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Australian container ports in an international context

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GPO Box 501, Canberra ACT 2601, Australia

Telephone (international) +61 2 6274 7210

Fax +61 2 6274 6816

Email: bitre@infrastructure.gov.au

Internet: http://www.bitre.gov.au/

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Foreword

BITRE undertook this study at the request of the Australian Maritime Group (AMG)—a senior officer advisory committee with representatives from state governments and the Commonwealth Government. The aim of the study is to provide a better understanding of the productivity and competitiveness of Australia's container ports in an international context.

The paper was prepared by Godfrey Lubulwa, Tony Carmody and Cameron McAndrew. Comments on earlier drafts of the paper by Michael Sutton, Peter Hollister, Jim Hallion, John Van Pelt and other members of AMG, David Bayne (shipping consultant), Jaclyne Fisher (Australian Customs and Border Protection Service) and Richard David Rawnsley (Dubai Ports) are gratefully acknowledged.

For further information on this publication please phone (02) 6274 7312 or email data.team@infrastructure.gov.au.

Gary Dolman
General Manager
Regional Research and Transport Statistics
Bureau of Infrastructure, Transport and Regional Economics
Canberra
September 2009

Summary

BITRE undertook this study at the request of the Australian Maritime Group (AMG), a senior officer advisory committee with representatives from state governments and the Commonwealth Government. The aim of the study is to provide a better understanding of the productivity and competitiveness of Australia's container ports in an international context. The study compares Australia's five capital city container ports with 29 overseas container ports most of which were selected because they are located in countries that are 'end of shipping line' trading countries. This is the mix of the 29 overseas ports in the sample:

- Forty-eight per cent of the ports are among the Cargo Systems' list of top 100 container ports for 2008.
- Fourteen per cent have a rank within ten points of the ranking of Port of Melbourne, ranked 51.
- Fourteen per cent have a rank within twenty points of the ranking of Sydney Ports, ranked 70.
- Twenty-four per cent of the comparison ports are not ranked by Cargo Systems' (on account of size) and fall in the same category as Adelaide, Fremantle and Brisbane.

The study reports results against eight indicators—six of these are at port level for 34 ports and the rest are reported at aggregated national level for 26 countries in the sample. The indicators reported at the national level are from World Bank studies of port costs and competitiveness, based on a survey of a representative set of ports for each country with results aggregated to a national level.

Australian ports are compared against the median of the sample of overseas ports. The median, unlike the average, is not sensitive to extreme values. The key results follow.

Contextual indicators

Port TEU throughput in 2006–07:

- The median for overseas ports was 2 446 000 TEU.
- The median for all ports in the sample was 2 168 500 TEU.
- The Australian five port median was 875 000 TEU.
- Two of Australia's five container ports are included in Cargo Systems' top 100 container ports for 2008. Melbourne with 2 093 000 TEU ranks number 51 and Sydney with 1 620 000 TEU throughput ranks number 70.

The number of ships visiting each port in 2005–06:

- The median for overseas ports was 6200 ship visits.
- The median for all ports in the sample was 5100 ship visits.
- The Australian five port median was 2500 ship visits.

Port productivity indicators

The net crane rate:

In this comparison, *Waterline* data for 2007–08 are used for Australian ports.

- The median for overseas ports was 30.0 containers per hour.
- The median for all ports in the sample 28.6 containers per hour.
- The Australian five port median was 28.1 containers per hour.
- The net crane rates in the five Australian container ports are higher in 2007–08 than what they were in the 2003 Productivity Commission's international benchmarking study. However, in 2007–08, the median net crane rates at the five Australian ports and the estimate for each port were below the median for overseas ports in the sample: Adelaide 29.7, Port of Melbourne 29.0; Fremantle 28.1; Sydney Ports 26.2; and Port of Brisbane 23.4.

Throughput per berth metre:

- The median for overseas ports was 945 TEU per berth metre.
- The median for all ports in the sample was 904.
- The Australian five port median was 545 TEU per berth metre.
- In 2007–08, of the five Australian ports only Port of Melbourne with an estimate of 1146 TEU per berth metre exceeded the overseas ports sample median. The other Australian ports achieve much lower TEU throughput per berth metre: Sydney Ports 834; Port of Brisbane 545; Fremantle 392; and Adelaide 278.

Yard utilisation measured as TEU throughput per hectare:

- The median for overseas ports was 26 683 TEU per hectare.
- The median for all ports in the sample was 24 336 TEU per hectare.
- The Australian five port median was 13 040 TEUs per hectare.
- In 2007–08, of the five Australian ports, only the Port of Melbourne with an estimate of 27 576 TEU per hectare exceeded the overseas ports sample median.

Port competitiveness indicators

Turnaround time for vessels:

- The median for overseas ports was 26.0 hours.
- The median for all ports in the sample was 27.5 hours.
- The Australian five port median was 29.0 hours.
- Four Australian ports had vessel turnaround times that were longer than the median of 26.0 hours for overseas ports: Fremantle 27.0 hours; Sydney Ports 29.0 hours; Melbourne 31.0 hours; and Port of Brisbane 34.0 hours. The exception is Adelaide with 22.0 hours.

Other national level indicators of competitiveness

The World Bank, under its project on trading across borders, undertook a worldwide survey of about 700 ports, including one Australian port, to estimate time costs of transporting a container between countries. The time costs of trade procedures includes the time needed to find the most appropriate route for a shipment; to prepare documentation to meet customs and insurance requirements; to arrange payments of fees and duties; and advising on legislative changes and political developments that could affect the movement of freight. It includes time delays due to administrative hurdles, including customs procedures, tax procedures and clearance of cargo.

The duration of procedures of exporting a container:

- The median of World Bank estimates for all countries in the sample of this study was thirteen days in 2005.
- The estimate for Australia was nine days in 2005 distributed as follows: five days for document preparation, one day for customs clearance, one day for ports and terminal handling and two days for inland transportation and handling.

The duration of procedures of importing a container:

- The median of World Bank estimates for all countries in the sample of this study was 13 days in 2005.
- The estimate for Australia was twelve days in 2005 distributed as follows: five days for document preparation; two days for customs clearance; three days for ports and terminal handling; and two days for inland transportation and handling.
- Australian Customs and Border Protection Service (2007) using data from a selection of importers meeting the World Bank criteria found that, on average, importers receive containers fewer than six days after arrival.

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Introduction

The study compares Australia's five capital city container ports with 29 overseas container ports, most of them selected because they are located in countries that are 'end of shipping line' trading countries.

The terms of reference for this study were that the study should cover a selection of 'end of shipping line' trading countries; compare ports in those countries with Australian container ports against a set of port productivity and port competitiveness performance indicators; and use a research methodology relying on readily available, published and unpublished data.

The study reports on the following indicators.

- Two contextual indicators:
    1. Port TEU throughput: using port level survey data for 2006–07 drawn from an international shipping statistics yearbook published by the Institute of Shipping Economics and Logistics.
    2. Number of ships handled in a given time period: using port level survey data for 2005–06 drawn from an international shipping statistics yearbook published by the Institute of Shipping Economics and Logistics.
- Three port productivity performance indicators:
    3. Net crane rate: using port level data drawn from *Waterline* (for Australian port terminals) and from port terminal websites and various research papers for overseas ports.
    4. TEU throughput per berth metre: using port level survey data on TEU for 2006–07 drawn from an international shipping statistics yearbook published by the Institute of Shipping Economics and Logistics. Where berth lengths were not available from Lloyds Ports of the World database they were estimated using Google Earth Professional tools.
    5. Yard utilisation measured as TEU throughput per hectare: the area of yards was estimated using the same methodology as in 4.
- One port competitiveness performance indicator:
    6. Vessel turnaround times—using a sample of port container terminal level estimates based on ship arrival and ship departure schedules on the Hapag-Lloyd website.

- Two other national level indicators of competitiveness:
    7. Duration of procedures of exporting a container.
    8. Duration of procedures of importing a container.

Waterline publishes port interface costs for Australian ports No similar indicators of port level costs have been identified for overseas ports.

While estimates on Australian ports are available in BITRE publications (*Waterline* and *Australian Sea Freight*), the study has not to date found any estimates for overseas ports for the following indicators which were originally identified for inclusion in the study:

- the size of merchant fleet in a country
- the vessel working rate
- the crane time not worked (per cent)
- the ship rate
- the truck turnaround times on the landside of port terminal
- the availability of 24 hour a day, seven days a week service.

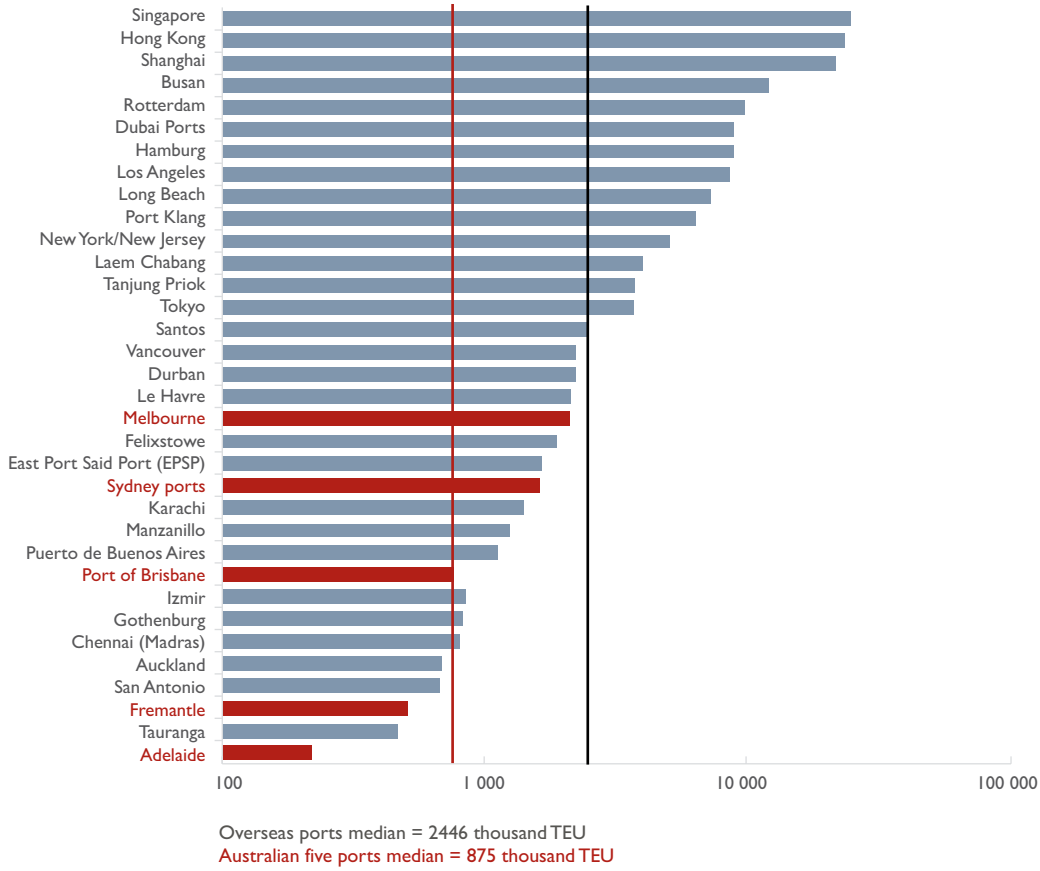
These indicators were therefore dropped from the study.

Contextual indicators

1. Port TEU throughput

A container port's TEU throughput is a proxy for port size and an indicator of economic activity at the port. Figure 1 and Table 1 (at the end of the paper) show the 34 ports in the sample in order of TEU throughput. Two of Australia's five container ports are large enough for inclusion in Cargo Systems' top 100 container ports for 2008. Melbourne is ranked number 51 and Sydney is ranked number 70.

Figure 1 Port TEU throughput (thousands), 2006–07



a. The horizontal axis is on a logarithmic scale so that the data for smaller ports can be visible on the chart.

b. The black line represents the median for overseas ports while the red line is the median for Australian five ports.

Source: Institute of Shipping Economics and Logistics 2007, BITRE 2009. Data for Dubai Ports is from Dubai Ports World-United Arab Emirates Region.

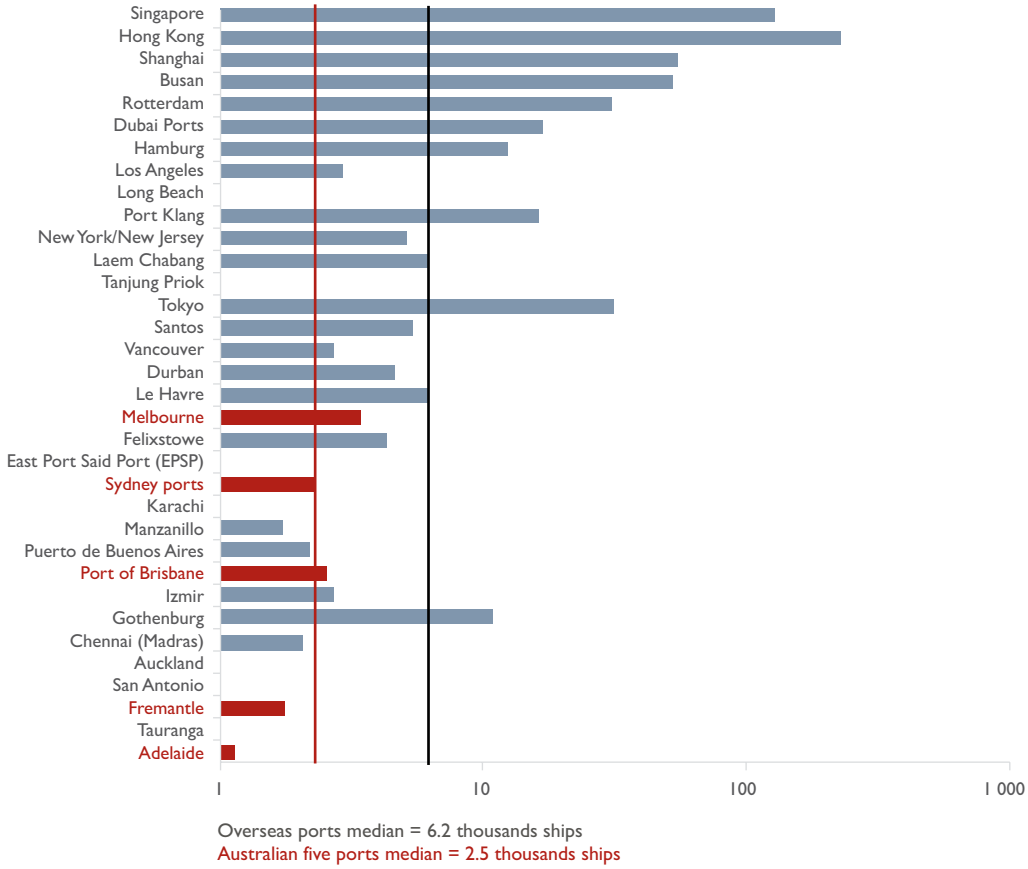
The majority of these ports are in countries sometimes referred to as 'end of shipping line' trading countries: The major exceptions are Singapore and Rotterdam (Netherlands) which are 'hubs' and different from Australian ports, but provide useful contrasts.

2. The number of ships visiting a port

The number of ships visiting a port is an important external factor which determines trade volumes, shipping patterns, and indirectly, the productivity of a port terminal. Port level data on container vessel visits was not available for most overseas ports. Thus Figure 2 and Table 2 present the number of all commercial ships arriving at the ports included in this study. Australia's five container ports have less than the median number of ship visits of 6.2 thousand in 2005–06 for the ports in sample.

Table 2, column 3, shows that general cargo and container ship visits as a per cent of total ship visits varies from a low of 26.2 per cent for Vancouver (Canada) to 100 per cent for Felixstowe (UK).

Figure 2 The number of commercial ships (thousands) arriving at a port, 2005–06



a. The horizontal axis is on a logarithmic scale so that the data for smaller ports can be visible on the chart.

b. The black line represents the median for overseas ports while the red line is the median for Australian five ports.

c. The most recent year for which data was available for this indicator was 2005–06.

d. Blank entries in the figure indicate data is not available.

Source: Institute of Shipping Economics and Logistics 2007. Data for Dubai Ports is from Dubai Ports World-United Arab Emirates Region.

Port productivity indicators

Production of various services at a port terminal requires inputs of capital, labour and land. Important capital inputs are the cranes used to load containers onto, and unload containers from, vessels and container vessel berths. Labour inputs include stevedoring labour and other labour (administrative, computing, security, et cetera). A container port terminal also requires an expanse of flat land for temporary storage of containers prior to loading on a ship (for export containers) or prior to being picked up after off-loading from a ship (for import containers). Depending on the land available containers could be stored individually or stored in stacks of two, three or more containers high. The land available influences the technology used for loading and unloading and thus influences the productivity of a port terminal.

Port productivity refers to how efficient a port is in optimising the use of these various resources. Port productivity is affected by decisions made by the port authority, terminal operators, stevedoring companies and shipping lines. These decisions relate to the resources which are made available for their port task. The cost of labour and capital is influenced by local and international financial and economic factors but these are not dealt with in this paper. This paper focuses on a limited number of factors, which are reasonably accessible from published sources. Productivity measures have traditionally been computed as ratios of two quantities: one reflecting the input and the other the output of a port (Committee on Productivity of Marine Port Terminals 1986).

3. The net crane rate

Waterline publishes estimates of the net crane rates for Australia's five city container ports. The study uses data corresponding to 2007–08 for these Australian ports. To date no data on net crane rates has been identified for 14 overseas ports. The most recent data that the study could identify for the remaining 15 overseas ports has been used. Table 3 shows that the most recent year was: 2008 for five overseas ports (Tauranga, Chennai, Gothenburg, Port Klang); 2007 for two overseas ports (Karachi, Hong Kong); 2006 for two overseas ports (Long Beach, Los Angeles); 2005 for one overseas port (Vancouver); and 2003 or earlier for five overseas ports (Durban, Auckland, Hamburg, Singapore, Dubai). Thus care needs to be exercised when interpreting the results for the net crane rates. When more up-to-date data for overseas ports becomes available the ranking with respect to net crane rates of Australia's ports may change.

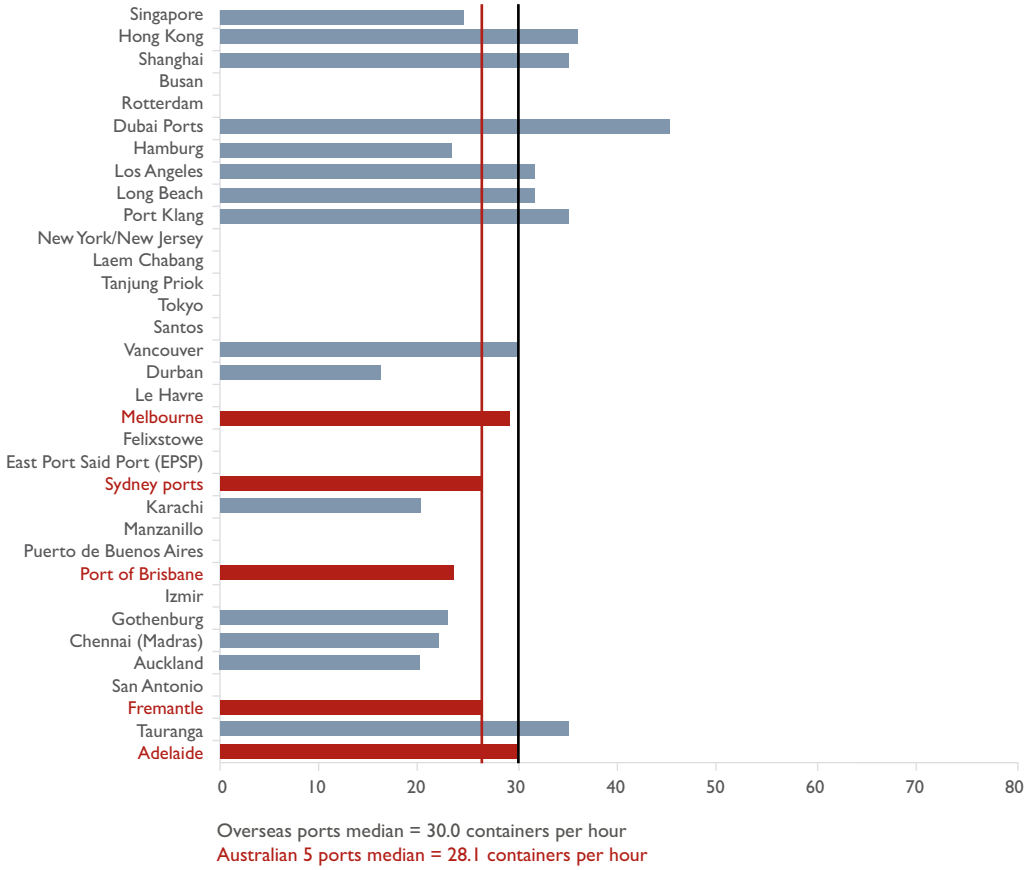
The lowest estimate for crane productivity was about 15 containers per hour for Durban. The average for the ports in sample was 28.5 containers per hour. The variation in productivity may be due to the variation in the mix of cranes used at different ports. For example, the more recently developed super post-panamax container cranes have advanced characteristics compared to ordinary container cranes. These new cranes offer maximum productivity of about 60 containers per hour where the ordinary cranes have a maximum of about 30 containers an hour.

Net crane rates at all four Australian ports were below the median for overseas ports in the sample:

- The median for overseas ports was 30.0 containers per hour.
- The Australian five port median was 28.1 containers per hour.

Figure 3 and Table 3 summarise the results.

Figure 3 Container handling rates at selected ports, various years (in order of port TEU throughput)



a. The black line represents the median for overseas ports while the red line is the median for Australian five ports

b. Blank denotes data is not available for the port. Data for Australian port terminals is for 2007–08 and is from BITRE (2009). The data for the overseas ports is for various years as shown in Table 3.

Source: Various sources listed in Table 3 at the end of the paper.

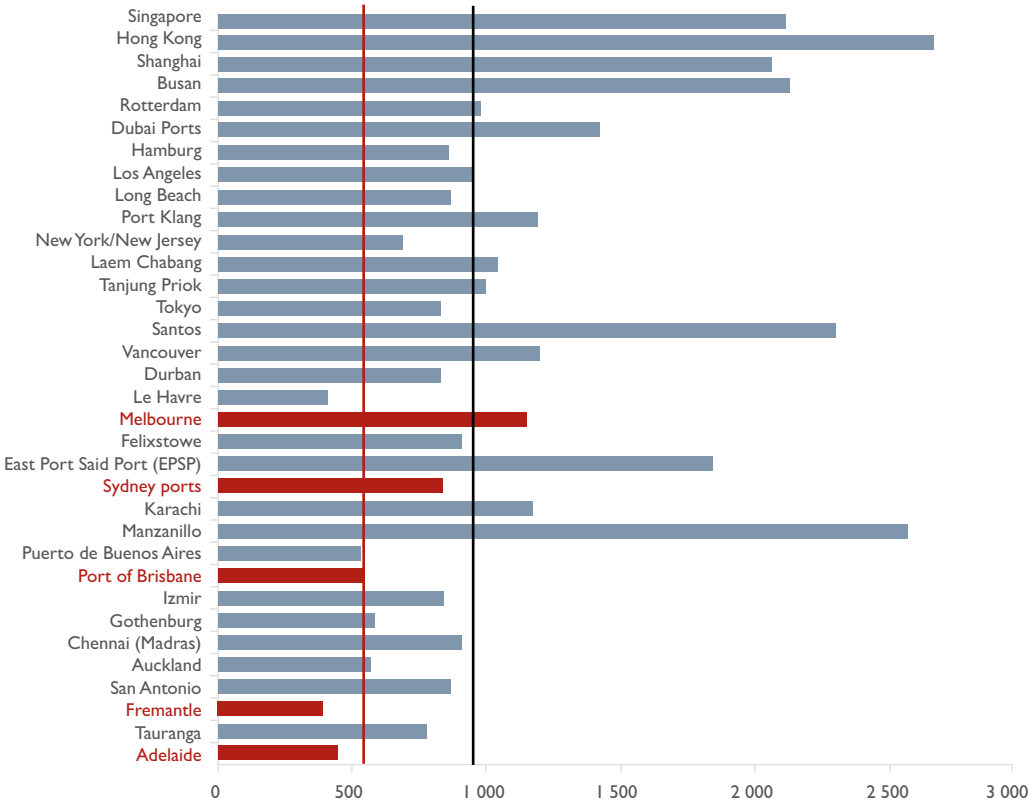
4. TEU throughput per berth metre

This indicator is computed by dividing TEU throughput by the total length of all of a container port's container terminals berths. The length of many selected ports container terminals berths is not readily available and in those cases was estimated by BITRE using Google Earth tools to identify the location and lengths of the various port terminal berths.

The higher the TEU throughput per berth metre is at a port terminal, the higher the container ship wharf productivity. The length and number of container ship berths varies from port to port as does the volume of containers. Large ports can have low productivity due to the number of underutilised wharfs while small ports can have high productivity because of the sheer volume of containers moved across their wharves.

Figure 4 and Table 4 summarise the TEU throughput per berth metre at container ports in the sample. In 2007–08, of the five Australian ports only the Port of Melbourne with an estimate of 1146 TEU per berth metre exceeded the overseas ports sample median of 945 TEU per berth metre. The other Australian ports achieved much lower TEU throughput per berth metre: Sydney Ports 834; Port of Brisbane 545; Fremantle 392; and Adelaide 445. Generally ports with larger TEU throughput performed better on this indicator.

Figure 4 TEU throughput per berth metre at container ports (in order of port TEU throughput)



Overseas ports median = 945 TEU per berth metre
Australian five ports median = 545 TEU per berth metre

a. The black line represents the median for overseas ports while the red line is the median for Australia's five capital city container ports

b. Blank denotes data is not available for the port. Data on TEU throughput for Australian port terminals is for 2007–08 and is from BITRE (2009).

c. This indicator is based on TEU throughput for 2006–07 but the lengths of berths were obtained from Lloyds, and also by direct measurement using Google Earth tools.

Source: BITRE estimates; Lloyds Ports of the World database. Data for Dubai Ports is from Dubai Ports World-United Arab Emirates Region.

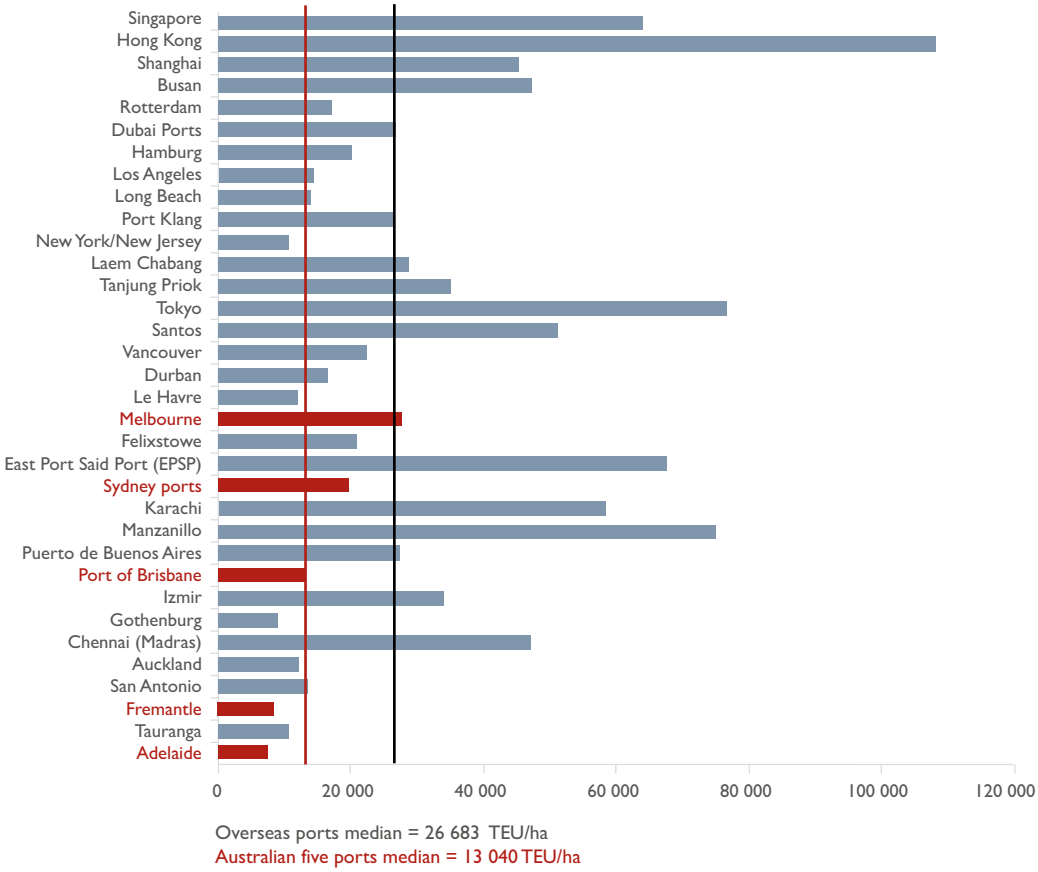
5. Yard utilisation measured as TEU throughput per gross hectare.

TEU throughput per gross hectare is a measure of container yard productivity with respect to the transfer of containers to and from ships. The methodology used to estimate gross hectare for a port is the same as used for estimating berth lengths for ports. Wharves which cater predominantly for river or canal container shipping and do not have container cranes have been excluded.

Gross hectare includes: branch roads for equipment; parking lots for equipment and yard operations; space for control buildings and associated equipment; reefer area/s and inspection area/s (Committee on Productivity of Marine Port Terminals, 1986).

Figure 5 and Table 5 summarise the yard utilisation measured as TEU throughput per gross hectare at ports in the sample. Of the Australian ports, only the Port of Melbourne at 27 576 TEU per gross hectare exceeds the estimated median of 24 336 TEU per gross hectare. The other four Australian container ports achieve lower TEU throughput per gross hectare. There does not appear to be a relationship between yard area and throughput except where more recent port terminals have been laid out more efficiently than older terminals. The Australian ports with the exception of Adelaide have quite similar yard areas but differ considerably in TEU throughput.

Figure 5 Yard utilisation measured as TEU throughput per gross hectare at port terminal (in order of port TEU throughput)



a. The black line represents the median for overseas ports while the red line is the median for Australia's five capital city container ports.

b. Blank denotes data is not available for the port. Data on TEU throughput for Australian port terminals is for 2007–08 and is from BITRE (2009).

c. This indicator is based on TEU throughput for 2006–07. The areas of container yards were obtained from Lloyds, and also by direct measurement using Google Earth tools.

Source: BITRE estimates using data from BITRE (2009), Lloyds Ports of the World database.

Port competitiveness indicators

This section discusses indicators of port competitiveness where data was available for comparison.

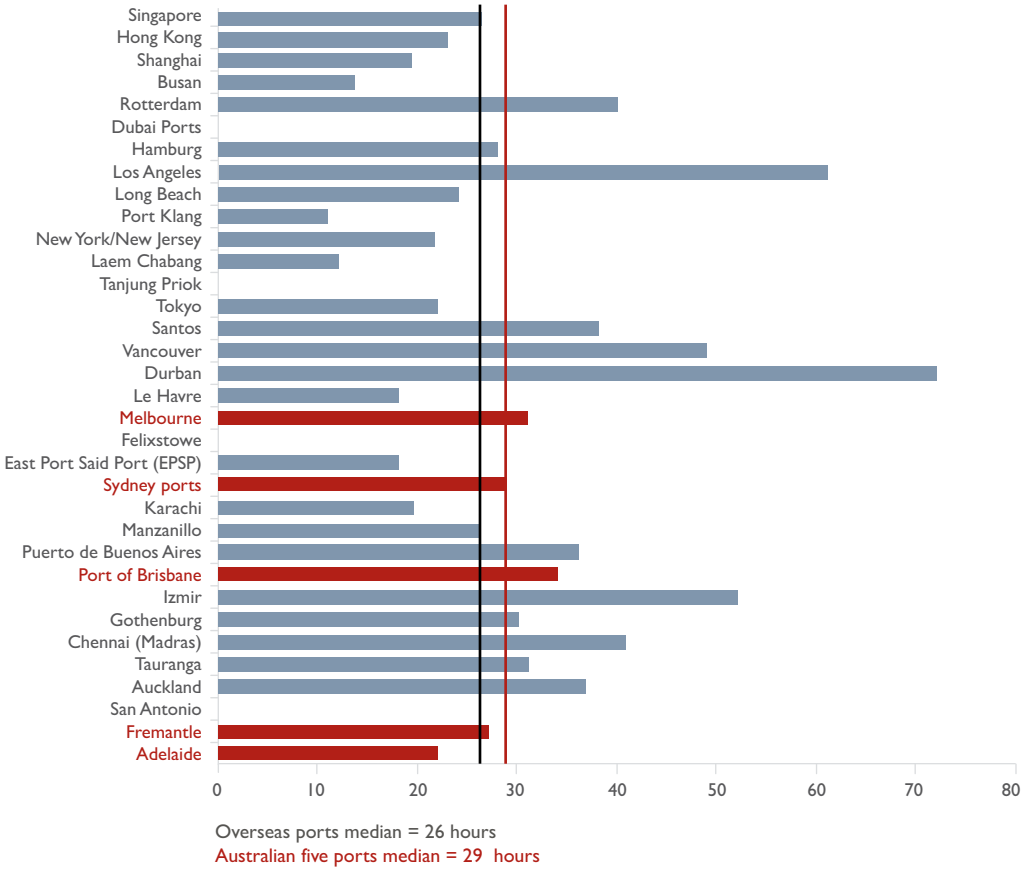
6. Vessel turnaround times at container port terminals

Vessel turnaround times at a port terminal affects the length of time a vessel spends in a port. BITRE has estimated vessel turnaround times, based on shipping schedules from the website of Hapag-Lloyd, a Hamburg-based company focussing on global container liner shipping. The Hapag-Lloyd website provides details on the company's 133 container ships including: the ship size; the date and time a ship arrives at a port terminal; and the date and time a ship leaves a port terminal. From these, for a sample of about 15 ships visiting a port, a turnaround time is estimated as an average. The ships selected fall into the average size of container vessels between 40 000 GRT to 52 000 GRT. Most of the Hapag-Lloyd schedules are for early 2009. Some of the turnaround times taken from port websites are for 2006 to 2008.

The measurements for Australian ports are derived from BITRE (2009) where port turnaround times (hours) is defined as the total time a container ship is in port. It is measured as a median of all the container ships in port over a six month period. The estimates of total time a ship is at port for overseas ports are estimates based on a ship's time of arrival at a port terminal and a ship's time of departure, as published in arrival and ship departure schedules.

Figure 6 and Table 6 summarise the results for this indicator. Four Australian ports had vessel turnaround times that were longer than the median of 26 hours for overseas ports: Fremantle 27 hours; Sydney Ports 29 hours; Melbourne 31 hours; and the Port of Brisbane 34 hours. The exception is Adelaide with 22 hours.

Figure 6 Vessel turnaround times for selected ports (in order of port TEU throughput)



a. The black line represents the median for overseas ports while the red line is the median for Australia's five capital city container ports.

Source: BITRE estimates from Hapag-Lloyd ship schedules and various port terminal websites.

Other national level indicators of competitiveness

The indicators discussed in the rest of the paper show some results on time competiveness of Australia compared to the rest of the world. Data on time competitiveness is not available on a port-by-port basis. This section draws on work by the World Bank (2008), Arvis, Mustra et al (2007) and Djankov, Freund and Pham Cong (2008). The World Bank constructs a logistics performance index which is based on various indicators of supply chain performance using data collected from surveys conducted in 2005. This paper uses the quantitative inputs to the index to throw light on Australia's ranking. Table 7 summarises the results World Bank's estimates of these indicators for Australia.

7. The duration of procedures of exporting a container

In 2005, the World Bank undertook a survey where respondents from participating countries were asked about the duration and cost of four procedures which have to be followed in order to export or import a container. These procedures were:

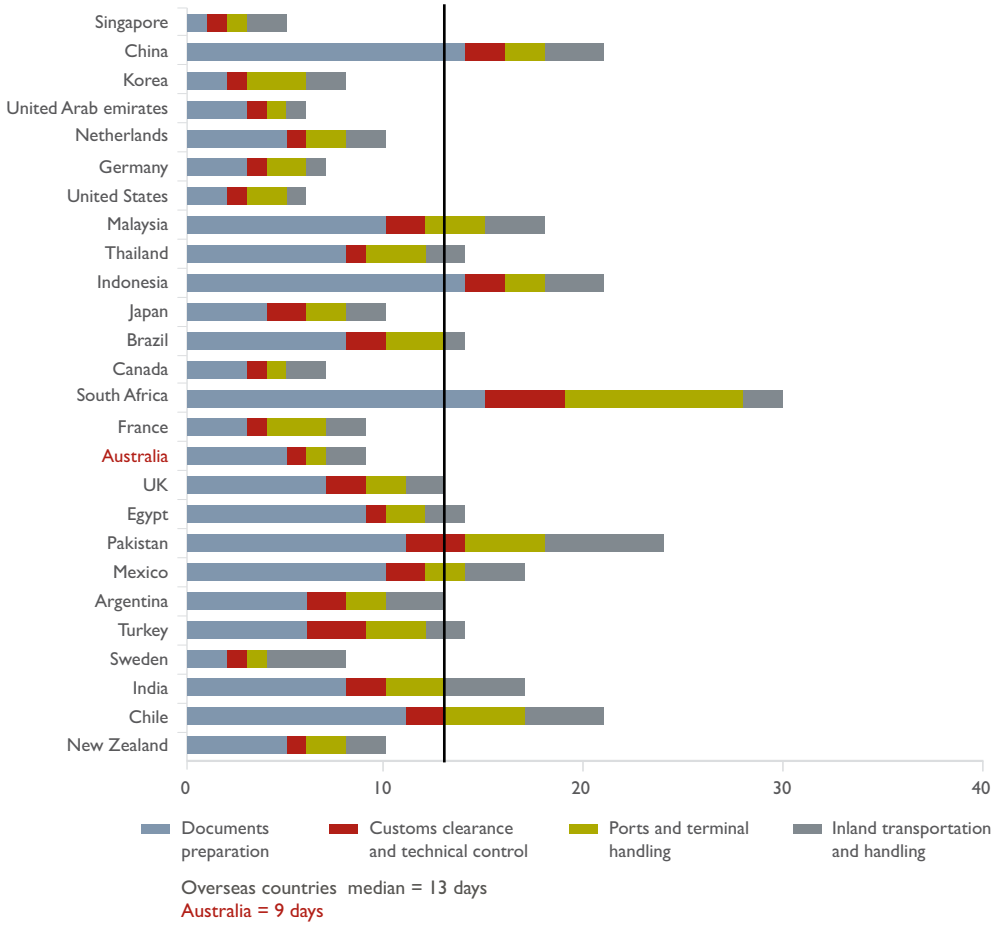
- documents preparation
- customs clearance and technical control
- ports and terminal handling
- inland transportation and handling.

Figure 7 and Table 8 summarise the World Bank's estimates based on responses to the survey for the countries in the sample for the current study:

The median for overseas countries was 13 days per export container.

The median for Australia, based on responses from one port only, was 9 days.

Figure 7 World Bank's estimates of the duration of procedures by country of exporting a container (days)



Source: World Bank 2008.

Australia at five days is below the median time of six days for document preparation. At one day it is below the median time of two days for customs clearance. At one day it is also below the median of two days for ports and terminal handling and it is at the median of two days for inland transportation.

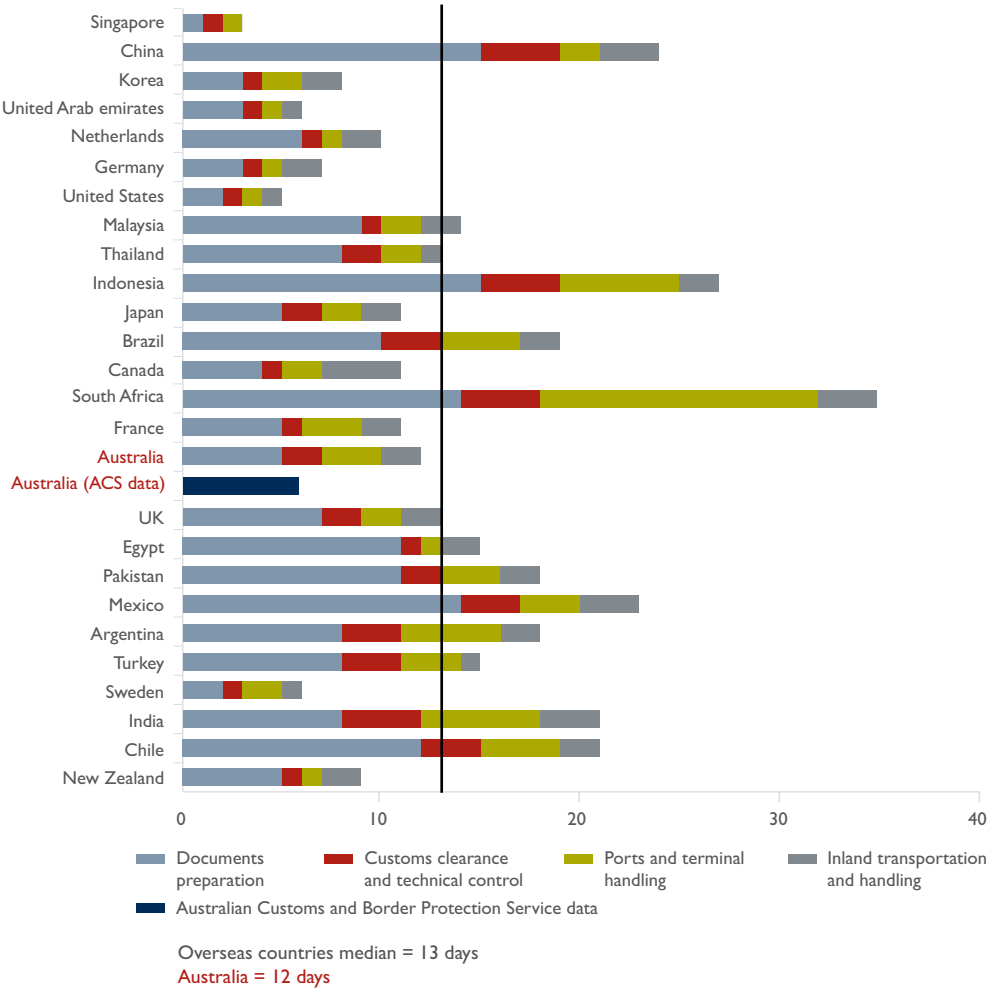
8. The duration of procedures of importing a container

Figure 8 and Table 9 summarise estimates of the duration of import procedures for the countries in the sample:

- The median for overseas countries in the sample for this study was 13 days per import container.
- The median for Australia, based on responses from one port only, was 12 days.

- Australian Customs and Border Protection Service (2007) using data from a selection of importers meeting the World Bank criteria found that, on average, importers receive containers fewer than six days after arrival.

Figure 8 Estimates of the duration of procedures, by country, of importing a container (days)



Note: The data for Australia (ACS) is from the Australian Customs and Border Protection Service (2007). The remaining data is from the World Bank.

Source: World Bank 2008, Australian Customs and Border Protection Service (2007).

Australia at five days is below the median time of eight days for document preparation. It is at the median of two days for customs clearance. At three days it is above the median of two days for ports and terminal handling and it is at the median of two days for inland transportation.

The World Customs Organisation has endorsed 'Time Release Studies' as a method to use to measure customs performance in trade facilitation. Australian Customs and Border Protection Service (2007) used the Time Release Study methodology.

Conclusion

This paper finds that:

- Two (Melbourne and Sydney) out of five of Australia's capital city ports are included in the Cargo Systems' listing of the top 100 ports in the world.
- In 2007–08 the net crane rates at Australian ports were below the median (30.0) for overseas ports in the sample with the Port of Melbourne 29.0; Fremantle 28.1; Sydney Ports 26.2; Port of Brisbane 23.4; and Adelaide 29.7.
- In 2007–08, of the five Australian ports, only the Port of Melbourne with an estimate of 1146 TEUs per berth metre, exceeded the overseas ports sample median. The other Australian ports achieved much lower TEU throughput per berth metre: Sydney Ports 834; Port of Brisbane 544; Fremantle 392; and Adelaide 278.
- Of the Australian ports, only the Port of Melbourne at 27 576 TEU per gross hectare exceeds the estimated median of 26 683 TEU per gross hectare of overseas ports in the sample. The other four Australian container ports achieved lower TEU throughput per gross hectare: Sydney Ports 19 708; Port of Brisbane 13 040; Fremantle 8350 and Adelaide 7450.
- Four Australian ports had vessel turnaround times that were longer than the median of 26 hours for overseas ports: Fremantle 27 hours; Sydney Ports 29 hours; Melbourne 31 hours; and the Port of Brisbane 34 hours. The exception was Adelaide with 22 hours.
- In terms of duration of export and import procedures, Australia, as estimated by the World Bank for one representative port, does better than the median of thirteen days for overseas countries with nine days for exports and is below the median of fifteen days for imports with twelve days.
- Australian Customs and Border Protection Service (2007) using data from a selection of importers meeting the World Bank criteria found that, on average, importers receive containers fewer than six days after arrival.

The constraints to this study include availability, timeliness, consistency and varying degrees of quality of data. Due to these constraints it is not possible to report across all indicators for all ports and countries in the study.

Finally, the report uses single and multiple indicators. With the single indicators each indicator results in a ranking of ports which are different from the ranking of ports based on other indicators.

Annex A Statistical tables

Table 1 Port throughput measured as containers handled by the port, 2006–07

Country name	*Port name*	*Total TEUs (thousands)*	*TEU throughput rank*	*Cargo systems top 100 container ports rank in 2007*
Low throughput ports in sample				
Australia	Adelaide	219	34	
New Zealand	Tauranga	466	33	
Australia	Fremantle	506	32	
Chile	San Antonio	673	31	
New Zealand	Auckland	686	30	
India	Chennai (Madras)	798	29	91
Sweden	Gothenburg	820	28	
Turkey	Izmir	848	27	
Australia	Port of Brisbane	875	26	
Argentina	Puerto de Buenos Aires	1 119	25	68
Mexico	Manzanillo	1 252	24	77
Pakistan	Karachi	1 404	23	87
Medium throughput ports in sample				
Australia	Sydney Ports	1 620	22	70
Egypt	East Port Said Port	1 648	21	38
UK	Felixstowe	1 886	20	32
Australia	Melbourne	2 093	19	51
France	Le Havre	2 138	18	41
South Africa	Durban	2 199	17	47
Canada	Vancouver	2 208	16	49
Brazil	Santos	2 446	15	44
Japan	Tokyo	3 696	14	27
Indonesia	Tanjung Priok	3 733	13	
Thailand	Laem Chabang	3 964	12	
High throughput ports in sample				
United States of America	New York/New Jersey	5 093	11	19
Malaysia	Port Klang	6 326	10	16
United States of America	Long Beach	7 290	9	15
United States of America	Los Angeles	8 470	8	13
Germany	Hamburg	8 882	7	9
United Arab Emirates	Dubai Ports	8 923	6	7
Netherlands	Rotterdam	9 690	5	6
Korea	Busan	12 039	4	5
Peoples' Republic of China	Shanghai	21 710	3	2
Peoples' Republic of China	Hong Kong	23 539	2	3
Singapore	Singapore	24 792	1	1
Overseas median		2 446		

Note: Overseas median excludes Australian ports highlighted in red.
A blank in the column headed 'Cargo systems top 100 container ports' means the port has a TEU rank greater than 100.

Source: Institute of shipping Economics and Logistics 2007, Cargo Systems (2008) BITRE (2009).

Table 2 Number of all commercial ships arriving at a port, 2005–06

Country name	*Port name*	*All commercial ships arriving at port*	*General cargo + container ships/ total visits (per cent)*	*Year*
Low throughput ports in sample				
Australia	Adelaide	1 134	17.3	2007–08
New Zealand	Tauranga	NA	46.6	2006
Australia	Fremantle	1 760	26.0	2007–08
Chile	San Antonio	NA	NA	NA
New Zealand	Auckland	NA	NA	NA
India	Chennai (Madras)	2 059	26.5	2006
Sweden	Gothenburg	10 938	49.0	2006
Turkey	Izmir	2 709	NA	2005
Australia	Port of Brisbane	2 527	30.6	2007–08
Argentina	Puerto de Buenos Aires	2 192	88.9	2006
Mexico	Manzanillo	1 729	62.6	2005
Pakistan	Karachi	NA	NA	NA
Medium throughput ports in sample				
Australia	Sydney Ports	2 459	50.7	2007–08
Egypt	East Port Said Port (EPSP)	NA	NA	NA
UK	Felixstowe	4 330	100	2006
Australia	Melbourne	3 422	NA	2007–08
France	Le Havre	6 181	30.7	2006
South Africa	Durban	4 566	18.2	2006
Canada	Vancouver	2 693	26.2	2006
Brazil	Santos	5 408	42.1	2006
Japan	Tokyo	31 653	NA	2006
Indonesia	Tanjung Priok	NA	NA	NA
Thailand	Laem Chabang	6 149	96.3	2006
High throughput ports in sample				
United States of America	New York/New Jersey	5 110	NA	2006
Malaysia	Port Kelang	16 404	88.4	2006
United States of America	Long Beach	NA	75.1	NA
United States of America	Los Angeles	2 912	89.3	2006
Germany	Hamburg	12 373	68.3	2006
United Arab Emirates	Dubai Ports	16 901	NA	2006
Netherlands	Rotterdam	31 077	55.5	2006
Korea	Busan	52 885	94.1	2006
PRC	Shanghai	55 000	NA	2006
Peoples' Republic of China	Hong Kong	230 960	84.7	2006
Singapore	Singapore	128 922	62.7	2006
Overseas median		6 165	59.05	

Note: Overseas median excludes Australian ports highlighted in red.

na: Not available.

a. For ports where container trade forms a small part of total trade (for example, Gothenburg) the number of all commercial ships arriving at port are out of alignment from the TEU throughput rank for those ports.

Source: Institute of Shipping Economics and Logistics 2007, Ports Australia 2008, pages 327–359. Data for Dubai Ports is from Dubai Ports World-United Arab Emirates Region.

Table 3 Container handling rates at selected port terminals

Port name	*The net crane rate*	*Reference year*	*Source*
Adelaide	29.7	2007–08	BITRE (2009)
Tauranga	35.0	2008	Port of Tauranga (2008a)
Fremantle	28.1	2007–08	BITRE (2009)
San Antonio	NA		
Auckland	20.0	2002	Productivity Commission (2003)
Chennai (Madras)	22.0	2008	Chennai Ports (2008)
Gothenburg	23.0	2008	Personal Communication. (2009)
Izmir			
Port of Brisbane	23.4	2007–08	BITRE (2009)
Puerto de Buenos Aires	NA		
Manzanillo	NA		
Karachi	20.0	2007	Streamline Supply Chain (2007)
Sydney Ports	26.2	2007–08	BITRE (2009)
East Port Said Port (EPSP)	NA		
Felixstowe	NA		
Melbourne	29.0	2007–08	BITRE (2009)
Le Havre	NA		
Durban	16.0	2003	Maiden (2003)
Vancouver	30.0	2005	Canadian Sailings (2005)
Santos	NA		
Tokyo	NA		
Tanjung Priok	NA		
Laem Chabang	NA		
New York/New Jersey	NA		
Port Klang	35.0	2008	Phang Datin Paduka(2008)
Long Beach	31.5	2006	Le-Griffin and Murphy (2006)
Los Angeles	31.5	2006	Le-Griffin and Murphy (2006)
Hamburg	23.1	2002	Productivity Commission (2003)
Dubai Ports	45.0	2000	Dubai Ports Authority 2005
Rotterdam	NA		
Busan	NA		
Shanghai	35.0		Maier (2008)
Hong Kong	36.0	2007	Port of Hong Kong (2007)
Singapore	24.3	2002	Productivity Commission (2003)
Overseas median	30.0		

na: Not available.
Note: Overseas median excludes Australian ports highlighted in red.
Source: Various sources as indicated in column 3 of the table.

Table 4 TEU throughput per berth metre, 2006–07

Port name	*TEU throughput per berth metre*
Adelaide	445
Tauranga	777
Fremantle	392
San Antonio	867
Auckland	568
Chennai (Madras)	902
Gothenburg	583
Izmir	841
Port of Brisbane	545
Puerto de Buenos Aires	529
Manzanillo	2 562
Karachi	1 170
Sydney Ports	834
East Port Said Port (EPSP)	1 839
Felixstowe	907
Melbourne	1 146
Le Havre	407
Durban	829
Vancouver	1 197
Santos	2 302
Tokyo	825
Tanjung Priok (Jakarta)	998
Laem Chabang	1 037
New York/New Jersey	685
Port Kelang	1 191
Long Beach	867
Los Angeles	945
Hamburg	862
Dubai Ports	1 418
Rotterdam	979
Busan	2 122
Shanghai	2 061
Hong Kong	2 661
Singapore	2 109
Overseas median	945

Note: Overseas median excludes Australian ports highlighted in red.

Source: BITRE estimates; Lloyds Ports of the World database. Data for Dubai Ports is from Dubai Ports World-United Arab Emirates Region.

Table 5 Yard utilisation measured as TEU throughput per gross hectare, 2006–07

Port name	*TEU throughput per gross hectare*
Adelaide	7 450
Tauranga	10 664
Fremantle	8 350
San Antonio	13 623
Auckland	12 046
Chennai (Madras)	47 219
Gothenburg	9 094
Izmir	33 255
Port of Brisbane	13 040
Puerto de Buenos Aires	27 293
Manzanillo	74 970
Karachi	58 257
Sydney Ports	19 708
East Port Said Port (EPSP)	67 541
Felixstowe	20 939
Melbourne	27 576
Le Havre	11 812
Durban	16 313
Vancouver	22 326
Santos	50 958
Tokyo	76 364
Tanjung Priok (Jakarta)	34 888
Laem Chabang	28 497
New York/New Jersey	10 655
Port Kelang	26 347
Long Beach	14 030
Los Angeles	14 346
Hamburg	20 168
Dubai Ports	26 683
Rotterdam	16 814
Busan	47 119
Shanghai	45 135
Hong Kong	107 977
Singapore	63 733
Overseas median	26 683

Note: Overseas median excludes Australin ports highlighted in red.

Source: BITRE estimates; Lloyds Ports of the World database. Data for Dubai Ports is from Dubai Ports World-United Arab Emirates Region.

Table 6 Vessel turnaround times on the wharf-side for selected ports, 2008

Port	*Wharfside turnaround times for vessels (hours)*
Adelaide	22.0
Fremantle	27.0
San Antonio	NA
Auckland	36.8
Tauranga	31.2
Madras	40.8
Gothenburg	30.0
Izmir	52.0
Port of Brisbane	34.0
Puerto de Buenos Aires	*36.0*
Manzanillo	*26.0*
Karachi	*19.6*
Sydney Ports	29.0
East Port Said Port (EPSP)	*18.0*
Felixstowe	*NA*
Melbourne	31.0
Le Havre	*18.0*
Durban	72.0
Vancouver	49.0
Santos	38.0
Tokyo	22.0
Tanjung Priok	NA
Laem Chabang	12.0
New York/New Jersey	21.7
Port Kelang	11.0
Long Beach	24.0
Los Angeles	61.0
Hamburg	28.0
Dubai Ports	NA
Rotterdam	40.0
Busan	13.7
Shanghai	19.3
Hong Kong	23.0
Singapore	26.4
Overseas median	26.4

Note: Overseas median excludes Australian ports highlighted in red.
Source: BITRE estimates.

Table 7 Estimates of time costs of procedures for exporting and importing containers, 2004–05

	World Bank overseas country sample median	World Bank Australia	Australian Customs Service
Time cost of trade procedures (days)			
Exports	13	9	Not applicable
Imports	13	12	≤ 6

Note: World Bank cost estimates were in US dollars and have been converted to Australian dollars using an exchange rate of $A = $US 0.76 for December 2005.

Source: BITRE (2005) World Bank (2008), Australian Customs and Border Protection Service (2007).

Table 8 World Bank estimates of the duration of procedures by country of exporting a container, 2005—days

Country Name	Documents preparation	Customs clearance and technical control	Ports and terminal handling	Inland transportation and handling	Total
Singapore	1	1	1	2	5
China	14	2	2	3	21
Korea	2	1	3	2	8
Netherlands	3	1	1	1	6
United Arab emirates	5	1	2	2	10
Germany	3	1	2	1	7
United States	2	1	2	1	6
Malaysia	10	2	3	3	18
Thailand	8	1	3	2	14
Indonesia	14	2	2	3	21
Japan	4	2	2	2	10
Brazil	8	2	3	1	14
Canada	3	1	1	2	7
South Africa	15	4	9	2	30
France	3	1	3	2	9
Australia	5	1	1	2	9
UK	7	2	2	2	13
Egypt	9	1	2	2	14
Pakistan	11	3	4	6	24
Mexico	10	2	2	3	17
Argentina	6	2	2	3	13
Turkey	6	3	3	2	14
Sweden	2	1	1	4	8
India	8	2	3	4	17
Chile	11	2	4	4	21
New Zealand	5	1	2	2	10
Overseas median	6	2	2	2	13

Note: Overseas median excludes Australia.

Source: World Bank 2008.

Table 9 Estimates of the duration of procedures, by country, of importing a container, 2005 (days)

Country Name	*Documents preparation*	*Customs clearance and technical control*	*Ports and terminal handling*	*Inland transportation and handling*	*Total*
Singapore	1	1	1	0	3
China	15	4	2	3	24
Korea	3	1	2	2	8
Netherlands	3	1	1	1	6
United Arab emirates	6	1	1	2	10
Germany	3	1	1	2	7
United States	2	1	1	1	5
Malaysia	9	1	2	2	14
Thailand	8	2	2	1	13
Indonesia	15	4	6	2	27
Japan	5	2	2	2	11
Brazil	10	3	4	2	19
Canada	4	1	2	4	11
South Africa	14	4	14	3	35
France	5	1	3	2	11
Australia	5	2	3	2	12
Australia (ACS)	na	na	na	na	≤ 6
UK	7	2	2	2	13
Egypt	11	1	1	2	15
Pakistan	11	2	3	2	18
Mexico	14	3	3	3	23
Argentina	8	3	5	2	18
Turkey	8	3	3	1	15
Sweden	2	1	2	1	6
India	8	4	6	3	20
Chile	12	3	4	2	21
New Zealand	5	1	1	2	9
Overseas median	8	2	2	2	13

Note: Overseas median excludes Australia. The data for Australia (ACS) is from the Australian Customs and Border Protection Service (2007) The remaining data is from the World Bank (2008).

Source: World Bank 2008.

References

Arvis J F, Mustra M A, Panzer J, Ojala L and Naula T, 2007, *Connecting to compete: Trade logistics in the global economy—the logistics performance index and its indicators*, The World Bank: Washington DC.

Australian Customs and Border Protection Service, 2007, Time Release Study 2007 viewed on 26 May 2009 at http://www.customs.gov.au/site/page.cfm?u=6067

BITRE, See Bureau of Infrastructure, Transport and Regional Economics

BITRE, 2009, *Waterline 45*, Canberra, Australia.

Canadian Sailings, 2005, *Post-Panamax containerization presents new port challenges*, viewed on 26 May 2009 at,<http://www.aims.ca/atlantica.asp?typeID=4&id=1210>

Cargo Systems, 2008, *Cargo systems top 100 container ports 2008*, viewed on 26 May 2009 at <www.cargosystems.net>

Chennai Port, 2008, *Chennai Port Operations*, viewed on 26 May 2009 at <http://en.wikipedia.org/wiki/Chennai_Port>

Cochrane R A, 2008, 'The Effects of Market Differences on the Throughput of Large Container Terminals with Similar Levels of Efficiency', *Maritime Economics & Logistics*, Volume 10, Numbers 1–2, March 2008, pp. 35–52(18)

Committee on productivity of marine port terminals 1986, *Improving productivity in US marine port terminals*, viewed on 3 Dec 2008 at <http://books.nap.edu/openbook.php?record_id=926&page=25>

Djankov S, Freund C and Pham Cong S 2008, *Trading on time*, viewed on 26 May 2009 at <http://www.doingbusiness.org/Documents/TradingOnTime_APR08.pdf>

Dubai Ports Authority, 2005, *World's largest gantry cranes installed at Dubai Port*, viewed on 26 May 2009 at 2009<http://www.ameinfo.com/52360.html>

European Sea Ports Organisation, 2007, *Benchmarking exercise*, viewed on 17 November 2008 at <http://www.espo.be/downloads/archive/3f70cb4e-3306-40cd-a5d1-bca3b5a72a91.pdf>

Gi-Tae Yeo, Roe M, and Dinwoodie J, 2008, 'Evaluating the competitiveness of container ports in Korea and China', *Transportation Research*, Part A, Volume 42, pp. 910–921.

Institute of Shipping Economics and Logistics (ISL), various years, *Shipping statistics yearbook*, ISL, Universitaetsallee GW1, Bremen, Germany.

Lloyd's Maritime Information Unit, *Containerisation international yearbook*, various years.

Maiden A, 2003, 'Durban: port in a storm', *African Business*, January 2003.

Maier H, 2008, *Freight Mobility and Intermodal Connectivity in China*, viewed on 26 May 2009 at <http://international.fhwa.dot.gov/pubs/pl08020/fmic_08_03.cfm>

Phang Datin Paduka, 2008, *Challenges in regulation, strategy and policy–impact on ports and shipping* , President's keynote address to the International Association of Ports & Harbours at the 7th International conference on coastal and port engineering in developing countries (pianc-copedec vii), viewed on 26 May 2009 at <http://www.iaphworldports.org/newsletter/PresidentPhang-PIANC-COPEDEC2008.pdf>

Port of Hong Kong, 2007, *Port Benchmarking Study for Assessing Hong Kong's Maritime Services and Associated Costs with other Major International Ports*, viewed on 26 May 2009 at <http://www.mardep.gov.hk/en/publication/pdf/pocp2_07.pdf>

Port of Tauranga, 2008a, *Port productivity: World class*, viewed on 26 May 2009 at<http://www.port-tauranga.co.nz/images.php?oid=879>

Port of Tauranga, 2008b, *Growth strategy extends beyond the bay of plenty*, viewed on 9 January 2009 at <http://www.navis.com/pdf/customer-case-study/cs_tauranga.pdf>

Productivity Commission, 2003, *International benchmarking of container stevedoring*, Commission Research Paper, July, Canberra.

Scribd, 2009, Terminal Productivity Container Management, viewed on 19 January 2009 at <http://www.scribd.com/doc/2170927/Terminal-Productivity-Container-Management>

Streamline Supply Chain, 2007, *Kolkata port congestion*, viewed on 28 May 2009 at <http://streamlinesupplychain.wordpress.com/?s=kolkata+port+congestion&searchbutton=go%21>

World Bank, 2008, *Doing business report*, viewed on 26 May 2009 at <http://www.doingbusiness.org/ExploreTopics/TradingAcrossBorders/>