International Comparison of Australia's Freight and Supply Chain Performance

Final Report

December 2020

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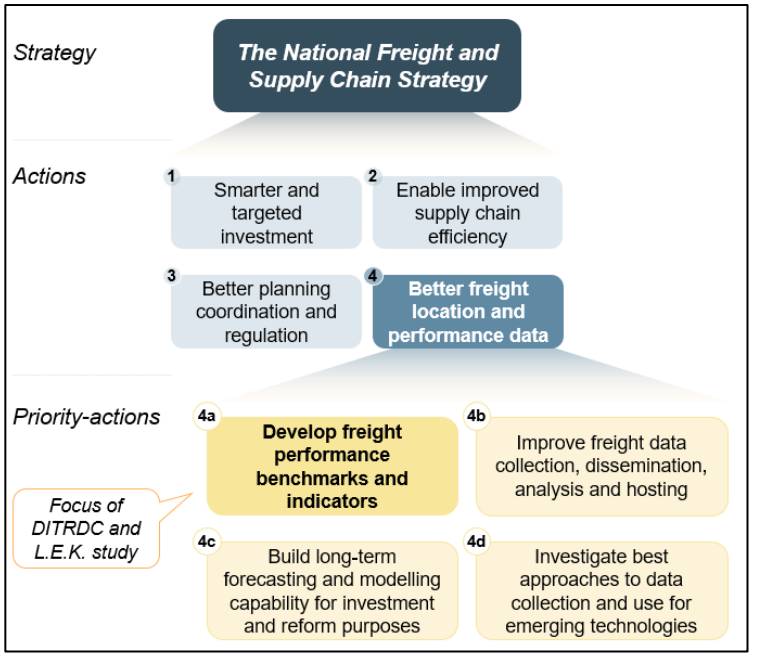
Executive Summary - Overview

- The purpose of the National Freight and Supply Chain strategy is to help Australia manage the projected 35% growth in freight volumes between 2018 and 2040, while tackling underlying productivity. This study addresses the priority action of developing freight and performance benchmarks and indicators. The vision for this priority action includes:
  - providing improved performance data to the freight sector
  - supporting infrastructure planning and investment
  - making Australia's supply chains more sustainable and competitive

- This study is a second step towards developing a broader set of comparative benchmarks for key Australian supply chains, providing improved performance data to the freight sector, and follows the initial 'pilot' study undertaken on the waste and wine supply chains in 2019. Through significant consultation with the broader freight sector, and specific industry groups, the grain (wheat) and cement supply chains were selected for review. International comparators were selected to enable a relevant comparison:
  - the wheat supply chain was compared with the comparator (and competitor) supply chains in Canada and Ukraine
  - the cement supply chain was compared with the supply chains in north-west USA, and France

- In general, this study has found that there is a paucity of data available on supply chain quality including safety, emissions, and supply chain performance. This is a gap that will be important to fill as supply chain monitoring is improved

- This report is prepared for open publication, building on detailed information collected and analysed by LEK for the Department



Executive Summary – Grain

The grain supply chain

- The supply chain costs as a proportion of the total delivered cost of a tonne of wheat contribute 35-50% of the overall cost, depending on the source market and destination. Excluding international shipping, the supply chain costs range between c.25% in the most efficient markets (i.e. WA, Ukraine, Canada) and c.35% in other markets (East Coast Australia)

- A number of inherent differences in the supply chains impact the nature and efficiency of the supply chain. These include:
  - the presence of free market and largely competitive supply chains (Australia, Ukraine) versus regulated monopolies (Canada)
  - the average distance between the harvest regions and international ports
  - the impact of harvest volatility on export volumes, after domestic demand is satisfied
  - centralised versus disaggregated supply chain planning

- Industry stakeholder consultation identified key issues of rail freight capacity, receival site efficiency and low port utilisation, which were contributing towards higher supply chain costs. International benchmarking validated these concerns with findings that Australian:
  - upcountry costs are broadly comparable to Canada's but more expensive than Ukraine's, driven by variable site utilisation
  - rail freight is more expensive due to structural issues such as shorter haulage distances, low utilisation and capacity constraints
  - port costs are relatively higher, primarily driven by lower capacity utilisation, particularly in Australia's eastern states

- Generally, Western Australia is more competitive than other Australian states due to its streamlined and predominantly export-orientated supply chain, which has benefitted from site rationalisation and upgrades, and ongoing investment in infrastructure to improve throughput efficiency

International benchmarking can provide significant value for government and industry stakeholders to identify and prioritise supply chain improvements

Benchmarking reveals the type of (**industry and government**) data that exists and identifies the critical gaps to be filled to build a **shared evidence base for decision making**

Benchmarking provides clarity of the **key supply chain issues** and highlights the major similarities and differences between supply chains (i.e. **drivers of efficiency and competitiveness**)

Benchmarking provides benefits to stakeholders by defining the current state and identifying future system wide supply chain requirements allowing them to **act with greater collaboration and co-ordination in planning** for supply chain improvements

Benchmarking provides information to help **prioritise key supply chain and infrastructure improvements** and investment, and **respond and plan for current and future supply chain disruptions** (e.g. COVID, bushfires and climate change)

This study addresses a priority action of the National Freight and Supply Chain Strategy

Strategy

The National Freight and Supply Chain Strategy

Actions

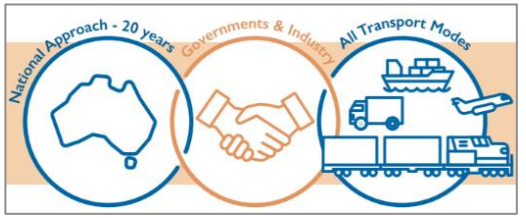
1. Smarter and targeted investment
2. Enable improved supply chain efficiency
3. Better planning coordination and regulation
4. **Better freight location and performance data**

Priority-actions

- 4a **Develop freight performance benchmarks and indicators**
- 4b Improve freight data collection, dissemination, analysis and hosting
- 4c Build long-term forecasting and modelling capability for investment and reform purposes
- 4d Investigate best approaches to data collection and use for emerging technologies

Focus of DITRDC and L.E.K. study

- The need for a national strategy is underpinned by a **projected growth** of over 35 percent in freight volumes from 2018 to 2040, particularly concentrated in urban areas
- The competitiveness of Australian exports has been impacted by **plateauing freight productivity and costs**
- Australia's freight and supply chains need to **build resilience to meet emerging issues** associated with natural disasters and climate risk, security and cyber threats and increasing community demands to improve safety and environmental outcomes



Source: Freight Australia; L.E.K. research

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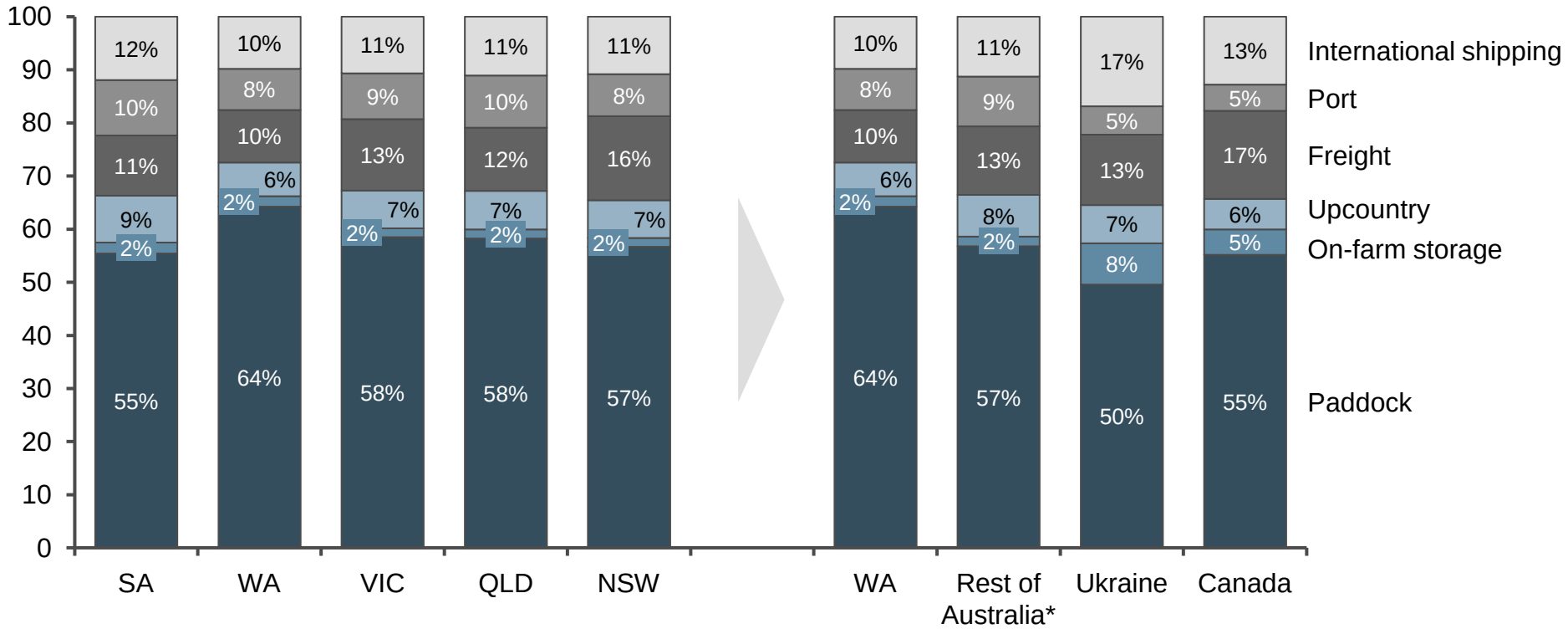
Through stakeholder and industry consultation, the Grain and Cement supply chains were selected for review

	Why Grain?	Why Cement?
Size and growth	35-45m tonnes; A$9-13b; 35k employees; 2% vol. compound annual growth	11.4m tonnes; A$15b; 30k employees; 3% vol. compound annual growth
Supply chain costs	The supply chain accounts for **c.30-35%** of the total FOB cost of grain *Supply Chain* | *Others*	The supply chain accounts for **c.30%** of the total price of cement *Supply Chain* | *Others*
Import / export mix	c.75% of grain (wheat) is exported (10-year average 2009-18) *Domestic* | *Export*	Almost 50% of cement is derived from imported cement or imported clinker *Domestic* | *Import*
Geographic scope	WA is the largest producer of grain with c.32% of Australia's average harvest (10-year average, 2009-18) *WA* | *NSW* | *SA* | *VIC*	Most cement production capacity comes from the east coast, with the largest being QLD with c.32% *QLD* | *NSW/ACT* | *VIC/TAS* | *Other*
Known efficiency / public interest	Comprehensive industry data available, with some international comparator data Continued industry transition post de-regulation, creating several market issues and significant public interest	Significant competitive tensions between major industry players, leading to limited data sharing – limited data available on relative efficiency vs. international comparators Third largest industry trucking fleet in Australia

Adherence to selection criteria
○ Low ● High

With much lower domestic transport distances Australia's supply chain (ex WA) accounts for c.43% of the delivered cost of wheat into Indonesia, relative to Ukraine's c.50% and Canada's c.45%

Components of delivered cost of wheat into Indonesia, excluding levies and check-offs (2019/20)
Percent



45%	36%	42%	42%	43%		36%	43%	50%	45%	% Supply Chain
200	265	340	320	470		265	295	570	1,610	Typical distance to port (km)

Note: * Weighted average based on export volume by state
Source: CBH; L.E.K. research and analysis

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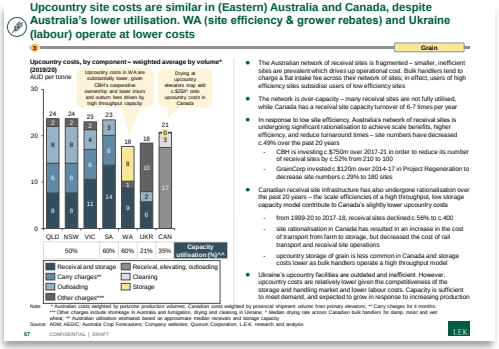
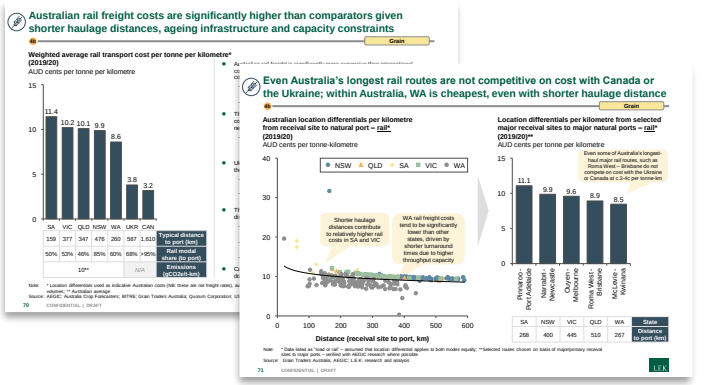
International benchmarking validated industry's concerns that Australian rail and port charges are significantly higher than comparators'

Upcountry receival 3



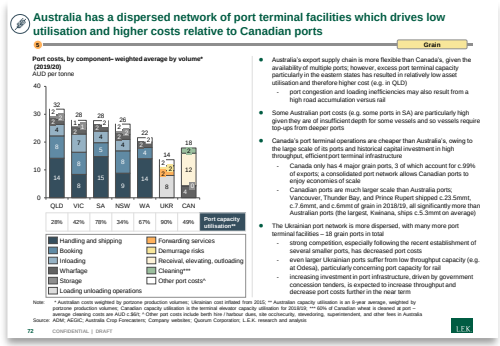
- Australian upcountry costs are broadly comparable to Canada's and more expensive than Ukraine's
- WA outperforms other states as high throughput infrastructure at port and upcountry drives efficiency
- Differences in cost are driven by variable site capacity utilisation – many of Australia's sites are not fully utilised

Rail transport 4b



- On a per tonne-kilometres basis Australian grain rail freight is more expensive than international comparators with a number of structural factors contributing this including shorter haulage distances, lower utilisation, and capacity constraints
- The cost of rail in WA is lower ($/t-km) than other Australian states due to loading efficiency, more consistent volume and the state's export focus
- SA and VIC have relatively higher rail costs ($/t-km) given their shorter haulage distances to port

Domestic port 5



- Australian port costs are relatively higher than in Canada and Ukraine
- Differences are largely driven by capacity utilisation which tends to be lower among eastern states
- Consolidation of the port network and investment in high throughput loading infrastructure in Canada has supported its cost competitiveness

Key grain supply chain findings

The supply chain is a significant contributor to export prices

Australia's supply chain accounts for c.40% of the delivered cost of wheat (c.43% in states outside WA) – domestic freight, port costs, and upcountry storage and handling costs account for c.11%, c.9%, and c.7% of delivered cost respectively

Australian inefficiencies are masked by shorter transport distances

The supply chain accounts for a larger proportion of the delivered cost of wheat in comparator countries (c.50% and c.45% in Ukraine and Canada respectively) – longer transport distances drive higher domestic freight costs (c.13% and c.17% of total delivered costs). Australian rail freight and port charges appear less competitive than comparators on a unit cost basis

WA outperforms other states

WA is generally more competitive than other Australian states, with only c.36% of delivered cost attributable to the supply chain – a streamlined, predominantly exports-focused supply chain, a more advanced programme of receival site rationalisation and capital investment in high throughput supply chain infrastructure (e.g. port loading facilities, high capacity rail) support WA's efficiency

Rail freight is important

Notwithstanding structural differences, continued focus on rail freight efficiency is critical to the overall supply chain costs

Australian port charges are more expensive than comparators'

Low utilisation of port terminal facilities also gives rise to lower competitiveness at port – Australian port costs are c.1.5-2x more expensive per tonne than comparators, driven by high road versus rail accumulation, loading inefficiencies and excess port capacity leading to underutilisation

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Context and purpose

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- L.E.K. has been engaged by the Department of Infrastructure, Transport, Regional Development and Communications (DITRDC, the "department") to a detailed benchmarking study of two priority supply chains, after an initial "pilot" study was undertaken on the waste and wine industries in 2019
  - this second supply chain study focusses on Australia's grain and cement supply chains against global comparators of Canada and Ukraine (for grain) and United States (Northeast) and France (for cement)

- The study was completed over 10 weeks from September to November, 2020 and investigated a number of areas, including
  - identification of key issues experienced with both grain and cement supply chains
  - benchmarked supply chains' performance against selected global comparators
  - high-level assessment and comparison of the approaches undertaken to infrastructure planning and investment

This study addresses a priority action of the National Freight and Supply Chain Strategy

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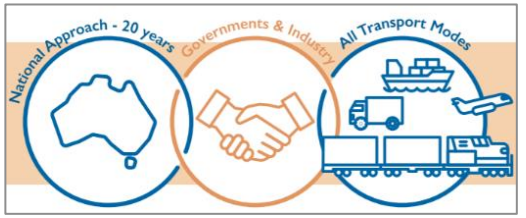

Source: Freight Australia; L.E.K. research

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The objective of the study is to improve the competitiveness of Australia's Supply Chains by providing improved performance data to the freight sector

Key problems

- There is lack of access and availability of data to measure, monitor and evaluate Australia's supply chain costs, service levels & efficiency versus competing markets
- Stakeholders lack a single source of truth to effectively understand, plan, regulate, and invest to improve supply chain efficiency and freight operations
- Better data can help inform initiatives to improve supply chain resilience highlighted by COVID, bushfires, climate change impacts etc.

Objective: Improve the competitiveness of Australia's Supply Chains

A 'call to action' for stakeholders to come together to support planning, development and investment into making Australia's supply chains sustainable and competitive

Sub-objectives

- Build broad consensus on a set of priority supply chain actions, acknowledging
  - the importance of a broadly agreed fact base to building consensus
  - the need for clarity about investment priorities at a system wide level
- Contribute to the National Freight Data Hub for strategic planning, operation, and evaluation of Australia's freight system
- Support COVID-19 recovery efforts through identification of supply chain opportunities and improvements

Outcomes

- Development of freight performance benchmarks and indicators for Australia's key import and export supply chains
- Development of an evidenced based view of key freight flows and their comparative performance
- Development of simple, repeatable and accessible benchmarks to analyse supply chain cost, service levels and efficiency
- Tracking the fulfilment of the National Freight and Supply Chain Strategy
- Identification of freight and supply chain priorities for improvement

Benefits for key stakeholders

Industry Bodies	Government	Corporates
Enhanced collaboration & co-ordination to integrate and optimise supply chain outcomes	Track the progress and impact of policy, regulation and investment, through the National Freight and Supply Chain Strategy	Improved efficiency and international competitiveness, enabled by data transparency

"…Nationally co-ordinated and well planned freight systems supporting a strong and prosperous Australia…"

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Consultation with Government and industry bodies highlighted broad alignment on the potential benefits of the study and the need for better data utilisation

Considerations

- **Industry is challenged by land use planning decisions** and restricted access to transport
  "… We face a number of challenges in terms of long term land use planning decisions and access to transport routes, rail for example…"
  – Cement industry representative
- **There is a current lack of available or accessible data** to support the prioritisation of investment opportunities
  "… Big issue for us is around the current lack of detailed data around investment opportunities for freight. …"
  – Cement industry representative
  "… Data is one that's going to be a challenge through the project …"
  – Grain industry representative

Potential benefits

- **Track** the progress and impact of the National Freight and Supply Chain Strategy
  "… One benefit is getting ability to repeat and track progress overtime across a range of different supply chains to see if freight strategy is having an impact…"
  – Government representative
- **Identify** common issues across multiple supply chains and prioritise these for remediation
  "… This kind of benchmarking approach can make a shared baseline …"
  – Government representative
- **Improve** accessibility, transparency and shared understanding of supply chains by centralising data
  "… It can help inform effective decision making, investment and operational efficiency …"
  – Grain representative

Data utilisation and visualisation

- **Data should be presented in a simple, repeatable, and accessible format**
  "… Having something to provide industry in a simple but meaningful way. Hopefully something we can repeat with consistency…"
  – Government representative
- **Data should be stored in a central location** (it is currently fragmented and/or inaccessible)
  "… We've got such varying data sets and data ownerships. Grain has ABARES and ABS and lots of data in different places which is problematic…"
  – Grain representative

There was broad agreement across representatives from both industries with the identified problems:

- There is a lack of available data to measure, monitor and evaluate Australia's supply chain performance versus competing markets
- Stakeholders lack a single source of truth to better optimise decisions about planning, investment and improve freight operations

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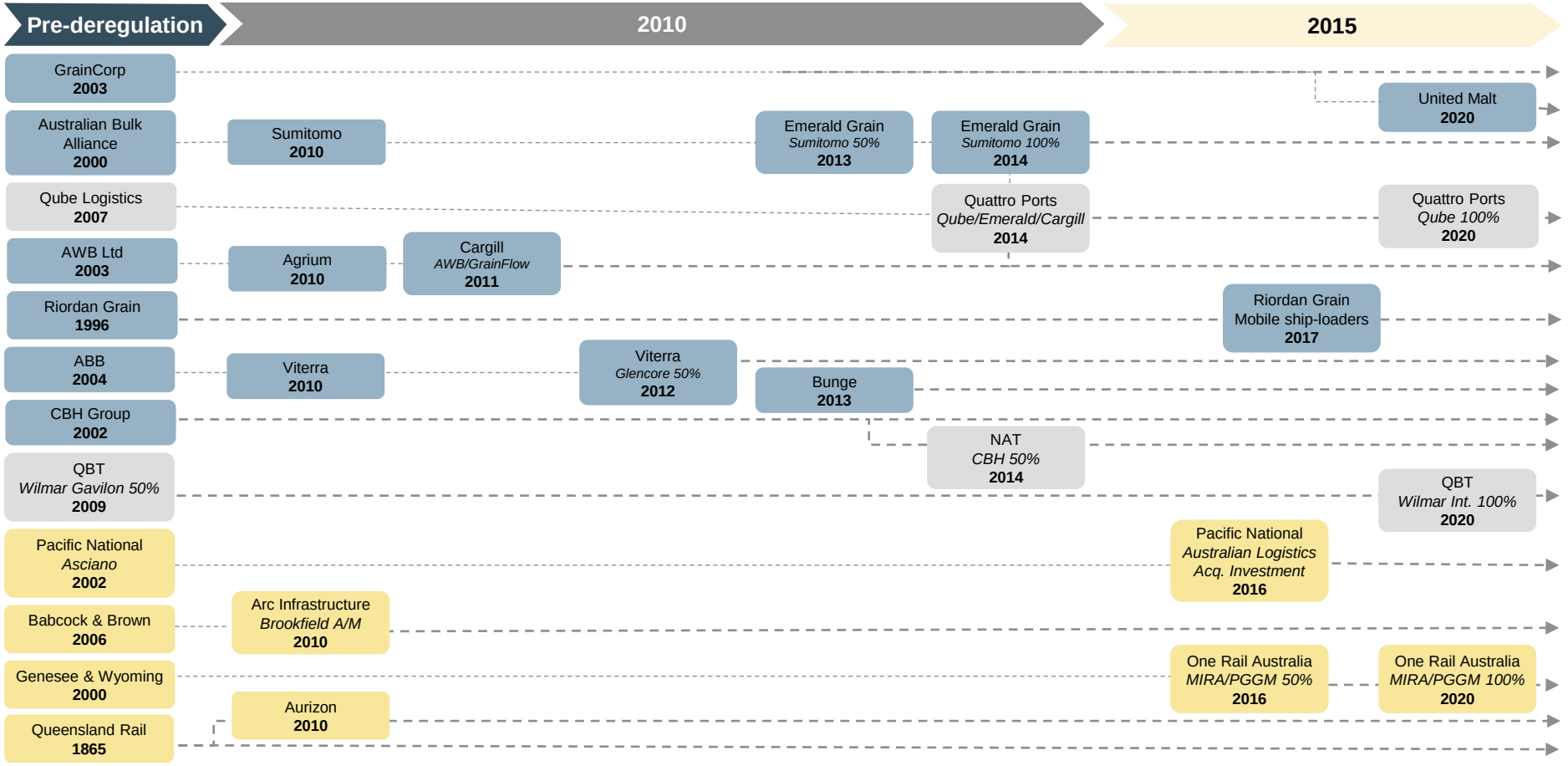
The grain industry has changed significantly over the past 10 years with consolidation among bulk handlers and new market entrants in rail and ports

Major companies involved with handling Australian grain – changes in ownership



Deregulation of the export wheat market in 2008 saw a reduction in the number of major grain handling companies in Australia, and the introduction of several scale international players with integrated marketing and bulk handling functions. The recent entry of new players in grain handling, storage, rail, and port terminal facilities, as the market realigns to proprietary pathways for exporters, have provided impetus for incumbents to be challenged

Note: Small or prospective new entrants are not fully represented here
Source: AEGIC, adapted from Kalisch Gordon et at (2016) and Productivity Commission (2010); L.E.K. research

Bulk handler and marketer | Port operator | Rail operator

There are a broad range of stakeholders involved in the grain supply chain, creating a complicated landscape for planning, coordination and investment

Example players at all stages of Australia's grain supply chain

NOT EXHAUSTIVE

Represent the interests of growers and other stakeholders	**Growers, R&D, industry standards and promotion**	Grain Growers; GPA Grain Producers Australia; aegic Australian Export Grains Innovation Centre; GRDC Grains Research & Development Corporation; Grain Trade Australia; **Grains Australia***
Receive, store and process grain upcountry and at port and market grain	**Bulk handling (upcountry and port) and marketing**	CBH Group; Viterra; GrainCorp; Cargill; Emerald Grain
Provide truck freight services	**Trucking operations**	Riordan Grain · Transport · Storage; Kelvin Baxter Transport; *Trucking operations are fragmented and largely conducted by smaller third parties*
Own and lease and operate rail track around Australia	**Below rail infrastructure**	ARTC; QueenslandRail; arc infrastructure; Aurizon; VicTrack; NSW Transport for NSW; One Rail Australia
Own, lease, and operate trains	**Above rail infrastructure and operations**	Aurizon; Watco Companies; Pacific National; SSR Southern Shorthaul Railroad; One Rail Australia
Own, lease, and develop port facilities	**Port infrastructure**	Fremantle Ports; Port of Melbourne; Flinders Ports; Southern Ports Albany Bunbury Esperance; North Queensland Bulk Ports; GeelongPort; Port Authority of New South Wales; Port of Newcastle; Port of Brisbane
Sell grain to markets domestically and internationally	**Marketing and export**	ADM; LDC; Glencore; COFCO 中粮; Bunge; Australian Grain Export
Coordinate industry planning and regulation	**Domestic customers**	Weston Milling; Manildra Group 100% Australian Owned; Allied Pinnacle; Ridley; Ingham's
Coordinate industry planning and regulation	**Planning, governance, regulatory**	ACCC Australian Competition & Consumer Commission; Australian Government Infrastructure Australia; Australian Government Department of Infrastructure, Transport, Regional Development and Communications; Government of Western Australia; Government of South Australia; Victoria State Government; NSW Government; Queensland Government

Note: * Grains Australia Limited is a newly created company, funded by GRDC, and is expected to assume some functions previously handled by Australia's statutory marketing authorities
Source: Press articles; L.E.K. research

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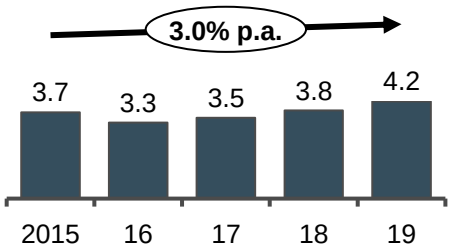
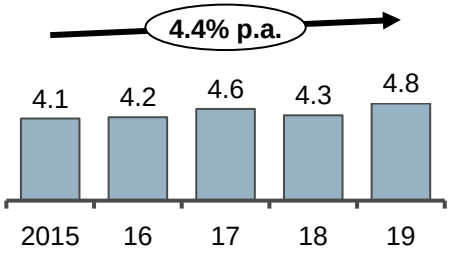
The grain industry is represented by three major bulk handlers covering the major grain growing areas of WA, SA and the East coast

	CBH GROUP	VITERRA	GrainCorp
Ownership structure	Co-operative – 3,900 grower-members	Owned by Glencore, which is publicly listed overseas	Publicly listed
Geographic footprint	WA	SA	VIC, NSW, QLD
Number of receival sites	c.150	c.55	c.145
Number of port terminals	4*	6**	7
Total port terminal capacity (Mt)	18.6*	7.3	12.0
Other notable assets	Australian Bulk Stevedoring, Blue Lake Milling, c.19% stake in Newcastle Agri Terminal, 50% stake in Interflour	*N/A*	GrainCorp Oils, 50% GrainsConnect Canada JV, 50% National Grower Register, 23% PumpFree Energy, 20% United Malt
Recent investments	**2012**: $175m investment in 22 locomotives and 574 wagons **2017-21:** $750m Network Strategy to achieve site rationalisation	**2019:** $15m at Port Lincoln into increasing unloading efficiency **2020**: $4m upcountry upgrades at Cummins and Gladstone	**2014-17:** $120m Project Regeneration to rationalise sites and bolster rail capacity **2017:** $18m Yamala Greenfield Site (180kt)
Revenue (Billions of AUD)		*N/A*	

Note: * Excludes the Newcastle Agri Terminal, in which CBH owns a c.19% stake; ** Includes both Inner and Outer Harbour Port Adelaide
Source: Company websites and annual reports; L.E.K. research and interviews

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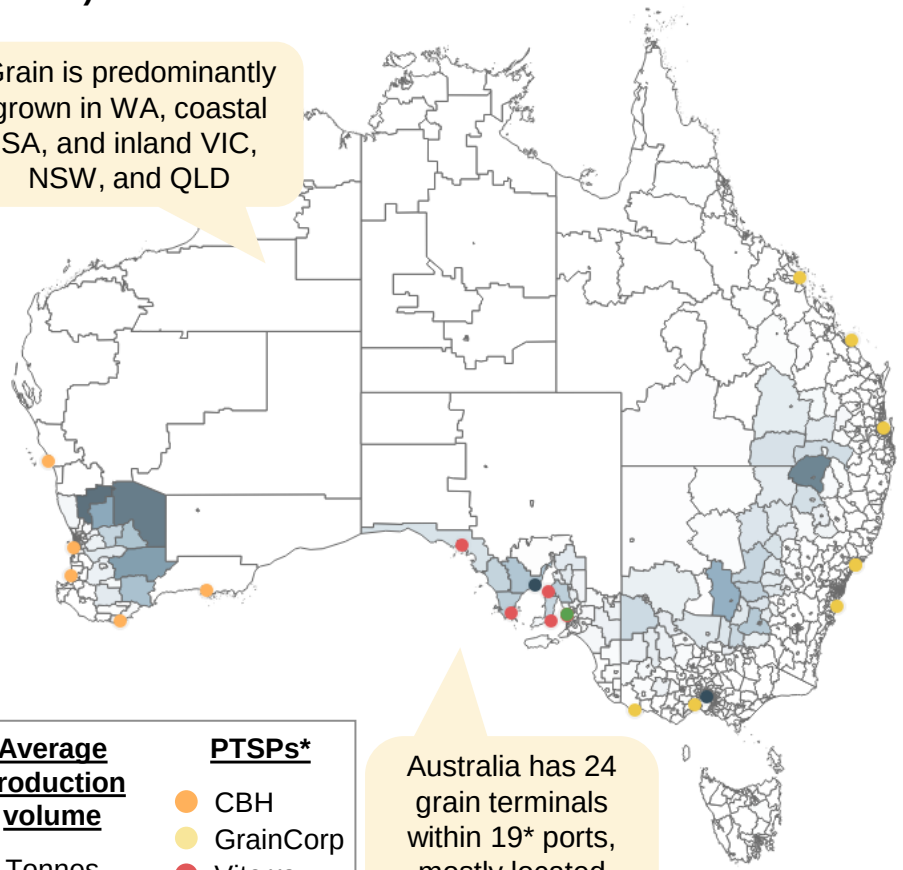
Wheat accounts for c.54% of total grain production and is predominantly grown in WA, the eastern states, and SA

Wheat production and grain ports across Australia (2015-16)

Grain is predominantly grown in WA, coastal SA, and inland VIC, NSW, and QLD



Average production volume

Tonnes

0 — 900,000

PTSPs*

- CBH
- GrainCorp
- Viterra
- Cargill
- Other

Australia has 24 grain terminals within 19* ports, mostly located within c.400km of production areas

Major crops** and percentage of Australian production (2009-10 to 2018-19)

Grain

Grains are the edible seeds of specific grasses, of which c.20 types are grown in Australia across c.19m hectares

Wheat 54%

Barley 20%

Canola 7%

Sorghum 4%

Cottonseed 3%

Oats 3%

Rice 1%

Other crops 9%

Wheat is a cereal grain used in the production of flour, bread, pasta, pastry, animal feed, etc. and **makes up more than half** of Australian crop** production with an average annual production volume of c.24mmt from 2009-10 to 2018-19

Note: * Some ports may have several Port Terminal Service Providers (PTSPs) operating; ** Crops include grains, oilseeds, and pulses
Source: ABS; AGEIC; ACCC; GLNC; L.E.K. research and analysis

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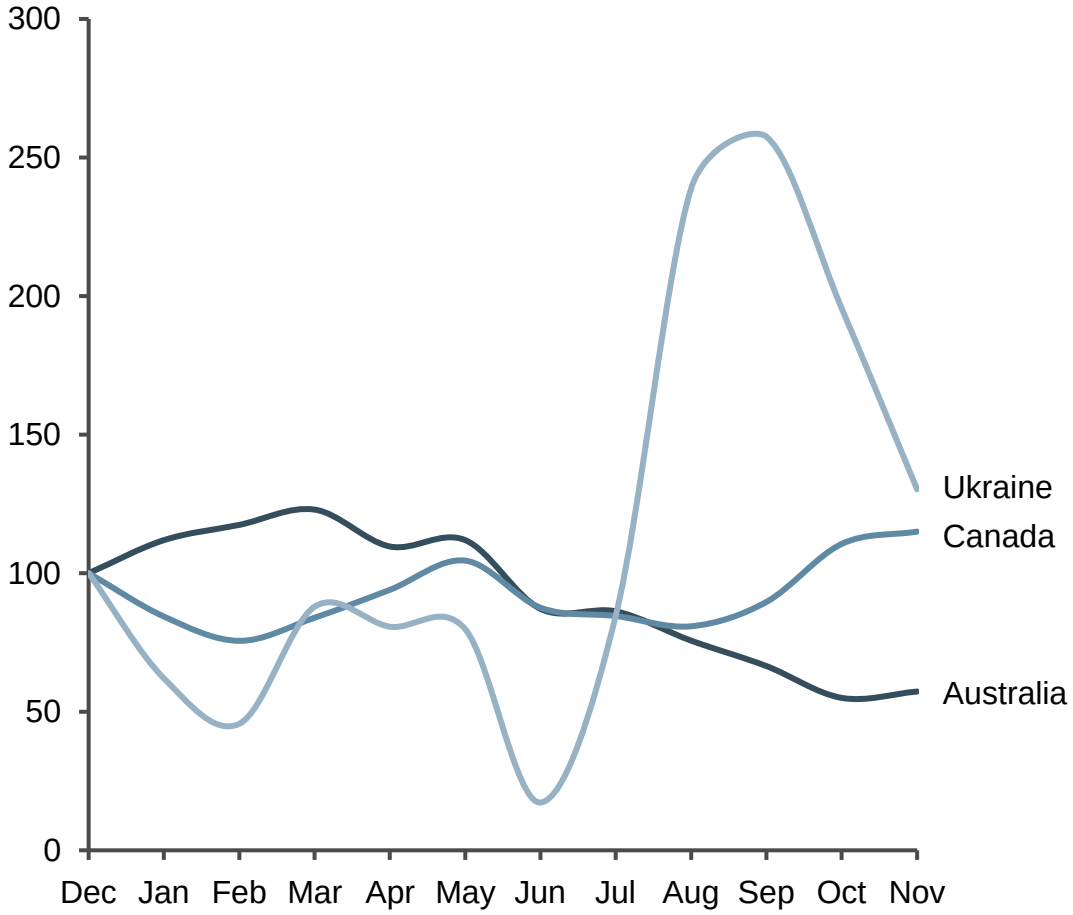
Australian exports are highly seasonal and counter-cyclical to the Northern hemisphere market, creating a tight window of opportunity for exports

Average grain exports, by month – indexed to December* (Dec-Nov)
Millions of tonnes

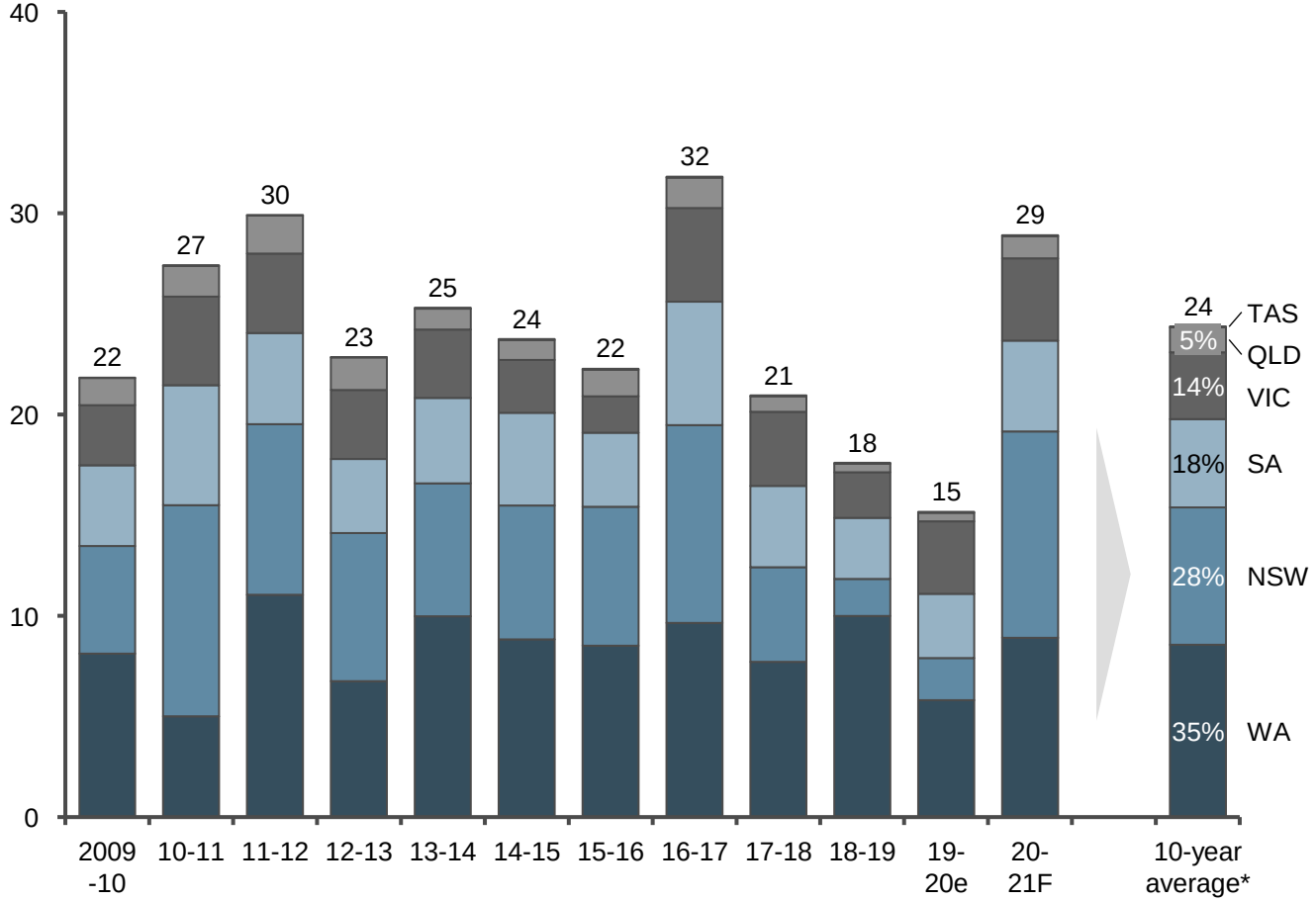


- Australian grain exports are highly seasonal, with export volumes in November c.53% lower than March, on average – seasonality can result in low asset utilisation during certain times of year, driving poor returns on capital
- Australian exports are counter-cyclical to the Northern Hemisphere, which follow a similar trend to the Ukraine. This presents a window of opportunity (December to May) to sell Australian grain to international markets, when there is less global supply
- To capitalise on higher prices and maximise the value that can be obtained during that window, participants in the Australian bulk grain export market need to move bulk tonnages quickly before northern hemisphere grain is available

Note: * Australia: 8 year average from 2012-19, Canada: 7 year average from 2014-20; Ukraine: 2020 wheat data available only
Source: ACCC; Canadian Grains Commission; UkrAgroConsult; L.E.K. research and analysis

Wheat is a highly volatile crop with large variations in annual production volumes, primarily driven by Australia's weather conditions

Australian wheat production, by state (2009-21F)
Millions of tonnes

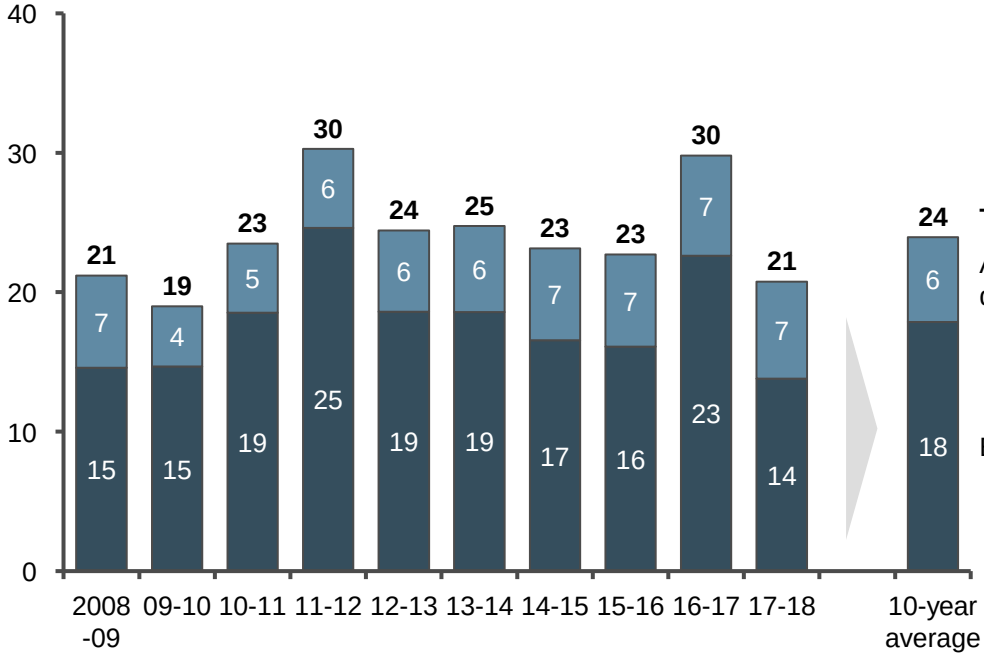


- Wheat production in Australia is volatile, as yields are heavily reliant on weather, which can be extreme
- Drought conditions from 2017-19 resulted in significantly lower harvests, especially in eastern states
- Volatility of production negatively impacts return on supply chain assets (e.g. port and railway infrastructure) which may be underutilised in drought years
- WA and NSW are consistently the largest producers of wheat, while SA and VIC are also responsible for significant volumes

Note: * 10-year average between 2009-10 and 2018-19
Source: ABARES; L.E.K. research and analysis

On average, c.75% of Australian wheat is exported after satisfying domestic demand; WA is the largest exporter, accounting for c.46% of export value

Australian wheat export and consumption volumes (2008-09 to 2017-18)
Millions of tonnes



	CAGR% (2008-09 to 2017-18)
Total	**(0.2)**
Apparent domestic use*	0.6
Exports	(0.6)

Share of export value, by state

48%	41%	28%	39%	40%	52%	52%	51%	38%	54%	**WA**
12%	23%	29%	19%	23%	21%	26%	21%	23%	26%	**SA**
7%	12%	16%	17%	16%	14%	12%	12%	16%	12%	**VIC**
11%	7%	7%	7%	6%	2%	2%	3%	4%	1%	**QLD**
23%	16%	20%	18%	15%	11%	9%	13%	19%	6%	**NSW**

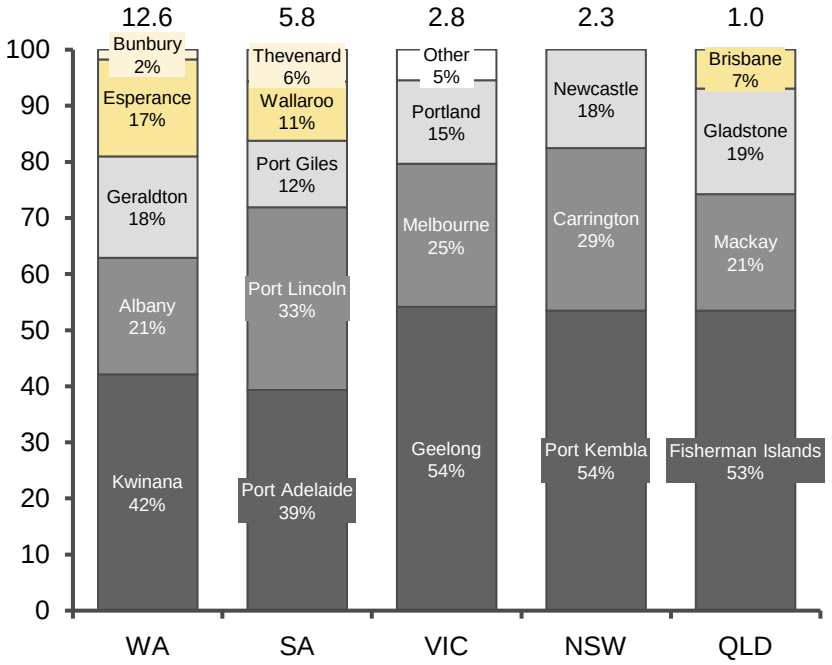
- Australia exports its excess wheat supply, with c.75% of production exported on average over the past 10 years
- While domestic consumption is relatively stable at c.6-7mmt per year, export volumes are volatile and vary with production
- WA and SA are the country's largest exporters of wheat, with domestic consumption greatest in the eastern states given their larger populations and large demand for feed grain

Note: * In principle, calculated as a residual: production plus imports less exports less any observed or assumed change in stocks and less seed use
Source: ABARES; L.E.K. research and analysis

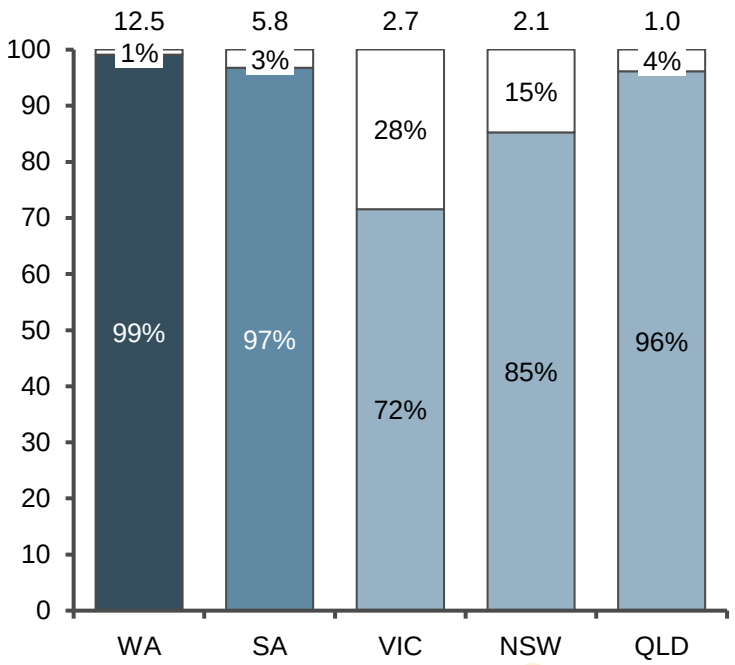
L.E.K.

Exports are shared across several ports in each state with the three main bulk handlers accounting for the majority of volume despite increasing competition

Bulk shipments of grain by port (2011-19)
8-year average, Percent (Millions of tonnes)



Volume of grain loaded by state and company (2011-19)
8-year average, Percent (Millions of tonnes)



Proportion of shipments – bulk vs. containerised (5-year average)

Bulk	97%	95%	60%	66%	62%	87%
Container	3%	5%	40%	34%	38%	13%

c.13% of Australia's total grain shipments are shipped in containers, although containerised exports are much more common in eastern states (c.37% of total)

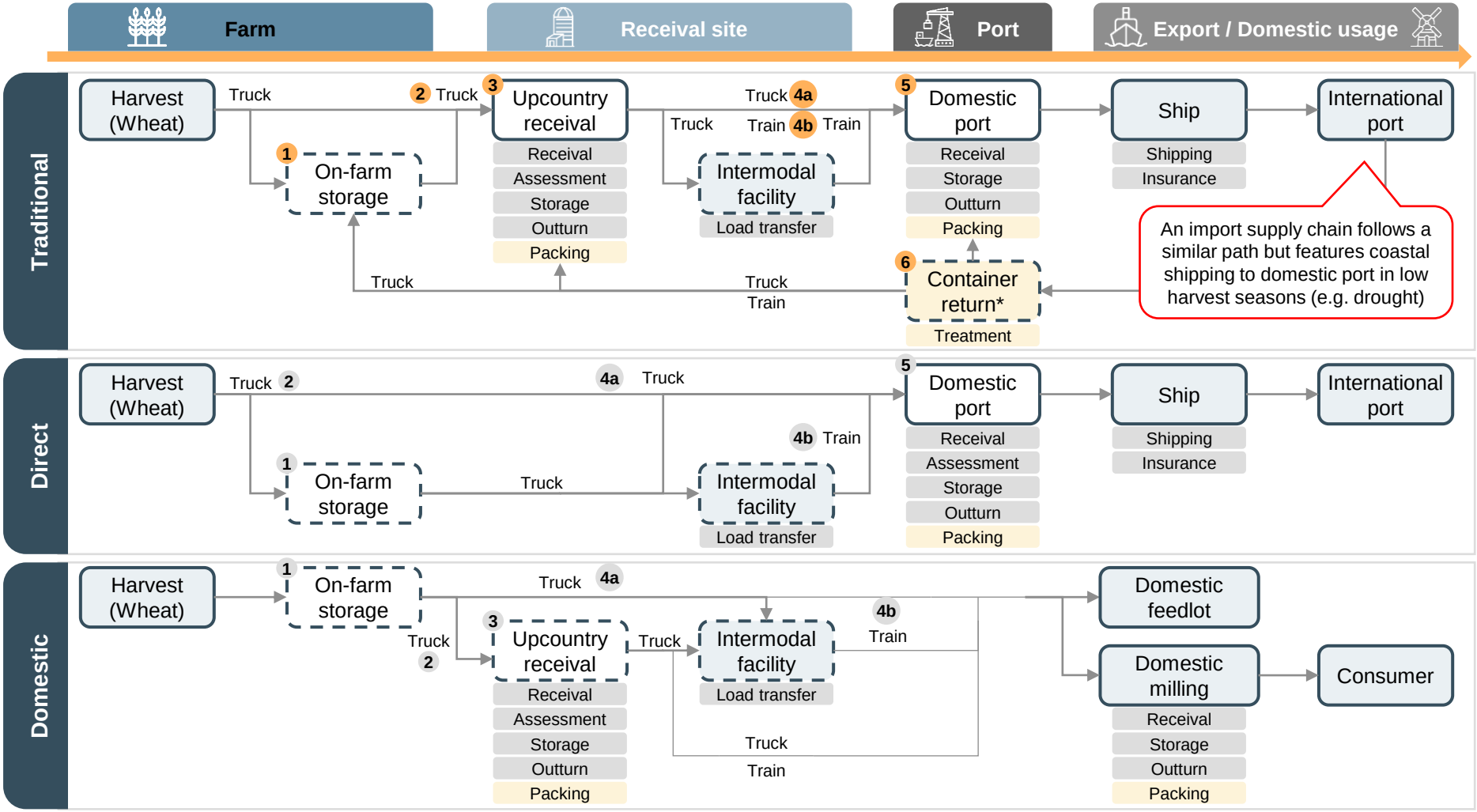
In the last 4 years since coming online, new entrants to the NSW market, NAT and Quattro, have managed to take a significant share of exports – c.27% and c.15% respectively – reducing GrainCorp's dominance

CBH | Viterra | GrainCorp | Other

Note: * Includes Port Adelaide Viterra, Semaphore and Linx; ** Includes Port Kembla GrainCorp and Quattro
Source: ACCC Bulk Grains Monitoring Report; L.E.K. research and analysis

L.E.K.

Three supply chain archetypes exist to describe the majority of grain movement in Australia

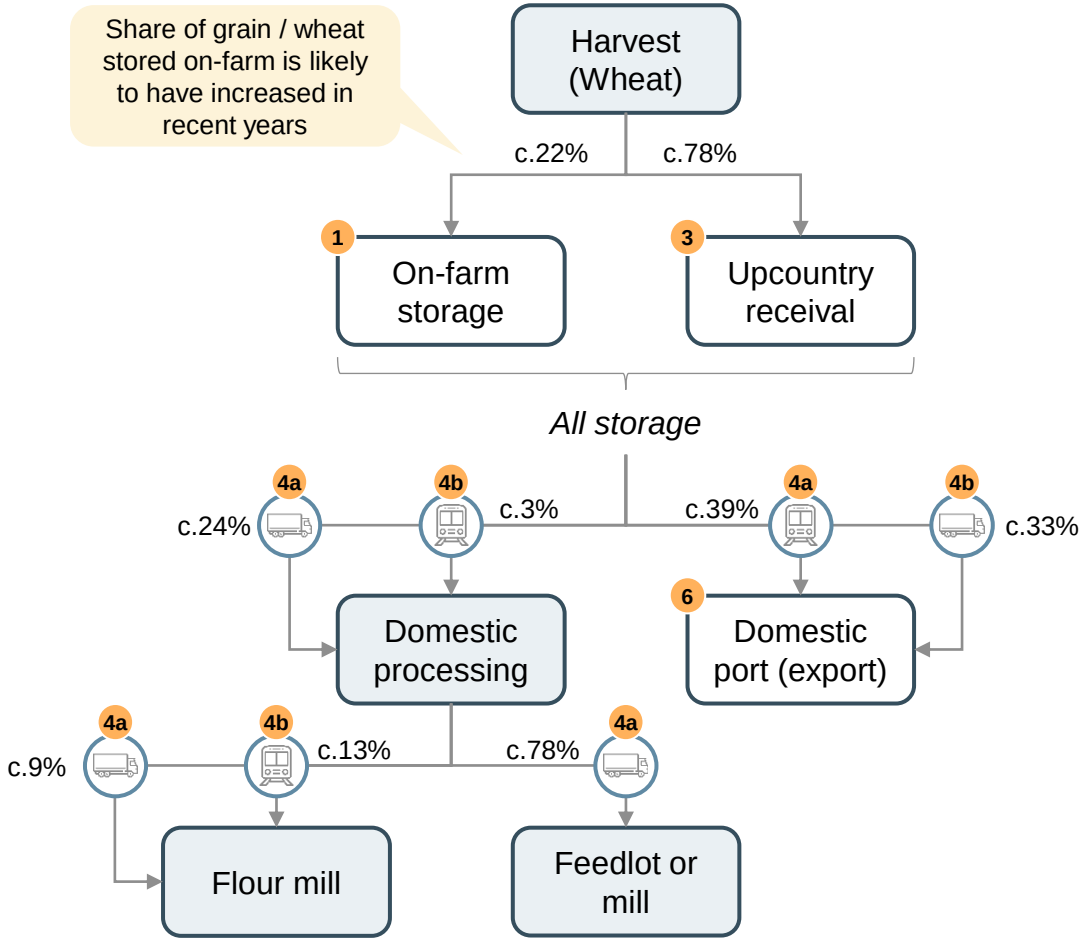


Note: * Container return may also apply to other grain flows (direct and domestic)
Source: AEGIC; CBH; Graincorp; Viterra; L.E.K. research

The path that grain takes to port or domestic process varies significantly by season and region but across the country rail accounts for c.50% of freight

Volume share of wheat flows through the Australian supply chain (2015)

INDICATIVE



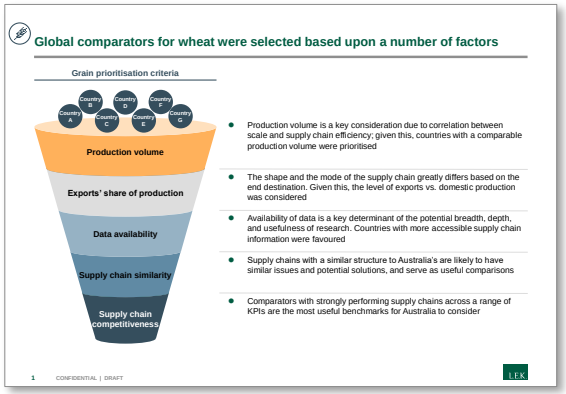
Note: All figures are indicative and taken from a certain reference year
Source: AEGIC; CSIRO; Nuffield Scholar; L.E.K. research and analysis

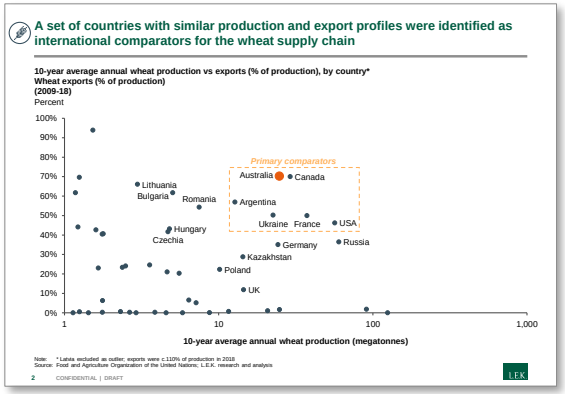
- c.75% of wheat produced in Australia is exported, c.50% of which travels from storage to port by rail
  - c.13% of Australia's export wheat is containerised, with containerisation far more prevalent in eastern states – VIC accounts for c.50% of all containerised exports
- Modal share varies by state – rail's share of volumes to port is larger within states with longer transit distances (c.85% in NSW vs. c.50% in SA)
- Volume stored on farm also varies by state and tends to be larger in eastern states (c.28%) than in WA (c.15%) and SA (c.11%)
  - on farm storage has trended upward in recent years, in response to increasing production, increases in harvester productivity, deregulation of wheat export marketing arrangements, and rationalisation of the up-country storage network

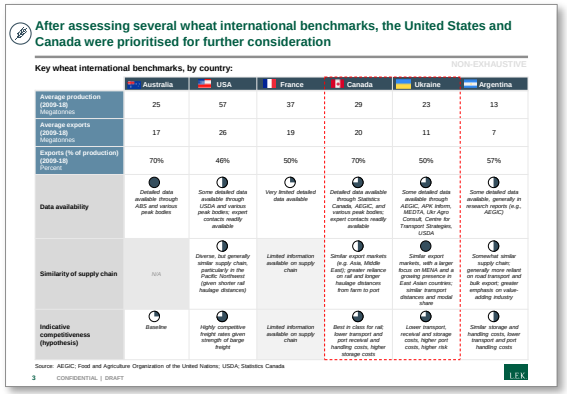
Contents

Canada and Ukraine were selected as benchmarking comparators after assessing a number of factors including scale, import / export mix, and supply chain similarity

Grain comparator prioritisation







Canada

- Similar **scale** (production and exports) and **export markets**
- **Strong benchmark** on port receival and handling costs and elevator efficiency
- **Highly efficient rail** network (albeit over large distances)

Ukraine

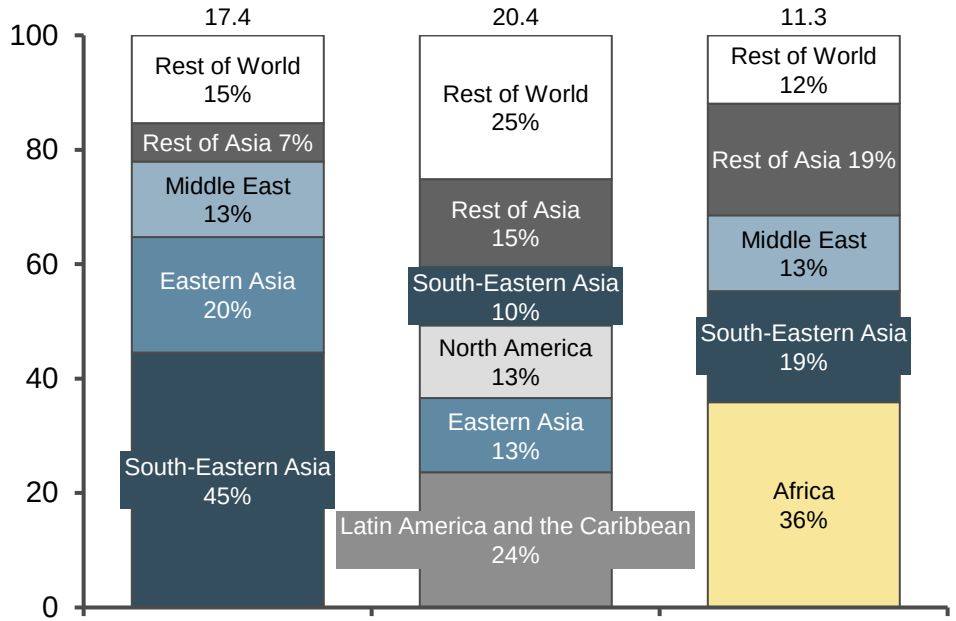
- **Significant and growing** competitor in similar export markets
- Strong benchmark on **transport, receival and storage cost**
- **Similar supply chain** in terms of transport distances and modal shares

Source: AEGIC; Cemnet; Food and Agriculture Organization of the United Nations; Statistics Canada; USDA; World Bank; L.E.K. research and analysis

Australia faces strong competition from Canada and Ukraine in its key export markets: Southeast, Eastern Asia, and the Middle East

Average annual wheat exports by destination region (2009-18)

Percent (Millions of tonnes)



Top import countries	Australia	Canada	Ukraine
1	Indonesia	USA	Egypt
2	Republic of Korea	Japan	Bangladesh
3	China, mainland	Indonesia	Indonesia
4	Japan	Bangladesh	Spain
5	Philippines	Peru	Republic of Korea

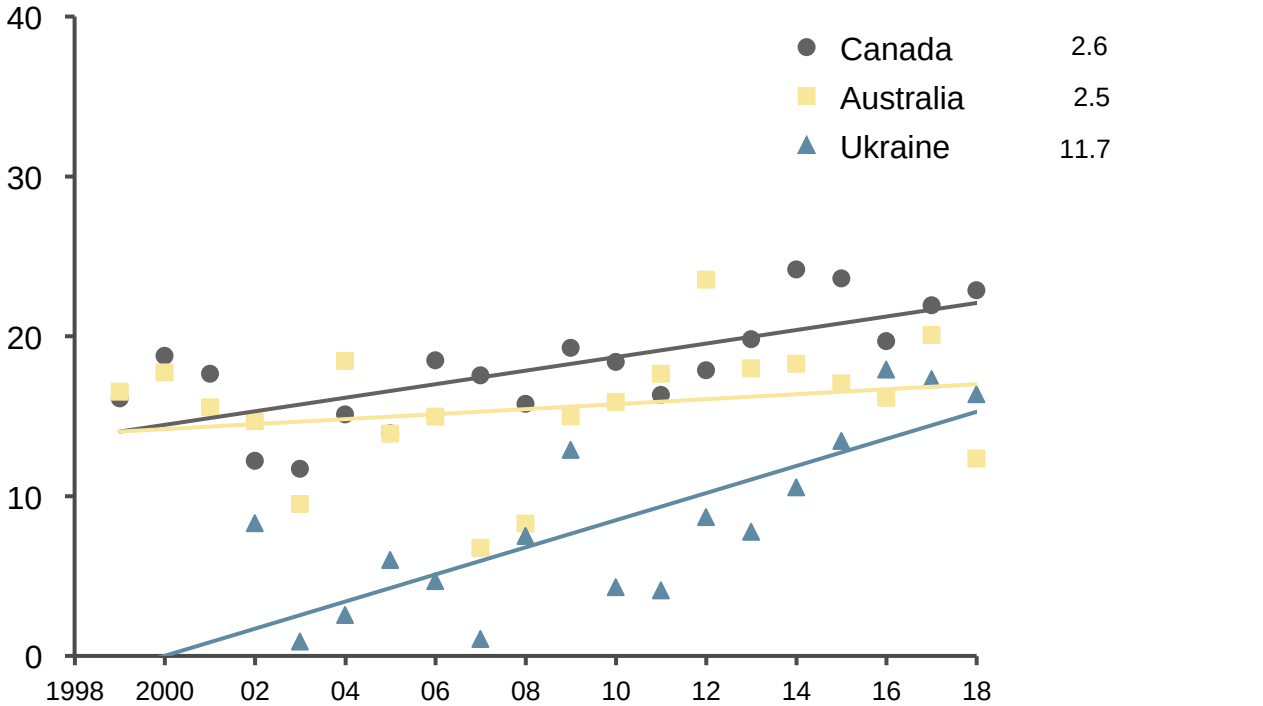
- Ukraine and Canada share several of Australia's key wheat export markets – Indonesia (c.21% of total Australian exports), Korea (c.7%) and Japan (c.6%)
- Both countries export significant volumes to Southeast Asia. Canada also has a presence in East Asia and Ukraine in the Middle East
- Australia faces increasing competition in Southeast Asia which is a major importer from all 3 countries
  - Southeast Asia is an important export destination for Australia, accounting for c.45% of exports, up from c.28% on average across 1999 to 2008
  - the proportion of Southeast Asian imports coming from Australia has remained relatively constant over time at c.40%, but import volumes have almost doubled, implying increasing competition from other nations
  - Australia's declining competitiveness in the region is partly driven by volatility in production and growing domestic demand, meaning high quality bread wheats are not consistently available for international milling
- Ukraine has an increasing focus on Southeast Asia which now accounts for c.19% of its exports, up from 4-5% across 1999 to 2008 – however, quality issues and disease risks have historically constrained Ukraine's competitiveness

Source: AEGIC; FAOSTAT; Press articles; L.E.K. research and analysis

L.E.K.

Canada and Ukraine are rapidly increasing exports compared with Australia, with Ukraine in particular experiencing fast volume growth rates

Volume of wheat exports (1999-2018)
Millions of tonnes



60	71	86	76	51	61	54	73	87	55	72	79	65	66	53	82	85	61	73	72	70 **Canada**
67	80	70	60	94	71	64	60	62	61	70	73	64	79	79	72	72	72	63	59	70 **Australia**
NA	NA	NA	40	8	15	32	33	8	29	62	26	18	55	35	44	51	69	66	66	50 **Ukraine**

Export intensity (%)

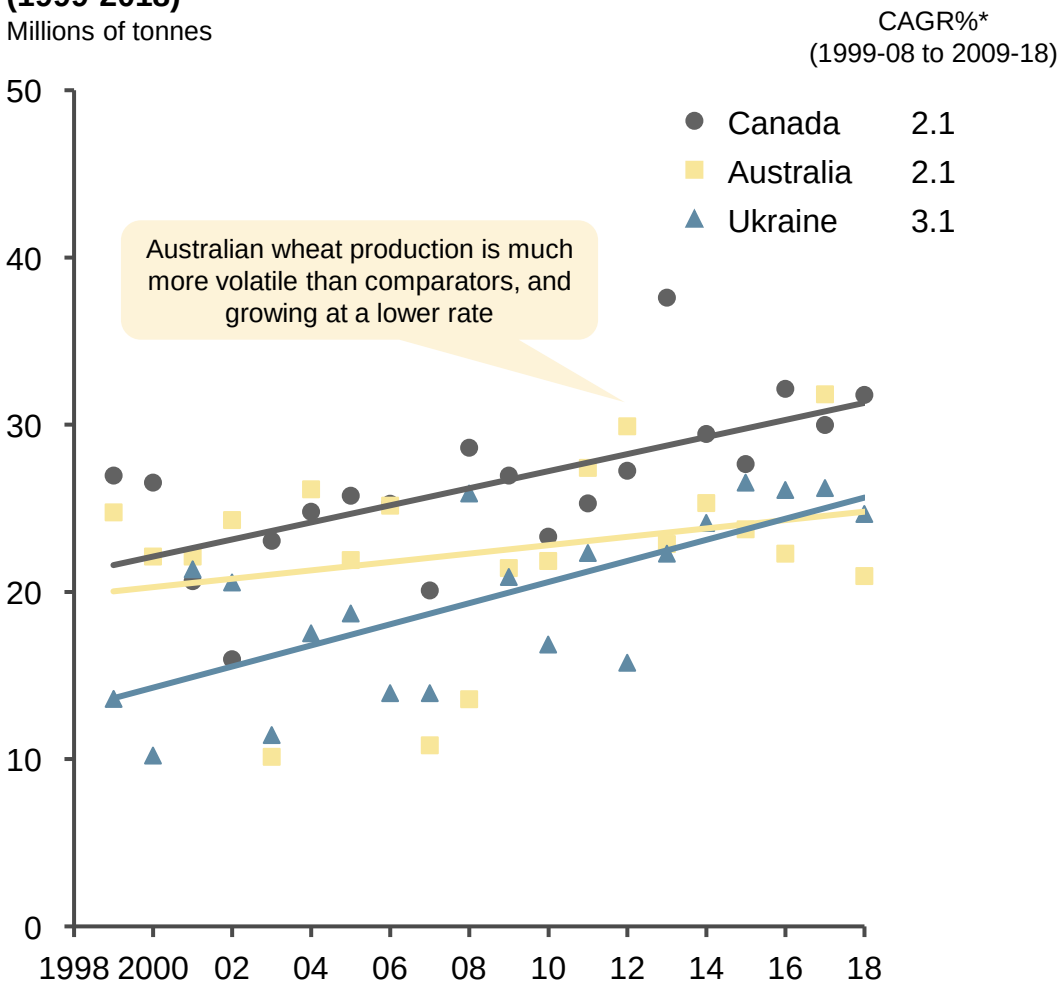
10-year average 2009-18

- Global annual wheat exports grew c.2% p.a. between 1999-08 and 2009-18
- Export volumes in Canada, Australia and Ukraine have grown faster than the global average, with Ukraine growing exports particularly rapidly, by c.12% p.a. over the past 2 decades
- Ukraine is an increasingly competitive exporter of wheat – Australia exported c.1.5x more wheat than Ukraine on average over 2009-18, down from c.4.4x over 1999-08
  - Ukraine's growing competitiveness is derived from increasing productivity with the adoption of modern farming practices, the devaluation of its local currency, and increasing investment in efficient supply chain infrastructure
  - it also enjoys significant and growing demand from nearby markets in the Middle East and North Africa
- While Australia and Canada have similar export intensities, exporting c.70% of production, Ukraine's export intensity is relatively lower (c.50%), signaling potential for further competition with Australia as Ukrainian production grows

Note: * CAGR of 10-year average export volume, from 1999-08 to 2009-18; 7-year average used for Ukraine from 2002-08 due to lack of availability of data
Source: AEGIC; FAOSTAT; L.E.K. research and analysis

Australian production is more volatile than comparators, and growing more slowly; improved labour productivity and modern farming practices have buoyed Ukrainian production

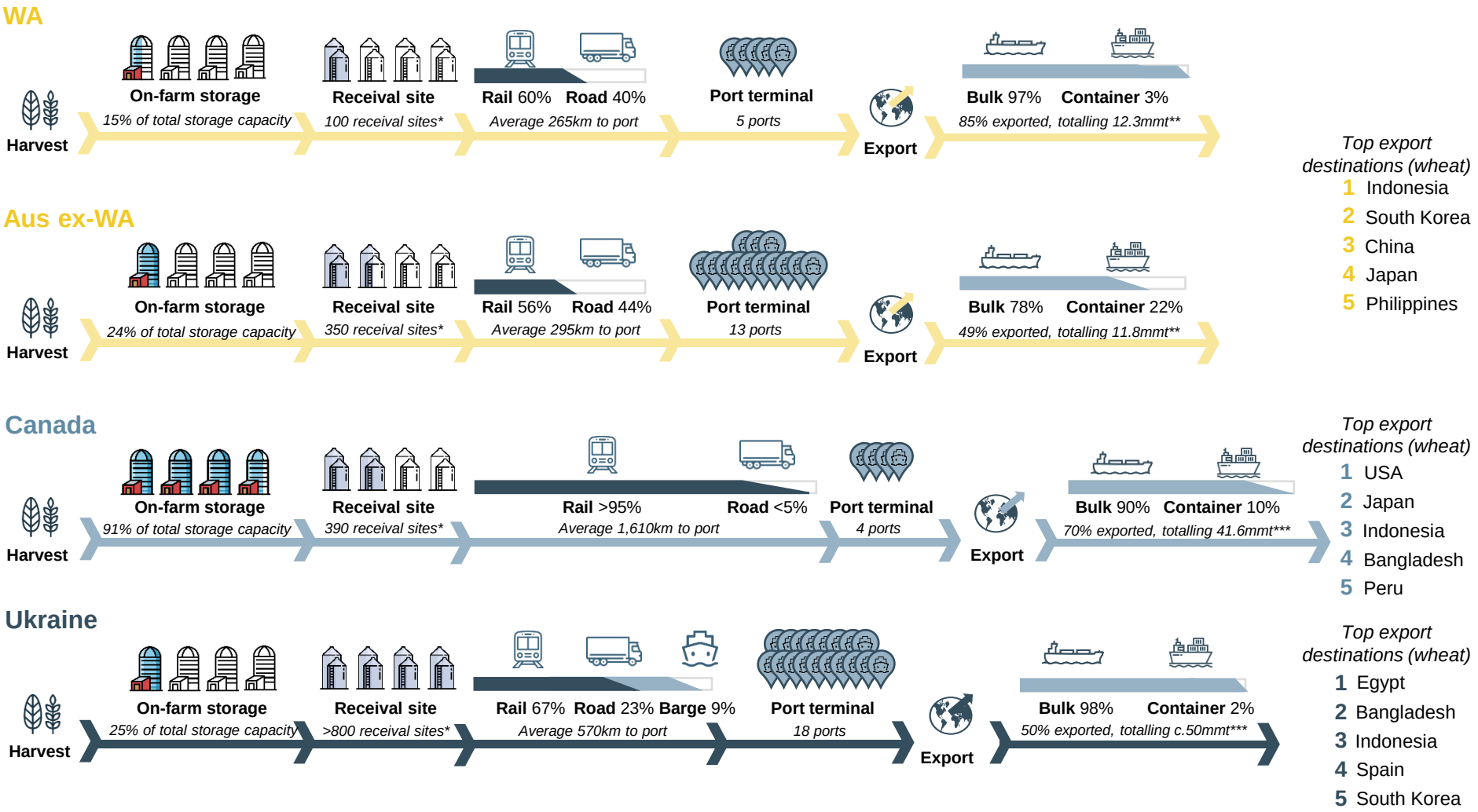
Volume of wheat production (1999-2018)
Millions of tonnes



- Global wheat production has grown by c.2% p.a. between 1999-08 to 2009-18
- Growth in production in Canada and Australia are on par with the global average, but they are significantly outpaced by Ukraine, which has grown 10-year average production by c.3% p.a. over the past 20 years
- While Australian growth has been driven by increases in cropping area as well as yield, Ukraine's growth has come solely from increased productivity
  - Ukrainian soil is much higher quality than Australia's, offering the country a significant upside in production capability
  - Ukrainian yields have grown c.85kg/ha annually compared to 19kg/ha in Australia since 2000/01, largely driven by land consolidation and growth in large scale farming, modern farming methods and incentivised earning arrangements stimulating improvements in labour productivity
- Canadian yields are also c.50-60% higher than Australia's due to higher soil fertility and more reliable soil moisture
- Australian production is more subject to climate volatility than comparators – droughts and other unfavourable weather conditions in eastern states have dampened production growth in recent years

Note: * 10-year CAGR calculated from average of 1999-09 and 2009-19
Source: AEGIC; FAOSTAT; L.E.K. research and analysis

While Canada and Ukraine provide useful comparisons to the Australian supply chain, there are several key contextual differences to note

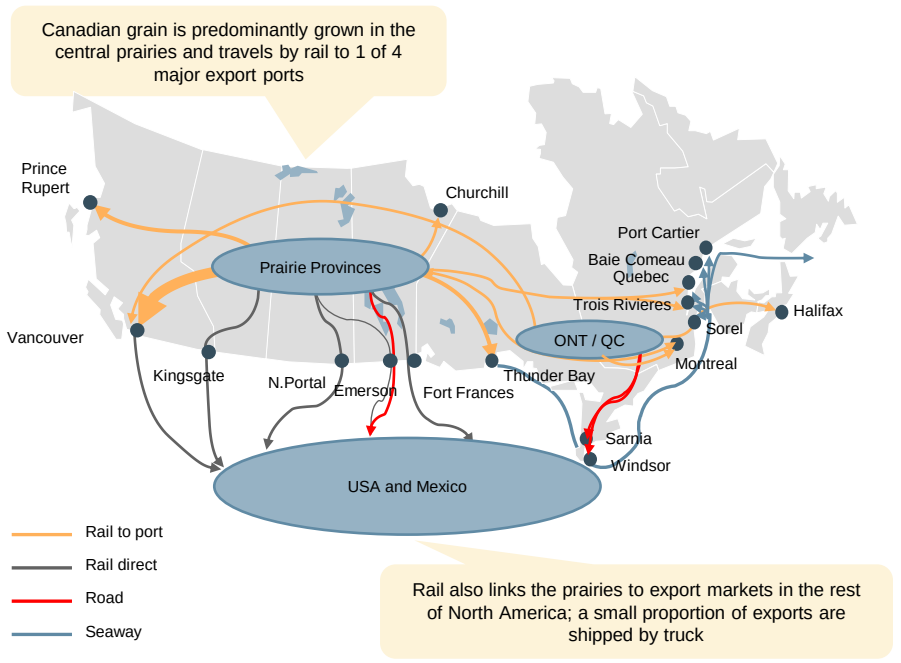


Note: * Includes all sites – major bulk handlers and independent players; WA value Does not include additional 76 surge sites ** 5-year average: 2014/15-18/19 for Australian states; *** Canadian and Ukrainian export intensities are for wheat, export volumes are for grain

Source: AEGIC; ACCC; ADM; Company websites; CSIRO; FAOSTAT; Nuffield Scholar; USDA; L.E.K. research and analysis

Canada's supply chain is characterised by long transport distances to port and consolidated, high throughput port infrastructure

Canadian export grain flows (2011)



- Canada is heavily reliant on rail to transport grain large distances from the central prairies to ports – rail accounts for >95% of freight from upcountry storage to port
- The rail network is owned by only 2 companies – these operate regional monopolies and are regulated through a revenue cap
- Canadian grain trains have significantly more capacity than in Australia, with some trains up to c.6x the capacity
- The Canadian supply chain is more 'proprietary', with grain more likely to be handled by the same company across the entire chain. As in Australia, 3 companies own most grain port terminals – each of these is also a dominant exporter and owner of upcountry infrastructure
- Canadian port terminal and elevator infrastructure has been well supported by capital investment, leading to high throughput volume
- Tracking of supply chain performance is statutorily mandated – grain stocks, upcountry deliveries, railcar supply, port unloads, shipments, and vessel lineups are tracked on a weekly basis; additional data is collected less frequently

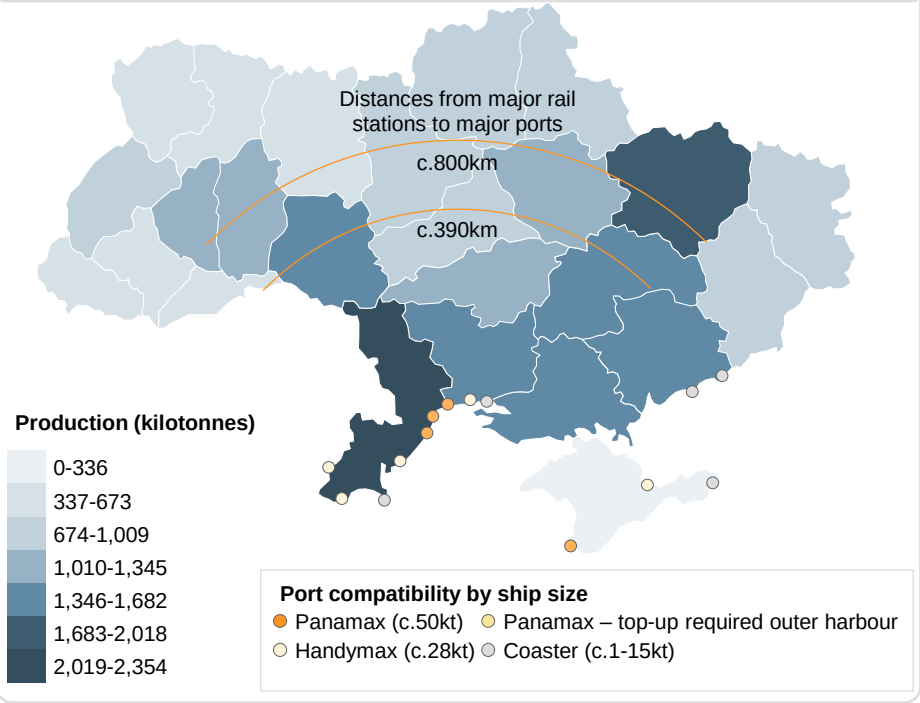
Canadian grain supply chain (2015)

Harvest producing 73mmt	**On-farm storage**	**60-80km Road transport**	**Inland elevator**	>95% rail transport **1300-1800km**	**Port terminal**	**Ship**
30,000 grain growers producing 73mmt	Capacity to store 73mmt -90%-120% of an average harvest	60-80km average distance, usual truck capacity 44t	392 primary elevators with a total storage capacity of 6.8mmt	2 national rail companies and 1 rail gauge, 5600km of grain only truck commonly 110 wagon trains carry 11,000mt	15 bulk terminals at 4 ports	1500+ ocean vessels and 37mmt grain and oilseed exported (18mmt wheat)

Source: AEGIC; Quorum Corporation; L.E.K. research

Ukraine's supply chain features marginally longer transport distances to port than Australia but similar distribution of port infrastructure

Ukrainian wheat production and major ports (2018)



- Ukraine is reliant on road and rail to transport grain to port, although c.9% of grain exports are transported by river barge
- The rail freight market is controlled by the state, which owns c.84% of rail wagons and provides freight services. Speculation exists to suggest that railways will be opened to private companies in the near term
- Ukraine's road network is in poor condition with lower adherence to vehicle load limits
- River freight is much cheaper than other transport modes and its modal share is expected to grow with investment in river infrastructure – the Government has recently announced a plan to drive investment in river freight due to its significant potential to lower overall logistics cost
- Port terminals are widely dispersed, and many are unable to support loading of large bulk vessels
- Much of the country's supply chain infrastructure such as receival sites and port terminal facilities is outdated
- Given rapidly growing production and export volumes, Ukraine is attracting significant private investment to upgrade infrastructure – multinational grain companies are partnering with local players to invest especially at port

Ukrainian grain supply chain (2015)

Harvest	On-farm storage	30-60km Road transport	Receival sile	rail / river barge / road 100-700km	Port terminal	9% Rail or road / 91% Ship Export
producing 71mmt						
40,000 grain and oilseed growers producing 71mmt	Capacity to store 14mmt - 15%-20% of an average harvest	30-60km average distance. Most inland receival sites can only accept 30t trucks and less than 10m long	>800 receival sites with a total storage capacity of 41mmt. This includes 790 registered sites with a storage capacity of 33mmt	1 state-owned rail company owns 84% of rail wagons, 1 rail gauge. 54 wagons carrying 3200t Over-limit truck loads common	24 bulk terminals at 14 ports	38mmt grain and oilseed exported (8mmt wheat)

Source: AEGIC; ADM; World Bank; USDA; L.E.K. research

KPIs have been identified to benchmark the competitiveness of the grain supply chain at each stage

Grain key performance indicators

	Stage	KPIs	Description
1	On-farm storage	Cost per tonne	Costs incurred by growers associated with storing grain on farm including maintenance and handling costs such as preparation and hygiene, aeration, inloading and outloading, monitoring and management, insect management, bags, shrinkage, and fixed costs such as depreciation and capital outlay
2	Road transport (farm to upcountry receival)	Freight cost per tonne-km	Cost of road freight from farm to upcountry receival sites
		Carbon emissions per tonne-km	Carbon emissions associated with road freight from farm to upcountry receival sites
3	Upcountry receival	Upcountry cost per tonne	Fees charged by bulk handlers for storage, receival, shrinkage, dust, inloading, outloading, etc.
		Storage utilisation	Rate at which storage capacity is turned over (turns per year)
4a	Road transport (to port)	Freight cost per tonne-km	Cost of road freight from on-farm or upcountry receival to port
		Carbon emissions per tonne-km	Carbon emissions associated with road freight from on-farm or upcountry receival to port
4b	Rail transport (to port)	Freight cost per tonne-km	Cost of rail freight from upcountry receival to port
		Carbon emissions per tonne-km	Carbon emissions associated with rail freight from upcountry receival to port
		Reliability	Proportion of train deliveries that fail or are cancelled
5	Domestic port	Port charges per tonne	Charges laid by Port Terminal Service Providers (PTSPs) for: intake, vessel nomination, loading or terminal shipping, storage, inspection, wharf fees, dust / shrinkage, outturn, and (most importantly) demurrage
		Port capacity utilisation	Rate at which port capacity is turned over (turns per year)
6	Containerisation	Container packing cost per tonne	Cost to pack containers for containerised export – base cost + the cost of any inefficiencies
	All (safety)	Lost Time Injury Frequency Rate	Number of lost time injuries occurring in a workplace per 1 million hours worked

Australia's grain supply chain benchmarks well overall, with gaps to efficiency best practice on rail and at ports

	Stage	Key performance indicators	WA	SA	VIC	NSW	QLD	CAN	UKR
1	On-farm storage	Cost per tonne							
2	Road transport (farm to upcountry receival)	Freight cost per tonne-km							
		Carbon emissions per tonne-km	*Australia-level data available only*					N/A	N/A
3	Upcountry receival	Upcountry cost per tonne							
		Storage utilisation							
4a	Road transport (to port)	Freight cost per tonne-km							
		Carbon emissions per tonne-km	*Australia-level data available only*					N/A	N/A
4b	Rail transport (to port)	Freight cost per tonne-km							
		Carbon emissions per tonne-km	*Australia-level data available only*					N/A	N/A
		Reliability	*Not publicly available*						
5	Domestic port	Port charges per tonne							
		Port capacity utilisation							
6	Containerisation	Container packing cost per tonne							
	All (safety)	Lost Time Injury Frequency Rate							

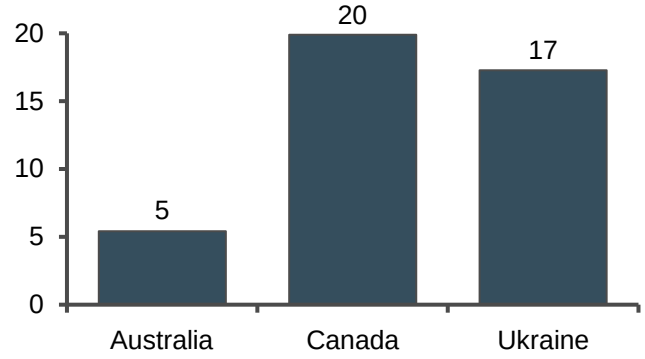
Strong performer | Neutral | Weaker performer

L.E.K.

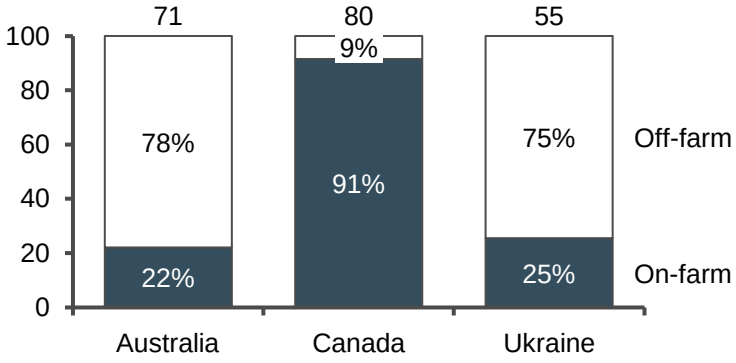
Australia has limited on-farm storage capacity relative to comparators, despite the lower cost of on-farm storage driven by the lower moisture content of grain

1

On-farm storage costs, by type (2019/20)
AUD per tonne



Storage capacity, by type (2016)
Percent (Millions of tonnes)



15	73	14	**On-farm storage capacity (mmt)**
20-80%	90-120%	15-20%	**As a proportion of average production**

Source: ADM; AEGIC; L.E.K. research and analysis

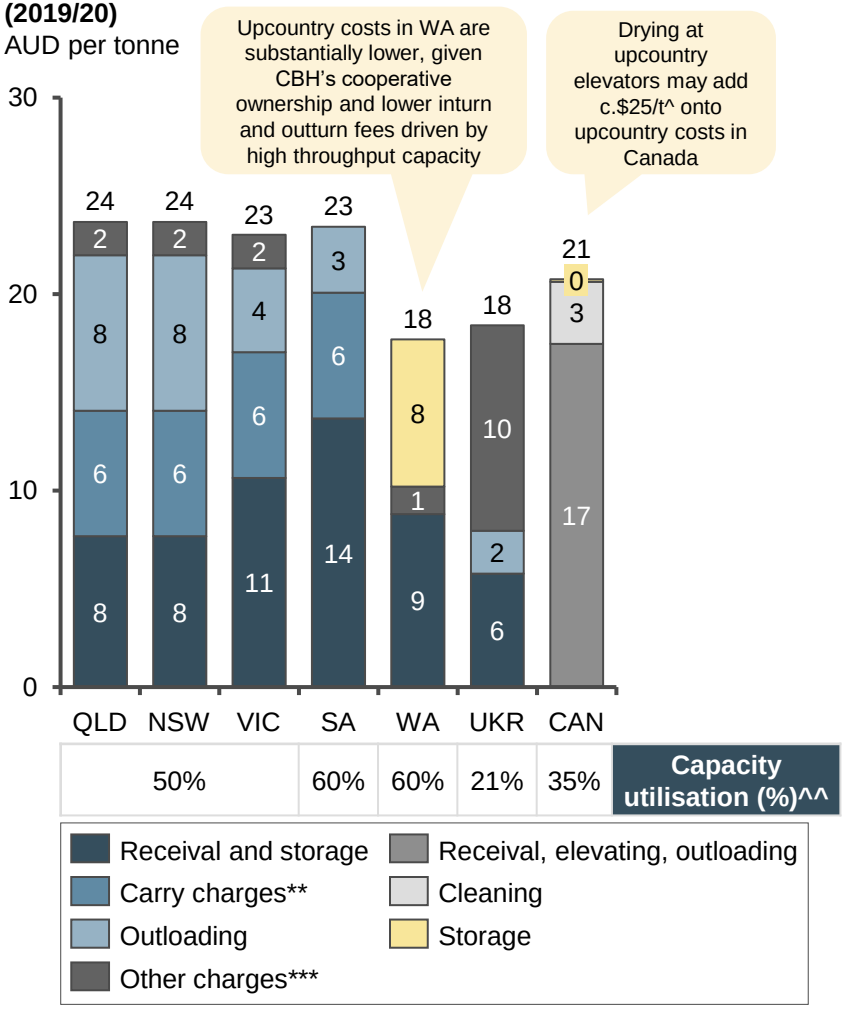
Contextual considerations

- In Australia, OFS capacity varies by state, given the diverse channels to market available – capacity is c.30% in WA/SA markets due to their export focus, while it can be up to c.80% in the more domestically focused NSW market, where growers are more likely to sell direct to feedlots or mills
- Australian and Ukrainian OFS capacity is significantly lower than Canada
  - Australia's limited capacity has been driven by the historical centralisation of the market
  - in the Ukraine, the capital cost of establishing OFS is often untenable or unfinanceable; cashflow constraints also necessitate the prompt sale of grain to bulk handlers. OFS capacity is growing in Ukraine as farmers increasingly seek to capture high prices for their grain
  - in Canada, bulk handlers charge a premium for grain drying which incentivises growers to store grain on-farm
  - tax incentives have also historically encouraged farmers to invest in their own grain silos
- Canadian and Ukrainian OFS costs are significantly higher than Australia given the higher moisture content of harvested grain, necessitating drying or cooling on-farm – in Ukraine, drying accounts for c.80% of total cost
- Demand for OFS in Australia (particularly in the Eastern states) is expected to grow, driven by:
  - growing diversity and accessibility of channels to market for farmers
  - increasing harvester capacity exceeding immediately available freight capacity
  - farmers seeking greater control of quality and price adopting on-farm blending
  - dynamic binning of grain, among traders
  - truck backloading (farmers back-hauling fertiliser to their farms)

Upcountry costs are similar in (Eastern) Australia & Canada, despite Australia's lower utilisation. WA and Ukraine operate at lower costs

3

Upcountry costs, by component – weighted average by volume* (2019/20)
AUD per tonne



Contextual considerations

- The Australian network of receival sites is fragmented – smaller, inefficient sites are prevalent which drives up operational cost. Bulk handlers tend to charge a flat intake fee across their network of sites; in effect, users of high efficiency sites subsidise users of low efficiency sites
- The network is over-capacity – many receival sites are not fully utilised, while Canada has a receival site capacity turnover of 6-7 times per year
- In response to low site efficiency, Australia's network of receival sites is undergoing significant rationalisation to achieve scale benefits, higher efficiency, and reduce turnaround times – site numbers have decreased c.49% over the past 20 years
  - CBH is investing c.$750m over 2017-21 in order to reduce its number of receival sites by c.52% from 210 to 100
  - GrainCorp invested c.$120m over 2014-17 in Project Regeneration to decrease site numbers c.29% to 180 sites
- Canadian receival site infrastructure has also undergone rationalisation over the past 20 years – the scale efficiencies of a high throughput, low storage capacity model contribute to Canada's slightly lower upcountry costs
  - from 1999-20 to 2017-18, receival sites declined c.56% to c.400
  - site rationalisation in Canada has resulted in an increase in the cost of transport from farm to storage, but decreased the cost of rail transport and receival site operations
  - upcountry storage of grain is less common in Canada and storage costs lower as bulk handlers operate a high throughput model
- Ukraine's upcountry facilities are outdated and inefficient. However, upcountry costs are relatively lower given the competitiveness of the storage and handling market and lower labour costs. Capacity is sufficient to meet demand, and expected to grow in response to increasing production

Note: * Australian costs weighted by portzone production volumes; Canadian costs weighted by provincial shipment volume from primary elevators; ** Carry charges for 4 months; *** Other charges include shrinkage in Australia and fumigation, drying and cleaning in Ukraine; ^ Median drying rate across Canadian bulk handlers for damp, moist and wet wheat; ^^ Australian utilisation estimated based on approximate median receivals and storage capacity

Source: ADM; AEGIC; Australia Crop Forecasters; Company websites; Quorum Corporation; L.E.K. research and analysis

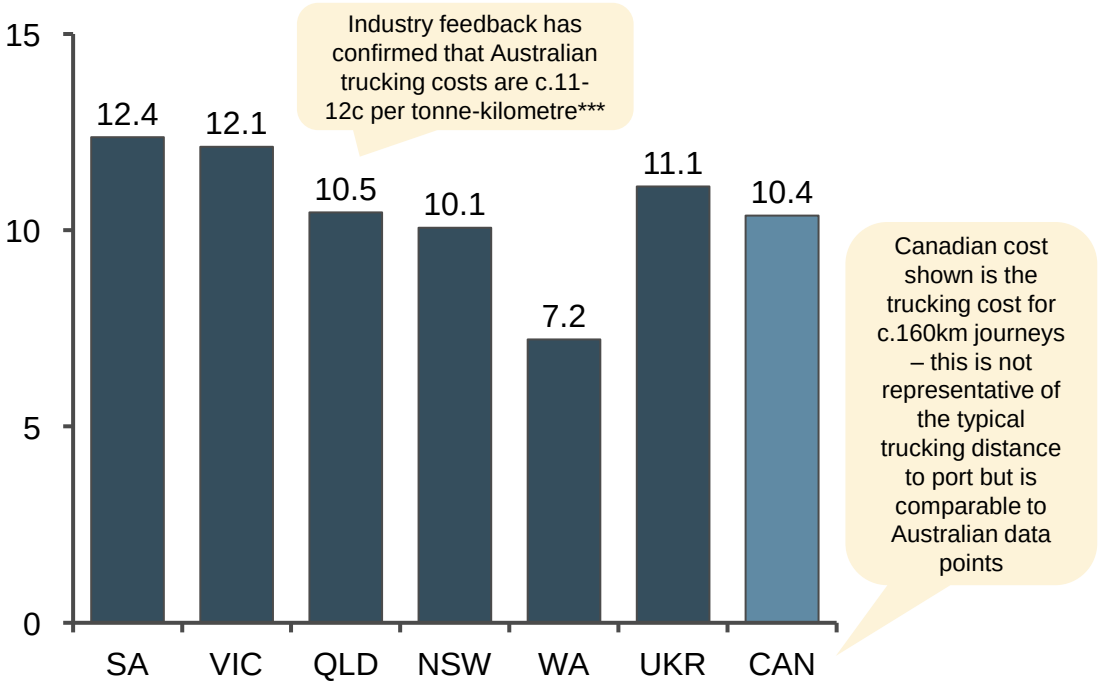
L.E.K.

Australian road freight costs are slightly cheaper than international comparators, owing to high modal share and an efficient road freight network

2 4a

Weighted average road transport cost <u>to port</u> per tonne per kilometre* (2019/20)

AUD cents per tonne per kilometre



SA	VIC	QLD	NSW	WA	UKR	CAN	
236	295	274	428	270	*N/A***	160	**Typical distance to port (km)**
50%	47%	54%	15%	40%	23%	0-5%	**Road modal share (to port)**
95^					*N/A*		**Emissions (gCO2e/t-km)**

Contextual considerations

- Australian grain supply chains are much more reliant on road freight than international comparators, given shorter distances to port and the sparse distribution of receival and port infrastructure, which demands freight flexibility
  - the Australian market is more subject to peak period pricing for trucking as its shorter harvest period results in significant peak demand for road haulage
  - differences in the cost of trucking between Australian states are likely driven by distance and the allowable capacity of truck configurations – higher capacity configurations are more accessible in WA
- Available data indicates that Australian road freight costs are comparable with Ukraine, despite Ukraine's significantly lower labour costs. Several key issues affect Ukrainian road freight:
  - truck gross weights are limited to 24t, but load restrictions are not widely obeyed and overweight trucks cause road damage
  - roads are in poor condition – somewhat due to the government's inability to finance maintenance
  - cost is driven up by congestion at ports, which results from limited port terminal capacity
- Significant distances (c.1,300-1,800km) limit the use of road freight from to port in Canada. Short-haul trucking costs vary from AUD c.46c/t/km for c.15km journeys to c.10c/t/km for c.160km journeys

Note: * Location differentials used as indicative Australian costs (NB: these are not freight rates), averaged across natural port terminals and weighted by portzone production volumes; Canadian cost not representative of transport cost to port; ** Typical Ukrainian trucking distance to port not available – overall average distance to port is c.500km; *** Industry feedback has also indicated that the cost of trucking from farm to upcountry receival is c.13.5c per tonne-kilometre; ^ Australian average

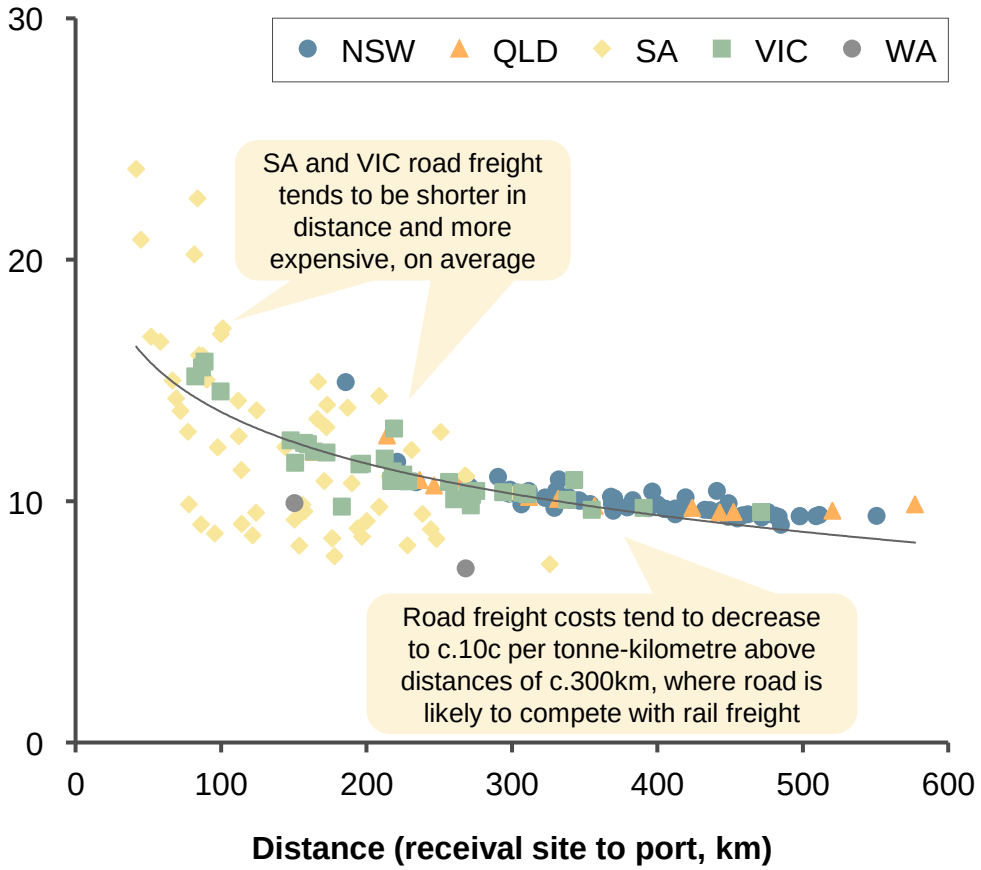
Source: AEGIC; Australia Crop Forecasters; BITRE; CSIRO TraNSIT; Grain Traders Australia; Quorum Corporation; USDA; L.E.K. research and analysis

L.E.K.

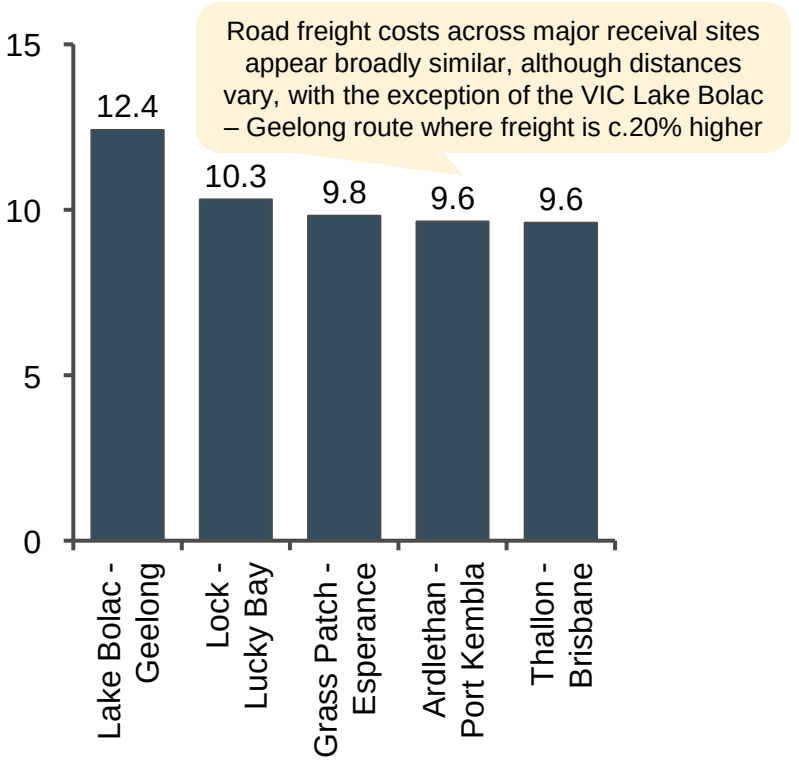
Australian road freight costs vary greatly with distance, decreasing to c.10c per tonne-kilometre at c.300km – SA and VIC appear most expensive

2 4a

Australian location differentials per kilometre from receival site to natural port – road* (2019/20)
AUD cents per tonne-kilometre



Location differentials per kilometre from selected major receival sites to major natural ports – road (2019/20)**
AUD cents per tonne per kilometre



VIC	SA	WA	NSW	QLD	State
157	132	87	433	520	Distance to port (km)

Note: * Excludes routes less than or equal to c.30km; **Selected routes chosen on basis of major/primary receival sites to major ports – verified with AEGIC research where possible
Source: Grain Traders Australia; AEGIC; L.E.K. research and analysis

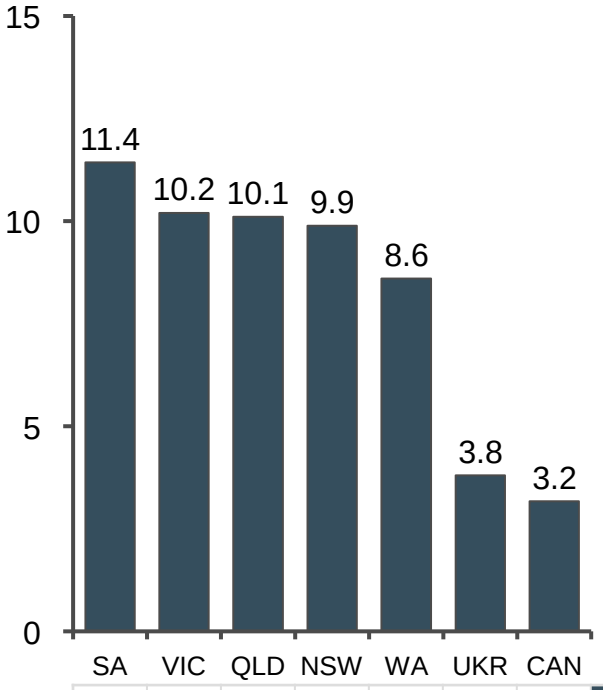
L.E.K.

Australian rail freight costs are significantly higher than comparators given shorter haulage distances

4b

Weighted average rail transport cost per tonne per kilometre* (2019/20)

AUD cents per tonne per kilometre



SA	VIC	QLD	NSW	WA	UKR	CAN	
159	377	347	476	260	567	1,610	Typical distance to port (km)
50%	53%	46%	85%	60%	68%	>95%	Rail modal share (to port)
10**					*N/A*		Emissions (gCO2e/t-km)

- The cost of rail in WA is c.15% lower than other Australian states as more consistent volume and the state's export focus drives high utilisation of the network and better returns on capital
  - a more proprietary supply chain model where CBH owns its own above rail assets (locomotives and wagons) also contributes to the better planning and higher operational efficiency of rail freight in WA
- Ukrainian rail bears similar issues in terms of condition – public ownership of the infrastructure has limited investment
  - Ukraine's rail fleet is ageing and there is limited access to rail wagons as government contracts can be elusive
  - however, rail costs are still low given longer haulage distances, more consistent harvest volumes, and cheaper labour
- The cost of Canadian rail transport is lower given significantly greater haulage distances, the higher capacity of the network and its economies of scale
  - an Australian train's capacity may be as low as 16% of the grain weight conveyed by a Canadian unit train
  - the network is shared by multiple industries, ensuring high utilisation of rail assets and high rates of return on capital
  - efficiency is supported by having a standard gauge across the network
- Canadian prices are also regulated via a revenue cap, as the market is dominated by 2 companies which operate largely as regional monopolies

Note: * Location differentials used as indicative Australian costs (NB: these are not freight rates), averaged across natural port terminals and weighted by portzone production volumes; ** Australian average

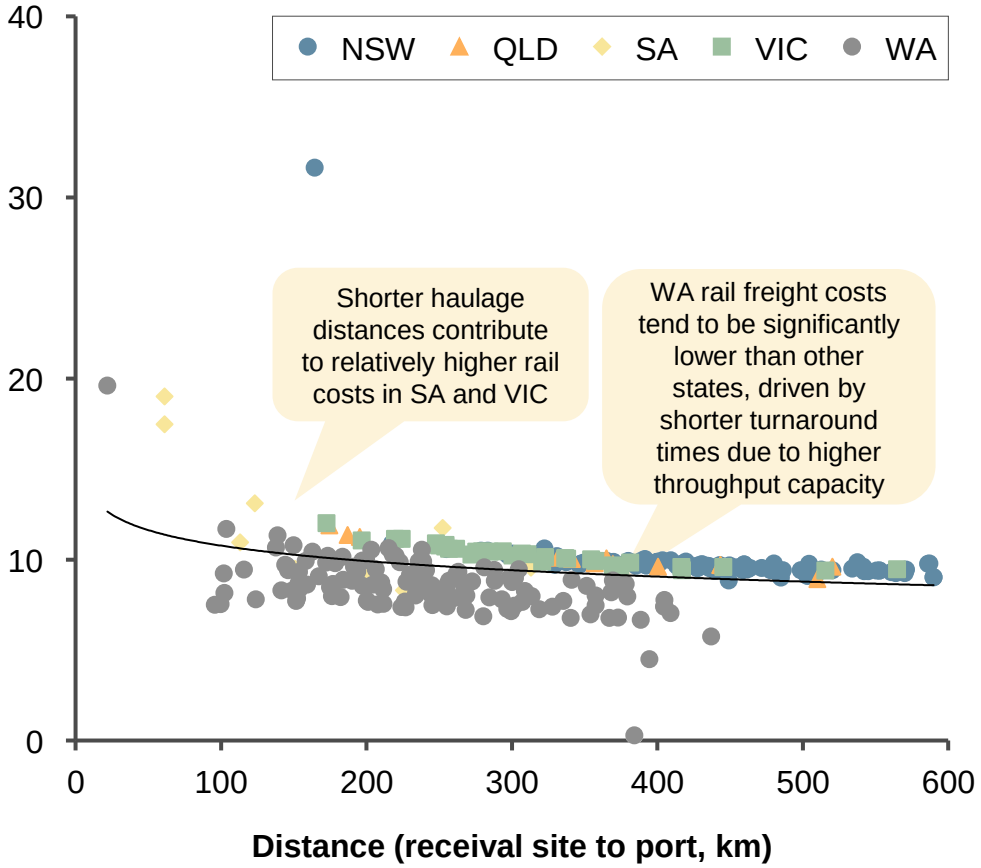
Source: AEGIC; Australia Crop Forecasters; BITRE; Grain Traders Australia; Quorum Corporation; USDA; L.E.K. research and analysis

L.E.K.

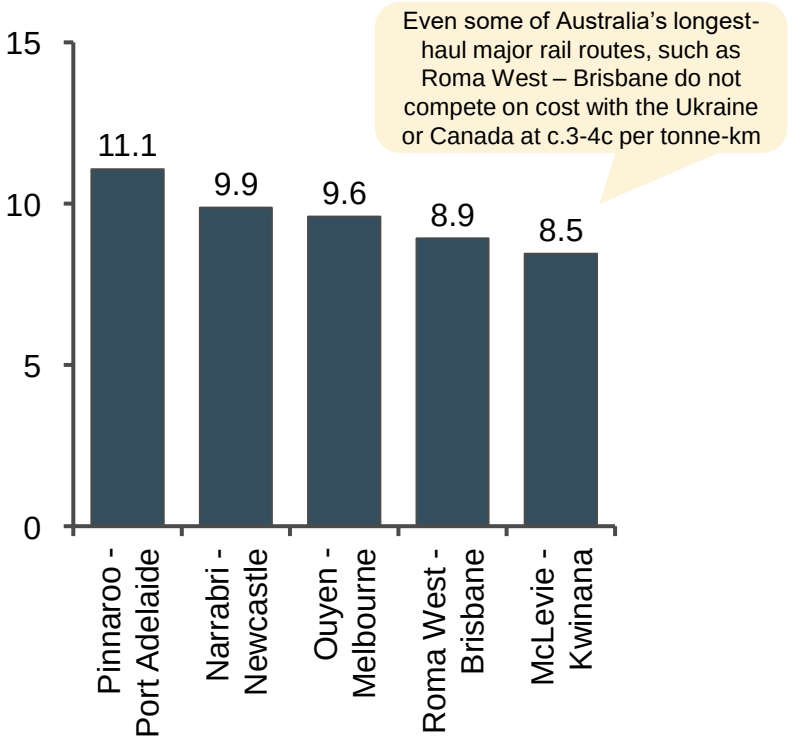
Within Australia, the WA is rail network is the cheapest

4b

Australian location differentials per kilometre from receival site to natural port – rail* (2019/20)
AUD cents per tonne-kilometre



Location differentials per kilometre from selected major receival sites to major natural ports – rail* (2019/20)**
AUD cents per tonne per kilometre



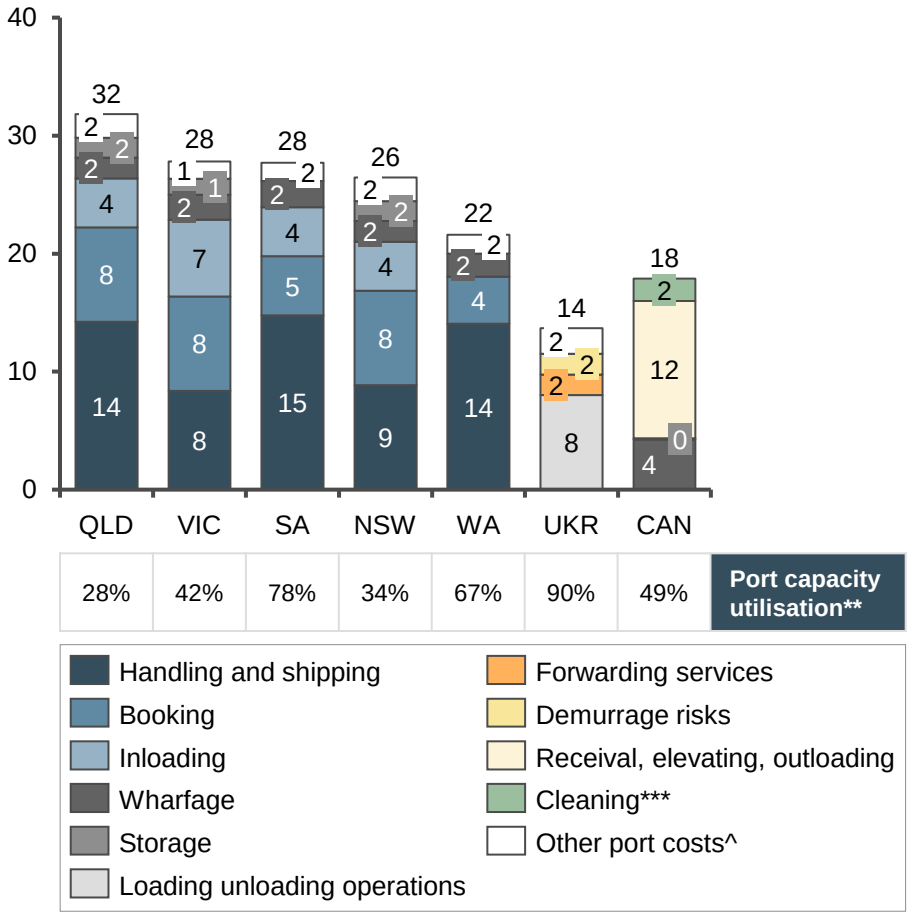
SA	NSW	VIC	QLD	WA	State
268	400	445	510	267	Distance to port (km)

Note: * Data listed as "road or rail" – assumed that location differential applies to both modes equally; **Selected routes chosen on basis of major/primary receival sites to major ports – verified with AEGIC research where possible
Source: Grain Traders Australia; AEGIC; L.E.K. research and analysis

Australia has a dispersed network of port terminal facilities which drives low utilisation and higher costs relative to Canadian ports

5

Port costs, by component– weighted average by volume* (2019/20)
AUD per tonne



- Australia's export supply chain is more flexible than Canada's, given the availability of multiple ports; however, excess port terminal capacity particularly in the eastern states has resulted in relatively low asset utilisation and therefore higher cost (e.g. in QLD)
  - port congestion and loading inefficiencies may also result from a high road accumulation versus rail
- Some Australian port costs (e.g. some ports in SA) are particularly high given they are of insufficient depth for some vessels and so vessels require top-ups from deeper ports
- Canada's port terminal operations are cheaper than Australia's, owing to the large scale of its ports and historical capital investment in high throughput, efficient port terminal infrastructure
  - Canada only has 4 major grain ports, 3 of which account for c.99% of exports; a consolidated port network allows Canadian ports to enjoy economies of scale
  - Canadian ports are much larger scale than Australia ports; Vancouver, Thunder Bay, and Prince Rupert shipped c.23.5mmt, c.7.6mmt, and c.6mmt of grain in 2018/19, all significantly more than Australian ports (the largest, Kwinana, ships c.5.3mmt on average)
- The Ukrainian port network is more dispersed, with many more port terminal facilities – 18 grain ports in total
  - strong competition, especially following the recent establishment of several smaller ports, has decreased port costs
  - even larger Ukrainian ports suffer from low throughput capacity (e.g. at Odessa), particularly concerning port capacity for rail
  - increasing investment in port infrastructure, driven by government concession tenders, is expected to increase throughput and decrease port costs further in the near term

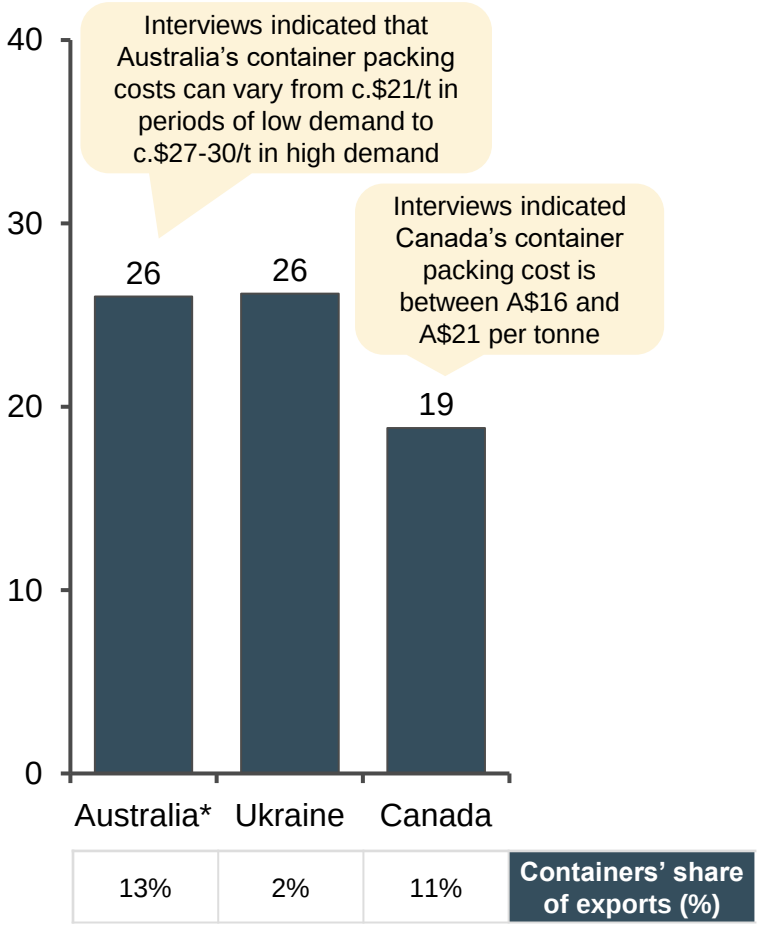
Note: * Australian costs weighted by portzone production volumes; Ukrainian cost inflated from 2015; ** Australian capacity utilisation is an 8-year average, weighted by portzone production volumes; Canadian capacity utilisation is the terminal elevator capacity utilisation for 2018/19; *** 60% of Canadian wheat is cleaned at port – average cleaning costs are AUD c.$6/t; ^ Other port costs include berth hire / harbour dues, site occ/security, stevedoring, superintendent, and other fees in Australia

Source: ADM; AEGIC; Australia Crop Forecasters; Company websites; Quorum Corporation; L.E.K. research and analysis

Australian container packing rates are c.40% higher than Canada's and comparable with the Ukraine's

6

Container packing cost per tonne (2020)
AUD per tonne



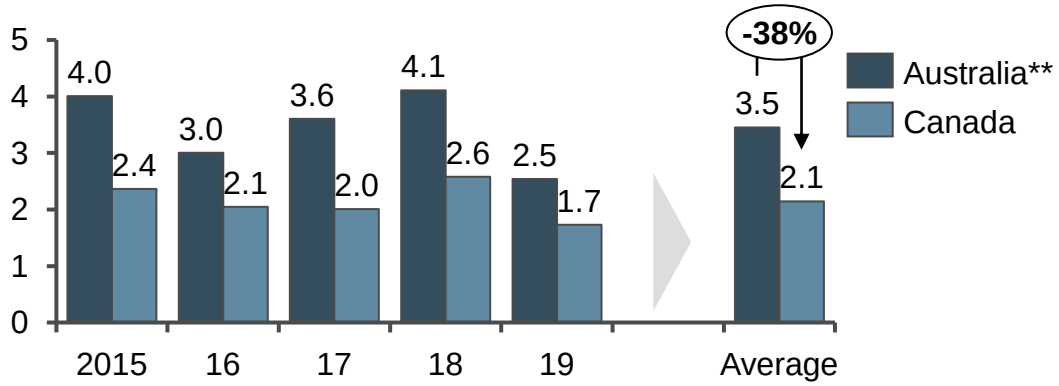
- The use of containers in the movement of export grain in Canada and Australia has grown considerably over the past 20 years
  - containerisation of grain has increased as freight costs have fallen and bulk ocean rates have risen
  - favourable sea transport back freight opportunities and international market preferences in delivery and order size have also driven the trend
- In Australia, container costs tend to be higher in regions of lower population such as WA, SA, and QLD (where import demand is lower)
- Higher costs may be due to high landside stevedore infrastructure charges driven by limited competition in container berth operations
  - for example, the Port of Melbourne – Australia's largest grain container port – has 2 berth operators: Patrick's and DP World
  - transport operators also have little choice over their stevedore – these are chosen by the shipping line
  - the split between grain packed upcountry and at port is relatively even – the latter enables packing of extra tonnage
- Low Canadian costs have been facilitated by investment in new transloading facilities which allow grain carried by railway hopper cars to be efficiently reloaded into containers (e.g. Ray-Mont Logistics' transloading facility at Prince Rupert, 2017)
- Canadian shippers are also incentivised by the railway to pack grain upcountry as there is limited storage capacity of containerised grain available at port transload locations, which may reduce cost
- Ukrainian container packing costs are comparable to Australia's although largely irrelevant given the small market share of containerised exports

Note: * Australian costs derived from CBH's listed loading fee; ** Canadian cost from 2007, inflated by CPI
Source: ACCC; ADM; AEGIC; CBH; Quorum Corporation; L.E.K. research and analysis

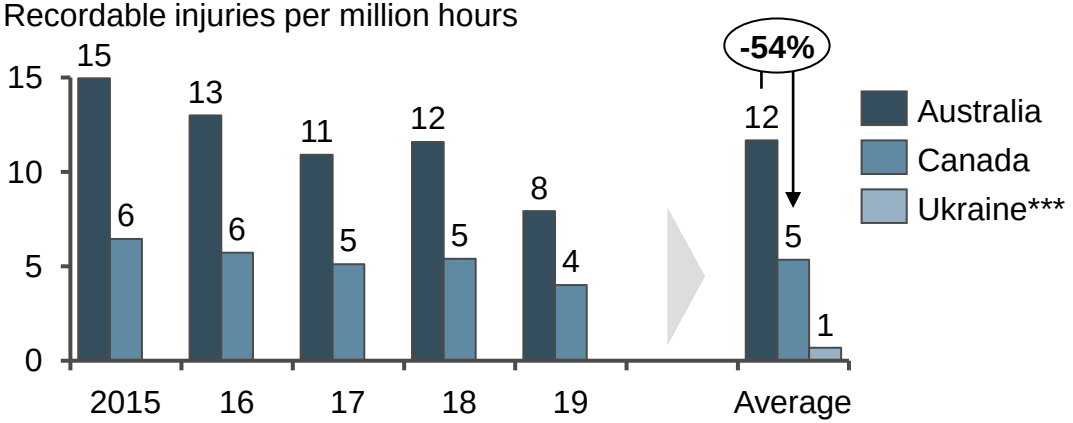
L.E.K.

An analysis of grain handling and marketing companies' injury rates suggests the Australian grain industry may be less safe than Canada's

Average LTIFR, by country* (2015-19)
Lost time per million hours



Average RIFR, by country* (2015-19)
Recordable injuries per million hours



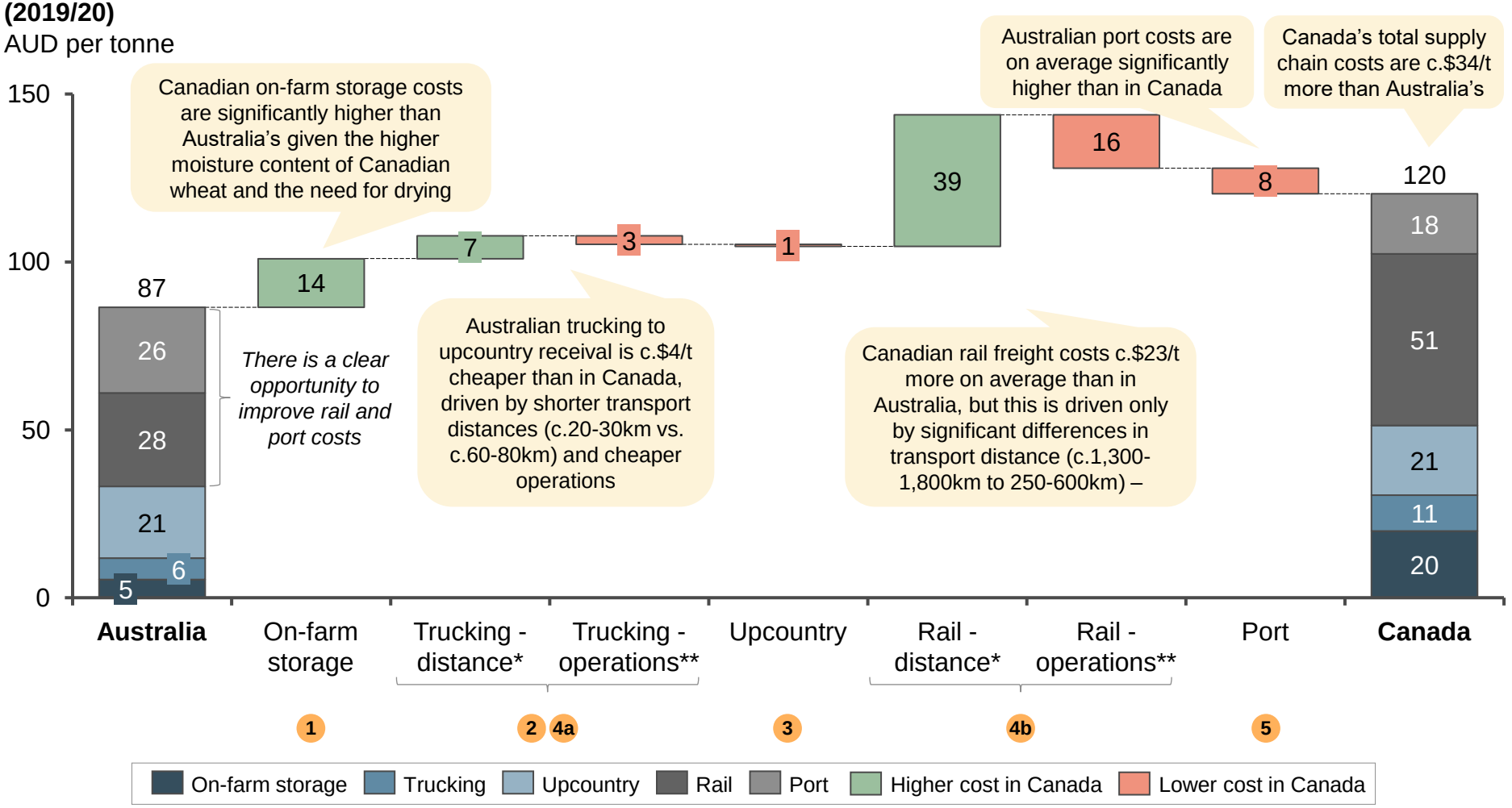
- Injury rates at Canadian grain handling companies appear c.40-50% lower than those at Australian companies
- Drivers of higher injury rates in Australia may include:
  - use of bunker storage, which carries hazards such as tarpaulin handling (in wind) and slips, trips, and falls
  - bunker storage is not used at all in Canada – grain is stored in elevated silos
  - Australia's road modal share is significantly higher than Canada's; movement of grain on road is less safe and implies more human intervention per tonne of grain, creating greater potential for injury
- Ukrainian data on injury rates is from a small sample; the metric is generally not well reported in Ukraine

Note: * Companies assessed in Australia include GrainCorp, Viterra, and CBH; companies assessed in Canada include Graincorp, Bunge, Louis Dreyfus, Glencore and Cargill; Some data may be group / multinational level and not Canada specific; ** Australian LTIFR data sourced only from GrainCorp and Viterra; *** Ukraine data sourced only from Kernel
Source: Company annual reports; L.E.K. research and analysis

While there are some clear structural differences, generally Australia's domestic supply chain is more expensive than Canada's

Cost differences between Australian and Canadian wheat supply chains (excl. levies, check-offs and end point royalties) (2019/20)

AUD per tonne



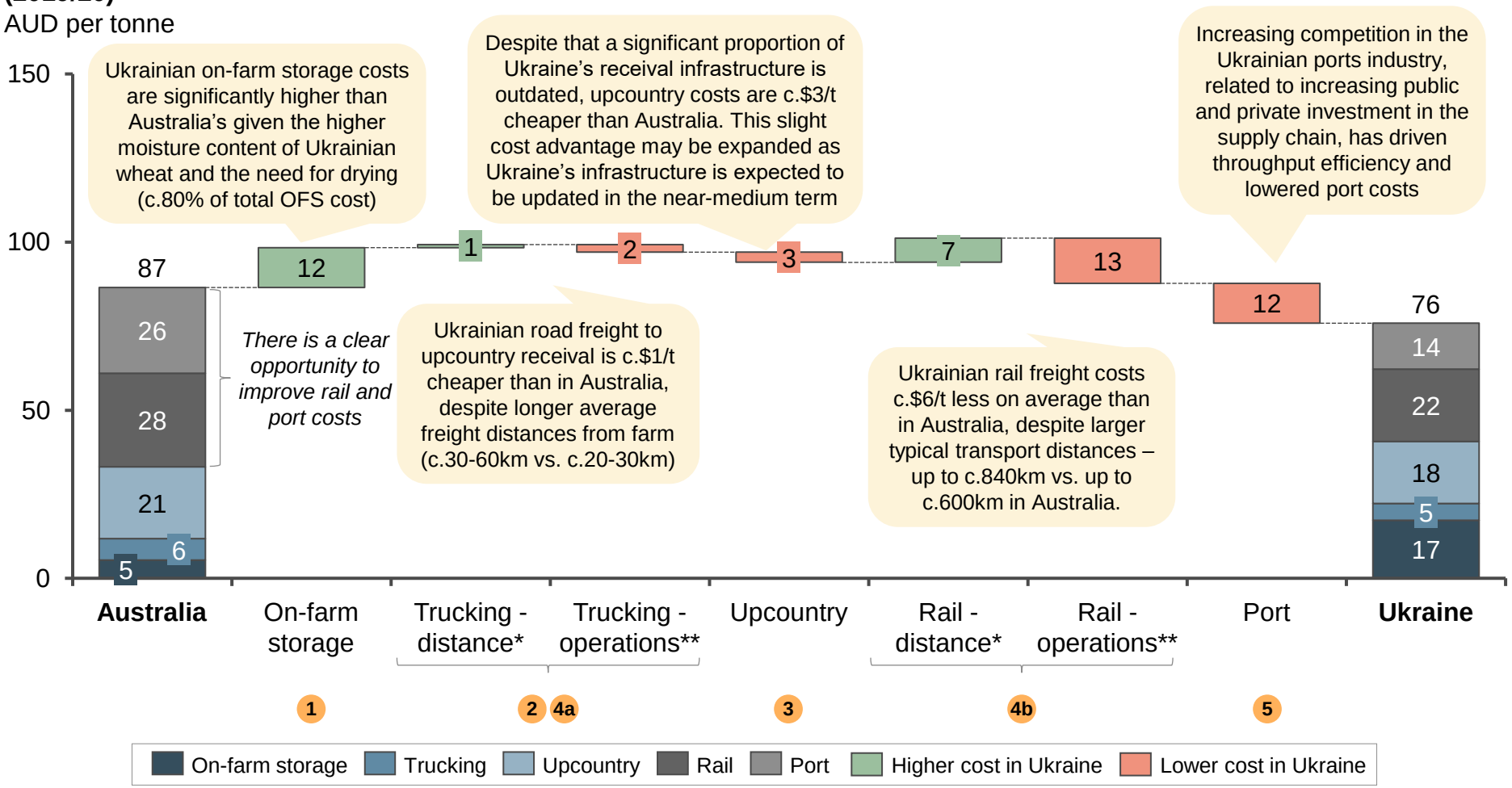
Note: * Cost difference attributable to differences in typical transport distance; ** Cost difference attributable to differences in operational efficiency; trucking costs are from farm to upcountry receival

Source: L.E.K. research and analysis

Australia's domestic supply chain is more expensive than Ukraine's, notwithstanding Ukraine's larger transport distances and ageing infrastructure

Cost differences between Australian and Ukrainian wheat supply chains (excl. levies, check-offs and end point royalties) (2019/20)

AUD per tonne



Note: * Cost difference attributable to differences in typical transport distance; ** Cost difference attributable to differences in operational efficiency; trucking costs are from farm to upcountry receival

Source: L.E.K. research and analysis

By way of illustration, closing the gap between Australia's and comparators' rail and port costs by a third could save the export wheat industry c.$130m p.a.

If Australia could extract supply chain efficiencies...

Potential rail operations cost reduction (AUD per tonne)

% of cost difference compressed	Canada	Ukraine	Average
10.0%	2	1	1
20.0%	3	3	3
30.0%	5	4	4
40.0%	6	5	6
50.0%	8	7	7
100.0%	16	13	15

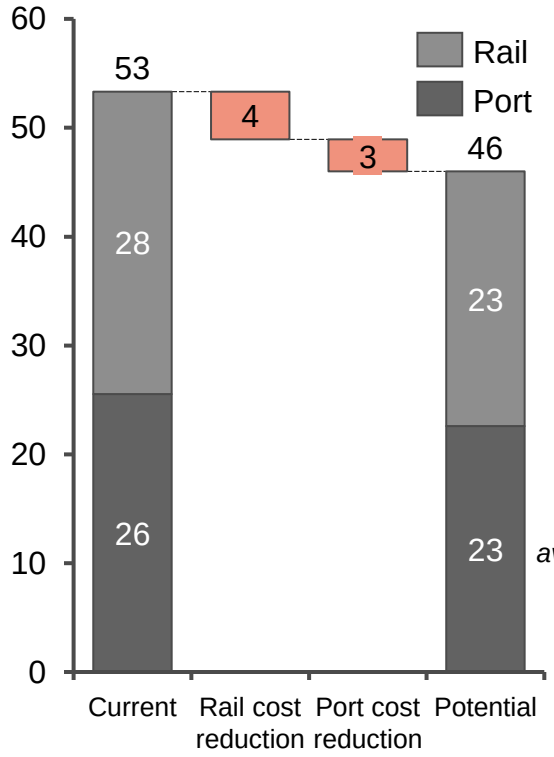
Potential port cost reduction (AUD per tonne)

% of cost difference compressed	Canada	Ukraine	Average
10.0%	1	1	1
20.0%	2	2	2
30.0%	2	4	3
40.0%	3	5	4
50.0%	4	6	5
100.0%	8	12	10

....and close 30% of the gap to comparators

ILLUSTRATIVE

Current and potential Australia rail and port costs
AUD per tonne



✖ *18mmt average wheat exports*

$131m

Annual cost saved by wheat industry

There may be an additional adjacent cost benefit to the supply chain of a modal shift towards rail (e.g. less road damage)

Source: L.E.K. research and analysis

L.E.K.

Key grain supply chain findings

The supply chain is a significant contributor to export prices

Australia's supply chain accounts for c.40% of the delivered cost of wheat (c.43% in states outside WA) – domestic freight, port costs, and upcountry storage and handling costs account for c.11%, c.9%, and c.7% of delivered cost respectively

Australian inefficiencies are masked by shorter transport distances

The supply chain accounts for a larger proportion of the delivered cost of wheat in comparator countries (c.50% and c.45% in Ukraine and Canada respectively) – longer transport distances drive higher domestic freight costs (c.13% and c.17% of total delivered costs). Australian rail freight and port charges appear less competitive than comparators on a unit cost basis

WA outperforms other states

WA is generally more competitive than other Australian states, with only c.36% of delivered cost attributable to the supply chain – a streamlined, predominantly exports-focused supply chain, a more advanced programme of receival site rationalisation and capital investment in high throughput supply chain infrastructure (e.g. port loading facilities, high capacity rail) support WA's efficiency

Rail freight is important

Notwithstanding structural differences, continued focus on rail freight efficiency is critical to the overall supply chain costs

Australian port charges are more expensive than comparators'

Low utilisation of port terminal facilities also gives rise to lower competitiveness at port – Australian port costs are c.1.5-2x more expensive per tonne than comparators, driven by high road versus rail accumulation, loading inefficiencies and excess port capacity leading to underutilisation

L.E.K.