	9.9	5.8	4.0

¹The Port of Melbourne Consolidated Group. The PoM Group shareholders comprise QIC, Future Fund, Global Infrastructure Partners (GIP) and OMERS.

Opex categories	2016-17 (A)	2017-18 (F)	2018-19 (F)
Other – Utility and Administration (inc. security)	8.2	8.1	7.5
Other – Professional and Advisory	2.7	3.6	4.1
Transition	2.5	2.5	1.2
Total	134.0	128.4	127.8

Attachment 1 of this document provides a mapping of the opex categories in Table 1 to the opex categories in the regulatory model, at Appendix B.

Figure 1 to Figure 3 show each opex category as a proportion of total annual opex.

Figure 1: 2016-17 (A) opex – category as a % of total

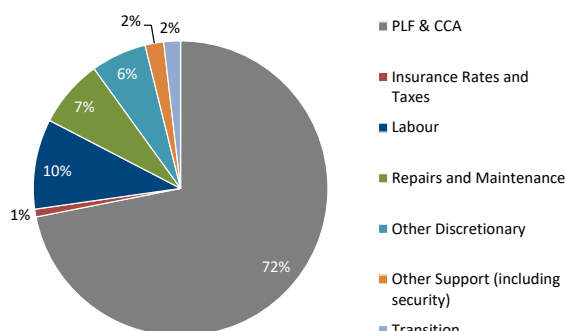


Figure 2: 2017-18 (F) opex – category as a % of total

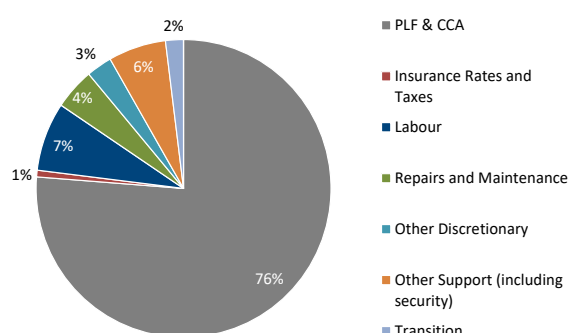


Figure 3: 2018-19 (F) opex – category as a % of total

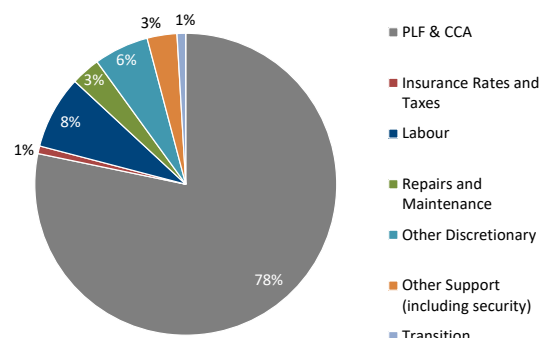


Table 1 and Figure 3 show that 78 per cent of PoM’s 2018-19 forecast opex relates to two items – the Port Licence Fee (PLF) and the Cost Contribution Amount (CCA). These items are non-controllable opex. They are required by and calculated in accordance with the relevant requirements in the *Port Management Act 1995* (Vic) (PMA)² and Port Concession Deed³. The PLF and CCA are deemed to be prudent and efficient under clause 4.5 of the Pricing Order.

Only 22 per cent, or \$27.8 million, of PoM’s 2018-19 forecast opex is controllable by PoM. PoM’s 2018-19 controllable opex is \$2.7 million or 10 per cent less than its 2017-18 controllable opex forecast and \$9.9 million or around 26 per cent less than its 2016-17 actual controllable opex.

² The Port Licence Fee has been calculated in accordance with sections 44K and 44J of the PMA

³ The Cost Contribution Amount has been calculated in accordance with clause 27.1 of the Port Concession Deed

2.1. Efficiency and prudence of opex

PoM's opex is compliant with clause 4.1.1 of the Pricing Order which requires PoM's opex to reflect that required by an efficient and prudent service provider.

Around 78 per cent of PoM's opex is non-controllable and deemed prudent and efficient under clause 4.5 of the Pricing Order. Controllable opex comprises only 22 per cent of PoM's 2018-19 opex forecast. In relation to its controllable costs, PoM has identified efficiency savings of more than nine per cent compared to 2017-18 forecast opex.

PoM's 2018-19 controllable opex is efficient and prudent because it:

- is based on PoM's most recent actual opex which provides the best available information or outcomes from competitively tendered contracts, and
- reflects business as usual expenditure requirements, which are prepared as part of its annual budget process and approved by PoM's Board.

Further, the following controls, practices and procedures apply to ensure all aspects of PoM's opex are prudent, efficient and deliver value for money:

- procurement policy and approach – PoM reviewed and updated its Procurement Policy in 2017 following an internal audit administered by Deloitte Risk Advisory (Deloitte). PoM's Procurement Policy drives commercial outcomes through competitive tendering (appropriate to the value of the contract engagement) to identify preferred suppliers. This competitive pressure on suppliers will ensure that PoM only incurs efficient costs for all outsourced arrangements through market-based pricing
- Internal audit – Deloitte has been appointed for three years (1 July 2017 to 30 June 2019) to undertake ongoing internal audit of various areas across PoM in order to assess whether the necessary controls and processes are in place, and are being followed, and to identify areas for improvement. The guiding themes underpinning these internal audits are: safety and security of all who use the port; the need to enhance and streamline operations to ensure sustainable business performance; compliance with the concession deed and legislative and regulatory requirements; infrastructure forward planning; sound financial management to support decision making; and corporate social responsibility
- contract structure – PoM's repairs and maintenance contracts are structured based on fixed and variable cost components to ensure only necessary works are undertaken with all additional works subject to inspections or reviews and different rate schedules. This is discussed in section 2.2 below, and
- PoM has sound recruitment policies and practices in place to ensure labour costs remain efficient and prudent and reflect current market conditions.

The fact that Prescribed Services revenue (subject to the Tariffs Adjustment Limit (TAL)) is less than the Aggregate Revenue Requirement (ARR) (calculated under the accrual building block methodology (ABBM)) provides a strong incentive for PoM to constrain its opex to prudent and efficient levels. Unlike depreciation costs which can be deferred for future recovery (when Prescribed Services revenue (subject to the TAL) is less than the ARR), unrecovered opex during the TAL period is never recovered.

2.2. Opex forecasting method

PoM has forecast its 2018-19 opex using a "bottom-up" approach of summing estimated efficient costs for each opex category. These forecasts are internally developed by subject matter experts (SME) at a Natural Account Code level. This is consistent with the approach applied by PoM to forecast its 2017-18 opex submitted to the ESC in its 2017-18 TCS.

The individual opex categories are explained below together with an explanation of how PoM has forecast 2018-19 opex.

Table 2: Description of opex categories and PoM’s approach to forecast capex by category

Opex category	Description and forecasting methodology
Port Licence Fee and Cost Contribution Amount	<p>The PLF has been calculated in accordance with sections 44K and 44J of the PMA. The CCA has been calculated based on clause 27.1 of the Port Concession Deed.</p> <p>In accordance with clause 4.5 of the Pricing Order, costs associated with the PLF and CCA payable under the Port Concession Deed are deemed prudent and efficient.</p>
Insurance Costs, Rates and Taxes	<p>The largest component of this expenditure category is insurance costs. PoM’s 2018-19 insurance forecast is based on the actual invoiced premiums for 2017-18, which relate to coverage for:</p> <ul style="list-style-type: none"> • Industrial Special Risks (property) • Port Operators Liability • Environmental Impairment Liability • Directors’ and Officers’ Liability • Crime • Motor Vehicle • Marine Hull and Protection and Indemnity • Marine Cargo • Business Travel • Cyber Liability • Tasmanian Workers Compensation • Contract works • Public and Products (Construction) Liability <p>PoM’s 2017-18 actual expenditure was adjusted based on discussions with PoM’s insurance broker, to accommodate expected changes in premiums related to, for instance, market trends and increases in commissioned assets (following the completion of large projects). PoM pays its insurance on an annual basis.</p> <p>Forecast expenditure relating to rates and taxes is also based on prior year actual expenditure.</p>
Labour	<p>PoM operates under a landlord port model and therefore the majority of its operational activities relate to the management of port infrastructure and related assets. As such, employee time is typically related to the business as a whole, apart from certain specific responsibility / cost centres which attribute all their time to a particular business segment.</p> <p>Labour costs relate to employee labour and on-costs. These costs are based on prior year actual expenditure adjusted for known and expected changes in required resources.</p>
Repairs and Maintenance	<p>Repairs and Maintenance opex relates to repairs and maintenance on electrical infrastructure, roads and civil, hazardous berths, navigational aids and wharves, buildings and other repairs and maintenance. The 2018-19 Repairs and Maintenance forecast is based on competitively tendered fixed and variable contracts with PoM’s suppliers.</p> <p>The fixed component of the contracts comprises around 60 per cent of the total 2018-19 Repairs and Maintenance forecast and relates primarily to routine testing, inspection and maintenance of assets. Routine inspection, testing and maintenance is driven by legislative and regulatory compliance (such as the <i>Building Regulations 2006</i>), asset criticality and implications of failure associated with these assets.</p> <p>The variable component comprises around 40 per cent of the total forecast and relates primarily to operation and repairs. The works program is largely driven by the asset condition reports arising from the inspection regime undertaken as part of the fixed component of the contract. This ensures that expenditure on these assets is only undertaken as and when required to maintain asset operability and condition.</p>
Other – Utility and Administration (including security)	<p>Other support costs relate to security, office rental, utilities and IT, which are necessary to support the management function. In relation to:</p> <ul style="list-style-type: none"> • Security – this is the largest cost component of this category and is forecast based on a competitively tendered contract with an external provider. This contract comprises a fixed and a variable component. PoM’s security requirements are primarily driven by regulatory compliance obligations under the <i>Maritime Transport and Offshore Facilities Security Act 2003</i> (Cth) (MTOFSA) and <i>Maritime Transport and Offshore Facilities Security Regulations 2003</i> (Cth) (MTOFSR)) • Office rental – this is based on actual rental in 2017-18 which has been adjusted down to

Opex category	Description and forecasting methodology
	<p>reflect PoM adopting a smaller office space and has also been adjusted for inflation.</p> <ul style="list-style-type: none"> • Utility and administration – this relates to costs for advertising and promotions, professional memberships and corporate subscriptions, electricity and water charges, communication costs and training and conferences. These costs are based on actual costs in the prior year and are adjusted for known and expected changes. • IT – these costs are based on actual software licencing costs in the prior year (with the major licences being for Microsoft, TechnologyOne and Objective) and are adjusted for known and expected changes.
Other – Professional and Advisory	This relates to the engagement of professional services including legal, accounting, tax and audit, environmental, as well as engineering condition inspections. PoM’s 2018-19 forecast is based on average actual costs in earlier years and adjusted for known and expected additional engagements and the consumer price index (CPI).

3. 2018-19 forecast capex

Capex is typically associated with creation of new assets, many of which have long asset lives, or the renewal or rehabilitation of existing assets that are in poor condition. Capex tends to be large and variable over time and therefore recovery of these costs is spread over the life of the asset to encourage efficient use of the asset.

Table 3 sets out PoM’s 2018-19 forecast capex by category, compared to its:

- 2017-18 forecast capex submitted to the ESC in its 2017-18 TCS, and
- 2016-17 actual capex.

Table 3: 2016-17 to 2018-19 Prescribed Services capex by category (\$, Million)

Capex category	2016-17 (A)	2017-18 (F)	2018-19 (F)
PCP	42.9	4.2	0.0
Channel	8.3	7.6	12.9
Wharves	18.4	47.7	38.0
Road	0.1	3.2	4.1
Rail	0.1	0.4	5.9
Plant	1.0	4.0	3.4
Other	1.5	0.5	3.5
Total	72.4	67.6	67.7

Attachment 2 of this document provides a mapping of the capex categories in Table 3 to the capex categories in the regulatory model, at **Appendix B**.

Figure 4 to Figure 6 show each capex category as a proportion of total annual capex.

Figure 4: 2016-17 capex – category as a % of total

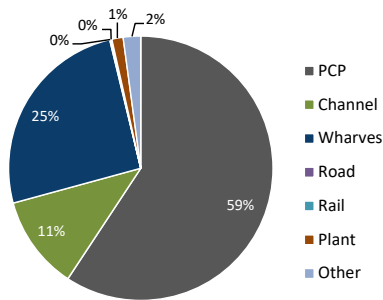


Figure 5: 2017-18 capex – category as a % of total

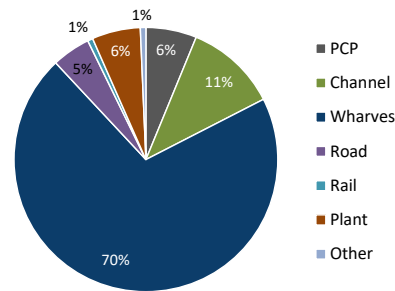


Figure 6: 2018-19 capex – category as a % of total

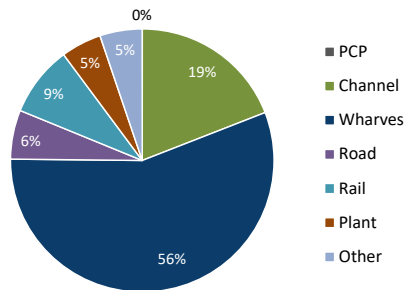


Figure 6 shows that expenditure relating to wharves is the largest category of capex and comprises 56 per cent of PoM’s total 2018-19 capex.

3.1. Efficiency and prudence of capex

PoM’s capex is compliant with the Pricing Order which requires PoM’s capex to reflect that required by an efficient and prudent service provider.

PoM’s 2018-19 capex is efficient and prudent because it:

- reflects business as usual expenditure requirements, which are prepared as part of its annual budget process and approved by PoM’s Board
- has been developed in accordance with PoM’s expenditure governance framework, including review by PoM’s Investment Review Committee (IRC), and Asset Management Framework. These are discussed in sections 3.3 and 3.4 below
- is driven by PoM’s contractual, compliance and regulatory obligations – for Channels and Wharfage. This is discussed in section 3.2 below, and
- is undertaken by external contractors appointed in accordance with PoM’s Procurement Policy which drives market-based pricing of all outsourced arrangements.

The shortfall between Prescribed Services revenue (subject to the TAL) and the ARR means that PoM has an incentive to constrain its capex to prudent and efficient levels. This is because it does not recover the shortfall relating to the return on capex during the TAL period, and it cannot defer this recovery until future periods. Further, the period in which PoM can recover deferred depreciation is limited to the period between the end of the TAL and the end of the lease.

3.2. Capex forecasting method

PoM has forecast its 2018-19 capex using a “bottom-up” forecasting methodology. Table 4 explains each capex category and the method that has been used to prepare PoM’s 2018-19 capex forecasts for each capex category.

Table 4: Description of capex categories and PoM’s approach to forecast capex by category

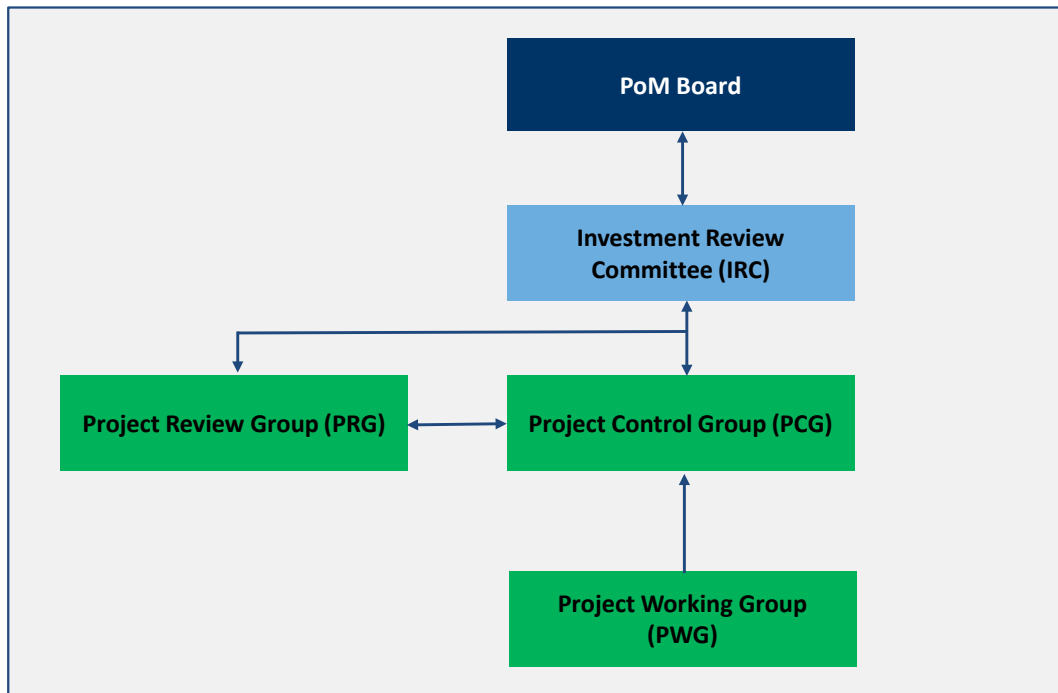
Capex category	Forecasting method
Channels	<p>Channels provide port access for commercial vessels visiting the port. Maintenance dredging is a routine part of port operations to remove a build-up of sediment to allow the safe navigation of vessels throughout port waters. Maintenance dredging activities including dredging, sweeping, water injection, material transport and placement, bunding, capping and associated environmental testing and monitoring functions.</p> <p>PoM maintains its channels in accordance with the declared depths as detailed in the Port Information Guide. The primary legislative instrument that controls PoM’s dredging activities is the <i>Coastal Management Act 1995 (Vic)</i>.</p> <p>PoM has 10 year (2012-2022) approvals, for the performance of maintenance dredging activities, from the Victorian Department of Environment, Land, Water and Planning (DELWP) and the Commonwealth Department of the Environment. The compliance requirements of the maintenance dredging activities are set out in PoM’s Environmental Management Plan (EMP), approved by DELWP.</p> <p>PoM annually reviews the volumes to be dredged using the most effective and appropriate dredging methodology having regard for historical dredged volumes, the results of the most recent hydrographic surveys of port waters and the requirements of the EMP. PoM’s whole of bay survey program developed, in conjunction with the Victorian Ports Corporation (Melbourne) Harbour Master (VPCM), sets out the frequency and other details of the hydrographic surveys of port waters that PoM undertakes to inform dredging requirements and needs. The survey results are also provided to VPCM.</p> <p>This annual review process ensures that the volumes of dredging work undertaken are efficient.</p> <p>PoM’s dredging program is performed by an external contractor under a Collaborative Framework Agreement (CFA). The CFA was executed in February 2013 following a global tender process and was reviewed and renewed for a second four year term in February 2017. The review found that the scope of works for each dredging program had consistently delivered works that were conducted within the CFA, budgets, agreed schedules and in accordance with the requirements and obligations of the EMP.</p>
Wharves	<p>Wharves are the common user area for loading and unloading cargo.</p> <p>PoM maintains the condition of its wharves in accordance with the Wharf Structures’ Condition Assessment Manual (WSCAM). Each asset has a modelling strategy, which determines the basis on which PoM assesses whether rehabilitation capex is required. In particular, the strategy sets out the assets:</p> <ul style="list-style-type: none"> • maximum potential life • effective life, and • maximum number of rehabilitations (to maintain its condition). <p>For instance, an asset classification is assigned a maximum life of, say, 100 years and may require rehabilitation every 20 years. PoM’s asset system maintains these dates which inform its Five Year Capex program and long-term capex forecast (which forms the basis of its Five Year Capex Program).</p> <p>PoM provides preliminary concept scope and requirements for its capex renewal and rehabilitation projects to an external quantity surveyor to ensure its expenditure forecast for the upcoming financial year is robust. These cost estimates are also tested and verified based on internal knowledge and expertise. All renewal / rehabilitation capex is undertaken by external contractors selected via a select or public tender process in accordance with PoM’s Procurement Policy.</p> <p>Rehabilitation / renewal capex is undertaken to meet the service lives determined based on the lowest life cycle cost taking into consideration operational levels, business drivers and compliance requirements (obligations to maintain and repair and handback conditions under the Port Concession Deed) and is therefore efficient and prudent.</p>
Rail	<p>PoM owns and maintains on-port common user rail tracks, which connect to on-port private sidings as well as off-port rail networks, which are generally used for grain distribution and containerised trade.</p> <p>An external contractor is responsible for undertaking condition inspections, developing the forward works program and undertaking the required work at agreed rates. PoM tests and verifies its renewal strategy, works program and rates through external quantity surveyors.</p>

Capex category	Forecasting method
Road	<p>PoM has 12 km of common user roads on the port which are essential for the movement of road transport, including heavy trucks, through the port.</p> <p>Road rehabilitation work is determined via ongoing risk based optimised asset condition assessments, where asset utilisation is a key factor. PoM’s roads are designed to facilitate truck usage in accordance with the National Heavy Vehicle accreditation scheme and PoM also has regard for VicRoads standards in designing and rehabilitating its roads.</p> <p>The majority of work is subject to competitive tender under PoM’s Procurement Policy given the value of this work.</p>
Plant	<p>Plant capex largely relates to Information Technology (IT) capex and miscellaneous rehabilitation capex relating to fire systems, mechanical and electrical systems (generators), gangways, equipment for contaminated waters (pumps and traps) and gates.</p> <p>IT capex relates to business applications (generally software) and IT infrastructure (generally hardware) which is required to replace or refresh assets that have reached the end of their useful life. PoM bases its forecast IT costs on indicative pricing from its support partners or in some cases the manufacturer. In most cases PoM undertakes free trials of new or upgraded hardware and software to ensure it meets its needs before committing to purchase it. This supports prudent and efficient investment decisions.</p> <p>Rehabilitation of miscellaneous capex is based on age or in-service failure and is undertaken via PoM’s ongoing maintenance contracts.</p>
Other	<p>Other rehabilitation capex relating to navigation aids (beacon lights) and utility assets (water, electricity and gas) is based on age (rather than condition), albeit that performance targets and asset criticality are also key considerations. These assets are replaced at end of their life (where this is defined by the expected number of years of service).</p> <p>Other rehabilitation capex is undertaken via PoM’s ongoing maintenance contracts.</p>

3.3. Capex governance

PoM’s capex governance comprises a number of components which enable PoM to be confident that it is making soundly based, prudent and efficient investment decisions that will deliver outcomes that support the long-term interests of Port Users and Victorian consumers.

Figure 7 – Capex Project Governance Framework



The key elements of PoM’s capex governance structure are discussed below.

Investment Review Committee (IRC)

PoM's IRC provides governance and oversight of the operational capital investment program and all component projects. The IRC is an executive level committee which is attended by the CEO and the CFO.

Key functions of the IRC are:

- investment portfolio governance and oversight
- investment portfolio contingency management
- in-budget project / program and unbudgeted project approvals
- project / program monitoring
- project initiation stage (Preliminary Concept Justification Form (PCJF)) approvals
- project implementation stage approvals, and
- project closeout approval including benefit realisation / residual risk review

The governance and oversight function of the IRC covers all capital investment projects and programs, irrespective of sponsor and / or division. The IRC typically meets monthly or otherwise as required.

Program Review Group (PRG)

The PRG is managed by the Executive General Manager (EGM) Operations. The PRG function is to oversee and collate status and performance metrics from all projects under delivery through project delivery team(s) directly. This includes:

- budget performance and cost control
- schedule and delivery status
- quality assurance tracking
- risk and issue monitoring, and
- safety and environmental performance.

The PRG provides updates to the IRC on the above on a monthly basis.

Project Control Group (PCG)

A PCG is formed to manage large, high risk or high complexity projects. Each PCG is chaired by the responsible Executive General Manager (EGM) and includes other relevant business EGMs as well the project delivery team and business representatives from Finance and Legal.

Each PCG is responsible for the commercial, strategic, legal and risk oversight of the project, making project decisions and providing governance and support to the project delivery team. The key functions of the PCG include:

- budget and schedule management
- project delivery / performance / benefit realisation accountability
- project due diligence / risk management
- project decision making responsibility
- status reporting
- project allowance drawdown approvals
- project contingency drawdown requests

Each PCG reports monthly to the IRC and provides updates on key project decisions and direction.

Project Working Group (PWG)

A PWG is established to manage low risk or low complexity projects. The PWG comprises representatives from each business unit that have a direct relationship with the project. The PWG's role is to support the project delivery team for the duration of the project by ensuring a whole of business approach overseeing all aspects of project delivery. For large projects, the PWG's functions include:

- reviewing project budget and schedule performance
- reviewing project status reporting
- reviewing project life cycle cost assessments
- reviewing project risk profiles and mitigation strategies
- providing project decision endorsement and/or strategy alignment
- reviewing project Key Performance Indicator (KPI) performance
- reviewing project benefit realisation alignment
- reviewing project allowance drawdown requests
- managing external stakeholder input and communications, and
- supporting project delivery team decision making.

The PWG typically meets monthly or otherwise as required.

3.4. Asset Management Framework

PoM is currently operating in accordance with the former Port of Melbourne Corporation's (PoMC) Asset Management Strategy. PoM has previously provided this to the ESC.

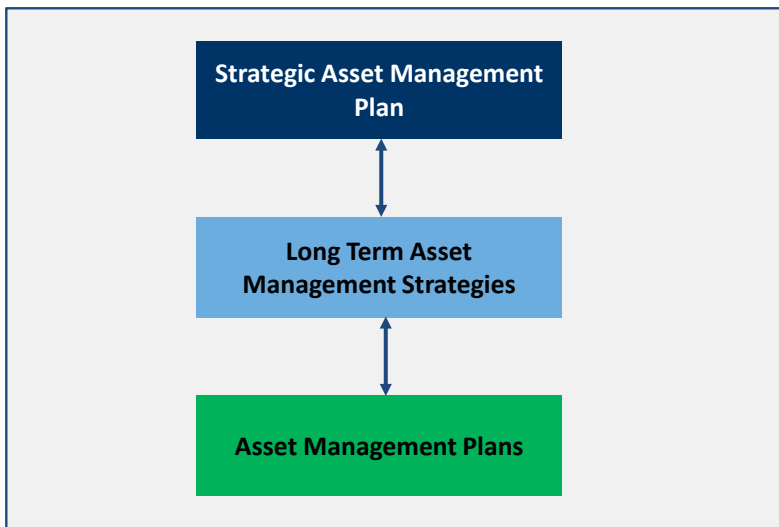
Under the Port Concession Deed (PCD) between PoM and the State of Victoria, PoM is required to be certified to International Standards Organisation (ISO) 55001:2014 - Asset Management) by 2021⁴. PoM is currently updating its asset management systems to meet these timeframes. This involves developing a new Strategic Asset Management Plan (SAMP) that will supersede the current Asset Management Strategy. The SAMP will provide a framework to redefine PoM's asset management objectives in line with revised organisational goals and align these with its operational processes accordingly.

Alignment of PoM's asset management system with ISO 55001 will ensure PoM's asset investment decision making processes are systematic, repeatable and take into account matters such as risk, stakeholder needs and expectations. It will also promote alignment between investment decisions and other matters including environment, quality, and safety practices.

It is proposed that PoM's asset management framework will be structured in accordance with Figure 8.

⁴ Within five years from the lease commencement date of 1 November 2016.

Figure 8 – PoM’s proposed asset management framework



The key elements of the PoM’s proposed asset management framework are discussed below.

Strategic Asset Management Plan (SAMP)

The SAMP, which is being developed in accordance with ISO 55000, will set out PoM’s overarching approach to achieving PoM’s asset management objectives in line with its business objectives and asset management policy principles. The SAMP is a governance document and will not be classified as a public document.

The SAMP will set out the:

- scope of the asset management system
- needs and expectations of key stakeholders impacted by the asset management system
- asset management objectives, and
- document hierarchy, decision making criteria and business processes required for PoM to achieve its asset management objectives.

PoM is currently developing its SAMP in accordance with the timeframe outlined in the PCD for the certification of PoM’s asset management system.

Long-term asset management strategies

PoM’s Port Development Strategy (PDS) and Port Development Implementation Plan (PDIP) sets out PoM’s strategic planning and development framework.

- The PDS will set out PoM’s long-term (approximately 30 years through to 2050) vision for the growth and development of the port. It will contain a range of potential future port development concepts to address current and emerging strategic issues, such as continued trade growth, trends in ship size and landside transport issues and opportunities, including on-dock rail. Key drivers of these emerging issues are continued population and economic growth, industry and market sector changes, agricultural climatic conditions and international commodity prices for exports. A public exhibition draft of the PDS is due to the Minister for Ports by 31 December 2018⁵ and every five years thereafter.
- The PDIP is a sub-set of the PDS and includes a more detailed 15 year view (2017-2032) of planned development activities within the port to support port capacity and growth in trade demand. It also sets

⁵ In accordance with the *Ministerial Guidelines - Port Development Strategies (Ministerial Guidelines)*, made under section 91M of the PMA and took effect on the date of gazettal, 10 July 2017. Under these Guidelines, Port authorities must prepare a PDS by 31 December 2018, and at intervals of 5 years thereafter in accordance with section 91K of the PMA.

out how PoM will work collaboratively with Port Users and other stakeholders to ensure sustainable growth over the next 50 years. PoM submitted its “first” PDIP to the Victorian Government on 31 October 2017 and must update it when it updates its PDS. The PDIP is not a public document and is intended to only be used by PoM and the Victorian Government.

Asset Management Plans (AMP)

The PCD requires PoM to create and maintain AMPs, which will document its approach to managing port assets. These AMPs will support the strategic objectives in the SAMP and will focus on the ongoing management of port assets including capital renewal, maintenance, and operational requirements. PoM is in the process of developing its AMPs in conjunction with the SAMP.

3.5. Capitalisation Guideline

PoM’s Capitalisation Guideline sets out its approach to capitalising expenditure, which is capital in nature and is attributable to the acquisition and or construction of an asset. These costs typically include:

- the cost of materials and direct labour
- other costs directly attributable to bringing the assets to a working condition for its intended use
- relocation costs (where relevant)
- the costs of dismantling and removing the items and restoring the site on which they are located, and
- capitalised borrowing costs.

The objective of PoM’s Capitalisation Guideline is to ensure that its capital costs are captured in an appropriate and accurate manner so that the asset value capitalised on PoM’s Fixed Asset Register is at its Fair Value.

PoM’s capitalisation approach is consistent with the relevant accounting standards.

PoM has prepared its 2018-19 Prescribed Services capex forecasts using the same capitalisation approach used to forecast its 2017-18 Prescribed Services capex.

4. Performance Standards

Performance standards reflect the level of service consistent with certain price outcomes. They increase transparency and accountability in relation to how a business performs in different areas such as safety, environment, reliability, capacity and customer service.

PoM recognises the need to develop performance standards consistent with tariffs subject to the TAL, which:

- are within its control, and
- reflect what Port Users and other stakeholders value.

PoM has drawn on the Bureau of Infrastructure, Transport and Regional Economics (BITRE) performance framework in preparing the following initial draft performance standards.

PoM is currently consulting Port Users and other stakeholders on the draft performance standards set out in Table 5 and will come back to the ESC once it has further progressed:

- the PDS and RAS which are critical to informing future investment and performance outcomes to meet Port Users and other stakeholder' long-term needs, and
- consultation with Port Users and other stakeholders on its initial draft performance standards and has, and will continue to, incorporate their feedback.

Table 5: Draft performance standards

Category	Outcomes (what we aim for)	Outputs (our actions)
Safety	<ul style="list-style-type: none"> • Zero harm to staff, contractors and the community • Provide and maintain safe marine infrastructure • Safety consultative forums 	<ul style="list-style-type: none"> • Compliance with safety legislation • OHS inspection, monitoring and reporting program • Continue to improve port-wide OHS culture • Annual reporting on safety performance indicators
Environment	<ul style="list-style-type: none"> • Operate in accordance with good environmental practice • Annual Port Environmental Strategy (PES) • Sustainability Report • Incorporate Environmental, Social and Governance (ESG) into decision making 	<ul style="list-style-type: none"> • Comply with environmental obligations • Prepare Annual PES. External certification every 5 years • ESG and Global Real Estate Sustainability Benchmark (GRESB) Infrastructure assessment • Provide a first strike response for marine pollution at a berth pocket • Obtain a global benchmark performance rating • Prepare a Sustainability Report • Utilise renewable energy sources where practicable • Consider climate change adaptation where practicable

Category	Outcomes (what we aim for)	Outputs (our actions)
Reliability / Availability	<ul style="list-style-type: none"> • Maintain infrastructure condition at current levels in accordance with Good Operating Practice • Vessel access to shipping channels 100% of the time in accordance with the declared depths as detailed in the Port Information Guide • Always having common user berths and equipment available for access. 	<ul style="list-style-type: none"> • Apply best practice asset management processes (i.e. International Organisation for Standardisation (ISO) 55000 certification) • Maintain channel depths to provide access • Provide and maintain sufficient wharf capacity
Capacity	<ul style="list-style-type: none"> • Port Development Strategy (PDS)¹ for submission to the Victorian Government • Rail Access Strategy (RAS)² for submission to the Victorian Government • Port Development Implementation Plan (PDIP)³ for submission to the Victorian Government 	<ul style="list-style-type: none"> • Detailed and broad consultation with Port Users and other stakeholders to inform the development of the PDS, RAS and PDIP • Develop, consult on and maintain a PDS, RAS and PDIP
Customer Service / Partner with the community	<ul style="list-style-type: none"> • Keep customers informed / timely communication • Address Port Users' and other stakeholders' priorities and views • Port open days • Port tours • Community days • Playscape • No complaints to ESC 	<ul style="list-style-type: none"> • Partner with supply chain • Identify top Port User priorities • Improve information on / useability of website • Provide convenient contact points • Consult with stakeholders on key issues (Port Access Forum, Swanson Forum, Rail Access engagement) • Maintain Playscape

1. The PDS will set out PoM's long-term (approximately 30 years through to 2050) vision for the growth and development of the port. A public exhibition draft PDS is due to the Minister for Ports by 31 December 2018. The PDS will be updated and provided to the Victorian Government every five years thereafter (in accordance with section 91K of the PMA).
2. The RAS will set out on-dock rail terminal infrastructure options for the movement of freight into and out of the port that provide viable, cost effective and sustainable alternatives to road transport. The first RAS is due to the Victorian Government in October 2019 and must be updated on an ongoing basis at the same time as the PDS.
3. The PDIP is a sub-set of the PDS and includes a more detailed 15 year view (2017-2032) of planned development activities within the port to support port capacity and growth in trade demand. PoM submitted its "first" PDIP to the Victorian Government on 31 October 2017. The PDIP is not a public document and is intended to only be used by PoM and the Victorian Government. The PDIP will be updated at least at the same intervals of time as the PDS.

5. Cost allocation method

PoM continues to allocate its costs in accordance with the Cost Allocation Principles set out in clause 5.2.1(a) and (b) of the Pricing Order, which require:

- (a) *Costs that are directly attributable to the provision of the Prescribed Services must be attributed to that Prescribed Service*
- (b) *Costs that are not directly attributable to the provision of the Prescribed Service but which are incurred in the course of providing both one or more Prescribed Services and other services must be allocated to the Prescribed Service on the basis of its share of total revenue from all services provided by the Port Licence Holder.*

PoM has reviewed, and made minor revisions to the attribution and allocation of costs between Prescribed Services and non-Prescribed Services from what it submitted in 2017-18 to reflect the appropriate treatment of these costs.

PoM's financial system is based on an account string with three mutually exclusive components that are attached to each transaction and are essential to PoM's financial controls and mechanisms:

Component	Description	Purpose
Responsibility Centre	Describes the organisational unit within PoM that is accountable for the particular transaction	Allows functional managers to monitor revenue and expenditure within their areas of responsibility
Program (then further grouped into precincts)	Identifies a particular physical location or major project to which the transaction relates	This informs assessment of the direct costs and revenue for each program which are further grouped by precinct
Natural Account Code	Captures the nature of the transaction (at a Profit and Loss/Balance Sheet account level)	This is required for statutory and management financial reporting

Using these components at a transaction level allows PoM to allocate costs by:

- directly attributing costs related to Prescribed Services to these services; and
- allocating, based on the share of revenue, costs that are not directly attributable to Prescribed Services and are relevant to the provision of both Prescribed Services and non-Prescribed Services.

This ensures that the revenue PoM recovers from the Prescribed Services only relates to the provision of these services. To this end, the approach to cost allocation complies with the objective and methodology of clause 5 of the Pricing Order.

PoM's approach to attributing and allocating costs between Prescribed Services and non-Prescribed Services is discussed below.

5.1. Cost allocation - opex

All opex incurred is allocated to a Natural Account Code. There are approximately 125 Natural Account Codes for opex. By way of example, these include:

- Tanker inspection – 1235 (directly attributable to the provision of Prescribed Services)
- Property Management Costs & Fees received – 1307 (directly attributable to the provision of non-Prescribed Services)
- Miscellaneous licence and other fees – 1410 (relevant to the provision of both Prescribed Services and non-Prescribed Services)

Natural Account Codes are assigned to:

- Prescribed Services – where the costs are directly attributable to Prescribed Services. There is no further allocation of these costs between different Prescribed Services.
- Non-Prescribed Services – where the costs are directly attributable to Non-Prescribed Services
- Shared Services – these costs relate to the provision of both Prescribed and Non-Prescribed Services and are therefore allocated between these services using a revenue allocator⁶.

Natural Account Codes can be viewed in terms of Responsibility Centres. These capture costs in the Natural Account Codes in terms of the organisational unit (group) within PoM to which they relate. This, for instance, allows all costs (such as electricity costs and salaries) to be viewed in terms of the business unit (or group) that incurred them. There are approximately 45 Responsibility Centres which have previously been provided to the ESC.

Appendix M contains the detailed allocation of PoM's opex.

5.2. Cost allocation - capex

As capex is incurred, it is recorded by Capital Activity Code in the Capital Work-in Progress (CWIP) ledger. Each capital project is allocated its own Capital Activity Code. Individual costs within each Capital Activity Code, such as project manager time, surveyor costs, design costs and construction costs are identified by a job number which distinguishes the nature of the cost.

These Capital Activity Codes are assigned to:

- Prescribed Services – where the costs are directly attributable to Prescribed Services. There is no further allocation of costs between different prescribed services;
- Non-Prescribed Services – where the costs are directly attributable to Non-Prescribed Services; or
- Shared Services – these costs relate to the provision of both Prescribed and Non-prescribed services.

Around 90 per cent of PoM's total 2018-19 capex is directly attributable to Prescribed Services and 5.4 per cent relates to the provision of both Prescribed Services and non-Prescribed Services and is therefore allocated between these services using a revenue cost allocator.

Once a capital project is complete, and all costs are incurred, the physical assets from that capital project are commissioned in the Fixed Asset Register⁷ (contained in FinanceOne). PoM's fixed assets are then allocated into the relevant asset classes.

At the time of recording an asset in the regulatory Fixed Asset Register, an identification (ID) number is assigned to each asset. This consists of a five-digit parent and a three-digit child asset number.

At this point, PoM confirms the service classification (Prescribed, non-prescribed or shared service) of each individual asset.

This enables PoM to track assets such that only those that relate to the provision of Prescribed Services or the relevant portion of those that relate to the provision of Prescribed Services and shared services are included in the Capital Base.

In 2018-19, the only categories of PoM's capex that need to be allocated in this way are Plant and Other (i.e. Buildings) because some of it is shared (i.e. relates to the provision of Prescribed Services and non-Prescribed Services).

Appendix M contains the detailed allocation of PoM's capex.

⁶ Revenue from Prescribed Services as a percentage of total revenue and revenue from Non-Prescribed Services as a percentage of total revenue

⁷ As distinct from the accounting, tax and insurance asset registers

6. Avoidable costs

Clause 2.1.1 of the Pricing Order requires that revenue for each Prescribed Service Bundle should lie on or between an upper bound, representing the stand-alone costs of providing each Prescribed Service Bundle, and a lower bound, representing the avoidable cost of not providing the Prescribed Service Bundle.

Consistent with its 2017-18 TCS, PoM has not sought to estimate the stand-alone cost for providing each Prescribed Service Bundle. This is because, regardless of what the stand-alone cost for providing each Prescribed Service Bundle might be, PoM would be in compliance with clause 2.1.1(b)(i) of the Pricing Order during the period in which clause 3.1.1 applies and any subsequent increase to any Initial Prescribed Service Tariff (as may be varied from time to time due to the acceptance of a Final Rebalancing Application under clause 3.2.18) does not exceed the TAL.

For example, if the revenue for each Prescribed Service Bundle was below the stand-alone cost of providing that Prescribed Service Bundle, then PoM would be in direct compliance with clause 2.1.1(b)(i). On the other hand, if the revenue for each Prescribed Service Bundle was above the stand-alone cost of providing that Prescribed Service Bundle, then in accordance with clause 2.1.4 of the Pricing Order, the upper bound principle in clause 2.1.1(b)(i) would not apply as clause 3.1.1 applies and the subsequent increase in Initial Prescribed Service Tariffs for 2018-19 does not exceed the TAL. PoM will therefore be in compliance with the upper bound principle in clause 2.1.1(b)(i) for the 2018-19 regulatory period.

Table 6 sets out PoM’s estimated average annual short-term avoidable costs of not providing the relevant Prescribed Service Bundle. Table 6 shows that PoM’s 2017-18 forecast revenue for each Prescribed Service Bundle, which PoM expects to be representative of its revenue over the short term, significantly exceeds its estimated avoidable costs of not providing the Prescribed Service Bundle. This is because, as a landlord port, PoM has relatively high fixed costs and a significant sharing of assets is required to provide Prescribed Service Bundles. This means that only a portion of costs are avoidable - the majority of asset-related costs cannot be avoided even if a particular Port User is no longer served. PoM will periodically review its estimated average annual short-term avoidable costs against its revenue.

Table 6: PoM’s estimated average annual short-term avoidable costs for Prescribed Service Bundles and its 2017-18 forecast revenue

Prescribed Services Bundle	Nature of avoidable costs	Avoidable cost (\$M)	Revenue (\$M)
Containerised cargo Swanson Dock	Berth maintenance - opex	0.18	
	Asset remediation - capex	1.89	
	Dredging (berth pockets)	0.56	
Containerised cargo Webb Dock	Berth maintenance - opex	0.00	
	Dredging (berth pockets)	0.17	
	Overheads	1.04	
Wharfage services for containerised cargo		3.84	217.4
Non-containerised / general cargo – Appleton Dock	Berth maintenance - opex	0.17	
	Asset remediation - capex	0.42	
	Dredging (berth pockets)	0.00	
Non-containerised / general cargo – Webb Dock	Dredging (berth pockets)	0.00	
	Overheads	0.06	
	Wharfage services for general cargo		0.65
Motor vehicle cargo – Webb Dock	Dredging (berth pockets)	0.00	
	Overheads	0.06	
Wharfage services for motor vehicle cargo		0.06	20.6

Prescribed Services Bundle	Nature of avoidable costs	Avoidable cost (\$M)	Revenue (\$M)
Liquid bulk cargo – Holden Dock, Maribyrnong & Gellibrand	Berth maintenance - opex	0.00	
	Asset remediation - capex	0.91	
	Dredging (berth pockets)	0.00	
	Safety, Security & pollution response	0.94	
	Overheads	0.21	
Wharfage services for liquid bulk		2.06	9.7
Dry bulk cargo – Yarraville 6, Appleton Dock, South Wharf	Berth maintenance - opex	0.51	
	Asset remediation - capex	0.00	
	Dredging (berth pockets)	0.00	
	Safety, security	0.10	
	Overheads	0.00	
Wharfage services for dry bulk cargo		0.61	12.5

Table 6 also shows the four key areas of avoidable costs: berth maintenance; asset remediation; maintenance dredging of berth pockets and overheads (which is an estimation of avoidable full time equivalent personnel for the respective Prescribed Services Bundle). For liquid bulk and dry bulk cargo specifically, safety, security and pollution response (for liquid bulk) has also been considered.

There are no avoidable costs for channels because:

- Shared Channels are common user infrastructure which are also utilised by Port of Geelong. These assets are not dedicated to a specific Prescribed Service Bundle. In addition, safety and compliance standards are mandated, and
- Dedicated Channels are common user infrastructure not dedicated to any specific Prescribed Service Bundle. Safety and compliance standards are also mandated.

7. Depreciation schedules and asset lives

Table 7 shows the economic lives for new capex (forecast 2018-19 capex) as well as the accounting lives for each asset category. PoM's asset categories and economic lives are the same as those set out in its 2017-18 TCS, with the exception of the following modifications which have been introduced to more accurately reflect the diversity of PoM's assets and their associated asset lives. PoM has:

- broken Channels down further into the following categories: Melbourne Channel; Melbourne Channel Over-Dredge; Shared Channels and Shared Channel Over-Dredge. The over dredge categories, which contain expenditure for maintenance dredging activities including dredging, sweeping, water injection, material transport and placement, bunding, capping and associated environmental testing and monitoring functions, have been assigned a three year life, and
- broken plant down further into: buildings, utilities, civil and minor-capital works. Plant now largely contains expenditure related to IT and survey equipment and therefore the life has been reduced to 10 years to better reflect the life of these assets.

PoM must depreciate its assets over a period no shorter than the economic life or the remaining term of the lease (whichever is shorter).

Table 7: Economic and accounting lives for new capex

Asset category	Economic lives for new capex – weighted average (years)	Accounting life – weighted average (years)
Melbourne Channel	50	50
Melbourne Channel Over Dredge	3	3
Shared Channels	50	n/a ¹
Shared Channel Over Dredge	3	3
Channel Service Protection	40	35
Roads	20	30
Rail	30	39
Buildings	25	26
Wharves	25	41
Plant	10	12
PCP - Wharves	50	n/a ²
PCP - Civil	30	
Navigational Aids	25	27
Utilities	30	41
Civil	40	43
Minor capital works	25	n/a ³

1. There are presently no shared channel assets in the Fixed Asset Register for capex incurred post 1 July 2016

2. There is no separate accounting life for PCP wharves and PCP civil, because for accounting purposes these assets are incorporated into the general asset categories for wharves, channel protection and plant.

3. These assets are capitalised according to the asset classes to which they relate

PoM has depreciated existing assets over their remaining asset lives and new assets according to the remaining economic lives for each asset class.

PoM has also used the alternative depreciation methodology permitted by clause 4.4.2(a) of the Pricing Order, rather than straight-line depreciation under clause 4.4.1 of the Pricing Order. This is because the application of the TAL prevents PoM increasing tariffs to the level whereby PoM could recover its ARR (calculated under the ABBM) with the application of straight-line depreciation. On this basis, in accordance with clause 4.4.2(a) of the Pricing Order, PoM has applied the alternative depreciation methodology, which only applies depreciation to the extent that revenue from Prescribed Services (subject to the TAL) exceeds the ARR excluding the depreciation allowance. Given that in 2018-19 PoM's forecast Prescribed Services revenue (subject to the TAL) is below the ARR, PoM has set 2018-19 straight-line depreciation to zero and deferred its recovery to future years. This method complies with the Pricing Order provisions relating to depreciation, including clause 4.4.3, which requires that the depreciation allowance is not below zero.

As requested, PoM has also provided the ESC with a calculation schedule, which demonstrates that its methods for calculating deferred and straight-line depreciation only recover depreciation once. This means that the amount by which each asset, or group of assets, is depreciated over the depreciation period does not exceed the value of the asset, or group of assets, at the time of its or their inclusion in the capital base.

Given this is only the second year of the regulatory regime (and the TAL period), PoM cannot, at this stage, provide a precise indication as to the timing and approach to recovering its deferred depreciation. PoM acknowledges that this is a matter of keen interest for Port Users and it is also of significant importance to PoM. Factors that will affect the amount of deferred depreciation include:

- future import volumes that are driven by domestic demand, population growth and the value of the Australian dollar, levels of domestic manufacturing and the location of domestic manufacturing (imports are primarily driven by domestic consumption)
- future export volumes that are driven by the economic growth of Victoria's trading partners (exports are primarily driven by foreign demand for Victorian products)
- the level of new capital investment during the TAL period such as, for example, to accommodate larger ships or enable on-port rail access, and
- the length of the TAL period.

PoM will consult Port Users on options for recovering any deferred depreciation to minimise volatility in tariff levels through price smoothing closer to the end of the TAL period, if deferred depreciation is yet to be recovered at such time. PoM will continue to engage with Port Users on the key principles underpinning its approach to recovering deferred depreciation in the future, including its commitment to smooth prices.

Attachment 1 – Opex mapping to regulatory model categorisation

Table 8 shows how the opex categories in Table 1 relate to the more granular opex categories in the regulatory model, at Appendix B

Table 8: Mapping between opex categories in Table 1 and the regulatory model

Regulatory model	TCS
Port Licence Fee	Port Licence Fee
Cost Contribution Amount	Cost Contribution Amount
Insurance, Rates & Taxes	Insurances, rates and taxes
Land Tax	
Labour Costs	Labour
Repairs & Maintenance	Repairs and maintenance
Construction	
Contract Security	Other – Utility and Administration (inc. security)
Utilities, Admin, Rental & IT	
Contractors and Professional Services	Other – Professional and Advisory
Transition	Transition

Attachment 2 – Capex mapping to regulatory model categorisation

Table 9 shows how the capex categories in Table 3 relate to the more granular capex categories in the regulatory model, at Appendix B

Table 9: Mapping between the capex categories in Table 3 and New Capex categories in the regulatory model

Regulatory model	TCS
PCP - Wharves	PCP
PCP - Civil	
Melbourne Channel	Channel
Melbourne Channel Over Dredge	
Shared Channels	
Shared Channel Over Dredge	
Wharves	Wharves
Road	Road
Rail	Rail
Plant	Plant
Utilities	Other
Navigational Aids	
Channel Service Protection	
Civil	
Buildings	
Minor Capital Works	



BIS OXFORD
ECONOMICS

PORT OF MELBOURNE TRADE FORECASTS

FORECASTS TO FY19

18 APRIL 2018



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- A Trade Volumes
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Overview

Forecast approach

For each trade category, we follow the same basic logic

Step 1 Acknowledge Common Characteristics

Major Australian container terminals tend to have the same basic characteristics:

1. The dominant full container trade flow tends to be imports (Burnie and Adelaide being the exception).
2. Each tends to be the only container terminal servicing an individual state, centred on the major population centre of that state (Burnie being the exception).
3. Strong growth between the 1990s and mid-2000s, with slower growth since the GFC.

These common features inform BIS Oxford Economics' trade analysis.

- For containerised imports, the outlook tends to track the national macroeconomic outlook with state-specific demand factors.
- Similarly, for containerised exports, we overlay national production outlooks with local specialisation within the Port of Melbourne

Step 2 Identifying drivers

As a rule, we would expect import (or export) volumes to track demand (or production) taking into account changes in domestic substitutes (or demand).

This ratio should be 1:1 over the past 20 years with few exceptions.

Major shutdowns of domestic manufacturing (historically has included cement factories, motor vehicle manufacturing) can be used to calibrate the substitution effect between domestic demand and overseas imports. This adds rigour to the outlooks regarding the future structural changes.

Note that there are some questions around data quality, but as expected, these appear to be most evident when the trade is examined at finer levels of categorisation. Accordingly, BISOE has grouped imported commodities according to six broad categories linked with common drivers to minimise the chance of a historical mis-categorisation creating a spurious result in the historical time series.

Step 3 Explaining variances from drivers

Sudden shifts in volumes at the Port of Melbourne that deviate from this principle reflect either a change in modal choice, port facilities, or local production factors.

These are rigorously examined to explain historic variances and then re-examined to see if there should be any changes over the forecast horizon.

These tend to be particularly relevant for exports as opposed to imports.

Step 4 Applying macroeconomic drivers

Once the relationship between the trade volumes and the macroeconomic drivers are established, and future structural changes are identified, the forecast trade volumes simply leverage off of the forecast macroeconomic outlook.

This report will explicitly identify the macroeconomic drivers used for each trade and then reference back to a section in the Appendix for further information.

Overview

Annual % Change	2014-15	2015-16	2016-17	2017-18	2018-19
Consumption (Food & Beverages)	1.5%	4.2%	9.4%	4.1%	5.2%
Consumption (Non-Food)	6.1%	-5.4%	1.2%	11.6%	3.9%
Capital Goods (& Parts)	2.4%	3.7%	5.4%	7.9%	2.3%
Parts for Transport Equipment	-6.2%	12.1%	-4.7%	9.4%	2.2%
Processed Industrial Supplies	10.0%	12.5%	5.0%	5.6%	2.9%
Other Intermediate Goods	2.3%	6.2%	1.6%	3.4%	2.7%
Total Imports (excl. Bass Strait)	3.9%	3.5%	3.1%	7.0%	3.3%

Annual % change	2014-15	2015-16	2016-17	2017-18	2018-19
Agriculture	-5.1%	-3.7%	13.6%	7.1%	-1.1%
Manufacturing	13.9%	-11.5%	12.3%	10.5%	3.3%
Paper	-21.8%	-4.5%	-7.0%	5.9%	-8.4%
Timber	15.2%	25.3%	22.8%	17.9%	3.7%
Other	-4.2%	8.3%	-5.3%	16.0%	2.8%
Total Exports (excl. Bass Strait)	-4.1%	-1.2%	7.9%	10.0%	-0.1%

Annual % change	2014-15	2015-16	2016-17	2017-18	2018-19
Agriculture	9.3%	3.3%	-1.5%	15.5%	8.1%
Manufacturing	-16.7%	33.2%	-2.4%	-0.8%	3.5%
Paper	57.7%	1.3%	7.2%	6.0%	-6.1%
Timber	-28.7%	-39.9%	3.8%	93.1%	3.7%
Other	3.7%	-5.2%	-5.9%	-12.0%	5.7%
Bass Strait Imports	7.7%	2.3%	-1.9%	5.3%	5.3%
Bass Strait Exports	2.6%	1.8%	-2.7%	3.7%	1.5%
Bass Strait (Full)	4.5%	2.0%	-1.6%	3.4%	3.0%

Annual % Change	2014-15	2015-16	2016-17	2017-18	2018-19
Break Bulk Exports	0.7%	1.6%	-93.3%	51.4%	-14.0%
Break Bulk Imports	2.4%	9.6%	-58.0%	24.0%	8.4%
Wheeled Unitised Exports	2.6%	5.1%	-51.1%	31.1%	1.5%
Wheeled Unitised Imports	12.0%	2.2%	-53.9%	3.8%	3.0%
Total Break Bulk	4.7%	4.8%	-60.5%	21.2%	3.3%

Annual % Change	2014-15	2015-16	2016-17	2017-18	2018-19
New MV Imports	5.3%	11.8%	2.0%	8.8%	4.5%
Transport Equipment, NEI, Imports	3.4%	1.1%	3.2%	29.9%	-1.9%
Second Hand MV Imports	8.3%	7.5%	-28.5%	12.1%	0.0%
New MV Exports	-14.1%	-1.7%	-11.2%	-50.4%	1.0%
Transport Equipment, NEI, Exports	13.8%	8.3%	0.4%	19.2%	0.0%
Second Hand MV Exports	5.2%	6.6%	-26.8%	15.5%	1.0%
Total MV Trade	1.3%	7.0%	-1.0%	4.9%	2.4%

Annual % change	2014-15	2015-16	2016-17	2017-18	2018-19
Cement	26.7%	12.2%	-1.5%	10.6%	2.3%
Gypsum	20.8%	0.7%	-2.5%	0.7%	2.3%
Crude Fertilizers	13.4%	-3.3%	15.3%	6.6%	2.3%
Sugar, raw	7.2%	-13.3%	-3.3%	28.1%	0.0%
Soda Ash	52.9%	20.0%	-26.5%	17.5%	0.0%
Total Dry Bulk Imports	21.1%	6.1%	-3.7%	9.7%	2.1%
Total Dry Bulk Exports	-42.8%	-60.6%	272.2%	-0.2%	-30.5%

Annual % change	2014-15	2015-16	2016-17	2017-18	2018-19
Crude Oil	-4.7%	-4.4%	0.4%	-2.9%	0.0%
Distillate Fuels	-21.5%	9.1%	35.9%	14.5%	1.6%
Motor Spirit	-4.1%	32.3%	-17.8%	43.1%	0.6%
Kerosene	11.9%	20.8%	-3.1%	2.0%	-4.4%
Petrochemicals	-11.7%	16.5%	6.0%	-6.4%	0.0%
Total Bulk Liquid Imports	-6.2%	2.2%	3.8%	3.3%	-0.4%





01

CONTAINERISED IMPORTS (EXCL. BASS STRAIT)

Full Imports

Why do imports grow faster than demand?

Substitution. This can be either by substituting a domestically made product for one made overseas, substituting repairs and maintenance for new products, or even substituting between product types.

A decline in manufacturing

Much of Australia's manufactured goods used to be either directly consumed by end users, or were inputs into the construction industry or general business, with relatively small volumes exported.

Over the past decade, the growth of manufacturing has failed to keep pace with Australian demand for either consumer goods or construction/general business activity. Accordingly, import volumes grew more strongly than demand to fill that gap.

Examples of where imports have fallen because of a decline in manufacturing has tended to be the exception rather than the rule (motor vehicle parts into Melbourne and Adelaide, for example).

Examples of where imports have substituted for domestic manufacturing are processed industrial supplies and consumer food and beverages.

Basket changes

Consumers have an ever changing consumption basket, with the ability to shift the composition of that basket to reflect relative prices.

Imported goods tend to experience lower price escalation than domestically produced items (in part due to improving economies of scale and increased specialisation for overseas manufacturing). These lower prices in turn shift the consumption basket more towards imported goods.

Furthermore, the relative decline in the costs of imported goods increase the frequency at which goods are cycled, replaced as opposed to repaired (with repair costs tending to grow at above inflation level, i.e. in line with wages).

Both of these support the increase in the import share of (non-food) consumables.

As a point of reference, about three-quarters of new passenger car sales in Australia serve to replace deregistered motor vehicles, which are retired at an average age 18 years. Most consumables do not have the same longevity, and would tend to have a higher replacement rate.

Can the import share continue to grow?

Yes.

While we have the import share for intermediate goods reach saturation within a decade, for consumer goods, [import volumes can continue to outpace the domestic demand for these same goods for the next 30 years](#), as so long as the price escalation of imported goods continues to grow more slowly than that of domestic goods and/or labour (i.e. repair) costs.

There are circumstances in which the import share may not grow, but these would tend to be temporary and are unlikely to be sustained throughout the forecast period. This could include

- significant falls in the exchange rate (temporarily raising import prices),
- significant falls in Australian energy prices (as compared of the rest of the world, for either gas or electricity) improving Australian manufacturing competitiveness, and
- recessions in Victoria (i.e. falling domestic demand tends to impact imports disproportionately).



Full Imports

Technical Note – Mapping to BoPBEC

BISOE's methodology behind imports is to first look at import volumes at all international container ports using the same categorisation, which can then be used to understand trends and market share.

Australian Transport Freight Commodity Classification (ATFCC)

Not all ports record trade in the same way, which makes it difficult to directly compare the imports into the major container ports.

However, most ports (other than Port Botany) do use a system which has its origins in a coding system developed in the early 1980s (called the Australian Transport Freight Commodity Classification, or ATFCC), which was the last time there was a concerted effort to generate a standardised classification of goods transported to, from and within Australia. It has been designed for use in the capture and presentation of data by organisations responsible for recoding information on Australian cargo or freight movements.

In practical terms, what happened was each of the major Australian Ports selected a subset (typically 100) of these classifications to report container volumes on, and have generally maintained this system ever since.

The structure of the ATFCC is based on the Standard International Trade Classifications (SITC) Revision 3, with adjustments to suit Australian requirements, but this ended up being superseded by a new system in 1988, but most ports remained on the older system.

Harmonised System & Customs Codes (HS)

International classification developments aimed at the harmonisation of commodity statistics led to the development of the Harmonised System in 1988 for the collection and dissemination of foreign trade statistics. Australian customs have expanded upon the international 6-digit HS codes to become 10-digit imported customs codes.

Imports are recorded in international trade statistics in the calendar month in which the import entries are finalised by the Australian Customs Service.

Normally this is within a few days of discharge of cargo although, on occasion, import entries may be delayed before being passed on to the ABS. For that reason, recorded imports for a particular month do not necessarily represent either entries lodged or commodities actually imported during that month. Analysis of recorded imports data has shown that, in aggregate, about 90 per cent of imports by value recorded for a particular month actually arrive during that month; of the balance, the majority have actually arrived during earlier months, with the remainder yet to arrive. For individual commodities, the percentage by value representing actual arrivals in a month can vary considerably.

Balance of Payments Broad Economic Categories (BoPBEC)

General merchandise goods debits (imports) are broken down into three 'end-use' categories—*consumption goods, capital goods and intermediate and other goods*—in broad accordance with the United Nations' *Classification By Broad Economic Categories (BEC)*, with further refinements by the ABS (combining the BEC with Standard Industrial Trade Classifications (SITC) Revision 4) as the Balance of Payments Broad Economic Categories (BoPBEC).

There are 26 such categories at the 2-digit level, with detailed data available from the ABS on monthly imports into each port and airport measured in tonnes and dollar value going back to the 1988.

BIS Oxford Economics uses this information to recut the Port's trade volumes into the BoPBEC, first in tonnes and then into TEUs, and uses this information to establish eight time series of imported TEUs (two of which are less than 1% of imports).

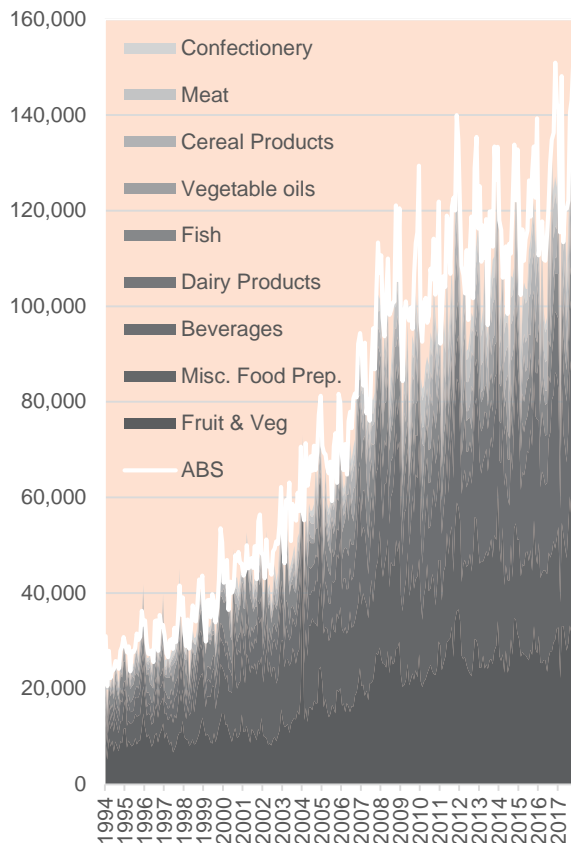


Full Imports

Checking BoPBEC against the Port of Melbourne

The correspondence from the Port of Melbourne commodities to the BoPBEC are not perfect for all broad categories.

Food & Beverages monthly imports, tonnes



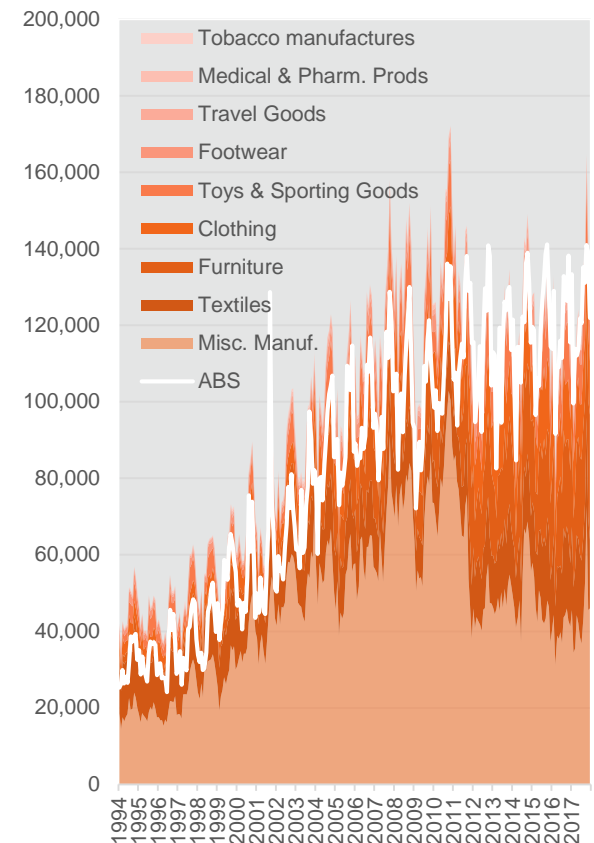
Structural Breaks

For Food and Beverages between 1994 and 2017, the mass of imports as measured by the ABS are within 1% of that recorded by the Port of Melbourne, with difference month-to-month due to differences in when customs and the Port of Melbourne records a shipment having arrived.

For Other Consumer Goods, the difference prior to 2012 is because of a single category "Misc. Manuf." which appears to have had a broader definition and included what is believed to be Processed Industrial Goods.

Historical volumes (in TEUs) of Other Consumer Goods and Processed Industrial Goods prior to 2012 are therefore derived using an alternative calculation.

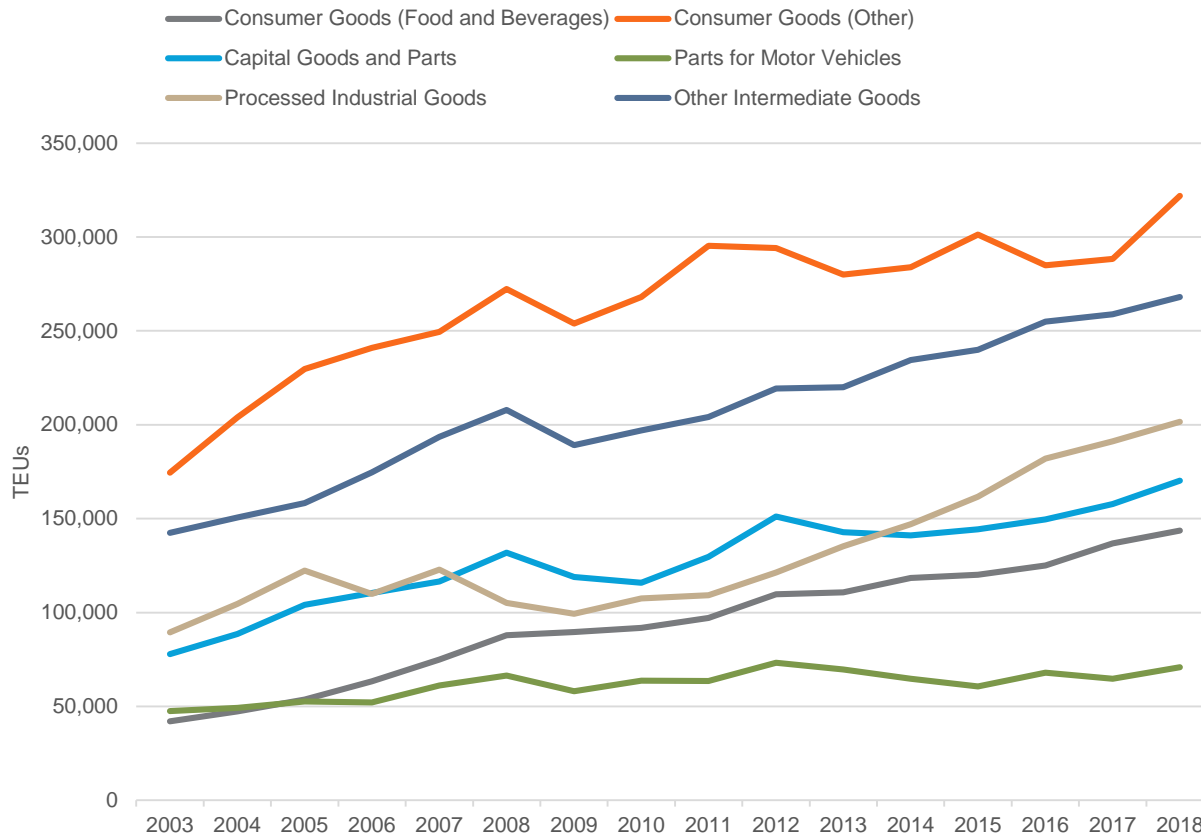
Other Consumer Goods monthly imports, tonnes



Full Imports (excl. Bass Strait) History and Composition

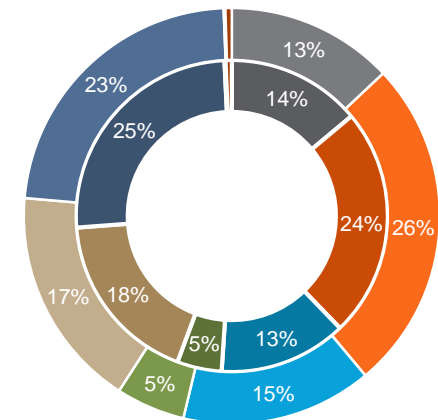
After recutting the import volumes into Broad Economic Categories, we find that the trade volumes have different historical narratives, which are explained by different macroeconomic drivers.

Historical Growth by Balance of Payment Broad Economic Categories
Financial Years, TEUs



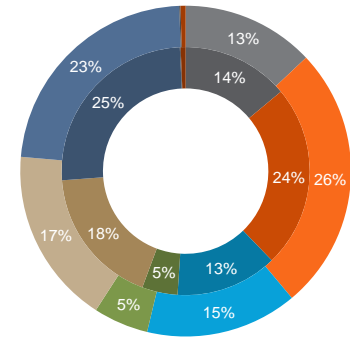
Full International Containerised Imports
(CY2017, inside containers, outside TEUs)

- Consumer Goods (Food and Beverages)
- Consumer Goods (Other)
- Capital Goods and Parts
- Parts for Motor Vehicles
- Processed Industrial Goods
- Other Intermediate Goods
- Motor Vehicles
- Petroleum Products



Full Imports (excl. Bass Strait) Forecast Methodology

We use a mix of national and state-specific drivers to forecast each subset of imported containers.



Intermediate Goods

Our working assumption is that the demand for intermediate goods should generally track that of State Final Demand for Goods, assuming no compositional changes in the economy.

However, the Australian economy *has* experienced a significant relative decline in the importance of Manufacturing. This has had two distinct impacts:

1. There are goods that are no longer required as imports because they were inputs into the Manufacturing process. **MV Parts** are an example of this.
2. There are goods that now must be imported because they are not produced in sufficient quantities to meet the demands of the domestic economy. **Motor Vehicles** are a prime example of this.

The remaining **Other Intermediate Imports** roughly track State Final Demand for Goods, and **Processed Industrial Supplies** roughly track **Building Construction**.

Note that while **Parts for Capital Goods** are technically part of the Intermediate Goods section, they have been forecast alongside Capital Goods.

Capital Goods

Historically, the import volumes (in TEUs) of **Capital Goods** (mostly Machinery and Equipment) track Victorian expenditure on Machinery and Equipment.

This relationship is assumed to hold over the forecast horizon.

Note that the same relationship also holds for **Parts for Capital Goods**.

Definition:

State Final Demand for Goods is the sum of:

1. Retail Turnover (including Motor Vehicles)
2. Construction (Dwelling and non-dwelling)
3. Government Consumption Expenditure (part of)
4. Public Investment
5. Machinery and Equipment (gross capital formation)

Consumer Goods

Current modelling of Consumer goods use a combination of the outlook for Retail Turnover and Import Penetration.

Note that the import penetration is exchange rate sensitive.

Currently two versions of consumer goods are considered.

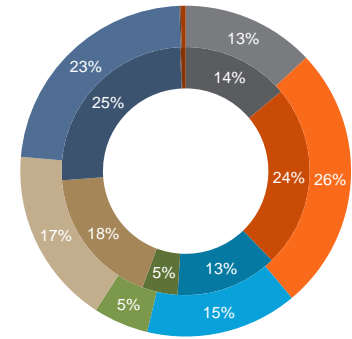
1. **Food and Beverages.** This is a less mature market for imported products, with current import penetration estimated to be at 10%. There is some evidence that the increase in import penetration has coincided with a decline in manufacturing of food and beverage products, however, the manufacturing outlook for food and beverages is not used to calculate the import penetration going forward, rather it is assumed to increase at a linear rate over the forecast horizon.
2. **Non-Food consumer goods.** This is a more diverse market. While the decline in manufacturing has coincided with an increase in import penetration, this isn't so clear cut as it is for food and beverages, and most of the increase seems to be due to increasing rates of replacement and substitution between product types.

*State Final Demand comprises of both Goods and Services, and is calculated as the sum of consumption plus investment plus government expenditure.

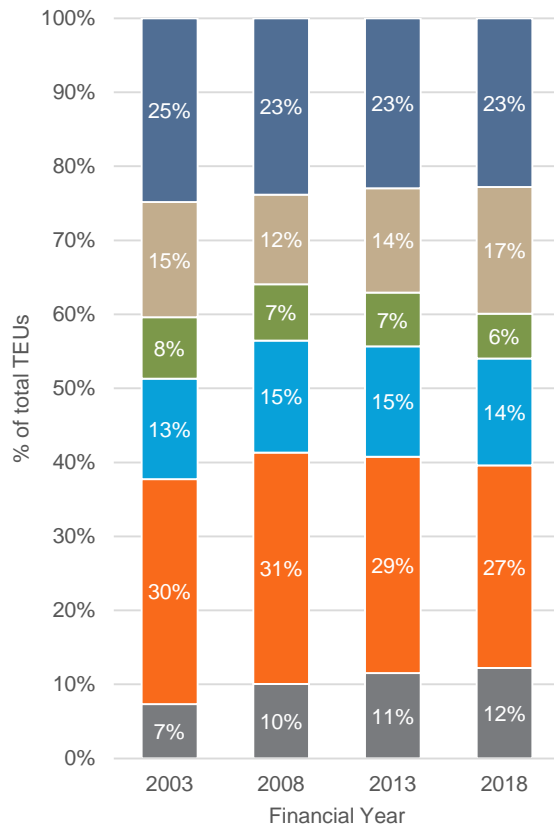
*State Final Demand plus exports minus imports equals Gross State Product.

Full Imports (excl. Bass Strait) Composition

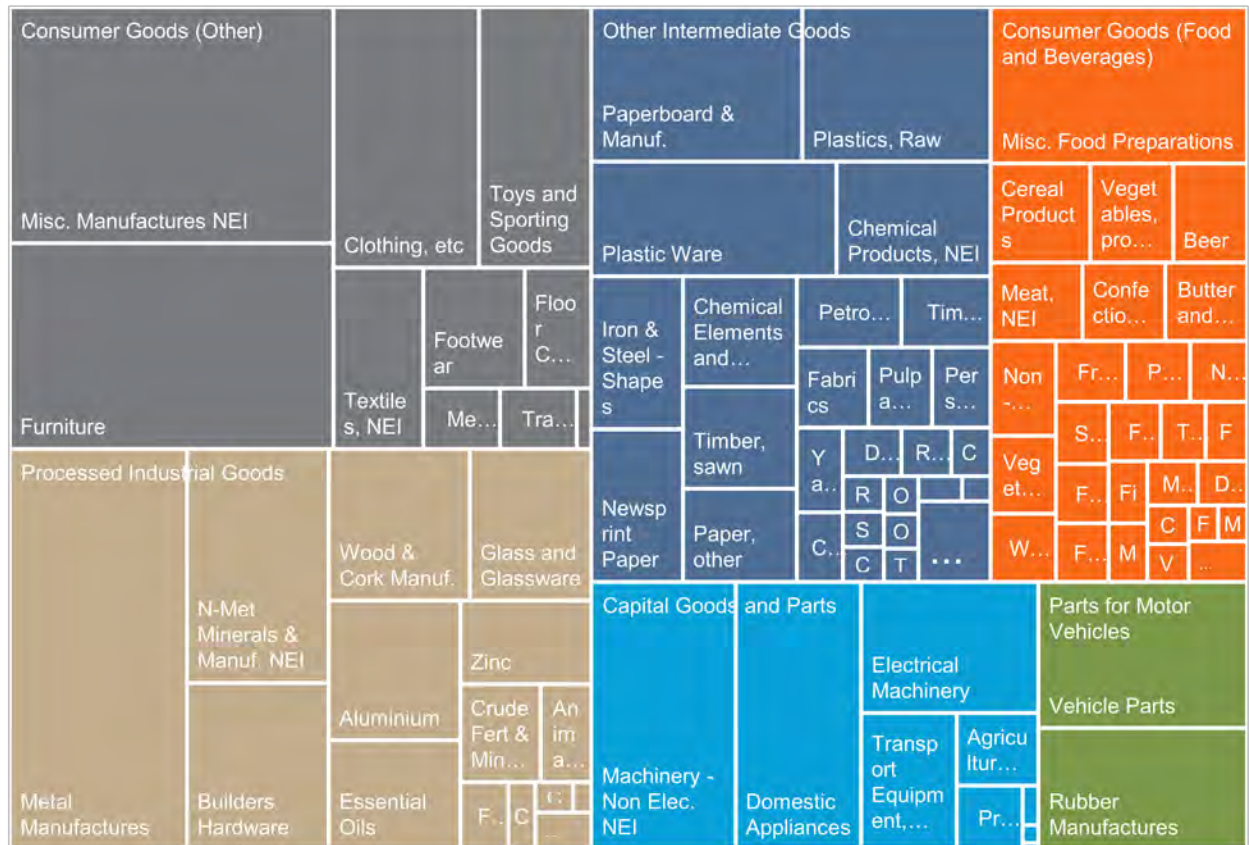
Compared to other Australian capital city ports, the Port of Melbourne is more heavily weighted towards capital goods and parts for motor vehicles.



Share of Imports by broad class



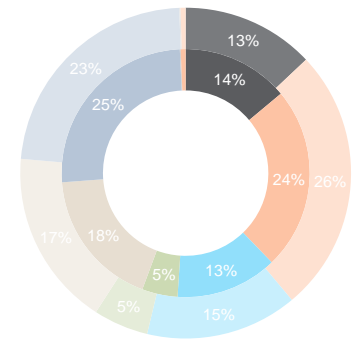
2017 Imports by BIS Code and Port of Melbourne Categories



Australian Overview

Imported Consumer Goods (Food and Beverages)

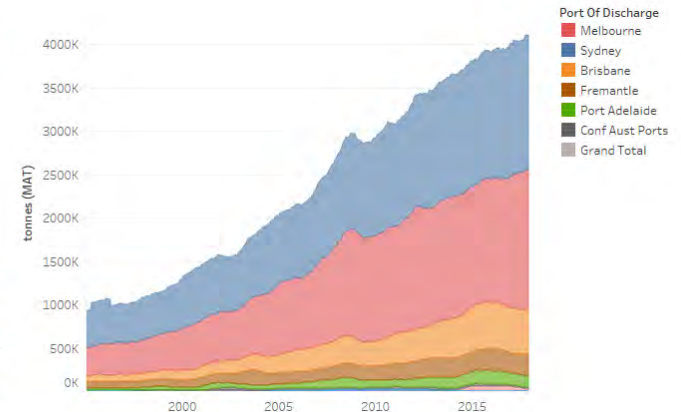
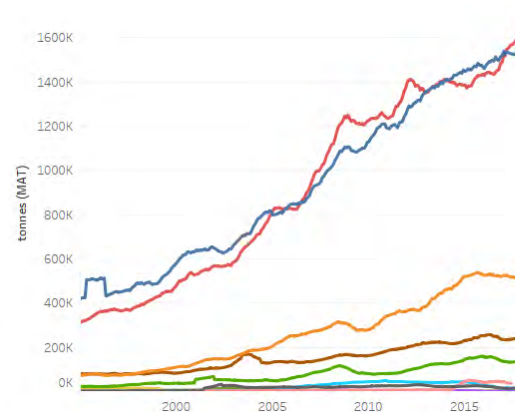
Melbourne's share has been holding steady at 39% to total Australian imports.



Key notes

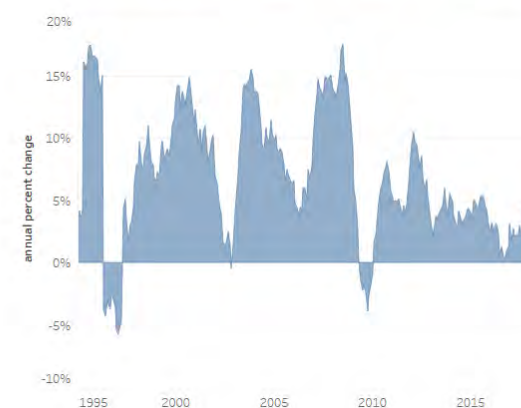
- Over 75% of food and beverages arrive via the Port of Melbourne and Port Botany. This reflects the concentration of the distribution network for the food and beverage industry within these states, rather than local demand.
- Food consumption in these two state are only 65% of the Australian total, suggesting that at a minimum 400,000 tonnes of imported food and beverages per annum are moved via road and rail out of New South Wales and Victoria.
- In November 2015, imported product into ports other than Melbourne and Botany peaked, and are now down almost 5% in the 25 months since.
- Sustained growth in imports which outpace retail turnover reflecting an increasing import penetration for food and beverages expenditure. This can be seen throughout the past two decades, with a compound annual growth rate of 7% vs a retail turnover growth averaging 4%.
- Imports are exchange rate sensitive, with generally stronger growth with an appreciating AUD/USD, and vice versa.

National Overview



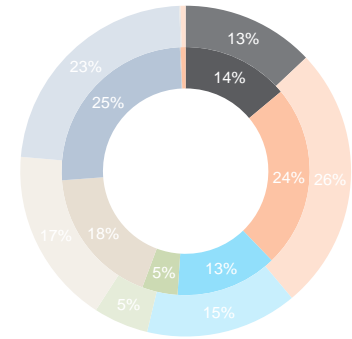
% change (year-on-year, quarter-on-quarter)

Port Of Disc.	2016 Q3	2016 Q4	2017 Q1	2017 Q2	2017 Q3	2017 Q4
Grand Total	0.4%	1.2%	2.7%	2.1%	2.6%	3.5%
Melbourne	1.6%	3.5%	7.3%	9.1%	9.4%	8.0%
Sydney	3.6%	8.9%	18.1%	6.1%	5.1%	3.9%
Brisbane	1.1%	3.4%	3.7%	1.8%	1.8%	2.7%
Fremantle	0.3%	4.1%	5.3%	-2.6%	0.4%	7.0%
Port Adelaide	-2.7%	-1.1%	-0.3%	-2.7%	-2.2%	-1.1%
Conf Aust Ports	-5.2%	-1.6%	3.4%	-7.0%	-3.5%	2.3%
Port Adelaide	3.5%	-6.7%	-8.3%	-7.2%	-4.2%	5.5%
Conf Aust Ports	-5.6%	-19.3%	-1.2%	1.8%	8.0%	12.8%
Port Adelaide	-4.7%	-14.6%	-12.4%	-14.6%	-9.1%	2.7%
Conf Aust Ports	-18.1%	-25.4%	-4.0%	-7.1%	6.1%	15.8%
Conf Aust Ports	-30.0%	-34.5%	-38.4%	-34.0%	-13.4%	-1.6%
Conf Aust Ports	-53.7%	-38.6%	-27.6%	-4.7%	47.5%	-2.9%



Full Imports (excl. Bass Strait) Consumer Goods (Food and Beverages)

Making up 13% all TEU imports (and 14% of containers), the driver is retail turnover, a growing import share, and changing container composition.



CY17 Imports (PoM classifications) TEUs



Increasing import penetration

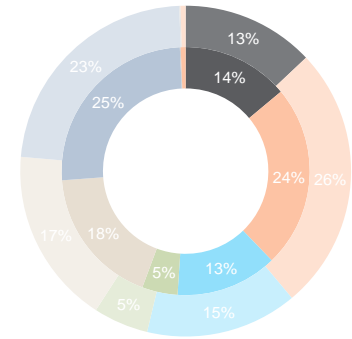
For food and beverages, our working assumptions to 2019 are as follows:

- Food retail for Australia grows at 1.5% in FY18 and 1.7% in FY19.
- Imports (measured in tonnes) growth linearly from 34 tonnes per \$million of food retail turnover in FY17 to 35.8 in FY19. This is working off of the assumption that the import penetration of food retail turnover grows at a linear rate, i.e. there are no major exchange rate fluctuations and the AUD/USD remains at about 0.75.
- The Port of Melbourne's market share for food and beverage imports holds at 39% (it has been between 33% and 42% for two decades, averaging 38%).
- The share of imports in 20ft containers falls from 55.5% in FY17 to 53.2% in FY19 (was 78.6% in FY06).
- Tonnes per container hold at 17.0 for 40-ft containers, and falls slightly for 20s (was 15.7 in CY17, forecast to be 15.6 in FY19).

Australian Overview

Imported Consumer Goods (Non-Food)

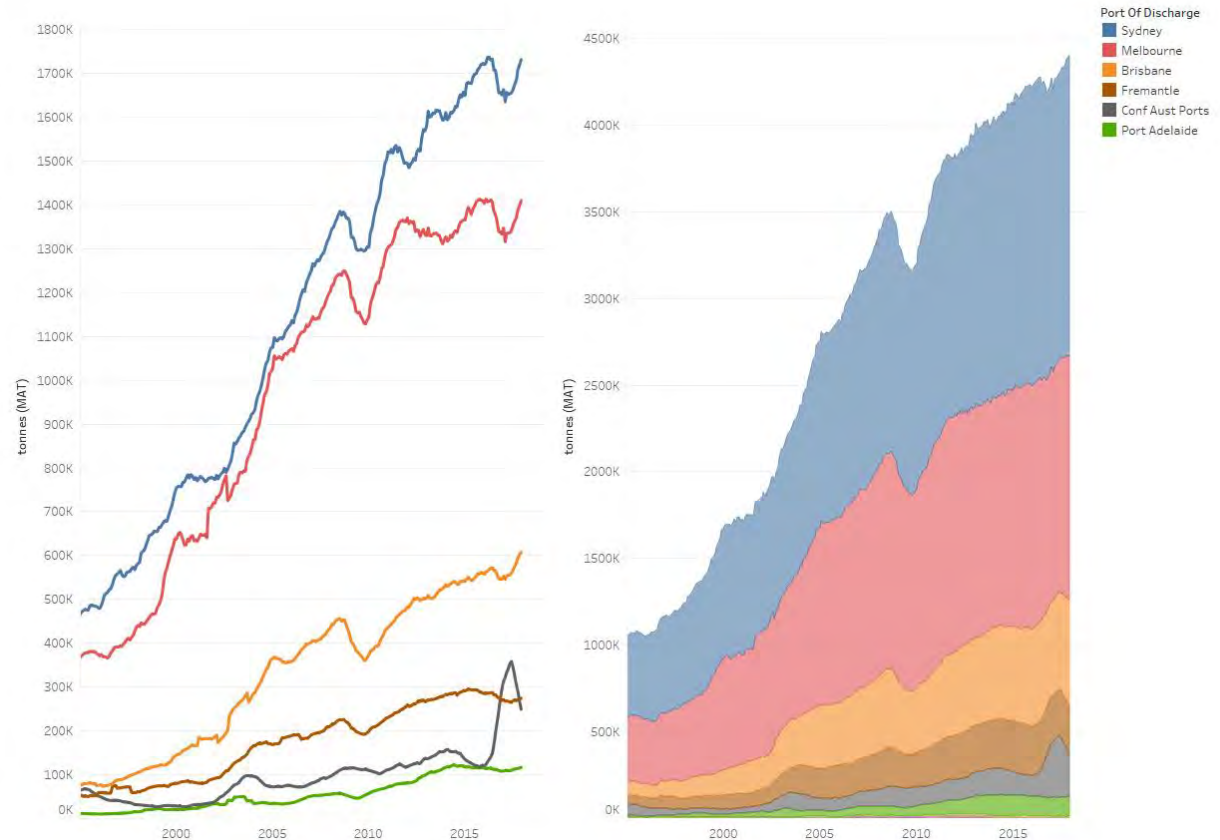
Melbourne's share of non-food consumer goods have been falling and now match historic lows of 36%.



Key notes

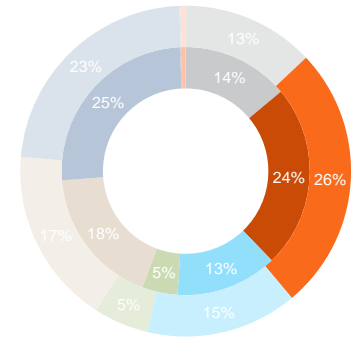
- Total consumer imports are increasingly focused on Port Botany, with the market share for consumer goods increasing (at the expense of Melbourne) for the past decade.
- Fremantle have seen declines in imported consumer goods since peaking in early 2015, despite roughly flat retail turnover in the state.
- Import volumes move sharply in line with major movements in the AUD/USD.
- Consumer goods are increasing at a rate outstripping retail turnover for the past two decades (7% p.a. vs 4% p.a.), reflecting an increasing import penetration for consumer goods.
- Weak growth since 2012 reflect both the falling dollar as well as anaemic consumer spending (and wage price growth).
- Fewer than a third of South Australia's imported consumer goods arrive direct via Port Adelaide, with the remainder relying upon transhipments and/or repacking and landside movements via road and rail.

National Overview



Full Imports (excl. Bass Strait) Consumer Goods (non-food)

Making up 26% all TEU imports (and 24% of containers) the driver is AUS retail turnover, a growing import share, and changing container composition.



CY17 Imports (PoM classifications) TEUs



Increasing import penetration

For non-food consumer goods, our working assumptions are as follows:

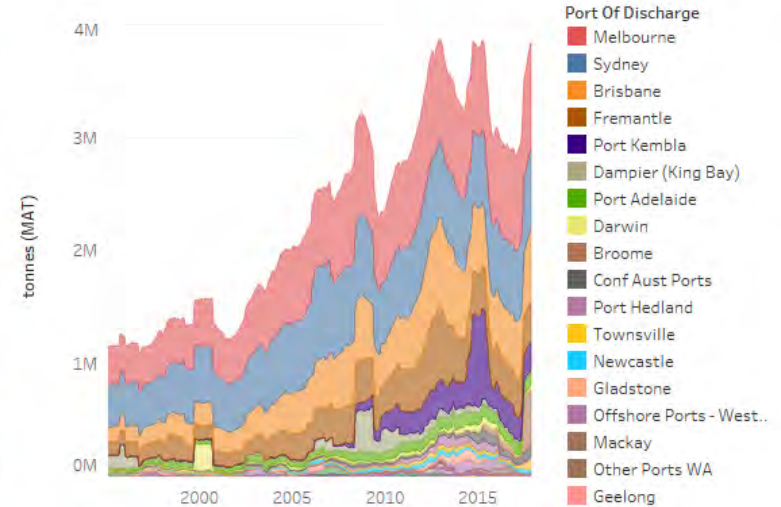
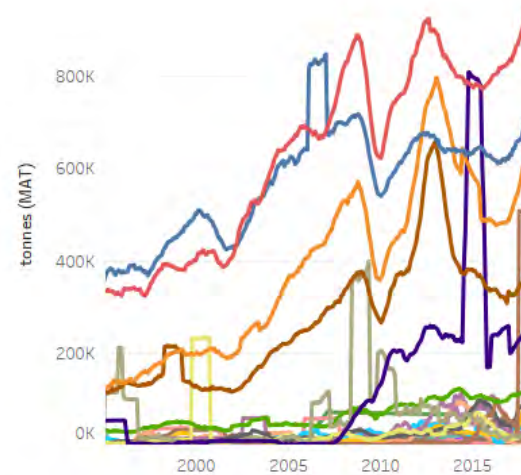
- Non-Food Retail Turnover in Australia grows at 2.7% in FY18 and 1.9% in FY19.
- Imports (measured in tonnes) growth linearly from 15.5 tonnes per \$million of non-food retail turnover in FY17 to 16.2 tonnes in FY19. This is working off of the assumption that the import penetration of consumer goods retail turnover grows at a linear rate and that the average exchange rate over the period is 0.75 AUD/USD.
- The Port of Melbourne's market share for food and beverage imports holds at 36% (it has been between 35% and 49% for two decades, averaging 41%).
- The share of imports in 20ft containers holds at 29%.
- Tonnes per container hold at 8.4 for 40-ft containers and 3.5 for 20-ft containers.

Australian Overview

Imported Capital Goods / Machinery & Equipment

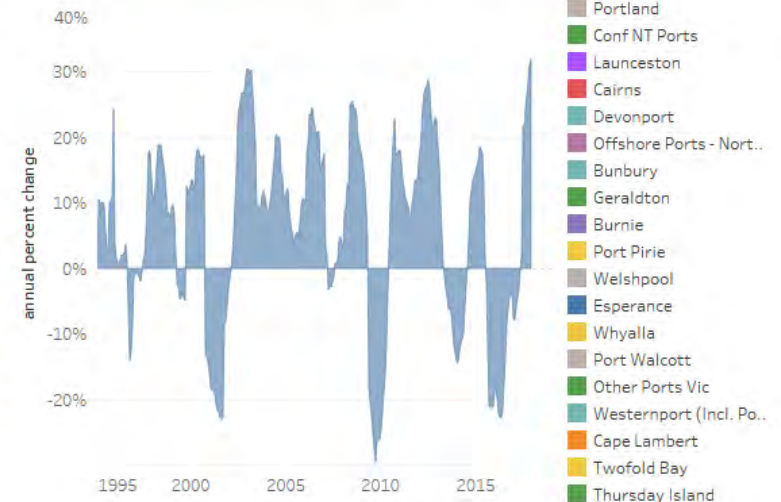
Mining Boom and Discrete Projects

- Evidence of the mining boom are reflecting in peak in volumes in 2013, with a spike in volumes arriving into not only Fremantle and Brisbane, but also Melbourne.
- Machinery and equipment arriving via small ports as once-off projects remain important to aggregate volumes, with Darwin, Dampier, Broome and Port Kembla playing host to large movements.
- Modelling by BIS Oxford Economics suggest that the box counts for Machinery and Equipment are dramatically lower (by a factor of 4 or so) than either of the consumer goods classes, despite similar volumes (in tonnes).
- This reflects not only the higher share of import volumes arriving via bulk ports, but also the mixed modes of cargoes arriving via the container ports, both within containers and as break-bulk or roll-on roll-off.



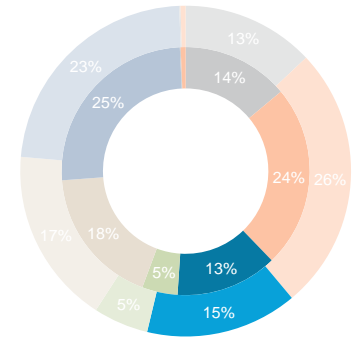
% change (year-on-year, quarter-on-quarter)

Port Of Disc..	2017 Q1	2017 Q2	2017 Q3	2017 Q4
Grand Total	-6.1%	-1.8%	24.4%	31.9%
Melbourne	-5.1%	6.0%	9.6%	13.5%
Sydney	7.9%	11.3%	15.4%	18.4%
Brisbane	3.9%	7.5%	7.9%	14.2%
Fremantle	15.5%	11.5%	6.1%	23.8%
Port Kembla	7.6%	13.4%	22.3%	31.9%
Port Adelaide	30.8%	23.4%	36.0%	36.1%
Broome	-3.5%	3.4%	9.2%	4.7%
Port Kembla	-8.3%	16.2%	16.2%	-1.3%
Port Adelaide	-12.9%	-8.0%	-6.3%	-4.5%
Broome	-46.0%	36.2%	23.3%	19.4%
Port Adelaide	16.8%	17.9%	18.8%	16.4%
Broome	38.3%	6.9%	10.4%	14.4%
Broome	-74.8%	-90.4%	639.4%	826.3%
Dampier (King Bay)	-98.7%	-93.8%	11911.8%	-70.3%
Dampier (King Bay)	-24.5%	-0.2%	22.8%	-36.5%
Dampier (King Bay)	136.9%	-71.3%	87.1%	-91.5%



Full Imports (excl. Bass Strait) Capital Goods, Parts for Capital Equipment

Making up 15% all TEU imports (and 13% of containers) the driver is VIC machinery and equipment expenditure.



CY17 Imports (PoM classifications) TEUs



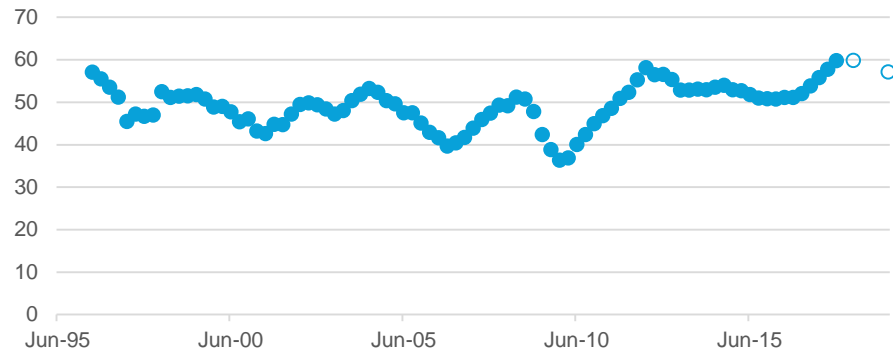
Strong and Stable Relationships

The growth profile continues to be directly related to Machinery and Equipment Expenditure in Victoria.

The share of M&E that is containerised (as opposed to break bulk) is not expected to change over the forecast period. For goods that are containerised, BISOE is projecting a shift away from 20s into 40s (1.5% p.a.), as a result TEU growth is projected to outpace container growth by 0.05% p.a.

Tonnes/container are not projected to change over the forecast period (holding at 7.9 and 9.1 for 20s and 40s respectively).

tonnes per \$ million of VIC Machinery and Equipment Expenditure (chain volume measures)

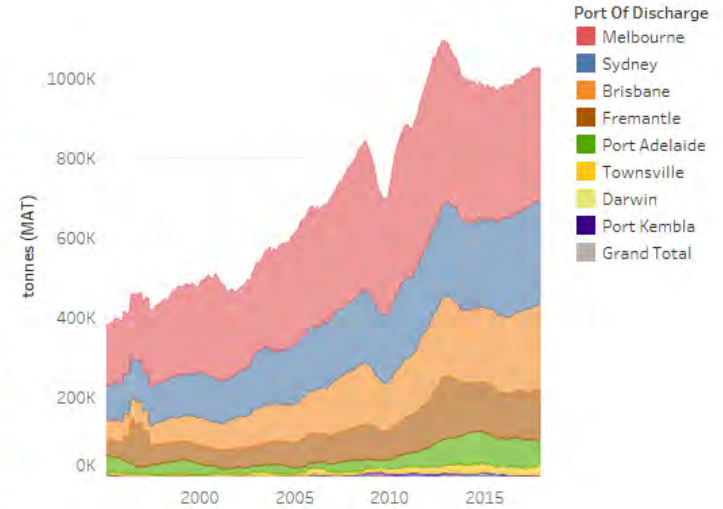
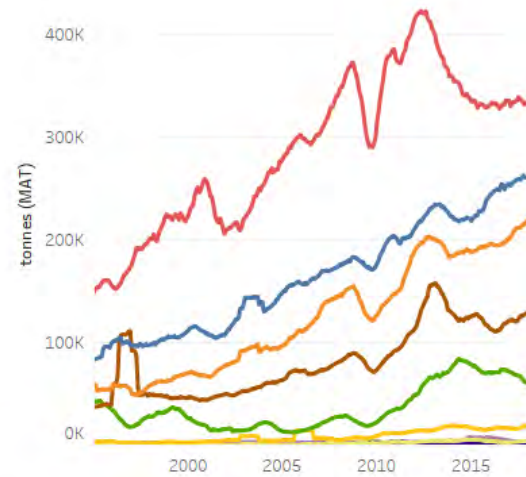


Australian Overview

Imported Parts for Motor Vehicles

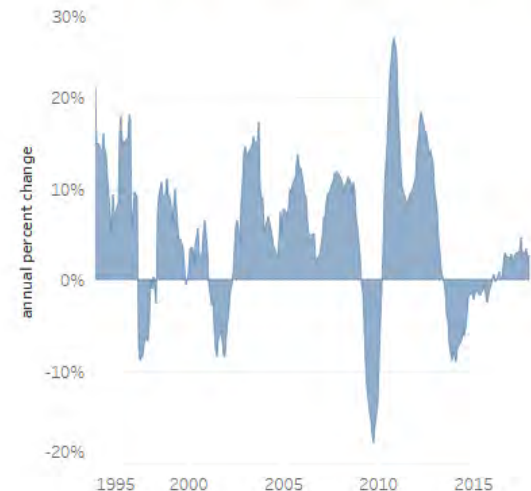
Melbourne remains dominant

- Falls in import volumes at the Ports of Melbourne and Adelaide were expected given the closure of their domestic manufacturing facilities.
- New South Wales is host to more motor vehicles than Victoria and Tasmania combined.
- Melbourne's continued dominance of imported motor vehicle parts suggests that the distribution networks for parts (which are split roughly evenly between tyres and other parts) retains a legacy of our manufacturing past, with as many as 10% of the imports into Melbourne then travelling to New South Wales to service motor vehicles in that state.
- Historical strong growth in volumes in import volumes in 2002 and 2010-2012 mirrored closures of domestic tyre manufacturers (first Thomastown, Footscray, Somerton, and lastly Bridgestone).
- The long-run forecast is for import volumes to now roughly track the increase in motor vehicle stock, which has been mildly outpacing population in each state.



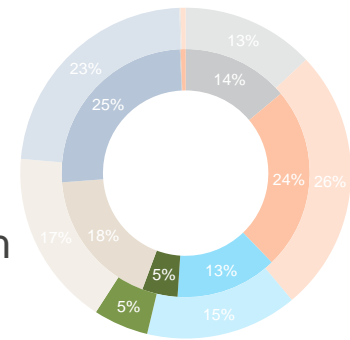
% change (year-on-year, quarter-on-quarter)

Port Of Disc..	2017 Q1	2017 Q2	2017 Q3	2017 Q4
Grand Total	2.7%	3.4%	2.7%	2.7%
Melbourne	0.4%	1.5%	1.2%	-0.5%
Sydney	3.2%	3.9%	2.4%	2.6%
Brisbane	4.7%	8.6%	8.2%	9.3%
Fremantle	9.1%	7.4%	7.3%	7.4%
Port Adelaide	0.7%	-4.0%	-10.7%	-15.4%
Townsville	3.2%	-9.4%	2.6%	16.8%
Darwin	-24.1%	3.3%	-38.2%	44.2%
Port Kembla	11.5%	24.9%	54.1%	71.7%
	56.6%	43.6%	126.9%	42.6%

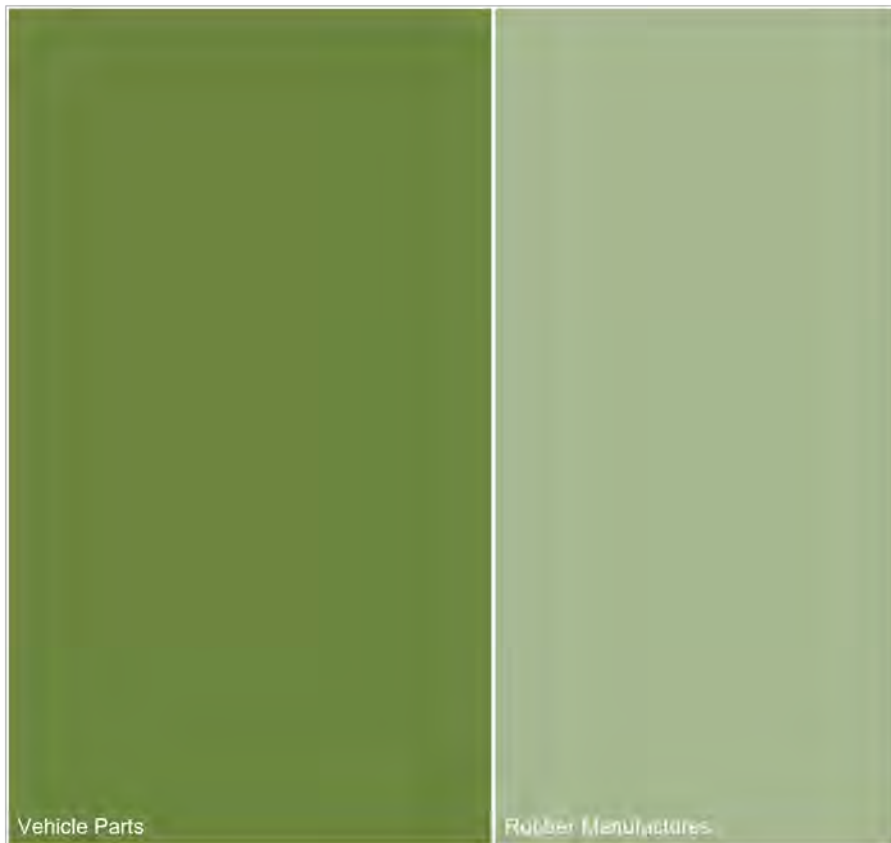


Full Imports (excl. Bass Strait) Parts for Transport Equipment

Making up 5% of imported containers, the driver is the stock of Motor Vehicles, which is forecast to grow in line with VIC population



CY17 Imports (PoM classifications) TEUs



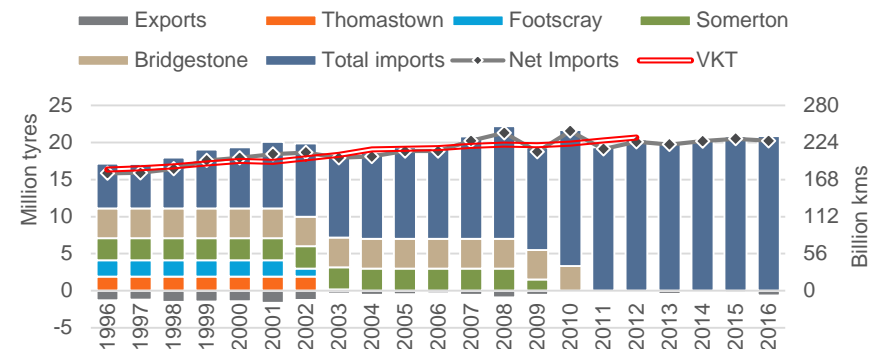
A decline in Australian Motor Vehicle Manufacturing

Imported motor vehicle parts consist of replacement parts and after-market components servicing for the Australian motor vehicle fleet, and are roughly split between tyres and other parts.

Historically, the containerised import volumes outpaced the growth in motor vehicle stock, but this can be entirely explained by a significant portion of tyres previously being manufactured domestically.

Henceforth, we are forecasting MV parts to follow the growth in the stock of motor vehicles, which is forecast to grow at 2.4% in FY18 and 2.2% in FY19.

Tyre Imports + (estimated) Domestic Construction & MV km travelled

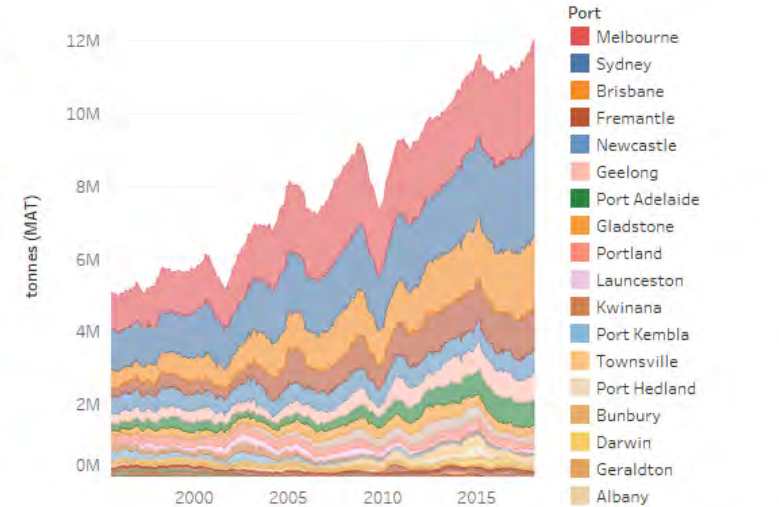
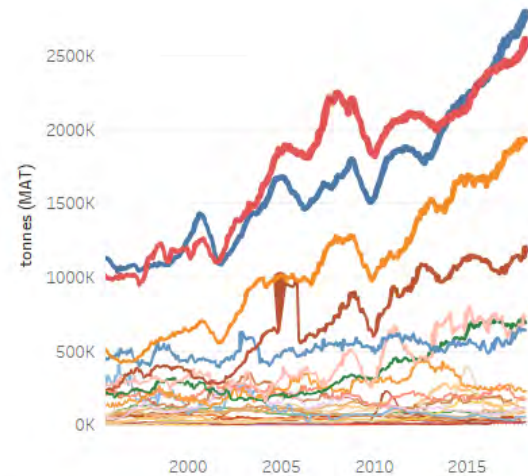


Australian Overview

Imported Non-bulk Processed Industrial Goods

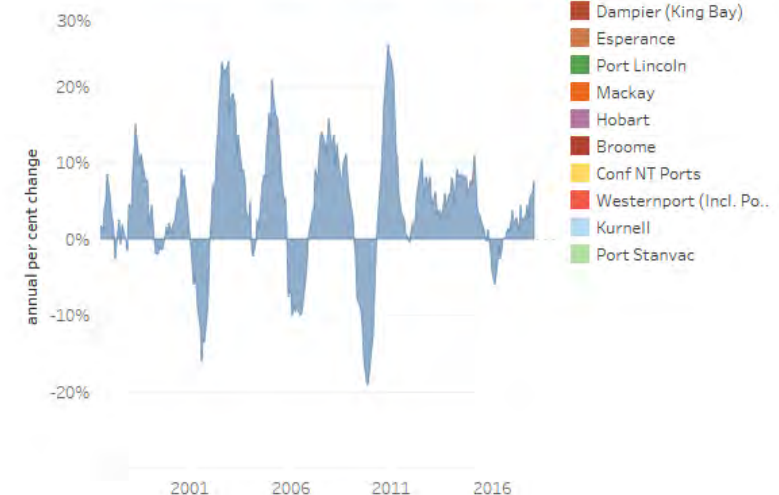
Often building materials

- Processed industrial goods are a mix of both containerised and non-containerised goods, with the later predominately dry bulky goods, such as cement clinker and gypsum.
- Containerised volumes include products such as sinks, baths, lights, windows, wood panelling, lamps, tiles, bricks, tiles, pavers, aluminium articles, and articles of iron and steel.
- As such, the dwelling and non-dwelling building cycles within each state drive trade volumes, with Sydney and Melbourne reaching new heights following their respective booms. Correspondingly, Fremantle volumes peaked in the 12 months to September 2015, which coincided with the peak in building activity in Western Australia.



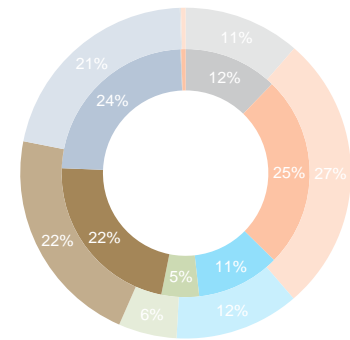
% change (year-on-year, quarter-on-quarter)

Port	2017 Q1	2017 Q2	2017 Q3	2017 Q4
Grand Total	2.2%	4.3%	3.2%	5.6%
Melbourne	2.9%	1.8%	2.0%	3.6%
Sydney	9.2%	8.7%	6.7%	6.7%
Brisbane	10.3%	10.8%	6.0%	8.0%
Fremantle	-1.5%	8.5%	12.4%	10.7%
Newcastle	11.1%	22.2%	8.2%	20.9%
Geelong	-16.0%	-15.2%	-9.4%	-3.5%
Port Adelaide	-23.8%	15.8%	13.2%	33.3%
Port	-2.0%	-1.0%	-3.5%	5.9%
Adelaide	-0.2%	2.5%	-4.5%	33.1%



Full Imports (excl. Bass Strait) Processed Industrial Goods

Making up 22% all TEU imports (and containers), the primary driver is Victorian *Dwelling and Other Building Construction*.



CY17 Imports (PoM classifications) TEUs



Strong and Stable Relationships

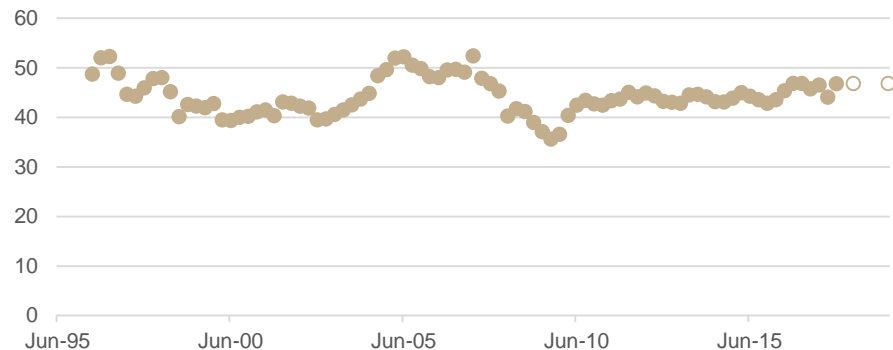
The volume of processed industrial goods is strongly related to Building (Dwelling and Non-Dwelling) Construction in Victoria.

For goods that are containerised, BISOE is projecting a shift away from 20s into 40s (0.7% p.a.), as a result TEU growth is projected to outpace container growth by 0.4% p.a.

Tonnes per container hold at 12.8 for 40-ft containers and 16.3 for 20-ft containers.

Building activity in Victoria is forecast to grow at 3.8% in FY18 and 2.5% in FY19.

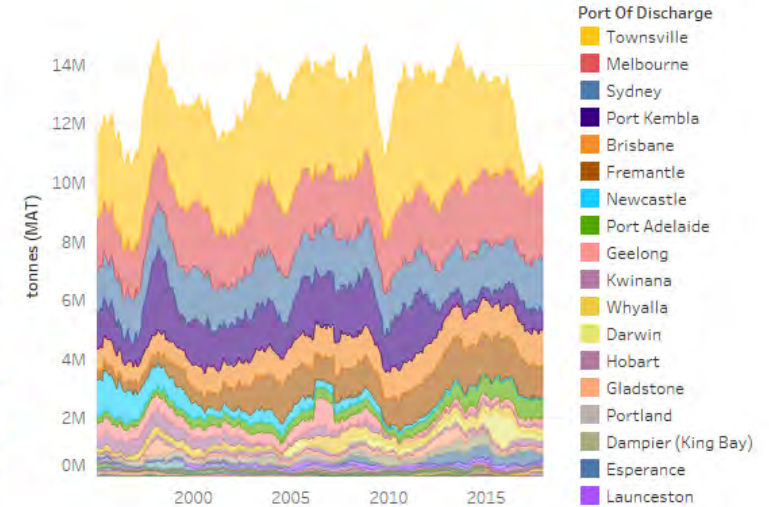
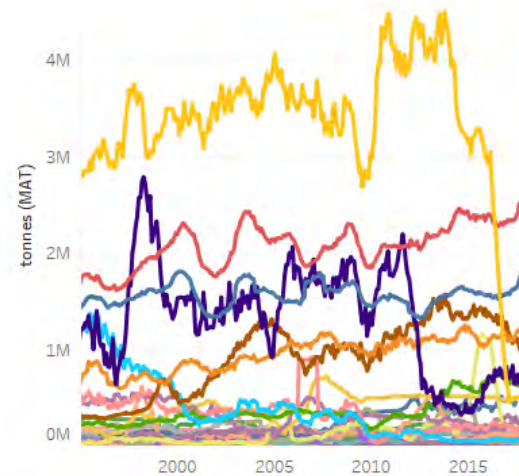
Containerised tonnes per \$ million of Victoria Building Construction (chain volume measures)



Other Intermediate Goods

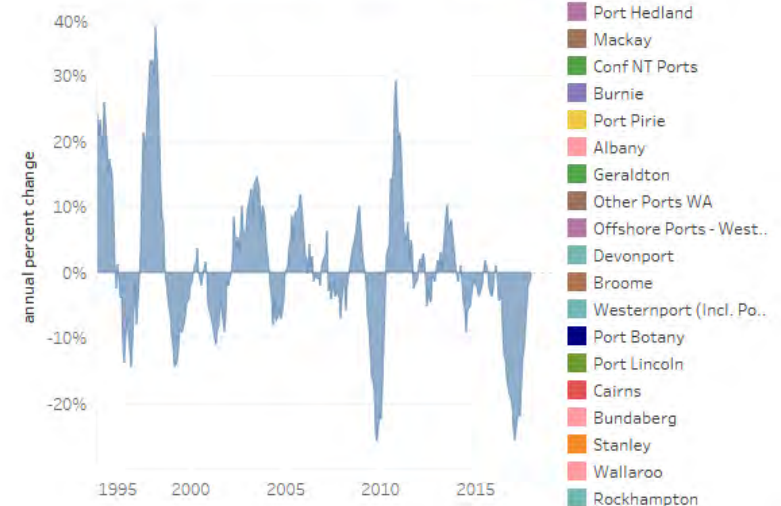
The fall of Queensland Nickel

- Until the closure of Queensland Nickel in 2016, the Port of Townsville was the largest import facility of other intermediate goods in the country.
- Gladstone's imports are predominately caustic soda, for use at Boyne Smelters, which also relies upon Bauxite delivered via coastal shipping.
- Port Kembla's steel mill shut down one of its two operating blast furnaces in 2011, and with it was a sudden contraction in the need for raw materials from overseas.
- The furnace was shutdown in response to weakness in key export markets, but more importantly because the high Australian dollar (which has averaged US\$0.97 over the past three years) had rendered exports unprofitable. Export dispatches from Bluescope's Australian operations had accounted for around 37% (on average) of raw steel production over the decade to 2011/12.



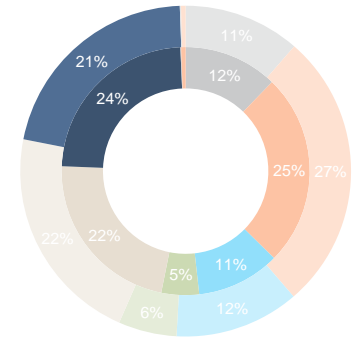
% change (year-on-year, quarter-on-quarter)

Port Of Disc..	2017 Q1	2017 Q2	2017 Q3	2017 Q4
Grand Total	5.2%	1.7%	1.7%	4.6%
Brisbane	44.8%	19.9%	12.4%	9.7%
Darwin	-5.2%	-6.1%	-11.7%	-7.8%
Fremantle	1.1%	2.7%	-0.2%	2.9%
Sydney	-1.2%	-5.2%	-4.1%	5.8%
Geelong	-19.8%	-12.0%	0.7%	15.2%
Kurnell	4.4%	9.7%	18.9%	5.1%
Melbourne	8.2%	17.7%	5.0%	7.1%
	8.9%	29.1%	-16.6%	14.0%



Full Imports Other Intermediate Goods

Making up 21% all TEU (and 24% of containers) imports, the primary driver is *Victorian State Final Demand*.



CY17 Imports (PoM classifications) TEUs



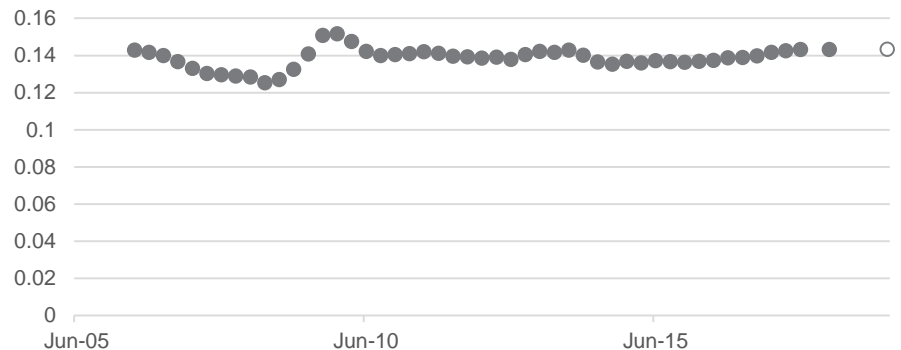
Strong and Stable Relationships

The volume of containerised other intermediate goods continues to be directly related to State Final Demand in Victoria, which is forecast to be 4.3% in FY18 and 2.3% in FY19.

For goods that are containerised, BISOE is projecting a shift away from 20s into 40s (1.2% p.a.), as a result TEU growth is projected to outpace container growth by 0.4% p.a.

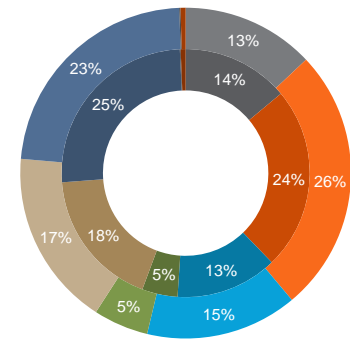
Tonnes/TEU are projected to remain unchanged for both 20s (at 16.3) and 40s (at 7.9).

Containerised tonnes per \$ million of VIC State Final Demand (chain volume measures)

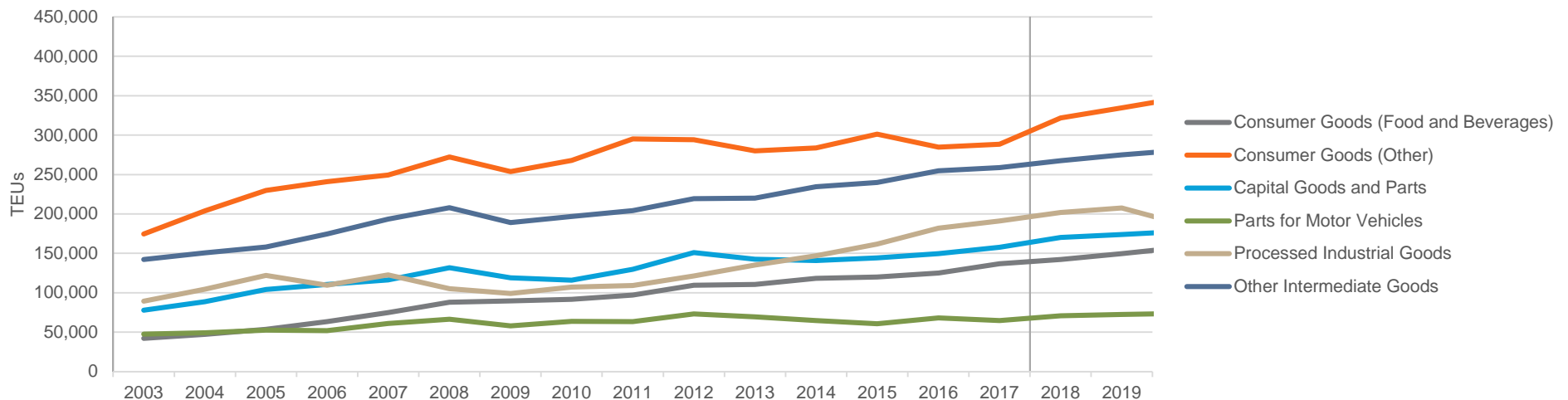


Full Imports (excl. Bass Strait) Outlook to FY19

BIS Oxford Economics is forecasting gradual declines in growth rates in most import categories, reflecting a combination of slowing population and import multipliers.



Forecast Imported Container Volumes by BoPBEC



Annual % Change	2014-15	2015-16	2016-17	2017-18	2018-19
Consumption (Food & Beverages)	1.5%	4.2%	9.4%	4.1%	5.2%
Consumption (Non-Food)	6.1%	-5.4%	1.2%	11.6%	3.9%
Capital Goods (& Parts)	2.4%	3.7%	5.4%	7.9%	2.3%
Parts for Transport Equipment	-6.2%	12.1%	-4.7%	9.4%	2.2%
Processed Industrial Supplies	10.0%	12.5%	5.0%	5.6%	2.9%
Other Intermediate Goods	2.3%	6.2%	1.6%	3.4%	2.7%
Total Imports	3.9%	3.5%	3.1%	7.0%	3.3%

Consumer goods growth over the past five years were weaker than normal with the exchange rate falling by over 25% (vs the USD). With no material changes forecast over the next five years, the return to normal will result in stronger growth by comparison.

Processed industrial supplies on the other hand are expected to have only moderate growth over the medium term, as the Melbourne construction boom slows.

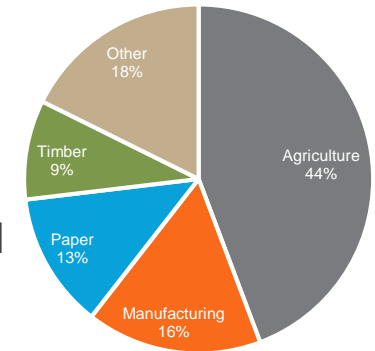


02

CONTAINERISED EXPORTS (EXCL. BASS STRAIT)

Full Exports (excl. Bass Strait) Classifications and Mapping

Similar to how we mapped containerised imports to a BoPBEC, we categorised each of the Port of Melbourne exports into a sets with common drivers.



Drivers

1. **Agriculture**
2. **Manufacturing**
3. **Other**
4. **Paper**
5. **Timber**

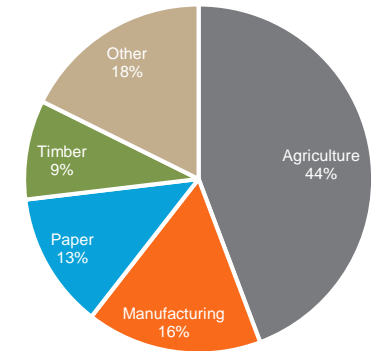
Within each of these subsets, we use the outlook for the industry in Victoria out to 2019, or if not available, the Australian equivalent. Where possible, we utilise projections undertaken by third parties, such as ABARES.

FY17 Full exports by Driver (TEUs)



Full Exports (excl. Bass Strait) Different Drivers

Full exports each have very different historical trajectories.



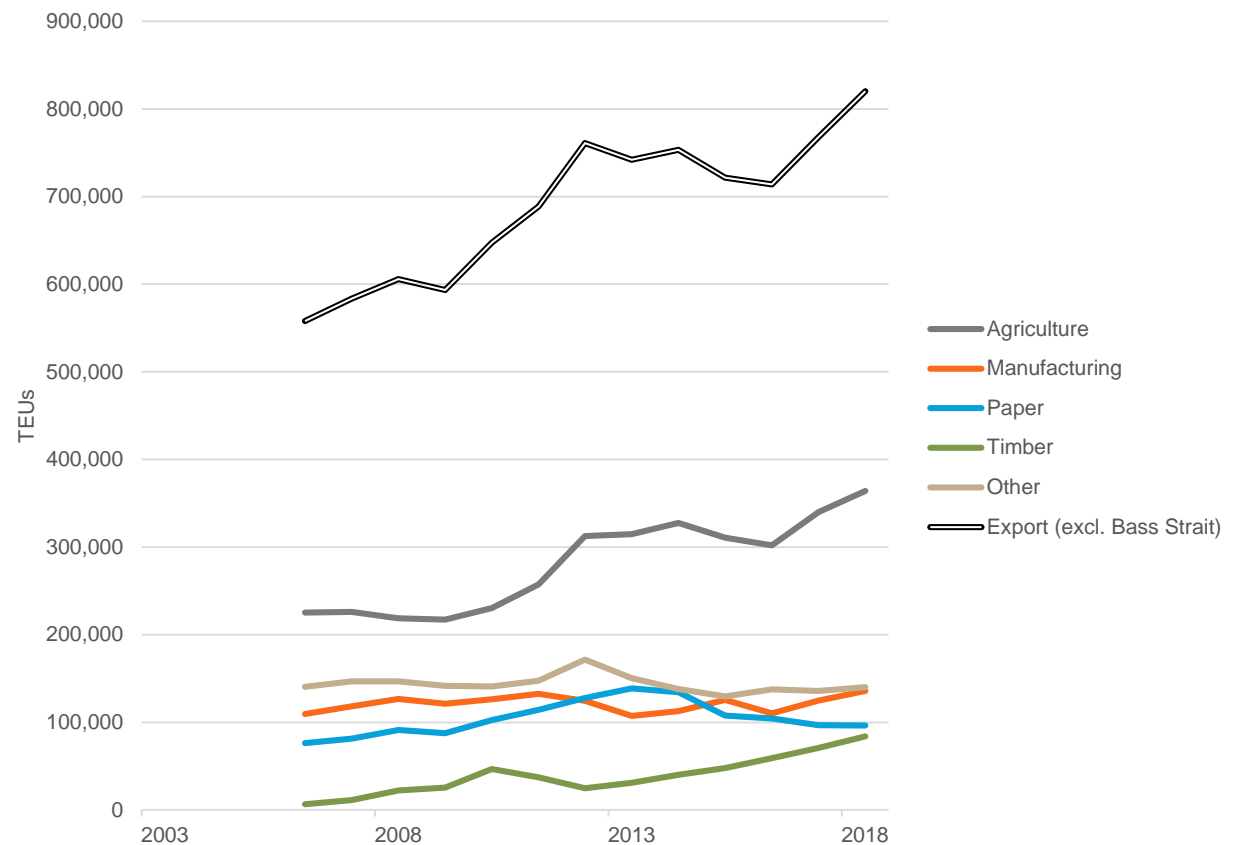
Broadly speaking, exports have been characterised by:

1. Slow growth in non-cereal rural exports
2. Strength in non-commodity manufacturing
3. Volatility in cereal exports (and an uplift in the late 2000s coinciding with increased containerisation).
4. Weakness in Other Manufacturing during the period of the high dollar.

Note that the volatility of cereals tends to drive year-to-year volatility in the aggregate export volumes. While this is expected to continue over the forward outlook, BISOE has assumed cereal exports will reflect and average wheat yield.

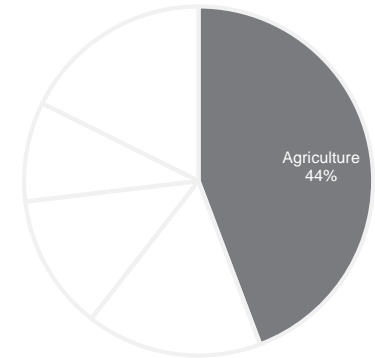
Note that there is no disconnect between the narrative that there is a decline in Australian manufacturing and strength in manufactured exports, as the declines experienced have been overrepresented in the import-competing sectors of the economy, while areas in which Australia retains a competitive advantage have tended to remain unscathed.

Historic International Full Exported Container Volumes by Driver



Full Exports (excl. Bass Strait) Agriculture Exports

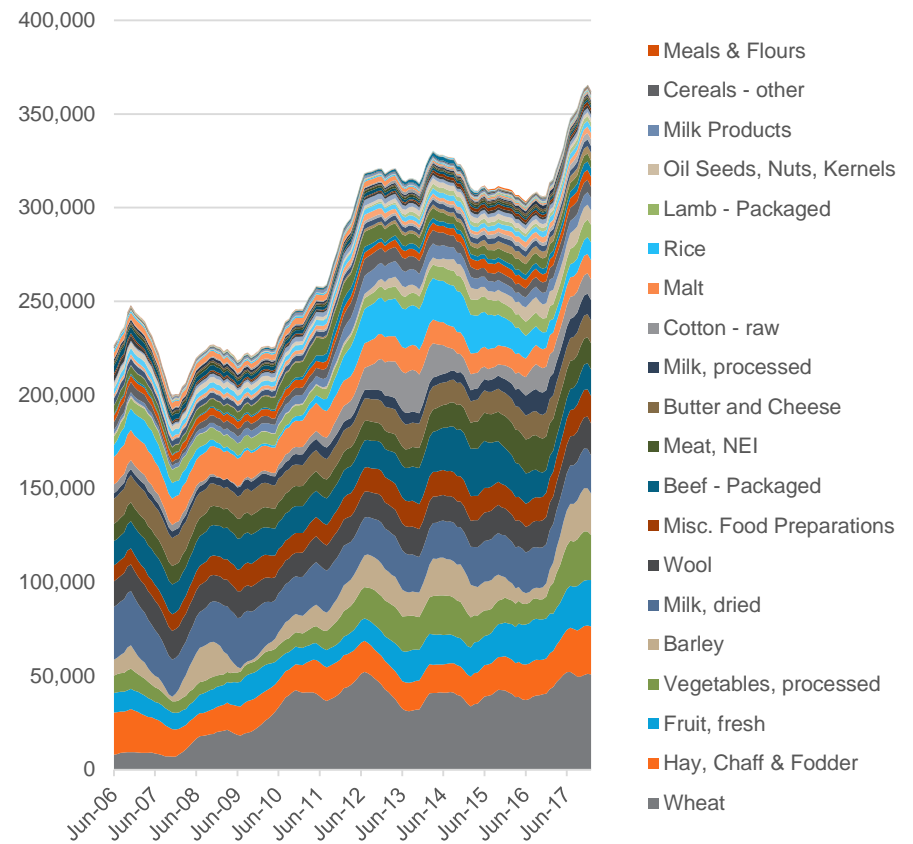
Recent strength is from Barley, Wheat, Hay and Processed Vegetables



CY17 Rural Exports (Port of Melbourne classifications) TEUs



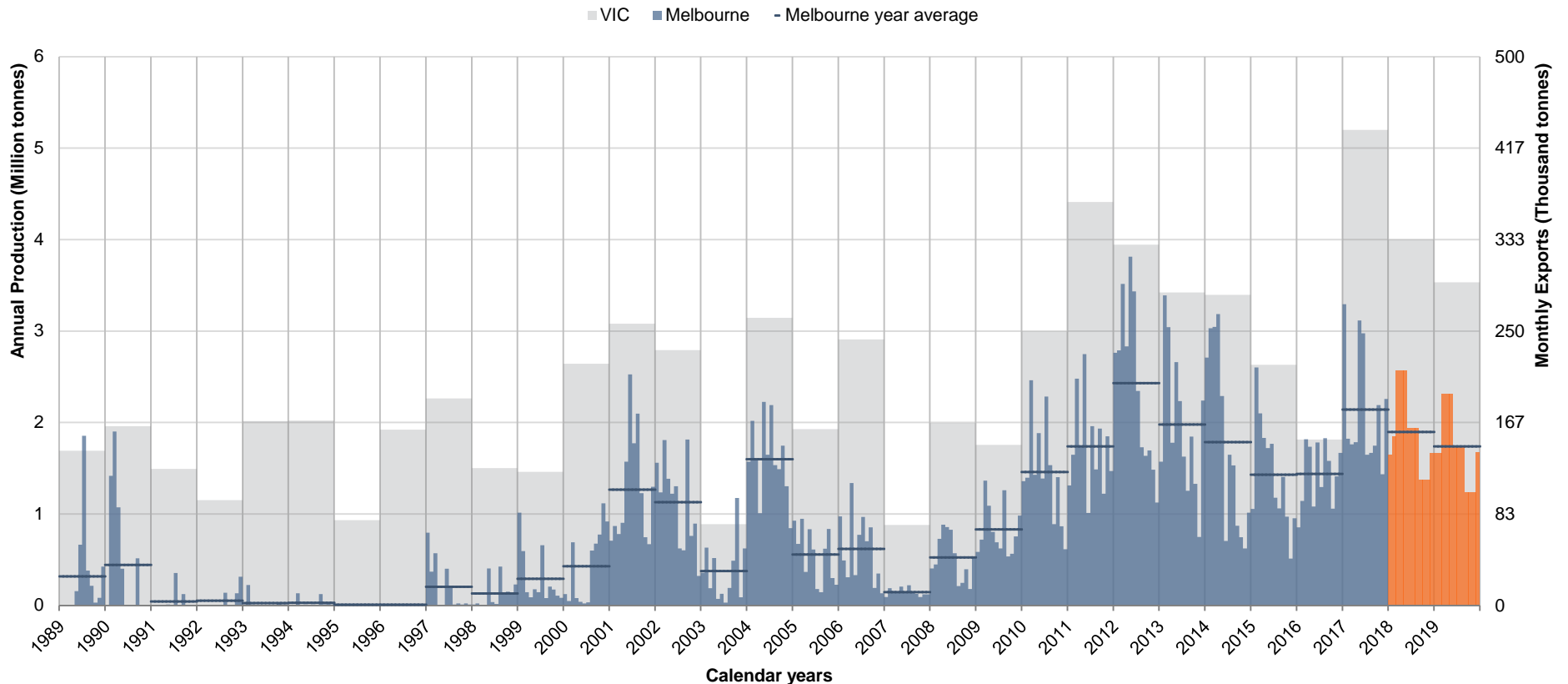
Historical volumes



Full Exports (excl. Bass Strait) Cereal Exports (wheat)

Since the movement towards containerisation of cereals in 2007, Port of Melbourne export volumes have roughly tracked VIC production of cereals (and wheat in particular), with domestic consumption of cereals generally stable over time.

VIC Wheat Production and Port of Melbourne Wheat Exports (historical and forecast)

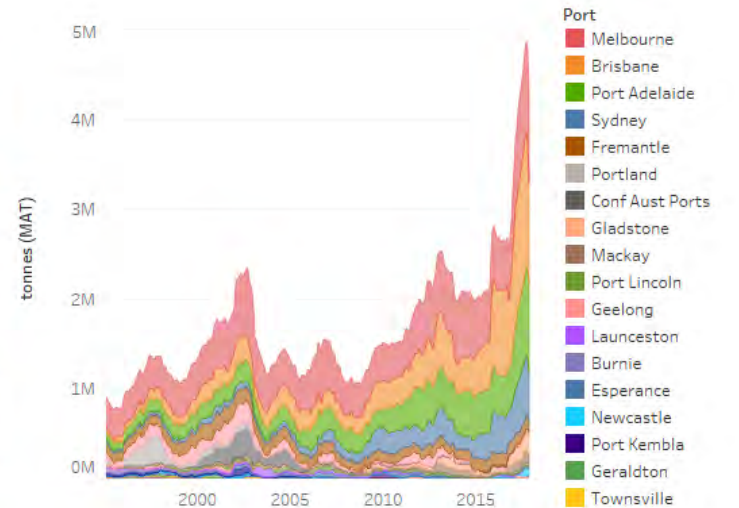
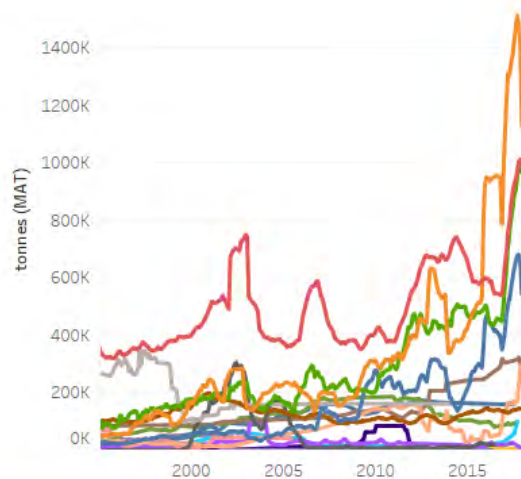


Australian Overview

Exported Fruit and Vegetables

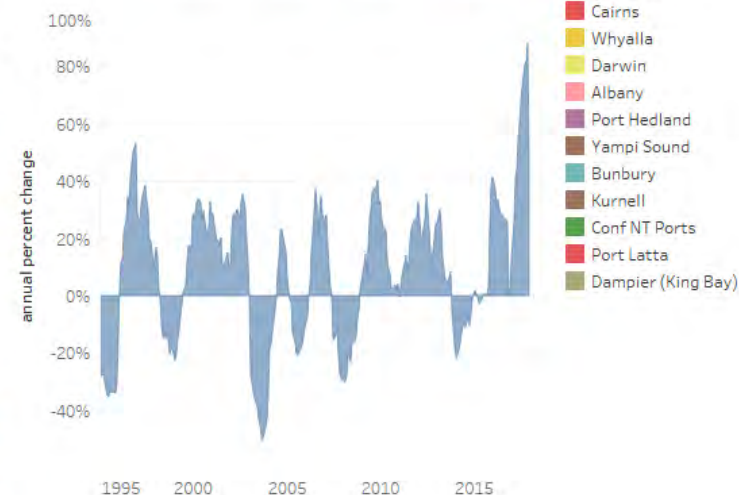
Strength in all markets

- Under trade agreements with China, Japan and the Republic of Korea, import tariffs on several horticultural products have been reduced—increasing the competitiveness of Australian horticultural exports. In the 12 months after the China–Australia Free Trade Agreement entered into force in December 2015, horticultural exports to China rose by 68 per cent compared with the previous 12 months. In the two years since the Korea–Australia Free Trade Agreement entered into force in December 2014, horticultural exports to Korea doubled. Australia’s export competitiveness in these key markets is expected to improve in the medium term because of scheduled further reductions in or eliminations of import tariffs under the FTAs, new and improved technical market access and the assumed lower Australian dollar.
- The agreements revised fumigation and cold-treatment protocols for table grapes and recognised Australia’s pest-free regions for citrus and cherries. Industries that benefit from improved market access are expected to grow at a faster rate than those that are more reliant on the domestic market.



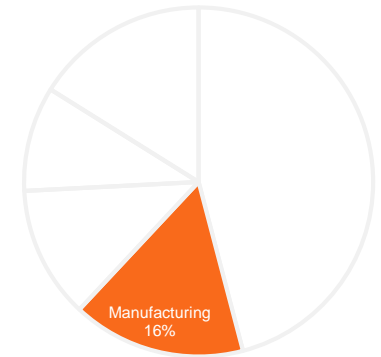
% change (year-on-year, quarter-on-quarter)

	2017 Q1	2017 Q2	2017 Q3	2017 Q4
Grand Total	40.2% 174.4%	59.2% 81.0%	80.1% 120.8%	49.0% -36.1%
Melbourne	29.7% 129.2%	64.7% 99.3%	78.9% 44.8%	70.5% 16.6%
Brisbane	40.3% 242.8%	44.5% 42.8%	59.0% 137.4%	16.2% -65.8%
Port Adelaide	60.8% 201.3%	91.5% 91.4%	110.7% 118.6%	91.4% 6.7%
Sydney	15.2% 165.4%	44.6% 187.2%	67.2% 182.7%	44.3% -64.4%
Fremantle	-8.0% -20.0%	1.7% 34.6%	0.8% 5.6%	5.4% 4.6%
Gladstone	-242.7% 1297.8%	153.1% -85.6%	217.7% 286.5%	50.1% 26.0%
Mackay	588.5%	588.5%	713.9%	3.6% -26.1%

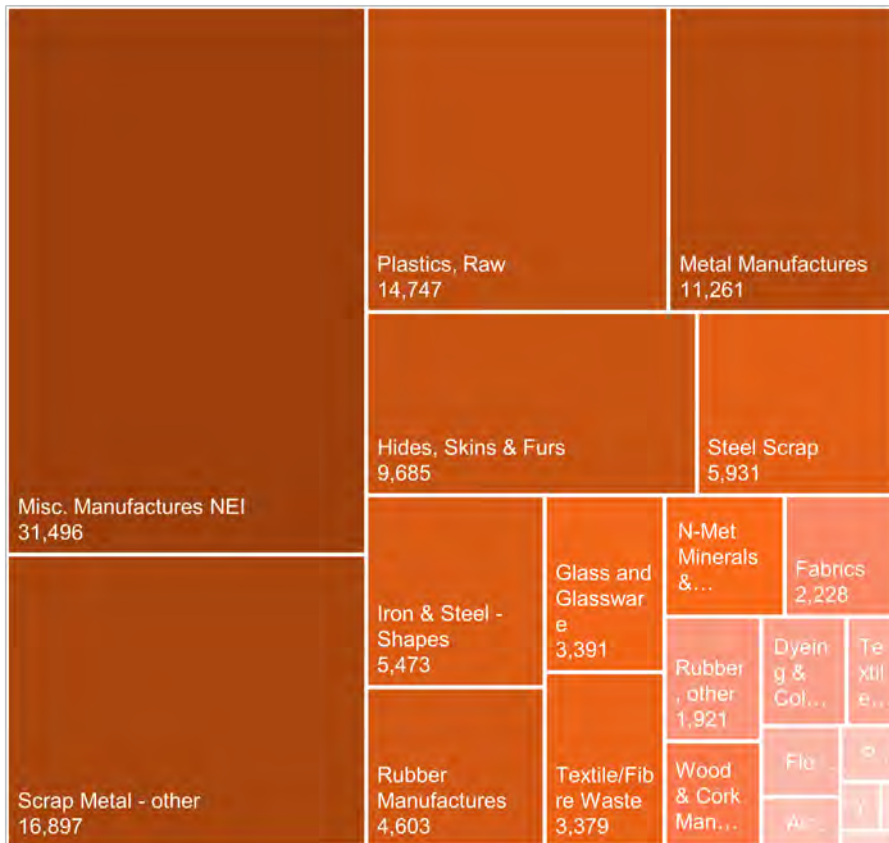


Full Exports (excl. Bass Strait) Manufacturing

Making up 16% all full container exports, “Manufacturing” tends to be internationally competitive and exchange rate sensitive.



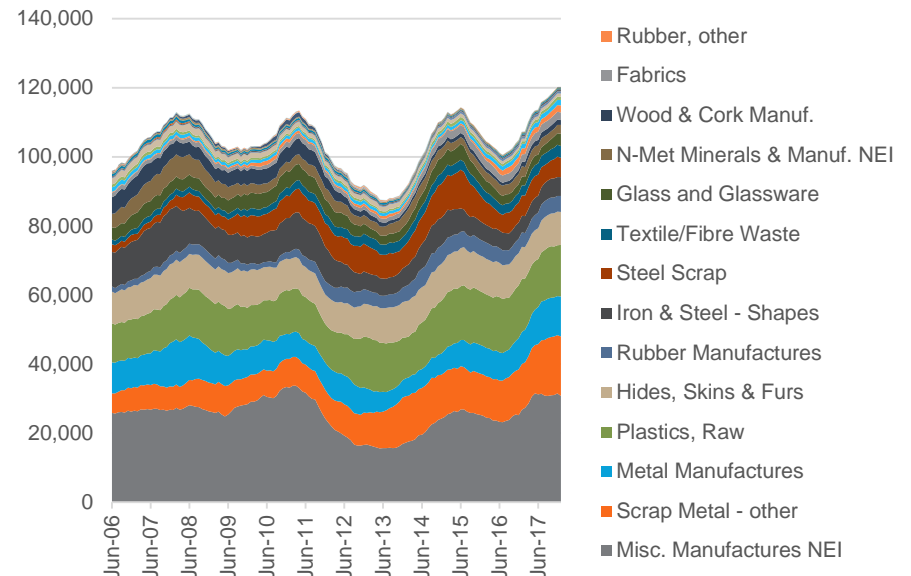
CY17 Manufacturing Exports (Port of Melbourne classifications) TEUs



Trading Partner Exposed

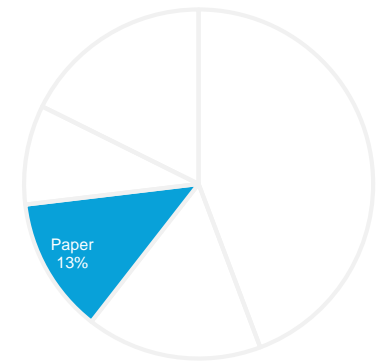
Broadly speaking, other manufacturing services the export market, and grows in line with trading partner economic activity (mostly developing countries for these goods, i.e. New Zealand and the United States). While the dollar was high through the mining boom, exports were less competitive, and Victorian exports were particularly impacted with a weaker local economy to sell into.

Historical TEU volumes Moving Annual Total

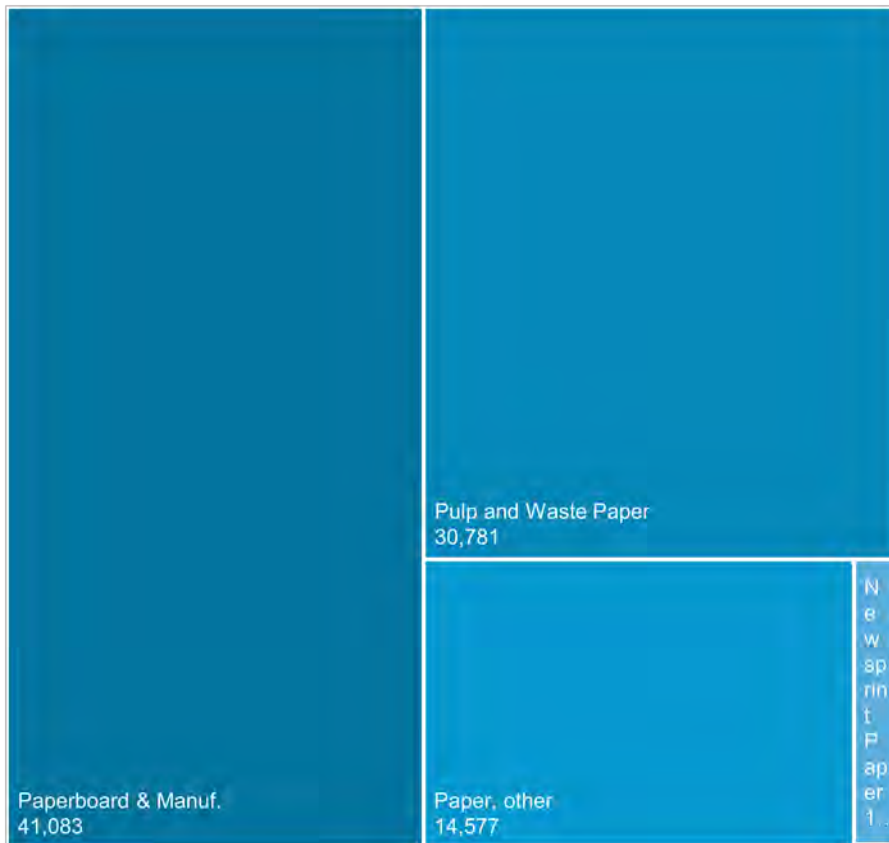


Full Exports (excl. Bass Strait) Paper

Making up 13% all full container exports, “Paper” is constrained by available softwood lumber, overseas demand, and competitive tensions between ports.



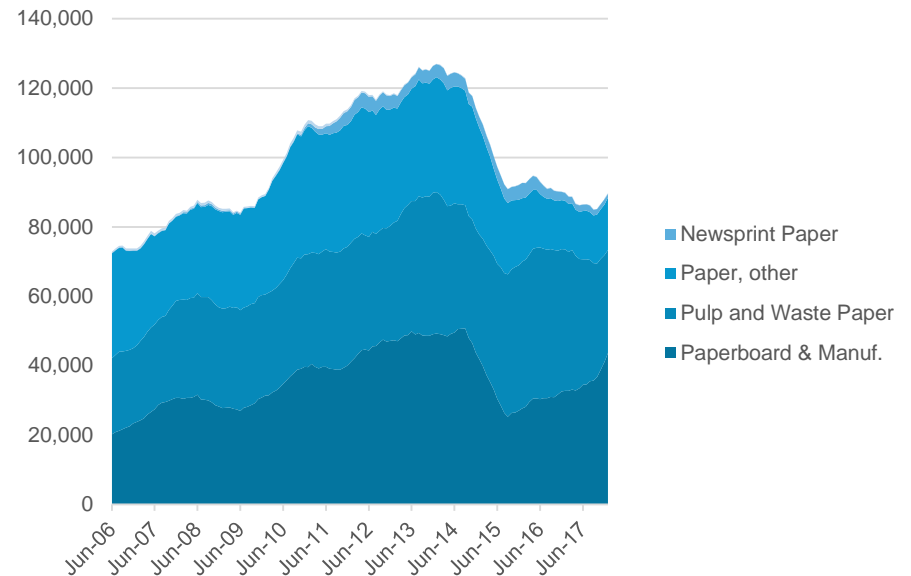
CY17 Paper Exports (Port of Melbourne classifications) TEUs



Competitive dynamics between ports matter

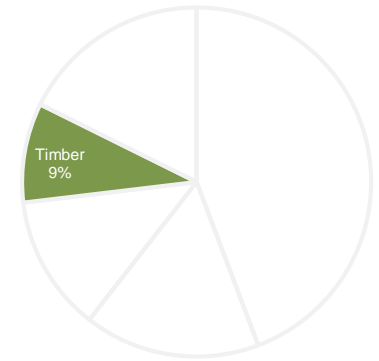
Volumes fell back in FY15 with the loss of VISY paper products to Port Botany.

Historical TEU volumes Moving Annual Total

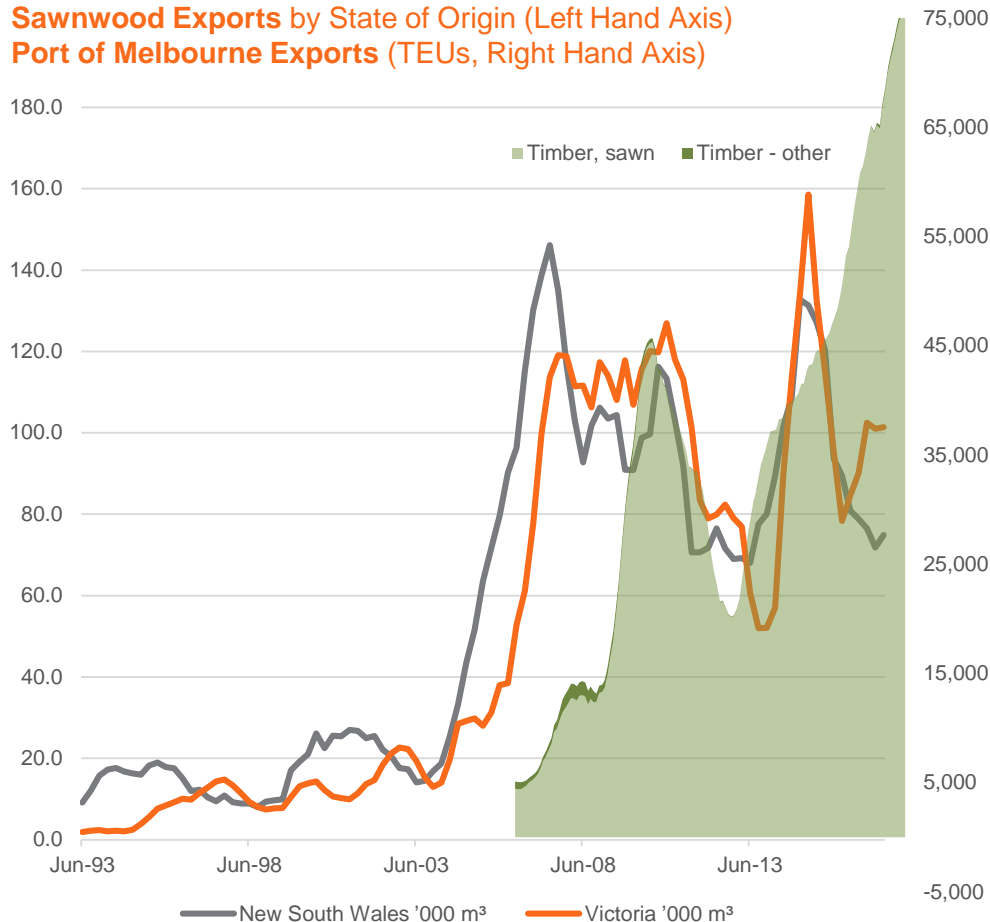


Full Exports (excl. Bass Strait) Timber

Making up 9% all full container exports, Timber is constrained by available plantation stock, overseas demand, and competitive tensions between ports.



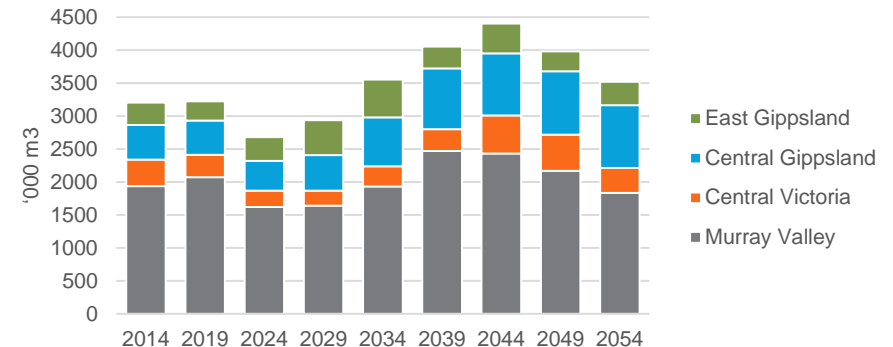
Sawwood Exports by State of Origin (Left Hand Axis)
Port of Melbourne Exports (TEUs, Right Hand Axis)



Trading Partner Exposed

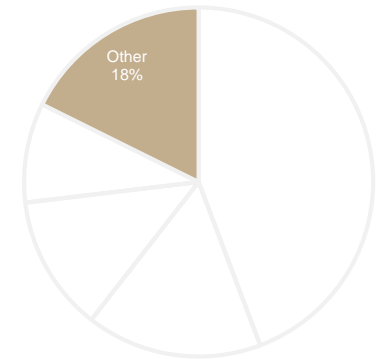
- Further gains beyond the current record harvest pace may be difficult, given capacity constraints in harvesting and transporting logs.
- The closure of mills across China due to increased environmental regulations is driving consolidation in the industry but have not affected Australian log exports to date, however if closures continue demand could be affected.
- Alternative sources of Chinese log imports could pose a challenge to New Zealand's market share, including Russia, Australia, and the US.

ABARES Production Forecasts by Catchment



Full Exports (excl. Bass Strait) Other

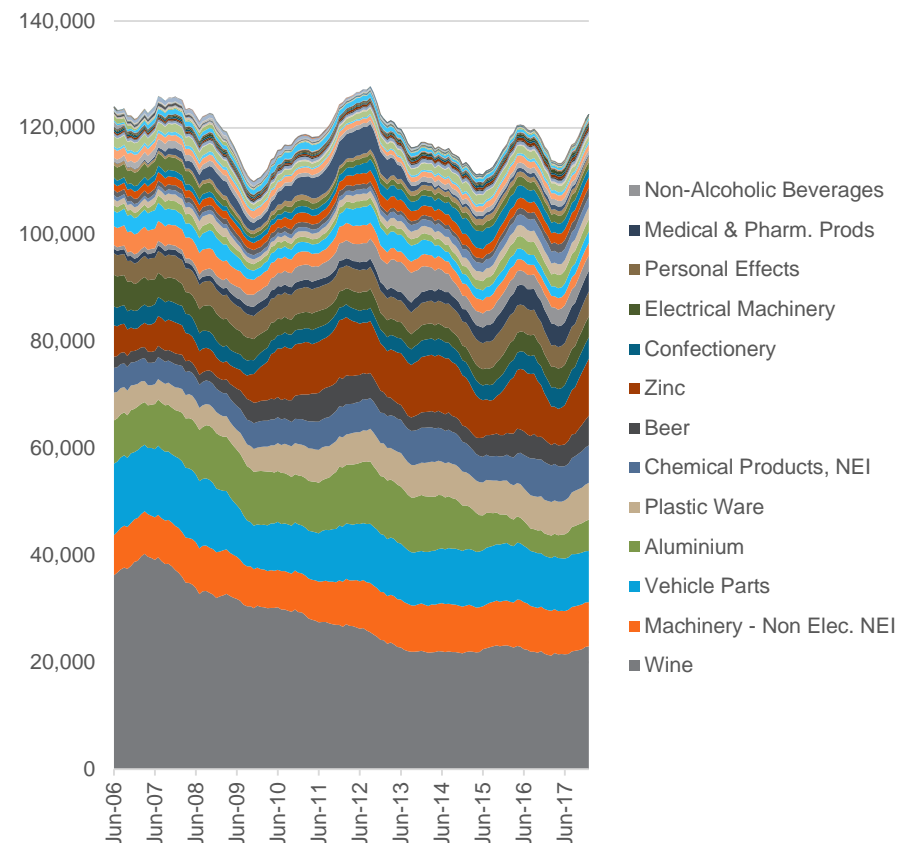
Making up 18% all full container exports, "Other" is a mixed bag, but has been growing since the fall in the AUD/USD.



CY17 Other Exports (Port of Melbourne classifications) TEUs

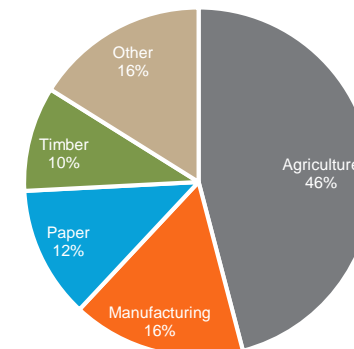


Historical TEU volumes Moving Annual Total



Full Exports (excl. Bass Strait)

Medium term outlook



Sectoral Outlook to 2023

As compared to the FY17 actuals, FY18 projections are forecast to have a notably stronger cotton exports, firstly because of a strong FY17 yield and harvest, and thereafter because of greater area sown projections (and average yields).

Agriculture are projected to ease back in FY19 to reflect an average yield, and then grow in line with yield improvements (for cotton and wheat) and ABARES projected export growth for Australian for dairy, meat, and other food (i.e. fruit and vegetables).

Annual %change	2014-15	2015-16	2016-17	2017-18	2018-19
Agriculture	-5.1%	-3.7%	13.6%	7.1%	-1.1%
Manufacturing	13.9%	-11.5%	12.3%	10.5%	3.3%
Paper	-21.8%	-4.5%	-7.0%	5.9%	-8.4%
Timber	15.2%	25.3%	22.8%	17.9%	3.7%
Other	-4.2%	8.3%	-5.3%	16.0%	2.8%
Total Exports (excl. Bass Strait)	-4.1%	-1.2%	7.9%	10.0%	-0.1%

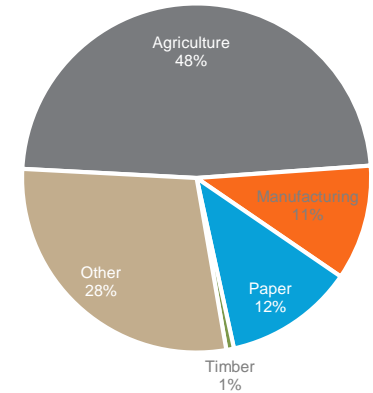


03

BASS STRAIT TRADE

Bass Strait Imports

We can examine containerised imports from Tasmania in the same fashion as containerised exports from Victoria.

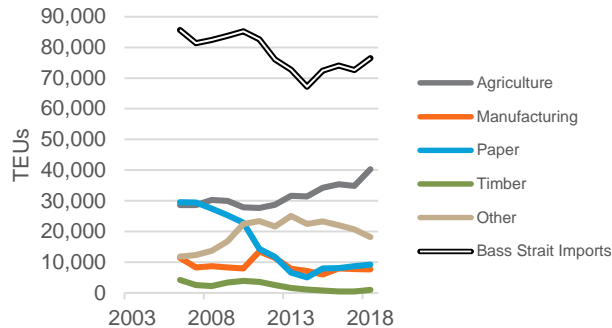


Drivers

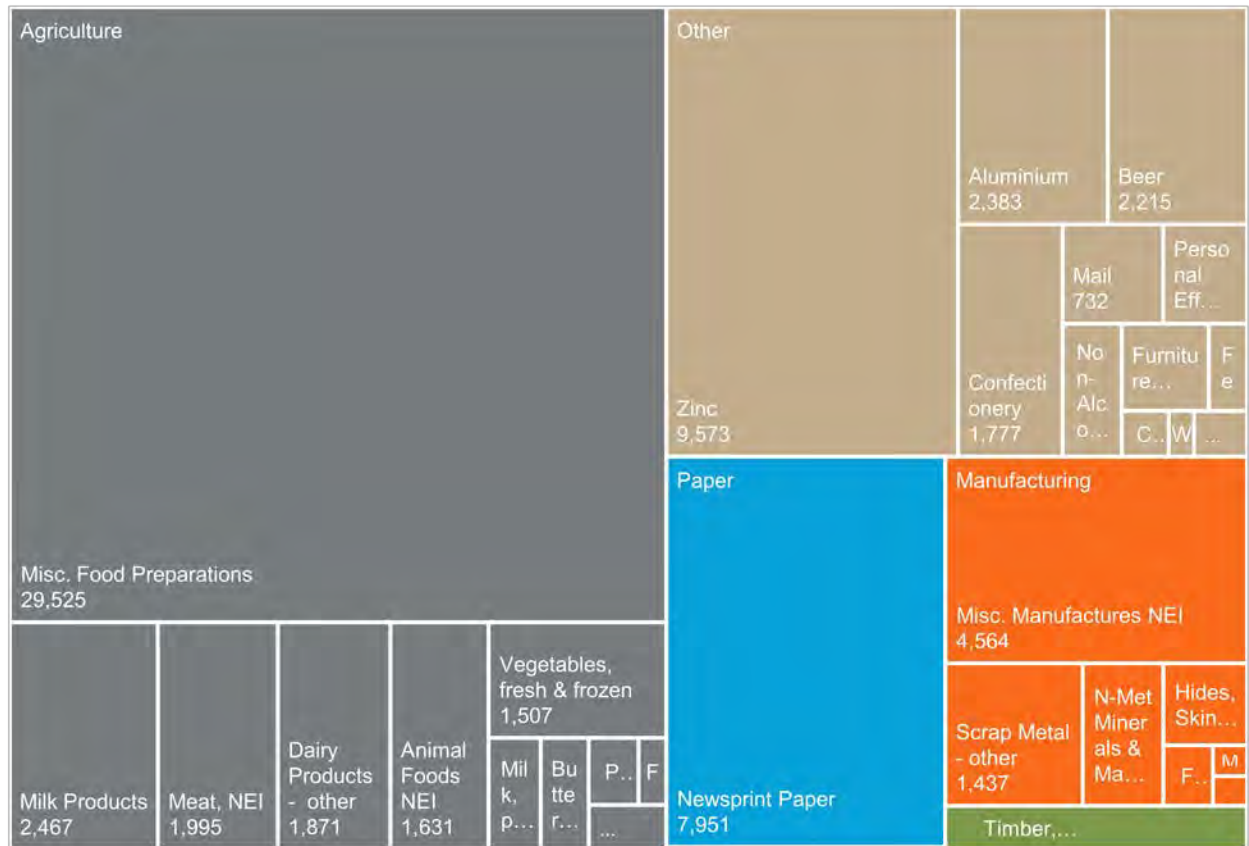
Using the conventions that we have from international trade into Australia (demand for imports driven by demand for goods, and exports driven by production levels), we flip it around to explain trade with Tasmania.

All containerised trade going through Tasmania travels through Melbourne, either directly from Victoria, or transhipped at the port itself.

Imports from Tasmania have eased back in recent years because of falling paper and newsprint production in the state. Over the past two decades, food (fresh fruit and vegetables or manufactured food preparations) has become the dominant export commodity.

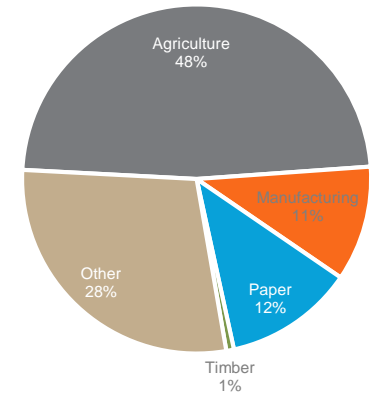


FY17 Full exports by Driver (TEUs)



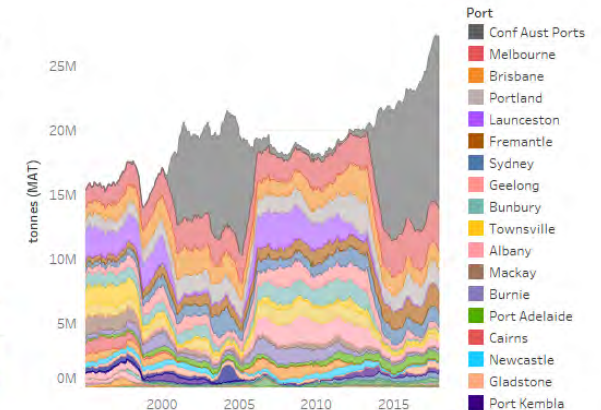
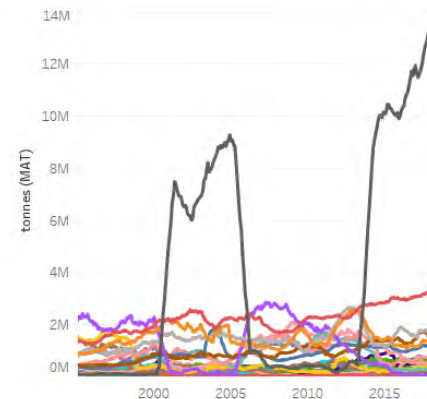
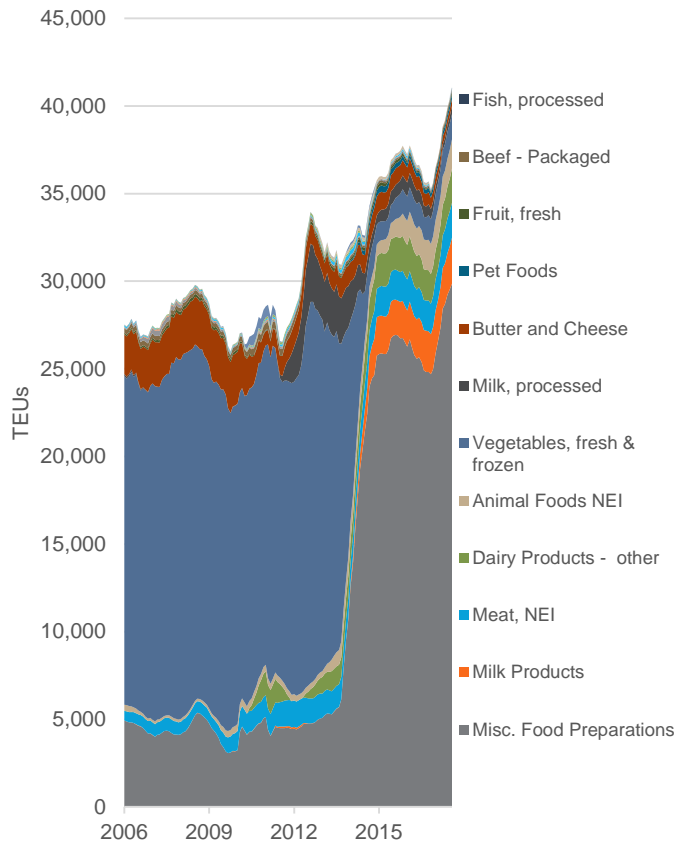
Bass Strait Imports Agriculture Goods

Imported Agriculture from Bass Strait strongly resembles the aggregate Rural Exports profile for Australia, which in turn is driven by international demand.



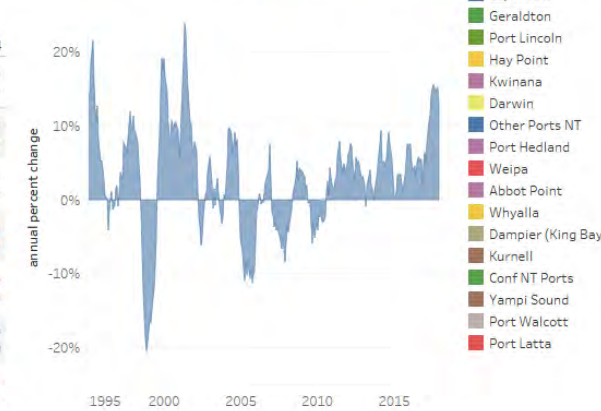
Bass Strait Imports - Agriculture

Australian Overview Exported Rural Goods



% change (year-on-year, quarter-on-quarter)

	2017 Q1	2017 Q2	2017 Q3	2017 Q4
Grand Total	7.5% 10.4%	14.2% 25.5%	15.0% 16.1%	13.0% 2.4%
Melbourne	4.4% 5.6%	6.9% 4.4%	5.2% 6.8%	6.5% 9.1%
Portland	-12.4% 7.5%	-1.0% 27.9%	12.6% 18.3%	1.5% -37.6%
Brisbane	0.3% 6.5%	23.2% 54.3%	11.4% 3.5%	23.3% 31.0%
Fremantle	21.1% 58.5%	33.0% 31.4%	29.8% -7.5%	11.3% -17.3%
Sydney	12.4% 16.6%	21.8% 31.8%	15.7% 3.8%	10.2% -5.4%
Albany	80.3% 120.6%	82.4% 51.9%	69.3% -51.4%	13.2% -51.4%



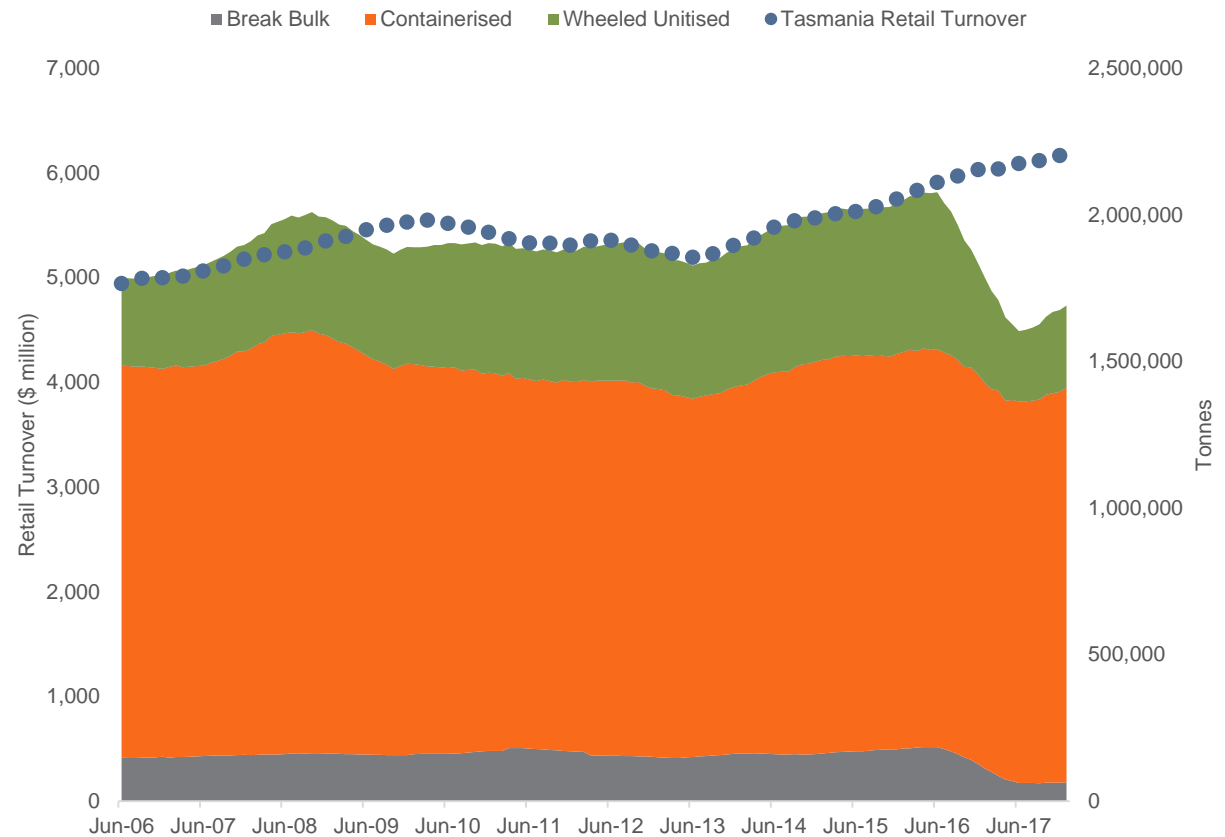
Bass Strait Exports

Retail turnover remains a solid driver of exports to Tasmania, with the drop off from FY16 explained by Station Pier volumes being removed from Port of Melbourne statistics.

Exports to Tasmania (all Modes)

Tonnes/TEU from Tasmania are holding at 11.3.

Over the forecast horizon, the split between Wheeled Unitised, Break Bulk, and Containerised is unchanged from CY17.



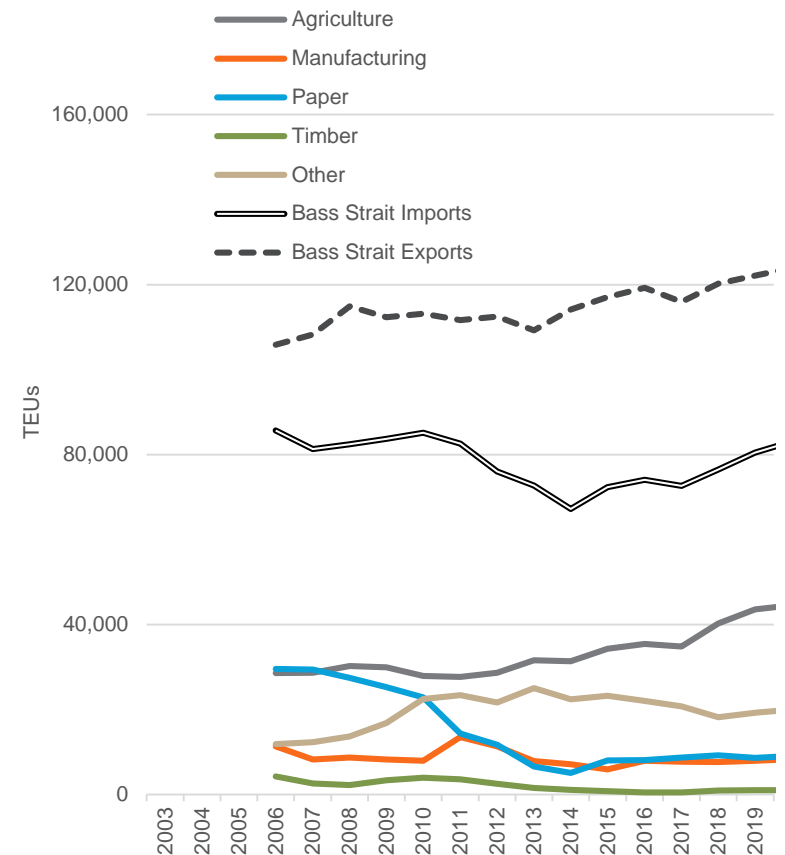
Bass Strait

Bass Strait Exports are constrained by the growth in Retail Turnover, which is a function of employment growth, productivity, and retail turnover's share of wages.

Annual movements

Annual % change	2014-15	2015-16	2016-17	2017-18	2018-19
Agriculture	9.3%	3.3%	-1.5%	15.5%	8.1%
Manufacturing	-16.7%	33.2%	-2.4%	-0.8%	3.5%
Paper	57.7%	1.3%	7.2%	6.0%	-6.1%
Timber	-28.7%	-39.9%	3.8%	93.1%	3.7%
Other	3.7%	-5.2%	-5.9%	-12.0%	5.7%
Bass Strait Imports	7.7%	2.3%	-1.9%	5.3%	5.3%
Bass Strait Exports	2.6%	1.8%	-2.7%	3.7%	1.5%
Bass Strait (Full)	4.5%	2.0%	-1.6%	3.4%	3.0%

TEU forecasts of Bass Strait Trade





04

EMPTYES AND TRANSHIPMENTS

Empties

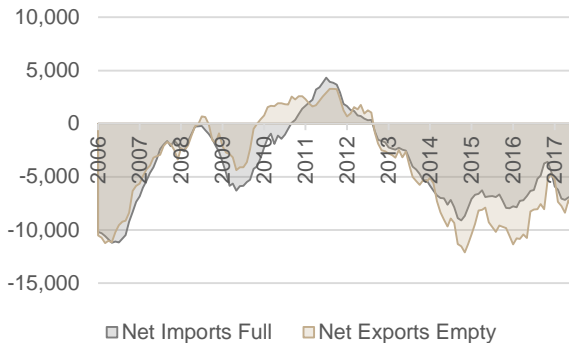
The dominant container types are 20' and 40' containers, both in dry and refrigerated (reefer). For each container type, trade flows tend to balance out between imports and exports.

Reefers

With significant agricultural exports, the Port of Melbourne exports more full reefers than it imports (in most years).

There is a slight differential between net full and net empty trade volumes (more containers are exported than are imported), but this can be explained by reefers being sourced from other import terminals (namely Botany) before being loaded for export through Melbourne.

40' Reefer Net trade flows

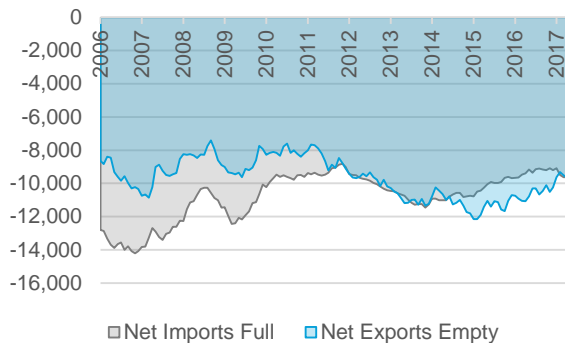


Dry Containers

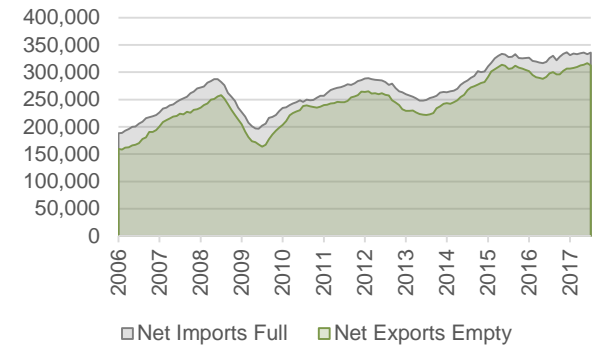
The major container ports in Australia import more full containers than they export. This is particularly the case for 40ft containers, which are ideal for the consumer and light-weight intermediate goods imported from overseas, but sub-optimal for the heavier (denser) items that Australia tends to exports (preferring instead 20ft containers, which are being generally phased out along most trade routes).

Over the forecast period, BISOE maintains the difference between full and empty containers as observed in 2017 and maintains this over the forward outlook, running it off of the modelled full exports and imports.

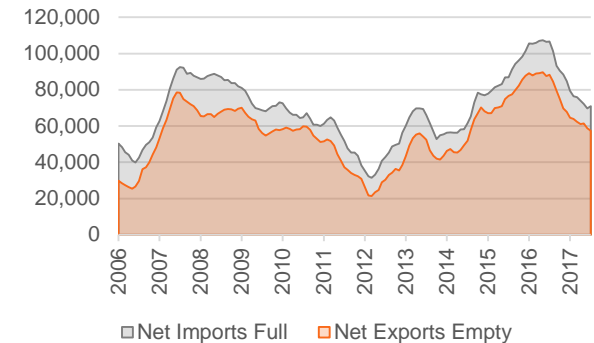
20' Reefer Net trade flows



40' Dry Net trade flows



20' Dry Net trade flows



Transhipments

Bass Strait

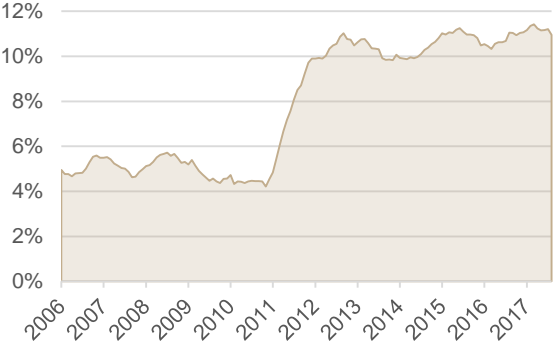
Currently, tranship exports to Tasmania make up about 11% of full exports. This is expected to continue throughout the forecast period.

Currently, tranship imports from Tasmania make up about a third of full imports. This is expected to continue throughout the forecast period

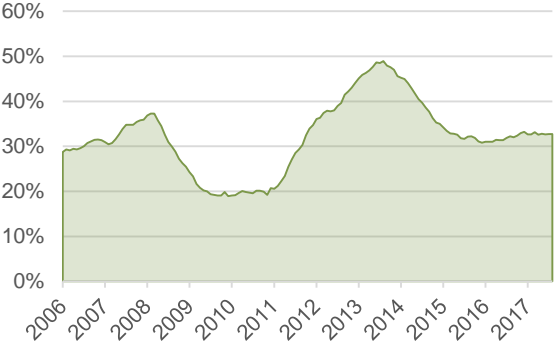
Excluding Bass Strait

Tranship imports make up less than 4% of full mainland and overseas imports. This is expected to continue over the forecast period.

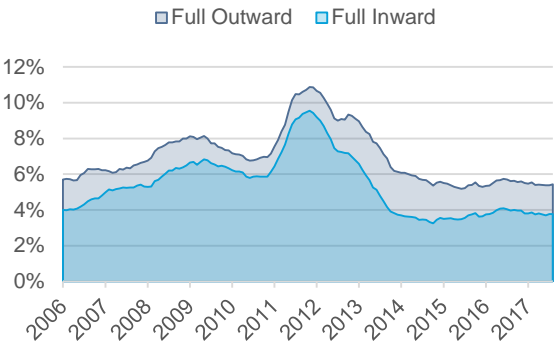
Outbound Transhipment
Bass Strait, Share of Full Bass Strait Exports



Inbound Transhipment
Excl. Bass Strait, Share Full Imports



Excl. Bass Strait
Share Full Imports





05

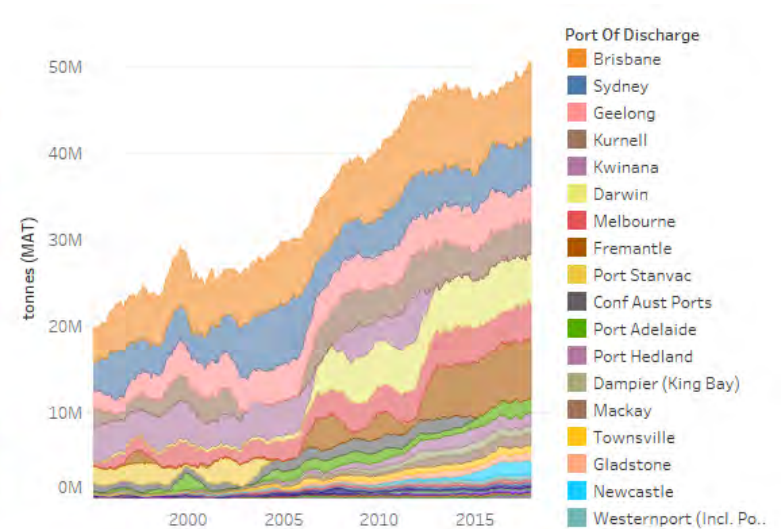
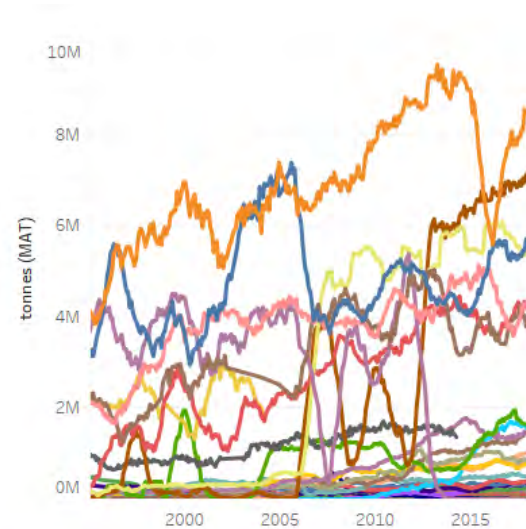
BULK LIQUID

Australian Overview

Imported Petroleum Products

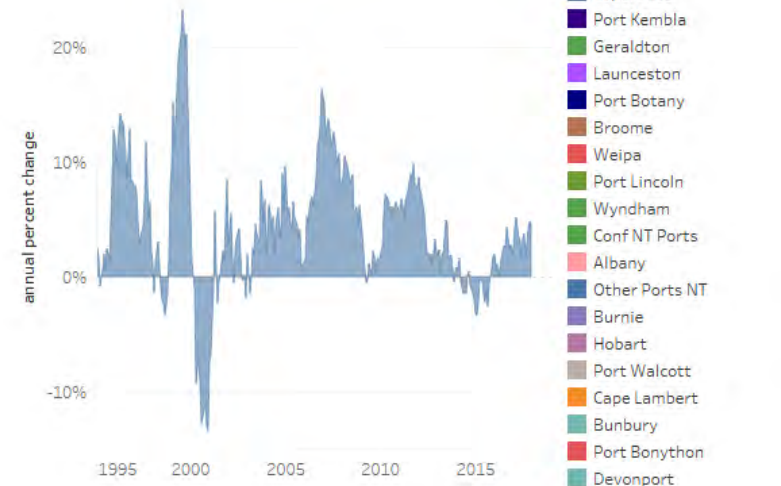
Brisbane is Australia's largest international importer, again.

- Over the past decade, half of Australia's eight remaining refineries closed (Port Stanvac in 2009, Clyde in 2012, Kurnell in 2014, Bulwer in 2015). The age and size of Australian refineries generally put these (and the remaining refineries) as a cost disadvantage vis-a-vis competing facilities in South East Asia.
- The net impact on import volumes has mostly been a straight substitution of crude oil for refined petroleum imports, but it has changed at an individual port level.
- Brisbane, for example, exported refined product when both of its refineries (Bulwar Island and Llytton) were operating. This has since ceased.
- Only a third of the dramatic fall in international import volumes in 2015 can be explained by the Bulwar Island refinery closure, the rest can be attributed to remaining Lytton refinery sourcing nearly a quarter of its crude requirements from Port Bonython in South Australia over the calendar year, which subsequently ceased in 2016.
- Similar jumps and falls at other ports can be generally explained by coastal shipping movements, both of crude oil and refined petroleum.



% change (year-on-year, quarter-on-quarter)

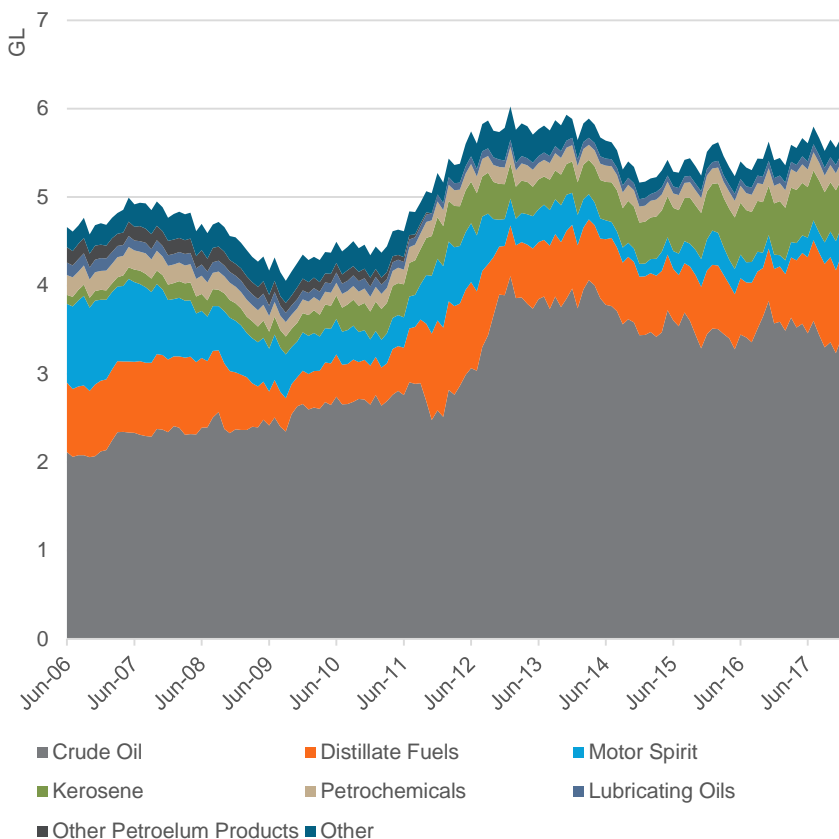
Port Of Disc..	2017 Q1	2017 Q2	2017 Q3	2017 Q4
Grand Total	5.2%	1.7%	1.7%	4.6%
Brisbane	44.8%	19.9%	12.4%	9.7%
Darwin	-5.2%	-6.1%	-11.7%	-7.8%
Fremantle	1.1%	2.7%	-0.2%	2.9%
Sydney	-1.2%	-5.2%	-4.1%	5.8%
Geelong	-19.8%	-12.0%	0.7%	15.2%
Kurnell	4.4%	9.7%	18.9%	5.1%
Melbourne	8.2%	17.7%	5.0%	7.1%



Bulk Liquids Overview

Petroleum Products Relating to Motor Vehicles Form the Majority of Bulk Liquid Imports into the Port of Melbourne

Port of Melbourne Bulk Liquid Imports



Forecasting approach

Petroleum products into Victoria are for one of four sectors of the economy:

1. Passenger Cars (LPG and Automotive Petrol)
2. Commercial Freight (Diesel)
3. Jet Fuel
4. Non-transport

These sectors each have markedly different drivers.

Passenger Cars demand has been weakening since the mid-2000s, primarily due to engine efficiency standards put in place in the US and Europe. This is expected to continue for at least another decade for new cars and another 30 years as the fleet composition changes.

Diesel demand has been climbing to reflect the requirements to move goods. There is also some growth from a shift towards diesel in the passenger car market.

Jet Fuel has had a strong run for the past decade, in large part because of increased overseas flight distances (which increases the fuel uplift for outbound flights). This too will continue for at least another decade to reflect the new aircraft fleet and desired stoppage route into China and the Middle East.

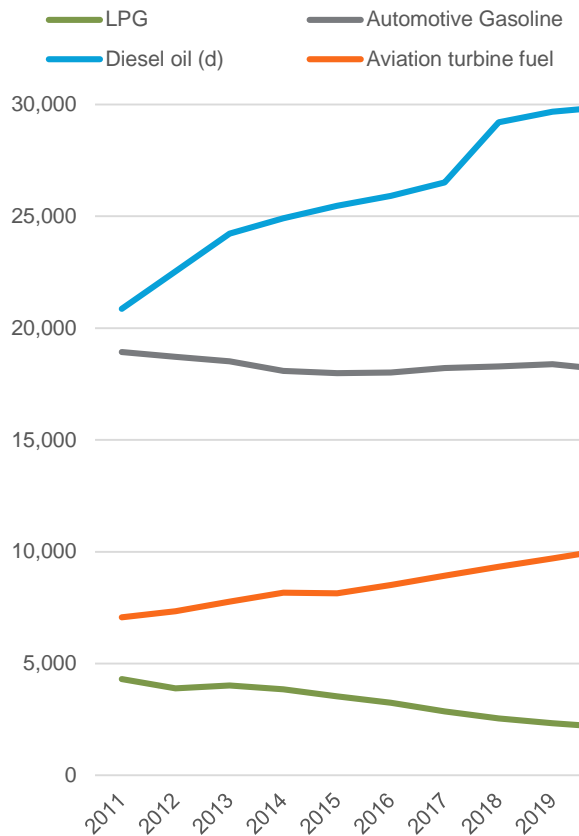
Non-transport demand tends to reflect broad economic activity.

Bulk Liquids

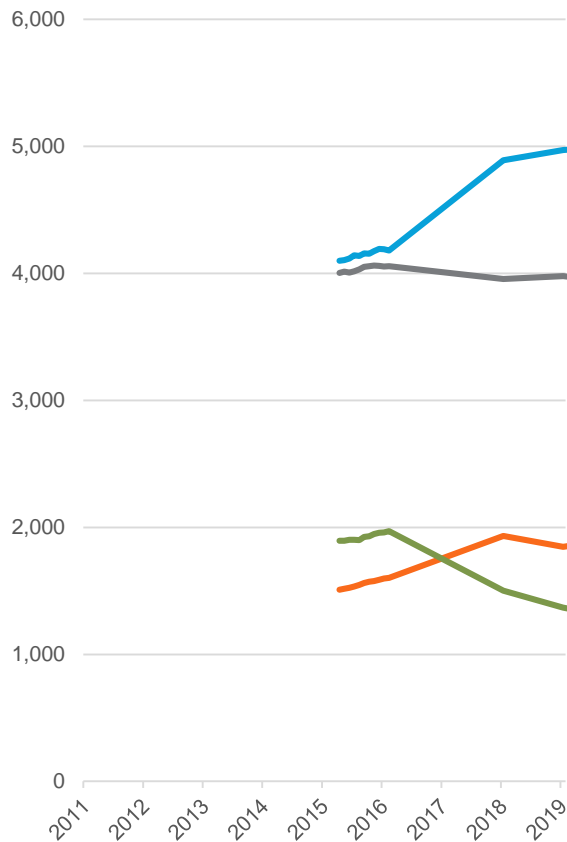
Recent History

Much of the Recent Growth in Imports has Resulted from an Improvement in the Competitive Landscape, Not Underlying Growth in Consumption

AUS Sales of Refined Petroleum MATs, ML



VIC Sales of Refined Petroleum MATs, ML



Based on Estimates from the Department of the Environment and Energy, Australian sales of petroleum fuels have remained relatively flat over the past 5 years.

Increases in **jet fuel** consumption (driven by rising tourism) and **diesel** (due a rise in the use of diesel vehicles and, more significantly, the mining boom) have been balanced out to some degree by falling demand for **petrol** (due to rising efficiency) and **LPG**.

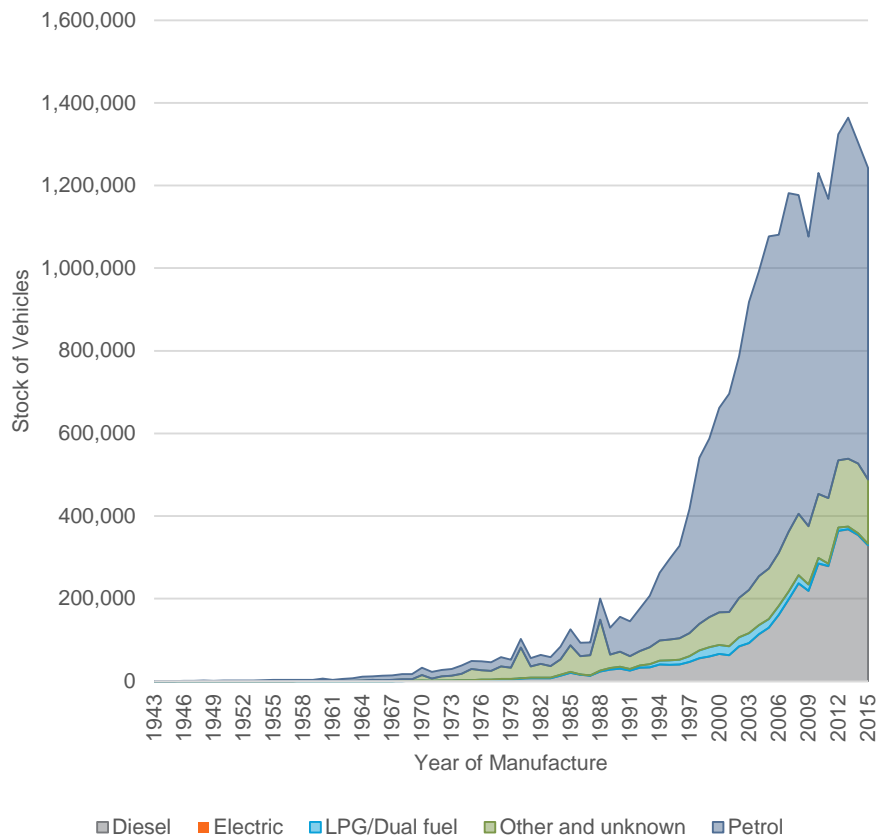
Imports of these refined petroleum products however have grown significantly, approximately doubling since 2009/10.

Bulk Liquids

Drivers: Motor Vehicle Fuels

Rising Fuel Efficiency is Resulting in Falling Petrol Consumption.

Stock of Motor Vehicles by Age by Fuel Type
Total Australia



Growth drivers

While BIS Oxford Economics is forecasting growth in the number of vehicle kilometres travelled in Victoria, we expect motor vehicle fuel consumption to trend down over the longer term. This is primarily due to rising fuel efficiency.

More stringent rules on emissions in Europe and elsewhere will mean motor vehicles sold in Australia (a much smaller market) will feature similar efficiency improvements.

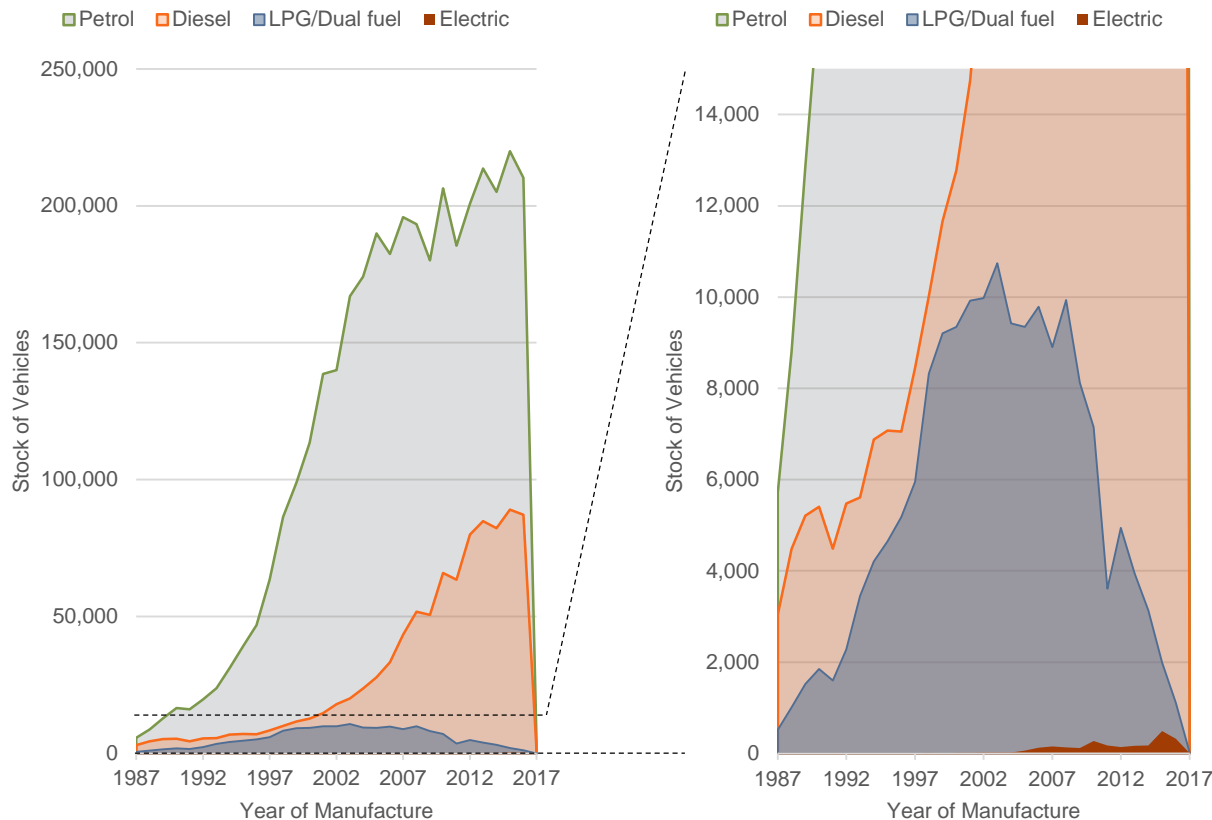
Petroleum consumption (a fuel used almost exclusively for motor vehicles) is already declining in consumption despite continued increases in motor vehicle use.

Bulk Liquids

Drivers: Motor Vehicle Fuels

We Forecast Some Switching Away from Higher Emission and LPG Technologies.

Stock of Diesel, Petrol Vehicles by Year of Manufacture
Total VIC, 2017 ABS Survey *Focus on LPG and Electric*



Non-Petrol motor vehicles are primarily made up of LPG and Diesel vehicles.

We expect **LPG** vehicle sales will fall to near zero in coming years. The vast majority of LPG vehicles in Australia are between 8 and 20 years old. Estimates of the life of motor vehicles suggests the LPG vehicles currently in stock will approach retirement in the next two decades.

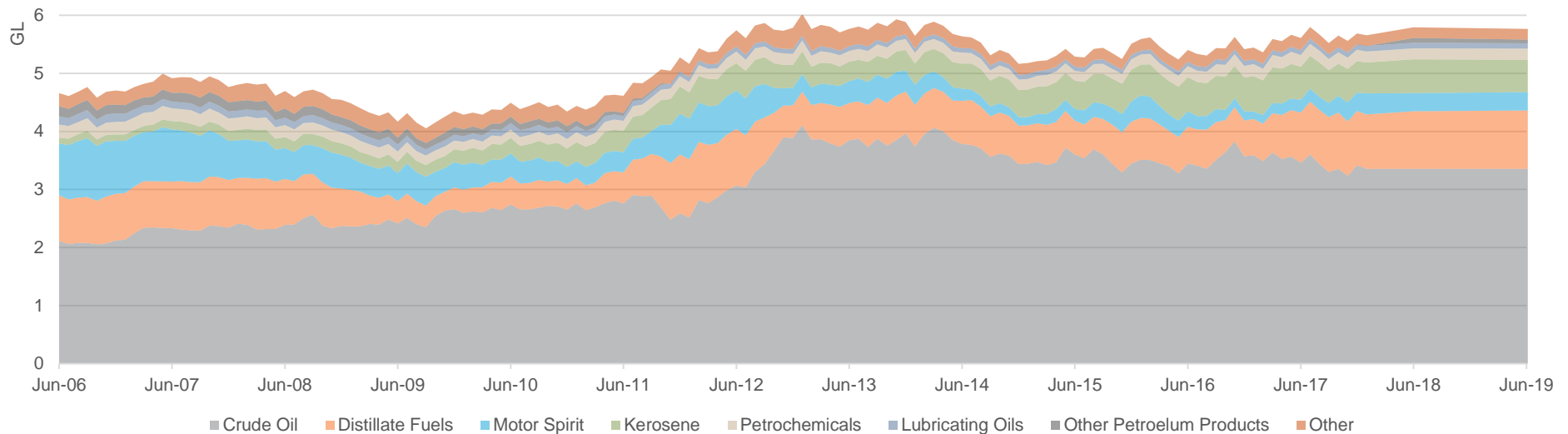
We estimate approximately 85% of motor vehicles do not reach 30 years of age.

The stock of **diesel** vehicles on the other hand has been growing rapidly in recent years but this is likely unsustainable. More stringent emissions rules are likely to see slower growth in the number of diesel vehicles sold over the next few years.

Bulk Liquids Forecasts

Rising Jet Fuel Imports Should Offset the Declines in most Other Petroleum Fuel Imports. The working assumption is that the Victorian refineries close in 2026

Port of Melbourne Bulk Liquid Imports Year Ended June



Annual % change	2014-15	2015-16	2016-17	2017-18	2018-19
Crude Oil	-4.7%	-4.4%	0.4%	-2.9%	0.0%
Distillate Fuels	-21.5%	9.1%	35.9%	14.5%	1.6%
Motor Spirit	-4.1%	32.3%	-17.8%	43.1%	0.6%
Kerosene	11.9%	20.8%	-3.1%	2.0%	-4.4%
Petrochemicals	-11.7%	16.5%	6.0%	-6.4%	0.0%
Total Bulk Liquid Imports	-6.2%	2.2%	3.8%	3.3%	-0.4%



06

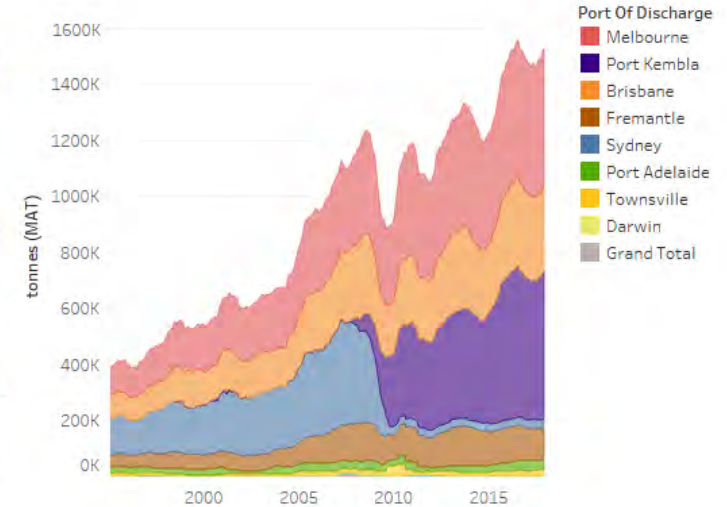
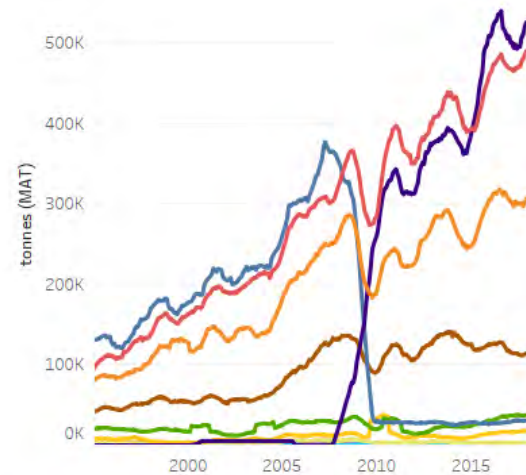
BREAK BULK, WHEELED UNITISED, MOTOR VEHICLES

Australian Overview

Imported Motor Vehicle

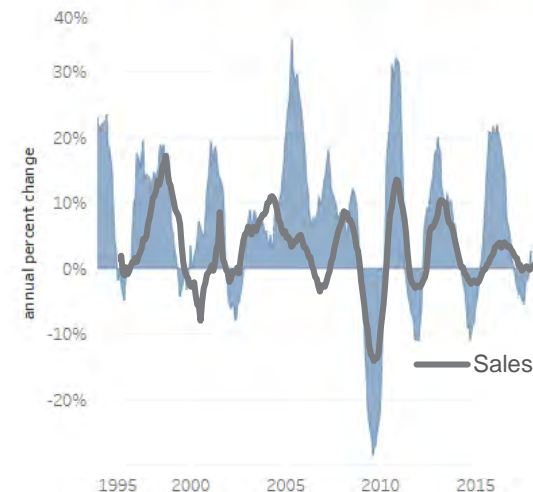
Super cycles

- The last Australian made passenger car rolled off the line in October 2017, with Holden's Elizabeth plant in South Australia closing down, following Toyota's closure in Altona earlier that month and Ford's closures of facilities in Geelong and Broadmeadows in Victoria. All three cited the lack of government assistance for the reason for the closure, but the sustained high Australian dollar during the mining boom provided the impetus behind the (unsuccessful) funding requests.
- At late as 2015, 7% of domestic motor vehicle sales were Australian manufactured. These 80,000 or so vehicles per annum are now sourced from overseas
- New South Wales imports shifted from Sydney Port to Port Kembla in between 2007 and 2009, with Port Kembla now the largest importing facility for motor vehicles in the country.
- In contrast with consumer goods, the New South Wales ports does not import large volumes which are then land-bridged to other states (although there currently are imports arriving into Port Kembla which are destined for South Australia that are transhipped).



% change (year-on-year, quarter-on-quarter)

Port Of Disc..	2017 Q1	2017 Q2	2017 Q3	2017 Q4
Grand Total	-2.6%	-4.8%	-2.3%	2.7%
Melbourne	-1.3%	-2.6%	0.0%	4.2%
Port Kembla	-2.9%	0.5%	8.3%	10.0%
Port Adelaide	-4.2%	-8.0%	-2.1%	4.1%
Brisbane	-3.6%	-4.9%	-3.4%	-0.5%
Fremantle	-8.4%	-1.8%	0.7%	7.2%
Sydney	-9.3%	-9.7%	-12.2%	-2.3%
Port Adelaide	-9.7%	-0.7%	-9.0%	11.0%
Sydney	10.5%	11.7%	6.0%	4.5%
Port Adelaide	6.6%	17.2%	-11.0%	9.0%
Port Adelaide	18.7%	12.3%	1.2%	5.7%
Port Adelaide	19.1%	11.4%	-13.8%	11.7%
Townsville	11.1%	7.3%	5.4%	8.8%
Darwin	-1.1%	6.3%	19.2%	11.6%
Darwin	8.2%	19.6%	-7.3%	7.3%
Darwin	-8.1%	4.4%	-41.2%	68.0%



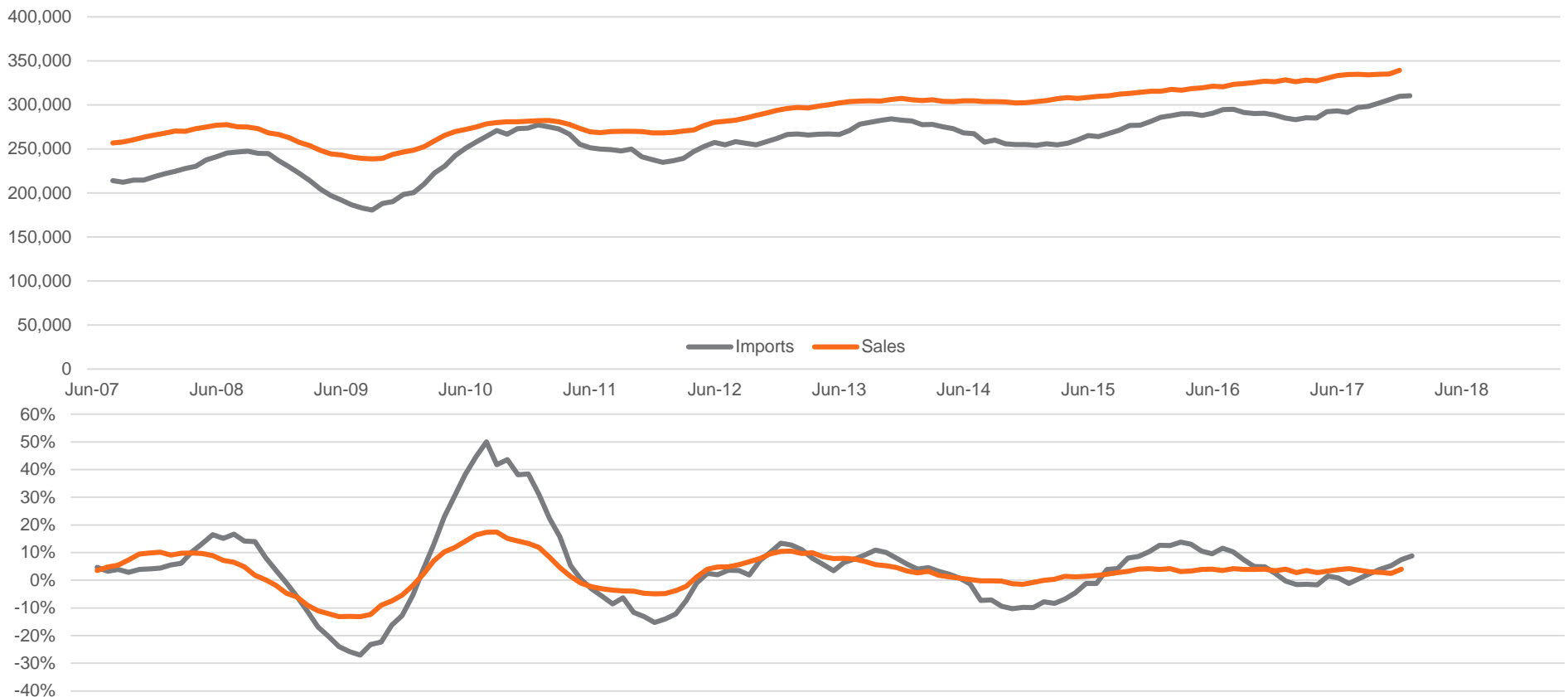
Break Bulk

Motor Vehicle Import Overview

The shutdown of domestic manufacturing are expected to result in Victorian sales and Direct Imports of Motor Vehicles aligning, commencing in October 2017.

PoM Imports and VIC Sales

(units, Moving Annual Total – top; Annual % change - bottom.)



Break Bulk

Motor Vehicle Imports

Steps undertaken to forecast imported vehicles.

1. Lifecycle analysis

We estimate the rate of turnover of existing stock by looking at the depreciation rates of vehicles in each class using the Motor Vehicle Census, which provides an annual report of the number of motor vehicles by year of manufacture and make/model. Current assumptions are that the depreciation schedule does not change.

2. Increase in stock

Sales which are not replacing stock turnover reflect changes in the demand. We measure this as both changes to the population and utilisation (or motor vehicles per capita). Note that since Light Commercial Vehicles have been increasing utilised as passenger cars (think of Toyota Hilux's) and as such now outnumber traditional utes and panel vans, we now combined the two in our analysis. We are continuing the long-term trend of an increase in the number of vehicles per capita over the forecast period.

3. Domestic Manufacturing

Historically, Australia manufactured over seven different models over the past 20 years. We have analysed the propensity to purchase these vehicles, and noted that Victoria and South Australia had the highest concentration of these vehicles at 8% and 9% respectively, while the other states and territories had about the same concentrations (i.e. about 6% of 2015 sales were Australian manufactured models).

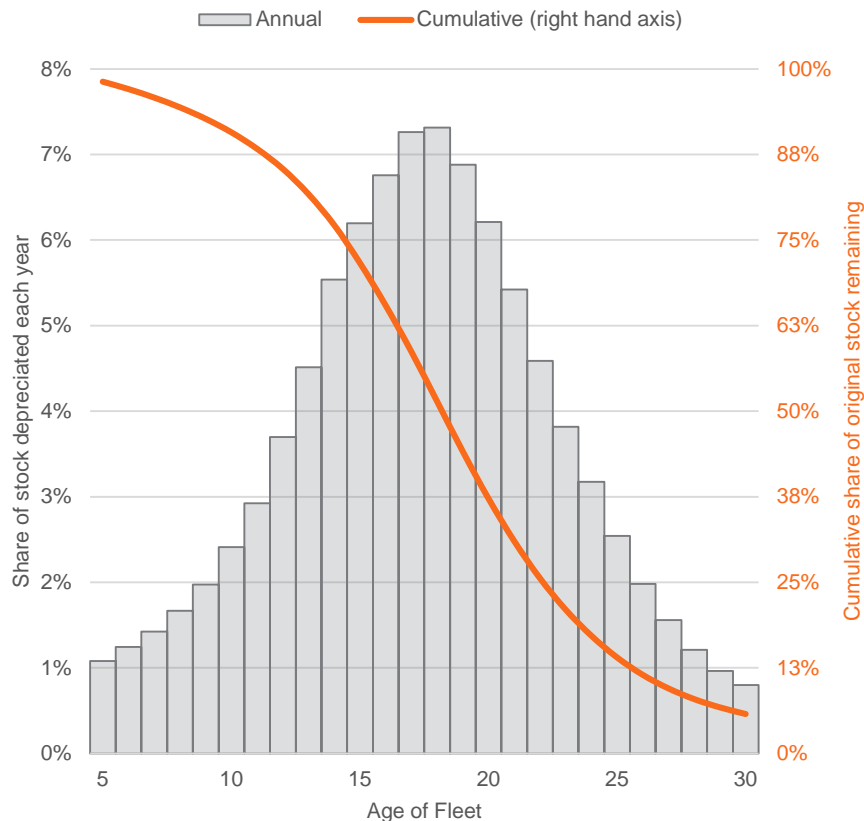


Break Bulk

Victoria sales of Motor Vehicles

The primary driver of motor vehicle sales is stock replacement of existing vehicles and growth from increasing population (and even increases in motor vehicles per capita).

Retirement of Motor Vehicles by Age



Sustainable Growth drivers

Just over two-thirds of all motor vehicle sales are replacement of existing stock.

The current average stock age in Australia has been largely unchanged since 2011 at 9.8 years.

The current stock of motor vehicles has an average replacement age of 17.4 years (i.e. the age at which the vehicle is removed from the motor vehicle registries).

BISOE's analysis based on the current depreciation schedule, sales to replace retired stock will grow faster than sales due to net increase in stock (driven by population and motor vehicles per capita) for the next decade, and then that relationship is expected to reverse.

$$\text{net increase in stock} = \text{sales} - \text{depreciation}$$

$$\text{sales} = \text{net increase in stock} + \text{depreciation}$$

The stock of motor vehicles is expected to outpace population growth by about 0.5% per annum over the forecast horizon.

The *net* increase in stock is forecast to grow at almost four times that rate, but the impact of slower depreciation is expected to constrain growth in total sales to population plus 0.3% per annum.

Note that imports measured in revenue tonnes (or cubic meter basis) outpace the growth in the number of units, due to the current trend towards SUVs. This is forecast to continue into FY19.

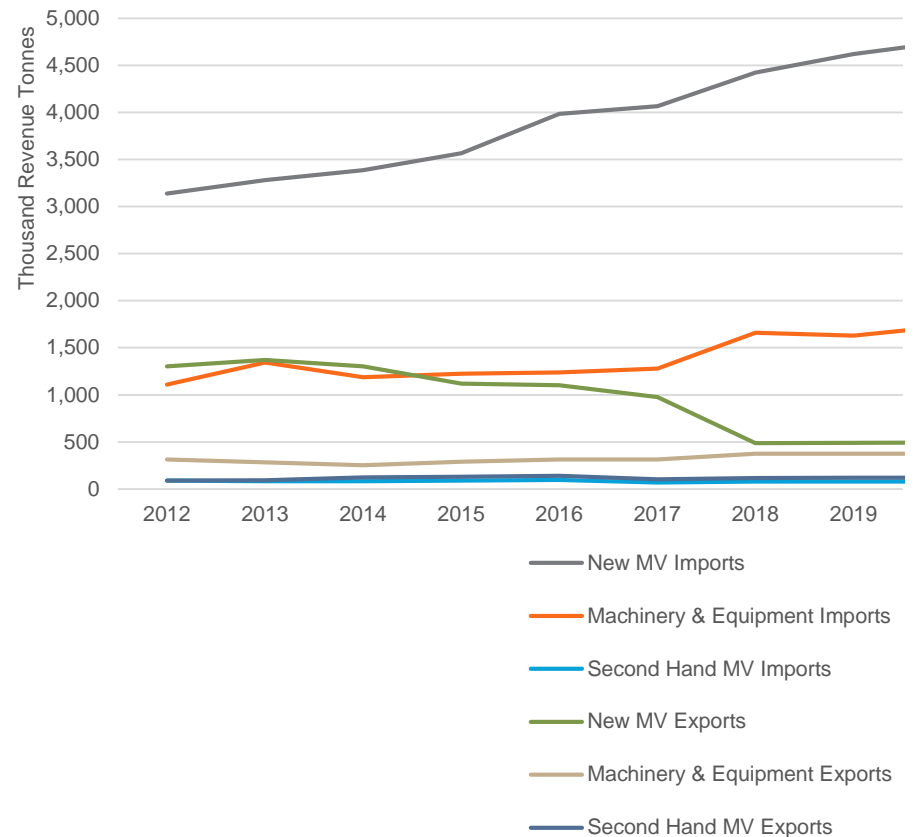
Break Bulk

MV Imports and Exports

Following the closure of the domestic manufactures, small volumes of MV exports continue to be exported to Tasmania and to a lesser extent other mainland states, which are first imported into Victoria.

Annual % Change	2014-15	2015-16	2016-17	2017-18	2018-19
New MV Imports	5.3%	11.8%	2.0%	8.8%	4.5%
Transport Equipment, NEI, Imports	3.4%	1.1%	3.2%	29.9%	-1.9%
Second Hand MV Imports	8.3%	7.5%	-28.5%	12.1%	0.0%
New MV Exports	-14.1%	-1.7%	-11.2%	-50.4%	1.0%
Transport Equipment, NEI, Exports	13.8%	8.3%	0.4%	19.2%	0.0%
Second Hand MV Exports	5.2%	6.6%	-26.8%	15.5%	1.0%
Total MV Trade	1.3%	7.0%	-1.0%	4.9%	2.4%

MV Imports and Exports



Break Bulk

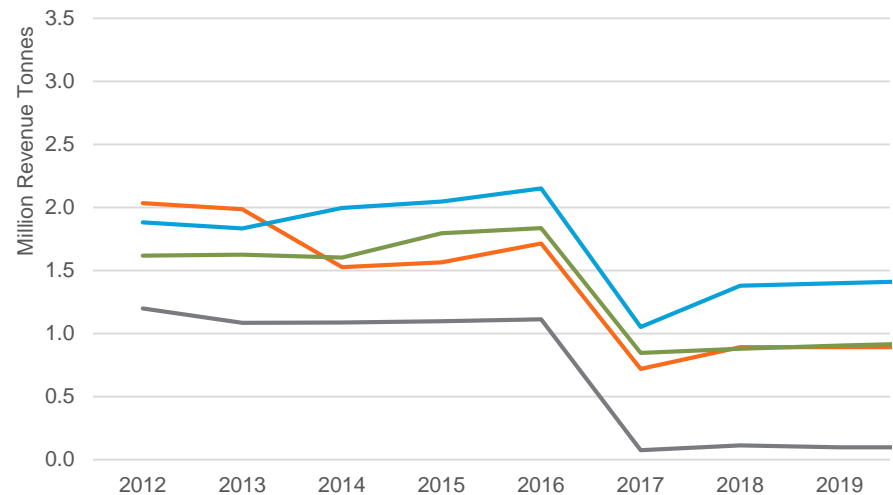
Non-containerised/general cargo

Volumes fell back with the loss of Station Pier

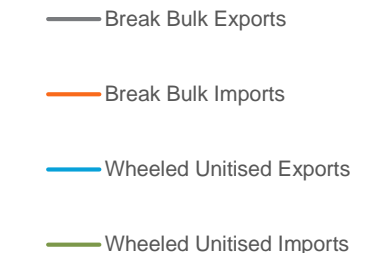
Moving forward, BISOE is forecasting the volumes of Wheel Unitised to roughly track containerised Bass Strait volumes, and for Break Bulk volumes to remain unchanged from current levels, with the following adjustment on the advice of Port Management:

- the construction of a new breakbulk storage facility at Appleton Dock, (due for completion in early 2019), will cater for an expected additional 150,000 tonnes per annum of import cargo

Non-containerised/general cargo imports and exports



Annual % Change	2014-15	2015-16	2016-17	2017-18	2018-19
Break Bulk Exports	0.7%	1.6%	-93.3%	51.4%	-14.0%
Break Bulk Imports	2.4%	9.6%	-58.0%	24.0%	8.4%
Wheeled Unitised Exports	2.6%	5.1%	-51.1%	31.1%	1.5%
Wheeled Unitised Imports	12.0%	2.2%	-53.9%	3.8%	3.0%
Total Break Bulk	4.7%	4.8%	-60.5%	21.2%	3.3%





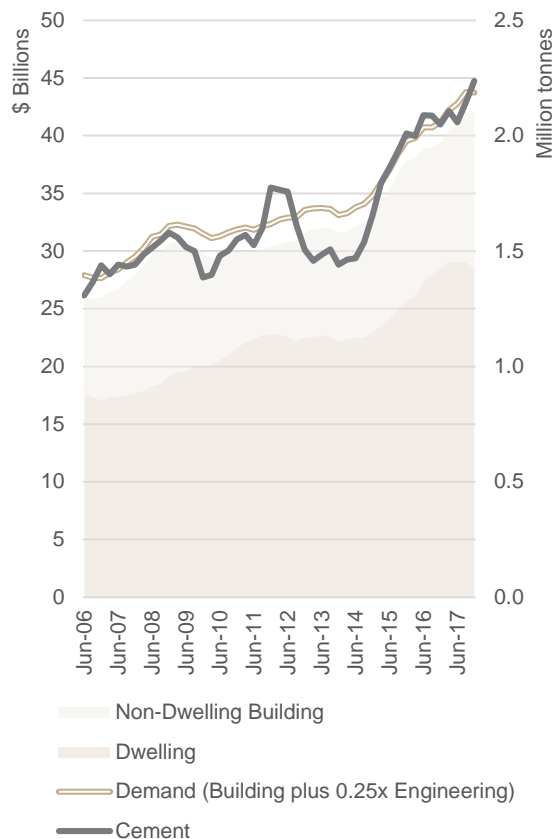
07

DRY BULK

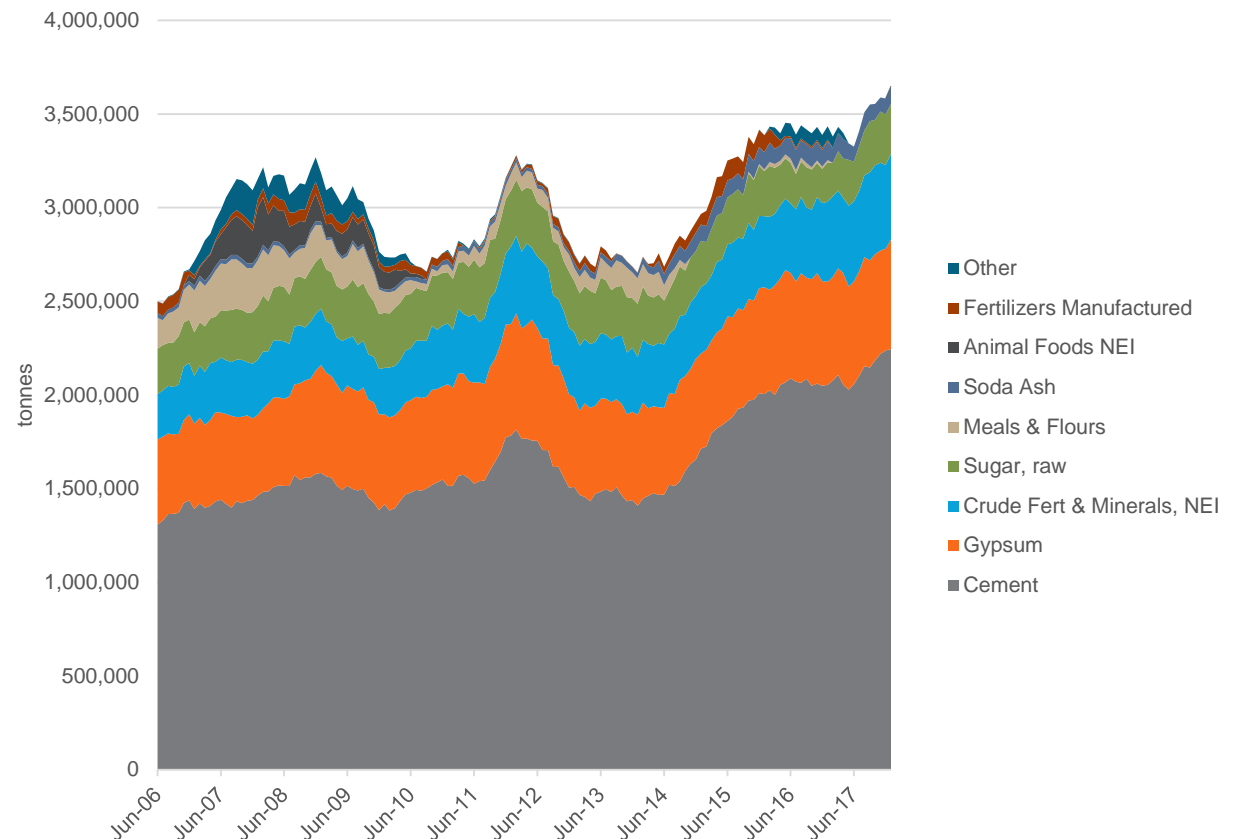
Dry Bulk Imports

Three of the top dry bulk imports are inputs into the building industry. As a demand driver, we take into account both dwelling and non-dwelling building and a quarter of Engineering Construction.

Demand for Cement



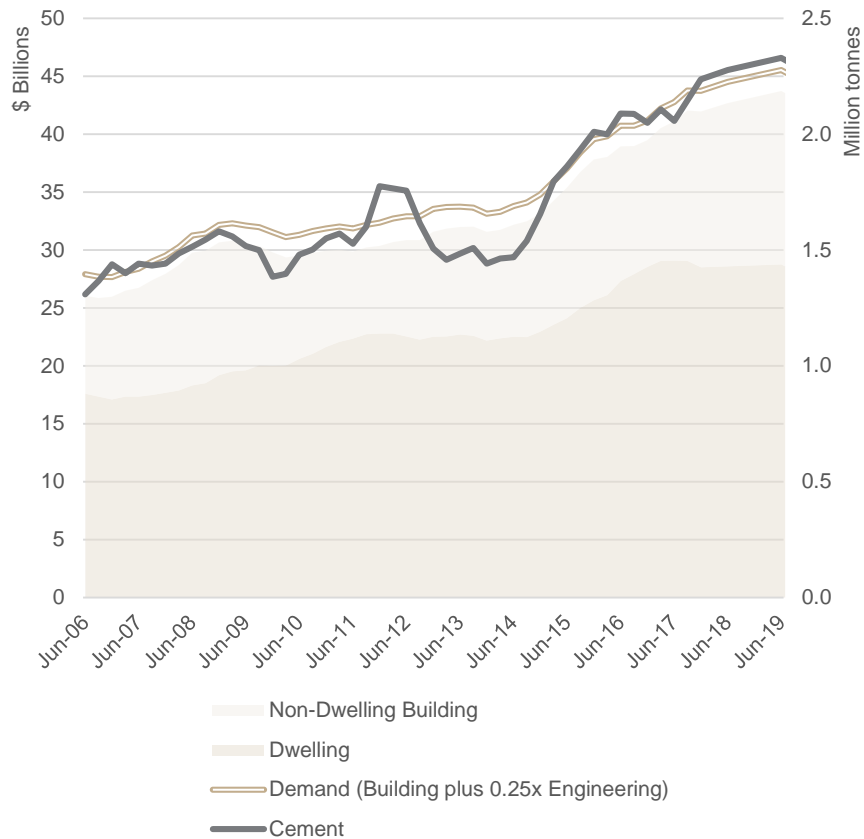
Port of Melbourne Dry Bulk Imports



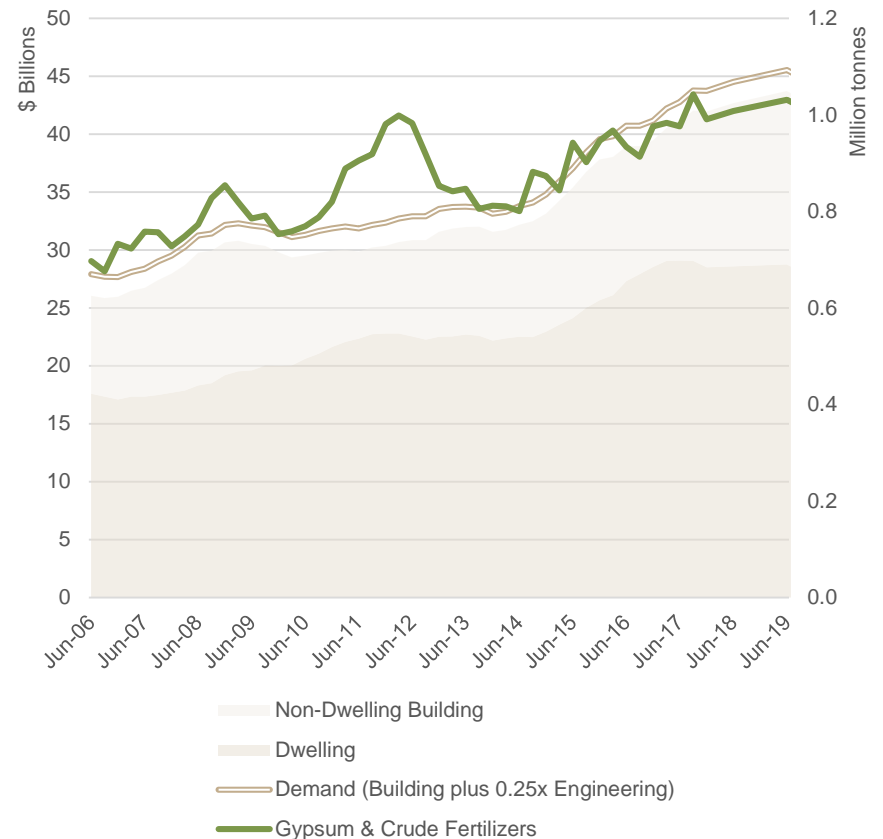
Dry Bulk Imports

The building boom in Victoria is forecast continue through to 2019.

Forecast demand for Cement



Forecast demand for Gypsum & Crude Fertilizers



Dry Bulk

Dry Bulk Exports are predominately cereals, and comprise of between 20% and 50% of cereal exports (with the rest containerised).

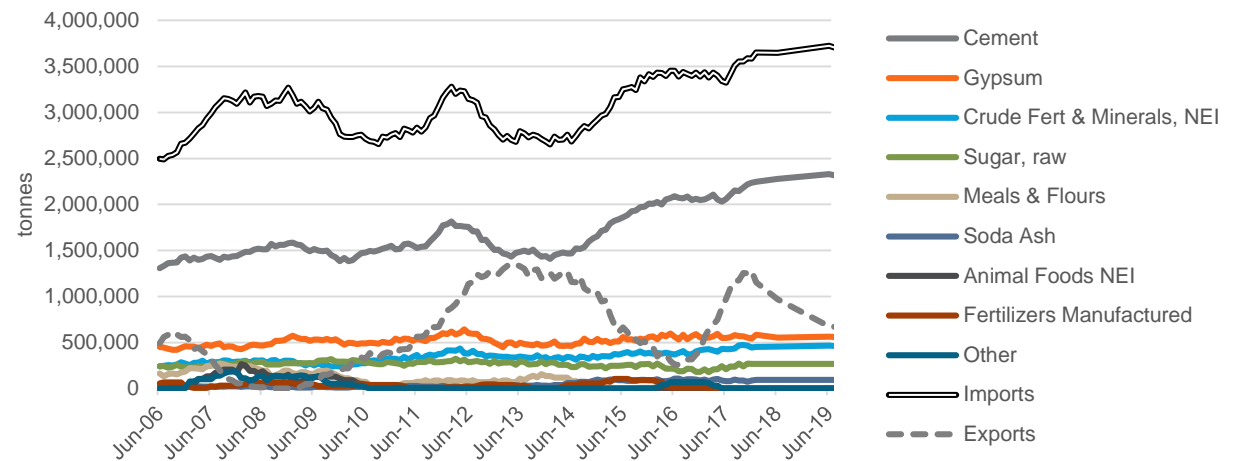
Soda Ash

Sodium carbonate is a common inorganic industrial chemical also known as *soda ash* (Na₂CO₃). It used in the manufacture of glass, chemicals, such as sodium silicates and sodium phosphates, the pulp and paper industries, the manufacture of detergents and for the treatment of water.

Penrice Soda was the only Australian producer of soda ash, which was used to make glass, washing power, detergents, pharmaceuticals and as a food additive, but it shut down in June 2013.

BIS Oxford Economics is projecting imports to hold flat over the forecast period.

Port of Melbourne Dry Bulk Imports and Exports



Annual % change	2014-15	2015-16	2016-17	2017-18	2018-19
Cement	26.7%	12.2%	-1.5%	10.6%	2.3%
Gypsum	20.8%	0.7%	-2.5%	0.7%	2.3%
Crude Fertilizers	13.4%	-3.3%	15.3%	6.6%	2.3%
Sugar, raw	7.2%	-13.3%	-3.3%	28.1%	0.0%
Soda Ash	52.9%	20.0%	-26.5%	17.5%	0.0%
Total Dry Bulk Imports	21.1%	6.1%	-3.7%	9.7%	2.1%
Total Dry Bulk Exports	-42.8%	-60.6%	272.2%	-0.2%	-30.5%



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TRADE VOLUMES

Trade Forecasts (FY17 to FY19)

Wharfage volume - Adopted	Unit	2017	2018	2019
Containerised Full - outward	TEU	708,538	779,140	778,391
Containerised Full - inward	TEU	1,105,845	1,183,630	1,222,322
Containerised Full Bass Strait	TEU	190,268	196,706	202,619
Containerised Empty (excl Bass Strait)	TEU	454,675	486,745	530,025
Containerised Empty (Bass Strait) - incl transhipment	TEU	75,209	79,466	81,674
Containerised Empty returns	TEU	2,951	3,118	3,205
Non-containerised/general	tonne or cm	2,692,591	3,263,907	3,370,659
Accompanied passenger vehicles	tonne or cm	0	0	0
Motor vehicles	tonne or cm	6,805,295	7,135,928	7,308,629
Liquid bulk (excl Mobil at Gellibrand)	tonne or cm	2,602,487	2,927,957	2,902,315
Liquid bulk - Inward (Mobil at Gellibrand)	tonne or cm	3,470,794	3,357,442	3,357,442
Liquid bulk - Outward (Mobil at Gellibrand)	tonne or cm	212,172	201,087	201,087
Dry bulk - inwards - overseas and coastal	tonne or cm	3,324,602	3,648,498	3,723,685
Dry bulk - outwards - overseas and coastal	tonne or cm	973,810	972,256	675,646
Transhipment - full outward (excl Bass Strait)	TEU	60,411	64,332	66,435
Transhipment - full inward (excl Bass Strait)	TEU	42,110	44,571	46,674
Transhipment - full Bass Strait	TEU	37,209	38,530	40,300
Transhipment - Full Bass Strait (2WDE)	TEU	0	0	0
Transhipment - Containerised Empty (excl Bass Strait)	TEU	19,827	14,398	14,398
Transhipment - MV and break bul	tonne or cm	14,233	58,796	58,796
Transhipment - Non-containerised/general	tonne or cm	1,642	4,463	4,463



MACROECONOMIC OUTLOOK

Macroeconomic Outlook

Victoria Population

Victoria's population growth has outpaced all other states and territories for the past four years to FY2017. Population growth is set to decelerate.

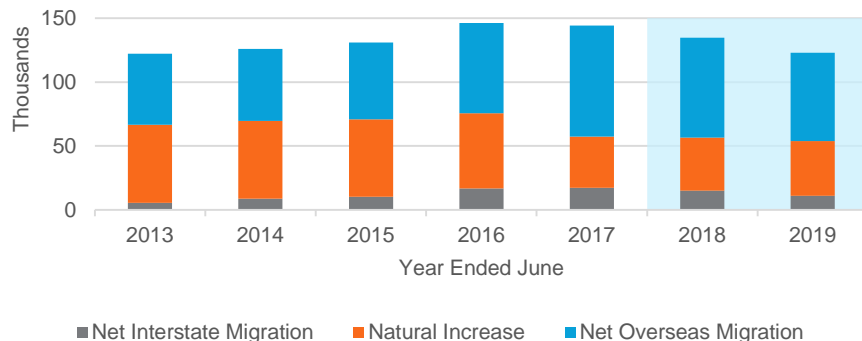
Population Outlook for Victoria

Population growth in Victoria has outpaced all other states and territories between FY2014 and FY2017, recording growth of 2.4% in FY2016 and 2.3% in FY2017. Between FY2014 and FY2017, net overseas migration accounted for 50% of the increase in population, natural increase accounted for 40% and net interstate migration accounted for 10%. Population growth has been underpinned by a relatively strong economy attracting migrants, higher fertility rates and increasing life expectancy supporting natural increase, and rising costs of living in New South Wales and perceived job opportunities boosting net interstate migration.

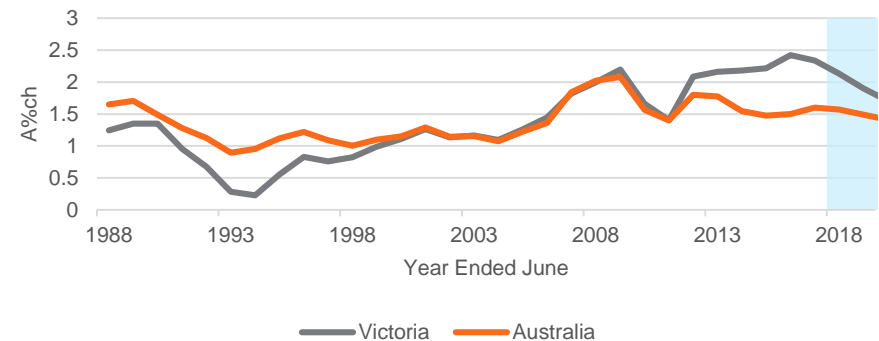
Population growth is expected to slow from FY2018, increasing 2.1% in FY2018 and 1.9% in FY2019. Net overseas migration is forecasted to continue to be the major contributor to population increase. Natural population increase is expected to rise, from 40,000 in FY2017 to reach 42,000 in FY2019, supported by relatively high fertility rates and increased life expectancy.

Net overseas and net interstate migration are expected to slow, and natural population increase will weaken, consistent with other developed economies, due to a falling birth rate and a higher death rate as the population ages.

Victoria Annual Population Increase by Source, Persons



Australia and Victoria Annual Population Growth



Macroeconomic Outlook

Victoria State Final Demand

Victoria's strong economic performance over the last three years to FY2017 is not expected to be sustained.

Short term Economic Outlook for Victoria

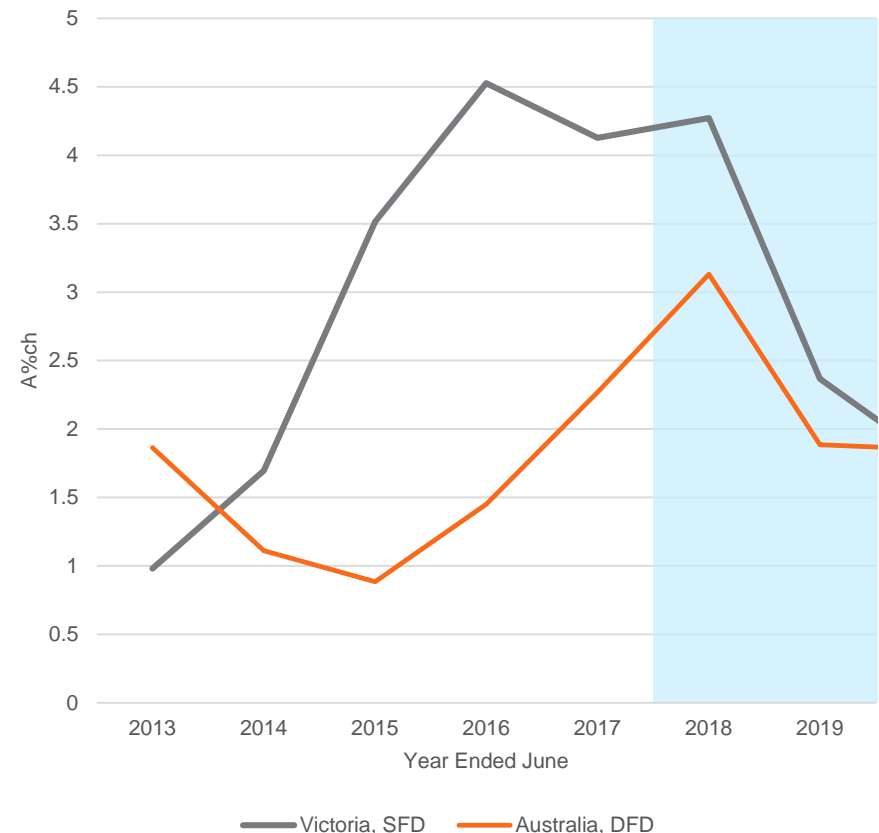
The Victorian economy has experienced strong growth over the three years to FY2017, due to strength in population growth, consumer spending and government spending on schools, hospitals, transport and other infrastructure. Over the three years to FY2017, Victoria's State Final Demand grew by 3.5% (FY2015), 4.5% (FY2016) and 4.0% (FY2017).

Victoria's economic growth is forecasted to slow over FY2018 (+3.8%) and FY2019 (+2.0%). Tighter lending policy by banks and a falling dwelling deficiency will push residential building into a downturn. Non-residential building is also expected to weaken from FY2019. Consumer spending is forecasted to weaken over FY2018 and FY2019 and Victoria's exports to other states will be affected by weak national growth.

The end of the car manufacturing industry in October 2017 will have negative impacts on employment, consumer spending, exports and SFD in FY2018. The shutdown of Hazelwood power station in March 2017 and problems with gas and other electricity supplies will also have a negative impact on manufacturing and investments in the state.

However, the lower Australian dollar is providing a significant boost to key trade-exposed industries, namely agriculture, manufacturing, international student education, tourism and some business services. Public investment will remain a key driver of growth over the next two years, supported by infrastructure such as the Metro Rail Project

Victoria State Final Demand Growth



Macroeconomic Outlook

Victoria Retail Turnover

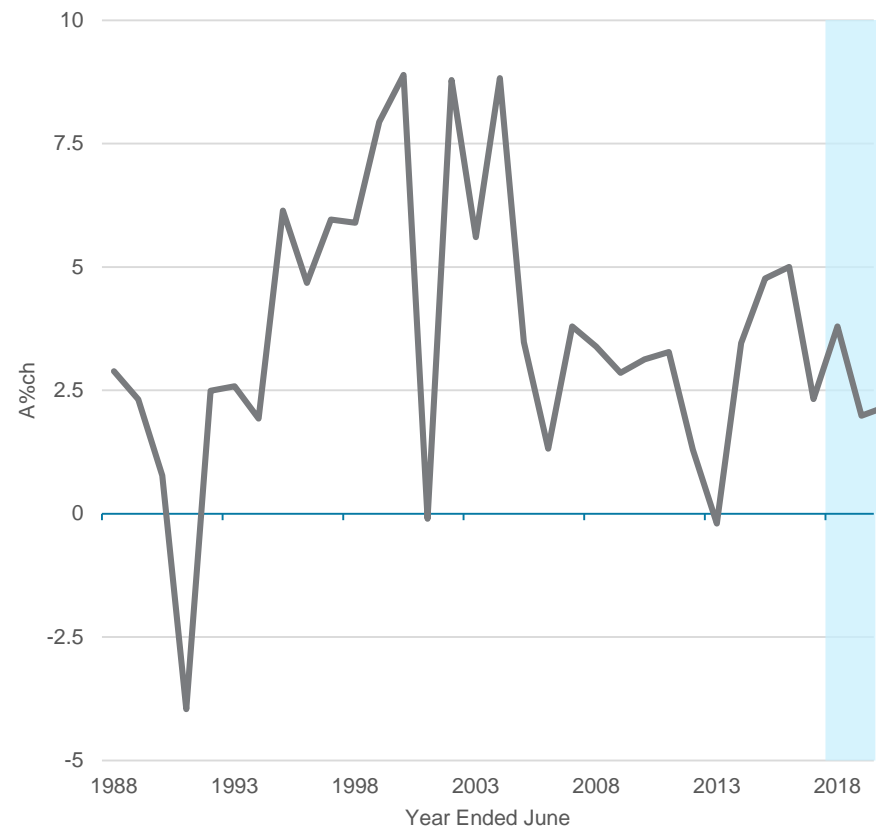
Victorian Retail Turnover is expected to pick up in FY2018, then fall back in FY2019 as economic growth slows.

Retail Turnover Outlook for Victoria

Victoria retail turnover picked up markedly between FY2013 (-0.2%) and FY2016 (+5.0%), supported by low interest rates, population growth and higher house prices. Retail turnover growth fell back to 2.3% in FY2017, still above the national average of 1.9%. The combination of rising prices for essential services such as health care and electricity, and weak wage growth is reducing discretionary spending.

Retail turnover growth is expected to lift to 3.9% in FY2018, then fall back to 2.2% in FY2019, due to stagnant wages and lower economic growth.

Victoria Retail Turnover Growth



Macroeconomic Outlook

Victoria Machinery & Equipment Investment

Growth in machinery & equipment investment in Victoria will resume, accelerating over FY2020 to FY2021.

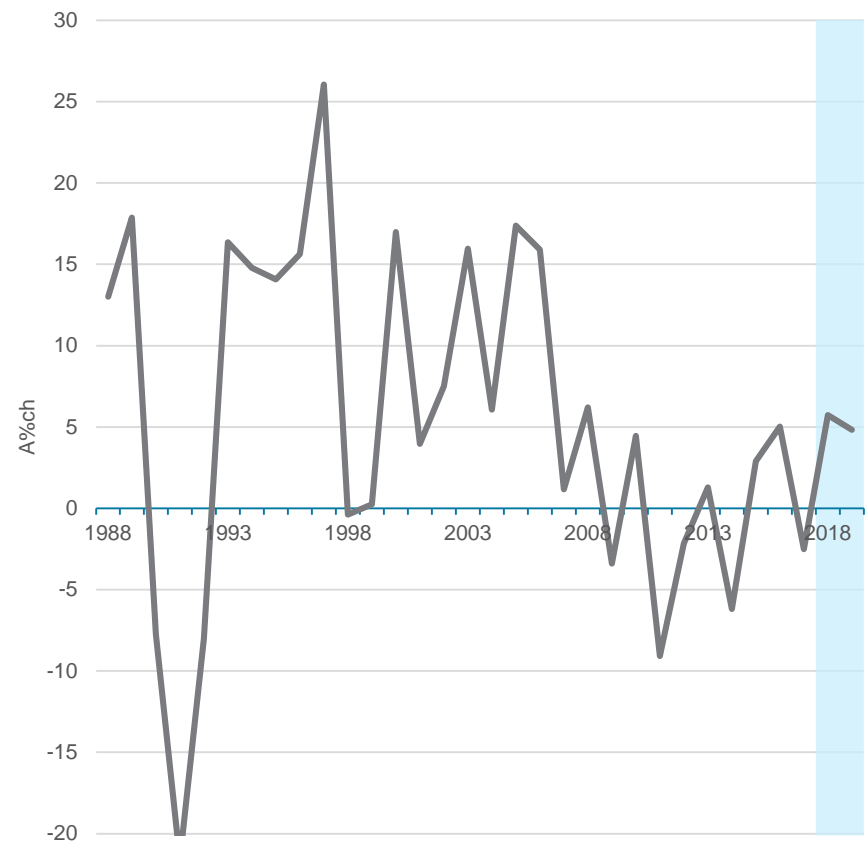
Machinery & Equipment Outlook for Victoria

Following a 2.5% reduction in machinery and equipment investment in FY2017, investment is forecasted to pick up to 6.9% in FY2018 and dipping slightly to 5.3% in FY2019.

BISOE expects a broad based non-mining investment recovery, boosting machinery and equipment investment. BISOE expects the initial surge will be deferred investment, as companies will need to renew capital spending following fairly weak non-mining investment since the Global Financial Crisis. Capacity will also be increased to meet anticipated expansions in demand.

Improving business confidence and increasing capacity constraints will drive investment in plant and equipment. Manufacturing machinery and equipment investment will pick up, in response to capacity constraints and the need to renew investment following the closure of a number of factories.

Victoria Machinery and Equipment Investment Growth



Macroeconomic Outlook

Victoria Building Construction – Dwelling

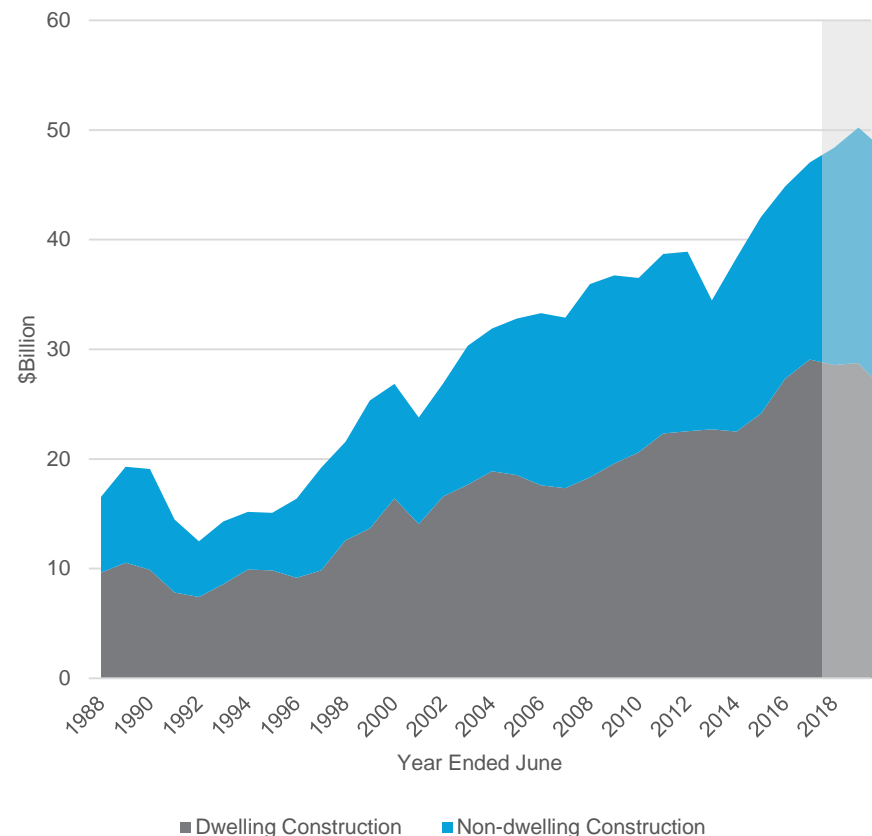
A three year dwelling investment downturn from FY2018 will be the main negative detracting from growth from FY2018 to FY2020.

Dwelling Building Construction Outlook for Victoria

After being a key growth driver in FY2015 (+7.2%), FY2016 (+13.3%) and FY2017 (+6.4%), growth in residential building is expected to weaken to 1.0% in FY2018 and FY2019, then decline in the following two years. Tighter lending policy by the banks is already impacting off-the-plan sales to investors.

However, with the level of dwelling building now well above demand, an oversupply has manifested over FY2017, which will cause a downturn from FY2018.

Victoria Dwelling and Non-Dwelling Construction



Macroeconomic Outlook

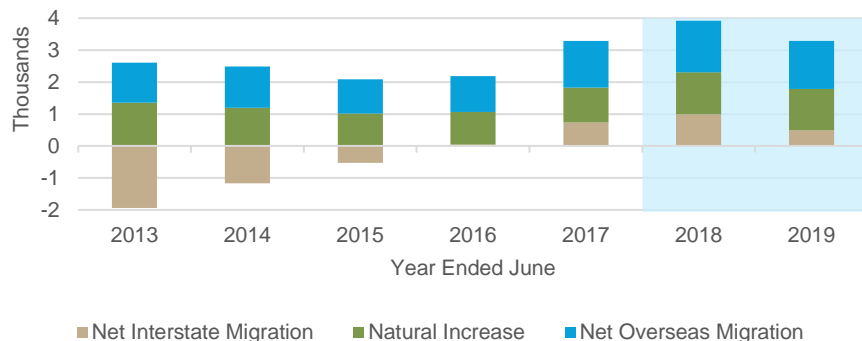
Tasmania Population

Tasmanian population growth will continue to pick up in FY2018. However, low population growth will continue to be a key problem for the state in the medium and long term.

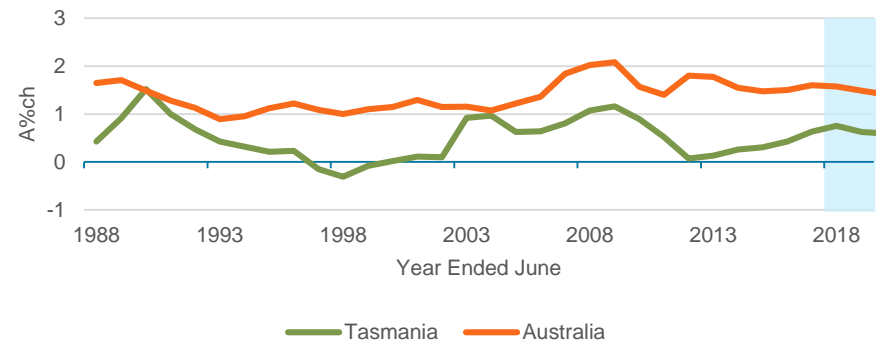
Population Outlook for Tasmania

Low population growth and the loss of young Tasmanians to mainland Australia is an ongoing problem for Tasmania. However, population growth has picked up from 0.1% in FY2013 to 0.6% in FY2017. Labour market conditions have improved over the past 18 months, with the unemployment rate falling from 7.1% in August 2016 to 5.3% in January 2018, and housing affordability concerns in other states are attracting migrants to Tasmania. Having seen consistent interstate outflows since September quarter 2011, Tasmania experienced net inflows in FY2016 and FY2017. Growth is expected to lift again to 0.8% in FY2018.

Tasmania Annual Population Increase by Source, Persons



Australia and Tasmania Annual Population Growth



Macroeconomic Outlook

Tasmania Retail Turnover

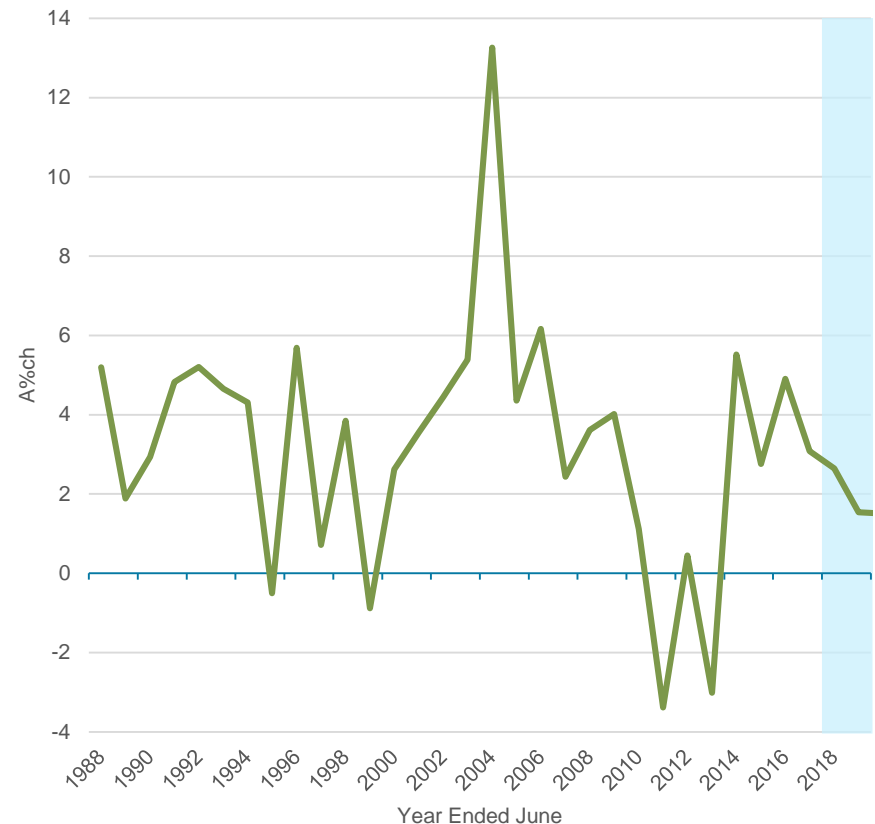
Tasmanian retail turnover has been strong, running ahead of the national average in FY2016 and FY2017. However, growth is expected to weaken and fall behind the national average from FY2019.

Retail Turnover Outlook for Tasmania

Tasmania retail turnover growth overtook the national average in FY2016 and FY2017, reaching 4.9% and 3.1% respectively. This increase was largely driven by a pick up in employment and strength in tourism and is in spite of weak, below national average wage growth.

Wage growth is expected to fall back, to 2.7% in FY2018, and 1.6% in FY2019, held back by weak wage growth. The existing slack in the labour market means we don't expect wage growth to accelerate in the near term.

Tasmania Retail Turnover Growth



Macroeconomic Outlook

Australian Population

Australia's population growth is among the highest of the developed economies. Growth is forecasted to decelerate out to FY2065.

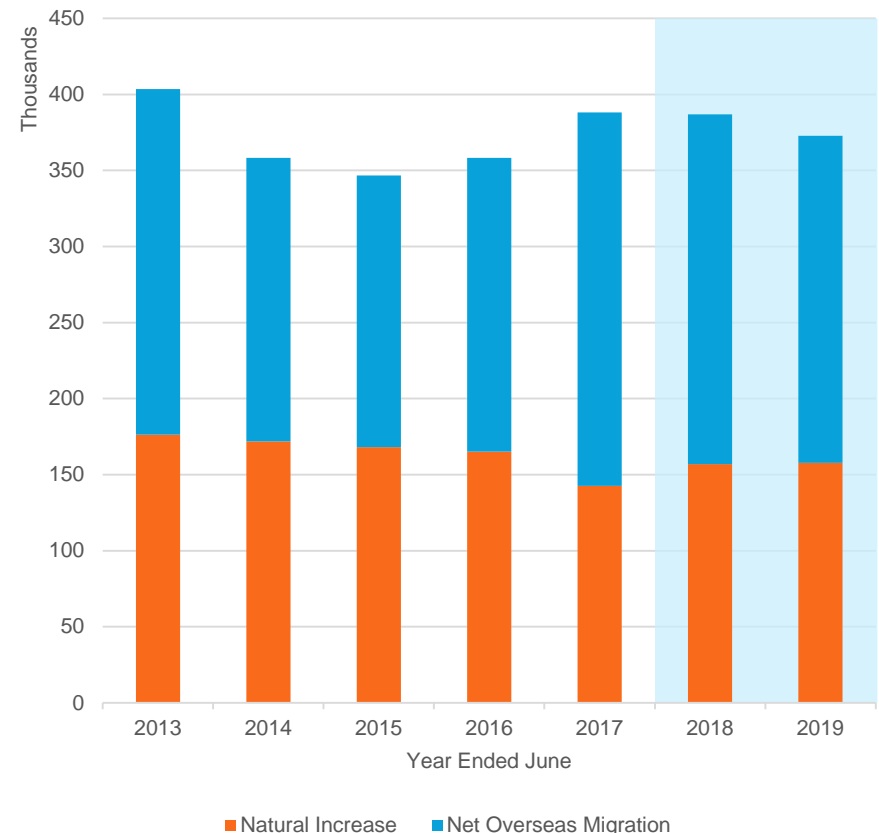
Population Outlook for Australia

Although we expect relatively high levels of overseas migration to persist over the medium to long term, the annual rate of population increase is projected to slowly decelerate, averaging 1.5% over the next 5 years.

Immigration accounted for approximately 55% of total population growth over the past five years. BISOE forecasts share of population increase from net overseas migration will increase over the next 15 years, reaching 64% in FY2032. Demand for skilled labour, as well as Australia's attractive lifestyle, will encourage continued migration. After a 27.1% increase to 245,000 in FY2017, BISOE expect NOM will fall back to 230,000 in FY2018, and 215,000 in FY2019.

By contrast, **natural rate of population increase** will ease over the long term. This is primarily due to Australia's ageing population structure. As the first of the baby boomers begin to move into their 80s, the death rate will begin to accelerate. In addition, the ongoing cultural change toward having fewer children is expected to continue to slow the birth rate. Although births will continue to exceed deaths, the gap between the two will continue to narrow, causing a slowdown in the rate of natural population increase.

Australia Annual Population Increase by Source, Persons



Macroeconomic Outlook

Australian Domestic Final Demand

Australia benefits from strong economic fundamentals, but the current pace of expansion is relatively subdued and growth is expected to ease from FY2027.

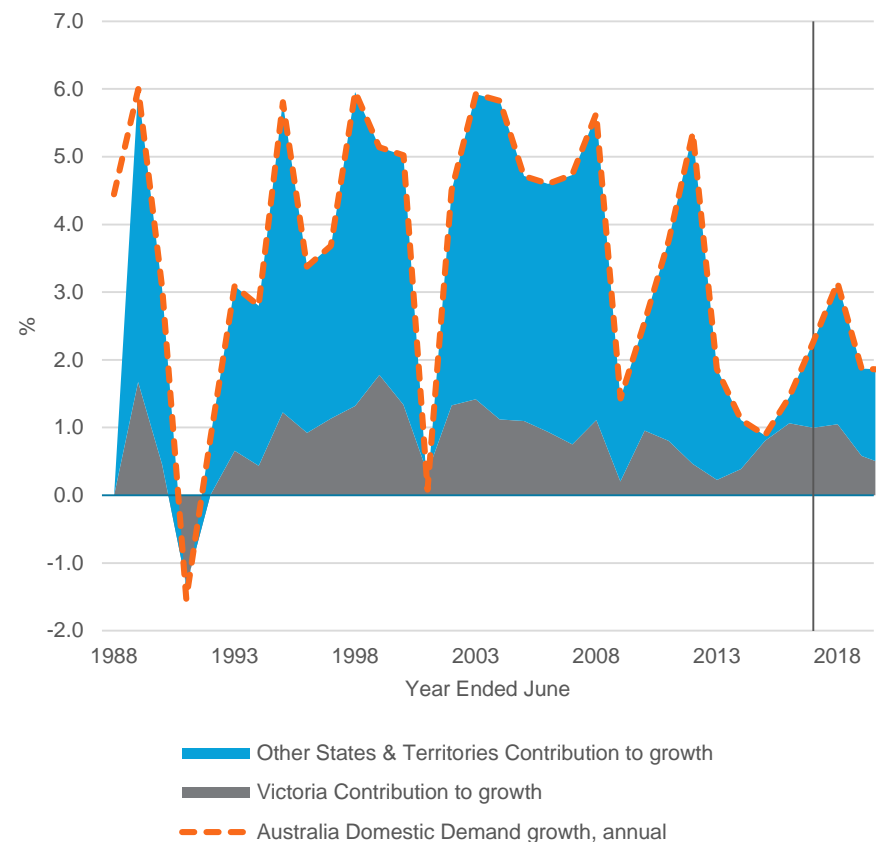
Economic Outlook for Australia

Australia has strong fundamentals, experiencing 26 years of uninterrupted growth since the FY1991 recession. Population growth is among the highest of the developed economies, which has helped underpin household consumption and demand for dwelling and infrastructure construction.

Nevertheless, growth in domestic final demand (DFD) has been lower over the past five years than the previous two decades. The main factor dragging down growth has been a major decline in mining investment, which has coincided (and contributed to) weakness in non-mining business investment.

The shift in the Australian economy back to broad-based growth following the mining boom continues to progress slowly. Growth is still below trend—DFD growth has averaged around 1.5% annually over the last five years, with FY2017 coming in at 2.1%. There are some positive signs. Net exports are contributing positively to demand, with the global upswing and competitive AUD helping to drive export volumes growth. But non-mining business investment remains patchy, and with spare capacity still to absorb in the labour market, household income and consumer spending growth is forecast to remain below trend this year and next. Overall, we expect growth to average 1.7% between FY2018 and FY2019.

Australia Contribution to Annual Domestic Final Demand Growth



Macroeconomic Outlook

Australia Retail Turnover

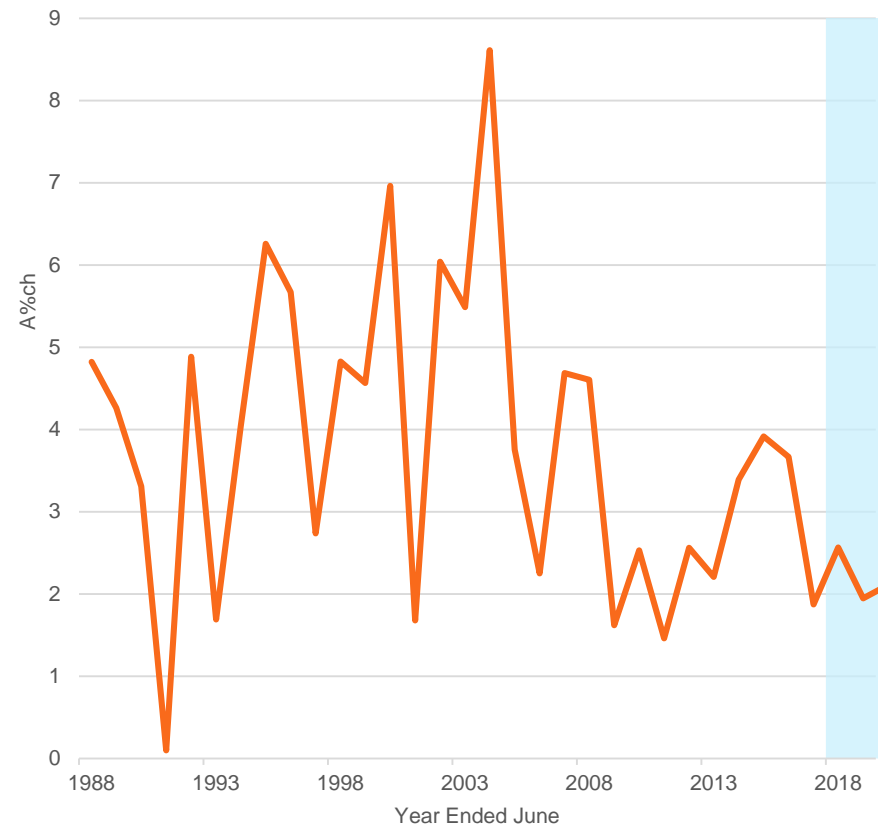
Retail will be constrained by weak household income and spending growth until a marked pick up from FY2020

Retail Turnover Outlook for Australia

Annual growth in retail turnover is at 2.1%, well below the long term average of 3.9%. The combination of rising prices for essential services, such as healthcare and electricity, and weak wage growth is reducing discretionary spending.

A significant rebound in wages is required to support retail expenditure into the future, and although the boom in employment growth will provide some support, the existing slack in the labour market means we don't expect wage growth to accelerate in the near term. We expect a subdued pace of growth to continue this year, with the volume of consumer spending expected to grow by around 2% this year and next.

Australia Retail Turnover Growth



Macroeconomic Outlook

Australia Building Construction – Non-Dwelling

Non-dwelling building will pick up, although this will be offset by declines in dwelling construction.

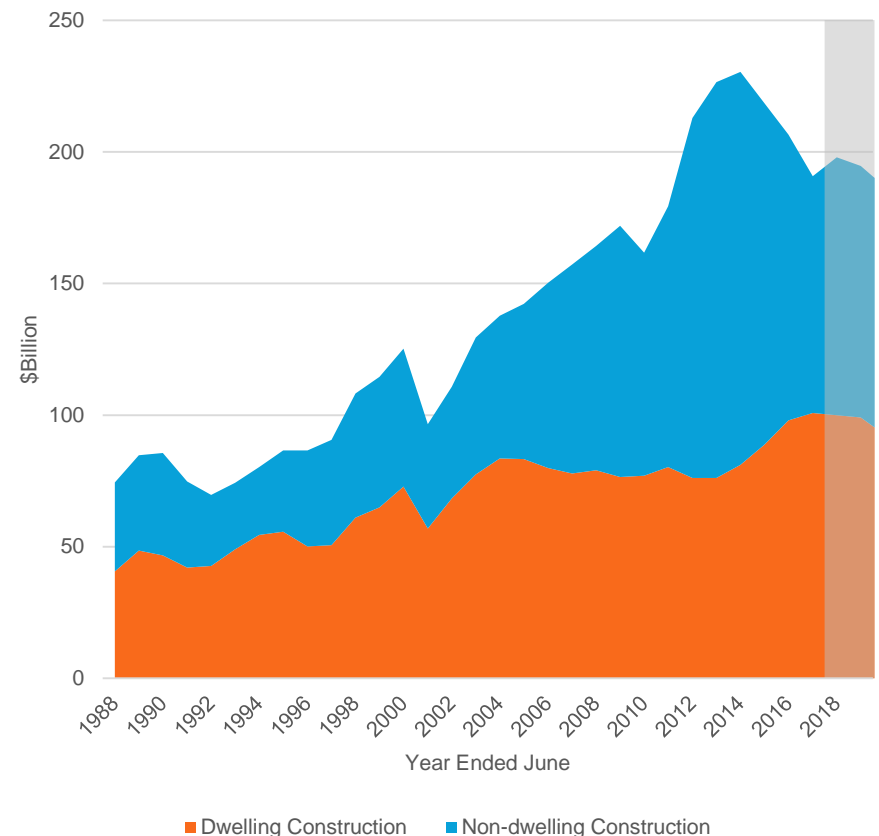
Non-Dwelling Building Construction Outlook for Australia

Following the end of the mining investment boom, there have been substantial declines in non-dwelling building construction in Australia. Non-dwelling building construction declined 0.7% in FY2014, 13.1% in FY2015, 16.3% in FY2016 and 17.1% in FY2017.

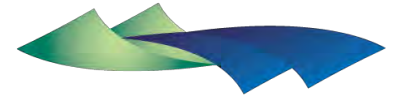
BISOE expects the sector will return to growth this financial year, recording growth of 5.1% in FY2018.

Private non dwelling building is driving current growth in non-mining business investment, boosted by a very sizeable pipeline of major projects. Commercial and industrial building is expected to lead the way with large retail, offices and hotels and accommodation projects expected to commence in CY2018, predominantly in New South Wales, Victoria and Queensland, with a significant lift in transport buildings also contributing over the next three years from airport terminal upgrades and railway stations (the latter PPPs). We expect private non-dwelling building to increase by 10.4% and 11.7% in FY2018 and FY2019 respectively, before growth eases.

Australia Dwelling and Non-Dwelling Construction



Port of Melbourne



2018-19 TCS – APPENDIX I

**WACC: SUBMISSION ON WELL ACCEPTED
APPROACHES**

31 May 2018

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1. Introduction

A new regulatory regime to oversee the pricing arrangements for Prescribed Services at the Port of Melbourne (PoM) took effect on 1 July 2016. The key regulatory instrument is the Pricing Order made pursuant to section 49A of the *Port Management Act 1995* (Vic) (Port Management Act) and administered by the Essential Services Commission (ESC). The Pricing Order:

- sets out how PoM must set its Prescribed Service Tariffs, which are defined under section 49 of the Port Management Act to include, amongst other things, the provision of shipping channels, berthing facilities, the provision of short-term storage and cargo marshalling; and
- requires PoM to demonstrate on an annual basis how its Prescribed Service Tariffs for the upcoming financial year comply with the Pricing Order.

Under clause 7 of the Pricing Order, PoM is required to submit an annual Tariff Compliance Statement (TCS) to the ESC by no later than 31 May of each year that explains how its Prescribed Service Tariffs for the upcoming financial year comply with the Pricing Order. Under the Port Management Act, the ESC must conduct a public review of PoM's compliance with the Pricing Order every five years. Within six months after each five-year review period, the ESC must report to the Minister on whether PoM has complied with the Pricing Order, and if there has been non-compliance, whether that non-compliance was "significant and sustained".

PoM submitted its initial TCS (Initial TCS) on 31 May 2017. The ESC has provided commentary on the Initial TCS and an overview of the ESC's likely regulatory approach going forward through three key documents:

- 2017-18 Port of Melbourne tariff compliance statement: Interim commentary (Interim Commentary);
- Statement of Regulatory Approach – version 1.0: Port of Melbourne pricing order (SoRA); and
- Feedback on consultation and other matters: Statement of Regulatory Approach version 1.0: Port of Melbourne pricing order (Feedback Paper).

PoM welcomes the ESC's approach in providing feedback in this way and looks forward to ongoing engagement with the ESC. As noted by the ESC in the Feedback Paper, 'providing up-front guidance supports a transparent and predictable application of the regime' and gives practical significance to the TCS in the compliance monitoring process. Furthermore, the ESC has promoted a genuine dialogue with PoM (and other interested parties), including ongoing engagement with PoM to constructively discuss the Initial TCS, the subsequent ESC commentary and the regulatory regime. Genuine cooperation of this kind and a willingness of the parties to reflect and refine their approach will ultimately best achieve the objectives of the regulatory regime and deliver positive outcomes for port users and Victorian consumers.

In that context, the purpose of this submission is to:

- identify some practical implications that flow from the respective roles, obligations and discretions given to PoM and the ESC under the regulatory regime;
- highlight the degree of similarity between the ESC and PoM on the application of the Pricing Order;
- illustrate PoM's support for the intent of the ESC's WACC Compliance Assessment Test; and
- clarify the key element of the ESC's WACC Compliance Assessment Test on which PoM has a different view to that of the ESC (the meaning of '...one or a combination of well accepted approaches...') and explain why PoM considers its approach is consistent with and compliant with the Pricing Order.

2. PoM and the ESC's roles

PoM's unique regulatory regime created by the Port Management Act and the Pricing Order falls between a light-handed price monitoring regime (without an obligation to price in accordance with pricing principles) and ex-ante price regulation (where a regulator sets prices based on regulatory principles for the next regulatory period).

Under the regime, Initial Prescribed Service Tariffs were set and weighted average annual tariff increases are capped at CPI for up to 20 years following the commencement of the Pricing Order – otherwise, PoM has the responsibility of setting Prescribed Service Tariffs consistently with the Pricing Order. In this way, PoM carries the obligation (which under an ex-ante form of price-regulation would be held by a regulator) to interpret and apply the pricing principles which by their nature contain inherent discretions that may yield a range of outcomes. The Pricing Order is drafted at a deliberately high level, leaving key elements open to discretionary choices that are to be made by PoM within the bounds of the Pricing Order’s specific terms and the applicable regulatory objectives. The CPI price cap and the discretionary choices available to PoM in applying pricing principles are key differentiations from other ex-ante price regulation regimes. While the ESC’s compliance monitoring role is an integral and important role in the regime, it is not the intent of the regulatory regime that the ESC’s role leads to prescription where the Pricing Order permits flexibility.

Part 3 of the Port Management Act establishes the framework for the regulation of port services, including the objectives that should both guide interpretation of the Pricing Order and potentially constrain discretions given to PoM. The objectives of most relevance to the estimation of PoM’s WACC are set out in section 48(1)(a)-(c) of the Port Management Act:

- to promote efficient use of, and investment in, the provision of prescribed services for the long-term interests of users and Victorian consumers;
- 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
- 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.

The ESC’s primary role is the formal public compliance review it must undertake every five years, and the report it must give on its findings and reasons. As discussed in the Interim Commentary, that formal compliance assessment is assisted by PoM providing an annual TCS showing its compliance with the Pricing Order as well as the informal consultative approaches the ESC adopts.

Importantly the ESC’s role does not include prescribing outcomes. Rather it monitors, educates, informs and influences those outcomes. The ESC may informally provide its views/feedback on regulatory compliance (as it has done in its commentary). This aids in transparency and certainty and minimises surprises in the formal compliance assessment. But the ESC’s role does not replace PoM’s obligation to apply the pricing principles and cost allocation principles, nor does it constrain the inherent discretions given to PoM by the Pricing Order.

The ESC also has ancillary roles in which it may respond to and investigate complaints, make recommendations to the Minister and (if required in limited circumstances) pursue enforcement proceedings.

In emphasising the different roles under the regulatory regime, PoM is not intending to give the impression that it is not and will not be influenced by the ESC’s approach and feedback. On the contrary, PoM wishes to develop a transparent and collaborative working relationship with the ESC, and will seek to address the ESC’s feedback and positions particularly during the intervening years before a formal review. The TCS process and the related informal activities by the ESC have commenced in the first year of the new regulatory regime and have been useful in both identifying areas of commonality and difference between the ESC and PoM. It is clear from the Initial TCS and the feedback documents that in most areas there is alignment in the approach adopted by PoM and the views of the ESC as to what is needed to demonstrate compliance with the Pricing Order. At the same time, a key difference has emerged in respect of the WACC (addressed in this paper). In particular, although PoM supports the intent of the ESC’s WACC Compliance Assessment Test, PoM considers that how the ESC has approached the meaning of ‘...one or a combination of well accepted approaches...’ requires further consideration. PoM has set out its comments and concerns below and looks forward to further discussing these with the ESC.

Other points of difference are less likely to have any material impact on tariffs (and therefore are not addressed in this submission).

3. ESC's WACC compliance assessment test

The Pricing Order provides that the return on capital required to calculate the Aggregate Revenue Requirement should be calculated on a pre-tax nominal basis and be:

An allowance to recover a return on its capital base, commensurate with that which would be required by a benchmark efficient entity providing services with a similar degree of risk as which applies to the Port Licence Holder in regards to the provision of Prescribed Services.¹

and:

in determining a rate of return on capital for the purposes of clause 4.1.1(a) the Port Licence Holder 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.²

These requirements must be interpreted in accordance with the objectives of the regulatory regime (set out above), including relevantly promoting efficient use/investment, protecting users and allowing efficient cost recovery.

The ESC has suggested a three stage test (each stage of which must be satisfied before proceeding to the next) to assess PoM's compliance with these requirements (WACC Compliance Assessment Test), assessing whether:

1. the approach or combination of approaches used by the port to determine the allowed rate of return are 'well accepted' (which the ESC has interpreted as being well accepted in regulatory practice);
2. the return on capital is commensurate with the returns that would be required by a 'benchmark efficient entity'; and
3. the return on capital outcomes are consistent with the Pricing Order and the objectives of the regulatory regime.

4. PoM's response

In principle, PoM supports the intent of the WACC Compliance Assessment Test as being a useful tool to apply the Pricing Order requirements.

However, for the reasons set out below, PoM considers that, the detail in which the ESC suggests applying step one of the test, departs from the approach contemplated and permitted by the Pricing Order. These are potentially significant departures and replace permitted flexibility in the Pricing Order with undue constraint that may undermine the ability to achieve the regulatory objectives.

There are three aspects of the ESC's approach to identifying and considering the approaches that PoM may use to derive a WACC to estimate the allowable return on its capital base that differ from what PoM submits is permitted (and required) by the Pricing Order, namely:

- A. constraining the choice of approach to those accepted by economic regulators;
- B. further defining 'well accepted' to those approaches that have recently been used by at least one such regulator; and
- C. the stipulation that the 'well accepted' standard must apply to any combination of approaches.

¹ Pricing Order, clause 4.1.1(a).

² Pricing Order, clause 4.3.1.

A. Well accepted not limited to economic regulators

In the SoRA, the ESC indicated that:

‘a view on the meaning of ‘well accepted’ that would be consistent with the regulatory regime would be approaches that are accepted by those entities that normally determine the inputs to an accrual building block methodology – that is, economic regulators (or review bodies that have the task of overseeing the decisions of economic regulators, such as the Australian Competition Tribunal)’³

PoM submits that this view contains a ‘regulatory practice’ overlay that is not required by the Pricing Order. Neither the Pricing Order nor the objectives of the regulatory regime limit ‘well accepted’ only to approaches that have been applied and accepted by economic regulators (or review bodies that have the task of overseeing the decisions of economic regulators). The approaches adopted by economic regulators will of course be relevant and will influence the choices permitted by the Pricing Order. But it is beyond the intention of the Pricing Order to prescribe as a necessary filter a constraint that precludes PoM from considering approaches that are well accepted by other relevant parties. Thus the approaches used by financial and academic communities for example (over which there has been general consensus of the approach’s utility for determining the return on capital) should also be available to PoM (provided they otherwise deliver on the Pricing Order requirements).

This is consistent with the approaches taken by others when estimating the return on capital. Not only do financial and academic estimators refer to and recognise approaches adopted or considered by regulators, but regulators, such as the Australian Energy Regulator (which is provided with a broad range of factors it must consider, but similarly to PoM, has the discretion in which it applies those factors),⁴ also recognise that financial and academic communities are also concerned with and have expertise in determining the return on capital, and that the views of these communities add context to the content of the return on capital building block under the rules that they apply. The Australian Energy Regulator in particular makes use of academics and consultants (i.e. non-regulators) as experts and advisors when conducting its own reviews.

This reinforces the reasons why it would not be appropriate for the ESC in its monitoring role to seek to restrict PoM’s discretion to include well accepted approaches from various parties when the views of non-regulatory parties are routinely considered by regulators and the views of regulators are routinely considered by non-regulatory parties in estimating the return of capital. PoM should not be required to, in effect, delegate to other economic regulators the ability to consider the well accepted approaches from the full suite of experts in the area.

This view is further reinforced by the open wording of clause 4.3.1 of the Pricing Order, which does not limit the reference to ‘well accepted approaches’ or specify by whom the approach must be ‘well accepted’. Instituting a requirement that PoM can only use an approach where it has in fact been applied by ‘at a minimum, at least one economic regulator’, imposes a constraint that is inconsistent with both the plain meaning of the phrase and is not required by any of the regulatory objectives underpinning the Pricing Order. It is also inconsistent with the ESC’s own approach to interpreting the benchmark efficient entity provisions which the ESC acknowledges should not be restricted to a regulated environment and the approach taken by other regulators when estimating the return of capital under other regulatory regimes with similar decision making criteria to those set out in the Pricing Order.

Contrary to the ESC’s discussion in the Feedback Paper, there is nothing in the context, including the regulatory objectives, that supports the addition of such a constraint on the plain wording of the Pricing Order. The ESC has identified only one substantive concern about PoM’s construction, namely a context risk where approaches accepted in academia and/or the finance community may disregard the context in which the estimate of return on capital is made. PoM agrees that any well accepted approach, and ultimately the return on capital estimated, must have regard to:

³ SoRA, p 20.

⁴ See for example, National Electricity Rule 6.5.2.

- the terms and context of the Pricing Order including the principle in the Pricing Order that Prescribed Service Tariffs must be set so as to allow PoM a ‘reasonable opportunity to recover the efficient cost of providing all Prescribed Services’;⁵ and
- the objectives of the regulatory regime set out in section 48 of the Port Management Act.

This consideration may exclude a specific approach from being applied under the Pricing Order. But the relevance of context as an influencing factor on the selection of the well accepted approach falls far short of a stipulation that only an approach accepted by at least one economic regulator is ‘well accepted’.

Finally, PoM also notes that adopting the ESC’s interpretation removes flexibility that is and should be built into the Pricing Order. This may result in delays to the adoption of new models and adjustments to reflect macroeconomic crises because the ESC would consider that at least one other regulator would have to adopt the relevant approach or address the macroeconomic issue before it could be adopted or addressed by PoM. That would be an artificial constraint not required by the Pricing Order which permits PoM to adopt ‘...one or a combination of well accepted approaches...’ that is able to meet the needs of the situation in a manner consistent with the Pricing Order and the regulatory objectives.

B. Current / recent regulator use requirement impractical

In the Feedback Paper, the ESC indicated that:

‘We consider that at a minimum, at least one economic regulator should be using (or should have recently used) an approach for it to be considered ‘well accepted’.’

There are serious questions about how this test would be applied in practice.

First, although an approach may not be currently used in practice, it might nonetheless be well accepted (e.g. although regulators might not be using it, they might acknowledge that it was an approach that was open for their use) – it is unclear whether the ESC requires regulators to actually adopt (rather than ‘accept’) the approaches for those approaches to be considered well accepted and, if so, what the requirement for the regulator to have adopted rather than accepted the approach adds.

Second, in circumstances where a longer regulatory period is contemplated, it is unclear what the consequences of this provision would be. For example, PoM might adopt an approach that is used by one or more regulators in year one of a regulatory period, but is no longer used by such regulators by the end of the regulatory period.

Furthermore, given the nature of regulatory periods and therefore the lack of frequent regulator assessments, if recent usage is a key requirement of the test then it is impracticable for the regulatory regime to prevent consideration of financial / academic approaches (which can more quickly respond to changing market forces / the development of enhanced approaches).

These points serve to emphasise why there is no need to impose the constraint on the discretion contained in the Pricing Order. The views of economic regulators are relevant and will no doubt inform and influence the adoption of one or a combination of well accepted approaches. Nothing more is required by the Pricing Order and the ESC’s stipulation should not be imposed.

C. No requirement for ‘combination’ to be well accepted

The Pricing Order requires that ‘the Port Licence Holder must use one or a combination of well accepted approaches’. In the Feedback Paper, the ESC indicated that:

‘The pricing order provides that the port may use ‘one or a combination of well accepted approaches.’ We consider that if the port uses more than one approach when determining the rate of return, all of those approaches used must be well accepted by economic regulators that determine a return on capital for use in

⁵ Pricing Order, clause 2.1.1(a).

an accrual building block methodology. Further, the way in which the port combines each of those approaches to determine the cost of equity or the cost of debt must also be well accepted by economic regulators and must be consistent with the pricing order and the objectives of the regulatory regime.⁶

PoM agrees with the ESC's view that when using a combination of approaches, each approach used must be well accepted. However, PoM submits that the ESC's assertion that *'the way in which the port combines... must also be well accepted'* is incorrect. Put simply, the Pricing Order does not require that a well accepted combination of well accepted approaches be used. Rather any combination of well accepted approaches must yield an outcome that is consistent with the Pricing Order and the regulatory objectives – without an additional 'well accepted' criterion being inserted.

First, such an interpretation is not consistent with the language of the Pricing Order.

Second, such an interpretation would undermine the ESC's own analysis of the word 'approach'. The ESC has interpreted the word 'approach' as implying *'a method or a series of steps used in the estimation process'*. Based on the commentary in the Feedback Paper, PoM understands the ESC is likely to consider each of the approaches adopted by the AER and the ERA (which are different but both separately calculate the cost of equity and debt) as being well accepted.⁷ However, if a third regulator referenced each of these approaches and then applied a combination of approaches (e.g. a simple average of each constituent approach or using the ERA's equity model and the AER's debt model) and the approach of the third regulator became well accepted, it should not be understood as a 'well accepted combination', but rather would simply itself be a well accepted approach (i.e. it is the third regulator's approach that is well accepted, regardless of the fact that it considered or combined other well accepted approaches). Accordingly, as 'well accepted combinations of well accepted approaches' will already be captured (given they would be well accepted approaches), it would not make sense to read a requirement into the Pricing Order that any combinations must be well accepted. The consequence of this interpretation is that PoM has a broad discretion to combine well accepted approaches (including in ways that themselves may not yet be well accepted) provided that the combination is consistent with the terms and context of the Pricing Order and the objectives of the regulatory regime set out in section 48 of the Port Management Act.

Third, requiring that both the constituent approaches and the combination of approaches must be well accepted could lead to unexpected outcomes. For example, in circumstances where it was well accepted by academic, financial and/or regulatory communities to combine three different approaches but one of the three approaches was not of itself 'well accepted' at a later time, then it would not be possible to adopt the combined approach. This might have the effect of 'infecting' combined approaches, even in circumstances where that combined approach is well accepted. Given that the estimation models are unlikely to be completely disregarded over a short period of time (even in circumstances where a new / superior model is developed and shortcomings in previous models have been identified), it likely to take some time for new models to be considered on a standalone basis / fully replace older models (and therefore new models could potentially take a very long time or never become well accepted). This cannot be the intended outcome of the regulatory regime.

The Pricing Order clearly requires PoM to adopt only well accepted approaches. Having done so, PoM has the discretion to combine the approaches in a manner that satisfies the pricing principles. This reflects the language of the Pricing Order and PoM's broader role under the regulatory regime, whereby within certain specific (e.g. only relying upon well accepted approaches) and general (e.g. complying with the pricing principles and the regulatory objectives) constraints, PoM has discretion in how it fulfils its obligations (e.g. selecting how best to weight those well accepted approaches).

⁶ Feedback Paper, p 40.

⁷ See ERA Rate of Return Guidelines: Meeting the requirements of the National Gas Rules and AER Rate of Return Guidelines, p 4.

5. Conclusion

As can be seen from the limited commentary above, it is clear from the Initial TCS and the feedback documents that in most areas there is alignment in the approach adopted by PoM and the views of the ESC as to what is needed to demonstrate compliance with the Pricing Order. However, in relation to step one of the ESC's WACC Compliance Assessment Test and in particular, how the ESC has approached the meaning of 'well accepted', PoM submits that the ESC should:

- broaden its consideration of well accepted approaches beyond regulators to recognise that the financial and academic communities have valuable insights on estimating the return on capital (and are indeed often used by and referred to by regulators);
- reconsider its suggestion to impose the 'should be using (or should have recently used)' constraint on the discretion contained in the Pricing Order to consider well accepted approaches (particularly given the potential practical implications of applying such a constraint); and
- reconsider its suggestion that a combination of approaches must be well accepted.