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Foreword

Waterline is published by the Bureau of Infrastructure, Transport and Regional Economics (BITRE) and provides information on container movements on both the wharf-side and the landside of five Australian major port terminals: Brisbane, Sydney, Melbourne, Adelaide and Fremantle. This Waterline covers port terminal activity up to the June quarter 2017.

Waterline reports on trends in container handling productivity on the waterfront in Australia as well as the cost of importing and exporting containers. It covers loading and unloading of container ships and the landside transport of containers to and from container terminals. This Waterline provides the latest data available on stevedoring productivity and landside performance.

This issue of Waterline was prepared in the Infrastructure and Surface Transport Statistics Section by Thomas Rutherford. For further information on this report please phone Thomas Rutherford on (02) 6274 6818, Jack McAuley on (02) 6274 7309 or email maritime_stats@infrastructure.gov.au.

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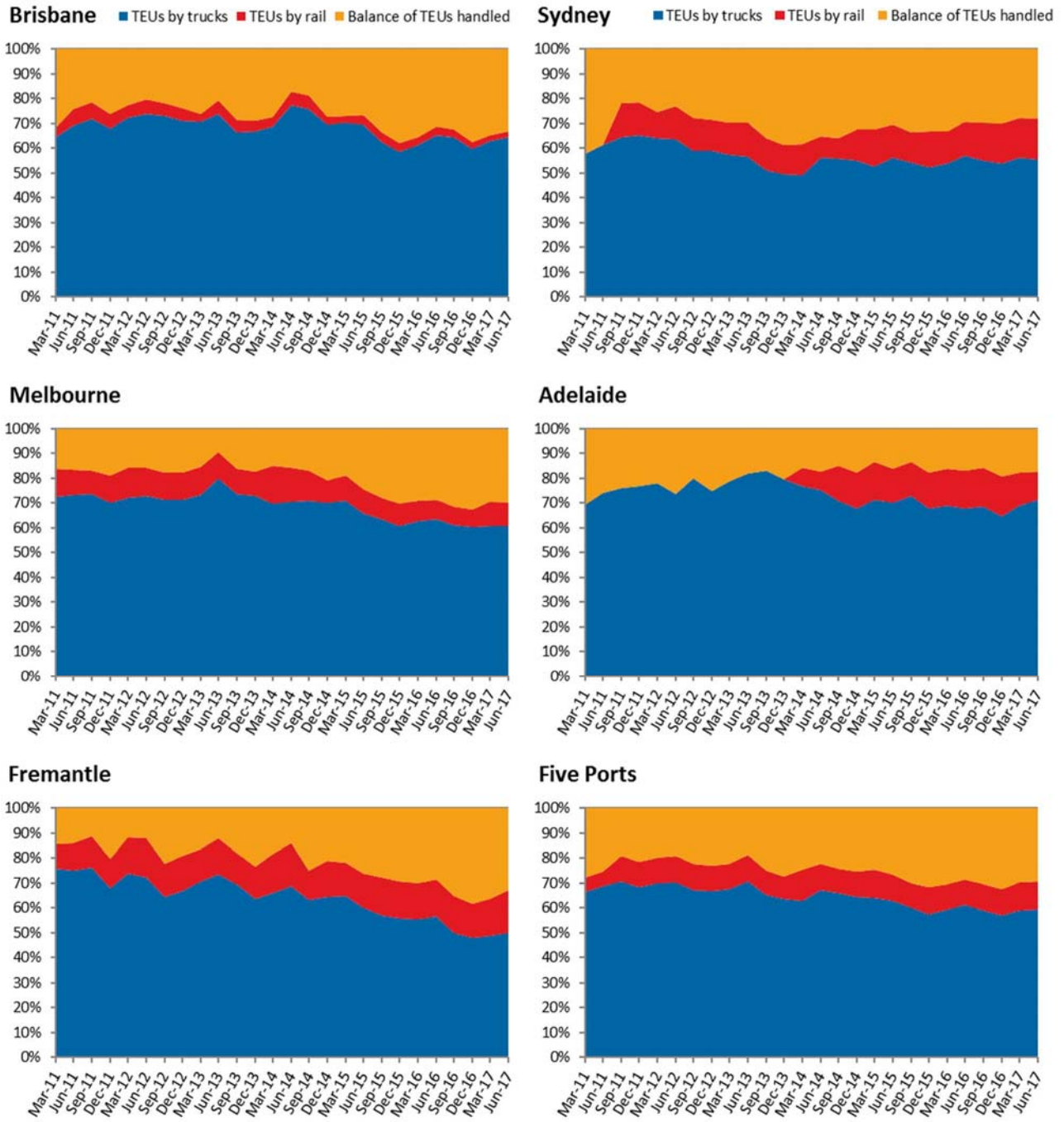
December 2017

At a glance

Throughput

- During the period January–June 2017 the *number of unitised cellular container ships (UCCs) handled by stevedores* increased by 5.3 per cent in the five ports, as compared with January–June 2016. The largest increases occurred at Adelaide (12.0 per cent) and Sydney (7.6 per cent). There was a decline of 0.8 per cent at Fremantle.
- The total *number of twenty foot equivalent units (TEUs) handled by stevedores* increased by 5.9 per cent during the period January–June 2017, as compared with the same period in 2016, with increases recorded at all five ports. The largest increases occurred at Adelaide (9.3 per cent) and Brisbane (8.3 per cent).
- Growth in annual TEU throughput at Australia's container ports was 3.5 per cent in the 12 months to June 2017, while non-farm GDP growth was 1.7 per cent over the same period.
- The *number of TEUs moved through empty container parks* grew by 5.12 per cent in January–June 2017, compared to the same period in 2016. The greatest increase was in Adelaide (24.7 per cent), while the biggest decrease was in Sydney (7.82 per cent).
- Figure A.1 illustrates the proportions of TEUs handled by VBS/TAS trucks, by rail, and the balance, for each port and the five ports total. The balance of TEUs handled outside of the VBS/TAS and rail systems relates to the movement of empty export containers via bulk runs, as well as the degree to which stevedores facilitate the ad hoc or opportunistic pickup and delivery of containers outside of pre-booked slots.

Figure A.1 Proportion of containers handled by VBS/TAS trucks, rail and other



Note: Balance of TEUs handled relates to the movement of empty export containers via bulk runs (as required by the stevedores when completing loading of a vessel). The balance also reflects the degree to which stevedores facilitate the ad hoc or opportunistic pickup and delivery of containers outside pre-booked slots. The balance is computed against the total containers handled wharfside; landside-only operations are additional to the totals.

Sources: BITRE estimates (2017).

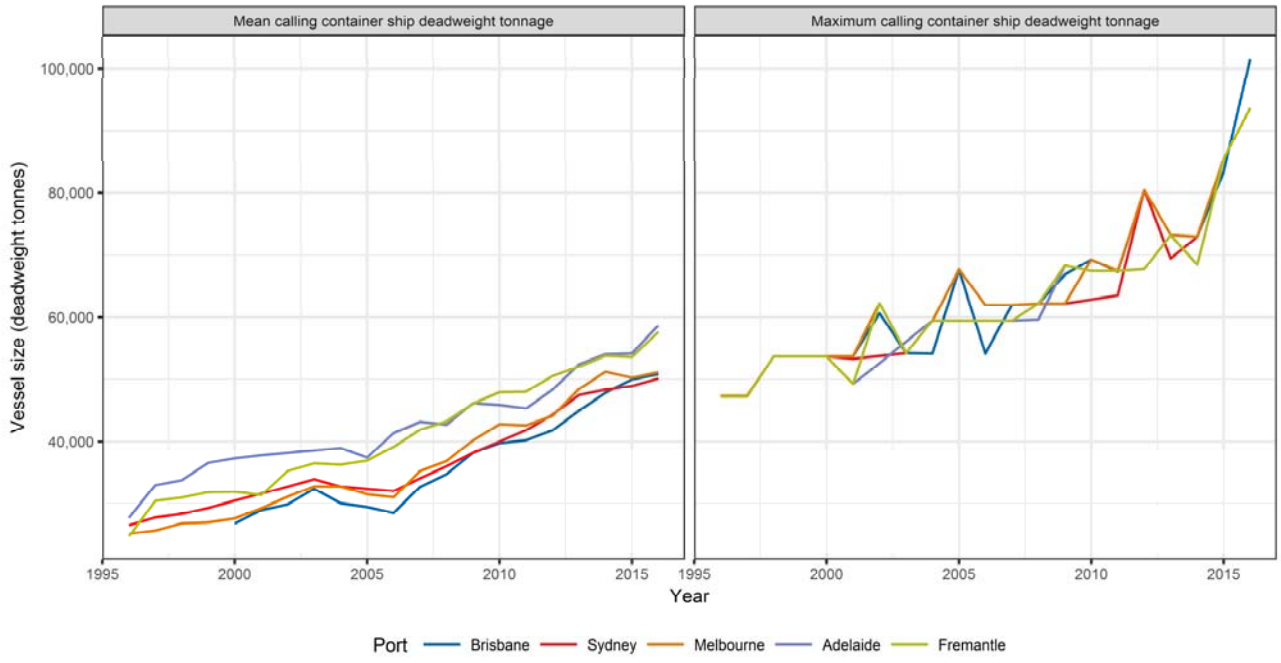
Vessel size

The size of container vessels employed by international shipping lines is increasing, driven by economies of scale for shipping lines in the operation of larger vessels. 2017 has seen the entry into service of three Ultra Large Container Vessels (ULCVs) in excess of 20 000 TEUs capacity—*MOL Triumph*, *Madrid Maersk* and *OOCL Hong Kong*.

While vessels such as these are not used on the Australian trade, the 'cascade' of vessels displaced by the new entrants has still seen an increase in the maximum and average vessel sizes calling at Australian ports.

Figure A.2 shows the mean and maximum deadweight tonnages of vessels calling to the five *Waterline* ports over calendar years 1996 to 2016. The maximum tonnage of calling vessels has increased from 62 007 deadweight tonnes in 2011 to 101 496 deadweight tonnes in 2016; over the same period, the mean tonnage of calling vessels has increased by 63 per cent, from 32 061 deadweight tonnes to 52 397 deadweight tonnes.

Figure A.2 Container vessel deadweight tonnage at five ports, 1996–2016



Source: BITRE estimates from data supplied by port authorities, port operators (1996–2016) and Lloyd's List Intelligence (1998–2017).

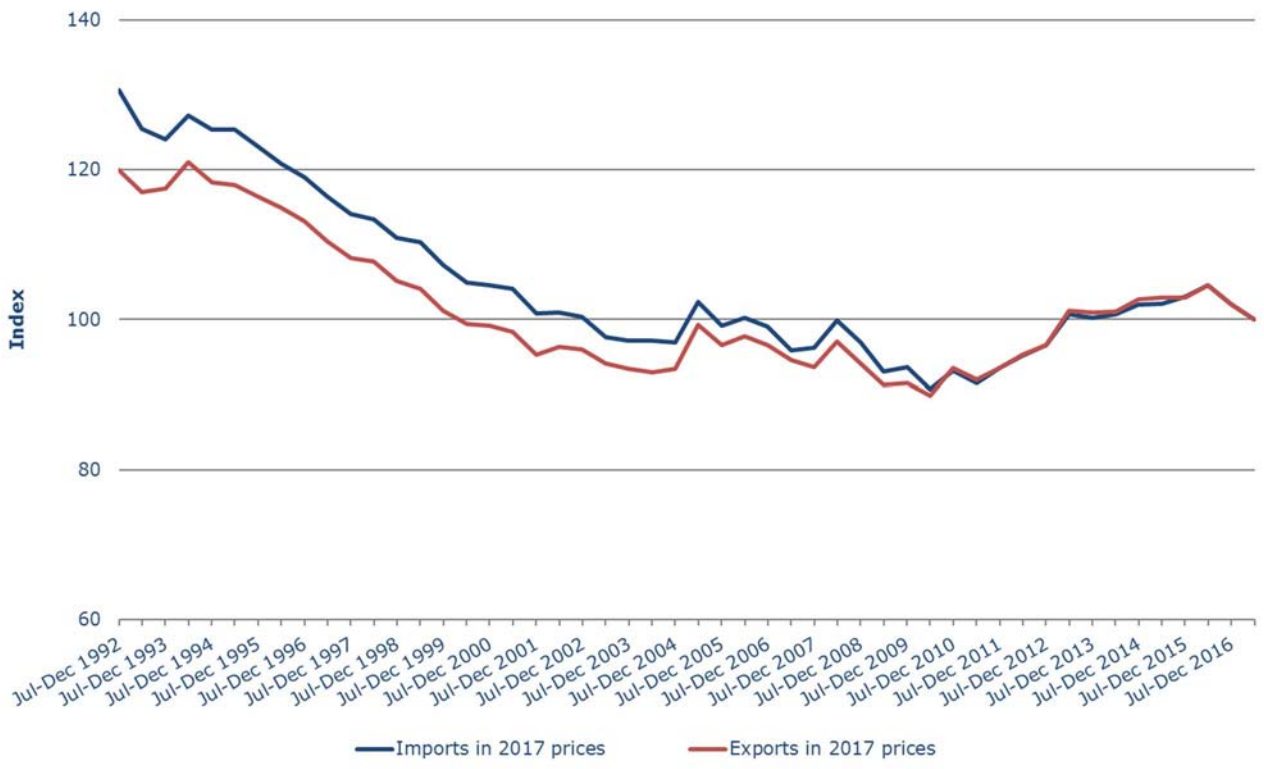
Productivity

- Compared to January–June 2016, the *median ship turnaround time* in January–June 2017 increased in four ports, with the biggest increase in Adelaide (16.8 per cent). Fremantle posted a decline (3.2 per cent). Across the five ports, this indicator increased 3.3 per cent to 30.6 hours.
- *Average lifts per ship-hour at berth* remained consistent, increasing by 0.1 per cent to 41.7 in January–June 2017 compared to the same period in 2016.
- *Average lifts per stevedore-hour* declined by 2.7 per cent across the five ports January–June 2017 compared to the same period in 2016. The greatest decline occurred in Sydney (6.2 per cent), while Fremantle posted the only increase (4.9 per cent).
- The *percentage of ships waiting at anchorage for more than 2 hours* remained constant in January–June 2017 compared to the same period in 2016, at 6.2 per cent of ships.
- Wharfside productivity measures improved at Fremantle in January–June 2017, with (TEUs per hour) *crane rate*, *elapsed labour rate* and *ship rate* improving by 0.5 per cent, 5.2 per cent and 4.0 per cent respectively, compared to the same period in 2016. The same measures declined at Adelaide, with *crane rate* decreasing by 12.3 per cent, *elapsed labour rate* by 8.4 per cent and *ship rate* by 10.1 per cent.
- The average *ship rate* (TEUs per hour) declined by 1.2 per cent across the five ports in the period January–June 2017 (compared to the same period in 2016).
- Average *truck turnaround times* decreased by 4.8 percent across the five ports in January–June 2017. Melbourne posted a decrease of 22.3 per cent, driven in part by commencement of operations at VICT. Adelaide and Sydney recorded increases of 10.6 per cent and 8.3 per cent, respectively. *Container turnaround times* decreased by 23.6 per cent in Melbourne and 6.2 per cent in Fremantle.
- The *per cent of trucks backloaded* shows the number of backloaded operations as a percentage of total VBS trucks in all five ports. During the period January–June 2017, the largest percentage of backloaded operations was in Adelaide (27.9 per cent), up from 24.2 per cent in January–June 2016. The share of backloaded operations also grew in Brisbane (from 11.3 to 13.2 percent), Melbourne (from 15.4 to 16.9 per cent) and Fremantle (from 11.8 to 12.3 per cent).
- The total *number of truck timeslots used* in the five ports increased by 2.1 per cent in January–June 2017 compared to the same period in 2016.

Port-interface cost

- The port interface cost index for exports decreased for all ship categories in the period January–June 2017:
  - For small ships (5 000 to 20 000 GT) port interface costs decreased by $18/TEU for exports;
  - For medium size ships (35 000 to 40 000 GT) port interface costs decreased by $19/TEU for exports; and
  - For large size ships (50 000 to 55 000 GT) port interface costs decreased by $23/TEU for exports.
- The port interface cost index for imports decreased for all ship categories in the period January–June 2017:
  - For small ships (5 000 to 20 000 GT) port interface costs decreased by $19/TEU for imports;
  - For medium size ships (35 000 to 40 000 GT) port interface costs decreased by $20/TEU for imports; and
  - For large size ships (50 000 to 55 000 GT) port interface costs decreased by $23/TEU for imports.
- Figure A.3 provides a long-term illustration of port interface costs for medium-sized ships (35 000–40 000 GT), adjusted by the non-farm GDP deflator.

Figure A.3 Adjusted port interface cost indices for medium sized vessels



Note: Medium sized vessels range in size between 35 000 and 40 000 GT. January–June 2017 is the base period.

Sources: BITRE estimates (2017).

Abbreviations and terms

ABS	Australian Bureau of Statistics
ACCC	Australian Competition and Consumer Commission
BITRE	Bureau of Infrastructure, Transport and Regional Economics
DP World	Dubai Ports World
FACT	Flinders Adelaide Container Terminal
Five ports	Refers to the aggregation of the following major container terminals at the five mainland capital city ports: • Fisherman Islands (Brisbane), • Brotherson Dock, at Port Botany (Sydney), • Swanson Dock (Melbourne), • Flinders Adelaide Container Terminal at Outer Harbor / Pelican Point (Adelaide) • North Quay in the "Inner Harbour" on the Swan River (Fremantle)
GT	Gross tonnage
Infrastructure	Department of Infrastructure and Regional Development
n.a.	Not applicable
Mins	Minutes
Pbm	Per berth metre
PICI	Port Interface Cost Index
Qtr	Quarter
TAS	Truck Appointment System (used by Hutchison Ports Australia to schedule trucks at a container terminal). See also VBS
TEU	Twenty-foot equivalent unit
TTT	Truck turnaround time
UCC	Cellular Container ship; a type of specialised container ship
VBS	Vehicle Booking System, used to schedule trucks at a container terminal. DP World and Patrick use a shared system developed by 1-Stop Connections Pty Ltd; FACT operates a similar system.

Acknowledgements

BITRE is particularly grateful for the assistance of the following organisations in the provision of data used to prepare Waterline:

- stevedoring companies: DP World, Flinders Adelaide Container Terminal, Hutchison Ports Australia, Patrick and Victoria International Container Terminal
- individual port authorities and corporations: Port of Brisbane Pty Ltd, Port Authority of New South Wales, NSW Ports, Port of Melbourne Operations Pty Ltd, Flinders Ports and Fremantle Ports
- Ports Australia
- Containerchain Pty Ltd
- shipping lines
- customs brokers
- road transport operators
- pilot, tug and mooring operators

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Chapter 1: Measures of container terminal throughput

Overview

Chapter 1 of Waterline presents all container port throughput indicators in a consolidated format. The indicators are in four groups—wharf-side, landside, whole of container terminal and whole of port.

There are four wharf-side quarterly throughput indicators:

1.1 UCC ships handled, as reported by stevedores

1.2 Total containers handled by stevedores

1.3 Total TEUs handled by stevedores

1.4 40-foot containers as per cent of all containers handled

There are nine landside quarterly throughput indicators:

1.5 Number of trucks used in VBS/TAS operations

1.6 Total number of containers transported by trucks and rail

1.7 Total number of containers transported by trucks

1.8 Number of containers by rail

1.9 Balance of containers handled landside

1.10 Total number of TEUs transported by trucks and rail

1.11 Total number of TEUs transported by trucks

1.12 Number of TEUs by rail

1.13 Balance of TEUs handled landside

Using data from port authorities, there are two quarterly whole-of-terminal throughput indicators:

1.14 Total number of container ship visits

1.15 Total number of containers (lifts) exchanged

Using data from port authorities, there are seven six-monthly whole-of-port throughput indicators:

1.16 Total cargo throughput

1.17 Non-containerised general cargo throughput

1.18 Total number of TEUs exchanged

1.19 Number of TEUs: Full import

1.20 Number of TEUs: Empty import

1.21 Number of TEUs: Full export

1.22 Number of TEUs: Empty export

Indicators are presented separately for Brisbane, Sydney, Melbourne, Adelaide and Fremantle, as well as for the five ports as a whole, where applicable.

Container terminal

The movement of containers from/to the container ship takes place on a wharf or pier known as a container terminal. Unlike a traditional wharf, a container terminal needs a large stacking area adjoining the wharf for storing containers. While in the terminal, the containers are at the disposal of a stevedoring company.

Stevedoring

The term stevedore can refer to a company which manages the operation of loading or unloading a ship. In Australia the people who work on the waterfront are referred to as waterside workers or stevedores. A stevedoring company typically owns equipment used in the loading or discharging operation and hires labour for that purpose. A stevedoring company may also contract with a terminal owner to manage all terminal operations. In Australia, there are three major stevedoring companies which handle containers: Patrick, Dubai Ports World and Hutchison Ports Australia.

Wharf-side throughput measures

Measures of throughput at the wharf-side relate only to containers moved by stevedoring companies from/to UCC ships at the container terminals.

Indicator 1.1 UCC ships handled, as reported by stevedores

Only fully cellular ships, or Unitized Cellular Container (UCC) ships, are included in this indicator. Normally these purpose built container ships are equipped with 40-foot cell guides below deck as a minimum requirement.

Indicator 1.2 Total containers handled

This is the total number of containers lifted on/off UCC ships at specialised container berths.

These counts are not standardised to account for different container sizes. Thus, one 20-foot container and one 40-foot container are counted as two containers.

Indicator 1.3 Total TEUs handled

This indicator is similar to total containers handled (Indicator 1.2), but measured in 'twenty-foot equivalent units' (TEUs). It accounts for containers of different sizes.

The TEU is a universally-recognised measure which represents containers of different sizes in a standardised way. A 20-foot container equals one TEU, and a 40-foot container equals two TEUs. Less common container sizes may be fractions of a TEU.

Indicator 1.4 40-foot containers as per cent of all containers handled

This is the number of 40-foot containers as a percentage of all containers handled.

Landside throughput measures

Indicator 1.5 Number of trucks used in VBS/TAS operations

This is the count of trucks processed through either the vehicle booking system (VBS) or the truck appointments system (TAS). This count excludes trucks that perform bulk runs of empty containers between the container parks and container terminals. This indicator counts trucks on a round trip. That is, a truck entering a container terminal and the same truck exiting the container terminal is counted as one truck.

Indicator 1.6 Total number of containers transported by trucks and rail

This indicator includes the total number of containers transported in all modes on the landside, either by trucks or by rail. Counts of containers in this indicator are further broken down into Indicator 1.7 (containers moved by trucks) and Indicator 1.8 (containers moved by rail).

Indicator 1.7 Total number of containers transported by trucks

This indicator includes the total number of containers transported by VBS/TAS trucks. This indicator is computed using data provided by stevedores. Up to Waterline 55, this indicator included the trucks undertaking bulk runs; this has been discontinued due to inconsistent data.

Indicator 1.8 Number of containers by rail

The total number of containers carried by rail in or out of container terminals, using data supplied by container port operators.

This indicator includes containers handled through 'on-dock' and 'near-dock' rail sidings. 'On-dock' refers to rail sidings accessible by yard container handling equipment, whereas 'near-dock' sidings are those within the port precinct, but accessed via the public road network.

Only on-dock rail data is reported for Sydney, as port precinct rail data is not available.

Indicator 1.9 Balance of containers handled landside

This indicator shows the difference between the throughput of containers on the wharfside (Indicator 1.2) and the total containers transported by VBS/TAS trucks and rail (Indicator 1.6). It illustrates the scale and variability of the container handling task outside of VBS/TAS and railway operations. This indicator includes containers handled by consignees' own transport, but excludes landside-only operations.

To avoid double counting of containers, this indicator is calculated differently in Melbourne and Adelaide, where it is the difference between throughput of containers on the wharfside (Indicator 1.2) and the number of containers transported by VBS/TAS trucks (Indicator 1.5).

Due to the mix of operations at Brisbane, both the standard and alternate calculations may double-count some containers. The standard calculation is used.

Indicator 1.10 Total number of TEUs transported by trucks and rail

This indicator includes the total number of TEUs transported in all modes on the landside, either by trucks or by rail. Counts of TEUs in this indicator are further broken down into Indicator 1.11 (TEUs moved by trucks) and Indicator 1.12 (TEUs moved by rail).

Indicator 1.11 Total number of TEUs transported by trucks

This indicator includes the total number of TEUs transported by VBS/TAS trucks. Up to Waterline 55, this indicator included the number of TEUs transported by trucks undertaking bulk runs; this has been discontinued due to inconsistent data.

Indicator 1.12 Number of TEUs by rail

The total number of TEUs carried by rail in or out of container terminals, using data supplied by container port operators.

This indicator includes containers handled through 'on-dock' and 'near-dock' rail sidings. 'On-dock' refers to rail sidings accessible by yard container handling equipment, whereas 'near-dock' sidings are those within the port precinct, but accessed via the public road network.

Only on-dock rail data is reported for Sydney, as port precinct rail data is not available.

Indicator 1.13 Balance of TEUs handled landside

This indicator is similar to Indicator 1.9, but calculated in TEUs. It shows the difference between the throughput of TEUs on the wharfside (Indicator 1.3) and the total TEUs transported by VBS/TAS trucks and rail (Indicator 1.10).

To avoid double counting of TEUs, this indicator is calculated differently in Melbourne and Adelaide, where it is the difference between throughput of TEUs on the wharfside (Indicator 1.3) and the number of TEUs transported by VBS/TAS trucks (Indicator 1.11).

Due to the mix of operations at Brisbane, both the standard and alternate calculations may double-count some TEUs. The standard calculation is used.

Whole of container terminal throughput

Indicator 1.14 Total number of container ship visits

This is a count of all port calls by UCC ships where the vessel visited and exchanged containers at the container terminal. Table 1.7 summarises ship visits by size of ship and by container port.

Indicator 1.15 Total number of containers (lifts) exchanged

This indicator is estimated using Indicator 1.4 (percentage of 40-foot containers) and the total number of TEUs exchanged with container vessels, as reported by ports.

Whole of port throughput

Indicator 1.16 Total cargo throughput

This is the weight, measured in tonnes, of all container and non-container general cargoes that passed through the port.

Indicator 1.17 Non-containerised general cargo throughput

This is the weight of non-container general cargoes processed through a port. Non-container general cargo refers to break bulk commodities including machinery, iron and steel products, timber, paper and timber products and other general cargoes. It does not include bulk cargoes.

Indicator 1.18 Total number of TEUs exchanged

This is a count of TEUs, exchanged through the port. This count is further broken down into Indicators 1.19 to 1.22.

Indicator 1.19 Full import TEUs

This is a count of full containers in TEUs imported (unloaded) at the port.

Indicator 1.20 Empty import TEUs

This is a count of empty containers in TEUs imported (unloaded) at the port.

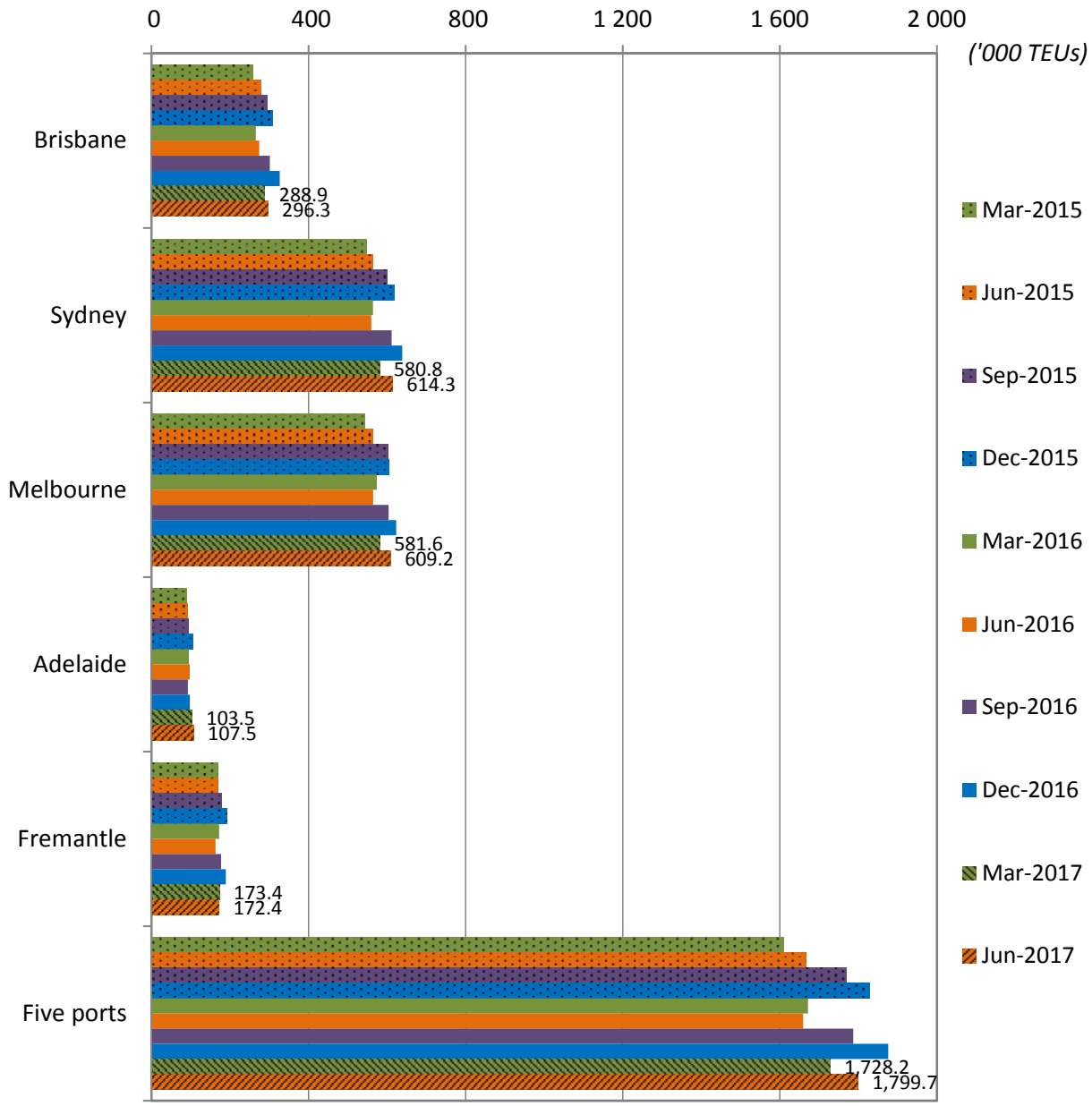
Indicator 1.21 Full export TEUs

This is a count of full containers in TEUs exported (loaded) at the port.

Indicator 1.22 Empty export TEUs

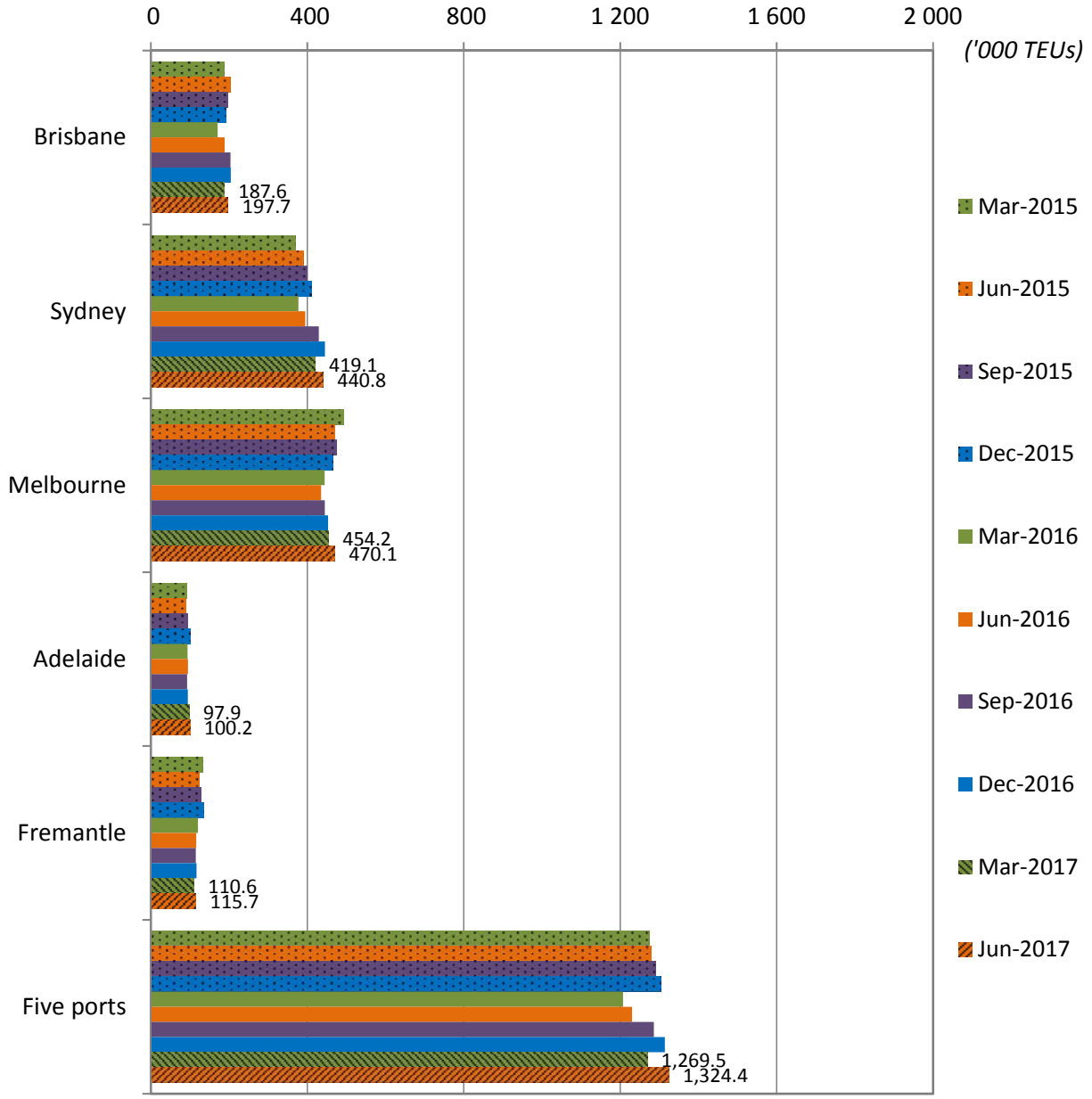
This is a count of empty containers in TEUs exported (loaded) at the port.

Figure 1.1 TEU throughput by container port: wharf-side



Sources: DP World (2017), Flinders Adelaide Container Terminal (2017), Hutchison Ports Australia (2017), Patrick (2017) and Victoria International Container Terminal (2017).

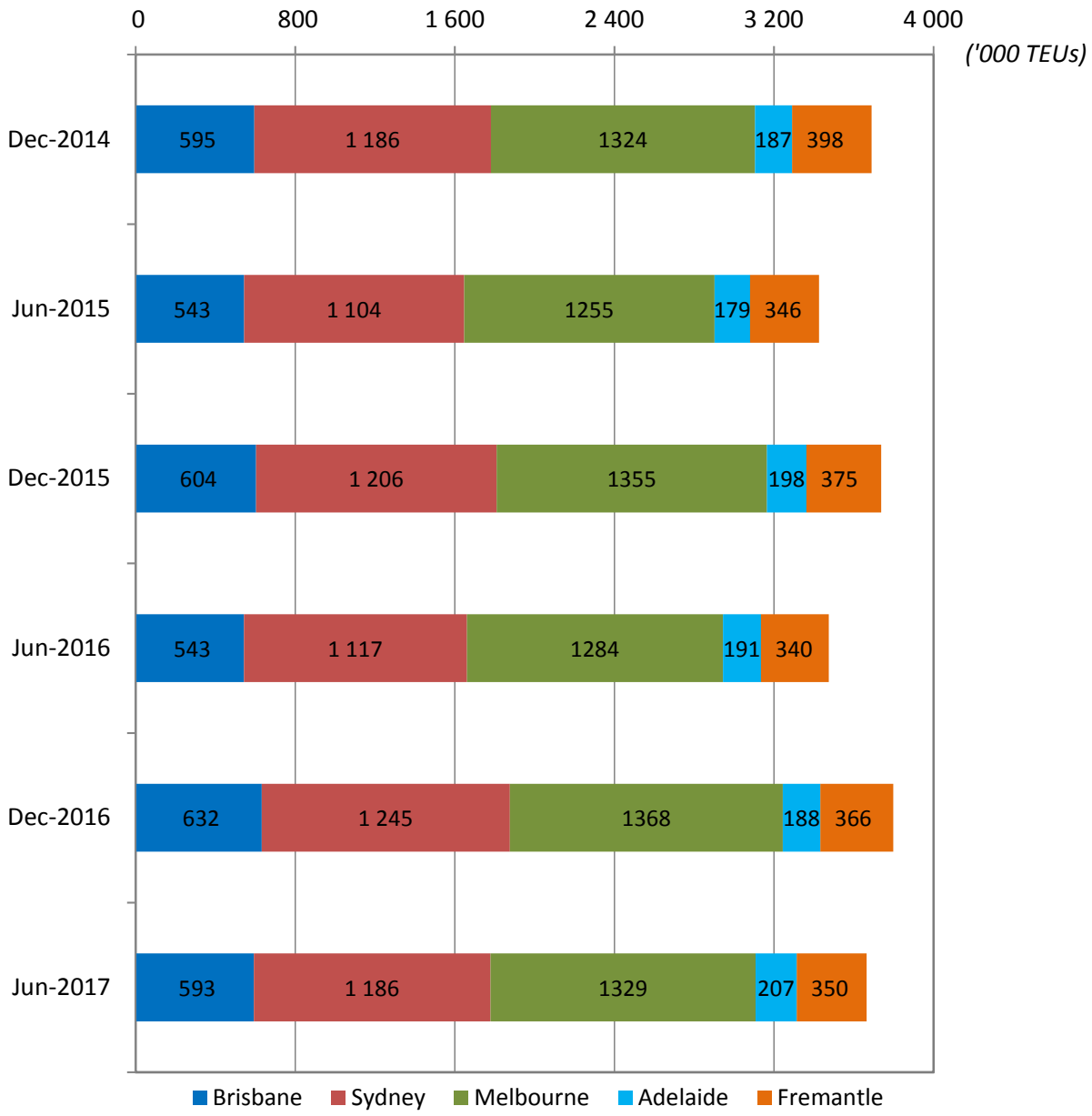
Figure 1.2 TEU throughput by container port: landside



Notes: The data in this figure shows the total TEUs moved on the landside by rail and by VBS/TAS trucks where data are available.

Sources: DP World (2017), Flinders Adelaide Container Terminal (2017), Hutchison Ports Australia (2017), Patrick (2017), Victoria International Container Terminal (2017), Flinders Ports (2017), Port of Brisbane Pty Ltd (2017), Port of Melbourne Operations Pty Ltd (2017) and Fremantle Ports (2017).

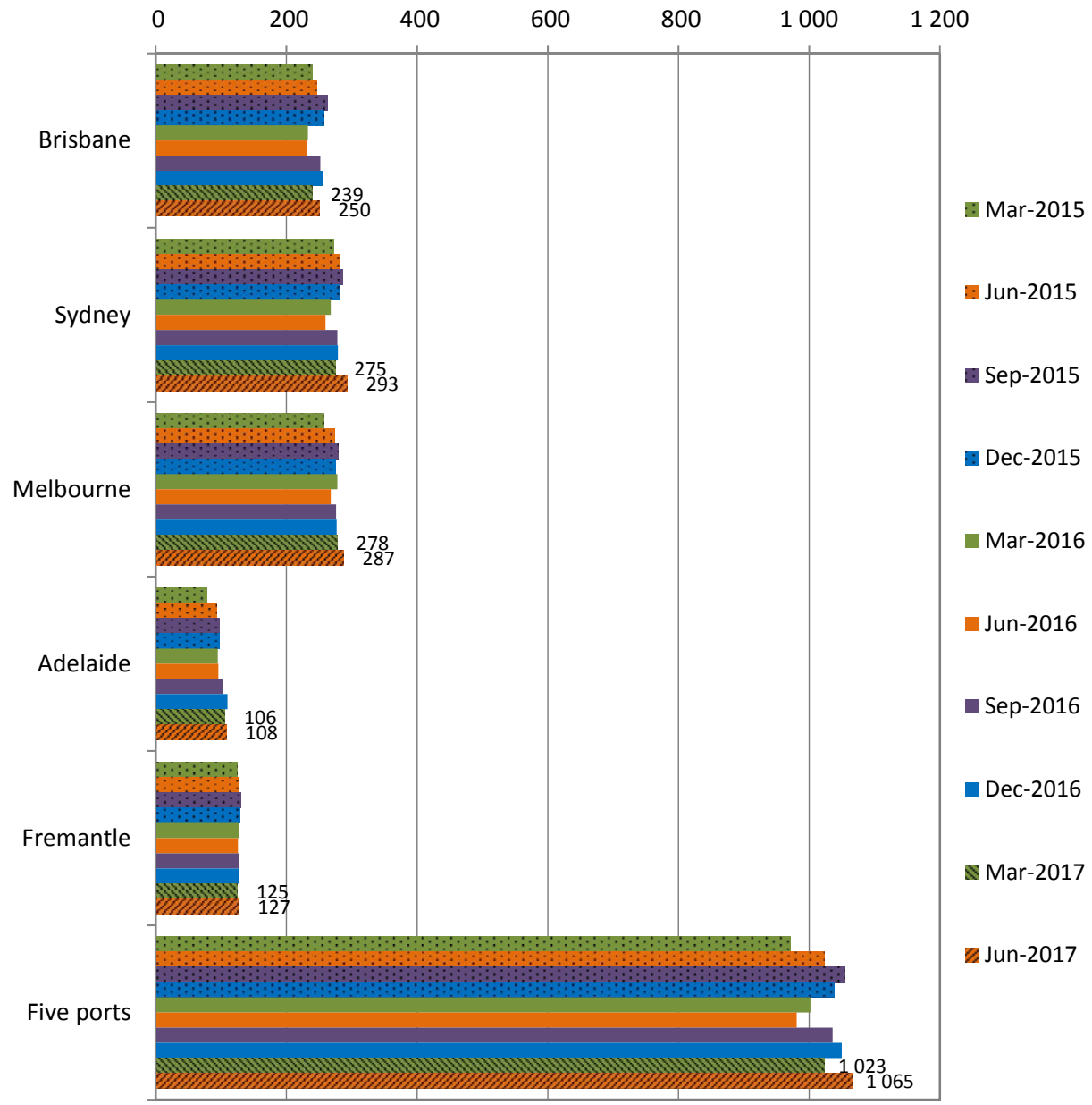
Figure 1.3 TEU throughput by container port: whole of port



Notes: The data relate to terminals at Fisherman Islands (Brisbane), Brotherson Dock at Port Botany (Sydney), Swanson Dock (Melbourne), Flinders Adelaide Container Terminal at Outer Harbor/Pelican Point (Adelaide), and North Quay in the Inner Harbour (Fremantle).

Sources: Port of Brisbane Pty Ltd (2017), Port Authority of New South Wales (2017), Port of Melbourne Operations Pty Ltd (2017), Flinders Ports (2017) and Fremantle Ports (2017).

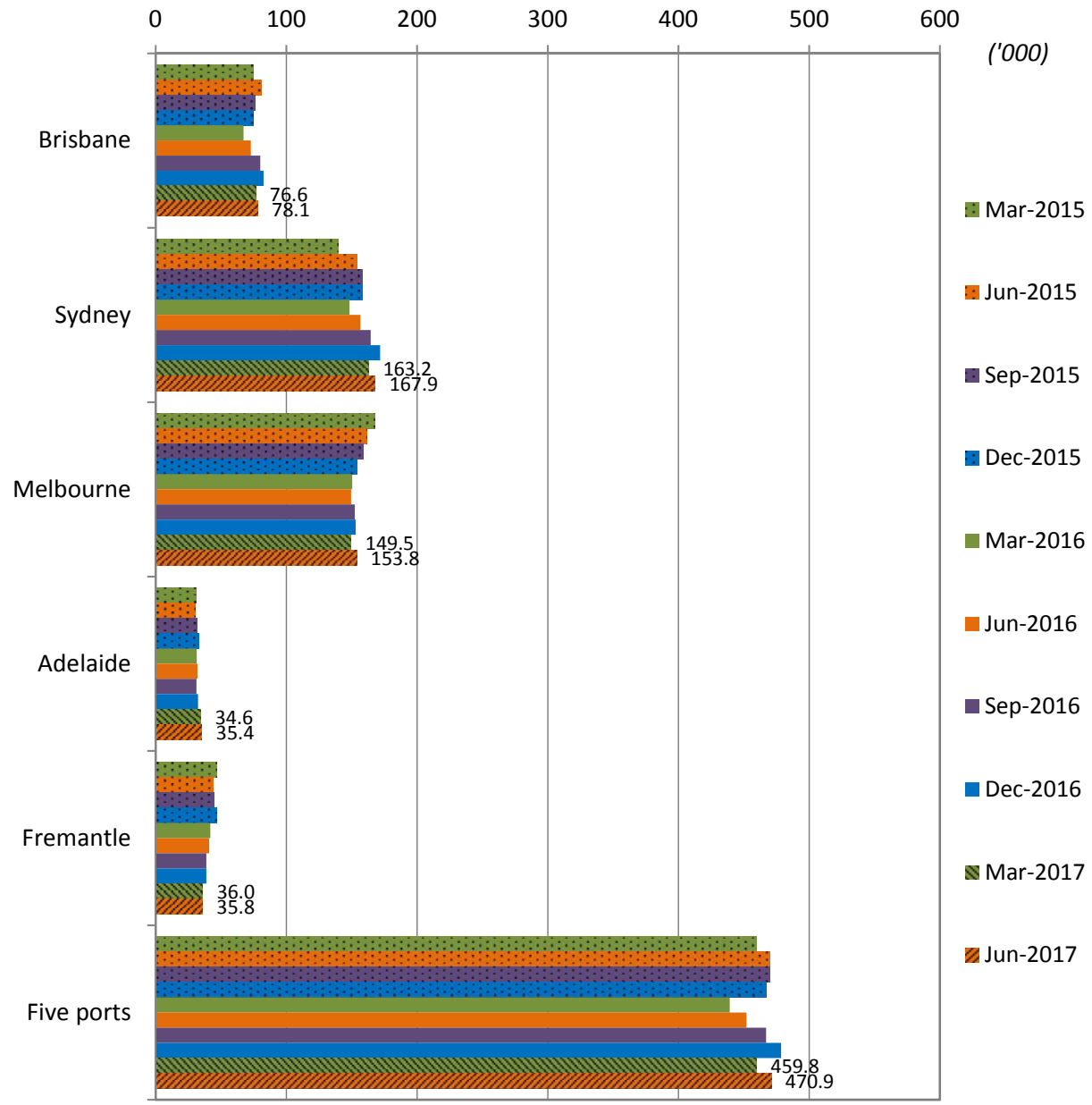
Figure 1.4 Container terminal traffic: number of UCC ships handled



Notes: The data contained in this figure relates to Indicator 1.1 as defined in the explanatory notes and Table 1.1 to 1.6.

Sources: DP World (2017), Flinders Adelaide Container Terminal (2017), Hutchison Ports Australia (2017), Patrick (2017) and Victoria International Container Terminal (2017).

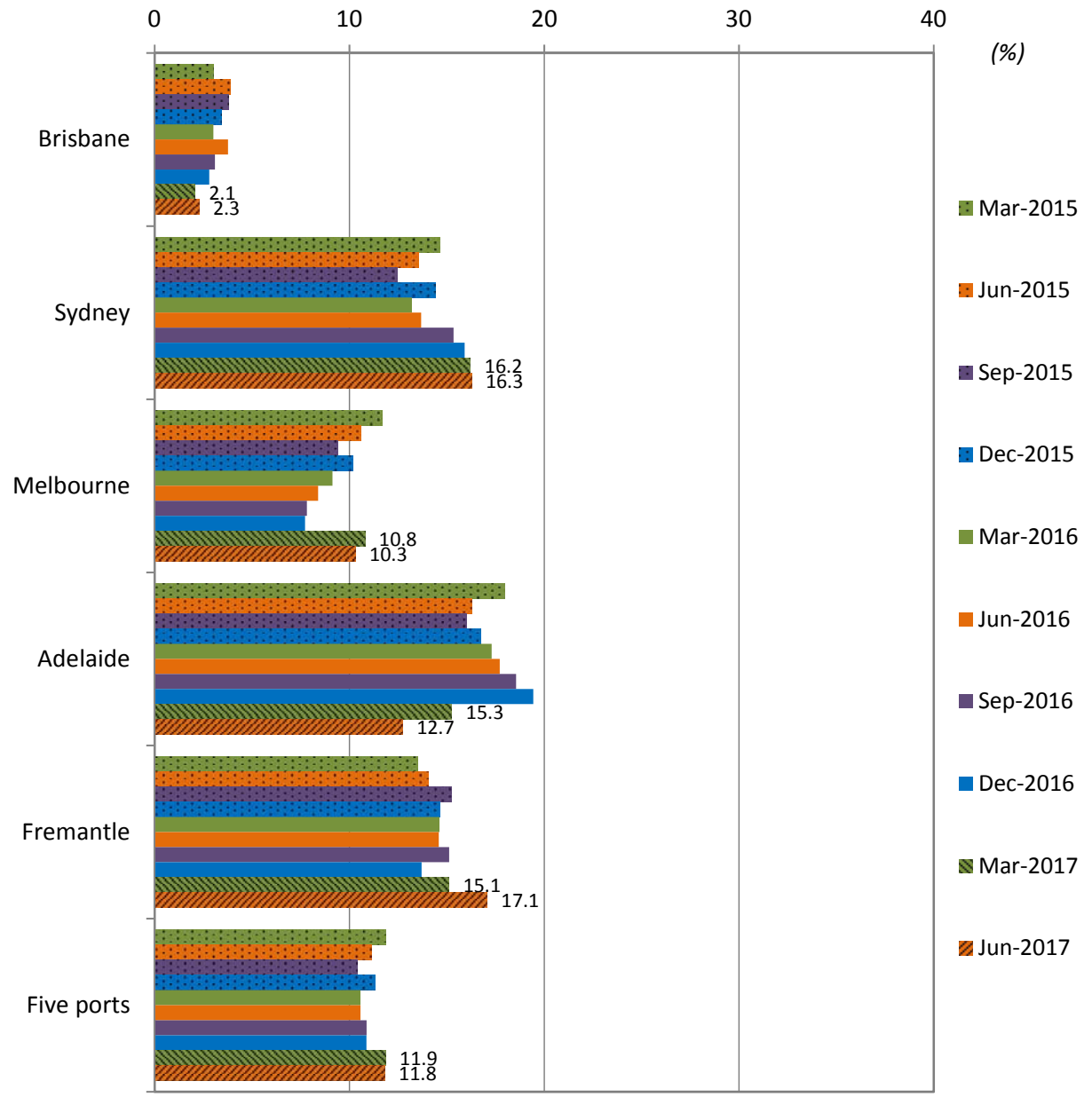
Figure 1.5 Container terminal traffic: number of trucks used in VBS/TAS operations



Notes: Data on number of trucks used in bulk runs are not available.

Sources: DP World (2017), Flinders Adelaide Container Terminal (2017), Hutchison Ports Australia (2017), Patrick (2017) and Victoria International Container Terminal (2017).

Figure 1.6 Rail share of TEUs handled



Sources: DP World (2017), Flinders Adelaide Container Terminal (2017), Hutchison Ports Australia (2017), Patrick (2017), Flinders Ports (2017), Port of Brisbane Pty Ltd (2017), Port of Melbourne Operations Pty Ltd (2017) and Fremantle Ports (2017).

Table 1.1 Container terminal throughput: Brisbane

	2015						2016						2017		
	Mar Qtr	Jun Qtr	Jan-Jun	Sep Qtr	Dec Qtr	Jul-Dec	Mar Qtr	Jun Qtr	Jan-Jun	Sep Qtr	Dec Qtr	Jul-Dec	Mar Qtr	Jun Qtr	Jan-Jun
WHARFSIDE															
UCC ships handled, as reported by stevedores	239	247	**486**	263	257	**520**	233	231	**464**	252	256	**508**	239	250	**489**
Total containers handled *('000)*	172.9	191.0	**363.9**	197.7	208.1	**405.8**	177.8	185.2	**363.0**	200.9	220.4	**421.4**	194.1	196.5	**390.5**
Total TEUs handled *('000)*	258.4	279.0	**537.4**	295.2	308.7	**603.9**	265.8	274.4	**540.1**	301.6	326.7	**628.4**	288.9	296.3	**585.2**
40-foot containers as per cent of all containers handled *(%)*	49.4	46.1	**47.7**	49.3	48.4	**48.8**	49.4	48.2	**48.8**	50.1	48.2	**49.1**	48.9	50.8	**49.8**
LANDSIDE															
Number of trucks used in VBS/TAS operations *('000)*	74.4	80.6	**155.0**	76.1	75.0	**151.2**	67.3	72.8	**140.1**	80.1	82.6	**162.7**	76.6	78.1	**154.7**
Total containers transported by VBS/TAS trucks and rail *('000)*	128.7	142.4	**271.2**	136.1	133.8	**269.9**	118.1	130.6	**248.6**	139.9	143.6	**283.5**	131.8	135.5	**267.2**
Containers by VBS/TAS trucks *('000)*	121.6	132.4	**254.0**	125.9	124.2	**250.1**	111.0	121.4	**232.4**	131.6	135.5	**267.1**	126.3	129.3	**255.6**
Containers by rail *('000)*	7.2	10.0	**17.2**	10.2	9.6	**19.8**	7.1	9.2	**16.3**	8.4	8.1	**16.4**	5.4	6.2	**11.6**
Balance of containers handled landside *('000)*	44.2	48.6	**92.7**	61.6	74.3	**135.9**	59.8	54.6	**114.4**	61.0	76.8	**137.8**	62.3	61.0	**123.3**
Total TEUs transported by VBS/TAS trucks and rail *('000)*	188.9	204.4	**393.3**	195.6	191.3	**386.9**	171.0	188.6	**359.6**	203.6	204.3	**407.9**	187.6	197.7	**385.3**
TEUs by VBS/TAS trucks *('000)*	181.1	193.5	**374.6**	184.4	180.7	**365.0**	163.0	178.2	**341.3**	194.3	195.1	**389.4**	181.7	190.9	**372.6**
TEUs by rail *('000)*	7.8	10.9	**18.7**	11.2	10.6	**21.9**	8.0	10.3	**18.4**	9.3	9.2	**18.5**	6.0	6.7	**12.7**
Balance of TEUs handled landside *('000)*	69.5	74.6	**144.1**	99.6	117.4	**217.0**	94.7	85.8	**180.5**	98.0	122.4	**220.4**	101.2	98.7	**199.9**
WHOLE OF CONTAINER TERMINAL															
Total number of container ship visits	236	236	**472**	246	241	**487**	227	226	**453**	245	236	**481**	229	232	**461**
Total containers (lifts) exchanged ('000)	170.7	186.0	**356.7**	191.1	201.6	**392.7**	174.6	182.8	**357.4**	199.5	214.4	**413.9**	190.0	191.2	**381.1**
WHOLE OF PORT															
Total cargo throughput *(million tonnes)*	8.8	7.9	**16.7**	7.5	7.7	**15.2**	7.5	7.5	**15.0**	8.3	8.2	**16.5**	8.4	8.3	**16.7**
Non-containerised general cargo throughput *(million tonnes)*	0.2	0.2	**0.4**	0.2	0.2	**0.4**	0.2	0.2	**0.4**	0.2	0.2	**0.4**	0.2	0.2	**0.4**
Total TEUs exchanged *('000)*	262.9	280.6	**543.5**	294.7	309.2	**603.9**	267.0	276.3	**543.3**	306.3	325.6	**632.0**	294.7	298.2	**592.9**
Full import *('000)*	118.3	118.9	**237.2**	131.7	135.5	**267.1**	119.9	122.5	**242.5**	138.7	146.9	**285.6**	131.4	134.4	**265.8**
Empty import *('000)*	13.2	23.5	**36.8**	20.1	19.7	**39.8**	13.2	17.7	**31.0**	19.9	19.8	**39.7**	15.0	17.3	**32.3**
Full export *('000)*	64.7	87.4	**152.0**	81.5	87.6	**169.1**	64.4	83.3	**147.7**	92.5	86.8	**179.4**	80.0	98.3	**178.3**
Empty export *('000)*	66.7	50.8	**117.5**	61.4	66.4	**127.8**	69.5	52.7	**122.2**	55.2	72.1	**127.3**	68.3	48.2	**116.5**

Note: Blank cells mean no data was reported in that period. Prior to March 2015, Whole of Port statistics were reported at six-monthly intervals only.
Balance of TEUs handled may include some or all of: empty container operations, bulk runs and containers handled at the port by importers/exporters. The balance is computed against the total containers handled wharfside; landside-only operations are additional to the totals.

Sources: DP World (2017), Hutchison Ports Australia (2017), Patrick (2017) and Port of Brisbane Pty Ltd (2017).

Table 1.2 Container terminal throughput: Sydney

	2015						2016						2017		
	Mar Qtr	Jun Qtr	Jan-Jun	Sep Qtr	Dec Qtr	Jul-Dec	Mar Qtr	Jun Qtr	Jan-Jun	Sep Qtr	Dec Qtr	Jul-Dec	Mar Qtr	Jun Qtr	Jan-Jun
WHARFSIDE															
UCC ships handled, as reported by stevedores	272	281	**553**	286	281	**567**	268	260	**528**	278	279	**557**	275	293	**568**
Total containers handled *('000)*	354.9	367.0	**721.8**	389.4	399.3	**788.7**	366.2	364.9	**731.2**	395.5	413.1	**808.6**	375.1	396.8	**771.9**
Total TEUs handled *('000)*	547.7	563.5	**1 111.3**	599.8	618.4	**1 218.3**	564.2	559.8	**1 123.9**	611.6	638.7	**1 250.3**	580.8	614.3	**1 195.1**
40-foot containers as per cent of all containers handled *(%)*	54.4	53.6	**54.0**	54.0	54.9	**54.5**	54.0	53.4	**53.7**	54.6	54.6	**54.6**	54.8	54.8	**54.8**
LANDSIDE															
Number of trucks used in VBS/TAS operations *('000)*	139.9	153.8	**293.7**	158.3	158.4	**316.7**	148.3	156.7	**305.0**	164.5	171.8	**336.3**	163.2	167.9	**331.0**
Total containers transported by VBS/TAS trucks and rail *('000)*	244.7	267.2	**511.9**	275.3	287.1	**562.3**	261.4	273.5	**535.0**	297.2	313.5	**610.7**	297.0	305.9	**602.9**
Containers by VBS/TAS trucks *('000)*	189.0	214.7	**403.7**	225.0	225.7	**450.7**	209.5	221.5	**431.0**	234.5	244.2	**478.6**	230.7	238.5	**469.2**
Containers by rail *('000)*	55.7	52.5	**108.2**	50.3	61.4	**111.6**	52.0	52.0	**104.0**	62.7	69.4	**132.0**	66.3	67.3	**133.6**
Balance of containers handled landside *('000)*	110.2	99.8	**210.0**	114.1	112.2	**226.3**	104.8	91.4	**196.2**	98.4	99.5	**197.9**	78.1	90.9	**169.1**
Total TEUs transported by VBS/TAS trucks and rail *('000)*	369.2	391.8	**760.9**	398.4	411.4	**809.7**	377.3	394.9	**772.2**	429.7	445.2	**874.9**	419.1	440.8	**859.9**
TEUs by VBS/TAS trucks *('000)*	288.8	315.5	**604.3**	323.8	322.3	**646.1**	302.8	318.3	**621.1**	335.8	343.6	**679.4**	325.0	340.8	**665.8**
TEUs by rail *('000)*	80.3	76.3	**156.6**	74.6	89.0	**163.7**	74.5	76.6	**151.1**	93.9	101.7	**195.5**	94.2	99.9	**194.1**
Balance of TEUs handled landside *('000)*	178.6	171.8	**350.4**	201.4	207.1	**408.5**	186.8	164.9	**351.7**	181.9	193.5	**375.4**	161.7	173.6	**335.2**
WHOLE OF CONTAINER TERMINAL															
Total number of container ship visits	260	267	**527**	277	271	**548**	258	255	**513**	274	271	**545**	269	281	**550**
Total containers (lifts) exchanged ('000)	350.1	362.7	**712.7**	385.3	392.3	**777.6**	363.5	363.8	**727.2**	388.5	409.5	**798.0**	375.6	388.0	**763.6**
WHOLE OF PORT															
Total cargo throughput *(million tonnes)*	4.4	5.8	**10.3**	5.7	6.4	**12.1**	5.9	6.1	**12.0**	6.5	6.9	**13.4**	6.6	7.0	**13.6**
Non-containerised general cargo throughput *(million tonnes)*	0.0	0.0	**0.0**	0.0	0.0	**0.0**	0.0	0.0	**0.0**	0.0	0.0	**0.0**	0.0	0.0	**0.0**
Total TEUs exchanged *('000)*	542.4	561.3	**1 103.7**	592.1	614.2	**1 206.3**	559.1	558.3	**1 117.5**	609.2	635.4	**1 244.6**	575.7	610.8	**1 186.5**
Full import *('000)*	265.3	282.0	**547.4**	299.2	307.5	**606.7**	275.6	280.2	**555.8**	312.3	315.9	**628.2**	283.9	305.4	**589.3**
Empty import *('000)*	3.1	2.3	**5.5**	2.1	3.9	**6.0**	1.7	2.7	**4.4**	2.3	3.6	**5.8**	3.3	4.1	**7.4**
Full export *('000)*	112.1	122.8	**234.9**	112.3	121.2	**233.6**	110.8	115.4	**226.2**	127.4	125.9	**253.2**	122.6	131.4	**254.0**
Empty export *('000)*	161.8	154.2	**316.0**	178.4	181.5	**359.9**	171.1	160.0	**331.1**	167.3	190.0	**357.3**	165.8	169.9	**335.7**

Note: Blank cells mean no data was reported in that period. Prior to March 2015, Whole of Port statistics were reported at six-monthly intervals only.
Cells with an entry of "0.0" mean that data were reported but rounded to zero.
Balance of TEUs handled may include some or all of: empty container operations, bulk runs and containers handled at the port by importers/exporters. The balance is computed against the total containers handled wharfside; landside-only operations are additional to the totals.

Sources: DP World (2017), Hutchison Ports Australia (2017), Patrick (2017) and NSW Ports (2017).

Table 1.3 Container terminal throughput: Melbourne

	2015						2016						2017		
	Mar Qtr	Jun Qtr	Jan-Jun	Sep Qtr	Dec Qtr	Jul-Dec	Mar Qtr	Jun Qtr	Jan-Jun	Sep Qtr	Dec Qtr	Jul-Dec	Mar Qtr	Jun Qtr	Jan-Jun
WHARFSIDE															
UCC ships handled, as reported by stevedores	257	274	**531**	279	275	**554**	278	268	**546**	276	277	**553**	278	287	**565**
Total containers handled *('000)*	363.6	376.8	**740.4**	399.1	400.9	**800.0**	380.7	374.7	**755.4**	397.4	408.4	**805.8**	385.1	399.3	**784.4**
Total TEUs handled *('000)*	543.1	563.1	**1 106.2**	602.6	604.8	**1 207.4**	574.0	564.6	**1 138.6**	603.8	623.2	**1 227.1**	581.6	609.2	**1 190.8**
40-foot containers as per cent of all containers handled *(%)*	49.4	49.4	**49.4**	51.0	50.9	**50.9**	50.8	50.7	**50.7**	51.9	52.6	**52.3**	51.1	52.6	**51.8**
LANDSIDE															
Number of trucks used in VBS/TAS operations *('000)*	167.6	161.3	**328.9**	158.9	154.0	**312.9**	150.4	149.6	**300.0**	152.3	153.1	**305.4**	149.5	153.8	**303.3**
Total containers transported by VBS/TAS trucks and rail *('000)*	332.1	319.1	**651.1**	319.5	311.4	**630.8**	296.9	292.2	**589.1**	296.4	301.5	**597.9**	305.6	314.2	**619.8**
Containers by VBS/TAS trucks *('000)*	289.5	279.2	**568.7**	282.0	270.5	**552.5**	262.1	260.8	**522.9**	265.4	270.0	**535.3**	264.0	273.1	**537.1**
Containers by rail *('000)*	42.5	39.9	**82.4**	37.5	40.8	**78.3**	34.8	31.4	**66.2**	31.1	31.5	**62.6**	41.6	41.1	**82.7**
Balance of containers handled landside *('000)*	74.0	97.7	**171.7**	117.1	130.4	**247.5**	118.6	113.9	**232.5**	132.1	138.4	**270.5**	121.1	126.2	**247.3**
Total TEUs transported by VBS/TAS trucks and rail *('000)*	492.4	469.6	**962.0**	473.8	465.4	**939.2**	444.5	435.5	**880.0**	444.9	453.3	**898.3**	454.2	470.1	**924.4**
TEUs by VBS/TAS trucks *('000)*	428.8	410.0	**838.8**	417.2	403.8	**821.0**	392.1	388.2	**780.2**	397.8	405.2	**802.9**	391.4	407.4	**798.8**
TEUs by rail *('000)*	63.5	59.7	**123.2**	56.6	61.6	**118.2**	52.4	47.4	**99.8**	47.2	48.1	**95.3**	62.8	62.8	**125.6**
Balance of TEUs handled landside *('000)*	114.3	153.1	**267.4**	185.4	201.1	**386.4**	182.0	176.4	**358.4**	206.1	218.0	**424.1**	190.2	201.8	**392.1**
WHOLE OF CONTAINER TERMINAL															
Total number of container ship visits	249	267	**516**	271	267	**538**	268	264	**532**	276	270	**546**	269	275	**544**
Total containers (lifts) exchanged ('000)	359.0	373.3	**732.3**	393.8	393.2	**786.9**	375.2	368.8	**744.0**	397.9	400.9	**798.8**	383.0	390.3	**773.2**
WHOLE OF PORT															
Total cargo throughput *(million tonnes)*	8.4	9.0	**17.5**	8.7	8.8	**17.5**	8.5	8.7	**17.2**	8.6	8.8	**17.4**	9.1	9.3	**18.4**
Non-containerised general cargo throughput *(million tonnes)*	0.5	0.6	**1.1**	0.6	0.6	**1.1**	0.6	0.5	**1.1**	0.4	0.4	**0.8**	0.4	0.4	**0.8**
Total TEUs exchanged *('000)*	616.6	638.5	**1 255.1**	673.9	681.1	**1 355.0**	646.1	637.4	**1 283.6**	673.4	694.7	**1 368.2**	648.3	680.6	**1 328.9**
Full import *('000)*	278.9	284.0	**562.9**	315.2	313.3	**628.5**	292.7	291.1	**583.8**	319.0	323.2	**642.2**	295.8	308.5	**604.3**
Empty import *('000)*	29.5	36.1	**65.7**	25.2	28.9	**54.1**	30.6	32.0	**62.6**	23.7	24.8	**48.5**	29.7	30.9	**60.7**
Full export *('000)*	204.8	218.1	**422.8**	206.4	213.8	**420.1**	209.8	216.9	**426.7**	216.5	215.6	**432.1**	225.5	240.3	**465.8**
Empty export *('000)*	103.4	100.3	**203.7**	127.1	125.1	**252.2**	113.0	97.5	**210.5**	114.3	131.2	**245.4**	97.3	100.8	**198.1**

Note: Blank cells mean no data was reported in that period. Prior to March 2015, Whole of Port statistics were reported at six-monthly intervals only.
Balance of TEUs handled may include some or all of: empty container operations, bulk runs and containers handled at the port by importers/exporters. The balance is computed against the total containers handled wharfside; landside-only operations are additional to the totals.
The counts of containers by rail include those handled by Qube Logisitics.

Sources: DP World (2017), Patrick (2017), Victoria International Container Terminal (2017) and Port of Melbourne Operations Pty Ltd (2017).

Table 1.4 Container terminal throughput: Adelaide

	2015						2016						2017		
	Mar Qtr	Jun Qtr	Jan-Jun	Sep Qtr	Dec Qtr	Jul-Dec	Mar Qtr	Jun Qtr	Jan-Jun	Sep Qtr	Dec Qtr	Jul-Dec	Mar Qtr	Jun Qtr	Jan-Jun
WHARFSIDE															
UCC ships handled, as reported by stevedores	78	93	**171**	97	97	**194**	95	96	**191**	103	110	**213**	106	108	**214**
Total containers handled *('000)*	63.0	64.3	**127.4**	65.0	74.7	**139.7**	64.9	67.7	**132.6**	64.2	70.9	**135.1**	75.1	77.2	**152.3**
Total TEUs handled *('000)*	89.1	92.1	**181.3**	93.2	105.4	**198.6**	95.5	97.5	**193.0**	92.7	98.1	**190.8**	103.5	107.5	**210.9**
40-foot containers as per cent of all containers handled *(%)*	41.4	43.2	**42.3**	43.4	41.0	**42.1**	47.2	44.0	**45.5**	44.4	38.3	**41.2**	37.7	39.2	**38.5**
LANDSIDE															
Number of trucks used in VBS/TAS operations *('000)*	31.0	30.3	**61.3**	31.9	33.3	**65.2**	31.5	32.0	**63.5**	31.3	32.4	**63.7**	34.6	35.4	**70.0**
Total containers transported by VBS/TAS trucks and rail *('000)*	64.6	62.6	**127.2**	64.7	71.3	**135.9**	64.1	66.2	**130.4**	64.3	68.7	**133.0**	71.5	71.7	**143.1**
Containers by VBS/TAS trucks *('000)*	53.2	51.9	**105.0**	54.5	58.8	**113.3**	52.7	54.0	**106.7**	52.2	54.3	**106.5**	59.2	61.4	**120.6**
Containers by rail *('000)*	11.4	10.7	**22.1**	10.2	12.5	**22.7**	11.4	12.3	**23.7**	12.1	14.3	**26.4**	12.2	10.3	**22.5**
Balance of containers handled landside *('000)*	9.9	12.5	**22.3**	10.5	15.9	**26.4**	12.2	13.8	**25.9**	12.0	16.6	**28.5**	15.9	15.8	**31.7**
Total TEUs transported by VBS/TAS trucks and rail *('000)*	91.0	89.9	**180.9**	93.4	101.2	**194.6**	93.9	95.1	**188.9**	92.7	94.5	**187.2**	97.9	100.2	**198.1**
TEUs by VBS/TAS trucks *('000)*	75.0	74.9	**149.9**	78.5	83.5	**162.0**	77.3	77.8	**155.1**	75.5	75.5	**151.0**	82.1	86.5	**168.6**
TEUs by rail *('000)*	16.0	15.0	**31.0**	14.9	17.7	**32.6**	16.5	17.3	**33.8**	17.2	19.1	**36.3**	15.8	13.7	**29.5**
Balance of TEUs handled landside *('000)*	14.1	17.2	**31.3**	14.7	21.8	**36.5**	18.1	19.7	**37.8**	17.2	22.6	**39.8**	21.3	21.0	**42.3**
WHOLE OF CONTAINER TERMINAL															
Total number of container ship visits	77	92	**169**	98	97	**195**	95	96	**191**	105	113	**218**	105	107	**212**
Total containers (lifts) exchanged ('000)	61.8	63.9	**125.6**	65.2	74.4	**139.6**	64.0	67.4	**131.4**	63.3	70.0	**133.3**	73.9	75.4	**149.2**
WHOLE OF PORT															
Total cargo throughput *(million tonnes)*	3.9	3.7	**7.6**	3.5	3.6	**7.1**	3.6	3.2	**6.8**	3.4	3.7	**7.1**	4.2	4.4	**8.6**
Non-containerised general cargo throughput *(million tonnes)*	0.1	0.1	**0.2**	0.1	0.1	**0.2**	0.1	0.1	**0.2**	0.1	0.1	**0.2**	0.1	0.1	**0.2**
Total TEUs exchanged *('000)*	87.3	91.6	**178.9**	93.4	104.9	**198.4**	94.3	97.1	**191.3**	90.7	97.7	**188.4**	101.8	105.1	**206.9**
Full import *('000)*	33.6	33.1	**66.7**	35.4	39.2	**74.6**	35.8	33.3	**69.1**	34.5	35.9	**70.4**	40.3	35.2	**75.5**
Empty import *('000)*	10.8	13.4	**24.2**	10.4	14.0	**24.4**	9.7	15.5	**25.2**	11.2	11.9	**23.1**	11.2	14.9	**26.1**
Full export *('000)*	36.9	39.0	**75.9**	38.0	41.2	**79.1**	36.8	41.0	**77.8**	37.4	43.9	**81.3**	37.9	45.0	**82.9**
Empty export *('000)*	6.0	6.1	**12.1**	9.7	10.6	**20.2**	11.9	7.4	**19.2**	7.4	5.8	**13.2**	12.4	9.9	**22.3**

Note: Blank cells mean no data was reported in that period. Prior to March 2015, Whole of Port statistics were reported at six-monthly intervals only.
Cells with an entry of "0.0" mean that data were reported but rounded to zero.
Balance of TEUs handled may include some or all of: empty container operations, bulk runs and containers handled at the port by importers/exporters. The balance is computed against the total containers handled wharfside; landside-only operations are additional to the totals.

Sources: Flinders Adelaide Container Terminal (2017) and Flinders Ports (2017).

Table 1.5 Container terminal throughput: Fremantle

	2015						2016						2017		
	Mar Qtr	Jun Qtr	Jan-Jun	Sep Qtr	Dec Qtr	Jul-Dec	Mar Qtr	Jun Qtr	Jan-Jun	Sep Qtr	Dec Qtr	Jul-Dec	Mar Qtr	Jun Qtr	Jan-Jun
WHARFSIDE															
UCC ships handled, as reported by stevedores	125	128	**253**	130	129	**259**	128	126	**254**	127	128	**255**	125	127	**252**
Total containers handled *('000)*	115.3	112.8	**228.1**	118.2	127.1	**245.3**	115.3	110.2	**225.5**	118.1	126.3	**244.4**	116.1	116.9	**233.0**
Total TEUs handled *('000)*	170.6	168.6	**339.2**	177.6	191.3	**368.9**	172.3	163.1	**335.3**	177.3	189.4	**366.7**	173.4	172.4	**345.8**
40-foot containers as per cent of all containers handled *(%)*	48.0	49.5	**48.7**	50.2	50.5	**50.4**	49.4	48.0	**48.7**	50.2	49.9	**50.1**	49.3	47.5	**48.4**
LANDSIDE															
Number of trucks used in VBS/TAS operations *('000)*	46.6	44.1	**90.8**	44.5	46.5	**90.9**	41.8	41.0	**82.8**	38.8	38.7	**77.5**	36.0	35.8	**71.8**
Total containers transported by VBS/TAS trucks and rail *('000)*	93.0	86.5	**179.4**	89.8	93.6	**183.4**	84.6	81.9	**166.6**	81.7	83.3	**165.1**	78.3	82.6	**160.9**
Containers by VBS/TAS trucks *('000)*	75.8	69.6	**145.4**	70.2	73.4	**143.7**	66.6	65.0	**131.6**	62.4	64.2	**126.6**	59.5	60.9	**120.4**
Containers by rail *('000)*	17.2	16.8	**34.0**	19.6	20.2	**39.8**	18.0	16.9	**35.0**	19.3	19.1	**38.4**	18.9	21.6	**40.5**
Balance of containers handled landside *('000)*	22.3	26.4	**48.6**	28.4	33.5	**61.9**	30.7	28.3	**58.9**	36.3	43.0	**79.3**	37.8	34.3	**72.1**
Total TEUs transported by VBS/TAS trucks and rail *('000)*	133.4	124.8	**258.3**	128.6	135.0	**263.6**	120.5	116.3	**236.8**	115.1	116.9	**232.0**	110.6	115.7	**226.3**
TEUs by VBS/TAS trucks *('000)*	110.4	101.1	**211.5**	101.5	107.0	**208.5**	95.3	92.5	**187.8**	88.3	91.0	**179.2**	84.4	86.3	**170.6**
TEUs by rail *('000)*	23.0	23.7	**46.7**	27.0	28.0	**55.0**	25.2	23.8	**49.0**	26.8	26.0	**52.8**	26.2	29.4	**55.7**
Balance of TEUs handled landside *('000)*	37.1	43.8	**80.9**	49.1	56.3	**105.3**	51.7	46.8	**98.5**	62.2	72.4	**134.7**	62.9	56.7	**119.5**
WHOLE OF CONTAINER TERMINAL															
Total number of container ship visits	126	128	**254**	132	130	**262**	127	128	**255**	126	127	**253**	127	127	**254**
Total containers (lifts) exchanged ('000)	114.6	112.0	**226.6**	119.8	124.7	**244.5**	115.7	111.7	**227.4**	116.1	123.1	**239.1**	116.6	117.4	**234.0**
WHOLE OF PORT															
Total cargo throughput *(million tonnes)*	9.2	9.3	**18.5**	8.2	8.6	**16.8**	9.3	8.8	**18.1**	8.4	8.8	**17.2**	8.7	9.4	**18.1**
Non-containerised general cargo throughput *(million tonnes)*	0.2	0.2	**0.4**	0.2	0.2	**0.5**	0.2	0.2	**0.4**	0.2	0.2	**0.4**	0.2	0.2	**0.4**
Total TEUs exchanged *('000)*	174.1	171.4	**345.5**	182.6	192.2	**374.9**	174.4	165.8	**340.2**	175.9	190.1	**366.1**	175.0	174.9	**349.9**
Full import *('000)*	83.1	82.9	**166.1**	90.0	93.7	**183.7**	83.4	80.3	**163.7**	88.1	87.4	**175.5**	83.1	84.5	**167.6**
Empty import *('000)*	4.6	5.4	**10.0**	5.1	5.9	**11.0**	4.8	5.9	**10.7**	5.3	7.0	**12.3**	7.0	6.3	**13.2**
Full export *('000)*	52.4	51.9	**104.2**	49.0	52.9	**101.9**	50.2	50.2	**100.5**	49.7	55.3	**105.0**	52.3	57.5	**109.8**
Empty export *('000)*	34.0	31.2	**65.2**	38.7	39.6	**78.3**	35.9	29.4	**65.3**	32.8	40.3	**73.2**	32.6	26.6	**59.3**

Note: Blank cells mean no data was reported in that period. Prior to March 2015, Whole of Port statistics were reported at six-monthly intervals only.
Balance of TEUs handled may include some or all of: empty container operations, bulk runs and containers handled at the port by importers/exporters. The balance is computed against the total containers handled wharfside; landside-only operations are additional to the totals.

Sources: DP World (2017), Patrick (2017) and Fremantle Ports (2017).

Table 1.6 Container terminal throughput: five ports

	2015						2016						2017		
	Mar Qtr	Jun Qtr	Jan-Jun	Sep Qtr	Dec Qtr	Jul-Dec	Mar Qtr	Jun Qtr	Jan-Jun	Sep Qtr	Dec Qtr	Jul-Dec	Mar Qtr	Jun Qtr	Jan-Jun
WHARFSIDE															
UCC ships handled, as reported by stevedores	971	1 023	**1 994**	1 055	1 039	**2 094**	1 002	981	**1 983**	1 036	1 050	**2 086**	1 023	1 065	**2 088**
Total containers handled *('000)*	1 069.6	1 112.0	**2 181.6**	1 169.5	1 210.0	**2 379.5**	1 104.9	1 102.7	**2 207.7**	1 176.2	1 239.0	**2 415.2**	1 145.5	1 186.6	**2 332.1**
Total TEUs handled *('000)*	1 608.9	1 666.4	**3 275.3**	1 768.4	1 828.6	**3 597.0**	1 671.7	1 659.3	**3 331.0**	1 787.1	1 876.1	**3 663.2**	1 728.2	1 799.7	**3 527.9**
40-foot containers as per cent of all containers handled *(%)*	50.4	49.9	**50.1**	51.2	51.1	**51.2**	51.3	50.5	**50.9**	51.9	51.4	**51.7**	50.9	51.7	**51.3**
LANDSIDE															
Number of trucks used in VBS/TAS operations *('000)*	459.6	470.1	**929.7**	469.6	467.3	**936.9**	439.3	452.1	**891.4**	467.0	478.6	**945.6**	459.8	470.9	**930.7**
Total containers transported by VBS/TAS trucks and rail *('000)*	863.1	877.7	**1 740.8**	885.4	897.0	**1 782.4**	825.2	844.5	**1 669.7**	879.6	910.6	**1 790.2**	884.1	909.7	**1 793.9**
Containers by VBS/TAS trucks *('000)*	729.1	747.8	**1 476.9**	757.6	752.6	**1 510.2**	701.9	722.6	**1 424.5**	746.0	768.2	**1 514.2**	739.7	763.2	**1 503.0**
Containers by rail *('000)*	134.0	130.0	**263.9**	127.8	144.4	**272.2**	123.3	121.9	**245.1**	133.5	142.4	**275.9**	144.4	146.5	**290.9**
Balance of containers handled landside *('000)*	260.5	284.9	**545.4**	331.7	366.3	**698.0**	326.0	301.9	**627.9**	339.8	374.3	**714.1**	315.2	328.2	**643.4**
Total TEUs transported by VBS/TAS trucks and rail *('000)*	1 274.9	1 280.5	**2 555.3**	1 289.8	1 304.2	**2 594.0**	1 207.2	1 230.4	**2 437.6**	1 286.0	1 314.3	**2 600.3**	1 269.5	1 324.4	**2 593.9**
TEUs by VBS/TAS trucks *('000)*	1 084.2	1 095.0	**2 179.2**	1 105.4	1 097.3	**2 202.7**	1 030.5	1 055.0	**2 085.5**	1 091.6	1 110.3	**2 202.0**	1 064.6	1 111.8	**2 176.4**
TEUs by rail *('000)*	190.7	185.5	**376.1**	184.4	207.0	**391.4**	176.7	175.4	**352.0**	194.4	204.0	**398.4**	204.9	212.6	**417.5**
Balance of TEUs handled landside *('000)*	413.6	460.6	**874.1**	550.1	603.6	**1 153.7**	533.4	493.6	**1 027.0**	565.4	628.9	**1 194.4**	537.3	551.7	**1 089.0**
WHOLE OF CONTAINER TERMINAL															
Total number of container ship visits	948	990	**1 938**	1 024	1 006	**2 030**	975	969	**1 944**	1 026	1 017	**2 043**	999	1 022	**2 021**
Total containers (lifts) exchanged ('000)	1 056.1	1 097.8	**2 153.9**	1 155.2	1 186.1	**2 341.3**	1 092.9	1 094.4	**2 187.4**	1 165.3	1 217.8	**2 383.1**	1 139.1	1 162.2	**2 301.3**
WHOLE OF PORT															
Total cargo throughput *(million tonnes)*	34.7	35.7	**70.5**	33.6	35.1	**68.7**	34.8	34.2	**69.1**	35.1	36.4	**71.5**	37.0	38.4	**75.4**
Non-containerised general cargo throughput *(million tonnes)*	1.0	1.1	**2.2**	1.1	1.1	**2.2**	1.0	1.0	**2.0**	0.9	0.9	**1.8**	0.8	0.9	**1.8**
Total TEUs exchanged *('000)*	1 683.3	1 743.4	**3 426.7**	1 836.8	1 901.6	**3 738.3**	1 741.0	1 734.9	**3 475.9**	1 855.5	1 943.6	**3 799.1**	1 795.5	1 869.5	**3 665.0**
Full import *('000)*	779.3	801.0	**1 580.3**	871.5	889.2	**1 760.7**	807.5	807.4	**1 614.9**	892.6	909.3	**1 801.9**	834.5	867.9	**1 702.5**
Empty import *('000)*	61.2	80.8	**142.0**	62.9	72.4	**135.3**	60.1	73.8	**133.8**	62.4	67.1	**129.5**	66.2	73.5	**139.7**
Full export *('000)*	470.8	519.1	**989.9**	487.2	516.7	**1 003.8**	472.0	506.9	**978.9**	523.5	527.5	**1 051.0**	518.3	572.5	**1 090.8**
Empty export *('000)*	372.0	342.5	**714.5**	415.2	423.2	**838.5**	401.4	346.9	**748.3**	376.9	439.4	**816.3**	376.4	355.4	**731.8**

Note: Blank cells mean no data was reported in that period. Prior to March 2015, Whole of Port statistics were reported at six-monthly intervals only.
Balance of TEUs handled may include some or all of: empty container operations, bulk runs and containers handled at the port by importers/exporters. The balance is computed against the total containers handled wharfside; landside-only operations are additional to the totals.

Sources: DP World (2017), Patrick (2017), Hutchison Ports Australia (2017), Flinders Adelaide Container Terminal (2017), Victoria International Container Terminal (2017), Port of Brisbane Pty Ltd (2017), NSW Ports (2017), Port of Melbourne Operations Pty Ltd (2017), Flinders Ports (2017) and Fremantle Ports (2017).

Table 1.7 Container terminal throughput: container ship visits by port, January–June 2017

	Brisbane	Sydney	Melbourne	Adelaide	Fremantle	Total
Gross Tonnage						
5 000 - 20 000 GT	55	88	86	0	25	254
20 001 - 35 000 GT	17	63	38	18	4	140
35 001 - 40 000 GT	49	61	65	26	31	232
40 001 - 50 000 GT	161	117	131	41	29	479
50 001 and above GT	179	221	222	126	165	913
All ship sizes	461	550	542	211	254	2018

Sources: Port of Brisbane Pty Ltd (2017), NSW Ports (2017), Port of Melbourne Operations Pty Ltd (2017), Flinders Ports (2017) and Fremantle Ports (2017).

Table 1.8 Container terminal throughput: container ship visits by port, July–December 2016

	Brisbane	Sydney	Melbourne	Adelaide	Fremantle	Total
Gross Tonnage						
5 000 - 20 000 GT	65	80	76	0	25	246
20 001 - 35 000 GT	13	63	39	20	9	144
35 001 - 40 000 GT	47	59	64	27	32	229
40 001 - 50 000 GT	186	139	154	49	36	564
50 001 and above GT	170	198	204	119	151	842
All ship sizes	481	545	546	218	253	2043

Sources: Port of Brisbane Pty Ltd (2017), NSW Ports (2017), Port of Melbourne Operations Pty Ltd (2017), Flinders Ports (2017) and Fremantle Ports (2017).

Chapter 2: Measures of container terminal productivity

Overview

Chapter 2 of Waterline presents container terminal productivity measures. The indicators are in three groups—wharf-side, landside and whole of container terminal.

Seven quarterly wharf-side productivity indicators are covered:

2.1 Crane rate – containers per hour

2.2 Elapsed labour rate – containers per hour

2.3 Ship rate – containers per hour

2.4 Crane rate – TEUs per hour

2.5 Elapsed labour rate – TEUs per hour

2.6 Ship rate – TEUs per hour

2.7 Throughput pbm (containers per berth metre).

The following five quarterly landside productivity indicators are reported for trucks involved in VBS/TAS operations. Bulk run trucks are not included in calculating these indicators:

2.8 Containers per truck

2.9 TEUs per truck

2.10 Per cent of trucks backloaded

2.11 Average truck turnaround time

2.12 Average container turnaround time.

Twelve indicators are reported for whole of container terminal productivity.

2.13 Median of ship turnaround time

2.14 95th percentile of ship turnaround time

2.15 Number of ships waiting at anchorage for more than 2 hours

2.16 Per cent of ships waiting at anchorage for more than 2 hours

2.17 Average waiting time at anchorage

2.18 Median waiting time at anchorage

2.19 Total time ships spent at berth

2.20 Average TEUs per ship-hour at berth

2.21 Average lifts per ship-hour at berth

2.22 Total time ships available to stevedores

2.23 Average lifts per hour of stevedoring operation

2.24 Average lifts per berth visit.

The indicators are presented for Brisbane, Sydney, Melbourne, Adelaide, and Fremantle, as well as aggregates of the five ports, where applicable.

Wharf-side productivity measures

Measures of productivity on the wharf-side of a container terminal relate only to containers moved by stevedoring companies from/to UCC ships at that container terminal.

Indicator 2.1 Crane rate – containers per hour

This is computed as the total number of containers handled divided by the total crane time (see details in Box 1).

Indicator 2.2 Elapsed labour rate – containers per hour

This indicator is computed as the number of containers handled divided by the total elapsed labour time (see details in Box 2). Sometimes this measure is reported as the "ship working rate".

Indicator 2.3 Ship rate – containers per hour

This is the average number of containers moved on or off a ship in an hour.

Indicator 2.4 Crane rate – TEUs per hour

This is similar to Indicator 2.1 after converting containers to TEUs.

Indicator 2.5 Elapsed labour rate – TEUs per hour

This is similar to Indicator 2.2 after converting containers to TEUs.

Indicator 2.6 Ship rate – TEUs per hour

This is similar to Indicator 2.3 after converting containers to TEUs.

Indicator 2.7 Throughput pbm (containers per berth metre)

This is the number of containers through a container terminal divided by the length (in metres) of berths. At a container terminal it measures the intensity of use of the terminal container handling facility. The six month figure is a weighted average of the corresponding quarterly throughput.

Box 1: Crane Time

This is the crane time allocated by the stevedore to work on a container ship, assuming the container ship is ready for loading or unloading. It is the sum of hours that each quay crane is allocated to a ship, less operational and non-operational delays:

- No labour allocated
- Closed-port holiday
- Port-wide industrial stoppage
- Total crane time spent handling break-bulk cargo and containers that require manual intervention, e.g. use of wires, chains, non-rigid spreaders or other handling gear
- Award or enterprise agreement breaks as applicable
- Adverse weather
- Delays caused by the ship or its agent
- All breakdowns, including spreader changes
- Other equipment breakdowns which stop crane operations
- Booming up for passing ships
- Handling hatch covers
- Cage work and lashing/unlashing where crane operations are affected
- Crane long-travelling between hatches and crossing accommodation
- Labour withdrawn without operator's agreement including enterprise agreement related industrial stoppages
- Over-dimensional containers requiring additional (rigid) spreader
- Spreader changes
- Waiting for export cargo
- Defective ship's gear (e.g. jammed twist-locks, broken cell guides, ballast pumps unable to maintain list/trim).

Box 2: Elapsed Labour Time

This is the time elapsed between labour first boarding a container ship and labour last leaving the ship, less any time when the labour has not worked for whatever reasons including non-operational delays such as:

- No labour allocated to ship
- Closed-port holiday
- Industrial stoppages
- Break bulk and containers that require manual interventions, e.g. use of wires, chains, non-rigid spreaders or other handling gear.

In contrast to 'crane time' (Box 1), elapsed labour time is not equivalent to the total labour-hours worked.

Landside productivity measures

These indicators relate to the performance in processing containers through the formal vehicle booking systems (VBS and TAS). They do not include the performance of bulk run trucks.

Indicator 2.8 Containers per truck

Count of containers processed through the VBS/TAS systems divided by the total number of VBS/TAS trucks used.

Indicator 2.9 TEUs per truck

Count of TEUs through the VBS/TAS systems divided by the total number of VBS/TAS trucks used. In contrast to Indicator 2.8, this indicator measures the truck efficiency in a standard unit, a TEU, and thus takes into account the different sizes of containers.

Indicator 2.10 Per cent of trucks backloaded

'Backloaded operations' refers to trucks which haul containers on both the inbound and outbound legs of a single trip. Such operations make more effective use of trucks and landside infrastructure. This indicator shows the number of backloaded trucks as a percentage of the total VBS/TAS trucks in Brisbane, Sydney, Melbourne and Fremantle. It was published for the first time in Waterline 57.

Indicator 2.11 Average truck turnaround time

The indicator measures the time elapsed from when the truck enters the gate of a container terminal to the time when the last container is loaded. This measure does not include the time the truck waits outside the gate of a container terminal. This is a measure of stevedoring efficiency and shows how fast (expressed in minutes) a stevedoring company processes a truck at a container terminal.

Indicator 2.12 Average container turnaround time

This is as the "average truck turnaround time" (Indicator 2.11) divided by "average containers per truck" (Indicator 2.8). It is a measure of the stevedoring efficiency in handling containers at a container terminal.

Container turnaround time improves (that is, it goes down) if either the truck utilisation rates improve, implying that the number of containers per truck increases, or the container terminal is faster in processing each truck.

Whole of container terminal measures

Indicator 2.13 Median of ship turnaround time

This is the median of the time (in hours) a container ship is in a port. It is the time that elapses from the time a ship enters a port to the time a ship leaves the port.

Indicator 2.14 95th percentile of ship turnaround time

The 95th percentile indicates that for 95 per cent of the ships, the turnaround time is below the value of the indicator. Conversely, for 5 per cent of the ships, the turnaround time is above the value of the indicator.

Indicator 2.15 Number of ships waiting at anchorage for more than 2 hours

This indicator provides the number of container ships, as reported by port authorities, that waited for longer than 2 hours for port entry clearance at the time of the ship's first entry. Delay before entering a

port usually results from the geography-specific situation of a port and may also be caused by operational reasons, either at the terminal, the ship, or both.

Indicator 2.16 Per cent of ships waiting at anchorage for more than 2 hours

This is the number of container ships in Indicator 2.15 as a per cent of the total number of container ships that visited the container terminal in the period.

Indicator 2.17 Average waiting time at anchorage

This is the average time (hours) ships have waited in anchorage. Only ships that waited for port entry clearance for two hours or more are included in the calculation.

Indicator 2.18 Median waiting time at anchorage

This is the median of time (hours) ships have waited in anchorage. Only ships that waited for port entry clearance for two hours or more are included in the calculation.

Indicator 2.19 Total time ships spent at berth

This is the total hours spent in berth by all dedicated container ships (UCC) that exchanged containers at that port. The time a ship spends in berth is the elapsed time between the time a ship arrives at berth and the time of its departure from berth. Port authorities report the berth time as a "gross value" including all times spent by a ship at berth such as time for loading/unloading containers, for maintenance and supply operations, or waiting for labour or suitable weather.

Indicator 2.20 Average TEUs per ship-hour at berth

This is the total TEUs lifted on/off dedicated container ships (UCC) divided by the total time ship spent in berth (Indicator 2.19). The indicator is strongly influenced by changes in average number of TEUs exchanged per visiting ships and by the mix of ship sizes during the period. The average number of TEUs exchanged also varies seasonally and cyclically.

Indicator 2.21 Average lifts per ship-hour at berth

This indicator is similar to Indicator 2.20 whereas the total crane lifts (containers handled) is used in calculating the indicator rather than the number of TEUs.

Indicator 2.22 Total time ships are available to stevedores

This is the total time (in hours) when ships can be loaded or unloaded.

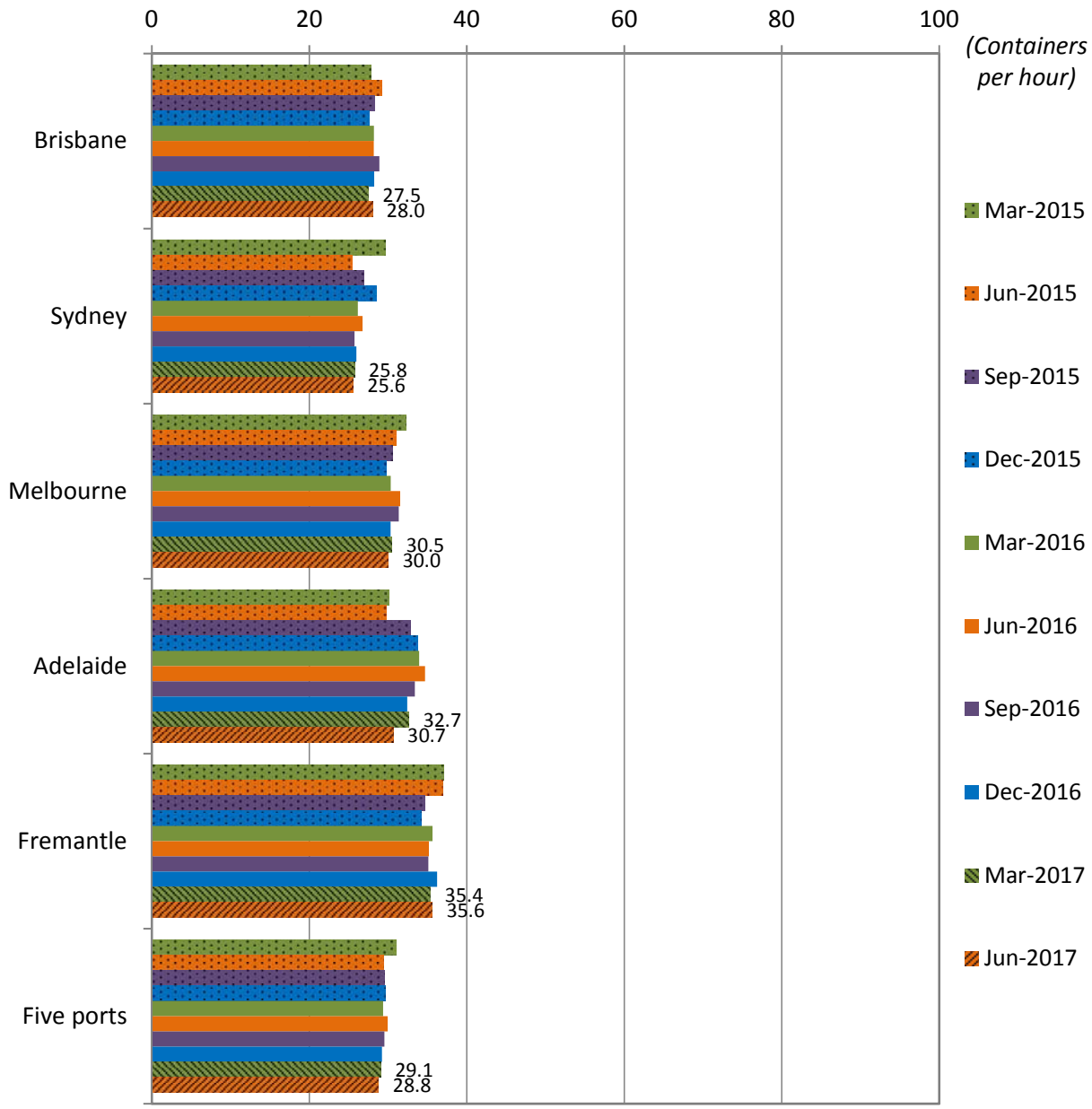
Indicator 2.23 Average lifts per hour of stevedoring operation

This is the total number of crane lifts (containers handled) divided by the total (gross) time available to stevedores for loading and unloading containers.

Indicator 2.24 Average lifts per berth visit

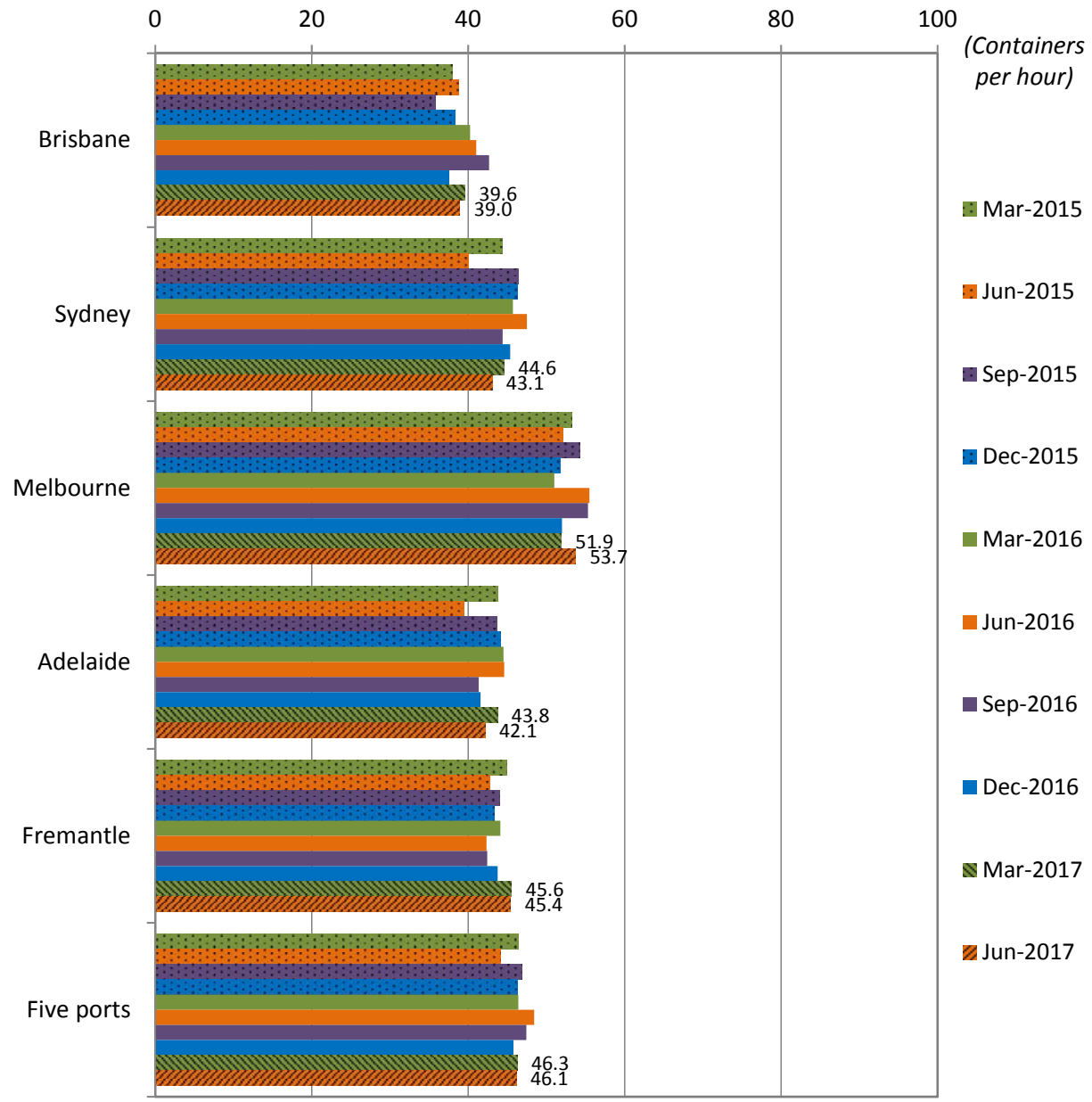
This is the number of crane lifts (containers handled) divided by the number of berth visits of dedicated container ships (UCC).

Figure 2.1 Wharf-side crane rate



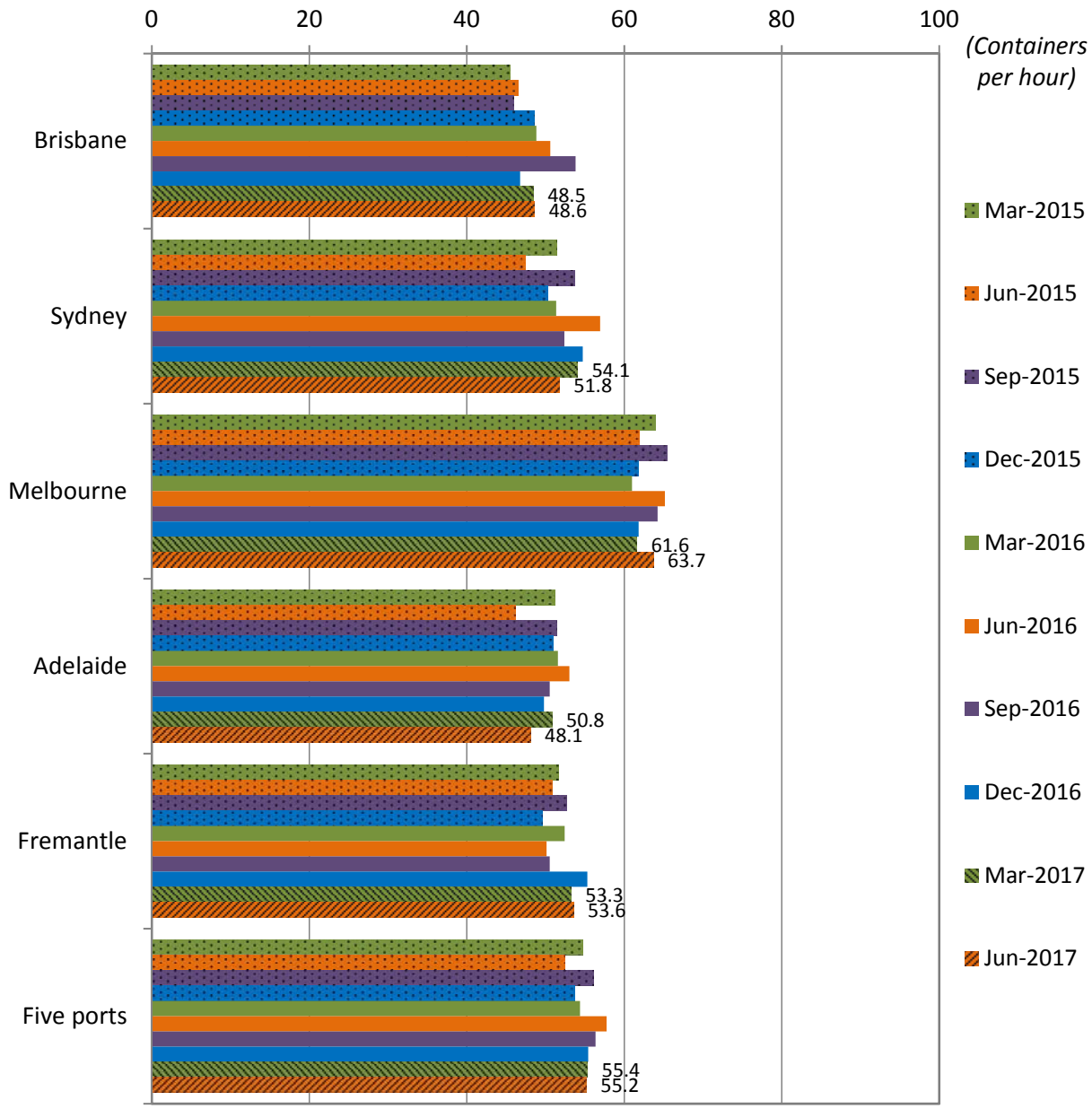
Sources: DP World (2017), Flinders Adelaide Container Terminal (2017), Hutchison Ports Australia (2017), Patrick (2017) and Victoria International Container Terminal (2017).

Figure 2.2 Wharf-side elapsed labour rate



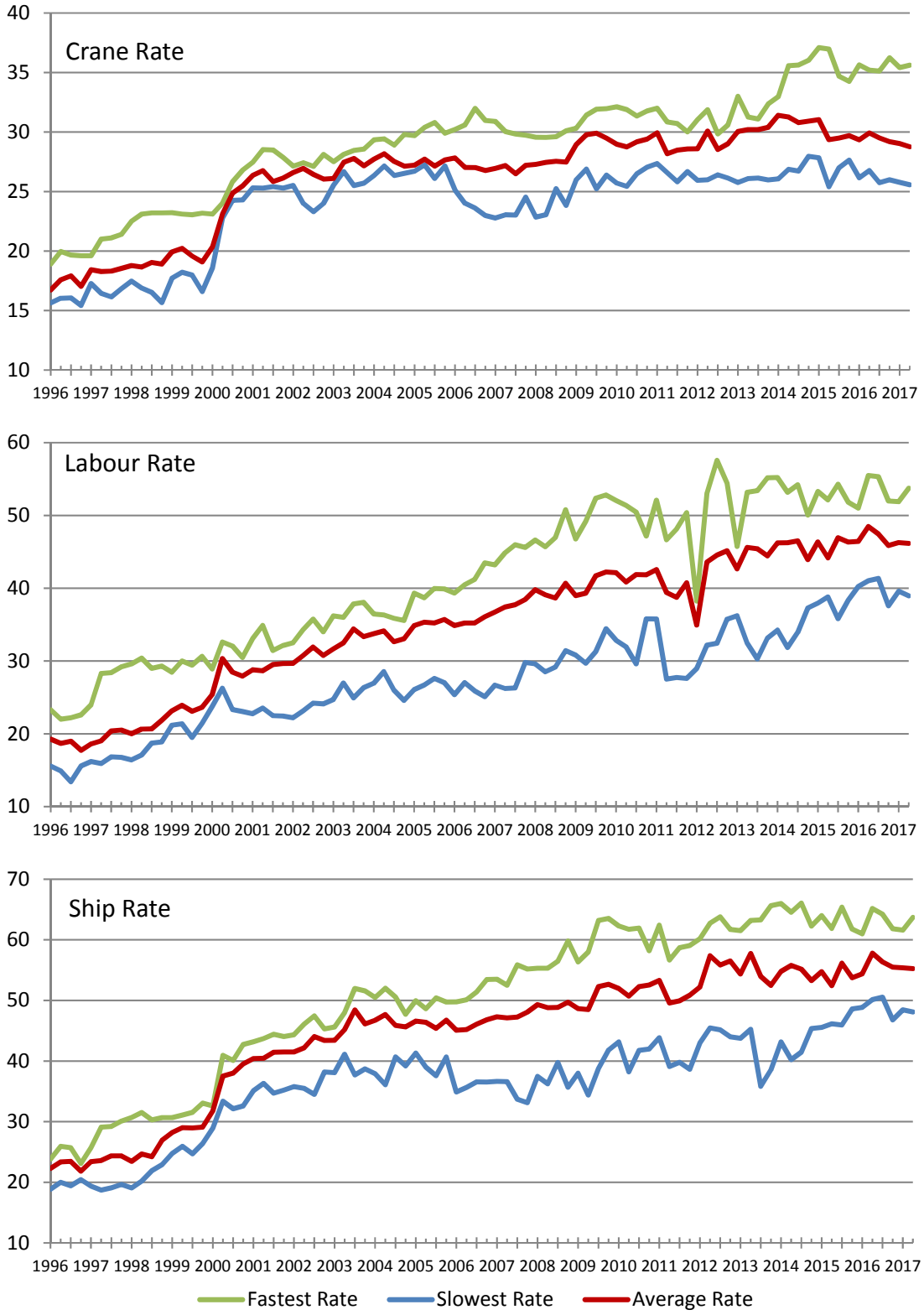
Sources: DP World (2017), Flinders Adelaide Container Terminal (2017), Hutchison Ports Australia (2017), Patrick (2017) and Victoria International Container Terminal (2017).

Figure 2.3 Wharf-side ship rate



Sources: DP World (2017), Flinders Adelaide Container Terminal (2017), Hutchison Ports Australia (2017), Patrick (2017) and Victoria International Container Terminal (2017).

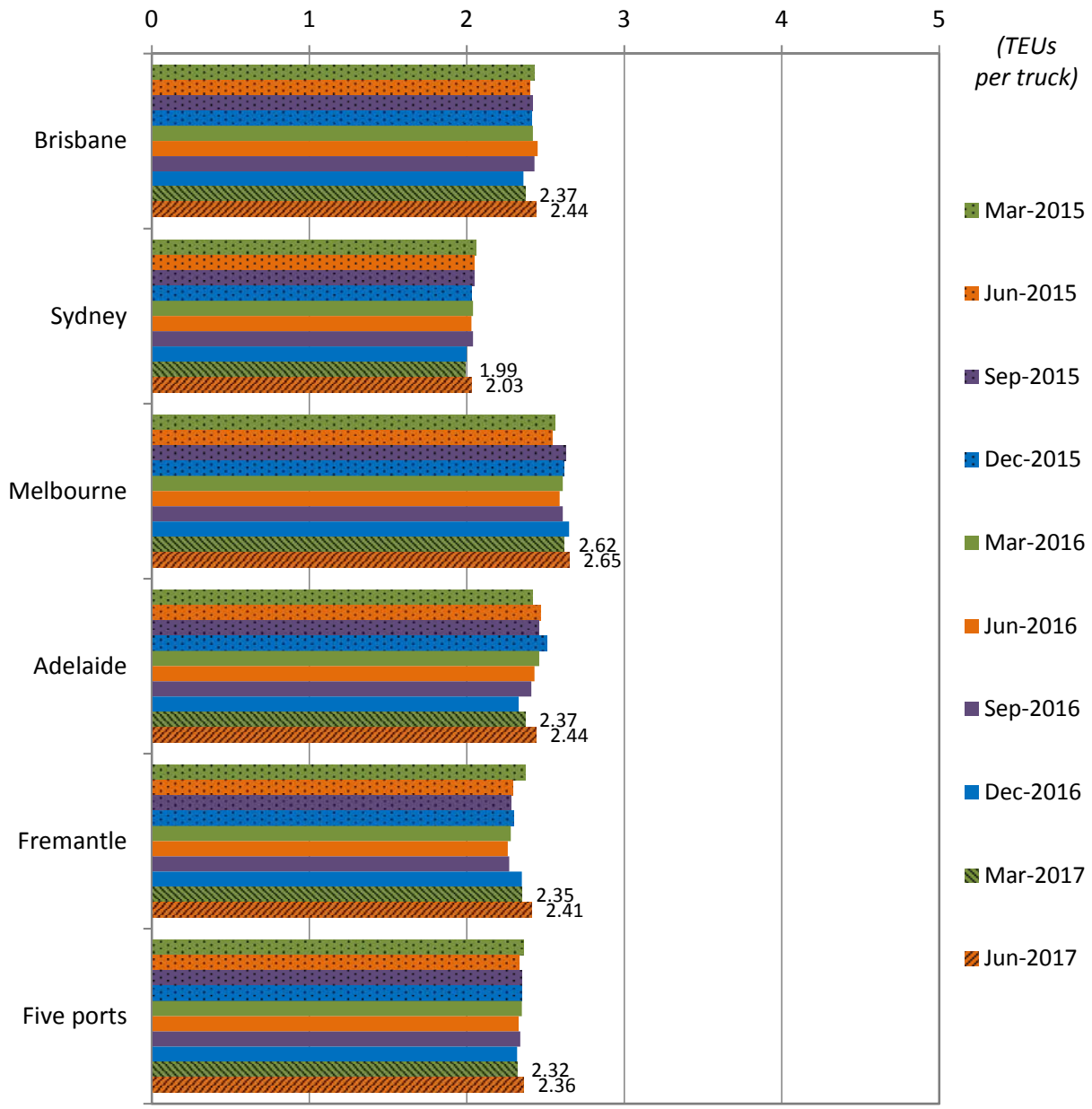
Figure 2.4 Productivity in five ports: comparison of wharf-side rates



Notes: The wharf-side crane rate, labour rate and ship rate are compared among all five ports and the fastest, average and slowest rates are illustrated. The fastest and slowest rate may correspond to different ports in different periods. The average rate is weighted by the TEU throughput at each port.
Crane rate, labour rate and ship rate are measured in containers per crane hour, elapsed labour hour and berth hour respectively.

Sources: DP World (2017), Flinders Adelaide Container Terminal (2017), Hutchison Ports Australia (2017), Patrick (2017) and Victoria International Container Terminal (2017).

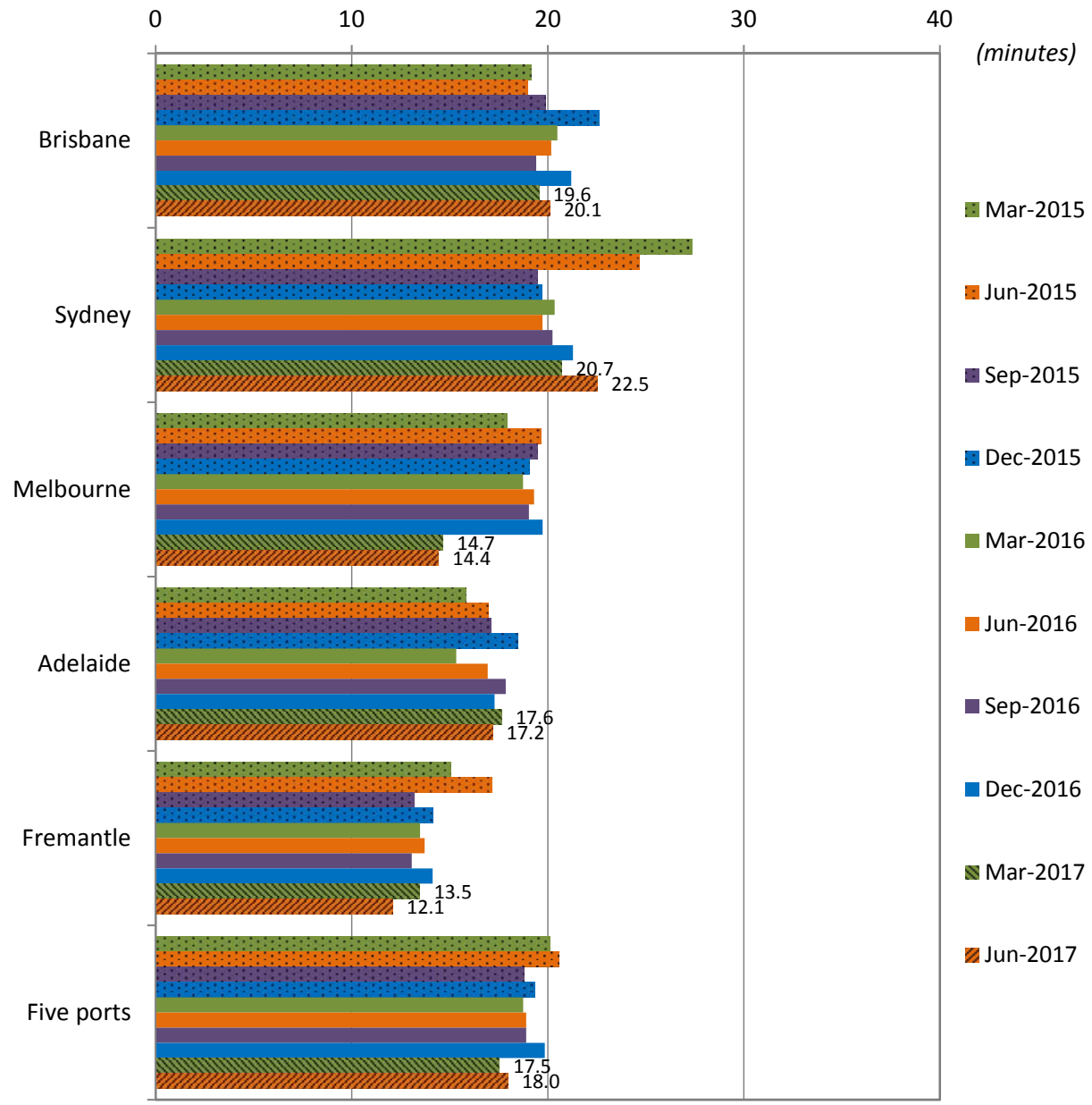
Figure 2.5 Average TEUs per truck on landside of container terminals



Notes: This indicator is based on only the trucks that are processed through the VBS/TAS system.

Sources: DP World (2017), Flinders Adelaide Container Terminal (2017), Hutchison Ports Australia (2017), Patrick (2017) and Victoria International Container Terminal (2017).

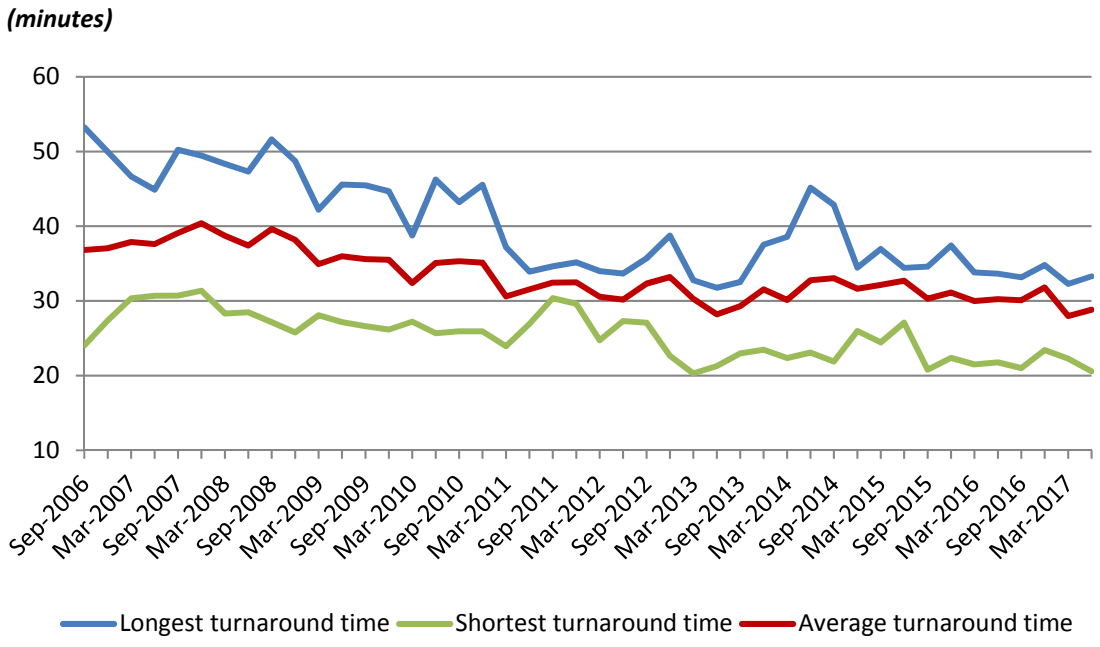
Figure 2.6 Average container turnaround time on landside of container terminals



Notes: This indicator is based on only the containers that are processed through the VBS/TAS system.

Sources: DP World (2017), Flinders Adelaide Container Terminal (2017), Hutchison Ports Australia (2017), Patrick (2017) and Victoria International Container Terminal (2017).

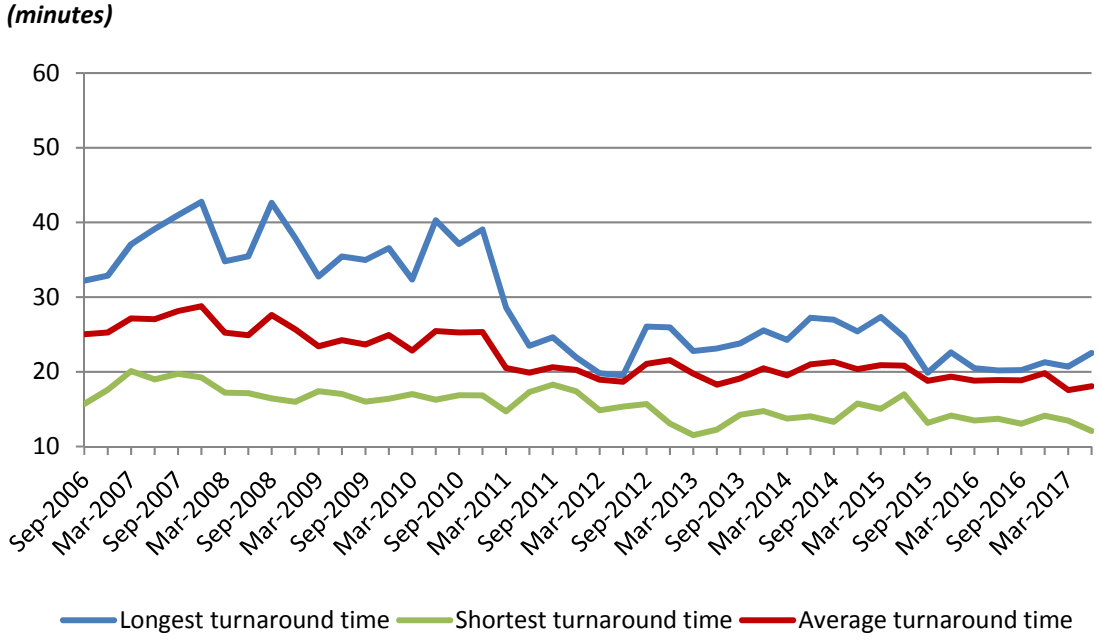
Figure 2.7 Longest and shortest truck turnaround time in five ports



Notes: The truck turnaround time is compared among all five ports in each quarter. The longest and shortest truck turnaround time may correspond to different ports in different periods. The average rate is weighted by the TEU throughput at each port.

Sources: DP World (2017), Flinders Adelaide Container Terminal (2017), Hutchison Ports Australia (2017), Patrick (2017) and Victoria International Container Terminal (2017).

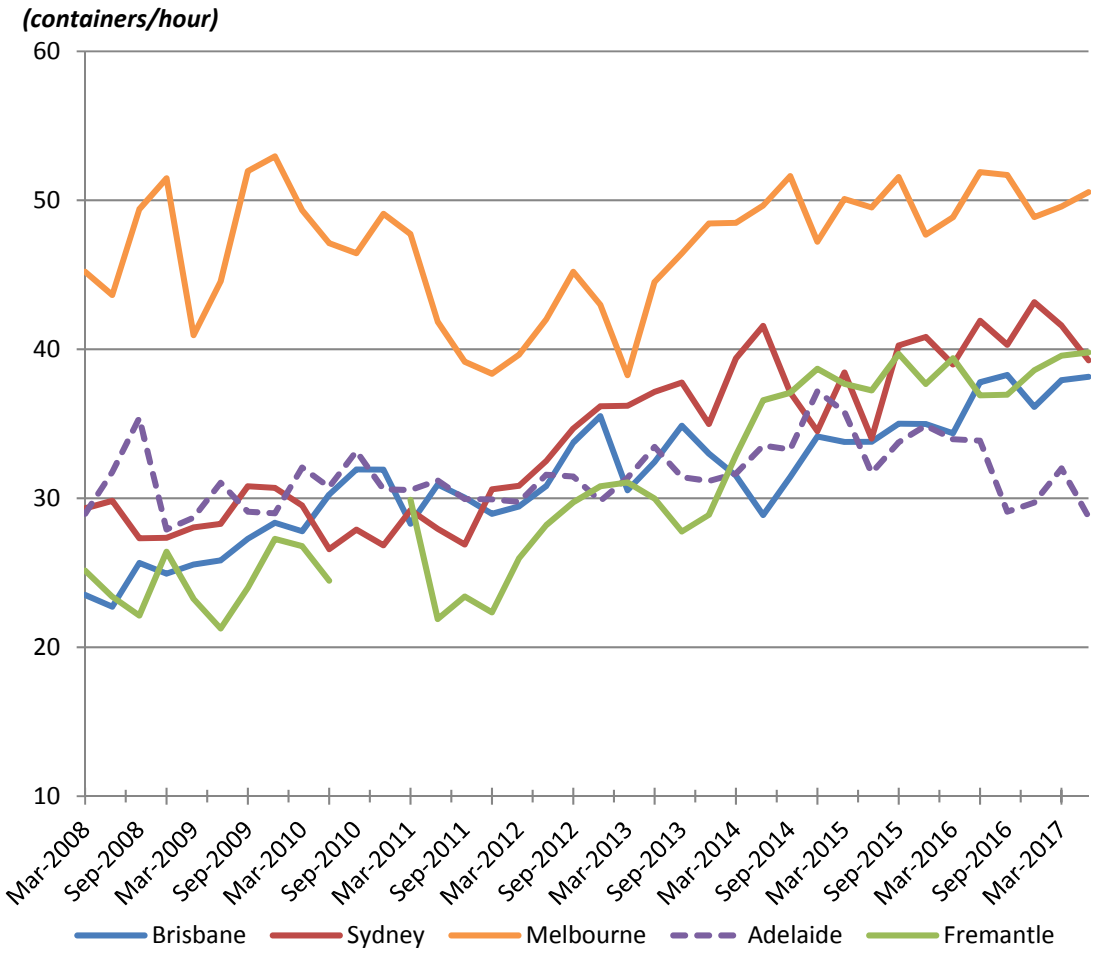
Figure 2.8 Longest and shortest container turnaround time in five ports



Notes: The container turnaround time is compared among all five ports in each quarter. The longest and shortest container turnaround time may correspond to different ports in different periods. The average rate is weighted by the TEU throughput at each port.

Sources: DP World (2017), Flinders Adelaide Container Terminal (2017), Hutchison Ports Australia (2017), Patrick (2017) and Victoria International Container Terminal (2017).

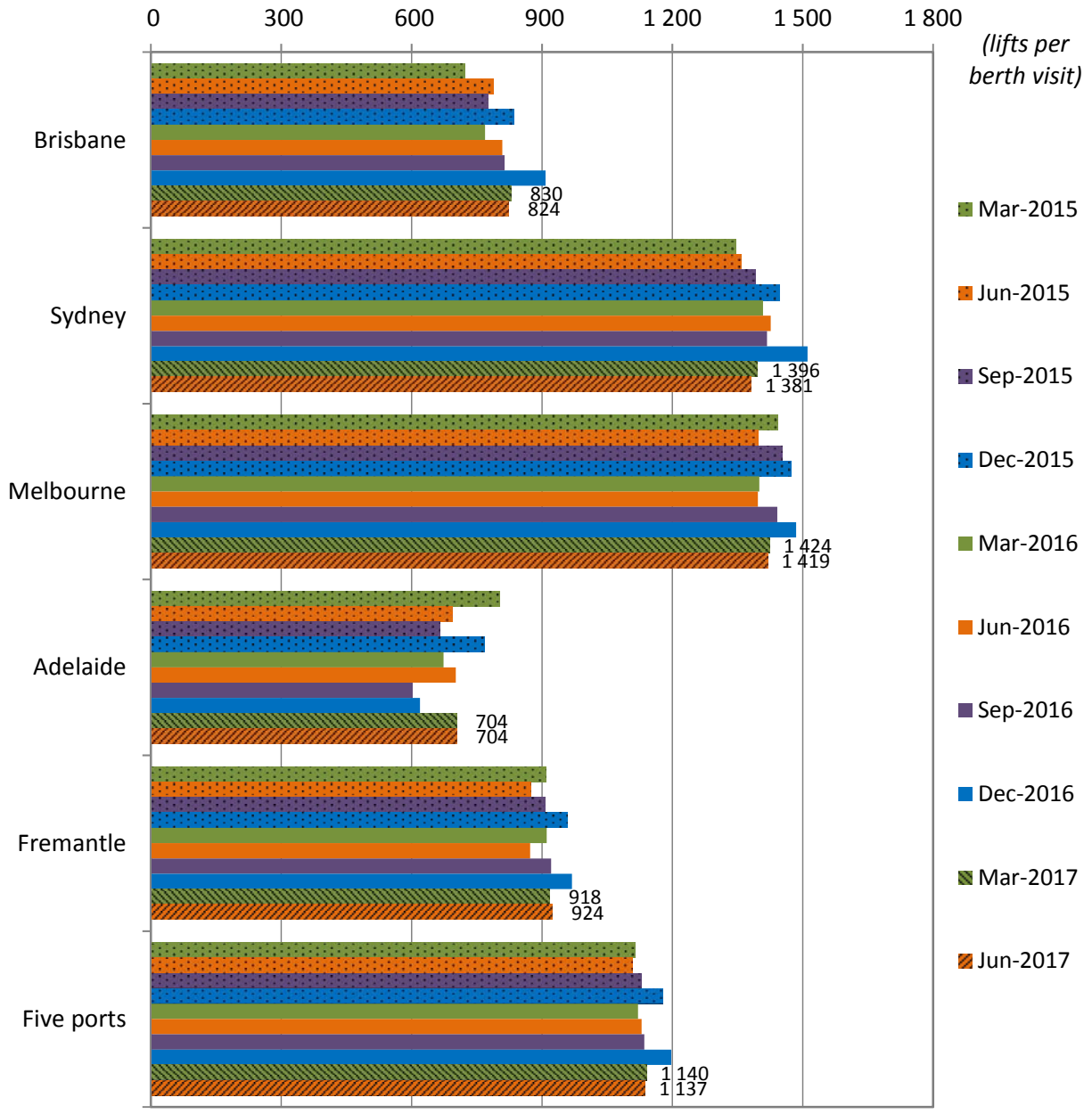
Figure 2.9 Average number of lifts per ship-hour at berth



Note: In September and December quarters of 2010 only part of ship movement statistics for Fremantle was available for analysis. These data points are not plotted.

Sources: BITRE estimates based on data from Port of Brisbane Pty Ltd (2017), NSW Ports (2017), Port of Melbourne Operations Pty Ltd (2017), Flinders Ports (2017) and Fremantle Ports (2017).

Figure 2.10 Average number of lifts per berth visit



Sources: BITRE estimates based on data from Port of Brisbane Pty Ltd (2017), NSW Ports (2017), Port of Melbourne Operations Pty Ltd (2017), Flinders Ports (2017) and Fremantle Ports (2017).

Table 2.1 Container terminal productivity: Brisbane

	2015						2016						2017		
	Mar Qtr	Jun Qtr	Jan-Jun	Sep Qtr	Dec Qtr	Jul-Dec	Mar Qtr	Jun Qtr	Jan-Jun	Sep Qtr	Dec Qtr	Jul-Dec	Mar Qtr	Jun Qtr	Jan-Jun
WHARFSIDE															
Containers per hour															
Crane rate	27.8	29.2	**28.6**	28.3	27.6	**27.9**	28.2	28.2	**28.2**	28.9	28.2	**28.6**	27.5	28.0	**27.8**
Elapsed labour rate	38.0	38.8	**38.4**	35.8	38.4	**37.1**	40.2	41.0	**40.6**	42.7	37.6	**40.0**	39.6	38.9	**39.3**
Ship rate	45.6	46.5	**46.1**	46.0	48.6	**47.3**	48.8	50.6	**49.7**	53.8	46.8	**50.1**	48.5	48.6	**48.5**
TEUs per hour															
Crane rate	41.8	42.8	**42.3**	42.3	41.3	**41.8**	42.5	42.0	**42.2**	43.7	41.9	**42.7**	40.9	42.2	**41.6**
Elapsed labour rate	57.2	56.9	**57.0**	53.7	57.3	**55.5**	60.6	61.1	**60.9**	64.4	55.7	**59.9**	59.0	58.7	**58.9**
Ship rate	68.7	68.4	**68.5**	69.0	72.6	**70.9**	73.6	75.4	**74.5**	81.2	69.3	**75.0**	72.1	73.2	**72.7**
Throughput pbm	69.4	76.6	**73.0**	79.3	83.5	**81.4**	71.3	74.3	**72.8**	80.6	88.4	**84.5**	77.8	78.8	**78.3**
LANDSIDE															
Containers per truck	1.6	1.6	**1.6**	1.7	1.7	**1.7**	1.7	1.7	**1.7**	1.6	1.6	**1.6**	1.7	1.7	**1.7**
TEUs per truck	2.4	2.4	**2.4**	2.4	2.4	**2.4**	2.4	2.4	**2.4**	2.4	2.4	**2.4**	2.4	2.4	**2.4**
Per cent of trucks backloaded *(%)*	8.9	9.7	**9.3**	9.5	9.4	**9.5**	10.8	11.9	**11.3**	12.4	11.5	**11.9**	12.8	13.7	**13.2**
Truck turnaround time *(mins)*	31.3	31.2	**31.2**	32.9	37.4	**35.2**	33.8	33.6	**33.7**	31.9	34.8	**33.4**	32.3	33.3	**32.8**
Average container turnaround time *(mins)*	19.1	19.0	**19.1**	19.9	22.6	**21.2**	20.5	20.2	**20.3**	19.4	21.2	**20.3**	19.6	20.1	**19.8**
WHOLE OF CONTAINER TERMINAL															
Ship turnaround time															
Median *(hours)*	28.2	28.9	**28.8**	27.9	30.1	**29.0**	27.6	28.0	**27.9**	27.5	30.5	**29.2**	28.7	28.9	**28.8**
95th percentile *(hours)*	44.5	45.8	**45.2**	54.5	56.8	**56.1**	49.2	40.3	**45.4**	44.9	76.8	**56.1**	42.7	41.1	**42.5**
Ship waiting time at anchorage															
Number of ships waiting at anchorage for more than 2 hours	11	11	**22**	15	17	**32**	8	4	**12**	10	23	**33**	13	10	**23**
Per cent of ships waiting at anchorage for more than 2 hours *(%)*	4.7	4.7	**4.7**	6.1	7.1	**6.6**	3.5	1.8	**2.7**	4.1	9.8	**6.9**	5.7	4.3	**5.0**
Average waiting time at anchorage *(hours)*	10.0	20.0	**15.0**	17.3	14.4	**15.7**	7.1	11.6	**8.6**	79.0	22.9	**39.9**	10.6	13.7	**11.9**
Median waiting time at anchorage *(hours)*	9.0	18.8	**10.1**	13.8	8.3	**11.1**	5.7	4.8	**5.7**	12.4	15.8	**13.0**	10.6	11.2	**10.6**
Total time ships spent at berth *('000 hours)*	5.1	5.5	**10.6**	5.5	5.8	**11.2**	5.1	4.8	**9.9**	5.2	5.9	**11.1**	5.0	5.0	**10.0**
Average TEUs per ship-hour at berth *(TEUs per hour)*	50.5	49.4	**49.9**	52.3	51.9	**52.1**	51.3	56.0	**53.6**	57.5	53.6	**55.4**	56.5	57.5	**57.0**
Average lifts per ship-hour at berth *(lifts per hour)*	33.8	33.8	**33.8**	35.0	35.0	**35.0**	34.4	37.8	**36.0**	38.3	36.1	**37.1**	37.9	38.2	**38.0**
Total time ships are available to stevedores ('000 hours)	4.7	5.0	**9.7**	5.8	5.8	**11.6**	4.6	4.7	**9.2**	5.0	5.9	**10.9**	5.0	5.1	**10.0**
Average lifts per stevedores' hour *(lifts per hour)*	36.7	37.1	**36.9**	32.8	35.0	**33.9**	38.3	39.0	**38.6**	40.2	36.1	**38.0**	38.4	37.8	**38.1**
Average lifts per berth visit *(lifts)*	723.1	788.2	**755.7**	777.0	836.5	**806.4**	769.0	808.8	**788.9**	814.2	908.3	**860.4**	829.5	824.1	**826.8**

Note: Cells may not sum to totals due to rounding.

Sources: DP World (2017), Hutchison Ports Australia (2017), Patrick (2017) and Port of Brisbane Pty Ltd (2017).

Table 2.2 Container terminal productivity: Sydney

	2015						2016						2017		
	Mar Qtr	Jun Qtr	Jan-Jun	Sep Qtr	Dec Qtr	Jul-Dec	Mar Qtr	Jun Qtr	Jan-Jun	Sep Qtr	Dec Qtr	Jul-Dec	Mar Qtr	Jun Qtr	Jan-Jun
WHARFSIDE															
Containers per hour															
Crane rate	29.6	25.4	**27.5**	27.0	28.5	**27.8**	26.2	26.8	**26.5**	25.7	26.0	**25.9**	25.8	25.6	**25.7**
Elapsed labour rate	44.3	40.0	**42.1**	46.4	46.3	**46.3**	45.7	47.5	**46.6**	44.4	45.4	**44.9**	44.6	43.1	**43.8**
Ship rate	51.5	47.4	**49.4**	53.7	50.2	**51.9**	51.3	56.9	**54.1**	52.4	54.7	**53.6**	54.1	51.8	**52.9**
TEUs per hour															
Crane rate	45.7	39.1	**42.4**	41.7	44.2	**43.0**	40.3	41.1	**40.7**	39.8	40.0	**39.9**	39.8	39.5	**39.7**
Elapsed labour rate	68.8	62.1	**65.4**	71.7	71.8	**71.8**	70.8	73.3	**72.0**	69.3	70.7	**70.0**	69.2	67.0	**68.1**
Ship rate	79.9	73.4	**76.6**	82.9	77.8	**80.3**	79.5	87.8	**83.7**	81.6	85.0	**83.3**	83.8	80.5	**82.1**
Throughput pbm	97.6	100.9	**99.2**	107.1	109.8	**108.4**	100.7	100.3	**100.5**	108.8	113.6	**111.2**	103.1	109.1	**106.1**
LANDSIDE															
Containers per truck	1.4	1.4	**1.4**	1.4	1.4	**1.4**	1.4	1.4	**1.4**	1.4	1.4	**1.4**	1.4	1.4	**1.4**
TEUs per truck	2.1	2.1	**2.1**	2.0	2.0	**2.0**	2.0	2.0	**2.0**	2.0	2.0	**2.0**	2.0	2.0	**2.0**
Per cent of trucks backloaded *(%)*	8.1	8.3	**8.2**	8.5	8.7	**8.6**	8.9	10.7	**9.8**	9.2	8.6	**8.9**	7.9	8.6	**8.3**
Truck turnaround time *(mins)*	36.9	34.4	**35.6**	27.7	28.1	**27.9**	28.7	27.9	**28.3**	28.8	30.3	**29.6**	29.3	32.0	**30.7**
Average container turnaround time *(mins)*	27.3	24.7	**25.9**	19.5	19.7	**19.6**	20.4	19.7	**20.0**	20.2	21.3	**20.8**	20.7	22.5	**21.6**
WHOLE OF CONTAINER TERMINAL															
Ship turnaround time															
Median *(hours)*	32.5	34.1	**32.9**	32.1	33.9	**32.5**	33.7	30.9	**31.8**	32.2	34.1	**33.7**	32.4	33.6	**32.9**
95th percentile *(hours)*	60.3	84.5	**69.2**	60.3	57.4	**57.7**	66.5	62.5	**64.8**	56.5	53.5	**55.4**	55.1	62.5	**56.9**
Ship waiting time at anchorage															
Number of ships waiting at anchorage for more than 2 hours	68	110	**178**	55	42	**97**	49	37	**86**	45	34	**79**	30	31	**61**
Per cent of ships waiting at anchorage for more than 2 hours *(%)*	26.2	41.2	**33.8**	19.9	15.5	**17.7**	19.0	14.5	**16.8**	16.4	12.6	**14.5**	11.2	11.0	**11.1**
Average waiting time at anchorage *(hours)*	24.7	28.0	**26.7**	15.7	12.5	**14.3**	29.2	13.4	**22.4**	91.0	13.0	**57.4**	12.3	9.3	**10.8**
Median waiting time at anchorage *(hours)*	7.8	11.5	**9.8**	8.6	6.4	**7.4**	7.6	8.6	**7.9**	6.4	5.8	**6.4**	5.5	6.2	**5.8**
Total time ships spent at berth *('000 hours)*	9.1	10.7	**19.8**	9.6	9.6	**19.2**	9.3	8.7	**18.0**	9.6	9.5	**19.1**	9.0	9.9	**18.9**
Average TEUs per ship-hour at berth *(TEUs per hour)*	59.3	52.2	**55.5**	62.0	63.2	**62.6**	60.0	64.3	**62.1**	62.3	66.7	**64.5**	64.4	60.8	**62.5**
Average lifts per ship-hour at berth *(lifts per hour)*	38.4	34.0	**36.1**	40.3	40.8	**40.5**	39.0	41.9	**40.4**	40.3	43.2	**41.7**	41.6	39.3	**40.4**
Total time ships are available to stevedores ('000 hours)	8.3	9.9	**18.2**	8.5	8.7	**17.2**	8.1	8.1	**16.2**	9.4	9.5	**18.9**	8.5	9.6	**18.1**
Average lifts per stevedores' hour *(lifts per hour)*	42.1	36.8	**39.2**	45.2	45.0	**45.1**	44.7	45.1	**44.9**	41.4	43.2	**42.3**	44.0	40.4	**42.1**
Average lifts per berth visit *(lifts)*	1 346.4	1 358.3	**1 352.4**	1 390.8	1 447.6	**1 418.9**	1 408.8	1 426.6	**1 417.6**	1 417.9	1 511.0	**1 464.2**	1 396.4	1 380.8	**1 388.4**

Note: Cells may not sum to totals due to rounding.

Sources: DP World (2017), Hutchison Ports Australia (2017), Patrick (2017), NSW Ports (2017) and Port Authority of New South Wales (2017).

Table 2.3 Container terminal productivity: Melbourne

	2015						2016						2017		
	Mar Qtr	Jun Qtr	Jan-Jun	Sep Qtr	Dec Qtr	Jul-Dec	Mar Qtr	Jun Qtr	Jan-Jun	Sep Qtr	Dec Qtr	Jul-Dec	Mar Qtr	Jun Qtr	Jan-Jun
WHARFSIDE															
Containers per hour															
Crane rate	32.3	31.0	**31.6**	30.5	29.8	**30.2**	30.3	31.5	**30.9**	31.4	30.3	**30.8**	30.5	30.0	**30.3**
Elapsed labour rate	53.3	52.1	**52.7**	54.3	51.8	**53.1**	51.0	55.5	**53.2**	55.3	52.0	**53.6**	51.9	53.7	**52.8**
Ship rate	64.0	61.9	**62.9**	65.4	61.8	**63.6**	61.0	65.2	**63.1**	64.2	61.8	**63.0**	61.6	63.7	**62.7**
TEUs per hour															
Crane rate	48.0	46.2	**47.1**	45.9	44.8	**45.3**	45.5	47.4	**46.4**	47.5	46.2	**46.9**	45.9	45.7	**45.8**
Elapsed labour rate	80.1	78.1	**79.1**	81.9	78.0	**80.0**	76.8	83.6	**80.2**	84.0	79.3	**81.6**	78.3	82.1	**80.3**
Ship rate	96.6	93.1	**94.8**	99.0	93.3	**96.1**	92.1	98.3	**95.2**	97.7	94.3	**96.0**	93.1	97.6	**95.4**
Throughput pbm	166.2	172.2	**169.2**	182.4	183.2	**182.8**	174.0	171.2	**172.6**	181.6	186.6	**184.1**	135.0	140.0	**137.5**
LANDSIDE															
Containers per truck	1.7	1.7	**1.7**	1.8	1.8	**1.8**	1.7	1.7	**1.7**	1.7	1.8	**1.8**	1.8	1.8	**1.8**
TEUs per truck	2.6	2.5	**2.5**	2.6	2.6	**2.6**	2.6	2.6	**2.6**	2.6	2.6	**2.6**	2.6	2.6	**2.6**
Per cent of trucks backloaded *(%)*	16.7	16.1	**16.4**	16.5	15.2	**15.9**	14.9	15.9	**15.4**	16.6	15.5	**16.0**	16.7	17.2	**16.9**
Truck turnaround time *(mins)*	31.0	34.0	**32.5**	34.6	33.5	**34.1**	32.7	33.6	**33.2**	33.2	34.8	**34.0**	25.9	25.6	**25.7**
Average container turnaround time *(mins)*	17.9	19.7	**18.8**	19.5	19.1	**19.3**	18.7	19.3	**19.0**	19.0	19.7	**19.4**	14.6	14.4	**14.5**
WHOLE OF CONTAINER TERMINAL															
Ship turnaround time															
Median *(hours)*	35.6	34.3	**35.0**	35.3	37.5	**36.3**	35.4	33.0	**34.0**	35.5	37.9	**36.8**	36.4	35.9	**36.0**
95th percentile *(hours)*	52.6	59.5	**55.6**	47.9	60.7	**56.8**	60.4	50.7	**57.0**	70.3	57.7	**59.5**	53.1	49.5	**51.7**
Ship waiting time at anchorage															
Number of ships waiting at anchorage for more than 2 hours	10	9	**19**	5	2	**7**	3	2	**5**	1	2	**3**	4	1	**5**
Per cent of ships waiting at anchorage for more than 2 hours *(%)*	4.0	3.4	**3.7**	1.9	0.8	**1.3**	1.1	0.8	**0.9**	0.4	0.7	**0.6**	1.5	0.4	**0.9**
Average waiting time at anchorage *(hours)*	20.3	29.8	**24.8**	19.4	14.8	**18.1**	14.7	63.9	**34.3**	3.7	8.6	**7.0**	9.9	75.1	**23.0**
Median waiting time at anchorage *(hours)*	21.3	24.4	**21.5**	20.4	14.8	**20.0**	10.9	63.9	**30.8**	3.7	8.6	**6.5**	7.7	75.1	**12.3**
Total time ships spent at berth *('000 hours)*	7.2	7.5	**14.7**	7.6	8.2	**15.9**	7.7	7.1	**14.8**	7.7	8.2	**15.9**	7.7	7.7	**15.4**
Average TEUs per ship-hour at berth *(TEUs per hour)*	74.8	74.0	**74.4**	77.8	71.9	**74.8**	73.7	78.2	**75.9**	78.6	74.6	**76.5**	74.9	77.1	**76.0**
Average lifts per ship-hour at berth *(lifts per hour)*	50.1	49.5	**49.8**	51.6	47.7	**49.6**	48.9	51.9	**50.3**	51.7	48.9	**50.2**	49.6	50.6	**50.1**
Total time ships are available to stevedores ('000 hours)	6.9	7.3	**14.2**	7.4	7.8	**15.2**	7.5	6.8	**14.2**	7.2	7.9	**15.1**	7.5	7.5	**15.0**
Average lifts per stevedores' hour *(lifts per hour)*	52.0	51.4	**51.7**	53.5	50.4	**51.9**	50.2	54.6	**52.3**	55.3	50.8	**53.0**	51.3	52.2	**51.7**
Average lifts per berth visit *(lifts)*	1 441.8	1 398.0	**1 419.1**	1 453.1	1 472.5	**1 462.7**	1 400.1	1 396.8	**1 398.5**	1 441.7	1 484.8	**1 463.0**	1 423.8	1 419.1	**1 421.4**

Note: Cells may not sum to totals due to rounding.
Whole of container terminal refers to East and West Swanson Docks and Webb Dock East.

Sources: DP World (2017), Patrick (2017), Port of Melbourne Operations Pty Ltd (2017) and Victoria International Container Terminal (2017).

Table 2.4 Container terminal productivity: Adelaide

	2015						2016						2017		
	Mar Qtr	Jun Qtr	Jan-Jun	Sep Qtr	Dec Qtr	Jul-Dec	Mar Qtr	Jun Qtr	Jan-Jun	Sep Qtr	Dec Qtr	Jul-Dec	Mar Qtr	Jun Qtr	Jan-Jun
WHARFSIDE															
Containers per hour															
Crane rate	30.1	29.8	**30.0**	32.9	33.7	**33.3**	34.0	34.7	**34.3**	33.4	32.4	**32.9**	32.7	30.7	**31.7**
Elapsed labour rate	43.8	39.5	**41.6**	43.7	44.1	**43.9**	44.5	44.6	**44.6**	41.3	41.6	**41.5**	43.7	42.1	**42.9**
Ship rate	51.2	46.1	**48.6**	51.5	51.0	**51.2**	51.6	53.0	**52.3**	50.5	49.8	**50.2**	50.8	48.1	**49.4**
TEUs per hour															
Crane rate	42.5	42.7	**42.6**	47.1	47.6	**47.4**	50.0	50.0	**50.0**	48.3	44.9	**46.5**	45.0	42.7	**43.8**
Elapsed labour rate	61.9	56.5	**59.2**	62.7	62.2	**62.4**	65.5	64.2	**64.9**	59.7	57.5	**58.6**	60.2	58.7	**59.4**
Ship rate	72.4	66.1	**69.2**	73.8	71.9	**72.8**	75.9	76.3	**76.1**	73.0	68.9	**70.9**	70.0	67.0	**68.4**
Throughput pbm	105.1	107.2	**106.1**	108.3	124.5	**116.4**	108.1	112.9	**110.5**	107.0	118.1	**112.6**	125.2	128.6	**126.9**
LANDSIDE															
Containers per truck	1.7	1.7	**1.7**	1.7	1.8	**1.7**	1.7	1.7	**1.7**	1.7	1.7	**1.7**	1.7	1.7	**1.7**
TEUs per truck	2.4	2.5	**2.4**	2.5	2.5	**2.5**	2.5	2.4	**2.4**	2.4	2.3	**2.4**	2.4	2.4	**2.4**
Per cent of trucks backloaded *(%)*				24.7	26.5	**25.7**	23.9	24.5	**24.2**	22.6	23.2	**22.9**	26.3	29.5	**27.9**
Truck turnaround time *(mins)*	27.2	29.1	**28.1**	29.3	32.6	**31.0**	25.6	28.6	**27.1**	29.8	29.0	**29.4**	30.2	29.8	**30.0**
Average container turnaround time *(mins)*	15.9	17.0	**16.4**	17.1	18.5	**17.8**	15.3	16.9	**16.1**	17.9	17.3	**17.6**	17.6	17.2	**17.4**
WHOLE OF CONTAINER TERMINAL															
Ship turnaround time															
Median *(hours)*	21.9	21.6	**21.8**	18.1	20.8	**20.0**	19.0	19.9	**19.6**	18.1	20.7	**19.1**	21.8	23.2	**22.9**
95th percentile *(hours)*	39.5	37.6	**38.0**	32.3	33.4	**33.0**	29.8	34.8	**33.0**	37.2	32.3	**35.3**	36.0	41.1	**39.2**
Ship waiting time at anchorage															
Number of ships waiting at anchorage for more than 2 hours	2	4	**6**	5	4	**9**	6	5	**11**	8	16	**24**	11	18	**29**
Per cent of ships waiting at anchorage for more than 2 hours *(%)*	2.6	4.4	**3.6**	5.1	4.1	**4.6**	6.3	5.2	**5.8**	7.6	14.2	**11.0**	10.5	16.8	**13.7**
Average waiting time at anchorage *(hours)*	16.4	29.9	**25.4**	17.5	21.8	**19.4**	8.6	10.7	**9.6**	30.7	18.3	**22.5**	15.9	17.0	**16.5**
Median waiting time at anchorage *(hours)*	16.4	28.0	**22.7**	14.8	16.3	**14.8**	8.2	9.0	**9.0**	27.2	13.5	**17.9**	11.2	12.7	**12.2**
Total time ships spent at berth *('000 hours)*	1.7	2.0	**3.7**	1.9	2.1	**4.1**	1.9	2.0	**3.9**	2.2	2.4	**4.5**	2.3	2.6	**4.9**
Average TEUs per ship-hour at berth *(TEUs per hour)*	50.6	45.4	**47.8**	48.4	49.2	**48.8**	50.0	48.7	**49.4**	42.0	41.1	**41.5**	44.1	40.0	**41.9**
Average lifts per ship-hour at berth *(lifts per hour)*	35.8	31.7	**33.6**	33.8	34.9	**34.3**	34.0	33.9	**33.9**	29.1	29.7	**29.4**	32.0	28.8	**30.3**
Total time ships are available to stevedores ('000 hours)	1.4	1.6	**3.1**	1.5	1.7	**3.2**	1.5	1.5	**3.0**	1.6	1.7	**3.3**	1.7	1.8	**3.5**
Average lifts per stevedores' hour *(lifts per hour)*	42.9	39.2	**40.9**	43.8	43.9	**43.9**	43.9	44.4	**44.2**	40.8	41.1	**40.9**	43.0	41.1	**42.0**
Average lifts per berth visit *(lifts)*	802.0	694.0	**743.3**	665.0	766.8	**715.7**	673.7	701.9	**687.8**	602.7	619.5	**611.4**	703.5	704.4	**703.9**

Note: Cells may not sum to totals due to rounding.
Blank cells mean no data was reported for the categories. Backloaded trucks were reported for the first time in Waterline 57.

Sources: Flinders Adelaide Container Terminal (2017) and Flinders Ports (2017).

Table 2.5 Container terminal productivity: Fremantle

	2015						2016						2017		
	Mar Qtr	Jun Qtr	Jan-Jun	Sep Qtr	Dec Qtr	Jul-Dec	Mar Qtr	Jun Qtr	Jan-Jun	Sep Qtr	Dec Qtr	Jul-Dec	Mar Qtr	Jun Qtr	Jan-Jun
WHARFSIDE															
Containers per hour															
Crane rate	37.1	37.0	**37.0**	34.7	34.3	**34.5**	35.6	35.2	**35.4**	35.1	36.2	**35.7**	35.4	35.6	**35.5**
Elapsed labour rate	44.9	42.8	**43.9**	44.1	43.3	**43.7**	44.1	42.3	**43.2**	42.4	43.8	**43.1**	45.6	45.4	**45.5**
Ship rate	51.6	50.9	**51.3**	52.7	49.6	**51.1**	52.4	50.1	**51.3**	50.5	55.3	**53.0**	53.3	53.6	**53.4**
TEUs per hour															
Crane rate	54.5	54.9	**54.7**	51.6	51.1	**51.4**	52.9	51.9	**52.4**	52.6	54.2	**53.4**	52.8	52.5	**52.7**
Elapsed labour rate	65.7	63.4	**64.6**	66.0	64.9	**65.5**	65.8	62.4	**64.1**	63.6	65.5	**64.6**	68.0	67.0	**67.5**
Ship rate	75.9	75.8	**75.9**	79.2	74.6	**76.8**	78.3	74.0	**76.2**	75.8	82.9	**79.5**	79.5	79.0	**79.3**
Throughput pbm	89.8	87.9	**88.9**	92.2	99.0	**95.6**	89.9	85.9	**87.9**	92.0	98.4	**95.2**	90.5	91.1	**90.8**
LANDSIDE															
Containers per truck	1.6	1.6	**1.6**	1.6	1.6	**1.6**	1.6	1.6	**1.6**	1.6	1.7	**1.6**	1.7	1.7	**1.7**
TEUs per truck	2.4	2.3	**2.3**	2.3	2.3	**2.3**	2.3	2.3	**2.3**	2.3	2.3	**2.3**	2.3	2.4	**2.4**
Per cent of trucks backloaded *(%)*	12.7	11.4	**12.1**	11.0	11.1	**11.1**	11.5	12.0	**11.8**	11.9	12.0	**11.9**	12.2	12.4	**12.3**
Truck turnaround time *(mins)*	24.4	27.1	**25.7**	20.8	22.4	**21.6**	21.5	21.8	**21.6**	21.0	23.4	**22.2**	22.3	20.6	**21.4**
Average container turnaround time *(mins)*	15.0	17.2	**16.1**	13.2	14.2	**13.7**	13.5	13.7	**13.6**	13.1	14.1	**13.6**	13.5	12.1	**12.8**
WHOLE OF CONTAINER TERMINAL															
Ship turnaround time															
Median *(hours)*	25.2	25.1	**25.2**	23.9	27.5	**25.2**	25.1	24.7	**24.9**	26.5	27.4	**27.3**	24.1	24.3	**24.1**
95th percentile *(hours)*	49.0	43.9	**46.8**	44.7	61.6	**50.9**	46.3	49.2	**47.8**	50.3	46.0	**48.2**	48.8	40.4	**42.2**
Ship waiting time at anchorage															
Number of ships waiting at anchorage for more than 2 hours	2	4	**6**	6	5	**11**	4	3	**7**	4	6	**10**	3	5	**8**
Per cent of ships waiting at anchorage for more than 2 hours *(%)*	1.6	3.1	**2.4**	4.6	3.9	**4.2**	3.2	2.3	**2.8**	3.2	4.7	**4.0**	2.4	3.9	**3.2**
Average waiting time at anchorage *(hours)*	16.4	9.8	**12.0**	13.7	28.1	**20.2**	29.6	18.3	**24.8**	16.5	14.4	**15.2**	13.9	13.1	**13.4**
Median waiting time at anchorage *(hours)*	16.4	5.9	**7.7**	11.7	23.8	**11.7**	13.4	16.1	**15.0**	15.2	11.0	**13.3**	17.5	13.9	**15.4**
Total time ships spent at berth *('000 hours)*	3.0	3.0	**6.1**	3.0	3.3	**6.3**	2.9	3.0	**6.0**	3.1	3.2	**6.3**	2.9	3.0	**5.9**
Average TEUs per ship-hour at berth *(TEUs per hour)*	55.8	55.7	**55.7**	59.6	56.7	**58.1**	58.9	54.6	**56.7**	55.5	57.9	**56.7**	59.1	58.7	**58.9**
Average lifts per ship-hour at berth *(lifts per hour)*	37.7	37.2	**37.5**	39.7	37.7	**38.6**	39.4	36.9	**38.1**	37.0	38.6	**37.8**	39.6	39.8	**39.7**
Total time ships are available to stevedores ('000 hours)	2.7	2.7	**5.4**	2.7	3.0	**5.7**	2.6	2.7	**5.3**	2.8	2.9	**5.7**	2.6	2.6	**5.2**
Average lifts per stevedores' hour *(lifts per hour)*	42.5	41.4	**42.0**	44.4	42.0	**43.2**	43.9	41.9	**42.9**	41.2	42.1	**41.6**	45.1	44.9	**45.0**
Average lifts per berth visit *(lifts)*	909.8	874.8	**892.2**	907.6	959.0	**933.1**	911.0	872.9	**891.8**	921.3	969.0	**945.2**	918.4	924.4	**921.4**

Note: Cells may not sum to totals due to rounding.

Sources: DP World (2017), Patrick (2017) and Fremantle Ports (2017).

Table 2.6 Container terminal productivity: five ports

	2015						2016						2017		
	Mar Qtr	Jun Qtr	Jan-Jun	Sep Qtr	Dec Qtr	Jul-Dec	Mar Qtr	Jun Qtr	Jan-Jun	Sep Qtr	Dec Qtr	Jul-Dec	Mar Qtr	Jun Qtr	Jan-Jun
WHARFSIDE															
Containers per hour															
Crane rate	31.1	29.4	**30.2**	29.5	29.7	**29.6**	29.4	30.0	**29.7**	29.5	29.2	**29.4**	29.1	28.8	**28.9**
Elapsed labour rate	46.4	44.2	**45.3**	46.9	46.3	**46.6**	46.4	48.4	**47.4**	47.4	45.8	**46.6**	46.2	46.1	**46.2**
Ship rate	54.8	52.4	**53.6**	56.1	53.8	**54.9**	54.4	57.8	**56.1**	56.4	55.4	**55.9**	55.4	55.2	**55.3**
TEUs per hour															
Crane rate	46.6	43.9	**45.3**	44.5	44.8	**44.7**	44.3	45.0	**44.6**	44.8	44.1	**44.4**	43.7	43.5	**43.6**
Elapsed labour rate	70.0	66.5	**68.2**	71.1	70.2	**70.6**	70.4	73.2	**71.8**	72.4	69.7	**71.0**	69.9	70.3	**70.1**
Ship rate	82.9	79.1	**80.9**	85.2	81.4	**83.3**	82.6	87.3	**84.9**	85.9	84.3	**85.1**	83.7	84.1	**83.9**
Throughput pbm	104.9	109.0	**106.9**	114.6	118.6	**116.6**	108.3	108.1	**108.2**	115.3	121.5	**118.4**	105.4	109.2	**107.3**
LANDSIDE															
Containers per truck	1.6	1.6	**1.6**	1.6	1.6	**1.6**	1.6	1.6	**1.6**	1.6	1.6	**1.6**	1.6	1.6	**1.6**
TEUs per truck	2.4	2.3	**2.3**	2.4	2.3	**2.4**	2.3	2.3	**2.3**	2.3	2.3	**2.3**	2.3	2.4	**2.3**
Per cent of trucks backloaded *(%)*				12.3	12.1	**12.2**	12.3	13.5	**12.9**	13.2	12.6	**12.9**	13.4	14.2	**13.8**
Truck turnaround time *(mins)*	31.9	32.7	**32.3**	30.3	31.1	**30.7**	30.0	30.2	**30.1**	30.2	31.9	**31.0**	28.2	29.1	**28.6**
Average container turnaround time *(mins)*	20.1	20.6	**20.3**	18.8	19.3	**19.1**	18.7	18.9	**18.8**	18.9	19.8	**19.4**	17.5	18.0	**17.7**
WHOLE OF CONTAINER TERMINAL															
Ship turnaround time															
Median *(hours)*	30.5	30.7	**30.6**	30.1	31.7	**30.9**	30.0	29.4	**29.7**	30.4	32.2	**31.2**	30.4	31.0	**30.6**
95th percentile *(hours)*	53.0	61.3	**56.7**	51.6	57.7	**55.6**	55.3	50.2	**52.9**	52.9	56.3	**54.6**	50.2	51.1	**50.4**
Ship waiting time at anchorage															
Number of ships waiting at anchorage for more than 2 hours	93	138	**231**	86	70	**156**	70	51	**121**	68	81	**149**	61	65	**126**
Per cent of ships waiting at anchorage for more than 2 hours *(%)*	9.8	13.9	**11.9**	8.4	7.0	**7.7**	7.2	5.3	**6.2**	6.6	8.0	**7.3**	6.1	6.4	**6.2**
Average waiting time at anchorage *(hours)*	22.1	27.0	**25.0**	16.1	14.6	**15.5**	24.3	15.3	**20.5**	76.4	16.9	**44.1**	12.5	13.4	**13.0**
Median waiting time at anchorage *(hours)*	8.8	13.1	**10.6**	11.5	8.4	**9.9**	8.2	10.2	**8.5**	8.9	10.4	**9.5**	8.9	9.4	**9.3**
Total time ships spent at berth *('000 hours)*	26.1	28.7	**54.8**	27.6	29.1	**56.7**	26.9	25.6	**52.5**	27.9	29.2	**57.0**	27.0	28.2	**55.2**
Average TEUs per ship-hour at berth *(TEUs per hour)*	60.9	57.3	**59.0**	63.3	61.7	**62.4**	61.5	64.2	**62.8**	63.5	63.2	**63.4**	63.6	62.5	**63.1**
Average lifts per ship-hour at berth *(lifts per hour)*	40.5	38.2	**39.3**	41.8	40.8	**41.3**	40.6	42.7	**41.6**	41.8	41.8	**41.8**	42.2	41.2	**41.7**
Total time ships are available to stevedores ('000 hours)	24.0	26.5	**50.5**	25.9	26.9	**52.8**	24.3	23.7	**48.0**	25.9	27.9	**53.8**	25.3	26.6	**51.8**
Average lifts per stevedores' hour *(lifts per hour)*	44.0	41.5	**42.7**	44.6	44.0	**44.3**	45.0	46.2	**45.6**	45.0	43.6	**44.3**	45.1	43.7	**44.4**
Average lifts per berth visit *(lifts)*	1 114.0	1 108.9	**1 111.4**	1 128.1	1 179.0	**1 153.3**	1 121.0	1 129.5	**1 125.2**	1 135.7	1 197.6	**1 166.5**	1 140.4	1 137.1	**1 138.7**

Note: Cells may not sum to totals due to rounding. n.a.: not applicable. Backloaded trucks were reported for the first time in Waterline 57.

Sources: DP World (2017), Patrick (2017), Hutchison Ports Australia (2017), Flinders Adelaide Container Terminal (2017), Victoria International Container Terminal (2017), Port of Brisbane Pty Ltd (2017), Maritime Safety Queensland (2017), Port Authority of New South Wales (2017), NSW Ports (2017), Port of Melbourne Operations Pty Ltd (2017), Flinders Ports (2017) and Fremantle Ports (2017).

Chapter 3: Vehicle booking system and empty container park operations

Overview

This chapter reports on three main indicator types:

1. The number of truck booking or appointment timeslots available at a container terminal
2. The number of truck booking or appointment timeslots used at a container terminal
3. The volume of container traffic through empty container parks

The data is derived from the vehicle booking systems used by the stevedores. An important use of these statistics is to monitor the time of day and week when trucks access the container terminals to pick up or deliver containers. For this reason the count of slots available and used are provided for the following windows:

Monday to Friday Day: 6:01 AM to 6:00 PM

Monday to Friday Evening: 6:01 PM to 12:00 Midnight

Monday to Friday Night: 12:01 Midnight to 6:00 AM

Saturday Day: 6:01 AM to 6:00 PM

Saturday Evening: 6:01 PM to 12:00 Midnight

Saturday Night: 12:01 Midnight to 6:00 AM

Sunday Day: 6:01 AM to 6:00 PM

Sunday Evening: 6:01 PM to 12:00 Midnight

Sunday Night: 12:01 Midnight to 6:00 AM

The stevedores at the five container terminals do not have identical day, evening and night shifts. Thus data has been adjusted to fit into these standardised work shifts for comparative purposes.

Indicator 3.1 Number of truck timeslots available

Stevedoring companies make available a number of truck timeslots at various times in each day, based on the deployment of container handling equipment. The main factors affecting the availability of truck timeslots are the volume of containers to be processed, and terminal resources available to process containers. When shipping schedules and container volumes demand extra resources, additional labour and extra equipment can be deployed to the landside of a container terminal and extra available timeslots are advertised normally one or two days in advance.

Indicator 3.2 Number of timeslots actually used

This is the count of timeslots actually used by trucks.

Indicator 3.3 Timeslots used by trucks in all off-peak periods as per cent of total timeslots used at container terminals

This indicator, derived from Indicator 3.2, gives the count of timeslots used by trucks during the off-peak period as a per cent of all timeslots used. The off-peak period is defined as all time periods except Monday to Friday 6:01 AM to 6:00 PM.

Results for this indicator are presented in Figure 3.1. The indicator is further divided up into Monday to Friday off-peak usage (Indicator 3.4) and week-end usage (Indicator 3.5).

Indicator 3.4 Timeslots used by trucks in Monday to Friday off-peak periods as per cent of total timeslots used

This indicator, derived from Indicator 3.2, gives a count of timeslots used by trucks during the Monday to Friday off-peak period as a per cent of all timeslots used. Results for this indicator are presented in Figure 3.2.

Indicator 3.5 Timeslots used by trucks on Saturday and Sunday as per cent of total timeslots used

This indicator, derived from indicator 3.2, gives a count of timeslots used by trucks during the Weekend (Saturday to Sunday) as a per cent of all timeslots used. Results for this indicator are presented in Figure 3.3.

Indicator 3.6 Average TEUs handled per VBS/TAS truck timeslot

This indicator is a measure of the intensity of usage of timeslots. The indicator increases as opportunities for out/return load carrying trips in one job increase. Results for this indicator are presented in Figure 3.4.

Indicator 3.7 Number of containers moved through empty container parks

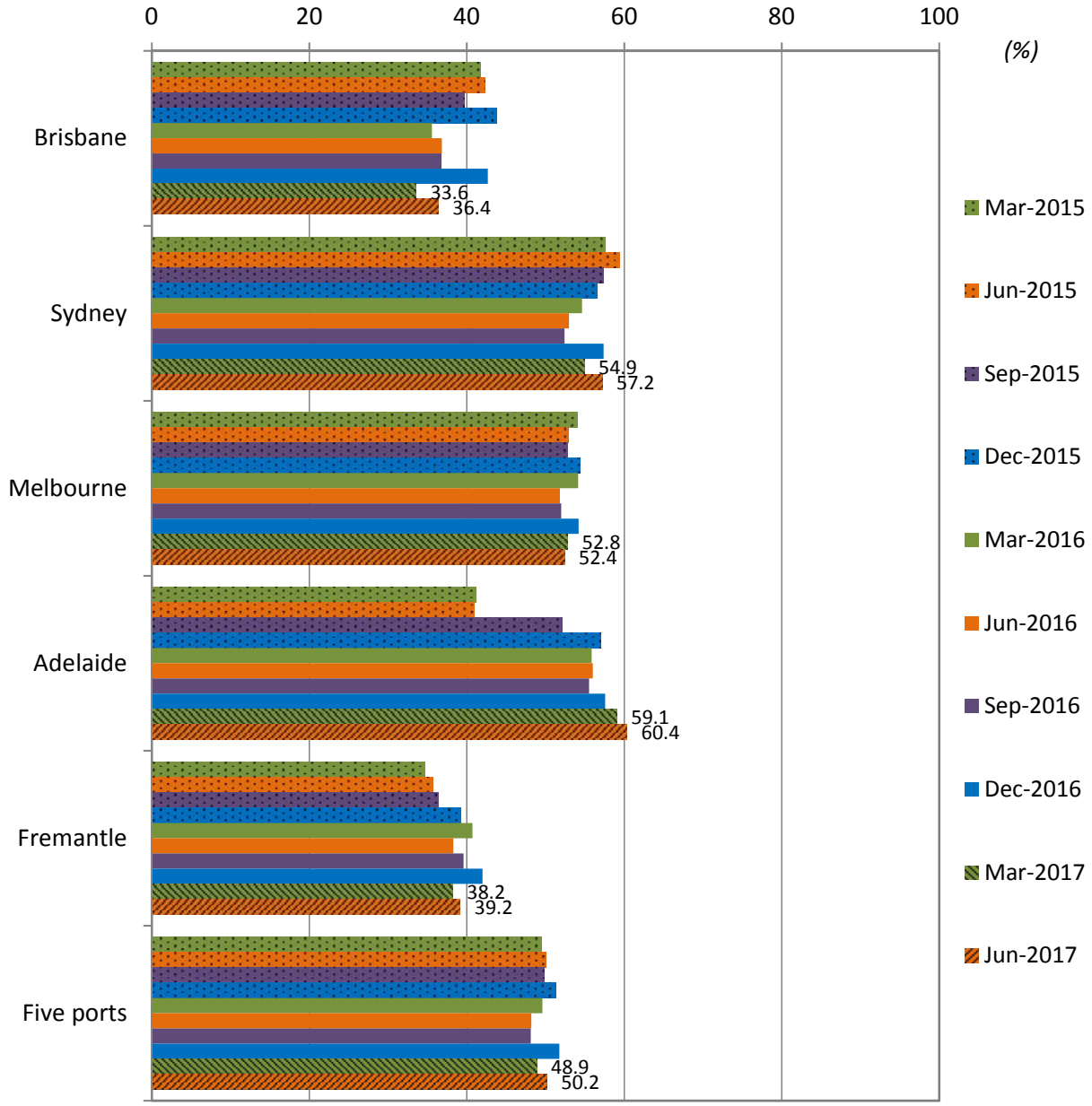
This indicator is a measure of the usage of empty container parks. It shows the number of notifications of container movements to empty container parks in the vicinity of each port.

Indicator 3.8 Number of TEUs moved through empty container parks

This indicator is a measure of the usage of empty container parks. It shows the number of TEUs moved in the operations shown by Indicator 3.7.

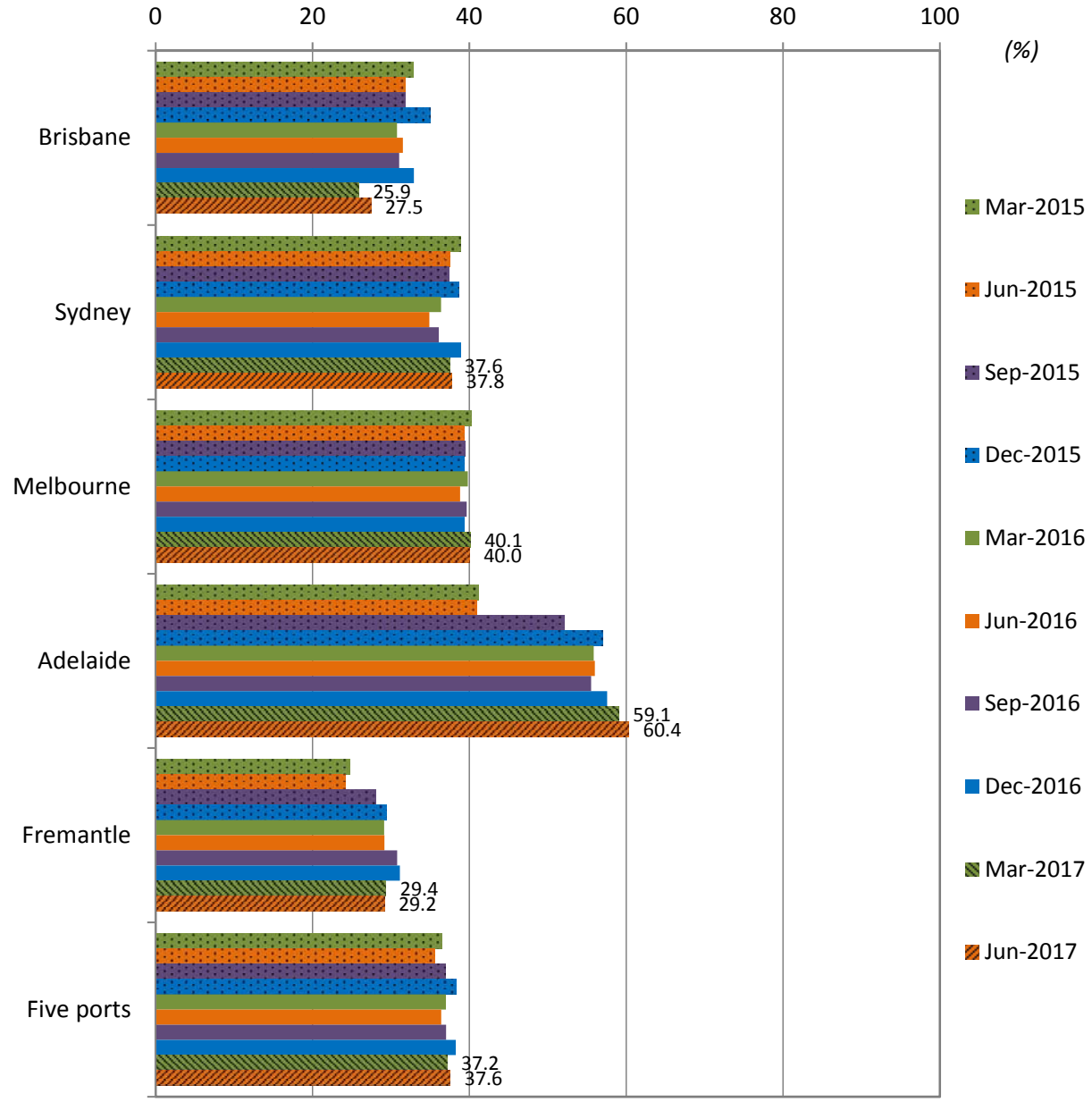
Webb Dock East and Port Phillip Bay. Photo courtesy of Port of Melbourne.

Figure 3.1 Timeslots used by trucks in all off-peak periods



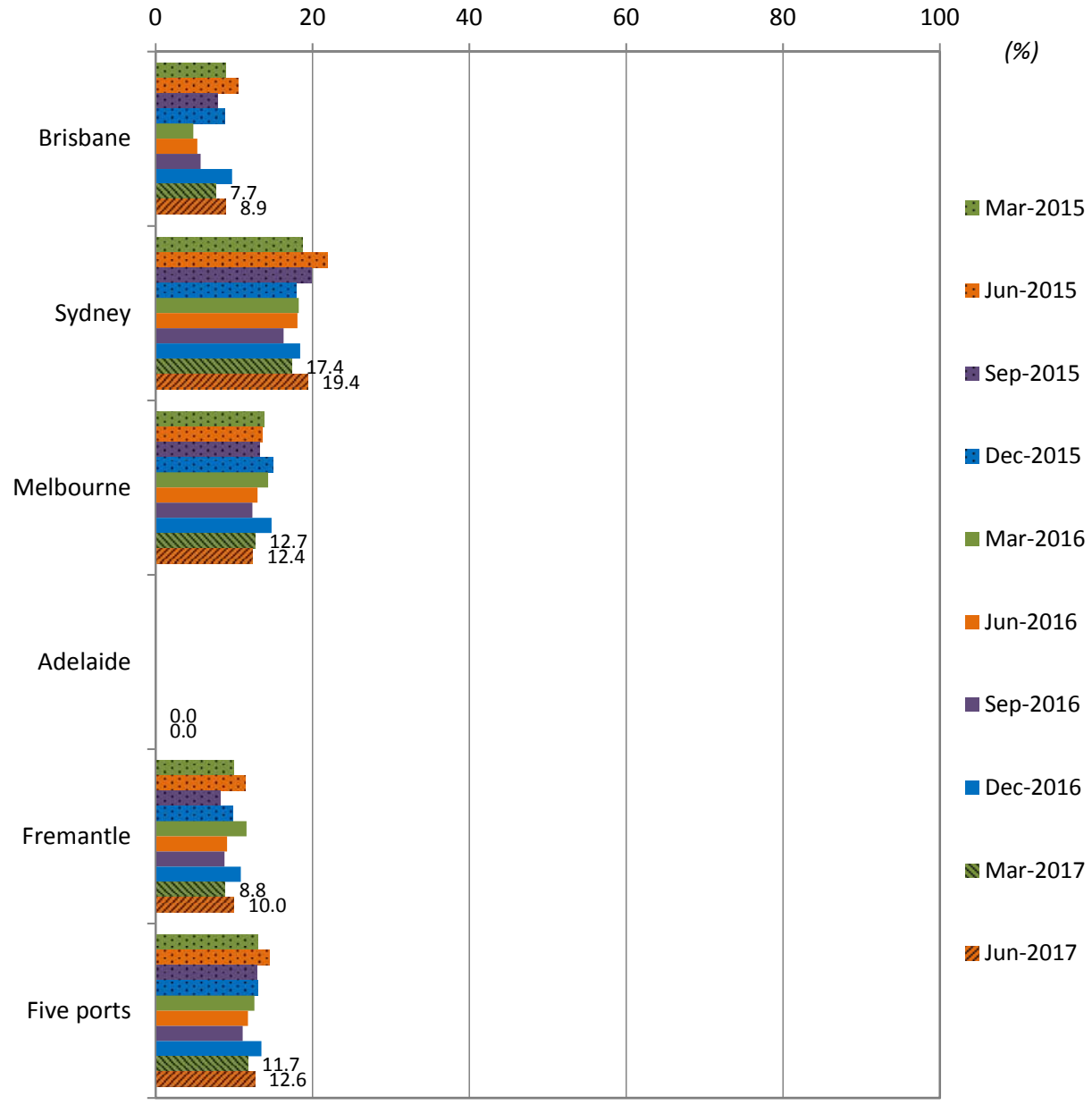
Sources: DP World (2017), Flinders Adelaide Container Terminal (2017), Hutchison Ports Australia (2017), Patrick (2017) and Victoria International Container Terminal (2017).

Figure 3.2 Timeslots used by trucks in off-peak periods, Monday to Friday



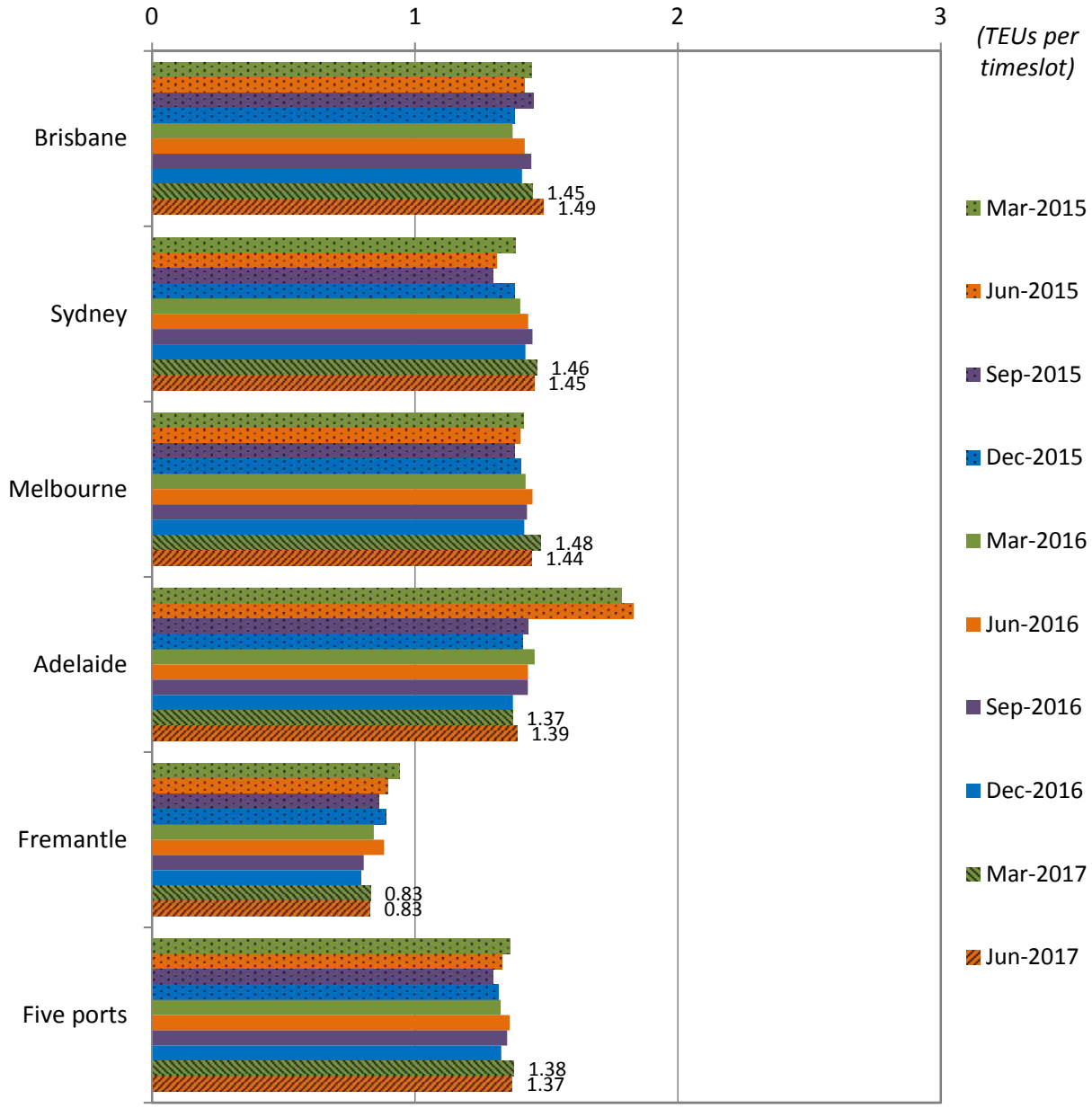
Sources: DP World (2017), Flinders Adelaide Container Terminal (2017), Hutchison Ports Australia (2017), Patrick (2017) and Victoria International Container Terminal (2017).

Figure 3.3 Timeslots used by trucks on Saturday and Sunday



Sources: DP World (2017), Flinders Adelaide Container Terminal (2017), Hutchison Ports Australia (2017), Patrick (2017) and Victoria International Container Terminal (2017).

Figure 3.4 TEUs processed per VBS timeslot used at container terminals



Sources: DP World (2017), Flinders Adelaide Container Terminal (2017), Hutchison Ports Australia (2017), Patrick (2017) and Victoria International Container Terminal (2017).

Table 3.1 Timeslots available and actually used by trucks: Brisbane

			2015				2016				2017	
	Weekday	Shift	Mar Qtr	Jun Qtr	Sep Qtr	Dec Qtr	Mar Qtr	Jun Qtr	Sep Qtr	Dec Qtr	Mar Qtr	Jun Qtr
Available timeslots *('000)*	**Monday - Friday**	**Day**	78.1	86.7	82.6	81.0	104.4	123.1	150.6	130.9	135.4	102.8
		Evening	30.6	32.5	26.4	28.2	32.9	40.4	50.8	52.6	51.8	34.5
		Night	14.3	15.7	16.3	21.5	21.4	28.8	38.2	39.7	29.8	15.8
		Sub-total	**123.0**	**134.9**	**125.3**	**130.6**	**158.7**	**192.3**	**239.6**	**223.3**	**217.0**	**153.0**
	Saturday	**Day**	8.7	11.5	10.2	8.3	5.2	5.8	6.5	15.8	24.0	17.7
		Evening	2.9	2.3	1.7	0.1	0.0	0.2	0.1	3.6	5.0	3.3
		Night	0.5	0.6	0.6	1.6	0.5	0.2	1.2	5.4	8.4	1.2
		Sub-total	**12.0**	**14.4**	**12.4**	**10.0**	**5.7**	**6.3**	**7.8**	**24.8**	**37.3**	**22.2**
	Sunday	**Day**	2.6	4.4	2.5	2.0	0.1	0.1	0.2	6.7	3.8	1.6
		Evening	0.4	0.5	0.1	0.0	0.0	0.0	0.0	0.9	1.0	0.0
		Night	0.5	0.7	0.9	0.8	0.5	0.6	0.6	2.1	1.3	0.7
		Sub-total	**3.5**	**5.6**	**3.5**	**2.9**	**0.6**	**0.7**	**0.9**	**9.7**	**6.1**	**2.3**
	Total available timeslots		**138.6**	**154.9**	**141.2**	**143.5**	**165.1**	**199.2**	**248.4**	**257.8**	**260.4**	**177.4**
Used timeslots *('000)*	**Monday - Friday**	**Day**	73.0	78.8	76.6	73.6	76.6	79.4	85.1	79.5	83.3	81.5
		Evening	27.3	28.8	24.7	25.5	22.5	24.5	25.6	27.6	23.3	24.3
		Night	13.8	14.6	15.8	20.4	14.1	15.1	16.2	18.1	9.2	10.9
		Sub-total	**114.1**	**122.2**	**117.1**	**119.5**	**113.2**	**119.1**	**126.9**	**125.2**	**115.8**	**116.7**
	Saturday	**Day**	7.1	9.6	8.0	7.1	4.6	5.6	5.8	8.8	8.1	9.9
		Evening	2.3	1.4	0.5	0.1	0.0	0.2	0.1	0.6	0.5	0.7
		Night	0.4	0.6	0.5	1.5	0.5	0.2	1.0	1.7	0.2	0.0
		Sub-total	**9.7**	**11.6**	**9.0**	**8.7**	**5.1**	**6.0**	**6.9**	**11.2**	**8.8**	**10.6**
	Sunday	**Day**	0.8	2.2	0.4	1.9	0.1	0.1	0.2	1.6	0.3	0.2
		Evening	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
		Night	0.4	0.6	0.7	0.8	0.5	0.6	0.6	0.6	0.6	0.7
		Sub-total	**1.5**	**2.8**	**1.0**	**2.7**	**0.6**	**0.7**	**0.8**	**2.3**	**0.9**	**0.8**
	Total used timeslots		**125.3**	**136.5**	**127.1**	**131.0**	**118.9**	**125.7**	**134.6**	**138.7**	**125.5**	**128.2**

Note: Data are rounded to the nearest 1000. Cells with an entry of "0.0" mean that data were reported but rounded to zero.

Sources: DP World (2017), Hutchison Ports Australia (2017) and Patrick (2017).

Table 3.2 Timeslots available and actually used by trucks: Sydney

			2015				2016				2017	
	Weekday	Shift	Mar Qtr	Jun Qtr	Sep Qtr	Dec Qtr	Mar Qtr	Jun Qtr	Sep Qtr	Dec Qtr	Mar Qtr	Jun Qtr
Available timeslots *('000)*	**Monday - Friday**	**Day**	99.3	111.5	131.4	128.1	134.0	134.8	135.7	168.0	166.1	170.5
		Evening	49.3	53.8	58.4	53.9	48.4	47.7	52.3	83.6	71.6	77.5
		Night	44.8	48.8	49.1	47.2	39.7	37.6	41.9	63.6	56.2	65.5
		Sub-total	**193.4**	**214.1**	**238.8**	**229.2**	**222.1**	**220.1**	**229.9**	**315.2**	**293.8**	**313.5**
	Saturday	**Day**	16.9	21.5	19.6	21.5	18.1	19.0	17.8	36.4	21.7	25.9
		Evening	2.1	3.9	2.9	1.6	1.1	1.6	1.1	4.0	4.1	4.7
		Night	5.1	6.6	6.4	5.5	4.0	4.5	4.8	21.4	10.9	10.5
		Sub-total	**24.0**	**32.0**	**28.9**	**28.7**	**23.1**	**25.0**	**23.8**	**61.9**	**36.7**	**41.1**
	Sunday	**Day**	9.7	14.9	13.8	12.0	11.8	10.7	8.3	11.1	12.9	14.6
		Evening	6.4	7.5	7.8	7.0	6.7	6.1	6.4	6.2	6.1	6.5
		Night	3.8	4.6	5.5	3.2	3.6	3.3	3.3	4.6	6.0	7.2
		Sub-total	**20.0**	**27.0**	**27.1**	**22.2**	**22.1**	**20.1**	**18.0**	**21.9**	**25.0**	**28.4**
	Total available timeslots		**237.4**	**273.1**	**294.8**	**280.1**	**267.3**	**265.3**	**271.6**	**398.9**	**355.6**	**383.0**
Used timeslots *('000)*	**Monday - Friday**	**Day**	88.5	97.6	106.4	101.7	98.1	104.6	110.4	103.1	100.0	100.4
		Evening	43.3	48.0	49.6	47.9	42.3	42.4	45.9	49.9	45.0	47.0
		Night	37.9	42.3	43.8	42.4	36.4	35.3	37.9	44.3	38.5	41.7
		Sub-total	**169.8**	**187.9**	**199.9**	**192.1**	**176.8**	**182.2**	**194.2**	**197.3**	**183.5**	**189.0**
	Saturday	**Day**	14.7	18.3	16.1	14.8	14.9	16.0	14.9	16.8	14.2	16.0
		Evening	1.6	3.2	2.2	1.3	0.7	1.4	1.0	2.1	1.6	2.6
		Night	4.6	6.1	6.2	5.4	3.9	4.3	4.8	6.6	4.9	5.8
		Sub-total	**21.0**	**27.6**	**24.5**	**21.5**	**19.4**	**21.7**	**20.7**	**25.5**	**20.6**	**24.3**
	Sunday	**Day**	9.2	14.4	13.4	11.3	10.7	9.7	7.9	10.3	9.2	11.0
		Evening	5.8	7.0	7.2	6.5	6.1	5.7	6.2	5.8	5.7	6.3
		Night	3.1	3.7	4.5	2.6	3.2	3.1	3.1	3.0	2.9	3.9
		Sub-total	**18.1**	**25.1**	**25.1**	**20.4**	**20.0**	**18.5**	**17.2**	**19.1**	**17.9**	**21.2**
	Total used timeslots		**208.8**	**240.5**	**249.4**	**234.0**	**216.2**	**222.5**	**232.1**	**241.9**	**222.0**	**234.6**

Sources: DP World (2017), Hutchison Ports Australia (2017) and Patrick (2017).

Table 3.3 Timeslots available and actually used by trucks: Melbourne

			2015				2016				2017	
	Weekday	Shift	Mar Qtr	Jun Qtr	Sep Qtr	Dec Qtr	Mar Qtr	Jun Qtr	Sep Qtr	Dec Qtr	Mar Qtr	Jun Qtr
Available timeslots *('000)*	**Monday - Friday**	**Day**	143.2	140.9	145.8	133.9	129.1	131.3	136.1	133.7	125.6	128.7
		Evening	68.4	65.4	66.4	62.1	60.1	57.2	61.2	64.3	60.3	59.7
		Night	57.4	52.8	55.6	54.9	52.8	49.4	52.2	51.5	46.3	48.3
		Sub-total	**269.0**	**259.1**	**267.8**	**250.9**	**241.9**	**237.9**	**249.5**	**249.4**	**232.2**	**236.7**
	Saturday	**Day**	19.4	17.7	18.5	19.1	18.2	17.2	15.5	18.3	15.5	16.1
		Evening	0.3	0.4	0.3	0.6	0.6	0.2	0.0	0.3	0.4	0.2
		Night	5.9	5.0	4.8	4.6	4.7	4.0	4.8	6.0	3.6	4.3
		Sub-total	**25.5**	**23.2**	**23.7**	**24.3**	**23.6**	**21.4**	**20.3**	**24.6**	**19.5**	**20.6**
	Sunday	**Day**	6.2	7.8	6.3	9.1	7.4	6.1	5.5	8.2	7.1	6.1
		Evening	7.3	6.1	6.7	6.7	6.2	5.0	6.0	7.0	5.2	4.7
		Night	5.0	4.6	5.2	5.0	4.6	3.9	3.9	4.3	3.6	3.6
		Sub-total	**18.5**	**18.5**	**18.2**	**20.7**	**18.2**	**14.9**	**15.5**	**19.5**	**15.9**	**14.4**
	Total available timeslots		**313.1**	**300.8**	**309.6**	**296.0**	**283.7**	**274.2**	**285.3**	**293.5**	**267.6**	**271.6**
Used timeslots *('000)*	**Monday - Friday**	**Day**	139.6	137.8	143.0	131.3	126.5	129.2	133.8	131.1	124.9	134.3
		Evening	66.7	63.8	64.9	60.4	58.6	56.1	59.6	62.8	61.3	65.9
		Night	55.5	51.3	54.5	52.9	51.2	48.0	51.0	49.9	44.9	47.2
		Sub-total	**261.8**	**252.9**	**262.3**	**244.6**	**236.3**	**233.4**	**244.4**	**243.8**	**231.2**	**247.4**
	Saturday	**Day**	18.5	17.1	17.8	18.5	17.4	16.5	14.8	17.4	14.5	16.7
		Evening	0.2	0.4	0.3	0.6	0.5	0.1	0.0	0.3	0.3	0.1
		Night	5.6	5.0	4.8	4.5	4.7	3.9	4.7	5.9	3.5	4.2
		Sub-total	**24.4**	**22.4**	**22.9**	**23.5**	**22.5**	**20.5**	**19.5**	**23.6**	**18.4**	**21.0**
	Sunday	**Day**	6.0	7.5	6.1	8.8	7.2	5.8	5.3	8.0	6.8	6.0
		Evening	7.0	5.7	6.5	6.3	5.8	4.9	5.8	6.7	5.1	4.6
		Night	4.6	4.1	4.8	4.5	4.1	3.7	3.8	4.0	3.4	3.4
		Sub-total	**17.6**	**17.4**	**17.3**	**19.6**	**17.1**	**14.3**	**14.9**	**18.7**	**15.3**	**14.0**
	Total used timeslots		**303.7**	**292.7**	**302.6**	**287.8**	**275.9**	**268.3**	**278.8**	**286.1**	**264.8**	**282.4**

Note: 'Available timeslots' data are not included for VICT during January–June 2017. 'Used timeslots' includes VICT figures for the same period.

Sources: DP World (2017), Patrick (2017) and Victoria International Container Terminal (2017).

Table 3.4 Timeslots available and actually used by trucks: Adelaide

			2015				2016				2017	
	Weekday	Shift	Mar Qtr	Jun Qtr	Sep Qtr	Dec Qtr	Mar Qtr	Jun Qtr	Sep Qtr	Dec Qtr	Mar Qtr	Jun Qtr
Available timeslots *('000)*	**Monday - Friday**	**Day**	25.0	24.7	26.6	25.6	24.1	24.5	24.4	23.7	24.7	25.0
		Evening	17.6	17.4	18.2	18.7	17.2	17.0	17.5	17.6	19.3	20.1
		Night	0.0	0.0	15.6	17.2	15.6	16.7	16.2	16.1	18.2	20.1
		Sub-total	**42.6**	**42.1**	**60.4**	**61.4**	**56.9**	**58.3**	**58.1**	**57.4**	**62.2**	**65.2**
	Saturday	**Day**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Evening	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Night	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Sub-total	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
	Sunday	**Day**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Evening	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Night	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Sub-total	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
	Total available timeslots		**42.6**	**42.1**	**60.4**	**61.4**	**56.9**	**58.3**	**58.1**	**57.4**	**62.2**	**65.2**
Used timeslots *('000)*	**Monday - Friday**	**Day**	24.7	24.2	26.3	25.5	23.5	23.9	23.5	23.3	24.5	24.7
		Evening	17.3	16.7	17.4	18.4	16.3	15.8	16.1	17.2	19.0	19.9
		Night	0.0	0.0	11.2	15.4	13.4	14.7	13.2	14.4	16.4	17.8
		Sub-total	**42.0**	**40.9**	**54.9**	**59.3**	**53.1**	**54.4**	**52.8**	**55.0**	**59.9**	**62.3**
	Saturday	**Day**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Evening	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Night	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Sub-total	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
	Sunday	**Day**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Evening	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Night	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Sub-total	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
	Total used timeslots		**42.0**	**40.9**	**54.9**	**59.3**	**53.1**	**54.4**	**52.8**	**55.0**	**59.9**	**62.3**

Note: Blank cells mean no data was reported for the categories. Until September Quarter 2015, Adelaide did not operate VBS on night shift.

Source: Flinders Adelaide Container Terminal (2017).

Table 3.5 Timeslots available and actually used by trucks: Fremantle

			2015				2016				2017	
	Weekday	Shift	Mar Qtr	Jun Qtr	Sep Qtr	Dec Qtr	Mar Qtr	Jun Qtr	Sep Qtr	Dec Qtr	Mar Qtr	Jun Qtr
Available timeslots *('000)*	**Monday - Friday**	**Day**	78.3	73.9	76.1	74.4	68.3	66.1	67.1	67.2	63.7	64.4
		Evening	21.5	21.5	24.9	25.3	24.2	23.1	23.8	24.9	21.6	21.9
		Night	9.0	7.2	9.3	11.1	9.6	9.0	11.2	12.4	9.3	9.7
		Sub-total	**108.8**	**102.6**	**110.3**	**110.8**	**102.1**	**98.2**	**102.0**	**104.5**	**94.5**	**95.9**
	Saturday	**Day**	5.6	6.0	4.5	4.5	7.0	4.8	4.7	6.5	5.8	6.3
		Evening	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
		Night	0.0	0.1	0.2	0.1	0.0	0.3	0.0	0.2	0.1	0.0
		Sub-total	**5.6**	**6.1**	**4.8**	**4.6**	**7.1**	**5.3**	**4.8**	**6.7**	**5.9**	**6.3**
	Sunday	**Day**	6.3	6.7	4.9	7.0	6.0	4.3	4.7	6.1	3.1	3.9
		Evening	0.3	0.4	0.4	0.4	0.2	0.2	0.3	0.6	0.2	0.3
		Night	0.0	0.2	0.1	0.1	0.0	0.0	0.2	0.1	0.0	0.2
		Sub-total	**6.6**	**7.4**	**5.3**	**7.5**	**6.3**	**4.6**	**5.2**	**6.8**	**3.4**	**4.4**
	Total available timeslots		**121.0**	**116.0**	**120.5**	**122.9**	**115.5**	**108.1**	**112.0**	**118.0**	**103.8**	**106.7**
Used timeslots *('000)*	**Monday - Friday**	**Day**	76.5	72.4	75.0	73.1	67.0	64.7	66.2	66.3	62.7	63.3
		Evening	20.4	20.2	24.0	24.5	23.4	21.9	23.0	23.3	20.7	20.8
		Night	8.6	7.1	9.1	10.9	9.6	8.7	10.7	12.3	9.2	9.6
		Sub-total	**105.5**	**99.7**	**108.1**	**108.6**	**100.0**	**95.3**	**100.0**	**101.9**	**92.6**	**93.7**
	Saturday	**Day**	5.4	5.9	4.3	4.4	6.9	4.7	4.5	5.8	5.6	6.1
		Evening	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
		Night	0.0	0.1	0.2	0.1	0.0	0.3	0.0	0.2	0.1	0.0
		Sub-total	**5.5**	**6.0**	**4.6**	**4.5**	**6.9**	**5.1**	**4.5**	**5.9**	**5.6**	**6.1**
	Sunday	**Day**	5.9	6.3	4.7	6.8	5.9	4.2	4.6	5.9	3.1	3.8
		Evening	0.3	0.4	0.4	0.4	0.2	0.2	0.3	0.5	0.2	0.3
		Night	0.0	0.2	0.1	0.1	0.0	0.0	0.2	0.1	0.0	0.2
		Sub-total	**6.2**	**6.9**	**5.1**	**7.3**	**6.2**	**4.4**	**5.1**	**6.5**	**3.3**	**4.3**
	Total used timeslots		**117.2**	**112.6**	**117.8**	**120.4**	**113.1**	**104.8**	**109.6**	**114.3**	**101.6**	**104.1**

Note: Data are rounded to the nearest 1000. Cells with an entry of "0.0" mean that data were reported but rounded to zero.

Sources: DP World (2017) and Patrick (2017).

Table 3.6 Timeslots available and actually used by trucks: Five Ports

			2015				2016				2017	
	Weekday	Shift	Mar Qtr	Jun Qtr	Sep Qtr	Dec Qtr	Mar Qtr	Jun Qtr	Sep Qtr	Dec Qtr	Mar Qtr	Jun Qtr
Available timeslots *('000)*	**Monday - Friday**	**Day**	424.0	437.7	462.4	442.9	459.8	479.9	513.9	523.6	515.5	491.4
		Evening	187.4	190.5	194.2	188.2	182.7	185.5	205.6	243.0	224.5	213.6
		Night	125.5	124.5	145.9	151.7	139.2	141.5	159.6	183.2	159.7	159.2
		Sub-total	**736.9**	**752.7**	**802.5**	**782.8**	**781.7**	**806.9**	**879.1**	**949.8**	**899.7**	**864.3**
	Saturday	**Day**	50.5	56.8	52.8	53.5	48.5	46.8	44.6	77.1	67.0	66.1
		Evening	5.3	6.6	4.9	2.4	1.7	2.1	1.2	7.9	9.5	8.2
		Night	11.5	12.3	12.1	11.8	9.2	9.1	10.8	33.0	22.9	16.0
		Sub-total	**67.3**	**75.7**	**69.8**	**67.7**	**59.5**	**57.9**	**56.6**	**118.0**	**99.5**	**90.2**
	Sunday	**Day**	24.9	33.8	27.3	30.2	25.4	21.2	18.8	32.1	27.0	26.1
		Evening	14.4	14.4	15.1	14.1	13.1	11.3	12.8	14.6	12.5	11.6
		Night	9.3	10.2	11.7	9.1	8.7	7.8	8.1	11.1	10.9	11.7
		Sub-total	**48.6**	**58.5**	**54.1**	**53.4**	**47.2**	**40.3**	**39.6**	**57.9**	**50.4**	**49.4**
	Total available timeslots		**852.7**	**886.9**	**926.4**	**903.9**	**888.4**	**905.1**	**975.4**	**1 125.6**	**1 049.6**	**1 003.8**
Used timeslots *('000)*	**Monday - Friday**	**Day**	402.3	410.8	427.3	405.2	391.6	401.9	419.1	403.3	395.5	404.3
		Evening	175.0	177.5	180.6	176.7	163.2	160.7	170.2	180.8	169.3	177.8
		Night	115.9	115.2	134.4	142.1	124.6	121.8	129.1	139.1	118.2	127.1
		Sub-total	**693.2**	**703.5**	**742.3**	**724.0**	**679.4**	**684.4**	**718.4**	**723.2**	**683.0**	**709.2**
	Saturday	**Day**	45.8	50.9	46.3	44.8	43.7	42.7	40.1	48.8	42.4	48.8
		Evening	4.1	5.0	2.9	2.0	1.2	1.8	1.1	2.9	2.4	3.4
		Night	10.7	11.7	11.7	11.5	9.1	8.8	10.5	14.4	8.7	10.0
		Sub-total	**60.5**	**67.6**	**61.0**	**58.3**	**54.0**	**53.4**	**51.7**	**66.2**	**53.5**	**62.1**
	Sunday	**Day**	21.9	30.3	24.5	28.8	23.9	19.8	18.0	25.8	19.4	20.9
		Evening	13.3	13.1	14.1	13.3	12.1	10.8	12.3	13.1	11.1	11.2
		Night	8.1	8.7	10.0	8.0	7.8	7.4	7.7	7.7	6.9	8.2
		Sub-total	**43.3**	**52.1**	**48.6**	**50.0**	**43.8**	**38.0**	**37.9**	**46.6**	**37.3**	**40.3**
	Total used timeslots		**797.0**	**823.2**	**851.8**	**832.4**	**777.2**	**775.8**	**808.0**	**836.0**	**773.8**	**811.6**

Note: 'Available timeslots' data are not included for VICT during January–June 2017. 'Used timeslots' includes VICT figures for the same period.

Sources: DP World (2017), Flinders Adelaide Container Terminal (2017), Hutchison Ports Australia (2017), Patrick (2017) and Victoria International Container Terminal (2017).

Table 3.7 Empty Container Park operations

		2015				2016				2017	
		Mar Qtr	Jun Qtr	Sep Qtr	Dec Qtr	Mar Qtr	Jun Qtr	Sep Qtr	Dec Qtr	Mar Qtr	Jun Qtr
Number of containers ('000)	**Brisbane**	120.3	131.2	133.9	135.3	115.7	127.7	135.4	139.1	130.1	142.4
	Sydney	200.6	204.4	217.4	207.2	193.3	189.2	188.7	195.0	178.1	178.3
	Melbourne	335.8	325.7	344.6	332.1	314.1	316.2	329.8	356.8	347.2	337.0
	Adelaide	11.5	17.7	18.3	19.4	18.6	20.1	22.0	23.6	25.1	23.4
	Fremantle	84.6	80.1	82.7	84.8	79.8	81.2	82.4	87.7	86.7	89.2
	Five ports	**752.8**	**759.1**	**797.0**	**778.9**	**721.5**	**734.5**	**758.4**	**802.3**	**767.2**	**770.3**
Number of TEUs ('000)	**Brisbane**	166.2	179.2	186.2	186.5	159.6	178.4	190.3	186.5	175.2	201.8
	Sydney	303.8	308.5	328.7	311.7	289.9	281.1	281.2	289.0	263.5	262.9
	Melbourne	492.1	474.7	509.1	492.7	466.0	469.6	488.3	529.0	512.9	502.6
	Adelaide	17.0	26.0	26.6	27.3	26.3	28.0	32.3	33.3	35.1	32.6
	Fremantle	119.8	114.5	118.0	121.1	114.5	115.6	117.6	124.3	123.5	127.7
	Five ports	**1098.9**	**1102.8**	**1168.6**	**1139.2**	**1056.2**	**1072.6**	**1109.6**	**1162.1**	**1110.1**	**1127.6**

Sources: Containerchain Pty Ltd (2017).

Chapter 4: Port interface cost index

Overview

The port interface cost index (PICI) provides a measure of shore-based shipping charges which approximate costs of carting containers through Australia's mainland major city ports. The PICI is based on an indicative approach; that is, the index is not an average of all charges, but is based on those typically charged by service providers in most instances. The PICI is computed as a national average (Table 4.6) taking into account the port fees and charges for imports and exports of containers at the five major container ports (Table 4.1 to 4.5).

What PICI measures

The PICI is a measure of shore-based shipping costs or charges for containers moved through mainland capital city ports. These are called "shore-based" because they are that part of the charges paid by importers and exporters of containers which are directly related to the activity which occurs in the port and on the wharf. They do not include the total price for importing or exporting goods carried in containers paid by customers to customs brokers and freight forwarders. The index is a measure of the movements in costs to users of waterfront and related services and, signals whether the cost is increasing or decreasing. The waterfront is defined as the interface between seaports and land transport, hence the term port interface cost index. Port interface costs are estimated for standard representative ships.

The port interface cost index is based on twenty indicators which fall in four main groups:

1. Parameters used in computing the index;
2. Ship-based charges;
3. Cargo-based charges; and
4. Other charges, namely: Stevedoring costs; Customs brokers' fees; Road transport costs.

Parameters used in computing the index

These parameters enable the PICI charges to be estimated on a per TEU basis for these typical ships.

Indicator 4.1 Ship size

The port interface costs vary by ship size.

Ship size is the total internal capacity of a ship often referred to as Gross (Registered) Tonnage. The PICI has as its starting point the estimation of parameters for three typical sizes of container ships:

- 9 991 GT ship represents all ships of sizes ranging from 5 000 to 20 000 GT
- 37 394 GT ship represents all ships of sizes ranging from 35 000 to 40 000 GT
- 53 324 GT ship represents all ships of sizes ranging from 50 000 to 55 000 GT

Indicator 4.2 Average TEUs exchanged

This is the sum of Indicator 4.3 and Indicator 4.6.

Indicator 4.3 Average TEUs Full (or loaded)

This is the sum of Indicator 4.4 and Indicator 4.5.

Indicator 4.4 Average TEUs Full inwards (or imports)

This is the sum of full (or loaded) import containers converted to standardised twenty foot equivalent units moved into a port by ships in a GT range, divided by the number of ship visits in the GT range for the given period.

Indicator 4.5 TEUs Full outwards (or exports)

This is the sum of full (or loaded) export containers converted to standardised twenty foot equivalent units moved out of a port by ships in a GT range, divided by the number of ship visits in the GT range for the given period.

Indicator 4.6 Empty TEUs

This is the sum of empty import and empty export containers converted to standardised twenty foot equivalent units that are moved into and out of a port by ships in a GT range, divided by the number of ship visits in the GT range for the given period.

Indicator 4.7 Average number of port calls by ships in the GT range

This is the total number of ship calls to a container port by ships in the GT range, divided by the number of ship visits in the GT range for the given period.

Indicator 4.8 Average elapsed berth time for ships in GT range

This is the total number of elapsed berth time in hours for ships in the GT range, divided by the number of ship visits in the GT range for the given period. A ship's elapsed berth time (hours) is the time between a ship's arrival at berth, and a ship's departure from berth.

These parameters are summarised at the table of each of Tables 4.1 to 4.5 for each container port.

Ship-based charges ($ per ship visit)

Indicator 4.9 Total ship-based charges by ship visit

Ship-based charges are the charges ship owners pay for a port visit by the ship.

Indicator 4.10 Total ship-based charges for handling empty containers

This is also a summary cost indicator for the port. It is computed as the sum of wharfage, harbour dues, berth charges and channel fees charged per empty TEU multiplied by the average number of empty TEUs exchanged.

Ship-based charges ($ per TEU)

Indicator 4.11 Conservancy

Conservancy charges are navigation service charges levied by the government of the state in which the port is situated.

Indicator 4.12 Tonnage

Tonnage charges are based on the Gross Tonnage of the ship—port service charges levied by the port authority.

Indicator 4.13 Pilotage

Pilotage charges cover services for piloting the ship. A pilot is a mariner who guides ships through dangerous or congested waters, such as harbors or river mouths. Pilots are expert ship handlers who possess detailed knowledge of local waterways.

Indicator 4.14 Towage

Towage charges are levied by the operator of a tugboat—a boat that manoeuvres vessels by pushing or towing them.

Indicator 4.15 Mooring, unmooring charges

These relate to the services provided to moor—make fast (a ship, for example) by means of cables, anchors, or lines or to unmoor—to loosen (a ship) from moorings or anchorage. These charges can be levied either by the port authority, stevedoring company or other service providers

Indicator 4.16 Total ship-based charges per TEU

The total costs are the sum of the ship-based charges in Indicators 4.11 to 4.15.

Cargo-based fees and charges ($ per TEU)

Each of these fees and charges are discussed only once in the text below. They are however, listed separately for imports and exports in Tables 4.1 to 4.5.

Indicator 4.17 Cargo based: Wharfage

Wharfage is the charge assessed against cargo or merchandise, vessel's stores, fuel and supplies for passage on, over, under or through any wharf, pier, or bank controlled by a port authority. Wharfage is also charged for cargo passing between ships or overside ships (to or from barge, lighter or water) when berthed at a wharf, pier or bank controlled by the port authority.

Indicator 4.18 Cargo based: Harbour dues

These are monies that a ship owner must pay to a port authority for keeping a ship in a harbour. The amount of money charged is usually based on the volume of cargo the ship is carrying.

Other cargo-based charges ($ per TEU)

Indicator 4.19 Other charges: Stevedoring charge

Stevedoring charges are the charges levied by stevedoring companies for handling containers. They are estimated for Australia each year by the Australian Competition and Consumer Commission (ACCC) which monitors their price. The stevedoring costs are taken from the ACCC's annual report on the stevedoring industry.

Indicator 4.20 Other charges: Customs broker fees

These are the fees charged by customs brokers for the administrative costs associated with organising the import and export of containers for a representative consignment.

Indicator 4.21 Other charges: Road transport charges

Transport charges are estimates of what transport companies charge for transporting a container to or from the wharf from/to the metropolitan area of the capital city in which the port is situated. These charges are estimated for a representative transport distance.

Indicator 4.22 Total fees and charges ($/TEU)

This is the sum of ship-based charges per TEU, the cargo-based charges per TEU, and the other cargo-based charges per TEU. These costs enable the calculation of the national PICI measured in current and constant prices in dollars per TEU. These are computed separately for imports and exports in Tables 4.2 to 4.6.

Indicator 4.23 Port's share in national index

These shares are used in computing the national PICI and they are computed for exports and imports separately as follows.

For each port compute the port shares for imports:

1. PICI (port k, imports) is given by the average (total) port interface cost for imports (Indicator 4.22) times the total TEUs imported through the port (Indicator 4.4);
2. PICI (5 ports, imports) is the sum PICI (Brisbane, imports), PICI (Sydney, imports), PICI (Melbourne, imports), PICI (Adelaide, imports), PICI (Fremantle, imports);
3. Then share (port k, imports) = PICI (port k, imports) / PICI (5 ports, imports).

Similarly for each port compute the port shares for exports:

1. PICI (port k, exports) is given by the average (total) port interface cost for exports (Indicator 4.22) times the total TEUs imported through the port (Indicator 4.5);
2. PICI (5 ports, exports) is the sum of PICI (Brisbane, exports), PICI (Sydney, exports), PICI (Melbourne, exports), PICI (Adelaide, exports), PICI (Fremantle, exports);
3. Then share (port k, exports) = PICI (port k, exports)/ PICI (5 ports, exports).

Indicator 4.24 National Port Interface Cost index for ships in GT range

The national port interface cost indexes are the main outputs of the PICI calculations. These indexes are computed separately for imports and exports and for each of the ship GT ranges monitored in Waterline:

- 5 000 to 20 000 GT

- 35 000 to 40 000 GT
- 50 000 to 55 000 GT

The national PICI for ships in a GT range is the national average cost per TEU. From BTCE (1993) this is a weighted average of individual port estimates computed as follows, taking imports shipped in ships in the 5 000 to 20 000 GT as an example.

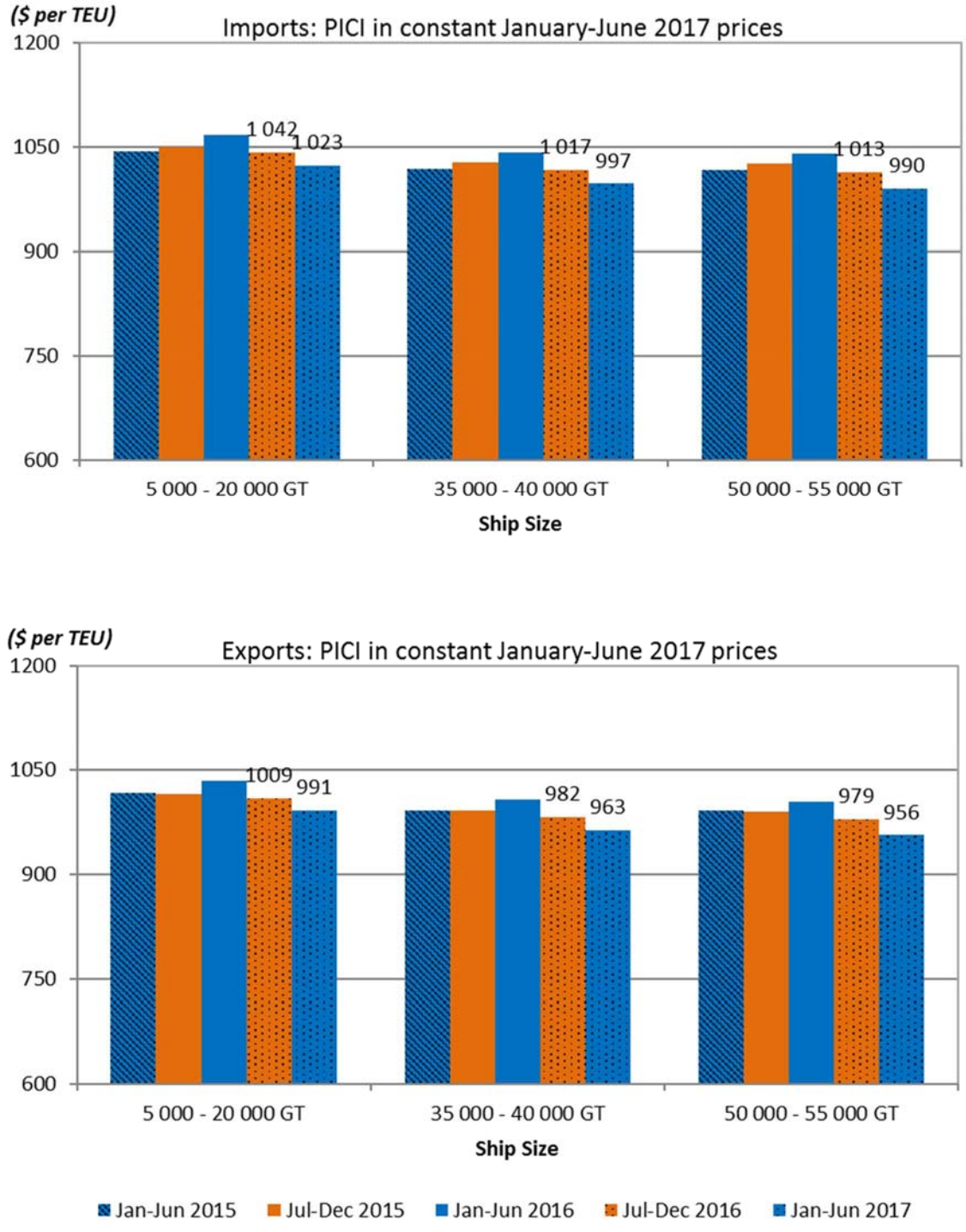
Now let $TC_{Br,M}$, $TC_{Sy,M}$, $TC_{Mel,M}$, $TC_{Ad,M}$, $TC_{Fr,M}$, respectively stand for the sum of ship-based, cargo-based and other fees and charges on each TEU of imports transported to a Brisbane port (Br), Sydney port (Sy), Melbourne port (Mel), Adelaide (Ad) and Frematle (Fr) for ships in the 5 000 to 20 000 GT range.

Then PICI for imports shipped in ships in the 5 000 to 20 000 GT

$= b_1 * TC_{Br,M} + b_2 * TC_{Sy,M} + b_3 * TC_{Mel,M} + b_4 * TC_{Ad,M} + b_5 * TC_{Fr,M}$

The shares b1, b2, b3, b4, b5 are as computed in Indicator 4.23. Note that these shares are different for imports and exports.

Figure 4.1 Port Interface Cost Index for container imports and exports, by ship size



Sources: BITRE estimates based on data in Tables 4.1 to 4.5 and data from ABS (2017).

Webb Dock (foreground) and Swanson and Appleton Docks (background). Photo courtesy of Port of Melbourne.

Table 4.1 Port interface costs by ship type-parameters and estimates: Brisbane

	5 000 to 20 000 GT ships					35 000 to 40 000 GT ships					50 000 to 55 000 GT ships				
	Jan-Jun 2015	Jul-Dec 2015	Jan-Jun 2016	Jul-Dec 2016	Jan-Jun 2017	Jan-Jun 2015	Jul-Dec 2015	Jan-Jun 2016	Jul-Dec 2016	Jan-Jun 2017	Jan-Jun 2015	Jul-Dec 2015	Jan-Jun 2016	Jul-Dec 2016	Jan-Jun 2017
Parameters used in estimation of the port interface fees and charges[a]															
Total TEUs exchanged	289	267	246	283	296	1 138	1 391	1 253	1 388	1 189	1 330	1 449	1 464	1 623	1 506
Loaded	223	208	182	218	232	849	1 001	939	1 011	918	917	974	1 008	1 164	1 080
Loaded inwards	97	80	115	82	101	539	665	330	586	455	548	593	377	774	694
Loaded outwards	126	128	67	135	130	310	336	609	426	463	370	382	631	390	386
Empty	66	60	63	65	64	289	390	313	377	271	413	475	456	459	426
No of port calls by ships in GT range	5	4	5	4	5	3	4	4	4	4	3	4	4	3	4
Elapsed berth time for ships in GT range *(hours)*	19	27	21	24	22	25	29	26	23	22	22	21	21	23	22
Charges per ship visit *($)*															
Total ship-based charges	24 092	23 617	24 215	24 748	24 939	44 822	44 480	45 931	47 354	47 689	52 919	52 610	54 327	56 033	56 407
Empty TEUs[b]	1 289	1 333	1 418	1 472	1 452	5 662	8 727	7 006	8 526	6 130	8 097	10 615	10 194	10 387	9 630
Ship-based charges *($/TEU)*															
Conservancy	7	8	9	8	8	7	6	6	6	7	8	8	8	7	8
Tonnage	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pilotage	30	32	36	33	31	14	12	13	13	15	14	13	13	13	14
Towage	36	40	44	38	37	16	13	15	14	16	15	14	14	13	14
Mooring, unmooring[c]	11	9	10	9	9	3	2	2	2	2	2	2	2	2	2
Total ship-based charges *($/TEU)*	83	88	99	88	84	39	32	37	34	40	40	36	37	35	37
Fees and charges for imports															
Ship-based charges	83	88	99	88	84	39	32	37	34	40	40	36	37	35	37
Cargo-based charges															
Wharfage	36	36	36	37	37	36	36	36	37	37	36	36	36	37	37
Harbour dues	66	66	66	67	67	66	66	66	67	67	66	66	66	67	67
Other charges															
Stevedoring	172	172	170	170	170	172	172	170	170	170	172	172	170	170	170
Customs brokers' fees	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150
Road transport charges	466	470	486	486	486	466	470	486	486	486	466	470	486	486	486
Total fees and charges *($/import TEU)*	**974**	**982**	**1 007**	**997**	**994**	**930**	**926**	**945**	**944**	**950**	**930**	**930**	**945**	**944**	**947**
Port's share in national import index[d]	**17%**	**17%**	**17%**	**18%**	**17%**	**16%**	**16%**	**16%**	**17%**	**16%**	**16%**	**16%**	**16%**	**17%**	**16%**

	5 000 to 20 000 GT ships					35 000 to 40 000 GT ships					50 000 to 55 000 GT ships				
	Jan-Jun 2015	Jul-Dec 2015	Jan-Jun 2016	Jul-Dec 2016	Jan-Jun 2017	Jan-Jun 2015	Jul-Dec 2015	Jan-Jun 2016	Jul-Dec 2016	Jan-Jun 2017	Jan-Jun 2015	Jul-Dec 2015	Jan-Jun 2016	Jul-Dec 2016	Jan-Jun 2017
Fees and charges for exports															
Ship-based charges	83	88	99	88	84	39	32	37	34	40	40	36	37	35	37
Cargo-based charges															
Wharfage	36	36	36	37	37	36	36	36	37	37	36	36	36	37	37
Harbour dues	66	66	66	67	67	66	66	66	67	67	66	66	66	67	67
Other charges															
Stevedoring	172	172	170	170	170	172	172	170	170	170	172	172	170	170	170
Customs brokers' fees	164	156	156	156	156	164	156	156	156	156	164	156	156	156	156
Road transport charges	466	470	486	486	486	466	470	486	486	486	466	470	486	486	486
Total fees and charges *($/export TEU)*	**989**	**989**	**1 013**	**1 004**	**1 001**	**944**	**932**	**951**	**951**	**957**	**945**	**937**	**952**	**951**	**954**
Port's share in national export index[e]	**17%**	**17%**	**17%**	**17%**	**17%**	**16%**	**16%**	**16%**	**16%**	**16%**	**16%**	**16%**	**16%**	**16%**	**16%**

Notes: Estimates of charges and fees are rounded to the nearest whole dollar. A value of zero indicates that the charge or fees per TEU is less than fifty cents.

a The average TEUs exchanged and the ship call parameters are mean values for ships in the GT category for the period in question.

b Sum of wharfage, harbour dues, berth charges and channel fees charged per empty TEU multiplied by the average number of empty TEUs exchanged.

c BITRE estimates.

d This is estimated as the TEU imports brought to the port as a per cent of five ports TEU imports.

e This is estimated as the TEU exports brought to the port as a per cent of five ports TEU exports.

Sources: BITRE estimates based on ship call data from Port of Brisbane Pty Ltd (2017) and other sources (see text).

Table 4.2 Port interface costs by ship type-parameters and estimates: Sydney

	5 000 to 20 000 GT ships					35 000 to 40 000 GT ships					50 000 to 55 000 GT ships				
	Jan-Jun 2015	Jul-Dec 2015	Jan-Jun 2016	Jul-Dec 2016	Jan-Jun 2017	Jan-Jun 2015	Jul-Dec 2015	Jan-Jun 2016	Jul-Dec 2016	Jan-Jun 2017	Jan-Jun 2015	Jul-Dec 2015	Jan-Jun 2016	Jul-Dec 2016	Jan-Jun 2017
Parameters used in estimation of the port interface fees and charges[a]															
Total TEUs exchanged	498	620	623	556	474	2 158	2 163	2 084	1 933	1 812	2 427	2 530	2 470	2 706	2 581
Loaded	448	582	584	318	291	1 477	1 451	1 390	1 060	995	1 693	1 725	1 762	1 416	1 330
Loaded inwards	185	274	246	26	36	989	1 009	893	569	531	1 135	1 180	1 159	775	701
Loaded outwards	263	308	338	293	255	488	442	497	491	464	558	545	603	641	629
Empty	50	38	39	238	182	681	712	694	873	817	733	805	708	1 291	1 251
No of port calls by ships in GT range	6	5	6	7	6	2	3	3	3	3	3	3	3	3	3
Elapsed berth time for ships in GT range *(hours)*	27	28	31	30	24	35	32	35	34	31	40	38	35	37	36
Charges per ship visit *($)*															
Total ship-based charges	23 351	23 550	24 264	25 174	25 373	49 453	49 453	51 377	53 517	53 799	60 663	60 946	63 091	65 677	65 987
Empty TEUs[b]	660	512	524	3 300	2 525	9 038	9 668	9 420	12 103	11 326	9 731	10 929	9 619	17 886	17 339
Ship-based charges *($/TEU)*															
Conservancy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tonnage	11	9	9	11	13	10	10	10	12	12	12	12	12	12	12
Pilotage	7	6	6	7	8	4	4	4	5	5	4	4	4	4	4
Towage	23	19	19	22	27	7	7	8	9	9	7	7	7	7	7
Mooring, unmooring[c]	5	4	4	5	6	2	2	2	2	3	2	2	2	2	2
Total ship-based charges *($/TEU)*	47	38	39	45	54	23	23	25	28	30	25	24	26	24	26
Fees and charges for imports															
Ship-based charges	47	38	39	45	54	23	23	25	28	30	25	24	26	24	26
Cargo-based charges															
Wharfage	125	127	127	130	130	125	127	127	130	130	125	127	127	130	130
Harbour dues	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other charges															
Stevedoring	172	172	170	170	170	172	172	170	170	170	172	172	170	170	170
Customs brokers' fees	153	153	151	151	151	153	153	151	151	151	153	153	151	151	151
Road transport charges	517	517	542	542	542	517	517	542	542	542	517	517	542	542	542
Total fees and charges *($/import TEU)*	**1 013**	**1 007**	**1 030**	**1 039**	**1 047**	**989**	**992**	**1 015**	**1 021**	**1 023**	**991**	**993**	**1 016**	**1 018**	**1 019**
Port's share in national import index[d]	**34%**	**34%**	**34%**	**34%**	**34%**	**32%**	**32%**	**32%**	**33%**	**32%**	**32%**	**32%**	**32%**	**33%**	**32%**

	5 000 to 20 000 GT ships					35 000 to 40 000 GT ships					50 000 to 55 000 GT ships				
	Jan-Jun 2015	Jul-Dec 2015	Jan-Jun 2016	Jul-Dec 2016	Jan-Jun 2017	Jan-Jun 2015	Jul-Dec 2015	Jan-Jun 2016	Jul-Dec 2016	Jan-Jun 2017	Jan-Jun 2015	Jul-Dec 2015	Jan-Jun 2016	Jul-Dec 2016	Jan-Jun 2017
Fees and charges for exports															
Ship-based charges	47	38	39	45	54	23	23	25	28	30	25	24	26	24	26
Cargo-based charges															
Wharfage	79	82	82	85	85	79	82	82	85	85	79	82	82	85	85
Harbour dues	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other charges															
Stevedoring	172	172	170	170	170	172	172	170	170	170	172	172	170	170	170
Customs brokers' fees	144	137	133	133	133	144	137	133	133	133	144	137	133	133	133
Road transport charges	517	517	542	542	542	517	517	542	542	542	517	517	542	542	542
Total fees and charges *($/export TEU)*	**959**	**945**	**967**	**975**	**984**	**935**	**930**	**952**	**958**	**960**	**937**	**931**	**953**	**954**	**956**
Port's share in national export index [e]	**34%**	**34%**	**34%**	**34%**	**34%**	**32%**	**32%**	**32%**	**33%**	**32%**	**32%**	**32%**	**32%**	**33%**	**32%**

Notes: Estimates of charges and fees are rounded to the nearest whole dollar. A value of zero indicates that the charge or fees per TEU is less than fifty cents.

a The average TEUs exchanged and the ship call parameters are mean values for ships in the GT category for the period in question.

b Sum of wharfage, harbour dues, berth charges and channel fees charged per empty TEU multiplied by the average number of empty TEUs exchanged.

c BITRE estimates.

d This is estimated as the TEU imports brought to the port as a per cent of five ports TEU imports.

e This is estimated as the TEU exports brought to the port as a per cent of five ports TEU exports.

Sources: BITRE estimates based on ship call data from NSW Ports (2017) and other sources (see text).

Table 4.3 Port interface costs by ship type-parameters and estimates: Melbourne

	5 000 to 20 000 GT ships					35 000 to 40 000 GT ships					50 000 to 55 000 GT ships				
	Jan-Jun 2015	Jul-Dec 2015	Jan-Jun 2016	Jul-Dec 2016	Jan-Jun 2017	Jan-Jun 2015	Jul-Dec 2015	Jan-Jun 2016	Jul-Dec 2016	Jan-Jun 2017	Jan-Jun 2015	Jul-Dec 2015	Jan-Jun 2016	Jul-Dec 2016	Jan-Jun 2017
Parameters used in estimation of the port interface fees and charges[a]															
Total TEUs exchanged	700	774	725	609	543	2 151	2 158	2 042	2 003	1 729	2 575	2 841	2 701	2 775	2 795
Loaded	585	705	634	571	463	1 752	1 730	1 644	1 644	1 489	2 039	2 221	2 166	2 188	2 283
Loaded inwards	218	332	306	276	212	1 095	1 142	1 062	1 094	989	1 190	1 396	1 295	1 391	1 316
Loaded outwards	367	372	328	296	252	657	588	582	550	501	850	825	871	796	968
Empty	116	69	91	37	80	400	428	398	359	240	535	620	536	587	512
No of port calls by ships in GT range	5	6	7	6	6	3	3	3	3	3	3	3	3	3	3
Elapsed berth time for ships in GT range *(hours)*	25	22	20	23	20	27	31	27	28	24	30	31	29	31	31
Charges per ship visit *($)*															
Total ship-based charges	27 115	27 475	28 484	28 500	28 655	54 176	55 298	56 566	54 641	54 849	66 121	67 581	68 910	70 140	70 358
Empty TEUs[b]	2 047	1 261	1 663	686	1 477	7 080	7 787	7 238	6 620	4 426	9 477	11 271	9 744	10 832	9 441
Ship-based charges *($/TEU)*															
Conservancy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tonnage	9	9	9	10	11	11	11	12	11	13	13	12	13	13	13
Pilotage	11	10	11	14	15	6	6	7	7	8	6	5	6	5	5
Towage	17	16	17	21	24	7	8	8	9	10	6	6	6	7	7
Mooring, unmooring[c]	1	1	2	2	3	0	0	1	1	1	0	0	1	1	1
Total ship-based charges *($/TEU)*	39	36	39	47	53	25	26	28	27	32	26	24	26	25	25
Fees and charges for imports															
Ship-based charges	39	36	39	47	53	25	26	28	27	32	26	24	26	25	25
Cargo-based charges															
Wharfage	71	73	73	74	74	71	73	73	74	74	71	73	73	74	74
Harbour dues	40	41	41	41	41	40	41	41	41	41	40	41	41	41	41
Other charges															
Stevedoring	172	172	170	170	170	172	172	170	170	170	172	172	170	170	170
Customs brokers' fees	155	155	155	155	155	155	155	155	155	155	155	155	155	155	155
Road transport charges	536	539	549	549	549	536	539	549	549	549	536	539	549	549	549
Total fees and charges *($/import TEU)*	**1 013**	**1 016**	**1 028**	**1 037**	**1 043**	**999**	**1 006**	**1 016**	**1 017**	**1 021**	**1 000**	**1 004**	**1 014**	**1 015**	**1 015**
Port's share in national import index[d]	**39%**	**38%**	**39%**	**38%**	**38%**	**36%**	**36%**	**37%**	**36%**	**36%**	**36%**	**36%**	**37%**	**36%**	**36%**

	5 000 to 20 000 GT ships					35 000 to 40 000 GT ships					50 000 to 55 000 GT ships				
	Jan-Jun 2015	Jul-Dec 2015	Jan-Jun 2016	Jul-Dec 2016	Jan-Jun 2017	Jan-Jun 2015	Jul-Dec 2015	Jan-Jun 2016	Jul-Dec 2016	Jan-Jun 2017	Jan-Jun 2015	Jul-Dec 2015	Jan-Jun 2016	Jul-Dec 2016	Jan-Jun 2017
Fees and charges for exports															
Ship-based charges	39	36	39	47	53	25	26	28	27	32	26	24	26	25	25
Cargo-based charges															
Wharfage	71	71	71	70	70	71	71	71	70	70	71	71	71	70	70
Harbour dues	40	41	41	41	41	40	41	41	41	41	40	41	41	41	41
Other charges															
Stevedoring	172	172	170	170	170	172	172	170	170	170	172	172	170	170	170
Customs brokers' fees	150	141	141	141	141	150	141	141	141	141	150	141	141	141	141
Road transport charges	536	539	549	549	549	536	539	549	549	549	536	539	549	549	549
Total fees and charges *($/export TEU)*	**1 008**	**1 000**	**1 012**	**1 018**	**1 024**	**994**	**990**	**1 000**	**999**	**1 003**	**995**	**988**	**998**	**997**	**997**
Port's share in national export index[e]	**39%**	**39%**	**39%**	**38%**	**39%**	**37%**	**36%**	**37%**	**36%**	**36%**	**37%**	**36%**	**37%**	**36%**	**36%**

Notes: Estimates of charges and fees are rounded to the nearest whole dollar. A value of zero indicates that the charge or fees per TEU is less than fifty cents.

a The average TEUs exchanged and the ship call parameters are mean values for ships in the GT category for the period in question.

b Sum of wharfage, harbour dues, berth charges and channel fees charged per empty TEU multiplied by the average number of empty TEUs exchanged.

c BITRE estimates.

d This is estimated as the TEU imports brought to the port as a per cent of five ports TEU imports.

e This is estimated as the TEU exports brought to the port as a per cent of five ports TEU exports.

Sources: BITRE estimates based on ship call data from Port of Melbourne Operations Pty Ltd (2017) and other sources (see text).

Table 4.4 Port interface costs by ship type-parameters and estimates: Adelaide

	5 000 to 20 000 GT ships					35 000 to 40 000 GT ships					50 000 to 55 000 GT ships				
	Jan-Jun 2015	Jul-Dec 2015	Jan-Jun 2016	Jul-Dec 2016	Jan-Jun 2017	Jan-Jun 2015	Jul-Dec 2015	Jan-Jun 2016	Jul-Dec 2016	Jan-Jun 2017	Jan-Jun 2015	Jul-Dec 2015	Jan-Jun 2016	Jul-Dec 2016	Jan-Jun 2017
Parameters used in estimation of the port interface fees and charges[a]															
Total TEUs exchanged						1 041	968	873	768	611	1 065	1 060	1 165	978	1 079
Loaded						786	681	679	667	570	872	814	855	816	847
Loaded inwards						336	237	314	441	433	414	422	449	386	383
Loaded outwards						450	444	366	226	137	458	391	405	430	464
Empty						255	287	194	101	41	194	246	310	162	232
No of port calls by ships in GT range						2	2	2	3	4	2	2	2	2	2
Elapsed berth time for ships in GT range *(hours)*						23	20	17	21	18	22	21	21	22	22
Charges per ship visit *($)*															
Total ship-based charges						42 828	43 015	42 721	44 581	44 023	48 823	49 418	49 933	51 341	51 726
Empty TEUs[b]						1 736	1 992	1 343	698	286	1 320	1 705	2 150	1 125	1 607
Ship-based charges *($/TEU)*															
Conservancy						5	5	6	7	9	6	7	6	7	7
Tonnage						9	10	10	13	14	11	11	10	13	12
Pilotage						6	7	8	9	11	6	6	6	7	6
Towage						21	23	25	29	37	22	23	21	25	23
Mooring, unmooring[c]						-	-	-	-	-	-	-	-	-	-
Total ship-based charges *($/TEU)*						41	44	49	58	72	46	47	43	52	48
Fees and charges for imports															
Ship-based charges						41	44	49	58	72	46	47	43	52	48
Cargo-based charges															
Wharfage						84	85	85	86	86	84	85	85	86	86
Harbour dues						7	7	7	7	7	7	7	7	7	7
Other charges															
Stevedoring						172	172	170	170	170	172	172	170	170	170
Customs brokers' fees						149	149	149	149	149	148	148	148	148	148
Road transport charges						377	381	399	399	399	377	381	399	399	399
Total fees and charges *($/import TEU)*						**829**	**838**	**859**	**869**	**883**	**833**	**839**	**852**	**863**	**858**
Port's share in national import index[d]						**5%**	**5%**	**5%**	**5%**	**6%**	**5%**	**5%**	**5%**	**5%**	**6%**

	5 000 to 20 000 GT ships					35 000 to 40 000 GT ships					50 000 to 55 000 GT ships				
	Jan-Jun 2015	Jul-Dec 2015	Jan-Jun 2016	Jul-Dec 2016	Jan-Jun 2017	Jan-Jun 2015	Jul-Dec 2015	Jan-Jun 2016	Jul-Dec 2016	Jan-Jun 2017	Jan-Jun 2015	Jul-Dec 2015	Jan-Jun 2016	Jul-Dec 2016	Jan-Jun 2017
Fees and charges for exports															
Ship-based charges						41	44	49	58	72	46	47	43	52	48
Cargo-based charges															
Wharfage						84	85	85	86	86	84	85	85	86	86
Harbour dues						7	7	7	7	7	7	7	7	7	7
Other charges															
Stevedoring						172	172	170	170	170	172	172	170	170	170
Customs brokers' fees						112	103	92	92	92	112	103	92	92	92
Road transport charges						377	381	399	399	399	377	381	399	399	399
Total fees and charges *($/export TEU)*						**792**	**792**	**802**	**812**	**826**	**797**	**795**	**796**	**807**	**802**
Port's share in national export index[e]						**5%**	**5%**	**6%**	**5%**	**6%**	**5%**	**5%**	**6%**	**5%**	**6%**

Notes: Estimates of charges and fees are rounded to the nearest whole dollar. A value of zero indicates that the charge or fees per TEU is less than fifty cents.

a The average TEUs exchanged and the ship call parameters are mean values for ships in the GT category for the period in question.

b Sum of wharfage, harbour dues, berth charges and channel fees charged per empty TEU multiplied by the average number of empty TEUs exchanged.

c BITRE estimates.

d This is estimated as the TEU imports brought to the port as a per cent of five ports TEU imports.

e This is estimated as the TEU exports brought to the port as a per cent of five ports TEU exports.

Sources: BITRE estimates based on ship call data from Flinders Ports (2017) and other sources (see text).

Table 4.5 Port interface costs by ship type-parameters and estimates: Fremantle

	5 000 to 20 000 GT ships					35 000 to 40 000 GT ships					50 000 to 55 000 GT ships				
	Jan-Jun 2015	Jul-Dec 2015	Jan-Jun 2016	Jul-Dec 2016	Jan-Jun 2017	Jan-Jun 2015	Jul-Dec 2015	Jan-Jun 2016	Jul-Dec 2016	Jan-Jun 2017	Jan-Jun 2015	Jul-Dec 2015	Jan-Jun 2016	Jul-Dec 2016	Jan-Jun 2017
Parameters used in estimation of the port interface fees and charges[a]															
Total TEUs exchanged	2 499	2 587	2 455	2 699	2 487	748	780	759	825	791	1 483	1 503	1 502	1 365	1 472
Loaded	1 999	2 029	2 039	2 204	2 116	610	621	657	736	739	1 130	1 110	1 088	1 023	1 155
Loaded inwards	1 197	1 264	1 159	1 315	1 187	426	361	484	540	574	707	744	707	638	732
Loaded outwards	802	766	881	889	929	184	260	173	197	165	423	367	381	385	423
Empty	499	558	415	494	371	138	160	103	89	52	353	393	414	342	317
No of port calls by ships in GT range	13	9	13	13	13	2	2	3	3	4	4	4	3	3	3
Elapsed berth time for ships in GT range *(hours)*	32	34	34	35	33	19	19	17	20	18	26	24	23	24	25
Charges per ship visit *($)*															
Total ship-based charges	13 348	13 619	13 651	12 543	12 586	34 596	35 177	35 313	38 533	38 718	41 063	41 760	41 916	46 552	46 762
Empty TEUs[b]	5 659	6 482	4 822	5 856	4 396	1 560	1 853	1 192	1 053	614	4 004	4 563	4 812	4 051	3 759
Ship-based charges *($/TEU)*															
Conservancy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tonnage	1	1	1	1	1	12	12	12	11	12	8	9	9	10	9
Pilotage	2	2	2	2	2	7	7	7	10	10	3	4	4	7	6
Towage	2	2	2	2	2	26	25	26	24	25	15	15	15	17	15
Mooring, unmooring[c]	1	1	1	1	1	2	2	2	2	2	1	1	1	1	1
Total ship-based charges *($/TEU)*	5	5	6	5	5	46	45	47	47	49	28	28	28	34	32
Fees and charges for imports															
Ship-based charges	5	5	6	5	5	46	45	47	47	49	28	28	28	34	32
Cargo-based charges															
Wharfage	75	77	77	79	79	75	77	77	79	79	75	77	77	79	79
Harbour dues	35	36	36	36	37	35	36	36	36	37	35	36	36	36	37
Other charges															
Stevedoring	172	172	170	170	170	172	172	170	170	170	172	172	170	170	170
Customs brokers' fees	163	163	162	162	162	163	163	162	162	162	163	163	162	162	162
Road transport charges	458	462	467	467	467	458	462	467	467	467	458	462	467	467	467
Total fees and charges *($/import TEU)*	**909**	**916**	**918**	**918**	**919**	**950**	**955**	**958**	**960**	**963**	**931**	**938**	**940**	**948**	**946**
Port's share in national index[d]	**11%**	**11%**	**11%**	**10%**	**10%**	**10%**	**10%**	**10%**	**10%**	**10%**	**10%**	**10%**	**10%**	**10%**	**10%**

	5 000 to 20 000 GT ships					35 000 to 40 000 GT ships					50 000 to 55 000 GT ships				
	Jan-Jun 2015	Jul-Dec 2015	Jan-Jun 2016	Jul-Dec 2016	Jan-Jun 2017	Jan-Jun 2015	Jul-Dec 2015	Jan-Jun 2016	Jul-Dec 2016	Jan-Jun 2017	Jan-Jun 2015	Jul-Dec 2015	Jan-Jun 2016	Jul-Dec 2016	Jan-Jun 2017
Fees and charges for exports															
Ship-based charges	5	5	6	5	5	46	45	47	47	49	28	28	28	34	32
Cargo-based charges															
Wharfage	75	77	77	79	79	75	77	77	79	79	75	77	77	79	79
Harbour dues	35	36	36	36	37	35	36	36	36	37	35	36	36	36	37
Other charges															
Stevedoring	172	172	170	170	170	172	172	170	170	170	172	172	170	170	170
Customs brokers' fees	97	89	109	109	109	97	89	109	109	109	97	89	109	109	109
Road transport charges	458	462	467	467	467	458	462	467	467	467	458	462	467	467	467
Total fees and charges *($/export TEU)*	**843**	**842**	**865**	**866**	**867**	**884**	**881**	**906**	**908**	**911**	**865**	**864**	**887**	**895**	**893**
Port's share in national export index[e]	**10%**	**10%**	**10%**	**10%**	**10%**	**10%**	**10%**	**10%**	**10%**	**9%**	**10%**	**10%**	**10%**	**10%**	**9%**

Notes: Estimates of charges and fees are rounded to the nearest whole dollar. A value of zero indicates that the charge or fees per TEU is less than fifty cents.

a The average TEUs exchanged and the ship call parameters are mean values for ships in the GT category for the period in question.

b Sum of wharfage, harbour dues, berth charges and channel fees charged per empty TEU multiplied by the average number of empty TEUs exchanged.

c BITRE estimates.

d This is estimated as the TEU imports brought to the port as a per cent of five ports TEU imports.

e This is estimated as the TEU exports brought to the port as a per cent of five ports TEU exports.

Sources: BITRE estimates based on ship call data from Fremantle Ports (2017) and other sources (see text).

Table 4.6 The national port interface cost indices, by size of ship

		Jan-Jun 2015	Jul-Dec 2015	Jan-Jun 2016	Jul-Dec 2016	Jan-Jun 2017
ABS GDP deflator (100.0 for Jan-Jun 2017)		95.4	94.9	95.0	97.7	100.0
				($ per TEU)		
5 000 - 20 000 GT ships	**Import costs: in nominal price**	995	996	1013	1018	1023
	Import costs: constant 2017 price	1043	1050	1066	1042	1023
	Export costs: in nominal price	970	963	982	986	991
	Export costs: constant 2017 price	1017	1015	1033	1009	991
35 000 - 40 000 GT ships	**Import costs: in nominal price**	971	974	990	993	997
	Import costs: constant 2017 price	1018	1027	1042	1017	997
	Export costs: in nominal price	946	940	957	959	963
	Export costs: constant 2017 price	991	991	1007	982	963
50 000 - 55 000 GT ships	**Import costs: in nominal price**	970	973	988	990	990
	Import costs: constant 2017 price	1017	1026	1040	1013	990
	Export costs: in nominal price	945	939	954	956	956
	Export costs: constant 2017 price	990	989	1004	979	956

Notes: Blank cells mean the data are not reported.

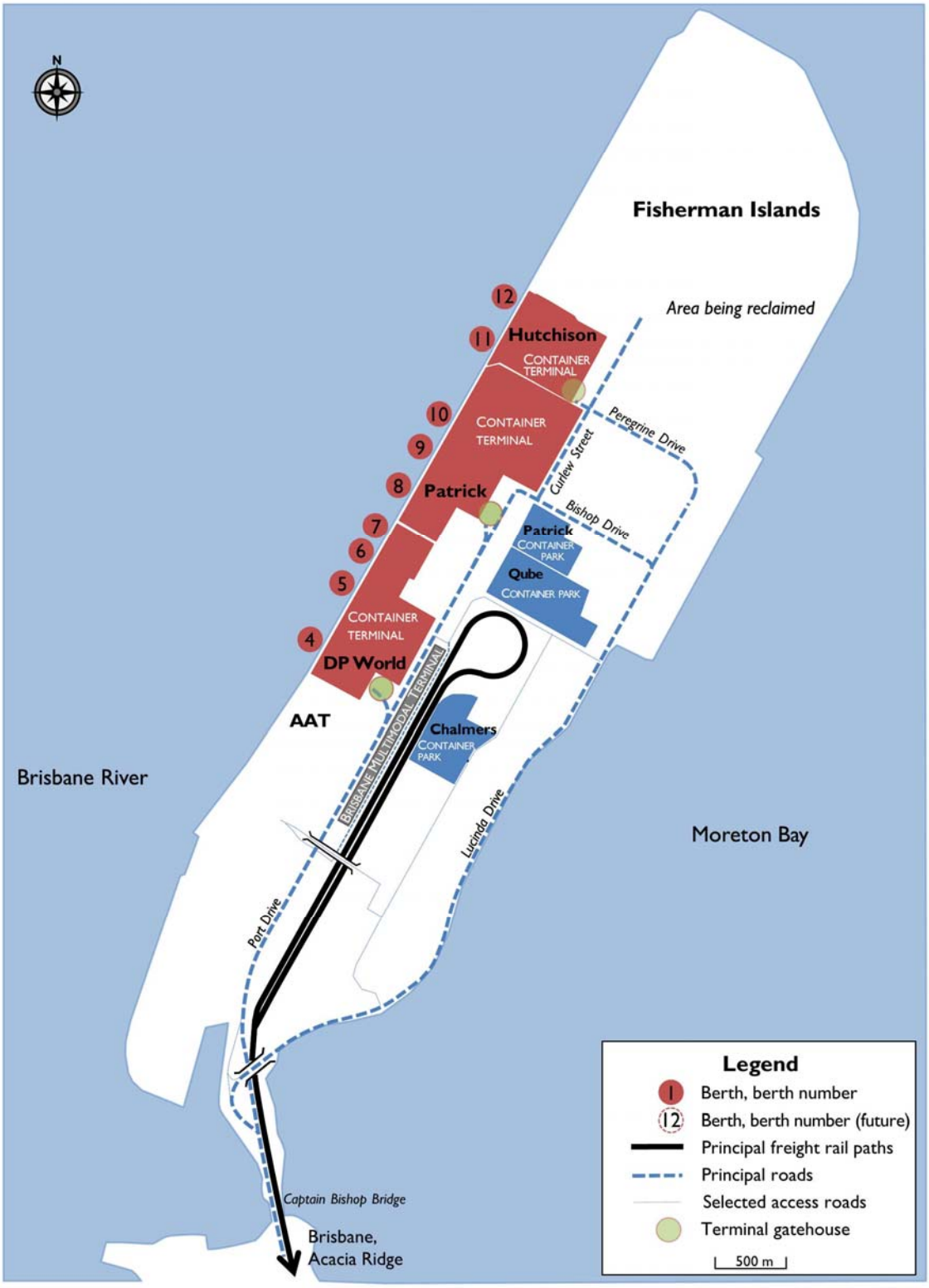
Values in constant 2017 prices are derived using the ABS non-farm GDP deflator with Jan–Jun 2017 as the base period. Constant price = Nominal or current price* (Base period deflator/Current year deflator).

Sources: BITRE estimates based on data in Tables 4.1 to 4.5 and data from ABS (2017).

Appendix A The five major Australian container ports

This appendix presents maps of container terminals and supplementary information about facilities and port services available at the five major Australian container ports.

Brisbane (Fisherman Islands Terminals)



(Last updated: September 2016)

The Port of Brisbane is managed and developed by the Port of Brisbane Pty Ltd, under a 99-year lease from the Queensland Government.

Dockside

Stevedores. The map shows the DP World, Patrick and Hutchison Ports Australia terminals. Some containers are also handled by Australian Amalgamated Terminals (AAT), who provide a multi-purpose, multi-user facility that is based at Berths 1–3, to the west of the DP World container yard.

Berths. DP World operates from container berths 4–7. The Patrick container berths are 8–10. Hutchison operates berths 11 and 12.

Equipment. DP World has 4 cranes, including 3 post-Panamax cranes and one Panamax crane. DP World's semi-automated terminal has 14 automated stacking cranes, with two more due to be commissioned in January 2017. Patrick has 5 cranes, consisting of 4 post-Panamax cranes and one Panamax crane; in addition, Patrick has 31 automated straddle carriers (AutoStrads). Hutchison's Brisbane Container Terminals includes 4 post-Panamax cranes and 6 automated stacking cranes.

Road

Road access to the area is via the bridge to Fisherman Islands, over the Captain Bishop Bridge. Access to the DP World and Patrick terminals is via Port Drive or Lucinda Drive/Bishop Drive/Curlew Street; access to the Hutchison terminal is via Curlew Street.

Rail

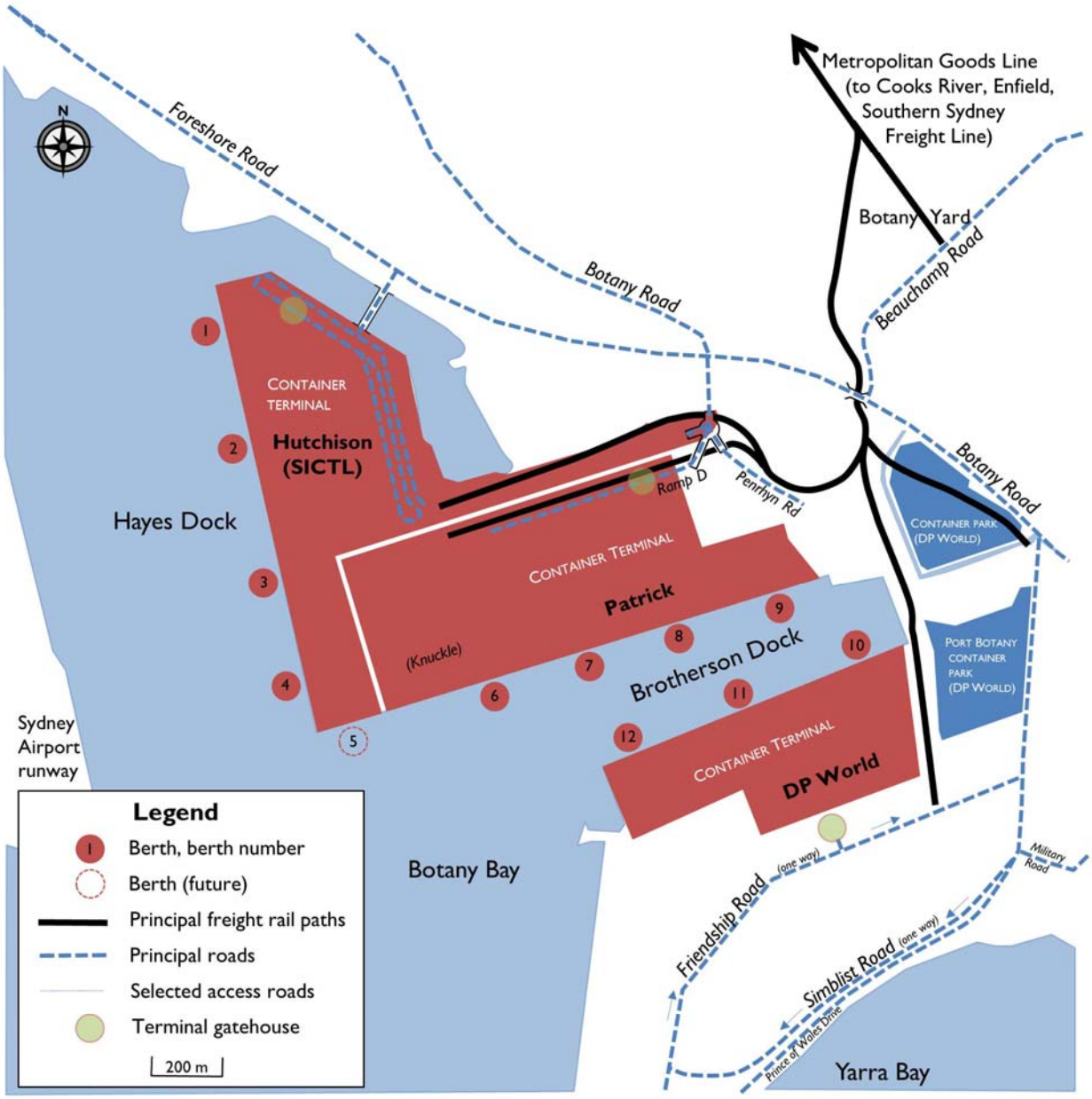
Facilities. An intermodal facility is provided on Fisherman Islands — the Brisbane Multimodal Terminal. Train lengths of up to 850 metres are permitted. Containers are shifted by road between that terminal and the container terminals. In that context, rail access is classed as having "near-dock" facilities.

Services. Scheduled rail services to the Brisbane Multimodal Terminal include long haul:

- bulk coal from West Moreton and grain from western Queensland, both via narrow gauge;
- reefer containers containing meat from northern abattoirs, by narrow-gauge trains;
- some containers are taken from Fisherman Islands—the presumption is that they are mainly empty containers; and
- there are no scheduled standard-gauge container trains.

National rail connections. Dual narrow and (national) standard gauge tracks are installed between Fisherman Islands and the interstate/intrastate intermodal terminal at Acacia Ridge.

Sydney (Container Terminals at Port Botany)



(Last updated: October 2017)

Port Botany is managed by the NSW Ports Consortium, which has a 99-year lease of the State-owned assets at the port.

Dockside

Stevedores. The three container terminals at Port Botany are served by the stevedores Patrick, DP World and Hutchison (Sydney International Container Terminals Limited, SICTL).

Berths. Patrick operates four berths, numbers 6–9. DP World's three berths are numbered 10–12. Hutchison has four operational berths (1–4).

Equipment. DP World equipment includes 4 twin-lift quay cranes and 4 single-lift quay cranes. DP World took delivery of their latest twin-lift, post-Panamax crane in March 2015. Patrick equipment includes 7 twin-lift quay cranes and 1 single-lift quay crane. The Hutchison terminal includes 4 post-Panamax quay cranes.

The Patrick terminal has implemented an automated container yard, with 45 automated straddle carriers (AutoStrads). Automatic operations commenced on 2 April 2015.

The Hutchison terminal operates 12 automated stacking cranes.

Road

Access to the DP World terminal is via Friendship Road (one-way). The Patrick terminal is accessed from Penrhyn Road. Hutchison's terminal is accessed via a bridge from Foreshore Road.

Rail

Facilities. Each stevedore has rail facilities near to, but not on, its berths.

DP World has 3 sidings of 340 metre length. Patrick has 2 sidings of 650 metre length. Hutchison's terminal has 2 rail sidings of 680 metres; these are parallel to the Patrick sidings.

Services. Scheduled short haul and long haul rail container services between Botany and the hinterland include:

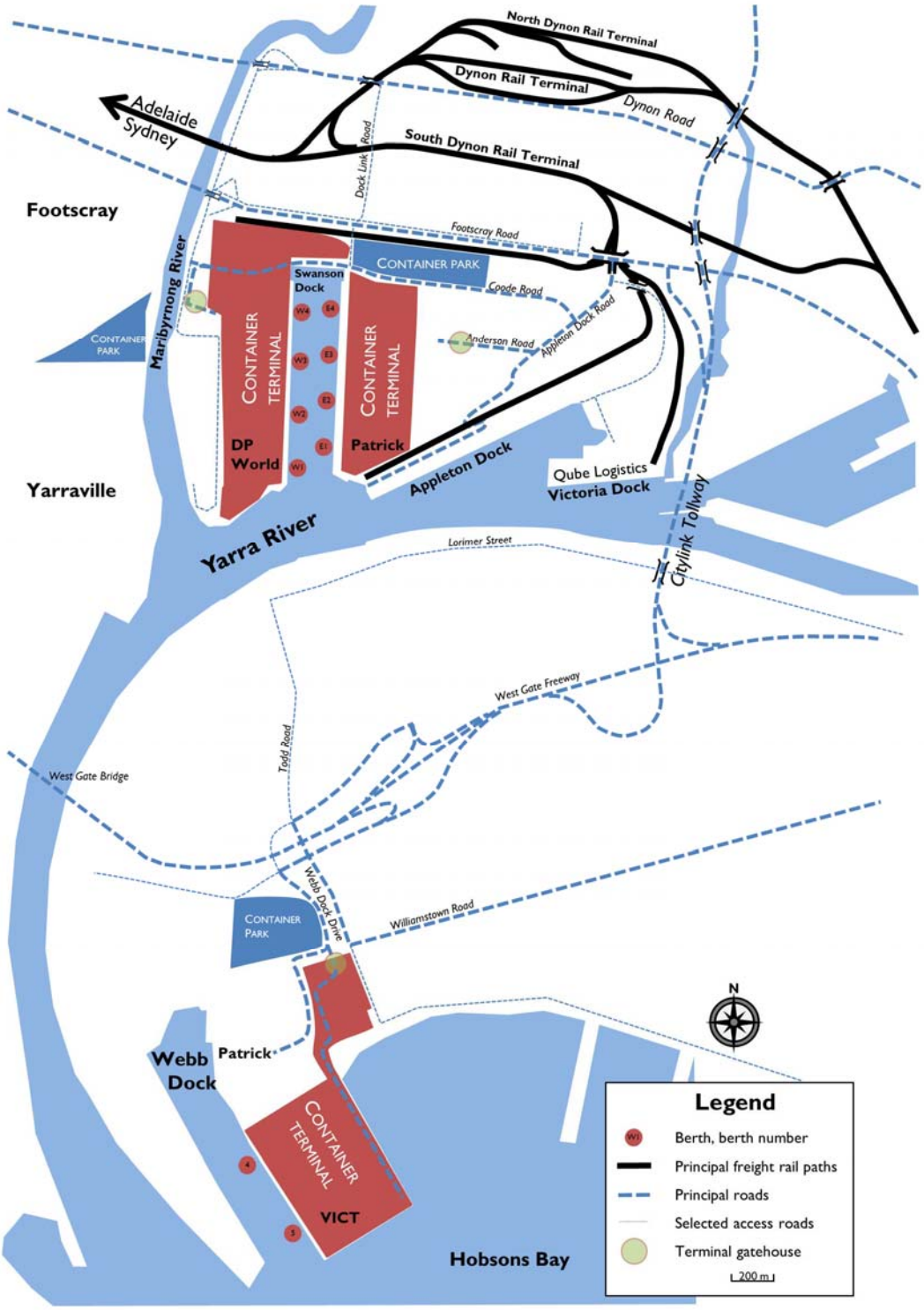
- Yennora, Cooks River, Minto and Enfield.
- logs and grain from Kelso (Southern Shorthaul Railroad; Pacific National);
- logs from Goulburn (Qube);
- reefer containers carrying processed meat, and grain in standard containers from Dubbo (Fletcher Export International/Southern Shorthaul Railroad; Qube);
- specialised grain transport from Coonamble (Qube);
- cotton and agricultural produce from Nevertire, Warren, Warren South, Trangie, Narrabri, Wee Waa, Narromine and Forbes (Qube; Genesee & Wyoming; Sydney Rail Services);
- paper products and grain from Harefield (Qube);
- aluminium, logs and agricultural produce from Walsh Point, Carrington and Sandgate [Newcastle] (Qube and Crawfords Freightlines/Sydney Rail Services).

Rail access. Railway sidings at Botany Yard are used to regulate train entry to the port; to split trains, where necessary, for onwards movements to the port, and to re-form trains from port-terminal wagon rakes for movements to Cooks River, Enfield and beyond.

National and regional rail connections. The port is linked to the intrastate and interstate rail network, including the Southern Sydney Freight Line, and the Northern Sydney Freight Corridor via the Metropolitan Freight Network (including the Port Botany Goods Line).

Webb Dock East looking towards Port Melbourne and Melbourne CBD. Photo courtesy of Port of Melbourne.

Melbourne (Swanson, Appleton and Victoria Dock terminals)



(Last updated: October 2017)

The Port of Melbourne is operated by Port of Melbourne Operations Pty Ltd on behalf of the Lonsdale Consortium, which holds a 50-year lease of the State-owned assets at the port.

Dockside

Stevedores. DP World's container terminal is at Swanson Dock West. Patrick has a container terminal across the dock at Swanson Dock East. Victoria International Container Terminal (VICT) operates on Webb Dock East.

Logistics. Qube Logistics has a container and general cargo terminal at Victoria Dock, with one berth.

Equipment. The Patrick terminal has 8 cranes, of which 3 are post-Panamax; the DP World terminal has 8 cranes, including 3 post-Panamax. VICT has 5 remotely operated Neo-Panamax quay cranes. Patrick has 42 straddle carriers, DP World has 48 straddle carriers and VICT has 11 automated container carriers and 20 automated stacking cranes (ASCs).

Berths. There are 4 container berths at Patrick's Swanson Dock East—berths E1–E4. There are 4 berths at DP World's Swanson Dock West—berths W1–W4. There are two berths at Webb Dock East operated by VICT. There is one general cargo berth at Victoria Dock (berth 24) which handles containers.

Road

Access to the DP World terminal is via Coode Road. Access to the Patrick terminal is via Appleton Dock Road; an access road leads to the Qube terminal from Appleton Dock Road. Access to VICT is from Webb Dock Road.

Rail

Facilities. Import and export containers are rail-served to near the dockside. Containers are also railed through the Dynon rail terminals (to the north of the docks) and conveyed by road between those terminals and the on-dock container stacks.

- West Swanson Intermodal Terminal serves DP World. This is a single dual-gauge (standard and broad) siding of 510 metres, running just to the south of Footscray Road; there is also a locomotive run-around track;
- Appleton Dock rail yard serves Patrick. The yard has two dual (standard and broad) gauge tracks of 640 metres in length and a locomotive run-around track;
- Qube's Victoria Dock sidings have two dual-gauge (standard and broad) sidings, with 630 metre lengths, plus a locomotive run-around track.

Services. Scheduled long-haul rail services shifting containers include:

- rice from Deniliquin to Victoria Dock sidings (Qube, broad gauge);
- paper products from Maryvale to Victoria Dock sidings (Qube, broad gauge);
- milk products from Shepparton/Mooroopna to Victoria Dock sidings (Qube, broad gauge);
- meat and milk products from Westvic/Warrnambool to Appleton Dock (Pacific National, broad gauge);
- grain and other agricultural products from Tocumwal to Appleton Dock (Pacific National and Qube, broad gauge);
- cotton, wine and agricultural products, including fruit in reefer containers, from Merbein/Mildura to Appleton Dock (Pacific National, broad gauge);

- grain and other agricultural products from Dooen to West Swanson Dock (SCT/Wimmera Container Line, standard gauge);
- cotton, beverages, meat and agricultural products from Griffith, Wumbulgal, Leeton and Ettamogah to Appleton Dock (Pacific National, standard gauge).

Port rail containers also arrive by road shuttles from the Dynon railway terminals.

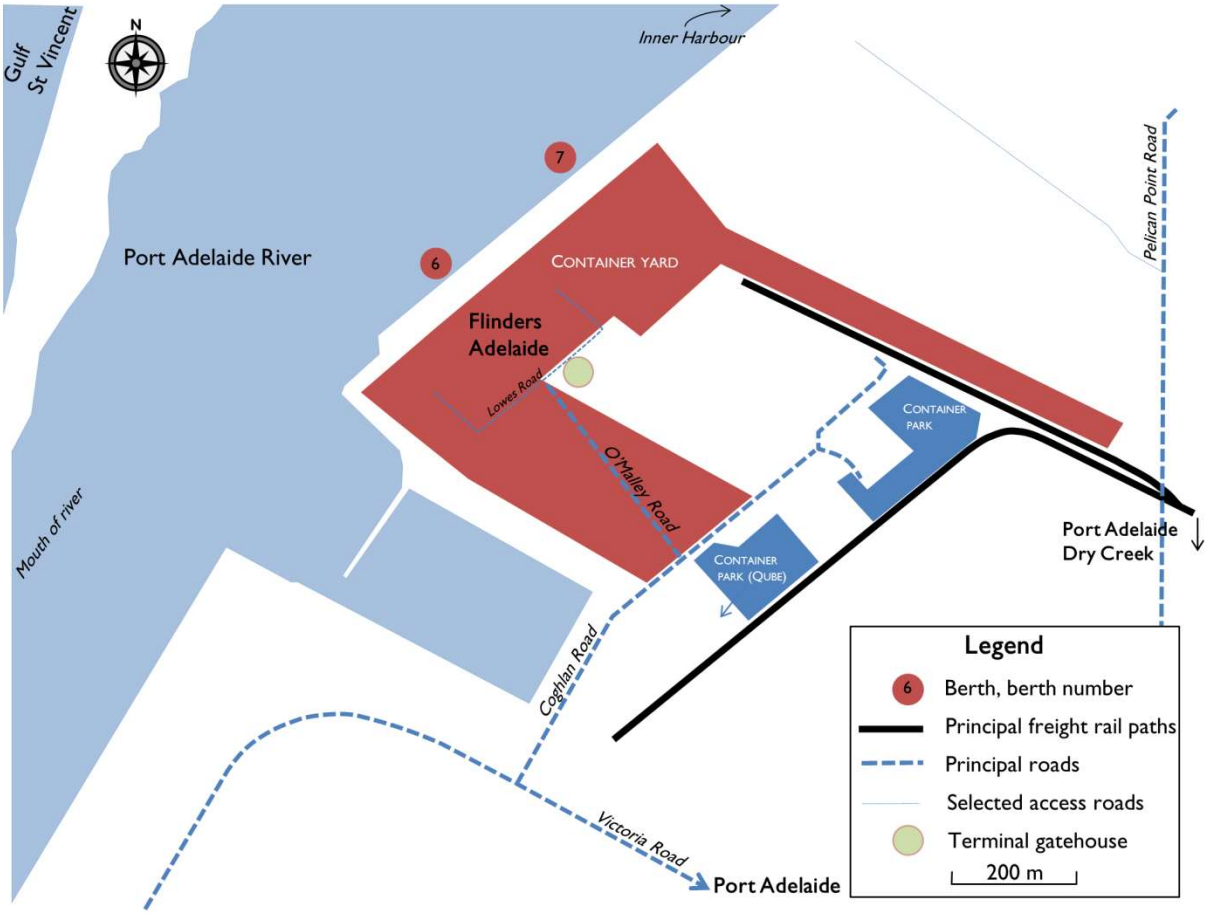
Rail linkages. The dock area consists of rail facilities near the docks and the nearby intermodal container terminals at South Dynon, Dynon and North Dynon. Although there is an eastern link from the Dynon terminals towards the east (Southern Cross and Flinders Street), the container movements are to and from the west via the Tottenham–Dynon line.

Of the five container ports represented here, the Port of Melbourne is unique in the proximity of intermodal terminals near to the docks as well as the on/near-dock facilities.

National rail connections. Principal freight rail paths are shown; most tracks (including dockside tracks) are dual gauge (namely, broad- and standard-gauge tracks). Access to the interstate network is via the dual-gauge track to the west, via Tottenham.

Swanson and Appleton Docks. Photo courtesy of Port of Melbourne.

Adelaide (Flinders Adelaide Container Terminal at Outer Harbor/Pelican Point)



(Last updated: November 2014)

Flinders Ports manages the port facilities in Adelaide; these are at Outer Harbor and the Inner Harbour (up the Port Adelaide River).

Dockside

Stevedores. Port Adelaide's Outer Harbor Container Terminal is operated by Flinders Adelaide, using two berths.

Berths. The map shows the container terminal located in the outer harbour (at Outer Harbor) of Port Adelaide; the Inner Harbour at Port Adelaide is not shown. The Flinders Adelaide container facilities use berths 6 and 7.

Equipment. The terminal has four travelling container-handling cranes: three post-Panamax and one Panamax.

Road

Flinders Adelaide Container Terminal is accessed via O'Malley Road, leading from Coghlan Road.

Rail

Facilities. The Outer Harbor terminal has two sets of standard-gauge rail sidings. Two sidings, each of 640 metre length, serve the Flinders Adelaide Container Terminal. The other set of sidings serve the Qube Logistics terminal and container park.

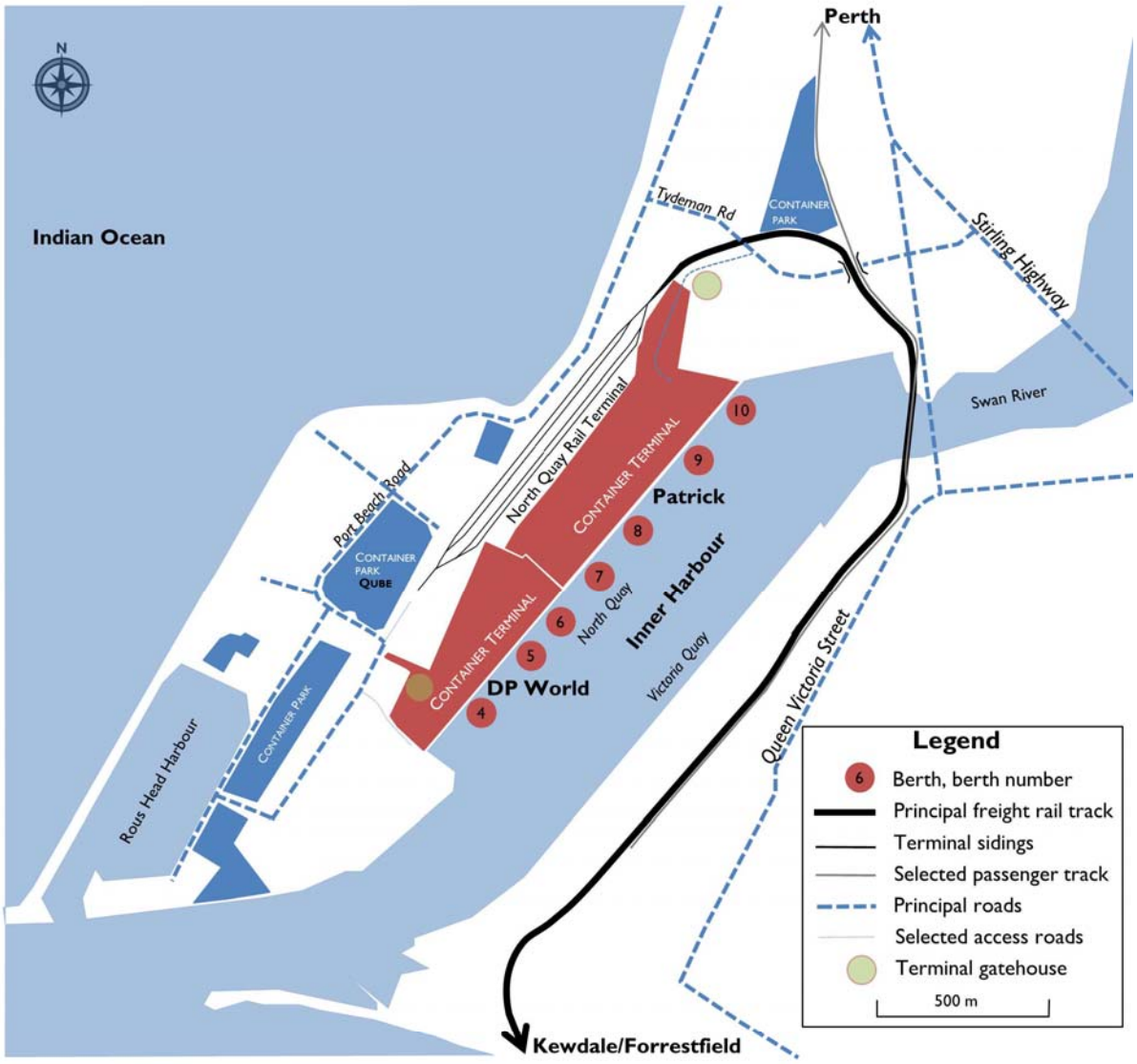
Services. Scheduled railed movements to the dockside include:

- Short-haul:
  - Penfield (Direk) to Flinders Adelaide (SCT Logistics).
- Long-haul:
  - containerised lead from Port Pirie, agricultural products from Bowmans Intermodal Terminal, via Port Flat. (Patrick PortLink SA);
  - bulk grain from various producers. Some of this is containerised at Viterra's (ABB) grain loader (inverter) for export;
  - copper concentrates from Prominent Hill.

Rail linkages. The Outer Harbor facility is at the extremity of a freight-only railway between Outer Harbor, Port Adelaide and Dry Creek.

National rail connections. The Outer Harbor–Dry Creek line connects with the interstate network at Dry Creek. Nearby intermodal terminals include the Aurizon terminal at Port Flat, the Genesee and Wyoming terminal at Dry Creek, the Pacific National terminal at Islington and the SCT Logistics terminal at Penfield.

Fremantle (North Quay Terminals in the Inner Harbour)



(Last updated: August 2016)

Fremantle Ports, a Western Australian Government trading enterprise, manages the port.

Dockside

Stevedores. Container stevedoring is undertaken at North Quay in the Inner Harbour by Patrick and DP World. Patrick have four berths and DP World has three berths.

Berths. Patrick's berth 10 is a multi-purpose container, ro-ro and general cargo facility. The six other stevedore berths are dedicated container ship berths.

Equipment. The Patrick terminal has 4 cranes, of which 3 are post-Panamax; the DP World terminal has 3 cranes, including 2 post-Panamax. DP World commissioned its second post-Panamax crane in April 2015.

Road

The principal roads on this peninsula are Tyderman Road (from the Stirling Highway) and Port Beach Road/Rudderham Drive. The DP World terminal is accessed via Rudderham Drive while the Patrick terminal is accessed via Tyderman Road.

Rail

Facilities. North Quay Rail Terminal, to the west of the Patrick terminal, serves both Patrick and DP World container terminals. The sidings at that location are around 690 metres in length, accommodating blocks of 600 metre-length trains. The Rail Terminal has dual-gauge tracks.

Services. Scheduled rail services to the port include the following (standard-gauge) trains:

- Short-haul:
  - A container train operates between Kewdale/Forrestfield and the North Quay Rail Terminal. (Intermodal Link Services/SCT)
- Long-haul:
  - lead and nickel matte from Leonora and Kalgoorlie. (Aurizon)

Rail linkages. Trains access the Rail Terminal on a dual narrow- and standard-gauge freight-only line from Midland. Freight and passenger trains share a track on the bridge over the Swan River.

National rail connections. The rail link to Midland, on the interstate network, includes spur tracks to interstate intermodal terminals at Kewdale and Forrestfield.

References

Australian Bureau of Statistics (ABS) 2017. *Australian National Accounts: National Income, Expenditure and Product, Jun 2017*, 'Table 24. Selected Analytical Series', time series spreadsheet, cat. no. 5206.0.

Australian Competition and Consumer Commission (ACCC) 2016. *Container stevedoring monitoring report 2015-16*, November 2016, Canberra.

Bureau of Transport and Communications Economics, 1993, *Port Interface Cost Index*, Report 84, BTCE, Australian Government Publishing Service, Canberra.

Containerchain Pty Ltd 2017. (unpublished data).

DP World 2017. (unpublished data).

Flinders Adelaide Container Terminal 2017. (unpublished data).

Fremantle Ports 2017. (unpublished data).

Hutchison Ports Australia 2017. (unpublished data).

Maritime Safety Queensland 2017. (unpublished data).

NSW Ports 2017. (unpublished data).

Patrick 2017. (unpublished data).

Port Authority of New South Wales 2017. (unpublished data).

Flinders Ports 2017. (unpublished data).

Port of Brisbane Pty Ltd 2017. (unpublished data).

Port of Melbourne Operations Pty Ltd 2017. (unpublished data).

Ports Australia 2015. (unpublished data).

SA Track and Signal 2014, Australian railway track and signal drawings and signal locations, (Online railway and port maps) http://www.sa-trackandsignal.net/.

Victoria International Container Terminal 2017. (unpublished data).

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