



BANKWEST CURTIN ECONOMICS CENTRE

# TRADING UP

International trade futures and  
the Western Australian economy

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<b>CONTENTS</b>	
<b>LIST OF FIGURES</b>	2
<b>LIST OF TABLES</b>	4
<b>BCEC REPORT SERIES</b>	5
<b>FOREWORD BCEC</b>	6
<b>EXECUTIVE SUMMARY</b>	7
Key Insights	8
<b>INTRODUCTION</b>	15
<b>WESTERN AUSTRALIA'S TRADE PROFILE</b>	19
Introduction	20
Western Australia's international trade profile – A focus on goods	27
Western Australia's international trade profile – A focus on services	37
Australia's foreign direct investment position	48
<b>FREE TRADE AGREEMENTS AND TRADE DYNAMICS</b>	51
Introduction	52
Benefits of free trade agreements	53
The impact of free trade agreements	55
Trade tariffs and trade flows – The Chinese case	60
Intra- and inter-industry trade	63
<b>BENEFITS OF TRADE ON HOUSEHOLD WELFARE</b>	69
Introduction	70
Income effects	71
Cost of living effects	73
<b>WESTERN AUSTRALIA'S POSITION IN A DECARBONISED GLOBAL ECONOMY</b>	79
Introduction	80
Trends in green products	81
WA's opportunities to advance its economic diversification and complexity	88
<b>SUMMARY AND POLICY DISCUSSION</b>	97
<b>APPENDIX</b>	101
<b>GLOSSARY</b>	109
<b>REFERENCES</b>	113

## LIST OF FIGURES

<b>FIGURE 1</b>	Gross state product, per capita, 1989-90 to 2021-22, by state	20
<b>FIGURE 2</b>	Merchandise exports as a share of the economy, WA and Australia, 1989-90 to 2021-22	21
<b>FIGURE 3</b>	Australian merchandise exports and import values over time, by state, 2020 to 2023, quarterly	22
<b>FIGURE 4</b>	Exchange rates and the share of national capital expenditure, by industry, 1992 to 2022	24
<b>FIGURE 5</b>	Capital expenditure, by state, 1989 to 2023, quarterly	25
<b>FIGURE 6</b>	Value and share of merchandise export sales, Australia and WA, 1996 to 2022	26
<b>FIGURE 7</b>	Share of merchandise exports value, by industry and by state, 2019-20	27
<b>FIGURE 8</b>	Net exports and key country groups, Australia and WA, 2013 to 2022	29
<b>FIGURE 9</b>	Top 10 destination countries for merchandise exports, WA, 2018-19 to 2021-22	30
<b>FIGURE 10</b>	Value and share of Australia's trade with major partners, year to month, December 2003 to December 2023	31
<b>FIGURE 11</b>	Value of exports from WA, by goods and major trading partners (top 10 only), 2013 to 2022, \$m	33
<b>FIGURE 12</b>	Selection of critical minerals and emerging manufactures, 2019 to 2022, WA	34
<b>FIGURE 13</b>	Top 10 source countries for merchandise imports, WA, 2018-19 to 2021-22	35
<b>FIGURE 14</b>	Value of imports to WA, by goods, and major trading partners (top 10 only), 2013 to 2022, \$m	36
<b>FIGURE 15</b>	Education travel service credits, value and annual change by state, 2000-01 to 2021-22	38
<b>FIGURE 16</b>	Number of international enrolments, by sector, 2002 to 2022, Australia and WA	39
<b>FIGURE 17</b>	WA's share of Australian international enrolments, by education pathway, 2002 to 2022	40
<b>FIGURE 18</b>	International student enrolments in Australia, by source country and region, 2019 and 2022	41
<b>FIGURE 19</b>	International student enrolments in WA, by source country and region, 2019 and 2022	42
<b>FIGURE 20</b>	Annual international trips to Australia by state ('000), 2012 to 2022	44
<b>FIGURE 21</b>	International short-term visitor arrivals to Australia and WA, by month, 2019 and 2022-23	47
<b>FIGURE 22</b>	Incoming and outgoing FDI, by major country groups, Australia, 2001 to 2022	48
<b>FIGURE 23</b>	Number of global and Australian free trade agreements, 1991 to 2022	54
<b>FIGURE 24</b>	Weighted mean tariff rate, all products, selection of regions, 2000 to 2020	55

## LIST OF FIGURES

<b>FIGURE 25</b>	WA's and AUS's trade intensity with key FTA partner countries and the rest of the world, 1999-00 to 2021-22	58
<b>FIGURE 26</b>	Exports of targeted goods, Australia and WA, 2013 to 2022	61
<b>FIGURE 27</b>	Global trade of barley, quantity in tons, by country, 2017 and 2021	62
<b>FIGURE 28</b>	Intra-industry trade, by major industry, Australia, 2005 to 2023	64
<b>FIGURE 29</b>	Intra-industry trade, detailed manufacturing industries, AUS 2005 to 2023	66
<b>FIGURE 30</b>	Channels through which Western Australia's trade relationships translate to benefits to WA households	70
<b>FIGURE 31</b>	Household income, per capita, 1989-90 to 2021-22, by state	71
<b>FIGURE 32</b>	Total amount of real disposable income in WA attributed to overall trade with major trading partners in 2022, WA	72
<b>FIGURE 33</b>	Imports of interest to consumers, by goods, 2013 to 2022, Australia	73
<b>FIGURE 34</b>	Expenditure weights for CPI groups, 2019 to 2022	74
<b>FIGURE 35</b>	CPI for tradable and non-tradable goods and services, percentage change from corresponding quarter of previous year, 2019 to 2022	75
<b>FIGURE 36</b>	CPI for tradable and non-tradable goods and services, index numbers, 2000 to 2023	76
<b>FIGURE 37</b>	Exports of environmental vs other goods, 2015 to 2021	82
<b>FIGURE 38</b>	Exports of environmental goods by state, 2010 to 2021	83
<b>FIGURE 39</b>	Exports of environmental goods by broad category, 2015 to 2021	84
<b>FIGURE 40</b>	Production value of WA's top critical minerals, 2012 to 2022	85
<b>FIGURE 41</b>	Australia's hydrogen export potential	87
<b>FIGURE 42</b>	Cross-country correlations between real GDP per capita and economic complexity index, 2021	88
<b>FIGURE 43</b>	Cross-country correlations between diversity and economic complexity index, 2021	89
<b>FIGURE 44</b>	Economic complexity indices of countries, all products, 2021	90
<b>FIGURE 45</b>	Economic complexity indices by state, 2021	91
<b>FIGURE 46</b>	Economic complexity index over time, all products, 2015 to 2021	92
<b>FIGURE 47</b>	Green complexity indices of major Australian states, 2021	93
<b>FIGURE 48</b>	Economic complexity and green complexity indices, including global rankings, selected states and countries, 2021	94
<b>FIGURE 49</b>	Green complexity index over time, 2015 to 2021	95
<b>FIGURE 50</b>	List of countries in key trading groups	102

## LIST OF TABLES

<b>TABLE 1</b>	Australia and WA's top 10 exports, goods and services, 2019-20 to 2021-22	23
<b>TABLE 2</b>	Top 10 international trips by country of origin, Australia, 2018 to 2022	45
<b>TABLE 3</b>	Top 10 international trips by country of origin, WA, 2019 to 2022	46
<b>TABLE 4</b>	Value and count of foreign investment approvals, by partner country, Australia, 2021-22	49
<b>TABLE 5</b>	Applied tariff rates for a selection of Australian exports to major trading partners, 2016 to 2022	57
<b>TABLE 6</b>	Estimating the impact of free trade agreements on Australia's exports	59
<b>TABLE 7</b>	Intra-industry trade, by partner country, top 5 and China, Australia, 2021	67
<b>TABLE 8</b>	Global position of WA in critical minerals production, 2022	86
<b>TABLE 9</b>	Interpretation of the FTA trade creation and diversion effects	104
<b>TABLE 10</b>	Estimating the effect of Australia's FTAs on trade creation and diversion	105
<b>TABLE 11</b>	The effects of trade on inflation rate	108

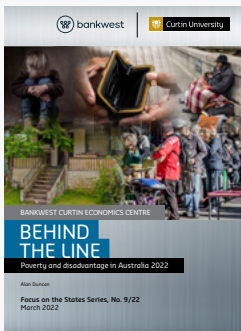
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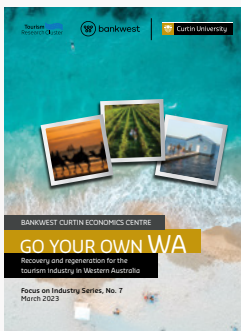
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## FOREWORD



Global dynamics are changing. The COVID-19 pandemic, geopolitical tensions, and shifts in international policy to accelerate decarbonisation are some of the issues that have raised new questions relating to the economics of trade and investment.

This report seeks to contribute to ongoing debates, by addressing the importance of trade to the Western Australian economy both historically and in the context of new global settings.

Through globalisation, countries have become increasingly interconnected and interdependent. This brings many benefits, including innovation, increased consumer choice and lower prices.

The degree of economic interdependence between countries and regions has been underlined during the pandemic. Border lockdowns and restrictions impacted global supply chains, business production processes and in turn business profitability. In addition to the social impact of border closures, households across the globe felt the impact on employment, travel and the price of goods and services consumed.

This report focuses on Western Australian trade, looking at the level of trade with key trading partners and across key goods and services.

The benefits of free trade agreements are explored as well as the impact of tariffs and trade restrictions. The flow of goods, such as barley, demonstrate the interconnected and complex world trade economy that WA is a part of.

This report looks at the welfare benefits of trade to WA households, with a focus on income and cost of living effects. These are particularly relevant with the current inflationary factors at play across the economy.

As the Western Australian government continues to build the foundations for future growth and diversification, this report identifies the state's positioning in a world where governments, businesses and consumers are increasingly conscious of, and shifting towards, sustainable economic development.

Green opportunities exist for Western Australia. But there is a need to keep pressing ahead with the green agenda, ensuring that the state does not lose ground in a very competitive and fast-moving global economy.

A handwritten signature in black ink, appearing to read 'Alan Duncan'.

Professor Alan Duncan  
Director, Bankwest Curtin  
Economics Centre  
Curtin Business School,  
Curtin University



## EXECUTIVE SUMMARY

The Western Australian economy continues to deliver substantial economic prosperity and its resilience to the COVID-19 pandemic has been the envy of other states. As of 2021-22 Gross State Product (GSP) per capita in WA reached \$135,320, some \$52,000 above the national average. The direct benefits to WA's households from such economic activity are both tangible and significant.

Much of this prosperity has been driven by the strength of the state's international trade in goods and services, led by Western Australia's mining and resources sector. In 2021-22 merchandise exports accounted for 59 per cent of the WA economy as measured by GSP. This compares to national exports contributing less than a quarter (23%) to the Australian economy.

The relative scale of WA's trade sector emphasises just how much the state benefits from – and depends upon – its economic relationships with trading partners. Through globalisation, countries have become increasingly interconnected and interdependent, with economies able to draw benefit from product specialisation, market integration and natural endowments as well as economies of scale.

At a federal level, Australia has signed more than 17 important free trade agreements with key trading partners that are intended to promote greater economic activity, support investment and reduce barriers to the flow of goods and services in global markets.

And the stakes are high in the pursuit of trade agreements, with evidence of an increasing level of protectionism and the preferential domestic economic treatment of key industry sectors.

Most economies around the world have been exposed to the fallout from disrupted global supply chains and emerging geopolitical tensions. And the resulting inflationary pressures and lack of supply have had a direct and consequential effect on households' economic wellbeing and caused governments across the globe to reflect on their national supply chain security.

Another major factor at play when setting trade strategy relates to the decarbonisation agenda and the global transition to net zero carbon emissions. Many economies now demand environmentally friendly imports, and carbon pricing plays a significant role in this shift. These developments present both challenges and opportunities for Australian businesses and households.

This latest Bankwest Curtin Economics Centre Focus on Industry report provides information to support discussions and decisions related to diversifying the WA economy, and to capitalise on the future global opportunities that are emerging.

A novel green economic complexity index shows how WA is positioned to take advantage of the global decarbonisation agenda, and with further support the economy can trade up to secure emerging opportunities.

The report highlights the broader dynamics of international trade, with analysis of inter-industry trade helping to paint a clearer picture of the role WA plays in a globally interconnected economy.

The impact of recent tariff and non-tariff restrictions imposed on Australian goods by key trading partners provides further insights into the dynamics of global trade, and the degree to which – and the speed with which – industry sectors have been able to pivot to new markets.

The key findings and recommendations outlined in this report provide a valuable addition to the evidence base on WA's strategic positioning and its response to the changing face of global trade.

## Key Insights

### Resilience in the face of uncertainty

In 2021-22 merchandise exports accounted for 59 per cent of the WA economy as measured by GSP. And in the year to April 2023, WA's merchandise exports accounted for 45 per cent of Australian exports and were valued at almost \$273Bn.

Over the course of the COVID-19 pandemic much of WA's merchandise export value was protected, with strict border protections from the WA Government and the ability of mine sites and ports to maintain production cycles playing a critical role. The strong iron ore price too played a role.

However, while the mineral and resources sector has remained strong, the value of resources and agricultural exports are exposed to significant volatility in commodity prices.

While continuing to focus on existing strengths, it is important that the economy continues to seek alternative sources of growth and secure a position in the emerging decarbonised global economy.

### Trade in services – the case of international education

Trade tariffs and border restrictions negatively impacted trade services both in WA and nationally. Sectors such as international education, tourism, and some agricultural related exports felt substantial pain, but are emerging from the crises.

Prior to the COVID-19 pandemic, there was a notable expansion in the trade of educational services in Australia. WA too experienced a significant increase in international student enrolments, reaching a record high of 53,400 in 2019.

By sector, higher education had the highest enrolment rate among international students in WA, with 25,100 enrolments (47%), followed closely by 15,400 enrolments for Vocational Education and Training (VET) courses (29%), and 10,500 enrolments for English Language Intensive Courses for Overseas Students (ELICOS) (18%).

Western Australia's share of international student enrolments sat at 6.0 per cent in 2022, a similar share to that reported in 2019 (5.9%). While the count of international student enrolments in WA increased by 63 per cent over the twenty years since 2002, WA's share of national enrolments has declined by 4 percentage points over the same period.

Relative to other states, WA was late to the game with the state's first international education strategy launched in 2018. The timing of COVID-19 impacted the sector's ability to stay the strategic course. The Western Australian International Education Recovery and Renewal Plan of December 2020 was a welcome response to help get the sector back on track. However, efforts must continue. Students require time to make decisions and there will be a lag in the efforts to recover and renew the sector.

It is important that WA takes the opportunity to regain market share and focus on new and emerging opportunities. The signing of the Australia-India Economic Cooperation and Trade Agreement (ECTA) at the end of 2022 is a case in point. It is anticipated that this agreement will foster investment prospects in various priority sectors for the nation, including international education. WA must take full advantage of such opportunities presented at the federal level.

The overall appeal of the international education sector goes beyond the quality of education supplied. The impact of the housing crisis on the attractiveness and price competitiveness of WA cannot be put aside. Housing availability, quality, and related costs are just some of the additional factors that need to be addressed for the international education sector to reach full potential.

#### Trade in services – the case of tourism

BCEC's report on the tourism sector launched earlier this year detailed the impact of COVID-19 and the challenges the sector faces across the regions of WA. This included a survey of residents' perspectives of the impacts of tourism.

Updates on tourist visitor trips provided in this report show that the sector's recovery is continuing. Throughout 2022, the removal of border restrictions and improved flight availability contributed to a gradual reduction in the visitor arrival gap compared to pre-COVID-19 levels.

The gap continued to decrease in the early months of 2023. By March 2023, the gap sat at 26.7 per cent for Australia and 12.7 per cent for WA, marking a significant decrease in the respective gaps of 79.6 per cent and 77.5 per cent observed in March 2022.

Western Australia's source countries look quite different to those observed nationally. In 2019, the United Kingdom was the leading source country for WA, accounting for 15 per cent of international visitors to the state. This was followed by Singapore (10.7%), Malaysia (10.1%), New Zealand (7.5%), and China (7.3%). The remaining countries in the top ten were the USA, Indonesia, Japan, Germany, and Hong Kong.

The hard work being undertaken to promote WA internationally needs to continue, with a focus on those economies that will bring most value to the WA community, tourism and hospitality sectors.

Backpackers and international students are essential for employment and prosperity across the regions. They also hold an important key to help unlock the workforce and skills issues faced by the nation and state.

#### Industry sector trade flows

For this report we generate a composite trade index to track the composition and direction of sectoral trade flows for Australia and the main states over time.

Among the insights to emerge from this analysis, we see that the inter-industry (export) concentration of mining has increased consistently over the past decade for Australia and Western Australia. The composition and direction of trade flows in Western Australia remained more or less unaltered over the course of the COVID-19 pandemic.

The same cannot be claimed for the mining sector in Queensland, which shifted towards more balanced trade flows in 2020 and 2021 before recovering to a net export state over the course of the past 18 months.

South Australia shifted towards net imports within mining during the pandemic, and has yet to recover its net export position.

### **Benefit of free trade agreements**

Australia has been actively pursuing free trade agreements (FTAs) with various countries, having signed 17 FTAs over the last couple of decades. Although there is a notable upward trend in the total number of FTAs implemented between countries, Australia negotiated lower tariff rates before many competing nations and potentially enjoyed a first mover advantage.

This report estimates the impact of free trade agreements on total trade flows. Results show that trade agreements with China, Japan, Korea and Thailand led to an increase in trade between Australia and these countries.

Compared to a counterfactual scenario without the free trade agreements, it is estimated that exports to China have increased by \$275.4 billion, exports to Japan by \$99.1 billion, and exports to Korea by \$40.7 billion, with exports to Thailand increasing by \$57 billion since the FTAs came into force. On aggregate, FTAs with these four countries led to estimated gains of \$472.2 billion for Australian exports to date.

### **Benefit of trade on household income**

Trade can affect household welfare through changes in income and the prices of consumer goods. Using internationally recognised econometric techniques, estimates in this report suggest that a one percentage point change in trade intensity with major trading partners leads to a \$220 change in household disposable income.

This suggests that the total amount of real household disposable income attributed to overall trade in 2022 is \$16,200 per household and \$6,400 per person in WA. On aggregate, this translates to \$17.9 billion for WA households.

The total real disposable income stemming from trade with China amounts to \$9,000 per household. And overall trade with Korea and Japan contributed a total of \$3,800 per household in 2022. This further highlights the importance of, and WA's position within the Indian Ocean Rim.

### **Benefit of trade on consumer prices**

Modelling conducted in this report reveals that WA's consumers directly benefit from trade.

It is estimated that a one percentage point increase in the import penetration rate of manufacturing products from major trading partners leads to a 0.15 per cent fall in the consumer price index. Among the manufactured goods consumed by households in Western Australia, imported goods constitute 29 per cent of the overall total.

This collective data suggests that, on average, households in WA would experience a 4.3 per cent rise in expenses if they were to consume the same products from alternative sources – be that domestically or from countries outside of Australia's primary trading partners.

This is foremost in the context of the ongoing inflationary pressures facing the national economy. The full weight of tackling inflation cannot, and should not, lie with monetary policy and the RBA.

Supporting further trade partnerships and agreements is not a quick inflationary fix. But supply side pressures are a key aspect of the inflationary narrative. And protectionist strategies are not the solution. Free trade is critical over the longer term, both to consumer welfare and as they relate to input prices for businesses.

### The dynamics of trade flows – the case of Chinese tariffs

During the COVID-19 pandemic, another event occurred that impacted the world of trade. China introduced several tariffs and embargos on Australian exports. Tariffs were imposed on barley, wine, and coal, as well as lobsters, lumber, and several other goods.

These tariffs displayed notable impacts on the composition of Australia's exports for the goods in question, with exports to China almost disappearing.

Some markets were able to adapt to the trade restrictions, finding new markets that could compete with the prices offered by China. Others, however, struggled to meet the same level of performance as before, with a reduction in export value.

Barley is one commodity that quickly pivoted to other markets. A major increase in exports from Australia to Saudi Arabia occurred, with some additional exports of barley to Japan too.

Meanwhile, China sought imports of barley from other nations in Australia's place, with France, Canada, and Ukraine being the major partners of choice.

Other goods, such as crustaceans, faced a more difficult path. Many exporters were forced to pivot proportions of their products to the frozen food market which achieved lower prices.

Crustacean exports from WA, for example, saw total value add fall by 41.2 per cent from 2019 to 2020, and a further 30.0 per cent from 2020 to 2021, with the industry shifting to new partners to meet their quotas.

During this period, the industry also had to deal with skyrocketing freight costs in the fallout of the pandemic, to the point where the state and federal governments needed to intervene and support the cost of air freight for crustacean exporters. Such supports helped many businesses to keep their head above water.

With soaring iron ore prices and a shortage of workers across the state, many of these industries also had to compete with the prosperous mining industry for workers and wages, with some turning to more automated processes. This can have a long term impact on regions and community viability.

The ongoing issue of labour and skills shortages is one that impacts long term export diversification across all sectors and is one that needs further attention.

### WA ranks highly in green trade...

On the course to net zero transition by 2050, decarbonisation offers opportunities for radical transformation of productions in an economy, in turn creating new industries and markets. The key question then is, how is WA positioned to capture the decarbonisation opportunities presented?

Green products are broadly defined as goods that have environmental benefits, and support the transition to net zero emissions. Both Australia and WA are shifting towards a greener economy, driven in part by decarbonisation and net zero transition commitments, as well as responding to international supply chains and consumer demand. There was a sharp increase in the index of exports of green products from 2018 onwards across the nation.

Western Australia has a far stronger trade profile in products connected to environmental improvements than the equivalent national profile. WA's green exports increased from just below 50 per cent of total exports in 2015 to more than 65 per cent by 2021. This translates to a more than threefold increase in value terms from \$51 billion in 2015 to \$157 billion by 2021.

#### ...and, WA ranks 12th globally in BCEC's green complexity index

Across all goods, WA has the lowest economic complexity across the states, and is ranked 120th globally. Model calibration shows that WA's heavy dependence on the mining sector is the primary factor that drives the state's index of economic complexity to the lower end. In fact, WA's rank rises to 86th in the world when iron ore is excluded from the products list.

To give appropriate attention to the emerging green agenda, the BCEC estimated a green complexity index for WA and compares the state against other Australian states, as well as their positioning in the global economy.

Results show that WA emerges as the top ranked jurisdiction nationally in the green complexity index, and the state's global ranking soars from 120th to 12th. NSW ranks second in Australia and 28th globally, followed by Victoria and South Australia.

The findings shine light on the optimistic future of the WA economy in green trade and growth and show that the state is well positioned to be at the centre of Australian prosperity in a decarbonised world.

It is important that the required federal, state, and local policy and infrastructure supports are in place to ensure that the benefits of the global green transition are maximised by the state.

#### Recommendations

- Explore diversified export opportunities that capitalise on Australia's – and especially Western Australia's – advantages in the production of complex or differentiated products, particularly those related to 'green' or decarbonisation agendas.
- Broaden the portfolio of Western Australia's trading partners as a route towards economic resilience and stability.
- Federal government should ensure that new trade partnerships and existing trade settings continue to deliver mutual benefits to trading partners, with critical growth industries for WA given sufficient weight in such agreements.
- It is essential that WA's role is recognised and appropriately supported by the US and Australian governments in the Climate, Critical Minerals and Clean Energy Transformation Compact new action plan that emerges over the course of 2023.
- Continue to investigate downstream opportunities in the mineral and resources, and manufacturing sectors, with a focus on supporting green and emerging opportunities in a decarbonised economy.
- Continue to invest in the WA brand to support the tourism and international education sectors in key and emerging markets.
- Address housing supply and accommodation issues to support housing for skilled workers, international students, hospitality workers and tourist visitors across the state.

- Specific policy and investment support to attract investment in clean technologies and energy transition.
- Address skills and labour shortages, including future skills needs, particularly as they relate to emerging industry opportunities.
- Increase individual and household awareness on the importance of trade and international relations to household income, employment, and welfare. This is an important element to support an upward and outward looking nation.

"THIS REPORT  
**SEEKS TO  
CONTRIBUTE  
TO CURRENT  
DISCUSSIONS**  
RELATING TO  
DIVERSIFICATION,  
THE GREEN AGENDA,  
AND THE BENEFITS  
OF TRADE."

Global







Logistics

Transport

Service

Distribution

Cargo

Supply chain

Retail

# INTRODUCTION

## INTRODUCTION

There are many benefits to trade, with economies specialising in what they are good at or have natural endowments in. Through globalisation, countries have become increasingly interconnected and interdependent. This became particularly evident during the COVID-19 pandemic, as lockdowns and restrictions disrupted global supply chains. This in turn impacted employment, the prices of goods and services for households, as well as the input prices and production processes for businesses.

As countries seek to broaden their economic trade horizons, the pursuit of free trade agreements has become an important strategy. Trade agreements can alter the global trade landscape affecting trade and political relations between countries.

Heightened geopolitical tensions, particularly involving China, have put an additional focus on trade dependencies. The trade sanctions imposed on certain Australian imports by China have added to this focus.

In 2019, the WA state government published 'Diversify WA', an economic development framework with the express goal of future-proofing the state economy by expanding the breadth of the state's economic specialisation. It was acknowledged that there is a need to reduce over-reliance on any one sector to ensure continued economic growth for the state in the long term.

The framework prioritised eight key industries to take advantage of projected global growth and demand, seven of which sat outside of the mining realm, namely: energy; tourism; international education; defence industries; space industries; health and medical life sciences; and primary industries.

To accomplish this, the framework recognised the importance of some key economic priorities that needed to be achieved. In particular, the development of WA's role in global supply chains and the need for the state to foster more complex forms of manufacturing, implementing cutting-edge science and innovation wherever possible.

Finally, the framework recognised the economic incentives presented by green development and renewables, such as the rapidly increasing demand for future batteries and the critical minerals needed to manufacture them.

At a federal level, Australia has signed several important free trade agreements, such as trade agreements with China (ChAFTA), Chile (ACIFTA), Hong Kong (AHKFTA), the USA (AUSFTA), Indonesia (IACEPA), Japan (JAEPFA), Korea (KAFTA), Malaysia (MAFTA), and Peru (PAFTA), as well as Singapore (SAFTA), and Thailand (TAFTA).

This latest Bankwest Curtin Economics Centre *Focus on Industry* report seeks to contribute to current discussions relating to diversification, the green agenda and the benefits of trade.

Furthermore, given the current inflationary pressures in the global economy, it becomes vital to evaluate Australia and Western Australia's exposure to imports and the nation's capacity to acquire necessary goods and services. WA's ability to access essential goods and services is crucial in the context of the COVID-19 supply chain disruptions, with implications for producers, and consumers' cost of living.

Both WA and Australia have a strong dependence on exports from the mining sector with iron ore playing a particularly crucial role. However, the economy also relies on exports in other sectors such as agriculture, manufacturing, tourism, and international education. This report provides a comprehensive analysis on WA's key trade commodities, services, and key trading partners.

A further dimension of this report relates to the decarbonisation agenda. In the landscape of international trade there is a growing emphasis on climate change and net zero emission targets. Many countries now demand environmentally friendly imports, and carbon pricing plays a significant role in this shift. These developments present both challenges and opportunities for Australian businesses.

A major contribution of this report lies in modelling a green complexity index (GCI) for Australia, identifying how the nation and individual states are positioned to take advantage of the decarbonisation agenda.

Overall, this report provides information to support discussions and decisions related to diversifying the Western Australian economy, helping to maximise on the current and emerging global opportunities.

"MUCH OF WESTERN AUSTRALIA'S PROSPERITY HAS BEEN DRIVEN BY INTERNATIONAL TRADE AND INVESTMENT, AND THE STRENGTH OF THE **MINING AND RESOURCES SECTOR.**"





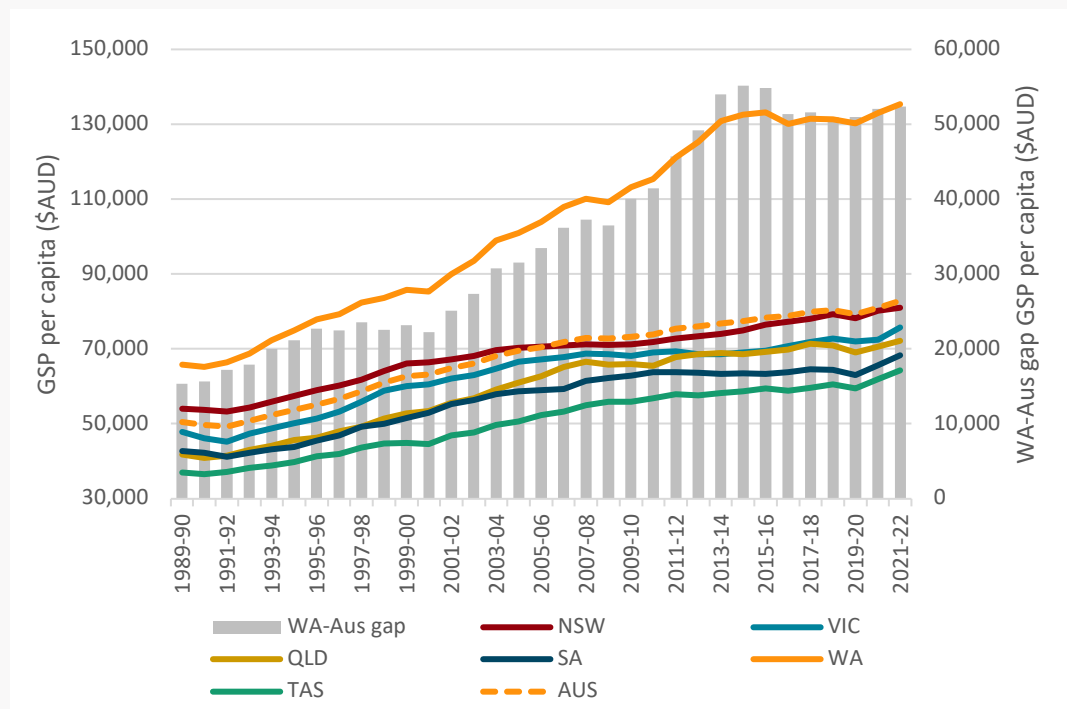
# WESTERN AUSTRALIA'S TRADE PROFILE

## INTRODUCTION

This chapter outlines the contribution of trade to both the state and national economies. Key trends relating to both merchandise and service exports are addressed. Trading partners are examined with a focus on critical goods and services, including trends during and emerging out of the COVID-19 pandemic.

Historically, the Western Australian economy has been strong and, in many respects, has been the envy of other states. As of 2021-22 Gross State Product (GSP) per capita (Figure 1) in WA sat at \$135,320, over \$52,000 above the national average.

**FIGURE 1**  
Gross state product, per capita, 1989-90 to 2021-22, by state



Notes: GSP and GDP per capita, chain volume measures, financial year.

Source: Bankwest Curtin Economics Centre | Authors' calculations from ABS CAT 5220 Table 1, and ABS CAT 3101 Table 4.

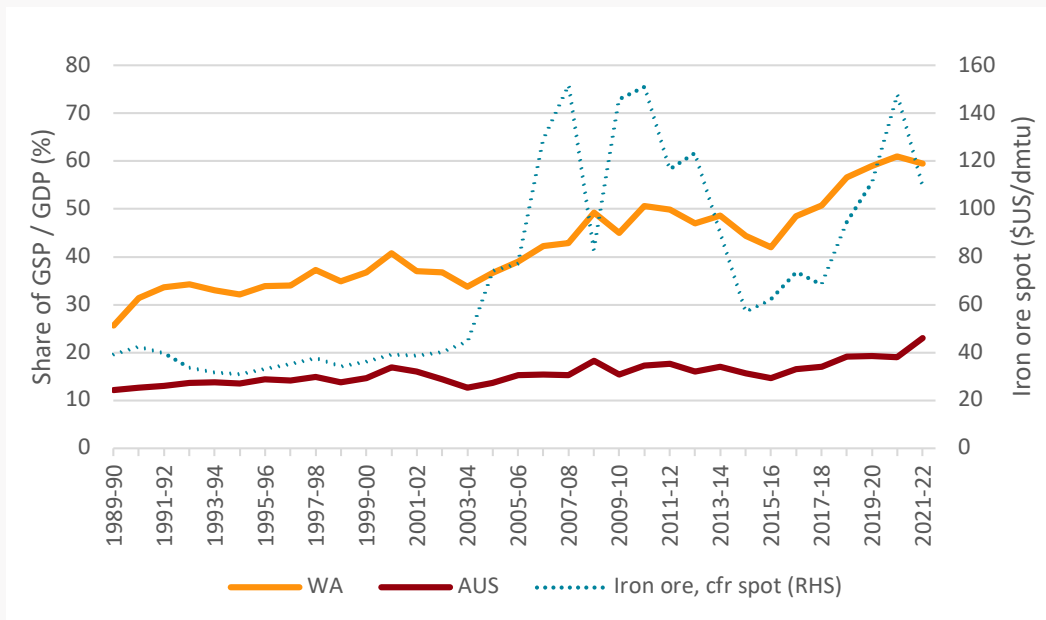
Much of this prosperity has been driven by international trade and investment, and the strength of the Western Australian mining and resources sector. In 2021-22 merchandise exports accounted for 59 per cent of the WA economy as measured by GSP. This compares to national exports

contributing some 23 per cent to the Australian economy.

And, the relationship between the iron ore spot price and trends in WA's economic trajectory are clearly evident (Figure 2).

**FIGURE 2**

Merchandise exports as a share of the economy, WA and Australia, 1989-90 to 2021-22



Notes: Share of GSP based on current prices, financial year.  
 Source: Bankwest Curtin Economics Centre | Authors' calculations from ABS CAT 5368, Tables 15a, and ABS CAT 5220, Table 1, and World Bank Commodity Markets data.



In 2021-22 merchandise exports accounted for 59% of the WA economy.



In the year to April 2023, WA's merchandise exports were valued at \$273Bn.

The sheer scale of the value of exports from WA is shown in Figure 3. In the year to April 2023, WA's merchandise exports accounted for some 45 per cent of Australian merchandise exports and were valued at almost \$273Bn (\$606Bn nationally).

Over the course of the COVID-19 pandemic much of WA's merchandise exports were protected, with strict WA border protections and the ability of mine sites and ports to maintain a business-as-usual production cycle playing a critical role. Of course, trade tariffs and border restrictions did impact other sectors in WA and nationally, such as international education, tourism, and some agricultural related exports.

Other states, many of which are more heavily reliant on service and manufacturing exports, were not as fortunate during the pandemic with declines in the value

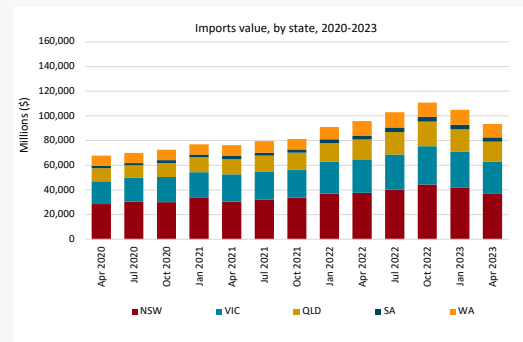
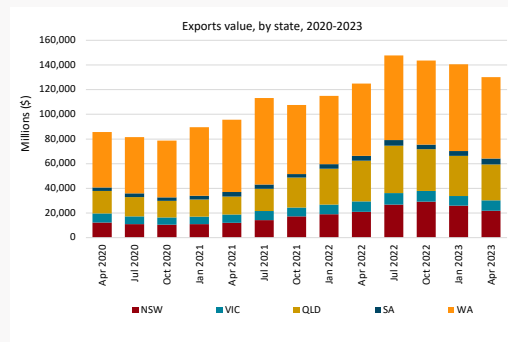
of merchandise exports evident for NSW, Victoria, and SA in 2020, but with a recovery also now evident.

Apart from COVID-19, WA's ability to maintain stability and security of supply in iron ore played a role in meeting global demand, with the Brumadinho dam disaster in Brazil in early 2019 affecting both the demand for, and price of WA's iron ore.

As for the value of merchandise imports WA's imports account for 11.2 per cent of national imports and align with the state's population share. The value of merchandise imports to WA and Australia have increased on the back of the pandemic, with the Ukrainian crisis also adding to international inflationary pressure. In the year to April 2021, imports to WA sat at a value of \$33.4Bn (\$300Bn nationally), increasing to \$47.0Bn in the year to April 2023 (\$421Bn nationally).

**FIGURE 3**

Australian merchandise exports and import values over time, by state, 2020 to 2023, quarterly



Notes: Value of exports in \$AUD, current prices.

Source: Bankwest Curtin Economics Centre | Author's calculations from ABS CAT 5368, Tables 15a and 15b.



Given the scale of merchandise exports to the WA economy, it is important that we don't lose sight of the services sector. The value of mining and agricultural exports are exposed to significant volatility in commodity prices. Services such as international education and tourism play an important role in the economy not only in value terms, but in relation to employment generated, the role in meeting future skill needs, and in supporting regional diversification agendas.

Table 1 displays the value of principal exports for the 2019-20 to 2021-22 financial years. Education-related travel services<sup>1</sup> was Australia's 4th largest export

in 2019-20, accounting for 7.9 per cent (\$37.3Bn) of the overall value of Australian exports. The impact of COVID-19 saw the sector decline to a value of \$21Bn in 2021-22, dropping to a rank of fifth (3.5% share). This is behind iron ore and concentrates (22.3%), coal (19.2%), natural gas (11.9%) and gold (3.9%).

As for WA, education-related travel now sits in 15th place with a value of \$1.2Bn. This compares to a value of over \$2.1Bn before the pandemic, when the international education sector was the 4th largest export from WA. Further discussion on the international education and tourism sectors will occur later in this report.

**TABLE 1**

Australia and WA's top 10 exports, goods and services, 2019-20 to 2021-22

## AUS

Product	2019-20			2020-21			2021-22		
	Value (\$ billions)	Share (%)	Rank	Value (\$ billions)	Share (%)	Rank	Value (\$ billions)	Share (%)	Rank
Iron ore & concentrates	102.9	21.7	1	153.0	33.3	1	132.5	22.3	1
Coal	54.6	11.5	2	39.2	8.5	2	113.8	19.2	2
Natural gas	47.5	10.0	3	30.5	6.6	3	70.6	11.9	3
Gold	24.4	5.1	5	26.1	5.7	5	23.2	3.9	4
Education-related travel services	37.3	7.9	4	27.6	6.0	4	20.8	3.5	5
Crude petroleum	8.6	1.8	8	7.0	1.5	9	13.6	2.3	6
Wheat	3.8	0.8	10	6.8	1.5	10	11.3	1.9	7
Aluminium ores & conc (incl alumina)	8.9	1.9	7	8.2	1.8	7	10.0	1.7	8
Beef, f.c.f.	11.3	2.4	6	8.4	1.8	6	9.9	1.7	9
Copper ores & concentrates	6.9	1.4	9	7.3	1.6	8	7.8	1.3	10
<b>Total Trade</b>	<b>474.2</b>			<b>458.8</b>			<b>593.9</b>		

## WA

Product	2019-20			2020-21			2021-22		
	Value (\$ billions)	Share (%)	Rank	Value (\$ billions)	Share (%)	Rank	Value (\$ billions)	Share (%)	Rank
Iron ore & concentrates	101.8	52.7	1	151.2	66.0	1	131.0	53.0	1
Liquid Natural Gas	26.3	13.6	2	16.3	7.1	3	37.9	15.3	2
Gold	21.5	11.1	3	22.0	9.6	2	18.7	7.6	3
Crude Oil and Condensate	8.1	4.2	4	6.0	2.6	4	12.2	4.9	4
Alumina and Bauxite	6.0	3.1	5	5.8	2.5	5	7.9	3.2	5
Crude minerals, nes	1.2	0.6	11	0.9	0.4	14	4.9	2.0	6
Nickel	3.2	1.6	6	3.5	1.5	6	4.8	1.9	7
Wheat	2.7	1.4	7	2.7	1.2	7	3.9	1.6	8
Oil-seeds & oleaginous fruits, soft	0.8	0.4	14	0.9	0.4	15	3.0	1.2	9
Gold coin & legal tender coin	1.0	0.5	13	2.2	1.0	8	2.5	1.0	10
<b>Total Trade</b>	<b>193.2</b>			<b>229.0</b>			<b>247.2</b>		

Notes: Share of GSP based on current prices, financial year. Rankings based on data available at time of publication. Due to confidentialised data items and merging of various data sources to compile this table for WA, caution should be used in the interpretation of these rankings and discrepancies may exist between totals reported elsewhere in the report.

Source: Bankwest Curtin Economics Centre | Liquid Natural Gas, Alumina and Bauxite, and Mineral Sands data sourced from DMIRS. Education-related travel services sourced from the ABS 5368.

<sup>1</sup> Education-related travel services includes international student expenditure on tuition fees (fees) and living expenses (goods and services).



Manufacturers' share of total CAPEX shrunk from 10.8% in 2008 to less than 6% by 2012.

### Dutch Disease?

Dutch Disease is a term used to describe the situation where a currency appreciation from rapid growth in a country's capital intensive resources sector leads to a loss of competitiveness in labour intensive industries.

Rapid economic growth due to a resource-led boom can result in a higher exchange rate for a country's currency, which in turn makes exports of other goods such as manufactured goods relatively more expensive. As a result, foreign markets may turn to alternative economies as a source for these goods. Given Australia's reliance on the resources sector, it is worth asking if this has been a factor at play in the economy.

The Australian dollar (AUD) has seen its value relative to other currencies swing up and

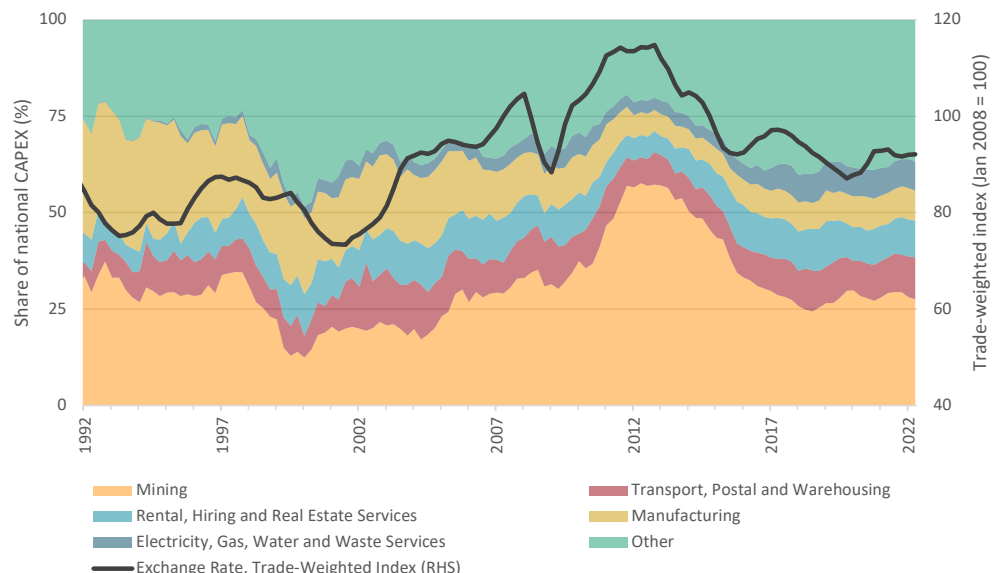
down many times over the course of history (Figure 4). The trade-weighted index trended up from 2002 to 2008, before taking a brief and sudden dip in the wake of the great recession. It then managed a quick recovery thanks in part to the mining boom and good fiscal and monetary policy.

After the peak of the mining boom, the AUD trended back down over time, and the trade-weighted index has remained below 100 since 2014.

During the mining boom, much of Australia's capital expenditure (CAPEX) was focused on the mining industry, with the manufacturing share of total CAPEX shrinking from 10.8 per cent in December 2008 to less than 6 per cent by the peak of the mining boom in December 2012.

**FIGURE 4**

Exchange rates and the share of national capital expenditure, by industry, 1992 to 2022



Notes: Rates are a smoothed 12-month average.

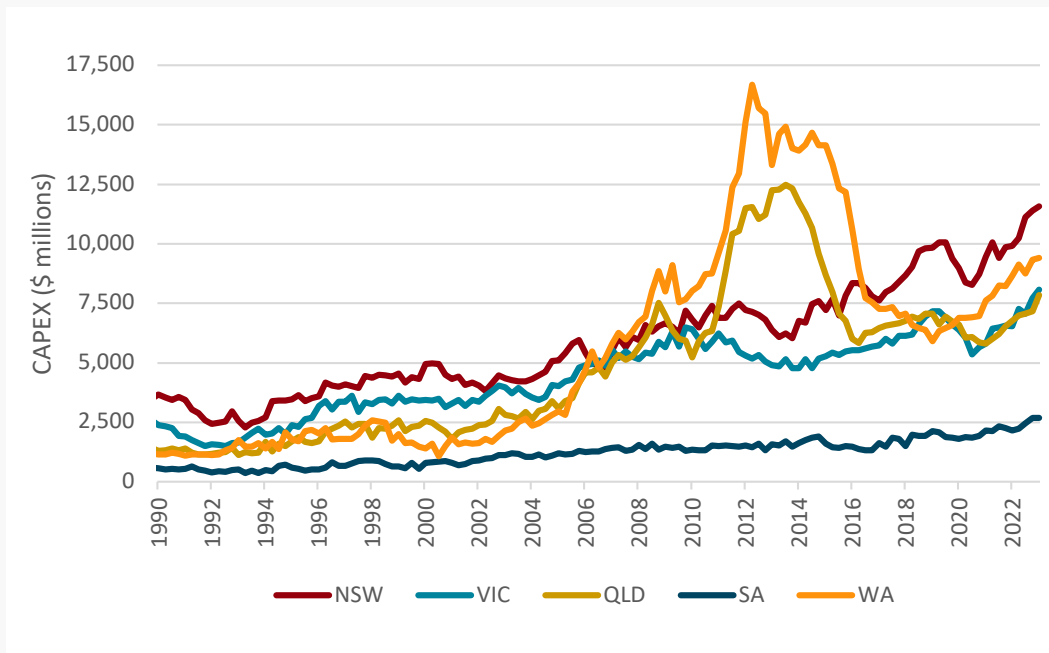
Source: Bankwest Curtin Economics Centre | Author's calculations from Reserve Bank of Australia, F11 Exchange Rates Historical Data, May 2023.

Much of this CAPEX was concentrated in WA (for iron ore) and Queensland (for coal and other non-iron mining resources (Figure 5)). CAPEX in NSW has re-emerged as the

highest across all states since 2017, with construction and infrastructure projects taking much of the weight.

**FIGURE 5**

Capital expenditure, by state, 1989 to 2023, quarterly



Notes: Seasonally adjusted measures, in current prices. Quarterly data.  
 Source: Bankwest Curtin Economics Centre | Author’s calculations from ABS CAT 5625, .stat Data Explorer Data.



In 2019-20, manufacturing in WA had a value of almost \$30Bn, some 9.6% of GSP.

The decline of CAPEX in manufacturing was also visibly linked to a decline in the industry's export value relative to GDP over a similar period; with national manufacturing exports declining from 4.5 per cent of GDP (\$57.0Bn) in 2008-09, to 2.4 per cent of GDP (\$36.6Bn) by 2012-13 (Figure 6).

However, since 2012-13 manufacturing's share of GDP has trended back, sitting at roughly 4.1 per cent (\$80.6Bn) nationally as of 2019-20.

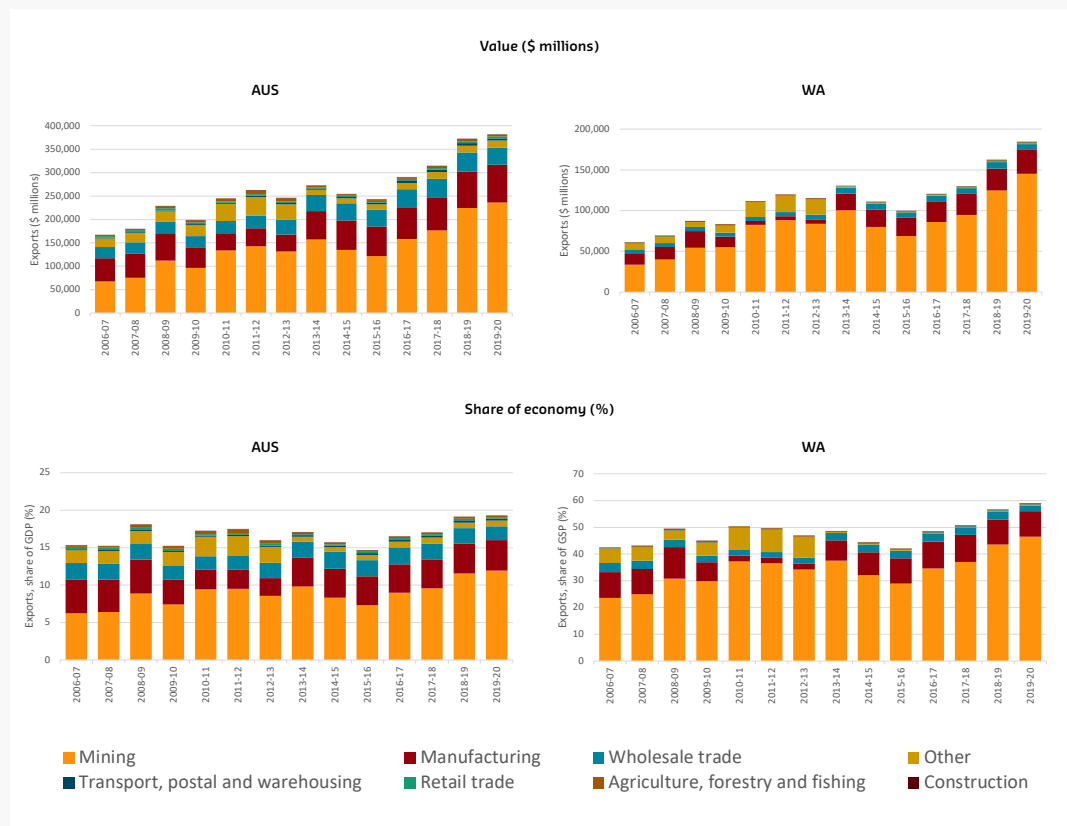
The story is similar for WA, with manufacturing's share going from 11.7 per cent (\$20.7Bn) in 2008-09 to 2.0 per

cent (\$4.9Bn) in 2011-12. However, for WA manufacturing has again bounced back, and with a value of almost \$30Bn, some 9.6 per cent of GSP.

Overall, it appears that Dutch Disease was noticeably present in Australia's economy during the peak of the mining boom, when the Australian dollar was at its strongest. Higher exchange rates made manufactured goods less accessible to investors, which in turn impacted the competitiveness and output of domestic manufacturing industries. However, as the exchange rate depreciated, manufacturing returned to strength.

**FIGURE 6**

Value and share of merchandise export sales, Australia and WA, 1996 to 2022



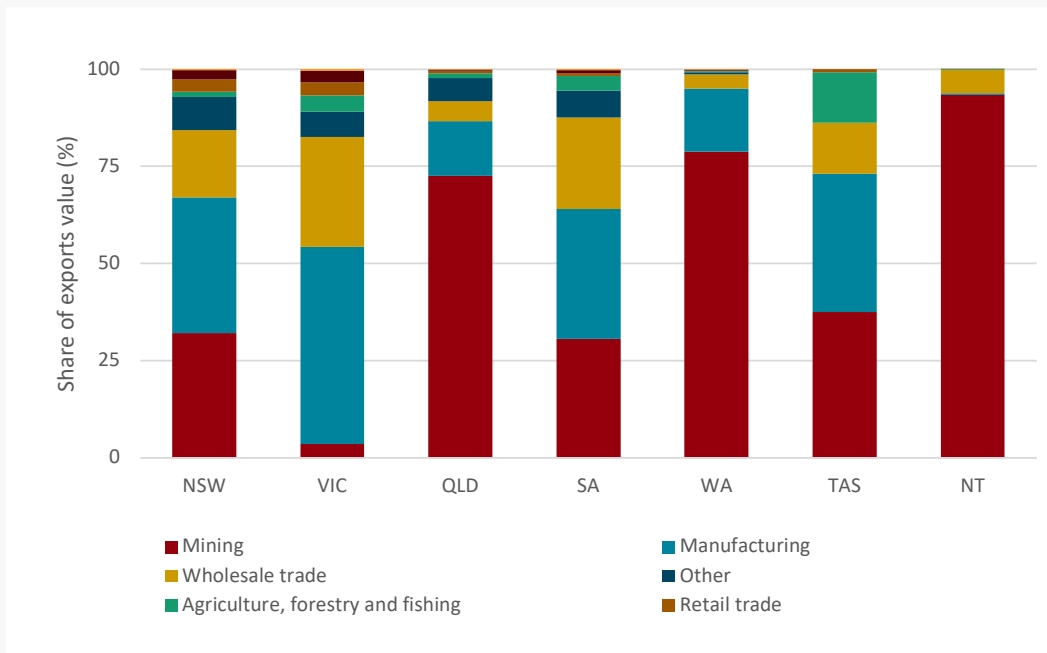
Source: Bankwest Curtin Economics Centre | Authors' calculations from ABS CAT 5368, Characteristics of Exporters, Table 8, 2013-14 release, and Table 4, 2019-20 release, and ABS CAT 5220, Tables 6 and 10.

## WESTERN AUSTRALIA'S INTERNATIONAL TRADE PROFILE - A FOCUS ON GOODS

Both Western Australia and Queensland's export profiles have a very high share of exports from mining, which of course is driven by the high value of mineral exports. This in turn implies a smaller share of exports from manufacturing, with wholesale firms having the third largest share (Figure 7). However, as noted earlier, the value of WA's manufacturing sector has become increasingly important to its economy.

The fact that WA and Queensland have the highest overall export values of Australian states relates to specialisation in natural resource endowments. Meanwhile, NSW, SA, and particularly Victoria lean more heavily on manufacturing exports, with retail trade also featuring more strongly than that of the mining and resource states.

**FIGURE 7**  
Share of merchandise exports value, by industry and by state, 2019-20



Notes: Share of exports calculated using current prices.  
Source: Bankwest Curtin Economics Centre | Author's calculations from ABS CAT 5368, Characteristics of Exporters Table 4.



WA now has a positive net export relationship with the European Economic Area.

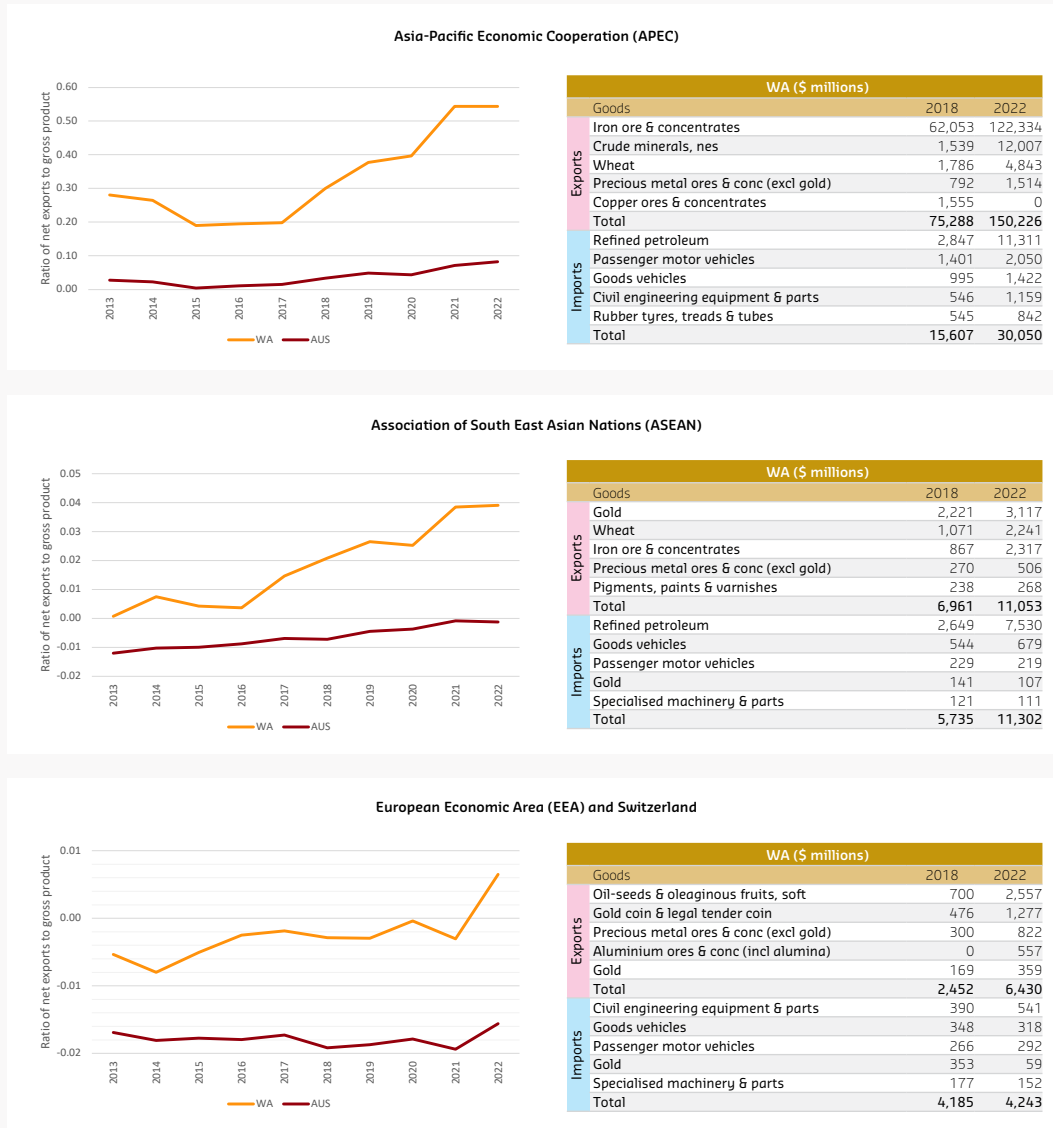
### Who does WA sell to?

On the global market, Australia is primarily a seller to two major country groups - the Asia-Pacific Economic Cooperation (APEC) and the Association of South-East Asian Nations (ASEAN). Both Australia and WA have strong trading relationships with these country groups, with APEC being a heavy consumer of WA's iron ore exports (Figure 8). ASEAN, whilst also being a large consumer of iron ore especially in more recent years, has a more balanced distribution of demand, and is also a relatively heavy consumer of WA's wheat and gold exports. WA, in return, imports refined petroleum from these regions.

More distant trading partners, such as those within the European Economic Area (EEA) have less demand for Australian exports. Australia currently has a negative net export (imports are greater than exports) relationship with the EEA, however the margin is relatively thin.

Western Australia on the other hand recently moved over to a positive net export relationship with the EEA, thanks to high exports of horticultural goods and legal tender, with a mix of preferred imports including civil engineering equipment, as well as goods and passenger vehicles.

**FIGURE 8**  
Net exports and key country groups, Australia and WA, 2013 to 2022



Notes: Ratio to Gross State / National Product in Chain Volume Measures. United Kingdom is not included in 2017 EEA measures.  
Source: Bankwest Curtin Economics Centre | Authors' calculations from ABS CAT 5220, Table 1, and Department of Foreign Affairs and Trade, Trade statistical pivot tables, 2022.



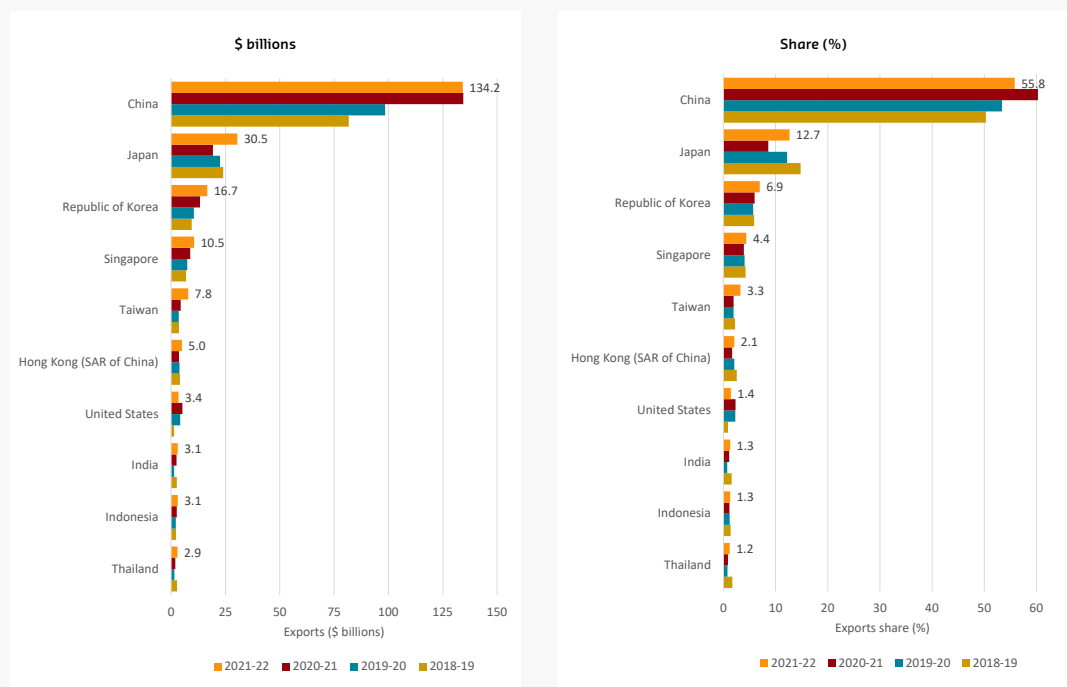
China's share of WA's exports reached 56% in 2021-22 equating to a value of \$134Bn.

Western Australia has a very strong reliance on exports to China, driven primarily by iron ore in value terms. China's share of WA's export profile exceeded 60 per cent during the 2020-21 financial year and sat at 56 per cent for the 2021-22 financial year. This equated to a value of \$134.2 billion.

Exports from WA to Japan have historically been the next largest target, constituting a 12.7 per cent share of the state's total exports and valued at \$30.5 billion in 2021-22.

**FIGURE 9**

Top 10 destination countries for merchandise exports, WA, 2018-19 to 2021-22



Notes: Ranking based on 2021-22.

Source: Bankwest Curtin Economics Centre | from Department of Foreign Affairs and Trade, Trade statistical pivot tables, 2022.



Australia's primary export destination since 2008 has been China with skyrocketing iron ore exports to the country as it scaled up its development and production at a rapid pace.

National exports of coal to Japan increased strongly in 2020 with WA also seeing a large increase in confidential exports to Japan.

Australia's third-most important export destination is the Republic of Korea, which saw a sharp increase in exports in 2020, again driven by coal nationally and confidential items from WA.

China's share of Australian exports trended up between 2008 and 2020, peaking at around half of total exports, before taking a decline in share terms. This coincides with Australia's significant increase in exports to Japan.

Imports follow a similar trend to exports, with China seeing a notably higher rate of growth in import values between 2004 and 2022 when compared to other importing countries. Prior to 2004, the USA was Australia's primary imports partner, and since then has remained the nation's second largest importer, though growing at a much slower pace than that of imports from China.

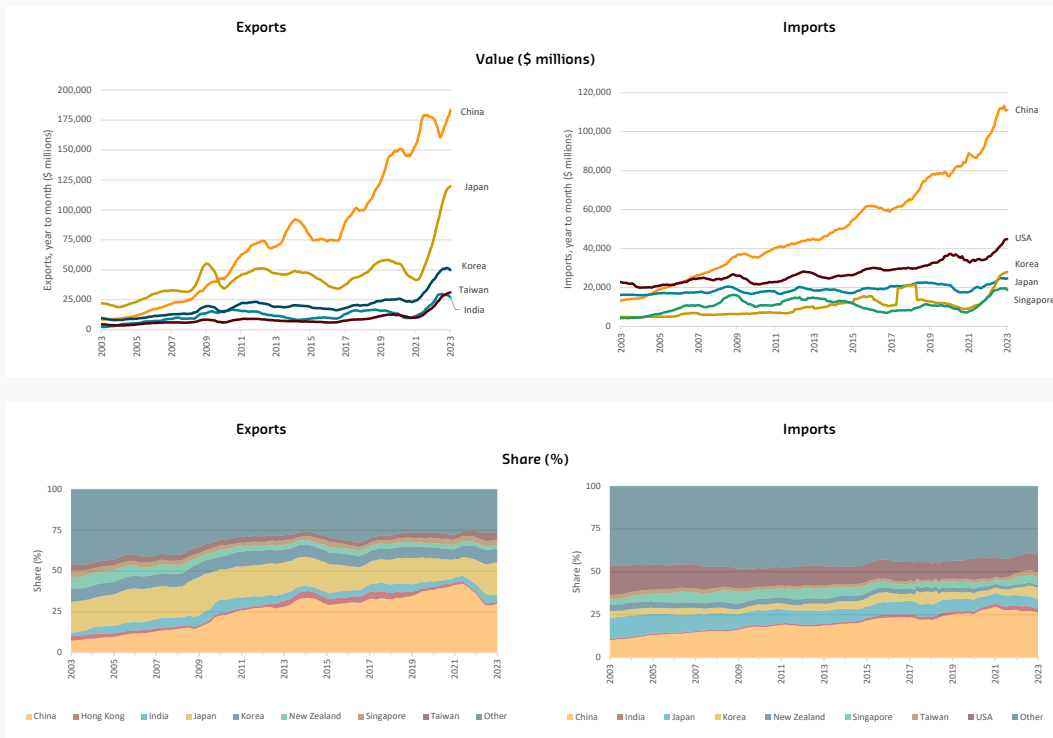
Imports from the USA recently saw a substantial increase in growth. This came as a result of rising imports of both air and land vehicles, as well as pharmaceutical products. Japan has been Australia's third most prominent import partner, but the nation was recently overtaken by the Republic of Korea with a rise in refined petroleum imports since 2022.



Australia's primary export destination since 2008 has been China with skyrocketing iron ore exports to the country.

**FIGURE 10**

Value and share of Australia's trade with major partners, year to month, December 2003 to December 2023



Notes: Export values in current prices.

Source: Bankwest Curtin Economics Centre | Author's calculations from ABS CAT 5368, Table 14a and Table 14b.

### **And what are the state's key merchandise exports?**

While China and iron ore exports remain critical to the WA economy, there are several other products and countries that WA exports to, and which form a crucial part of the state's global trade network.

Whilst China is WA's primary target for iron ore exports, other nations such as Japan and the Republic of Korea also make a prominent contribution to WA's total iron ore export profile (Figure 11). Other goods also make an impressive contribution to WA's exports. For example, WA has exported gold to nations such as the United Kingdom, Singapore, and the United States, as well as other precious metals to Korea, Philippines, and Germany.

Western Australia is also a strong grains exporter, with 2022 being a historically strong year with growth in the value of wheat exports to China, the Philippines, and Indonesia.

One other observation around iron ore exports is the decline in the value of exports from 2021 to 2022, both to China and other trade partners. Whilst the hope is that this is not an indication of a long term trend, rising global inflation and the resulting economic slowdown means that development in China will continue to slow, which may result in the value of WA's iron ore exports declining further. This, of course, speaks to the importance of the state, and by extension Australia as a whole, finding new and innovative means to diversify its exports profile.

**FIGURE 11**

Value of exports from WA, by goods and major trading partners (top 10 only), 2013 to 2022, \$m



Notes: Value of exports in current prices, \$ millions AUD. Ranking based on average over the period displayed, and authors selection. Top 10 only. Totals are not represented. The top 10 trading partners in 2022 constituted roughly 99.9% of iron exports, 99.1% of gold exports, 95.4% of wheat exports, 98.2% of precious metals exports, and 100% of other crude minerals' exports.

Source: Bankwest Curtin Economics Centre | Department of Foreign Affairs and Trade, Trade statistical pivot tables, 2022.

On the 29th of May, 2023, the then WA Deputy Premier, Roger Cook announced a number of target industries in order to “transform the Western Trade Coast into a Global Advanced Industries Hub”.

Three major industries were at the forefront of this plan, namely, hydrogen energy, rare earth minerals processing, and shipbuilding, with the intent of developing these industries in the coastal region towards further diversifying WA’s trade profile and strengthening the state economy.

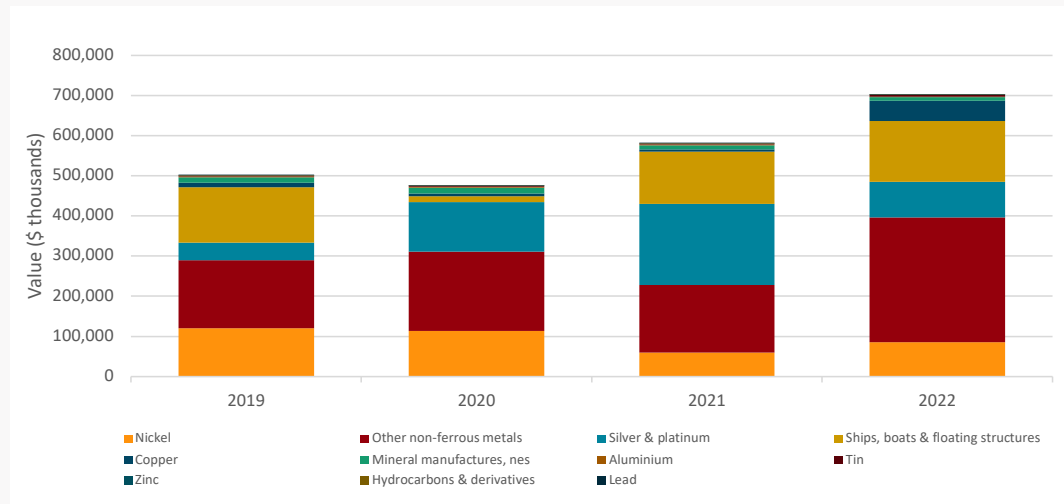
Western Australia is already involved in trading goods associated with a number

of these industries. Exports of critical minerals such as nickel already form a prominent share of WA’s exports profile, alongside the likes of silver, platinum, and other non-ferrous metals. WA also already has capacity for shipbuilding, with the Australian Marine Complex being a key hub for the state and hence supporting shipbuilding exports.

More focus on the opportunities presented from a decarbonised global economy are detailed later in this report.

**FIGURE 12**

Selection of critical minerals and emerging manufactures, 2019 to 2022, WA



Notes: Value of exports in current prices, \$ thousands AUD.

Source: Bankwest Curtin Economics Centre | Department of Foreign Affairs and Trade, Trade statistical pivot tables, 2022.

**A focus on merchandise imports to WA**

China is not just WA's top destination for exports, it is also WA's (and Australia) leading country of origin for imports, valued at roughly \$8 billion. This should come as no surprise, given the sheer scale of China's manufacturing industries.

However, compared to the exports side of the equation, China's share of WA's

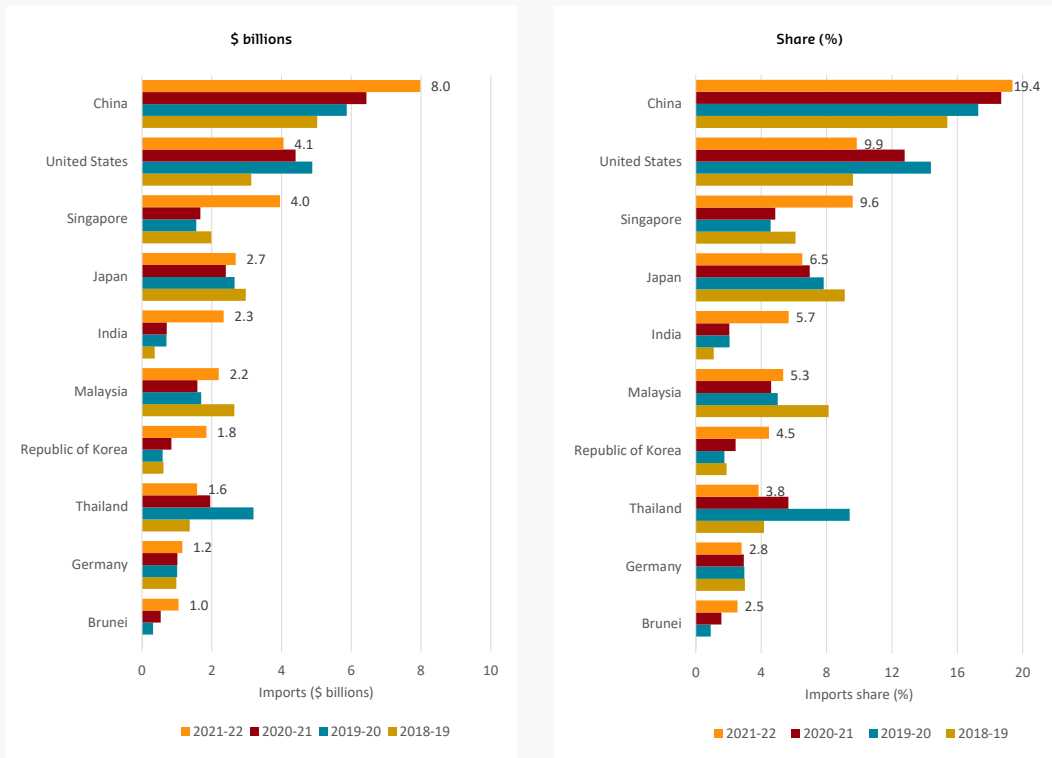
overall imports profile is relatively smaller, contributing 19.4 per cent of total imports as at 2021-22. Western Australia's overall imports profile is much more diverse than its exports profile. Nations such as the United States (9.9%), Singapore (9.6%), and Japan (6.5%) are also key source countries for imported goods to WA.



Almost 20% (\$8.0Bn) of imports to WA come from China.

**FIGURE 13**

Top 10 source countries for merchandise imports, WA, 2018-19 to 2021-22



Notes: Ranking based on 2021-22.

Source: Bankwest Curtin Economics Centre | from Department of Foreign Affairs and Trade, Trade statistical pivot tables, 2022.

WA's overall imports profile consists of a diverse range of goods of importance to both households and to businesses. As an example of WA's role in a global supply chain, the state has historically imported large quantities of gold ore which is refined and then exported to other nations. In the past, WA imported a large share of this gold ore from Papua New Guinea. However since 2021 WA sources it from other nations such as the United States and Mali.

Western Australia is also dependent on imports for most of the state's domestic

automobile market. In value terms, there has been an increase in imports of refined petroleum and passenger and goods vehicles.

The import of crude petroleum is important to the state but in recent years the majority of the trade has been confidential so it is not possible to comment on the top source countries. WA has also been importing a growing amount of civil engineering equipment with a particularly substantial exchange occurring in 2015, when WA purchased over a billion dollars' worth of equipment from the Republic of Korea.

**FIGURE 14**

Value of imports to WA, by goods, and major trading partners (top 10 only), 2013 to 2022, \$m



Notes: Value of imports in current prices, \$ millions AUD. Ranking based on average over the period displayed, and authors selection. Totals are not represented. The top 10 trading partners in 2022 constituted roughly 94.4% cent of gold imports, 98.1% of refined petroleum imports, 92.6% of passenger motor vehicles imports, 93.8% of goods vehicles imports, and 85.9% of civil engineering equipment imports.

Source: Bankwest Curtin Economics Centre | Department of Foreign Affairs and Trade, Trade statistical pivot tables, 2022.

## WESTERN AUSTRALIA'S INTERNATIONAL TRADE PROFILE – A FOCUS ON SERVICES

The significance of education and tourism to Australia's trade and economic development cannot be overstated. This section explores the pivotal role played by education and tourism in shaping international trade relationships for Australia.

International education serves as a crucial catalyst for economic growth and innovation, attracting foreign investment and fostering a skilled workforce. Promoting study opportunities in Australia helps address the skills gap and contributes to the country's competitive advantage. Likewise, tourism plays a vital role in international trade by generating revenue, creating employment opportunities and bolstering foreign relationships.

By gaining a comprehensive understanding of the dynamics of education and tourism in international trade, we can effectively grasp the broader implications for Australia's trade relations and its overall economic prosperity.

### International education

Prior to the COVID-19 pandemic, there was a large expansion in the trade of educational services in Australia. WA too experienced a significant increase in international student enrolments, reaching a record high of approximately 53,400 in 2019 across the higher education and vocational education and training (VET) sectors, as well as the study of English Language Intensive Courses for Overseas Students (ELICOS).

Figure 15 provides insights into the historical trends in the revenue obtained from education related travel service credits across Australian states.

From 2012 to 2019, all states witnessed a gradual increase in the value of these credits, reaching a peak point in 2018-2019 (\$39.9Bn). However, the outbreak of the pandemic had a significant impact, leading to a substantial decline in the value of international education across all states, with the national value declining to \$20.8Bn in 2021-22.

WA was not an exception to this trend, albeit with the decline between 2018-19 and 2021-22 (-42.7%) being below the national average (-48.0%). SA observed the lowest decline across these years (-30.3%), with the largest declines experienced by Victoria (-51.8%) and NSW (-48.6%).

While a recovery is underway, this sector requires further support to emerge from the disruption by re-engaging with key source countries and re-building brand and international reputation.



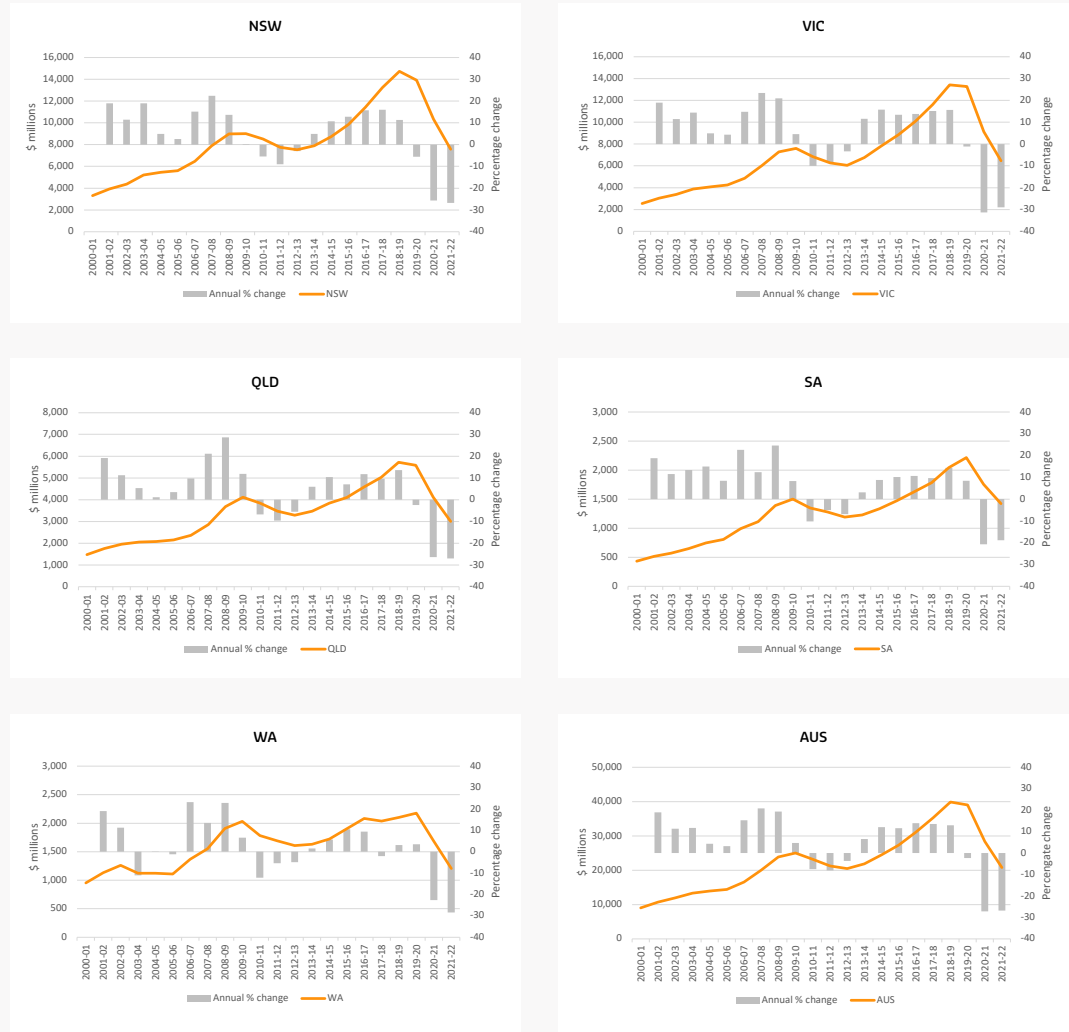
International enrolments in WA reached a record high of 53,400 in 2019.



Higher education contributes 46% of overall international enrolments in Australia.

**FIGURE 15**

Education travel service credits, value and annual change by state, 2000-01 to 2021-22



Notes: Value in estimated 2021-22 \$AUD prices. Annual percentage changes.

Source: Bankwest Curtin Economics Centre | Authors' calculations from ABS CAT 5368 and 5302.



Figure 16 illustrates the distribution of international student enrolments across different education sectors for Australia and WA.

In 2019, some 46 per cent (441,000) of international enrolments were in higher education programs in Australia. The next most popular pathway was VET, which attracted 30 per cent (281,400) of international enrolments. ELICOS ranked third, with a 16 per cent share (156,500), while schools had the lowest participation rate at just 3 per cent (25,500).

The trends were similar in WA, where higher education had the highest international student enrolment rate at 47 per cent (25,100), followed closely by VET at 29 per cent (15,400), and ELICOS at 18 per cent (10,500).

It is important to note that as of 2022, the overall flow of international student enrolments remained below pre-COVID-19 levels, both nationally and for WA. As of 2022, Australia had 79,600 fewer student enrolments in higher education compared to 2019 levels. Similarly, ELICOS was down by some 77,000 enrolments, and schools had 13,600 fewer enrolments. VET courses registered the smallest gap compared to other education pathways, with 7,500 fewer enrolments (roughly 97% of 2019 levels).

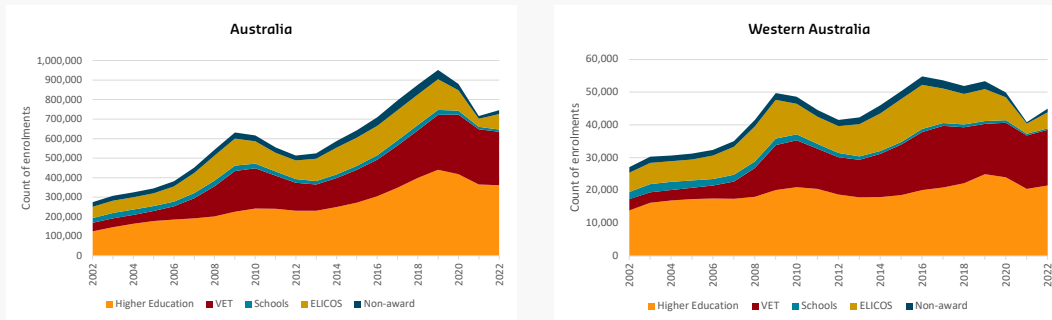
As of 2022, WA's enrolments are down on 2019 levels across all sectors. Higher education is down by 3,430 enrolments in higher education, with 4,927 fewer enrolments in ELICOS, and with 400 fewer students in school programs. Surprisingly, VET courses in WA exceeded 2019 enrolment levels, with 1,600 more enrolments.



As of 2022, Australia had 79,600 fewer student enrolments in higher education compared to 2019 levels.

**FIGURE 16**

Number of international enrolments, by sector, 2002 to 2022, Australia and WA



Source: Bankwest Curtin Economics Centre | Department of Education, International Student Data – full year data (based on data finalised in December 2022).

Over the period 2002 to 2022, Figure 17 offers an historical perspective of the share of international students in Australia that enrolled in WA institutions for each of the sectors. To get a sense of how these shares compare to WA's share of the overall national population WA's population share is also presented.

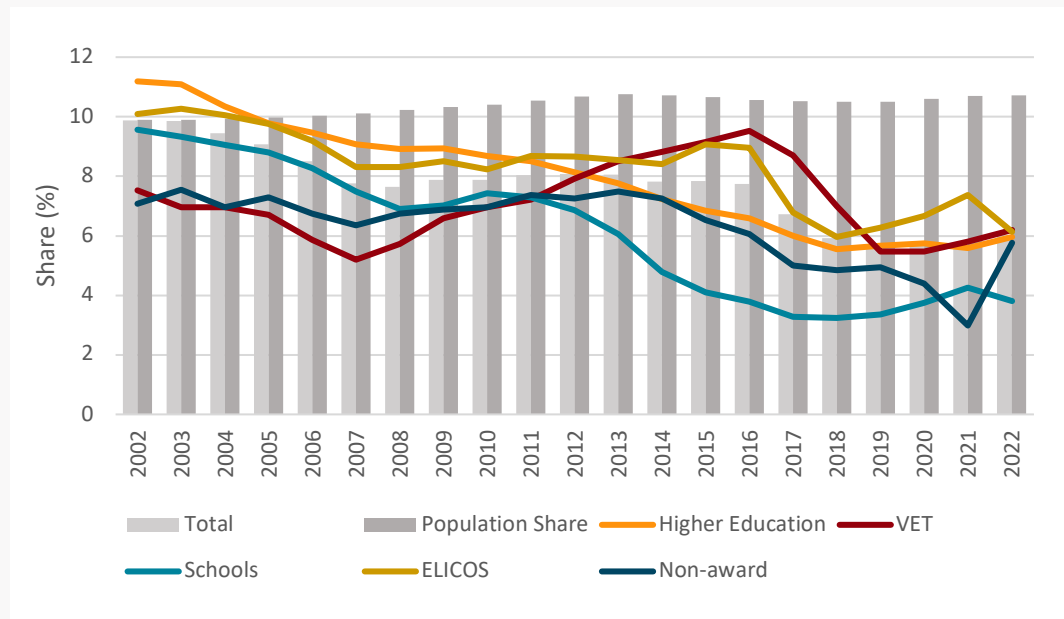
WA's proportion of the national population sits at 10.7 per cent. However, WA's share of total international student numbers sat at 6.0 per cent in 2022, a similar share to that

reported in 2019 (5.9%). While the count of international student enrolments increased by 63 per cent over the twenty years since 2002, WA's share of national enrolments has declined from the 10 per cent reported twenty years ago.

By sector, WA obtained some 6 per cent of national higher education enrolments in 2022, with similar levels reported across the VET (6.2%) and ELICOS sectors (6.1%). The lowest share of national enrolments in 2022 was observed in the schools sector (3.8%).

**FIGURE 17**

WA's share of Australian international enrolments, by education pathway, 2002 to 2022



Source: Bankwest Curtin Economics Centre | Department of Education, International Student Data – full year data (based on data finalised in December 2022).

In order to gain insights into the dynamics of Australia's international education across different regions worldwide, Figure 18 presents international student enrolments in Australia categorised by source country and region, comparing the years 2019 and 2022.

The North-East Asia region emerges as the top source region for Australia, with China (24% share) leading the way in 2022. Enrolments from China were on an upward trajectory before the pandemic but as of 2022, there were 82,600 less international

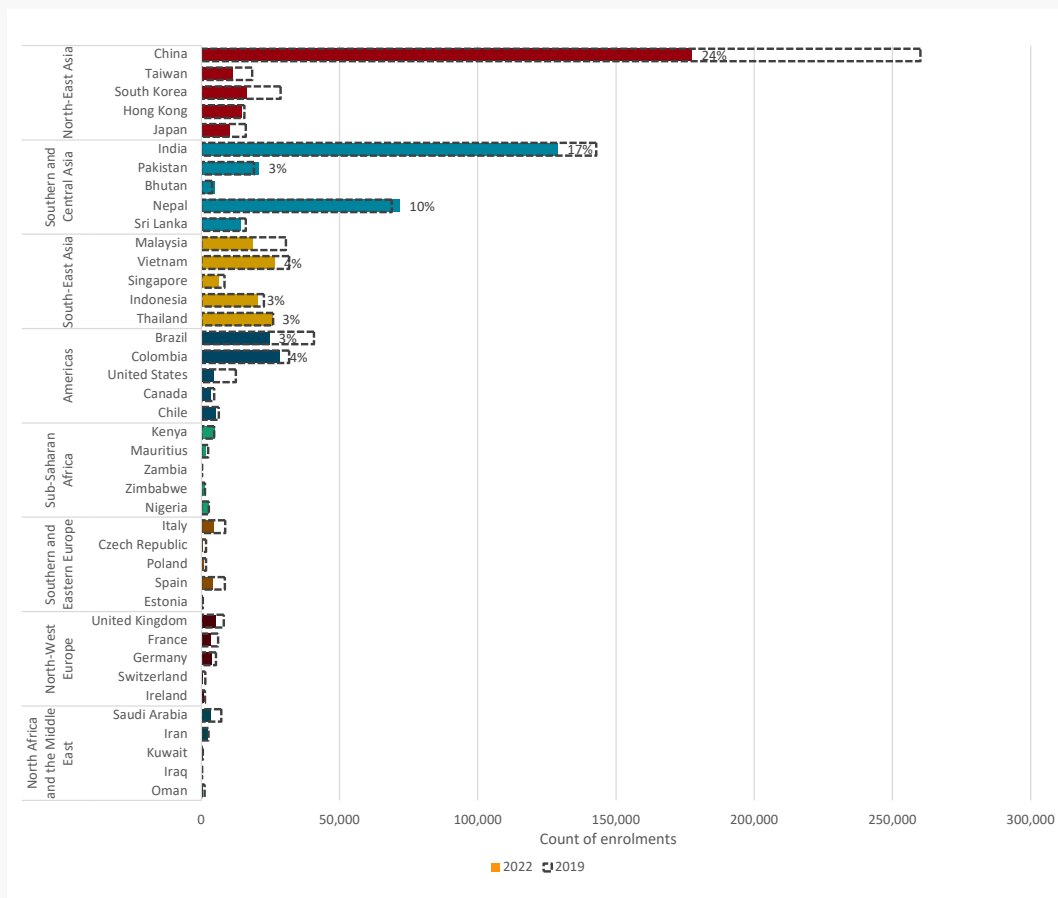
student enrolments (down 32%) compared to pre-COVID-19 levels.

In terms of regional distribution, Southern and Central Asia ranked as the second-highest region, with India (17% share) leading the way, followed by Nepal (10%) in 2022.

The South-East Asia region is in third place with Malaysia having a 4.0 per cent share. The Americas headed by Colombia and Brazil have a share of 4.0 per cent and 3.0 per cent respectively.

**FIGURE 18**

International student enrolments in Australia, by source country and region, 2019 and 2022



Source: Bankwest Curtin Economics Centre | Department of Education, International Student Data – full year data (based on data finalised in December 2022).



WA's international education sector is expected to benefit from the Australia-India ECTA agreement.

Figure 19 demonstrates international education enrolments in WA. There is a noticeable difference in source country shares between Western Australia and the country as a whole. WA has a more diverse range of countries contributing to the sector compared to the overall national market.

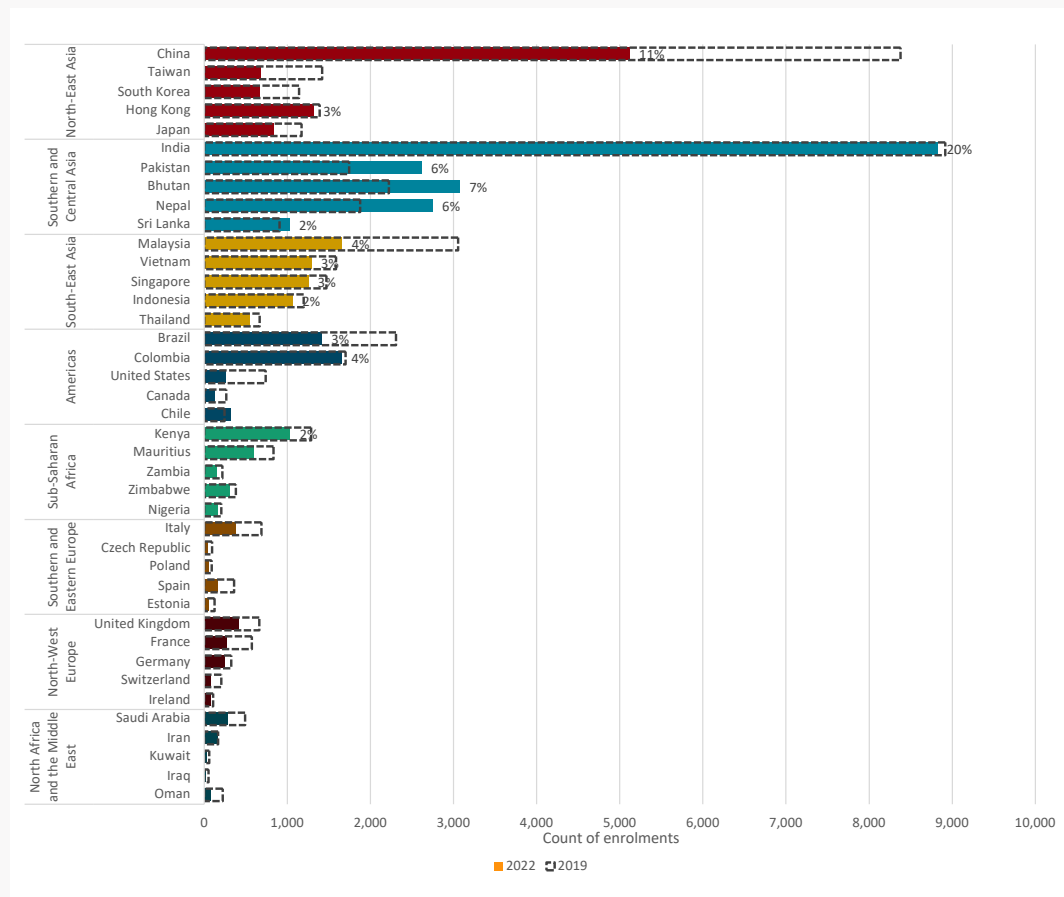
The Southern and Central Asia region provides the largest share of international

enrolments in WA. India leads with a 20 per cent share followed by China (11%) Malaysia (4%) and Vietnam and Singapore each reporting a 3.0 per cent share.

Some countries such as India have rebounded from the impact of COVID-19. China, where COVID-19 border and travel restrictions remained in place for longer, are getting closer to recovery.

**FIGURE 19**

International student enrolments in WA, by source country and region, 2019 and 2022



Source: Bankwest Curtin Economics Centre | Department of Education, International Student Data – full year data (based on data finalised in December 2022).

Like many sectors, the COVID-19 pandemic has provided an opportunity for the international education sector to reset.

Despite ongoing efforts to re-engage with international students, it is evident that several source countries are still lagging pre-COVID-19 levels. Students require time to make decisions and it will take time for the sector to recover.

Efforts must continue and it is important that WA takes the opportunity to regain market share and focus on emerging opportunities.

The recent signing of the Australia-India Economic Cooperation and Trade Agreement (ECTA) at the end of 2022 is a case in point. It is anticipated that this agreement will foster investment prospects in various priority sectors, and WA must take full advantage. These sectors encompass defence, space, critical minerals, renewable energy, technology, innovation, and international education. WA has a strong base in international education with India and further benefits can be derived from this partnership.

Difficult questions persist around how the sector will regain its previous momentum of 2019, with rising concerns about travel confidence, international uncertainty, and the national housing crisis. Attempts to address the latter need to consider the effect of housing in enabling the international student sector to reach its full potential.

International students play a critical role in helping to address current and future skills needs. The contribution they make while studying in Australia was highlighted during the COVID-19 pandemic. In the absence of international arrivals during COVID-19 lockdowns, the Australian government introduced measures to support international student employment. For example, the government removed existing work hour caps for Student Visa holders employed in the tourism and hospitality sector. Such measures can play an important role in supporting international students while they study and ensure they achieve work experience in Australia to support transition to future employment that utilises the knowledge and skills obtained during their studies.



International students play a critical role in helping to address current and future skills needs.



There were 8.7 million visitor trips to Australia in 2019, 11.5% of which were to WA.

### Trends in international tourist visits

Tourism plays a noteworthy role in the trading activities of Australia. According to data from 2022, the overall expenditure on trips to Australia from overseas visitors amounted to \$12.7 billion, encompassing approximately 8.7 million visits to the country. The most recent BCEC report titled 'Go Your Own WA: Recovery and regeneration for the tourism industry in Western Australia' (BCEC, 2023) provides more detailed analysis and insights into the outcomes of tourism. Here, an update on some key metrics is provided.

### Trips by state and source country

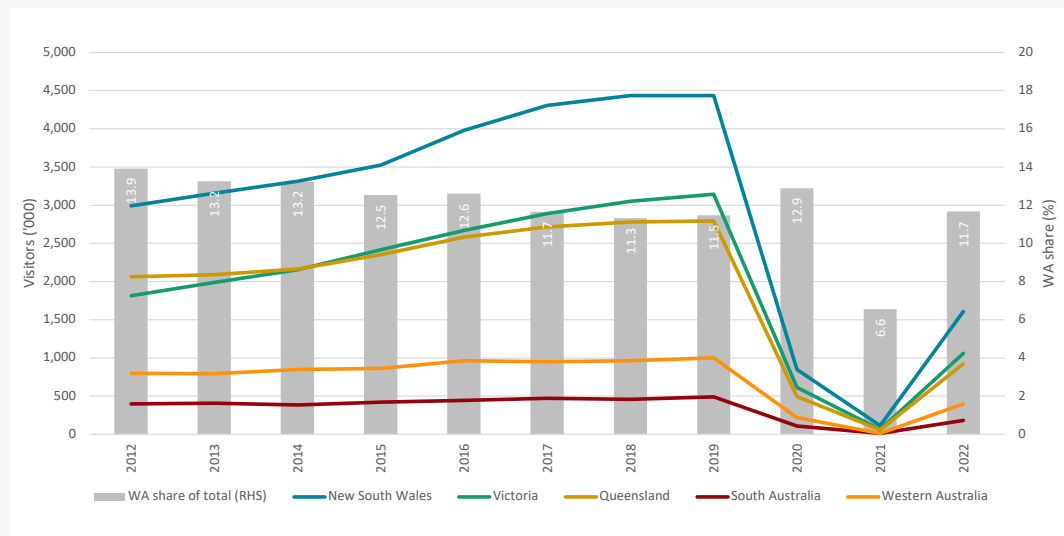
Overall, there were 8.7 million visitor trips to Australia in 2019. Trips to WA accounted for

11.5 per cent of the national (999,300 trips). These results represented an historical peak year both nationally and for the state. However, these numbers decreased dramatically in 2020, with a low of 224,100 international trips to Australia due to COVID-19 restrictions, 14,700 of which were to WA.

2022 brought clear signs of recovery as COVID-19 restrictions eased. There was a significant increase in visitor trips to Australia, reaching a total of 3.4 million. Out of this, 11.6 per cent (398,600 trips) were directed to WA. While these numbers still fell short of pre-COVID-19 levels, representing only 40 per cent of the trips from 2019, the signs of recovery remain strong both nationally and at the state level.

**FIGURE 20**

Annual international trips to Australia by state ('000), 2012 to 2022



Notes: The TRA imputed IVS estimates from the March quarter 2020 to June quarter 2022. This was due to COVID-19 related international border closures and insufficient sample size of interviews.

Source: Bankwest Curtin Economics Centre | Authors calculations based on Tourism Research Australia - International Visitor Survey.

By 2019, the top three of source countries for tourism visits to Australia accounted for almost 40 per cent of the total international trips. China led the way with 1.3 million trips (15.5% share), followed by New Zealand (14.9%) and USA (8.8%), with Japan, Singapore, India, Malaysia, Hong Kong, and Korea closing out the top ten.

In the post-COVID-19 period, the landscape of tourism in Australia looks different. By the end of 2022, New Zealand emerged as the leading country with 70,400 visitor trips constituting 18.5 per cent of the total. Following New Zealand were the UK (10.8%), the USA (8.8%), India (8.5%), and Singapore (7.5%).

An analysis of the trips in 2022 as a percentage of 2019 provides insights into the recovery of international trips to Australia by country. The results indicate that India is the country closest to reaching pre-COVID-19 levels, with 77.2 per cent of 2019 international trips. India is followed by Singapore (61.3%), the UK (55%), New Zealand (48.6%), and the USA (39.2%).

In contrast, China exhibits the lowest figure, with only 6.2 per cent of 2019 international trips. This is mainly attributed to the continued closure of Chinese borders until December 2022.



The UK is the top source country for tourism visits to WA (17.7% share).

**TABLE 2**

Top 10 international trips by country of origin, Australia, 2018 to 2022

Rank	Country of residence	2019		2020		2021		2022		2022/ 2019
		('000)	% share	('000)	% share	('000)	% share	('000)	% share	%
1	China	1,328.2	15.3	184.0	10.8	6.3	2.8	87.5	2.6	6.6
2	New Zealand	1,299.2	14.9	220.6	12.9	88.6	39.5	632.1	18.5	48.6
3	United States of America	767.0	8.8	182.4	10.7	14.7	6.5	300.3	8.8	39.2
4	United Kingdom	671.5	7.7	193.9	11.4	19.7	8.8	369.5	10.8	55.0
5	Japan	457.9	5.3	87.4	5.1	1.7	0.8	74.0	2.2	16.2
6	Singapore	416.5	4.8	53.4	3.1	13.0	5.8	255.2	7.5	61.3
7	India	376.7	4.3	80.4	4.7	12.4	5.5	290.8	8.5	77.2
8	Malaysia	342.9	3.9	42.1	2.5	2.2	1.0	79.8	2.3	23.3
9	Hong Kong	284.9	3.3	54.8	3.2	2.8	1.3	49.4	1.4	17.3
10	Korea	254.3	2.9	47.2	2.8	2.0	0.9	67.8	2.0	26.7
	Other countries	2,509.5	28.8	558.9	32.8	60.7	27.1	1,208.7	35.4	48.2
	Total	8,708.6		1,705.1		224.1		3,415.1		39.2

Notes: The top 10 are based on 2019 levels. The TRA imputed IVS estimates from the March quarter 2020 to June quarter 2022. This was due to COVID-19 related international border closures and insufficient sample size of interviews.

Source: Bankwest Curtin Economics Centre | Authors calculations based on Tourism Research Australia - International Visitor Survey.



In 2022 visitors from the UK to WA remained down 49% on the numbers observed in 2019.

As for WA, in 2019 the United Kingdom (UK) was the leading source country, accounting for 15 per cent of international visitors to the state.

Following the UK were Singapore (10.7%), Malaysia (10.1%), New Zealand (7.5%), and China (7.3%). The remaining countries in the top ten were the USA, Indonesia, Japan, Germany, and Hong Kong.

The establishment of a travel bubble between New Zealand and WA had an impact on the statistics. New Zealand emerged as the leading country visiting WA, accounting for 30.1 per cent of total international trips by 2021.

As many international travel borders reopened in 2022, the UK recovered to the top position, accounting for 17.7 per cent (70,400) of visitor trips. The UK was followed by Singapore (16.2%), New Zealand (9.0%), and USA (5.3%).

As for signs of a recovery, Singapore has recovered to some 60 per cent of pre-COVID-19 levels, followed by the UK (49.3%), New Zealand (48.3%), and the USA (36.5%). Chinese travel restrictions have meant that the nation has only recovered to 4.6 per cent of its pre-COVID-19 levels.

**TABLE 3**

Top 10 international trips by country of origin, WA, 2019 to 2022

Rank	Country of residence	2019		2020		2021		2022		2022/ 2019
		('000)	% share	('000)	% share	('000)	% share	('000)	% share	%
1	United Kingdom	142.8	14.3	45.4	20.6	1.4	9.8	70.4	17.7	49.3
2	Singapore	107.4	10.7	14.0	6.4	0.9	6.5	64.6	16.2	60.1
3	Malaysia	100.7	10.1	11.1	5.0	0.2	1.4	16.2	4.1	16.1
4	New Zealand	74.5	7.5	12.2	5.6	4.4	30.1	36.0	9.0	48.3
5	China	72.9	7.3	15.7	7.1	0.3	1.7	3.3	0.8	4.6
6	United States of America	57.5	5.8	17.0	7.7	0.6	4.1	21.0	5.3	36.5
7	Indonesia	38.8	3.9	5.8	2.6	0.4	3.0	10.5	2.6	26.9
8	Japan	38.8	3.9	9.0	4.1	0.1	0.6	3.3	0.8	8.5
9	Germany	33.8	3.4	10.1	4.6	0.2	1.3	14.7	3.7	43.5
10	Hong Kong	31.6	3.2	7.1	3.2	0.1	1.0	3.5	0.9	10.9
	Other countries	300.4	30.1	72.4	33.0	6.0	40.5	155.2	38.9	51.7
	<b>Total</b>	<b>999.3</b>		<b>219.7</b>		<b>14.7</b>		<b>398.6</b>		<b>39.9</b>

Notes: The top 10 are based on 2018-19 trips. The TRA imputed IVS estimates from the March quarter 2020 to June quarter 2022. This was due to COVID-19 related international border closures and insufficient sample size of interviews.

Source: Bankwest Curtin Economics Centre | Authors calculations based on Tourism Research Australia - International Visitor Survey.



The analysis of monthly arrivals provided by the Australian Bureau of Statistics (ABS) to March 2023 allows for a closer examination of the performance of international tourism in Australia and WA. Monthly variations are an important consideration given the seasonal nature of the tourism sector.

Throughout 2022, the removal of border restrictions and increased flight availability contributed to a gradual reduction in the gap between the 2022 and 2019 figures. The gap continued to decrease in the early months of 2023 and by March the gap had diminished to 26.7 per cent for Australia,

and 12.7 per cent for WA, marking a significant decrease from the gaps of 79.6 per cent and 77.5 per cent, respectively, observed in March 2022.

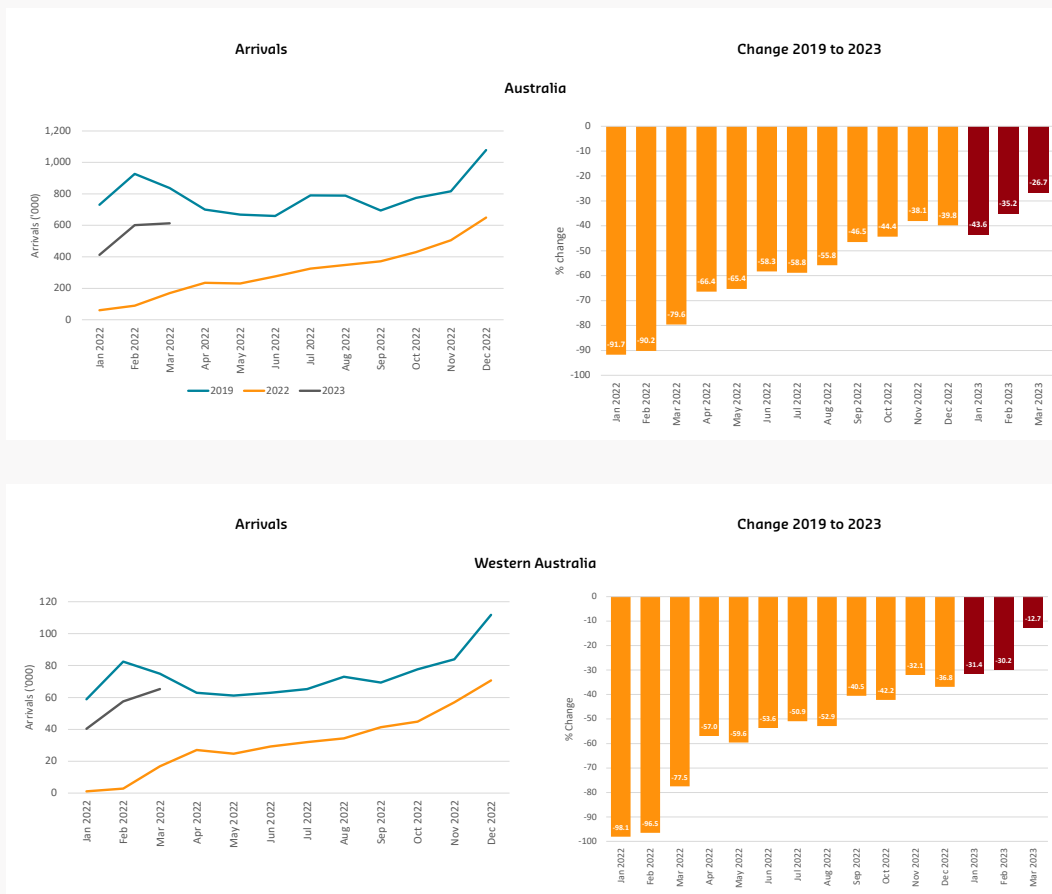
These findings highlight encouraging signs of recovery in the number of international visitors to Australia and WA which can be attributed to a growing confidence in travel and the easing of border restrictions between states. However, it will take more time before a complete recovery to pre-pandemic 2019 levels is seen in key tourism regions.



International short term visitor arrivals are steadily returning to pre-pandemic levels.

**FIGURE 21**

International short-term visitor arrivals to Australia and WA, by month, 2019 and 2022-23



Source: Bankwest Curtin Economics Centre | Authors calculations based on ABS Overseas Arrivals and Departures, Australia December 2022.



The USA, UK, NZ, and EU account for 55.4% (\$540.7Bn) of Australia's total outgoing FDI.

## AUSTRALIA'S FOREIGN DIRECT INVESTMENT POSITION

In 2022 the majority of foreign investment favoured incoming investment, amounting to a total of \$1,118.9 billion, while Australian investment abroad (outgoing investment) stood at \$975.5 billion.

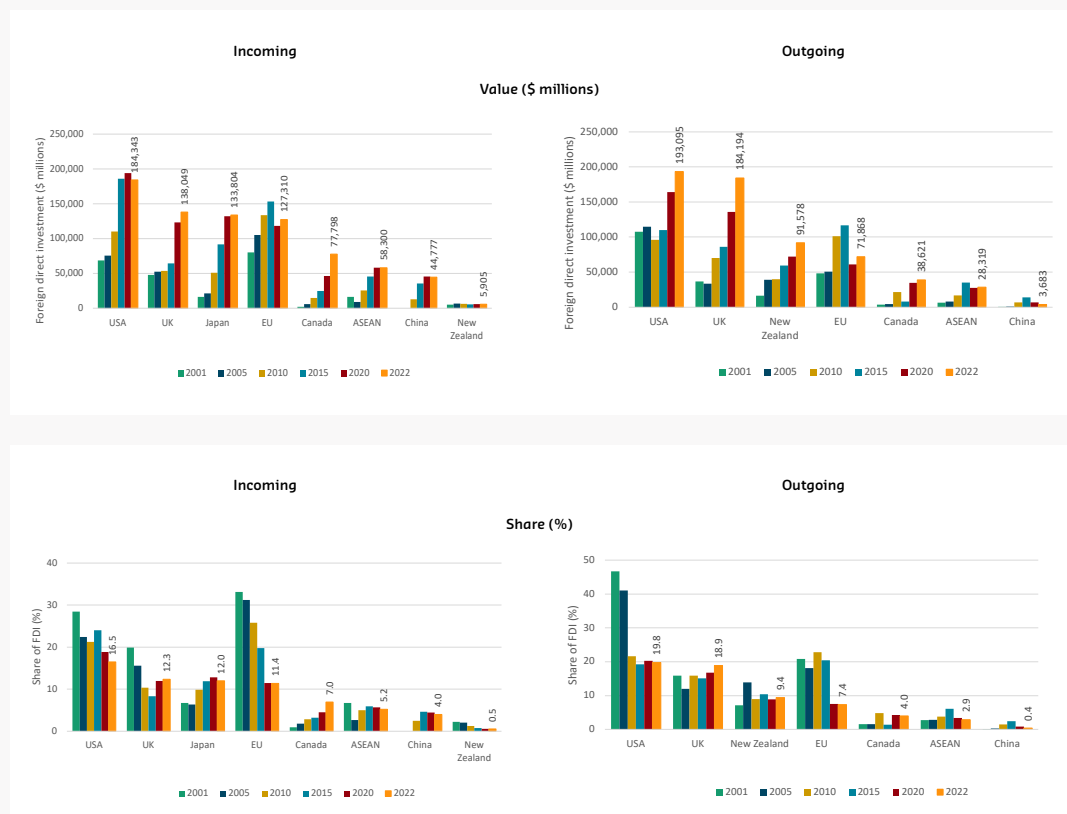
Figure 22 examines the historical trends in foreign direct investment (FDI) in Australia from 2001 to 2022, both incoming and outgoing. As of 2022, in terms of Australian investment abroad, the USA, UK and New Zealand, together with the EU collectively

make up nearly 55.4 per cent (\$540.7Bn) of the total outgoing FDI.

USA emerged as the primary source of incoming FDI in Australia, comprising a substantial 16.5 per cent (\$184.3Bn) of the total. Following the USA were the UK with 12.3 per cent (\$138.8Bn) and Japan with 12 per cent (\$133.8Bn). The EU closely followed in fourth place, accounting for 11.4 per cent (\$127.3Bn) of the overall investment inflows.

**FIGURE 22**

Incoming and outgoing FDI, by major country groups, Australia, 2001 to 2022



Notes: Investment value in current prices, \$AUD.

Source: Bankwest Curtin Economics Centre | Authors' calculations from ABS CAT 5368, Table 14a and Table 14b.

Table 4 highlights the top ten countries for value and count of foreign investment approvals for Australia in 2021-22. The leading country in terms of investment approvals was China, with a total of 2,620 approvals followed by the USA and Hong Kong with 931 and 791 approvals, respectively.

However, a different picture emerges when considering the monetary value associated with each country's investment approvals. In this regard, the USA takes the lead with \$118.9 billion approved for incoming investment. Canada and Singapore secure the second and third positions, with \$31.1

billion and \$24.1 billion respectively. China takes fourth place with a total of \$7.2 billion.

When examining the industries where countries allocated their investment in 2021-22, broad variation by country is observed. FDI from the USA into Australia is primarily geared towards the finance sector (\$81Bn) while FDI from Canada focuses primarily on manufacturing (\$11.4Bn).

China and Singapore predominantly invest in real estate with amounts of \$11.8 billion and \$3.7 billion respectively.

**TABLE 4**

Value and count of foreign investment approvals, by partner country, Australia, 2021-22

Country	Count Approvals	Agriculture	Finance	Manufacturing and Energy	Mining	Real Estate	Services	Total
United States	804	719.0	81,128.3	5,227.6	3,960.6	9,607.0	18,219.8	118,862.3
Canada	428	2,497.0	2,040.3	11,421.4	677.5	4,369.9	10,827.0	31,833.2
Singapore	565	1,430.4	1,957.3	1,113.0	10.4	11,795.3	7,873.9	24,180.2
China	2,620	235.5	288.2	1,212.3	1,247.0	3,703.0	561.0	7,247.0
Japan	199	409.9	169.6	1,791.0	981.7	2,318.3	1,550.1	7,220.7
United Kingdom	425	168.7	285.1	523.7	1,421.0	2,571.8	1,577.0	6,547.3
United Arab Emirates	182	58.8	393.5	960.9	600.5	2,117.5	2,069.9	6,201.1
Germany	151	215.0	650.7	524.9	496.6	2,987.5	1,281.7	6,156.4
Hong Kong	791	20.1	8.8	9.4	346.9	4,454.3	645.8	5,485.3
Korea, Republic of (South Korea)	182	92.2	184.5	1,622.7	294.5	1,090.9	1,246.8	4,531.7
<b>Total</b>	<b>10,178</b>	<b>8,184.9</b>	<b>93,925.0</b>	<b>34,275.1</b>	<b>14,069.8</b>	<b>64,762.1</b>	<b>86,141.6</b>	<b>301,358.4</b>

Notes: Value of investments in current prices.

Source: Bankwest Curtin Economics Centre | Treasury of Australia, Annual Report, 2021-22.

"THIS CHAPTER SEEKS  
TO **EVALUATE THE  
EXTENT TO WHICH  
THE FREE TRADE  
AGREEMENTS**  
SIGNED BY  
AUSTRALIA HAVE  
INFLUENCED TRADE  
FLOWS."





# FREE TRADE AGREEMENTS AND TRADE DYNAMICS



International trade is an essential driver of economic growth and prosperity.

## INTRODUCTION

In today's interconnected and globalised world, international trade is an essential driver of economic growth and prosperity. As nations strive to expand their economic horizons, the pursuit of free trade agreements has emerged as a prominent strategy.

This chapter seeks to evaluate the extent to which the free trade agreements signed by Australia have influenced trade flows.

Utilising internationally recognised econometric techniques, the findings presented aim to shed light on the complex dynamics that arise from the implementation of free trade agreements. In addition, this chapter will delve into how the imposition of severe tariffs and trade embargoes on specific commodities can impact trade dynamics and highlights the interconnectedness of nations.

## BENEFITS OF FREE TRADE AGREEMENTS

Over recent decades, Australia has been actively pursuing preferential trade agreements with various countries across the world. Having multiple trade agreements offers several advantages including decreased import tariffs, removal of trade barriers, and improvements to tariff-rate quotas. Reduced tariffs enhance the competitiveness of Australian goods in global markets and reduces the prices of imported products for Australian consumers.

Additionally, certain free trade agreements (FTAs) ensure preferential tariff-rate quotas, granting assured access to specific commodities in importing nations. These agreements can be either bilateral (between two countries) or plurilateral (involving multiple countries).

Australia signed 17 FTAs from 2000 to 2022 including the two most recent agreements, the Regional Comprehensive Economic Partnership (RCEP)<sup>2</sup> and the Australia-India Economic Cooperation and Trade Agreement (AIECTA) (Figure 23). Furthermore, the Australia-UK FTA recently entered into force on 31st May 2023.

RCEP presents Australian enterprises with fresh opportunities and improved regulations for expanding trade and investment activities in the dynamic and fast growing Indo-Pacific region. The agreement's objective is to gradually eliminate up to 90 per cent of import tariffs among the participating countries within 20 years of its inception.

Similarly AIECTA aims to eliminate or reduce tariffs on 99 per cent of Australian goods exports to India by 2038. This is very significant given that Australia exported \$19.3Bn worth of goods to India in 2021, some 4.2 per cent of Australia's total exports.

FTAs not only aim to reduce or eliminate tariffs but also play a vital role in addressing behind-the-border barriers that could hinder the movement of goods and services. FTAs also foster investment by enhancing regulations around issues such as intellectual property, e-commerce, and government procurement.

The ASEAN-Australia-New Zealand Free Trade Agreement (AANZFTA), Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) and Pacific Agreement on Closer Economic Relations Plus (PACER) are plurilateral agreements covering multiple countries<sup>3</sup>, including some nations with which Australia also has a bilateral agreement. For instance, Australia has already signed bilateral free trade agreements with China (ChAFTA), Chile (ACIFTA), Hong Kong (AHKFTA), the USA (AUSFTA), Indonesia (IACEPA), Japan (JAEP), Korea (KAFTA), Malaysia (MAFTA), and Peru (PAFTA), as well as Singapore (SAFTA), and Thailand (TAFTA) (Figure 23).



Australia signed 17 FTAs from 2000 to 2022.

<sup>2</sup> RCEP is a regional free trade agreement that complements and builds upon Australia's existing free trade agreements with 14 other Indo-Pacific countries (DFAT, 2023).

<sup>3</sup> AANZFTA is a trade agreement between Australia, New Zealand and ASEAN members including Brunei Darussalam, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand and Vietnam. CPTPP is a plurilateral free trade agreement between Australia and Canada, Japan, Mexico, New Zealand, Singapore, Vietnam, Peru, Malaysia, Chile while PACER is an agreement between New Zealand, Samoa, Tuvalu, Kiribati, Tonga, Solomon Islands, Niue, Vanuatu and Cook Islands.



There is a continuous upward trend in the number of FTAs established between countries.

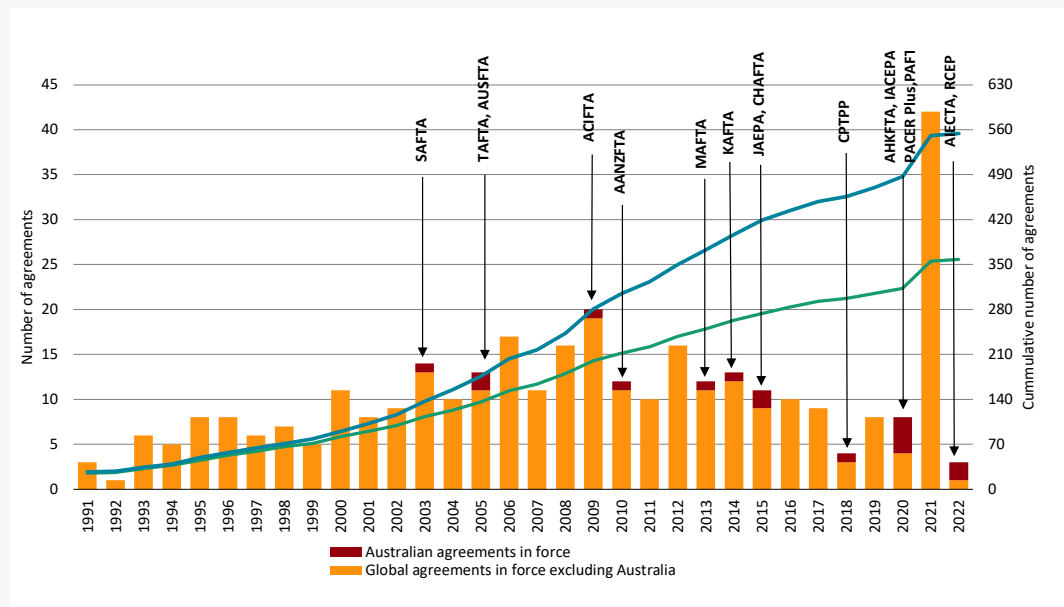
Australia negotiated FTAs and lower tariffs with key partners before many competing nations.

On a global scale, there is a continuous upward trend in the number of FTAs established between countries. In the last five years, 65 new FTAs have been implemented, as depicted in Figure 23. Moreover, there is a noticeable surge in cumulative notifications indicating a forthcoming increase in the number of FTAs that will be in effect in the coming years.

Australia negotiated lower tariffs and potentially enjoyed a first mover advantage over competitors. This decrease in tariffs enhances product appeal (price) to consumers, potentially resulting in an increase in export volume.

**FIGURE 23**

Number of global and Australian free trade agreements, 1991 to 2022



Source: Bankwest Curtin Economics Centre | Authors' calculations using DFAT (2023), WTO (2023).



## THE IMPACT OF FREE TRADE AGREEMENTS

As discussed, one of the benefits of FTAs is lower tariff rates. Regarding importing goods, reduced tariff rates offer several benefits. First, they make imported goods more affordable for Australian consumers. Second, lower import tariffs stimulate international trade and foster economic growth. By lowering barriers to imports, Australian businesses can access a diverse range of inputs, which can facilitate domestic production and enhance productivity. Additionally, lower import tariffs can encourage foreign investment and market entry. This can drive innovation, create job opportunities, and promote economic development.

Figure 24 presents the average of applied tariff rates weighted by the product import shares for a selection of major economies across the world. In 2020, imports to Australia faced a significantly lower average tariff rate of 0.71 per cent when compared to other economies such as the USA (1.52%) and Japan (2.22%), as well as groups of countries such as the European Union (1.48%).

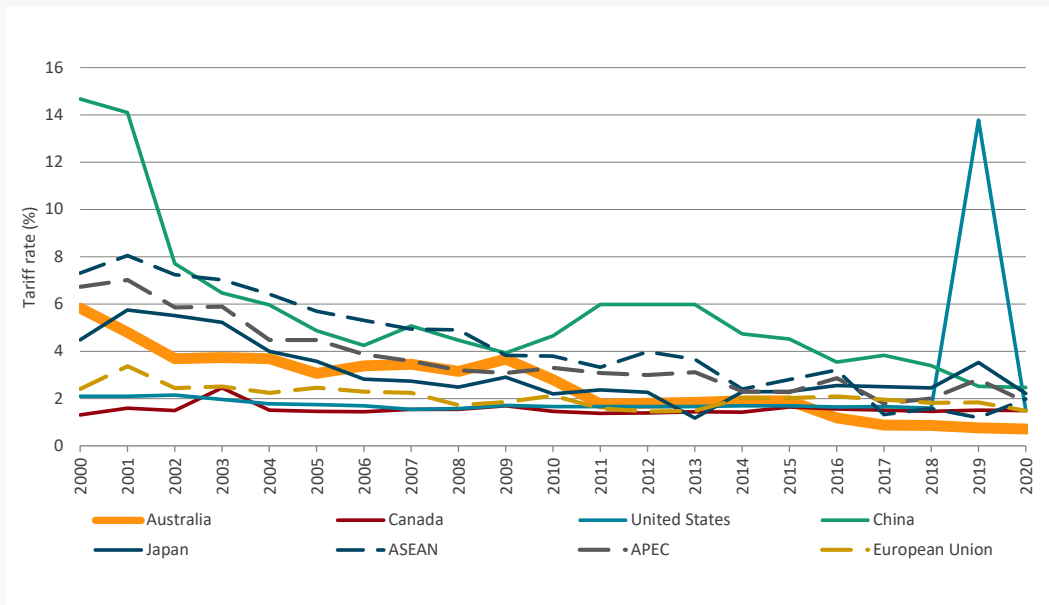
The 'Trump tariffs' on Chinese imports in 2019 were striking and aligned with the Trump administration's protectionist trade policies.



As of 2020, imports to Australia faced a significantly lower average tariff rate (0.71%) than that experienced by other economies.

**FIGURE 24**

Weighted mean tariff rate, all products, selection of regions, 2000 to 2020



Notes: Figure presents weighted means across all products in percentage.  
 Source: Bankwest Curtin Economics Centre | Authors' calculations using World Bank data.



Lower tariff rates play a facilitating role in driving the substantial export growth for key commodities in WA.

In terms of exporting goods, lower tariff rates can also offer numerous advantages. First, reduced tariffs could enhance the competitiveness of Australian products in international markets. Australian exports become more affordable thereby increasing their attractiveness to foreign consumers. Second, lower tariffs foster stronger trade relationships with partner countries and lastly they encourage diversification of exports and market expansion. Australian businesses can explore new markets and export a broader range of products to different countries, mitigating risks associated with overreliance on specific markets.

Table 5 presents the Most Favoured Nation (MFN)<sup>4</sup> as well as the preferential tariff rates Australian exports are subject to for selected commodities to major trading partners in 2016 and 2022. Tariff rates are also contrasted with the change in the value of exports for the same years.

There has been a substantial increase in the export value of iron ore and concentrates, as well as coal, between 2016 and 2022, for the countries presented. These two commodities are subject to zero per cent tariff rates for the selected nations. The increase in exports cannot be solely attributed to low tariff rates, nevertheless it indicates that the lower tariff rates have played a facilitating role in driving this substantial export growth. A modelling exercise follows examining the relationship between FTAs and trade.

The observed decline in negotiated tariff rates for exporting beef to China, Japan, and Korea appears to be correlated with a corresponding rise in beef exports to these nations during the same period. It is worth highlighting that there has been a substantial increase in barley exports to Saudi Arabia, which can be partially attributed to the imposition of severe tariffs and embargoes by China, as well as the favourable market accessibility offered by Saudi Arabia's low tariffs.

<sup>4</sup> Most Favoured Nation (MFN) is the tariff typically applied to imports from WTO member countries where reduced tariffs under an FTA are not available.

**TABLE 5**

Applied tariff rates for a selection of Australian exports to major trading partners, 2016 to 2022

	MFN <sup>a</sup>	Preferential Tariff		Exports (\$ billions)		
	(%)	Rate (%)		2016	2022	Change in %
	2022	2016	2022			
<b>Iron ore and concentrates</b>						
China	0%			44.1	103.3	134%
Japan	0%			4.8	8.7	81%
Republic of Korea	0%			3.3	7.0	113%
<b>Beef, f.c.f.</b>						
China	20%	16%	4%	0.7	2.1	211%
Japan	39%	32%	25% <sup>b</sup>	1.8	2.0	11%
United States	26%	26%	20% <sup>c</sup>	1.7	1.7	1%
Republic of Korea	40%	35%	16%	1.2	1.8	49%
<b>Coal</b>						
Japan	0%			11.9	57.0	380%
India	1%			6.7	23.0	246%
Republic of Korea	0%			4.8	17.2	257%
<b>Vegetables<sup>d</sup></b>						
China	8%	4%	0%	0.3	1.0	274%
India	11%			1.0	0.4	-62%
Japan	5%	0%	0%	0.2	0.2	12%
<b>Barley</b>						
Saudi Arabia	0%			0.1	1.4	1727%
Japan	28% <sup>e</sup>	0%	0% <sup>f</sup>	275.0	507.8	85%
Thailand	27%	0%	0%	6.7	10.2	52%
<b>Aluminium ores &amp; conc (incl alumina)</b>						
China	5% <sup>g</sup>	0%	0%	1.0	1.6	70%
South Africa	0%			0.4	0.7	98%
New Zealand	0%			0.2	0.3	66%

Notes: <sup>a</sup>Most Favoured Nation (MFN) is the tariff typically applied to imports from WTO member countries where reduced tariffs under an FTA are not available.

<sup>b</sup>Average preferential tariff rate when exporting under JAEPA and CPTP.

<sup>c</sup>The preferential tariff rate for beef described in gen. note 15 of the HTS is 0%.

<sup>d</sup>Tariff rates for vegetables are the simple average across all commodities.

<sup>e</sup>MFN Duties (Applied) for product 100310-Barley: Seed (HS2017).

<sup>f</sup>Preferential tariff for Australia under CPTPP is 7.09% for product 100390099-Barley: Other: Other: Other (HS2017).

<sup>g</sup>MFN tariff rate for product 26060 – Aluminium ores and concentrate (HS2017) is 0%.

Source: Bankwest Curtin Economics Centre | Authors' calculations based on Market Access Map and DFAT data.



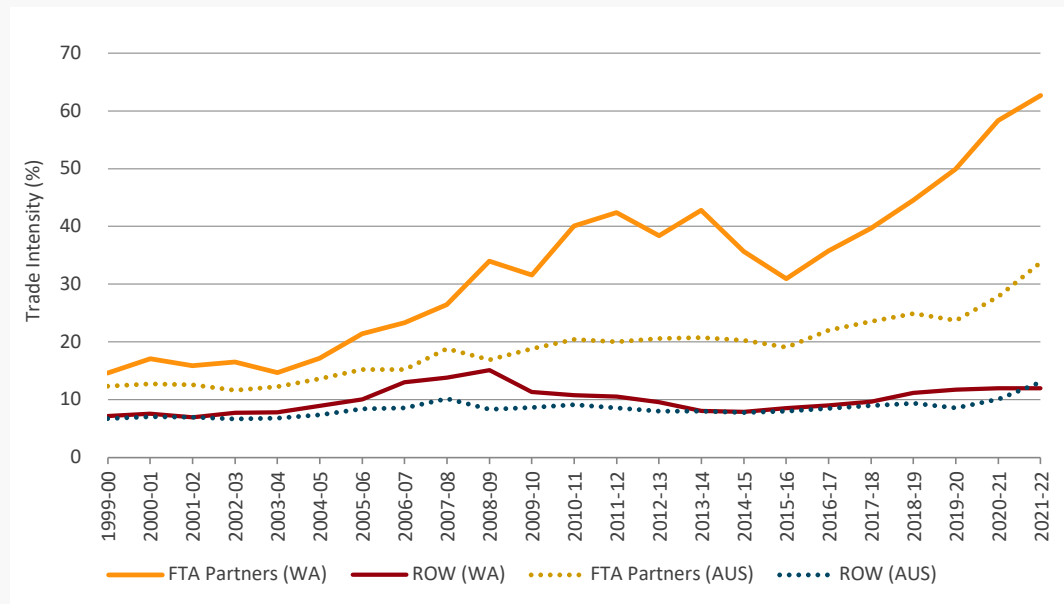
WA's trade intensity with FTA partner countries has increased by 84% since 2008-09.

Figure 25 presents Australia's and Western Australia's trade intensity<sup>5</sup> with FTA partner countries and the rest of the world. The trade intensity between WA and FTA partner countries has increased whereas trade intensity with the rest of the world

is stabilising. The gap is lower when the comparison is made at the national level. Specifically, WA's trade intensity with FTA partner countries has increased by 84 per cent since 2008-09.

**FIGURE 25**

WA's and AUS's trade intensity with key FTA partner countries and the rest of the world, 1999-00 to 2021-22



Notes: WA (Western Australia), AUS (Australia), ROW (Rest of the World).  
Source: Bankwest Curtin Economics Centre | Authors' calculations based on DFAT data.

<sup>5</sup> Trade intensity is defined as imports plus exports divided by gross state product/gross domestic product.

### Modelling the effects of free trade agreements

To estimate the impact of FTAs on trade, the BCEC estimated a gravity model, which is an econometric technique that has been widely used in the international trade literature (Timsina and Culas, 2020a; 2020b; 2022). A detailed description of the model can be found in the appendix.

For this modelling exercise, the total number of trade flows between a pair of countries is used. The focus is directed towards the most stringent specification<sup>6</sup>, which accounts for time-invariant characteristics across countries, global shocks over time, and a rich set of factors influencing trade. Therefore, modelling results are measures against a counterfactual scenario where trade determinants, year-specific events, and all observable and unobservable characteristics across countries are accounted for.

Findings demonstrate that the FTA with China (ChAFTA) led to trade creation, indicating an increase in trade flows between Australia and China. Specifically, exports to China have increased by \$275.4 billion since ChAFTA was implemented compared to a counterfactual scenario without the FTA enforced (Table 6).

The analysis also suggests that Australian exports shifted somewhat from other

countries towards China after the agreement. Similarly, since ChAFTA was enacted, Australia has become a more favourable destination for Chinese exports compared to other countries.

The trade agreements with Japan (JAEPA) and Korea (KAFTA) produced comparable outcomes. It is estimated that exports to Japan rose by \$99.1 billion whereas exports to Korea increased by \$40.7 billion following the implementation of the agreements.

The FTA with Thailand (TAFTA) resulted in trade creation implying a substantial increase in trade flows between Thailand and Australia without affecting the country-pairs trade relations with other countries. Indeed, exports to Thailand increased by \$57 billion since TAFTA was enforced.

On the other hand, modelling indicates that FTAs with New Zealand (ANZCERTA), Singapore (SAFTA), and Chile (ACIFTA) do not exert a statistically significant influence on trade.

Regarding the FTA with the USA (AUSFTA), findings suggest import diversion and a decrease in intra-group exports. This implies that Australia tends to import more goods from the USA compared to other countries, while exports to the USA have decreased following the implementation of the FTA<sup>7</sup>.



FTAs with China, Japan, Korea and Thailand have led to estimated gains of \$472.2Bn to Australian exports.

**TABLE 6**

Estimating the impact of free trade agreements on Australia's exports

	Year Enforced	Total Value of Exports since FTA was enforced	Estimated Total Value of Exports without the FTA	Estimated Change in Australian Exports due to the FTA	
	AU\$ billions	AU\$ billions	AU\$ billions	AU\$ billions	Percentage
ChAFTA	2015	1,019.9	744.5	275.4	37%***
JAEPA	2015	452.9	353.8	99.1	28%***
KAFTA	2014	234.7	194.0	40.7	21%**
TAFTA	2005	90.1	33.1	57.0	172%***

Notes: \*\* and \*\*\* indicate statistical significance at the 5% and 1% level respectively. Percentage changes are calculated using the formula  $e^{(\text{Coefficient})} - 1$  and the estimated intra-trade coefficients from the Gravity Model Table 10, Column 4.

Source: Bankwest Curtin Economics Centre | Authors' calculations based on Gravity Model estimates.

<sup>6</sup> See Table 10, column 4.

<sup>7</sup> These findings are in line with previous studies (see Armstrong, 2015).

## TRADE TARIFFS AND TRADE FLOWS - THE CHINESE CASE

During the COVID-19 pandemic, another event occurred that impacted the world of trade - China's introduction of several tariffs and embargos on Australian exports. Tariffs were imposed on barley, wine, and coal, as well as lobsters, lumber, and several other goods.

The rationale behind these trade restrictions was varied. In the case of barley, China argued that Australia was 'dumping' the grain in the Chinese market and acted on their interpretation of the World Trade Organization's Anti-Dumping Agreement. Crustaceans, meanwhile, were subjected to a 'technical embargo', with China claiming that they had discovered traces of heavy metals within live Australian rock lobsters, before implementing a mandatory testing period that was too long for the live lobster exports to survive.

Regardless of the justification behind them, these tariffs created an impact on the composition of Australia's exports for the goods in question, with exports to China almost disappearing in response to these measures (Figure 26).

Some markets were able to adapt to the trade restrictions, finding new target markets that could compete with the prices China offered. Others, however, struggled to meet the same level of performance as before, with a reduction in export value.

Barley is one commodity that quickly pivoted to other markets. A major increase in exports from Australia to Saudi Arabia occurred, with some additional exports of barley to Japan as well.

Meanwhile, China sought imports of barley from other nations in Australia's place with France, Canada, and Ukraine being the major partners of choice (Figure 27).

Other goods, such as crustaceans, faced a more difficult path. Many exporters were forced to pivot some of their products to the frozen food market which carries lower prices.

WA was not spared the effects of these trade restrictions. Though the state's primary export of iron ore was overlooked for trade restrictions, several smaller exporters were heavily impacted by the tariffs and embargoes implemented by China (Figure 26).

Crustacean exports from WA, for example, saw their total value add fall by 41.2 per cent from 2019 to 2020 and then a further 30.0 per cent from 2020 to 2021, with the industry shifting to new partners to meet their quota. During this period, the industry also had to deal with skyrocketing freight costs in the fallout of the COVID-19 pandemic, to the point where the state government needed to intervene and support the cost of air freight for crustacean exporters. The Federal Government also established the International Freight Assistance Mechanism (IFAM) to help Australian businesses deal with the impact of the COVID-19 pandemic.

With soaring iron ore prices, and a shortage of workers across the state, many of these industries also had to compete with the prosperous mining industry for workers. Many were unable to do so, leading to additional constraints. Not unlike the Dutch Disease discussed earlier, the ongoing issue of labour and skills shortages is one that impacts long term export diversification.

**FIGURE 26**  
Exports of targeted goods, Australia and WA, 2013 to 2022



Notes: Value of exports in current prices, \$ millions AUD.

Source: Bankwest Curtin Economics Centre | Department of Foreign Affairs and Trade, Trade statistical pivot tables, 2022.



China's tariffs ranged from a mild inconvenience to seriously threatening targeted Australian industries, Australia livelihoods, and regional communities.

The impact of the tariffs was also felt in China. In the case of more specialised goods, such as rock lobsters, the Chinese market had to rely on 'backdoor' shipping deals and middlemen in destinations such as Vietnam and Hong Kong. This increased the cost of importing in multiple ways; with longer lead times on imported lobsters, additional fees needed to cover the costs of shipping services, and additional spending on infrastructure to ensure that imported live lobsters did not perish before reaching their destination.

China replaced barley imports from Australia with additional imports from Canada, France and Argentina.

In the case of these European trade partners, getting barley shipped into China also raised inefficiency issues with for example less efficient trade routing with more intermittent steps through areas

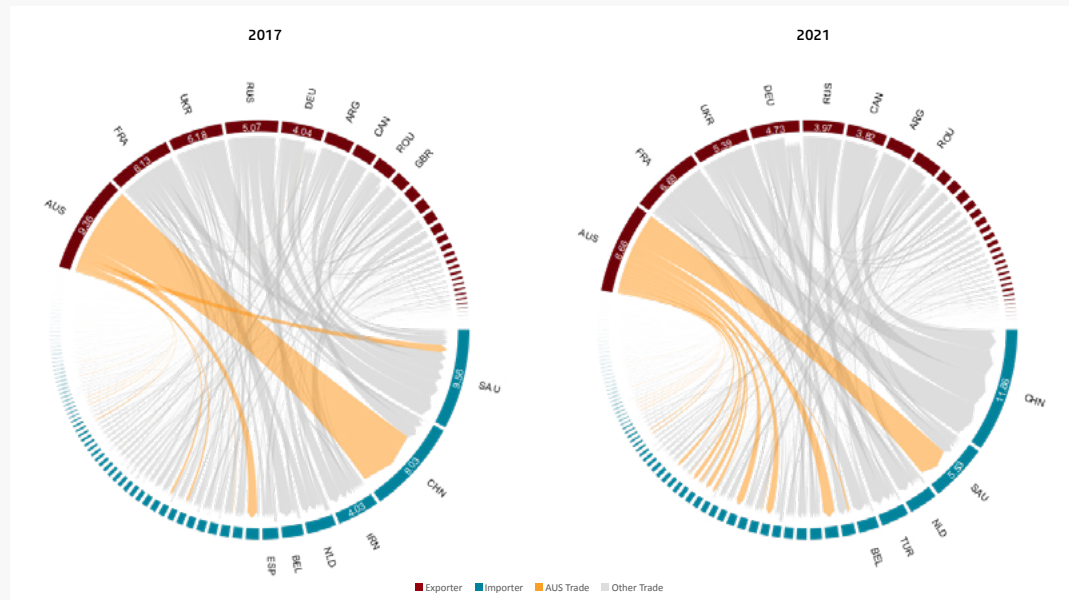
like the Malacca Strait and the Suez Canal. The latter, of course, suffered from a major supply-chain disruption for six consecutive days in 2021 that resulted in 450 large container vessels being effectively blockaded from travelling between Europe and Asia.

Whilst China's tariffs may have ranged from a mild inconvenience to seriously threatening targeted Australian industries, Australia livelihoods, and regional communities, other countries have benefitted from them.

In the case of barley, France pivoted to expand barley production and exported a greater volume to China as of 2021. Canada was also a beneficiary to this change in trade dynamics, with barley exports to China enabling Canada to overtake Argentina in global barley exports.

**FIGURE 27**

Global trade of barley, quantity in tons, by country, 2017 and 2021



Notes: Value labels indicate sum of exports + imports.  
Source: Bankwest Curtin Economics Centre | Authors' calculations from Centre d'Études Prospectives et d'Informations Internationales, BACI Bilateral Trade Flow Data.



## INTRA- AND INTER-INDUSTRY TRADE

The nature of trade flows within and between industry sectors is an important consideration in setting trade strategy, for both national and state governments.

The benefits and vulnerabilities from sectoral trade flows depend on the extent to which industry trade is substantially in one direction only (either predominantly exports, or predominantly imports), and whether trade is mainly concentrated on differentiated or similar products.

Two key concepts are used in trade policy discourse to capture these considerations:

\* **Intra-industry trade** refers to the import and export of goods of a similar trade classification within an industry sector, whereas:

\* **Inter-industry trade** refers to a situation in which an industry sector exports and imports goods with a different classification (OECD 2002).

Measures of intra-industry and inter-industry trade are useful economic indicators of the broad composition of a nation's trade flows and strategy.

For example, a high share of intra-industry trade can be an indicator of price-differentiated trade in the same nominal product (as a reflection of quality differences between exports and imports of the same product), production-differentiated trade (for example, importing machine parts, then exporting assembled machines), or as an indicator of horizontally-differentiated trade (that is, exporting and importing different brands of a similar type, such as in the case of car brands).

Inter-industry trade tends to occur when a jurisdiction has a comparative endowment advantage in a particular product or resource (for example, iron ore or lithium in the case of Western Australia) where there

are substantial economies of scale in their production and export.

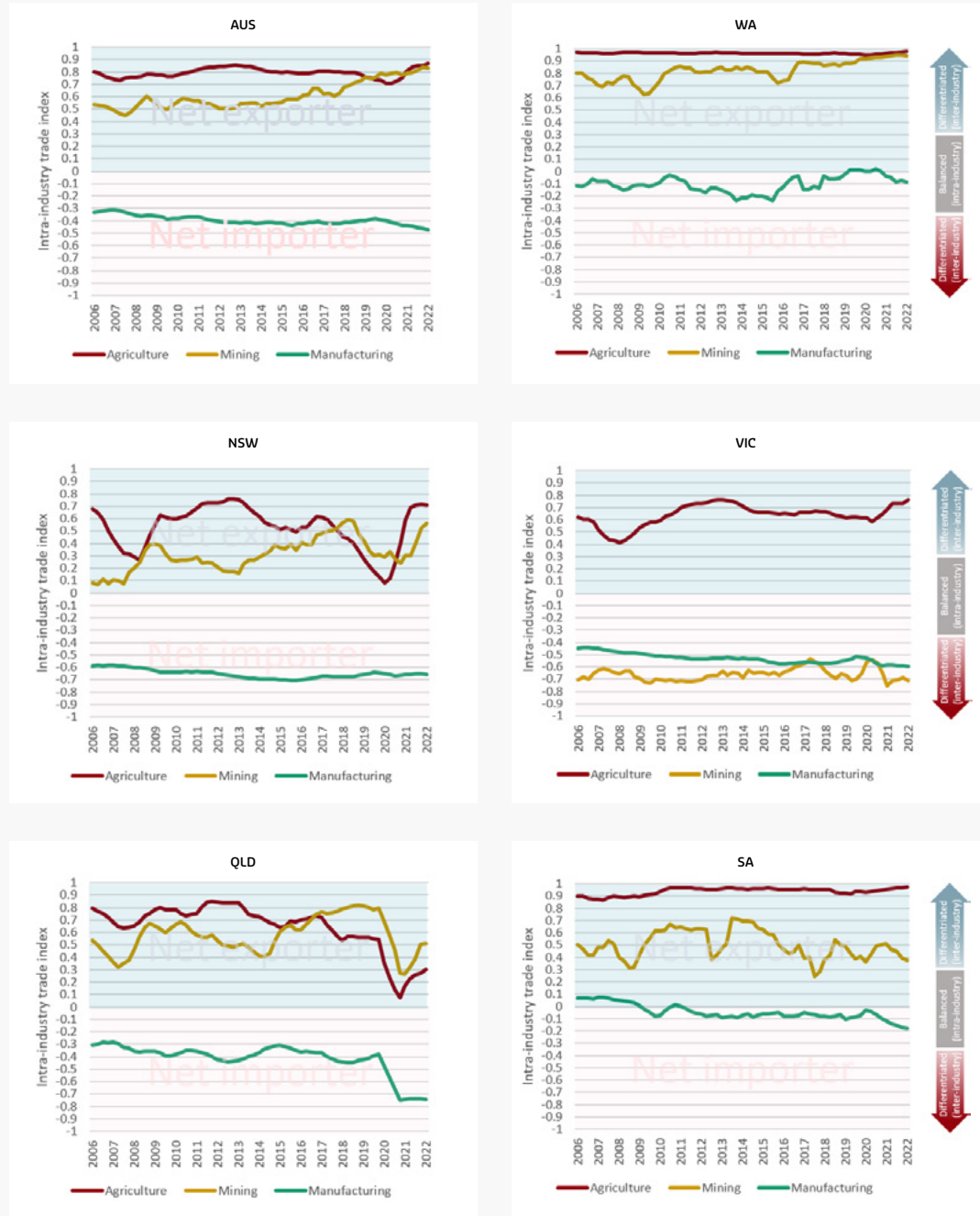
For this report we generate a composite trade index to track the composition and direction of sectoral trade flows for Australia and the main states over time (Figure 28). The index is scaled such that a value of 1 represents a high level of inter-industry trade dominated by exports, and a value of -1 represents import-dominated trade. Values close to zero reflect two-way intra-industry trade, with balanced exports and imports. The index is an adaptation of the Grubel-Lloyd intra-industry trade measure proposed by Zheng, Huang, and Xue (2010), with some adjustments to the latter's index construction approach.

Among the insights to emerge from this analysis, we see that the inter-industry (export) concentration of mining has increased consistently over the past decade for Australia (panel a) and Western Australia (panel b). The composition and direction of trade flows in Western Australia remained more or less unaltered over the course of COVID-19 pandemic.

The same can't be claimed for the mining sector in Queensland, which shifted towards more balanced trade flows in 2020 and 2021 before recovering over the course of the past 18 months. South Australia shifted towards net imports within mining during the pandemic, and has yet to recover its net export position.

Most states are net importers of manufacturing product, with Western Australia being the exception with more balanced (intra-industry) trade over the course of the past two decades.

**FIGURE 28**  
Intra-industry trade, by major industry, Australia, 2005 to 2023



Source: Bankwest Curtin Economics Centre | Authors' calculations from ABS CAT 5368, Tables 32a and 35a.

Exports dominate Western Australia's trade flows in agriculture, forestry and fishing, with a similar export concentration for South Australia. New South Wales lost its export concentration in agriculture over the course of the COVID-19 pandemic, having approached a virtually exact balance of (intra-industry) trade exports and imports in 2020. However, its post-COVID-19 recovery has been strong since then, with a strong shift back towards (export-oriented) inter-industry trade in agriculture.

These patterns may in part be inflation-driven, but volume measures also show some areas of agricultural exports, such as grains and cereal, have had historically high output volumes over the period.

Aggregate trade flows for manufacturing are generally oriented more towards import concentrated inter-industry flows, particularly in New South Wales (Panel c in Figure 28), Victoria (Panel d) and Queensland (Panel e). The aggregate balance of trade is more towards two-way trade flows in Western Australia (Panel b) and South Australia (Panel f).

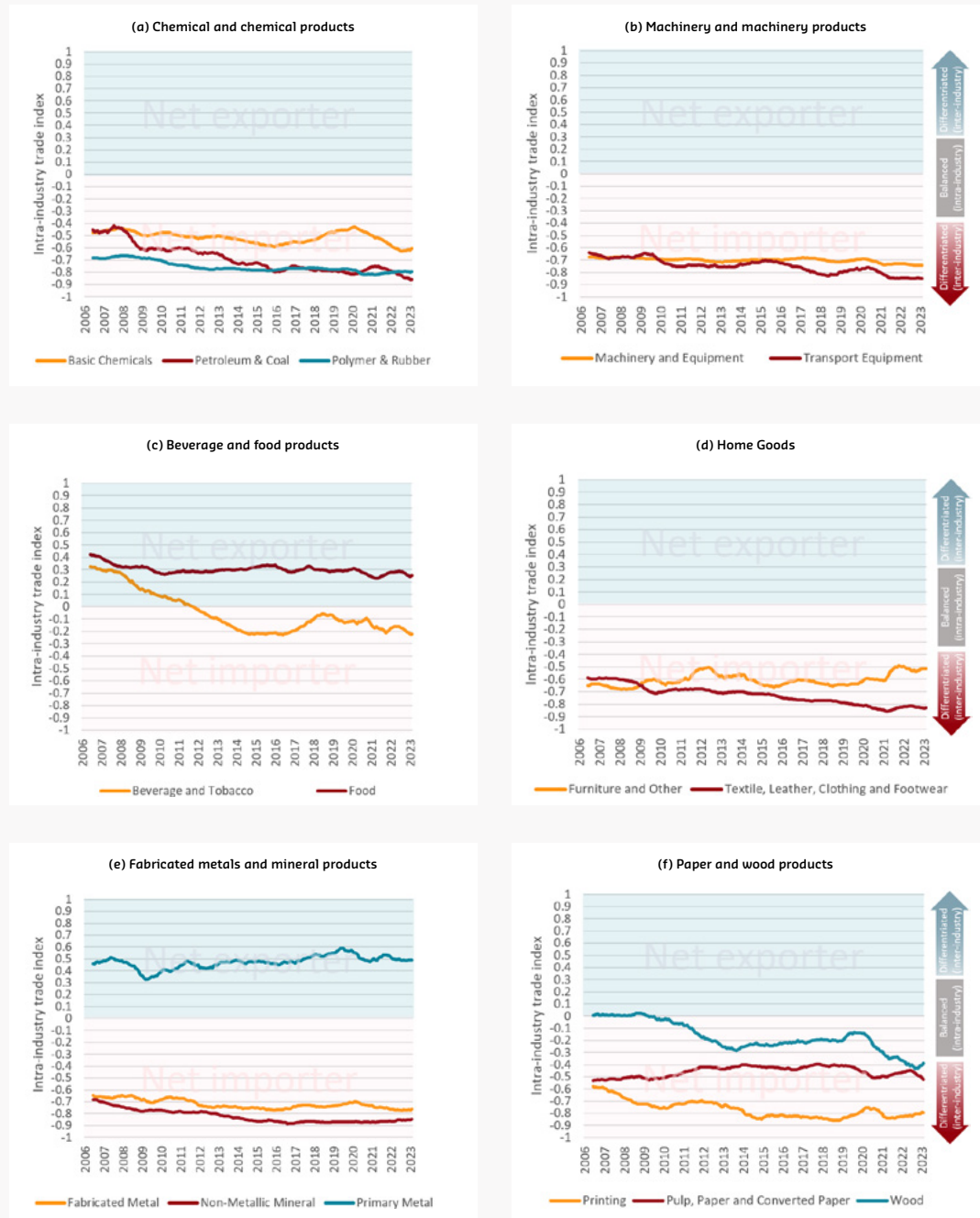
But there are some interesting details that contextualise the analysis of broad sectoral trade flows. Manufacturing industry sub-sectors that specialise in the production and export of complex goods are able to capitalise on economies of scale to capture a strong export share. Also, countries that manufacture specialised components of goods that are assembled from many different parts can also benefit from country-specific comparative advantages.

The higher incidence of intra-industry trade flows can be an indicator of ongoing internationalisation as well as increased specialisation for many industry sectors, including manufacturing.

As a case in point, Australia is a strong exporter of primary metal products, but imports a lot of its fabricated metals and non-metallic minerals products (as shown in Figure 29 Panel e). There is far more two-way (intra-industry) trade in food product and beverage and tobacco manufacturing (Figure 29).

**FIGURE 29**

Intra-industry trade, detailed manufacturing industries, AUS 2005 to 2023



Note: Values have been smoothed over a 12-month period.

Source: Bankwest Curtin Economics Centre | Author's calculations from ABS CAT 5368, Tables 32a and 35a.

Export and import concentrations also vary by trading partner and across industry sector. The shares of export and import concentration by country generally depends on where Australia’s trading partners sit on the global value chain.

Australia has relatively balanced (i.e. intra-industry) trade relations with nations such as New Zealand, Singapore, and the USA, especially for certain goods. For example, Australia trades relatively evenly with New Zealand in plastics, paper and paperboard, footwear, and aluminium.

Australia engages in relatively high intra-industry trade with Hong Kong, especially for complex goods plastics, as well as mechanical and electrical appliances and parts (Table 7).

These results show that Australia is strategically well positioned as a high value add nation, serving as a valuable link in the global supply chain by adding complexity to existing goods.

**TABLE 7**  
Intra-industry trade, by partner country, top 5 and China, Australia, 2021

IIT Rank	Country	GDP		WA Exports, 2022		WA Imports, 2022			
		Total (\$Bn US)	Rank	Per capita (\$Bn US)	Rank	Value (\$Bn AU)	Share (%)	Value (\$Bn AU)	Share (%)
1	New Zealand	249.9	50	48.8	24	1.5	0.1	0.6	1.3
2	Singapore	397.0	37	72.8	8	50.6	4.8	4.2	9.0
3	USA	23,315.1	1	70.2	9	16.0	1.5	4.6	9.9
4	Canada	1,988.3	10	52.0	20	0.8	0.1	0.5	1.1
5	Hong Kong	369.2	40	49.8	23	19.8	1.9	0.4	0.8
28	China	17,734.1	2	12.6	69	544.6	52.2	10.1	21.6

Notes: Export and import shares may differ slightly to previous figures presented due to use of different data sources and related discrepancies between datasets.

Source: Bankwest Curtin Economics Centre | Authors’ calculations from Centre d’Études Prospectives et d’Informations Internationales, BACI Bilateral Trade Flow Data.

"THIS CHAPTER  
FOCUSES ON  
ESTIMATING THE  
**IMPACT OF TRADE**  
**ON HOUSEHOLD**  
**INCOME AND**  
**COST OF LIVING.**"





# **BENEFITS OF TRADE** ON HOUSEHOLD WELFARE

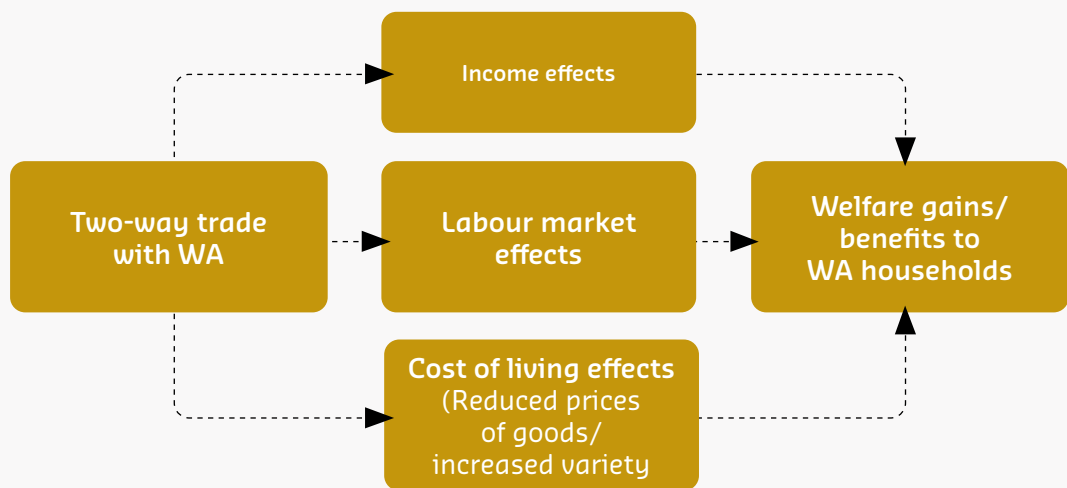
## INTRODUCTION

This chapter focuses on estimating the impact of trade on household income and cost of living. There are three main channels through which increases in Western Australia's trade intensity with other countries translates into welfare gains

for households. Figure 30 shows that the key channels are income, employment and reduced prices of the goods that households consume. The key results related to the income and cost of living effects are provided below.

**FIGURE 30**

Channels through which Western Australia's trade relationships translate to benefits to WA households



Source: Bankwest Curtin Economics Centre.



## INCOME EFFECTS

Income is one of the main channels that links trade to the welfare of WA households. Previous studies suggest that trade can positively affect national income (Frankel and Romer, 1999). This is because trade plays a pivotal role in the transfer of technologies that boost productivity and contribute to an overall rise in income. Also, free trade enables countries to specialise in sectors where a comparative advantage exists.

Gross household income is a widely used measure of financial security for households. WA ranks higher compared to the rest of the Australian states, with

average household disposable income per capita at \$60,000 in 2021-22, which is around \$5,000 above the national average (Figure 31).

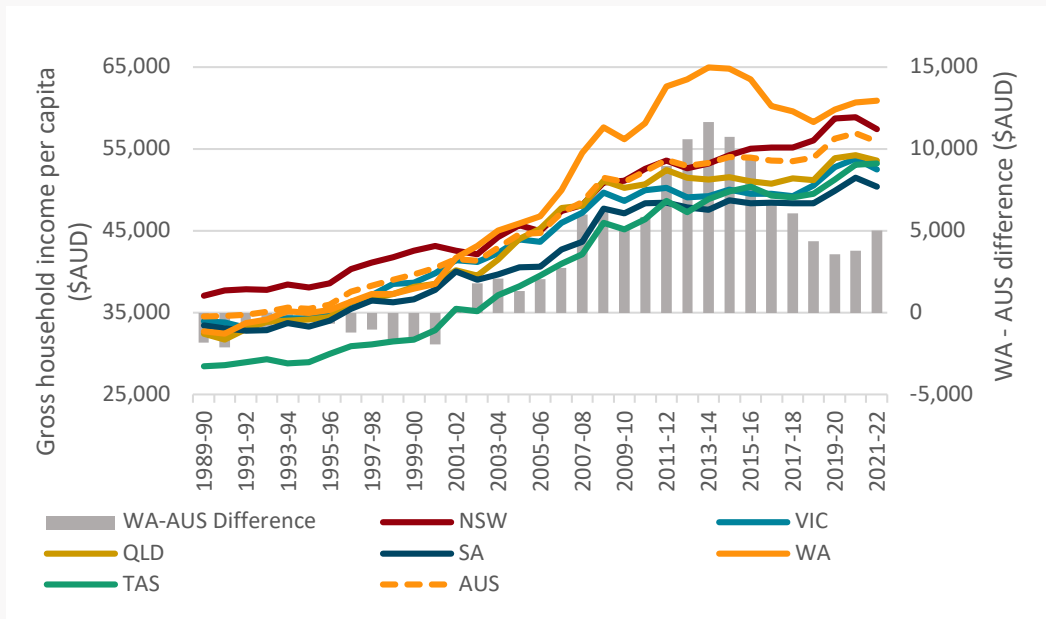
This difference was much greater (at around \$10,000 above the national level) from 2011 to 2016. This suggests that WA's mineral and petroleum industry following the 2010's mining boom has been a significant contributor to growth over the years, protecting the state against global shocks such as the COVID-19 pandemic, as well as potentially explaining the gap in household disposable income between WA and rest of the Australian states.



WA's household disposable income per capita is \$5,000 above the national average.

**FIGURE 31**

Household income, per capita, 1989-90 to 2021-22, by state



Notes: Incomes adjusted by CPI measures, June 2022 = 100.

Source: Bankwest Curtin Economics Centre | Authors' calculations from ABS CAT 5220 Table 20, and ABS CAT 6401 Tables 2 and 5.



Trade with China is estimated to have contributed \$9,000 to WA household income in 2022.

### Modelling the income effects

The BCEC utilised econometric methods based on trade literature and models to estimate the effects of trade on WA household income. A description of the estimation method is provided in the Appendix.

Results from modelling reveal that, on average, a one percentage point change in trade intensity with major trading partners leads to a \$220 change in household disposable income. It is estimated that the total amount of real disposable income attributed to overall trade with major trading partners in 2022 was \$16,200 per household and \$6,400 per person in WA (Figure 32). This is equivalent to 26 per cent of the average gross household disposable

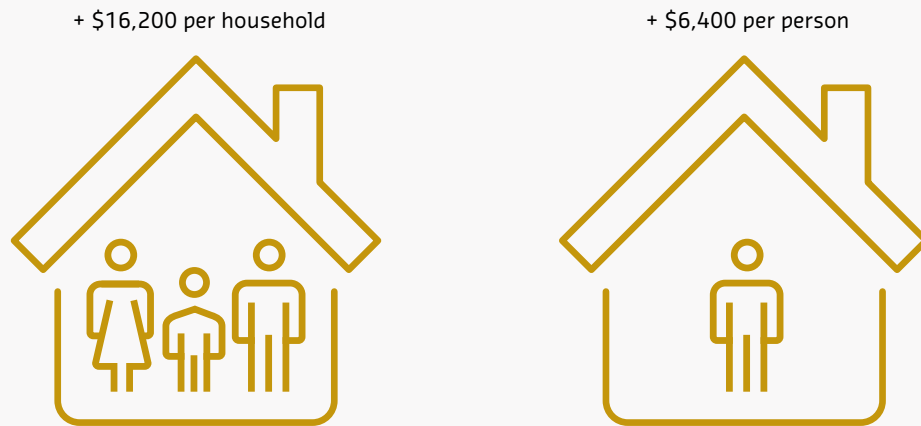
income in the same year. And, on aggregate, this translates to \$17.9 billion for WA households in 2022.

Additionally, the total real disposable income stemming from trade with China in 2022 amounts to \$9,000 per household and \$3,600 per person, equivalent to a cumulative total of \$10 billion for households in WA and 15 per cent of the average gross household disposable income.

Overall trade with Korea and Japan in 2022 has contributed a total of \$3,800 in real disposable income per household and \$1,500 per person, resulting in a combined sum of \$4.2 billion for households across Western Australia.

### FIGURE 32

Total amount of real disposable income in WA attributed to overall trade with major trading partners in 2022



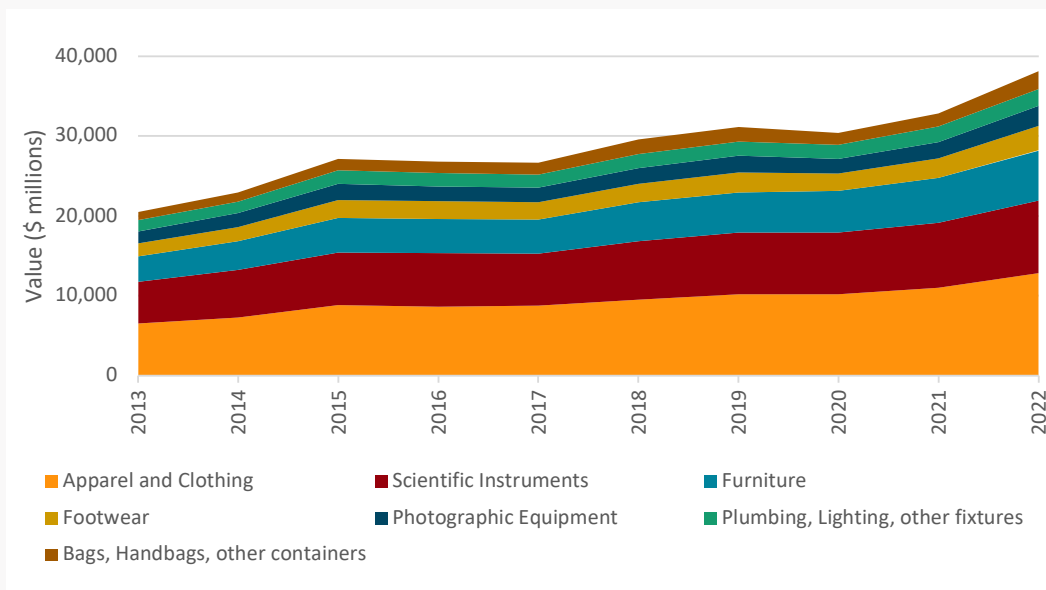
Source: Bankwest Curtin Economics Centre estimates based on various ABS data.

## COST OF LIVING EFFECTS

International trade models predict that free trade contributes to household welfare through lower prices of imported goods. Indeed, consumers directly benefit from trade since they can access a broad variety of goods such as furniture, machinery and vehicles at reduced prices. However, it is important to determine which goods constitute a greater weight in the shopping basket of Western Australian households in order to estimate the welfare gains from international trade.

Figure 33 shows the imports of interest for Australian consumers from 2013 to 2022. Goods such as apparel and clothing, scientific instruments, as well as furniture and footwear and miscellaneous items not shown, account for around \$57 billion, which is approximately 14 per cent of the total value of imports to Australia in 2022.

**FIGURE 33**  
Imports of interest to consumers, by goods, 2013 to 2022, Australia



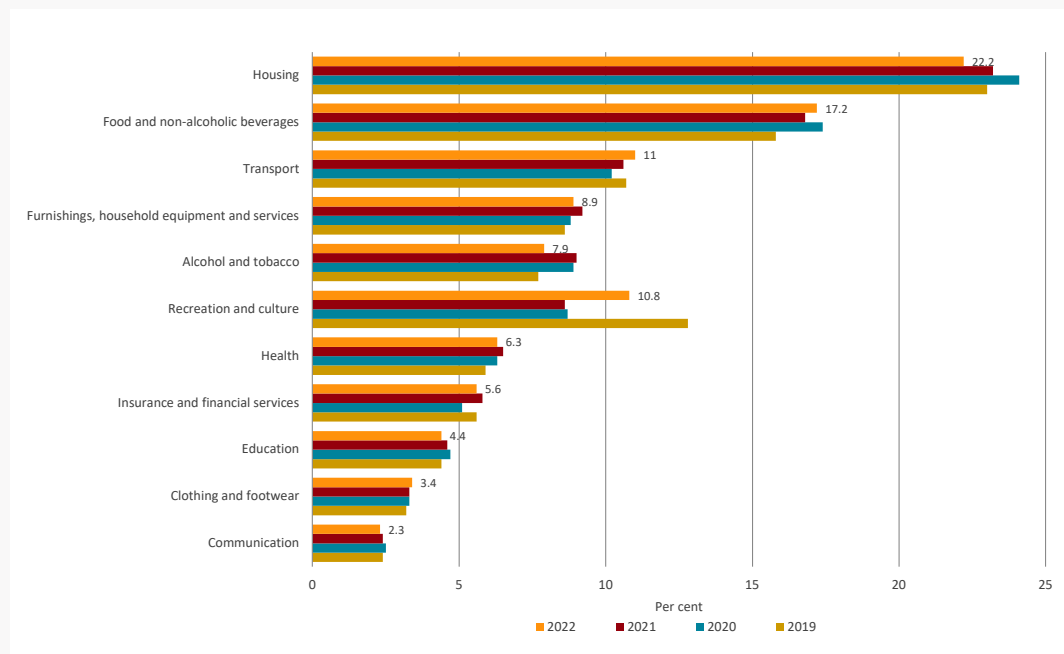
Notes: Value of imports in current prices, \$ millions AUD.

Source: Bankwest Curtin Economics Centre | Department of Foreign Affairs and Trade, Trade statistical pivot tables, 2022.

In addition, Figure 34 presents the weights for consumer price index (CPI) groups that depict how household spending patterns change over time. The CPI group of housing constitutes the largest weight in 2022 (22.2%) followed by the category of food and non-alcoholic beverages (17.2%), transport (11%) and furnishings, household equipment and services (8.9%).

WA households therefore enjoy a lower cost of living by consuming imported goods at prices lower than they would be if the products were produced domestically. The magnitude of free trade's direct benefits to households in WA therefore is determined by the proportion of consumer goods sourced from importing nations rather than those manufactured domestically.

**FIGURE 34**  
Expenditure weights for CPI groups, 2019 to 2022



Notes: September quarter.

Source: Bankwest Curtin Economics Centre | ABS Annual weight update of the CPI and Living Cost Indexes 2021 and 2022.

The benefits of free trade on the cost of living can play a pivotal role especially during times of high inflation rates. Household purchasing power significantly drops when prices of goods and services increase. The most well-known indicator of inflation is the Consumer Price Index (CPI) that captures the percentage fluctuation in the cost of a collection of goods and services that households typically consume.

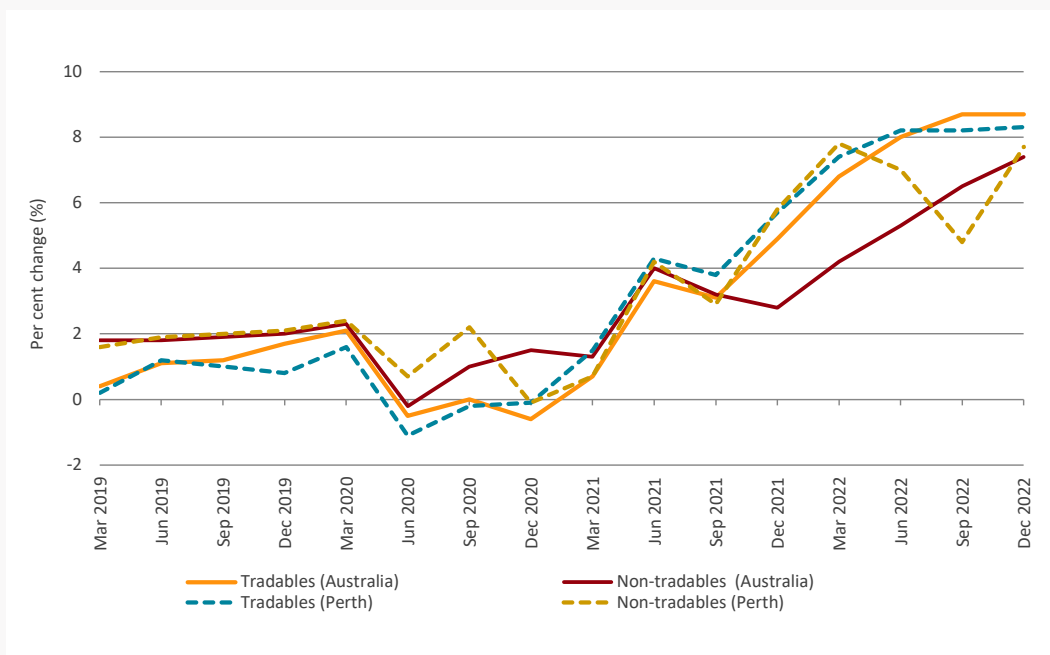
Figure 35 depicts the percentage change in CPI for tradeable and non-tradeable goods

over the last three years. In December 2022, CPI for tradable goods rose by 8.3 per cent whereas CPI for non-tradeable goods saw a 7.7 per cent increase when compared to December 2021. However, Figure 36 shows that the inflation rate for tradeable goods has been lower than that of non-tradeable goods over the last decade.

Taken together these results show that WA households can benefit from increased trade activities in the current climate of high inflation.

**FIGURE 35**

CPI for tradable and non-tradeable goods and services, percentage change from corresponding quarter of previous year, 2019 to 2022



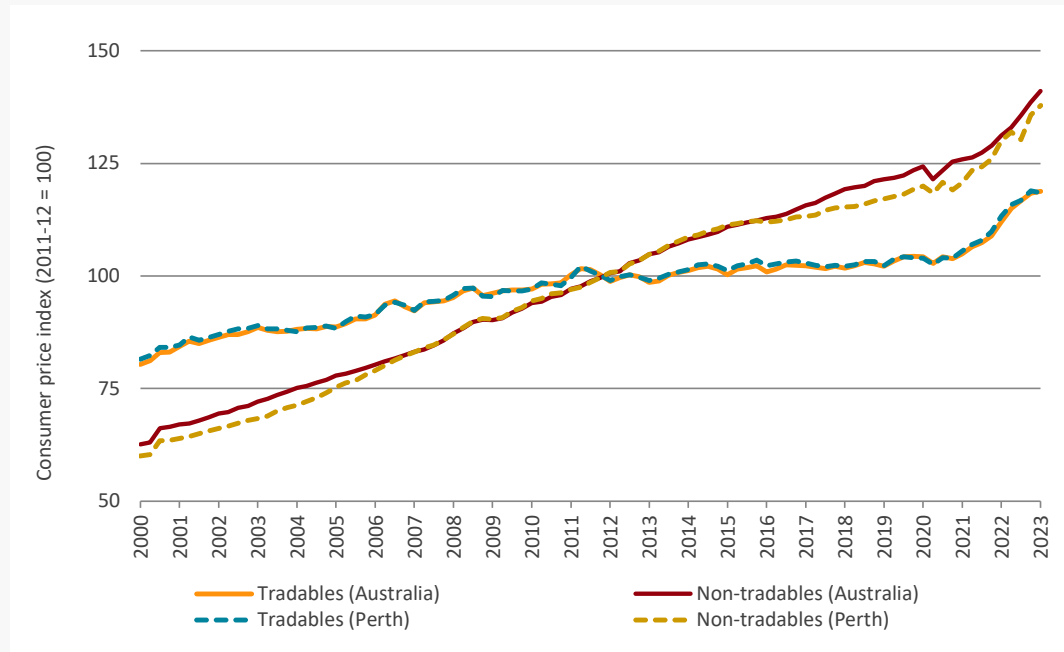
Source: Bankwest Curtin Economics Centre | Authors' calculations based on ABS 6401.



A 1ppt increase in the import penetration rate from major trading partners leads to a 0.15% fall in the inflation rate.

**FIGURE 36**

CPI for tradable and non-tradable goods and services, index numbers, 2000 to 2023



Source: Bankwest Curtin Economics Centre | Authors' calculations based on ABS 6401.

Additionally, these findings are in line with ongoing discussions on the role of supply shocks on the current inflation crisis. Should supply-side factors indeed contribute to at least half of the inflation increase (RBA, 2023), increasing interest rates would serve as a partial measure to address the problem.

### Modelling the cost of living effects

Simple correlations are useful to understand the association between increased trade activities and other macroeconomic indicators. However, they cannot produce causal effects to precisely estimate the

impact of trade on prices and the cost of living for consumers. Following previous studies and estimation techniques<sup>8</sup>, the impact of increased trade with major key partners<sup>9</sup> on the price level for manufacturing goods<sup>10</sup> is estimated.

Modelling focuses on major trading partners for two reasons. First, more than 80 per cent of Australia's imports come from these countries. Second, these are nations that Australia has a free trade agreement with and as a result imports are subject to reduced preferential tariff rates and costs. A brief description of the model is found in the Appendix.

<sup>8</sup> See Jaravel and Sager (2019).

<sup>9</sup> These countries are Canada, Chile, China, Hong Kong, Indonesia, Japan, Republic of Korea, Mexico, Malaysia, New Zealand, Peru, Philippines, Singapore, Thailand, United States of America, and Vietnam.

<sup>10</sup> Manufactured goods are selected since they constitute the largest weight in household expenditure as well as imports of interest. Furthermore, manufacturing imports were \$22 billion in 2022, which is approximately 55% of the total imports in WA the same year.

Results from the modelling show that a one percentage point increase in the import penetration rate from major trading partners leads to a 0.15 per cent fall in the inflation rate. Put another way, this estimate implies a 0.15 per cent decrease in the consumer price index.

Out of all the manufactured goods consumed by households in Western Australia, imported goods account for 29 per cent of the total. Taken together, this indicates that WA households would, on average, face a 4.3 per cent increase in costs for consuming the same products if they were produced domestically or obtained from countries other than Australia's major trading partners.



WA households would face a 4.3% increase in costs if goods consumed were obtained from countries other than Australia's major trading partners.

"THE FINDINGS IN  
THIS CHAPTER  
SHED LIGHT ON  
THE **OPTIMISTIC  
FUTURE OF THE  
WA ECONOMY**  
IN GREEN TRADE  
AND GROWTH."







# **WESTERN AUSTRALIA'S** POSITION IN A DECARBONISED GLOBAL ECONOMY

## INTRODUCTION

As the threats from climate change pose significant challenges to the environment and the human race, there is a growing consensus on the need for the world to transition to a lower carbon economy. On the course to net zero transition by 2050, decarbonisation offers opportunities for the radical transformation of productions in an economy, in turn, creating new industries and markets.

The key question then is, how is WA positioned to capture the decarbonisation opportunities presented?

This chapter aims to empirically assess WA's position in global trade by capitalising on the state's productive capabilities in environmentally friendly (green) products. The BCEC applies a relatively new and novel methodology to infer collective know-how in WA's green products in a decarbonised world.

This analysis aims to inform policy so that WA can adopt appropriate strategies to utilise the opportunities brought by decarbonisation and set the path for diversification and green growth. This is critical, as first movers have a clear advantage, while others risk being left behind.

The current study makes a significant departure from the existing studies (e.g., Hausman *et al.*, 2021) by modelling the green complexity index (GCI) at the state level. In the context of decarbonisation, estimates of GCI help to identify the opportunities emerging for WA's economy and demonstrates how the state compares to others across Australia.

## TRENDS IN GREEN PRODUCTS

Decarbonisation will lead to a significant shift in consumer demand. Specifically, it is expected that consumer demand for carbon-intensive products will decline significantly while demand for green products is expected to grow.

Therefore, it is important to understand the landscape for production and trade prospects of green products for WA. This will help to adopt appropriate strategies needed to reorient the existing economic structures of the economy to be more competitive in an environmentally conscious world.

### Defining green products

Green products are broadly defined as goods that have environmental benefits. Identifying and classifying green products is a challenging task for several reasons, such as the overlapping scope and usages of products, as well as different definitions and classification systems used by various countries and organisations.

An increasing share of jurisdictions around the world are moving to a harmonised international product classification maintained by the World Customs Organisation (WCO) known as the Harmonized Commodity Description and Coding System (Harmonised System). The latest (HS2022) product classification comprises over 5,000 goods at a 6-digit level of categorisation.

There have been several attempts by global trade or multinational organisations to develop categorisations of 'green' or environmentally protective goods:

- The OECD also provides a specific definition of environmental goods and services. However, the OECD acknowledges that an exclusive or exhaustive list or definition is not possible. The current OECD combined list of environmentally related goods (CLEG) comprises 255 products (HS 6 digit level) which are also subdivided into eleven environmental mediums.
  - The IMF defined environmental goods to include goods connected to environmental protection (connected goods) and goods that have been adapted to be more environmentally friendly or 'cleaner' (adapted goods). The current IMF environmental goods list contains 222 (HS 6-digit) products.
  - In 2022, recognising the importance of trade in environmental goods in supporting the transition to a green and sustainable economy, Singapore and Australia have mutually decided on a non-exhaustive list of environmental goods as a part of the Singapore-Australia Green Economy Agreement (GEA). This list currently consists of 372 goods and is subject to periodic review.
- As there is no internationally recognised list of 'green' goods, the BCEC draws on the existing APEC, IMF, OECD and GEA lists. These are collated into a single integrated list of 575 products that are connected to decarbonisation, cleaner production, environmental protection or improvement which have been further categorised into ten composite groupings of environmental products classified at the 6-digit level in HS2022.
- The modelling used in this report applies the Renewable Energy Production and Storage (REP) category of environmental goods, which is relevant to mitigate climate change in the context of decarbonisation.
- APEC is one of the pioneers, which endorsed APEC List of Environmental Goods in 2012. This contained 54 products (at HS 6 digit level) that directly and positively contribute to green growth and sustainable development objectives.



Both Australia and WA are shifting towards a greener economy.

### Trends in green products

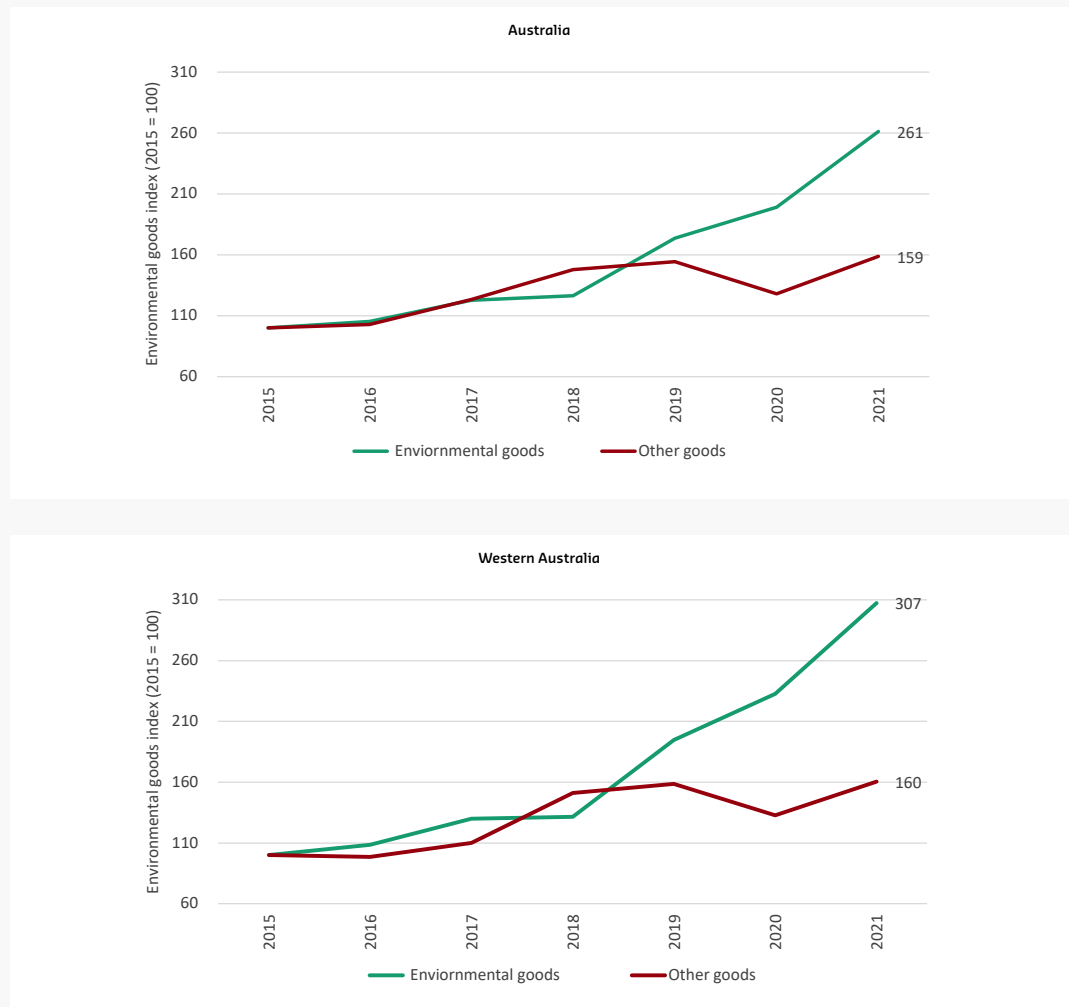
Both Australia and WA are shifting towards a greener economy, driven in part by decarbonisation and net zero transition commitments, as well as responding to international supply chains and consumer demand.

exports of green products from 2018. This is in line with the growing trade and investment in environmentally friendly goods and technology in leading economies, as highlighted in the reports by the OECD (2023) and UNCTAD (2023). The right panel shows that the shift towards green trade is even more pronounced in Western Australia.

This is evident from Figure 37 which shows a sharp increase in the index of Australian

**FIGURE 37**

Exports of environmental vs other goods, 2015 to 2021



Notes: Value of exports in current prices, index, 2015=100.

Source: Bankwest Curtin Economics Centre | ABS, Trade in goods, SITC 5-digit data by product, 2023.

Green goods accounted for less than 30 per cent of Australia’s total merchandise exports in 2015, with the share rising to more than 40 per cent in 2021.

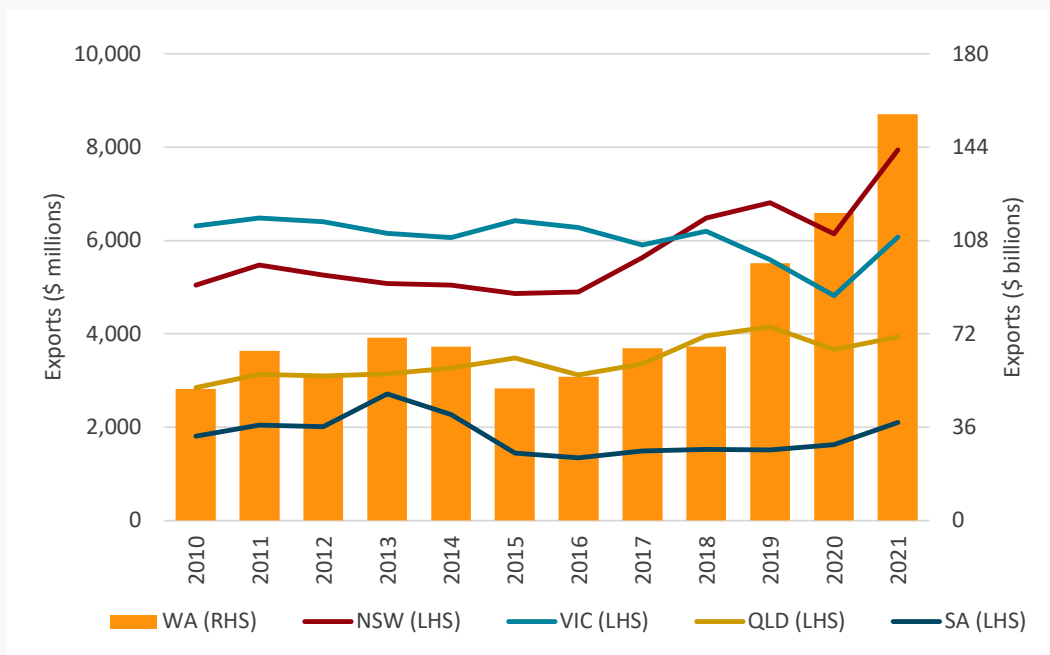
Western Australia has a far stronger trade profile in products connected to environmental improvements than the equivalent national profile. WA’s green exports increased from just below 50 per cent of total exports in 2015 to more than

65 per cent by 2021. This translates to a more than threefold increase in value terms from \$51 billion in 2015 to \$157 billion by 2021.

Figure 38 shows that WA registered considerable growth in the export of environmental goods from 2018 onwards, driven by the surge in demand for critical minerals used in clean energy production and storage and the prices of commodities.

**FIGURE 38**

Exports of environmental goods by state, 2010 to 2021



Notes: Value of exports are in current prices.

Source: Bankwest Curtin Economics Centre | ABS, Trade in goods, SITC 5-digit data by product, 2023.



WA’s green exports increased from just below 50% of total exports in 2015 to more than 65% by 2021.

Outside of Environmentally Preferable Materials and Products (EPP) which includes iron ores and concentrates, Renewable Energy Production and Storage (REP)<sup>11</sup> is also important from a WA perspective towards delivering on decarbonisation targets. The current export values of EPP and REP goods are presented in Figure 39.

The REP category contains inputs and materials that are important for energy transition and decarbonisation. Western Australia is home to a diverse range of critical minerals used primarily in clean and renewable energy production and storage.

**FIGURE 39**

Exports of environmental goods by environmental category, 2015 to 2021



Notes: Value of exports are in current prices. EPP= Environmentally Preferable Materials and Products; REP = Renewable Energy Production and Storage.

Source: Bankwest Curtin Economics Centre | ABS, Trade in Goods, 2023.

<sup>11</sup> Renewable Energy Production and Storage (REP): This category includes any inputs, goods, minerals that used for the generation, collection or transmission of energy from renewable sources, including biomass, solar, wind, tidal, or geothermal sources. These includes lithium, manganese, cobalt, platinum, nickel, magnesium, silicon, natural graphite, titanium.

**Trends in critical minerals**

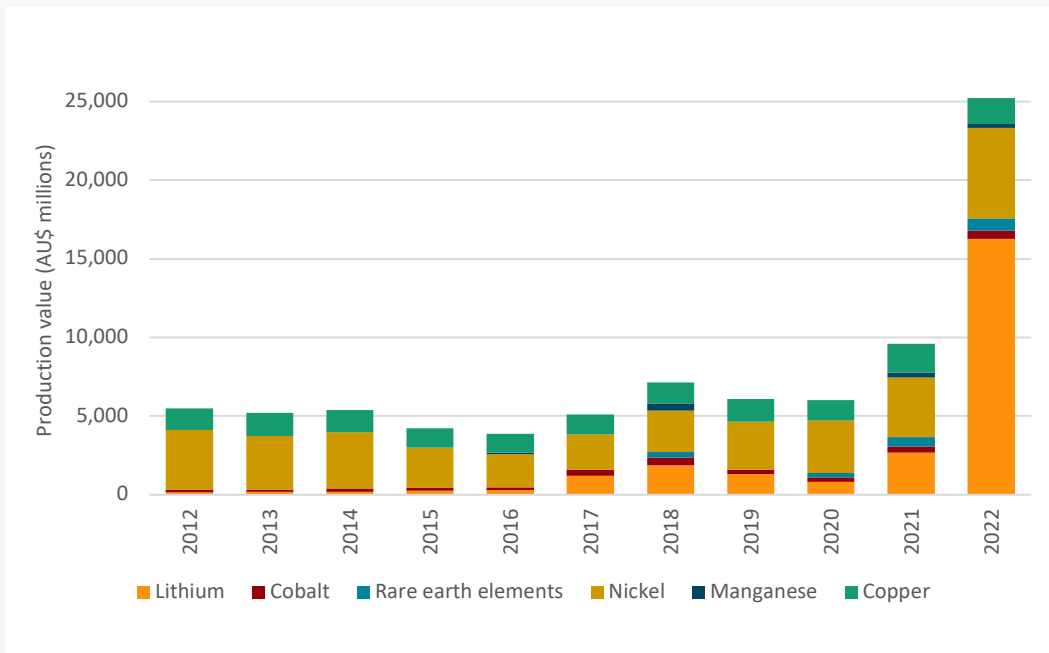
The need to transition to clean energy technologies is motivating a significant surge in demand for critical minerals, such as lithium, nickel, cobalt, copper, manganese and graphite.

recent years. Between 2017 and 2022, the value of the critical minerals increased by a factor of five, reaching about \$25 billion in 2022 (Figure 40). This is due primarily to the increased value of lithium, followed by nickel (Figure 40).

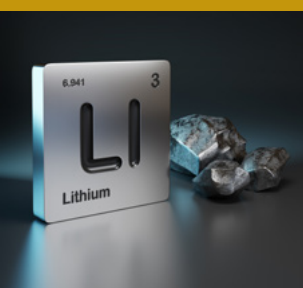
WA’s production of critical minerals has registered an unprecedented growth in

**FIGURE 40**

Production value of WA's top critical minerals, 2012 to 2022



Source: Bankwest Curtin Economics Centre | WA Department of Mines, Industry Regulation and Safety.



WA accounted for more than half of global lithium production in 2022.

Table 8 shows that WA is a major producer of critical minerals globally, and also has a large share of global reserves.

WA accounts for more than half of global lithium production in 2022. It is also ranked in the global top 10 for the production of

rare earths elements, cobalt, nickel, and manganese. This rich critical mineral reserve has the potential to support WA's future emergence as an important supply chain participant in leading the momentum for global decarbonisation.

**TABLE 8**  
Global position of WA in critical minerals production, 2022

Critical mineral	Production		Global		WA Share of global reserve
	Quantity (kt)	Value (\$ billions)	Rank	Share (%)	(%)
Lithium (Spodumene)	2,683.8	16.3	1	52	24
Rare earth elements	30.1	797.3	3	10	>1
Cobalt	5.8	528.1	4	3	13
Nickel	154.9	5.7	5	5	20
Manganese	827.4	272.9	6	4	
Copper	142.2	1.6	>13	1	>1

Source: Bankwest Curtin Economics Centre | WA Department of Mines, Industry Regulation and Safety; WA Department of Jobs, Tourism, Science and Innovation.



**Hydrogen**

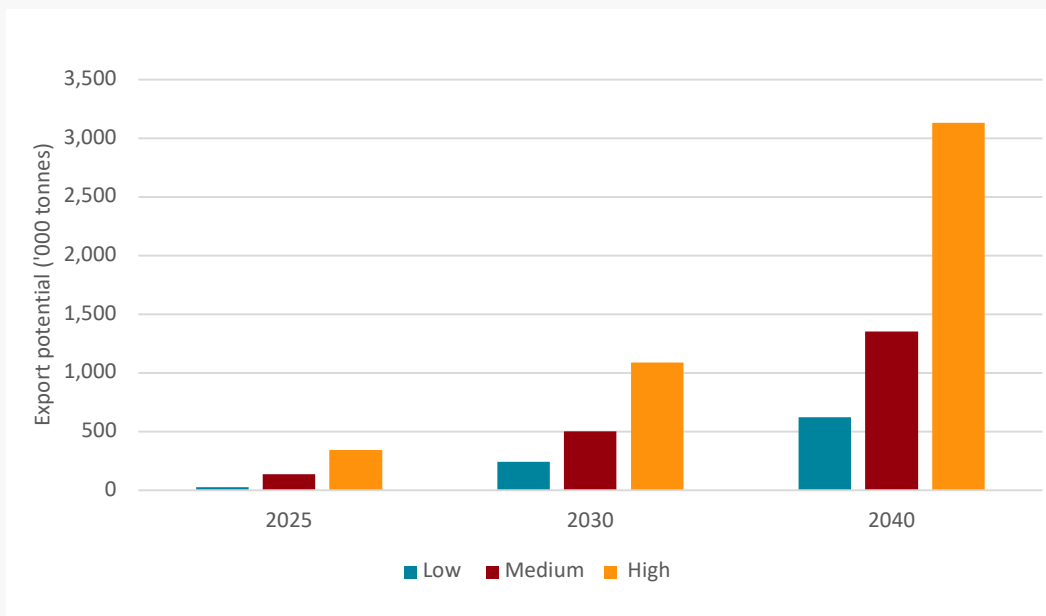
Hydrogen is another key resource that can support the transition to net zero emissions. Green hydrogen production and trade potential is forecast to be more than 20 times the global primary energy demand in 2050 (IRENA, 2023).

by 2040, which could contribute up to \$10 billion each year to the economy (ARENA, 2018). Land availability and excellent solar and wind potential place WA in an advantageous position to become one of the world’s cheapest producers and exporters of green hydrogen and green ammonia.

Hydrogen export demand from Australia could be over 3 million tonnes each year

**FIGURE 41**

Australia’s hydrogen export potential



Source: Bankwest Curtin Economics Centre | Based on Australian Renewable Energy Agency forecast.

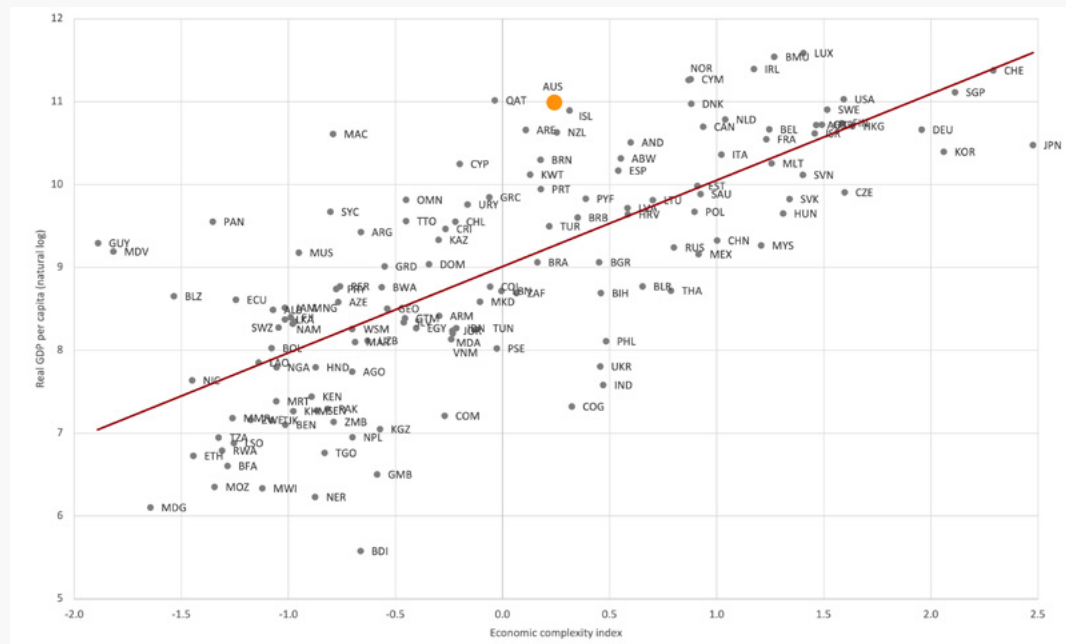
## WA'S OPPORTUNITIES TO ADVANCE ITS ECONOMIC DIVERSIFICATION AND COMPLEXITY

Economic complexity captures the production capabilities or technological sophistication of countries which plays a pivotal role for the prosperity of nations (Hausmann *et al.*, 2014). There is substantial empirical evidence that countries with higher levels of economic complexity tend to grow faster, hence economic complexity explains differences in income levels across nations or jurisdictions (Hidalgo and Hausmann, 2009).

In line with this, the evidence presented in Figure 42 shows that there is a strong positive correlation between the index of economic complexity and real GDP per capita. The data shows that wealthy countries like Japan, Switzerland, Singapore, Korea and Germany are ranked highest in their economic complexity. Looking at the relative position of Australia, it depicts that the nation has some work to do in order to catch up with the global leaders.

**FIGURE 42**

Cross-country correlations between real GDP per capita and economic complexity index, 2021

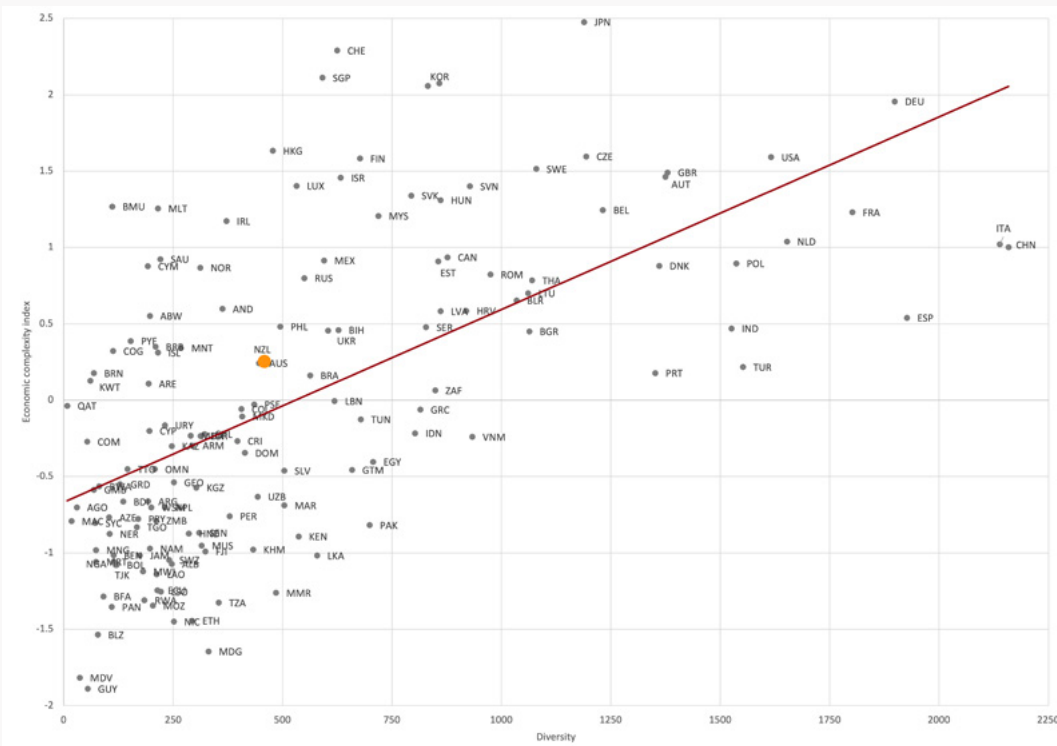


Source: Bankwest Curtin Economics Centre | Authors' calculations from UNCOMTRADE Data.

In the economic complexity literature, diversity is defined as the number of products/industries that a country has a revealed comparative advantage (RCA). It plays an important role in improving the economic complexity index of an economy.

As can be seen in Figure 43, there is evidence of a positive correlation between economic diversity and the index of economic complexity. China emerges as the most diversified economy while Australia is situated towards the lower end of the scale.

**FIGURE 43**  
Cross-country correlations between diversity and economic complexity index, 2021



Source: Bankwest Curtin Economics Centre | Author's calculations from UNCOMTRADE data.



There is evidence of a positive correlation between economic diversity and the index of economic complexity.



### Empirical evidence on the benefits to WA from green trade

#### A global view of economic complexity indices

Using unique state level trade data from the National Freight Data Hub International Merchandise Trade for Australian jurisdictions, in conjunction with the UN's COMTRADE data, the Green Complexity Indices of Australian States are modelled. This modelling builds on the method for computing economic complexity as proposed by Hidalgo and Hausman (2009).

The model utilises a subset of green products, namely the renewable energy production and storage products that are considered key elements of low-carbon technologies and instrumental in mitigating climate change (Mealy and Teytelboym, 2022; Hailemariam *et al.*, 2022). In addition, this class of green products is highly

relevant to WA's context, given the state's predominance in endowments of these products.

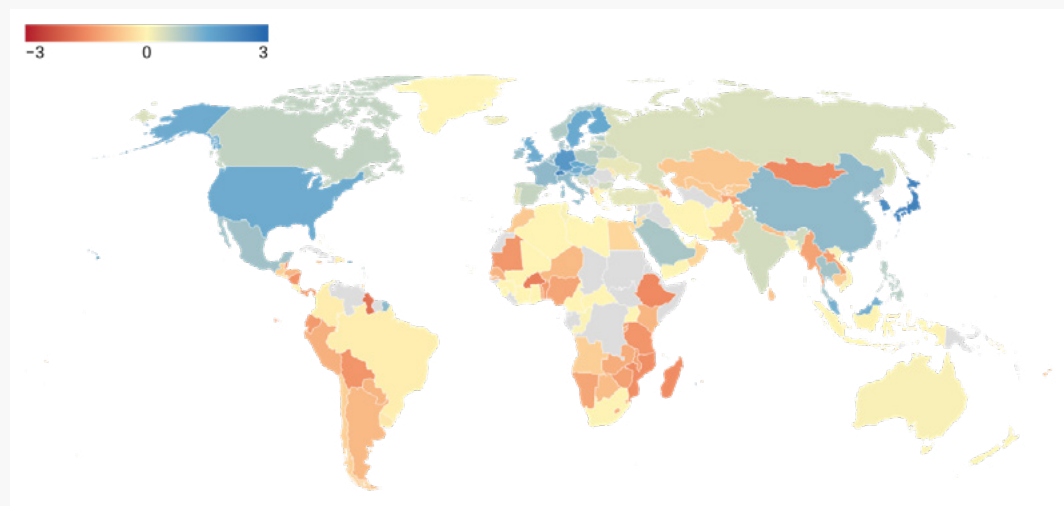
Before delving into the green complexity analysis, we begin by discussing the empirical estimates of economic complexity indices at national and international levels using all export products.

Figure 44 provides a visualisation of economic complexity indices of countries worldwide. The colour codes in the map show that countries highlighted in dark blue have higher indices of economic complexity, with those in red having the lowest indices.

Some of the East Asian countries including Japan and Korea and Western Europe have very high economic complexity indices. Australia, sits in the middle of the scale of economic complexity.

**FIGURE 44**

Economic complexity indices of countries, all products, 2021



Source: Bankwest Curtin Economics Centre | Author's calculations from UNCOMTRADE Data and National Freight Data Hub International Merchandise Trade Data.

**State level analysis of economic complexity**

Figure 45 presents a visualisation of the economic complexity indices (global ranking in parenthesis) for the major states in Australia based on the results from the BCEC modelling using export data.

Panel (a) shows that WA has the least economic complexity index (-0.94) and is ranked 120th globally suggesting a low level of technological sophistication. Victoria ranks top among Australian states as a relatively complex economy, followed by NSW. These findings are consistent with the

findings of a recently released report on the economic complexity in WA (Hausman *et al.*, 2021).

What is the main factor for WA's lower economic complexity index? A closer look at the model calibration shows that WA's heavy dependence on the mining sector is the primary factor that drives the state's index of economic complexity to the lower end. This is evident from panel (b) of Figure 45 which shows an improvement in WA's economic complexity index from -0.94 to -0.41 and climbing the global rank to 86th when iron ore is excluded from the model.

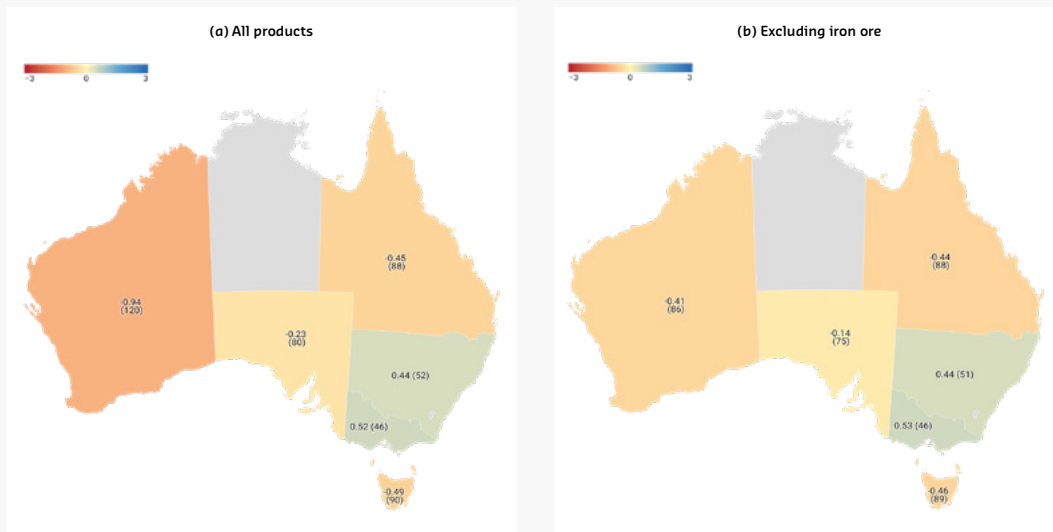


Across all goods, WA has the lowest economic complexity across the states, and is ranked 120th globally.

WA's rank rises to 86th in the world when iron ore is excluded from the products list.

**FIGURE 45**

Economic complexity indices by state, 2021



Source: Bankwest Curtin Economics Centre | Authors' calculations from UNCOMTRADE Data and National Freight Data Hub International Merchandise Trade Data.

### Trends in economic complexity

To ascertain that the results using trade data for 2021 are not mere coincidence, the study also examines the historical trends in economic complexity indices by state for the period from 2015 to 2021.

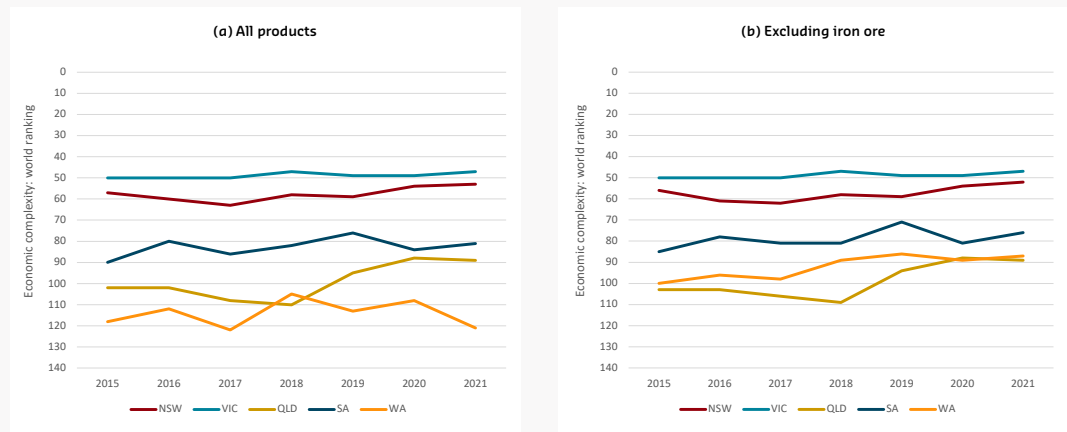
Panel (a) of Figure 46 presents the trends in the economic complexity indices by state using trade data for all products while panel (b) presents the trends in economic complexity indices for all products excluding iron ore. The charts show a consistent finding that Victoria is ranked top in the traditional measure of economic complexity

followed by NSW. WA's economy is ranked as the least complex during the same period, except in 2018.

An interesting difference between the results in Figure 46 panel (a) and panel (b) is that Queensland is found to have the lowest index and rank for most of the periods when iron ore is excluded while Victoria and NSW maintained their top position. Queensland's positioning is no doubt related to the fact that the state relies heavily on the minerals and resources sector, re-emphasising the need to look beyond a high level all products index.

**FIGURE 46**

Economic complexity index over time, all products, 2015 to 2021



Source: Bankwest Curtin Economics Centre | Author's calculations from UNCOMTRADE Data and National Freight Data Hub International Merchandise Trade Data.

**Green complexity index**

To give appropriate attention to the emerging green agenda, the BCEC estimates a green complexity index for WA and compares the state against other Australian states, as well as their place in the global economy.

In order to achieve this, the study utilises export data for green products that are identified as instrumental in mitigating climate change.

The estimated green complexity indices by state are reported in panel (b) of Figure 47 along with the previously reported standard indices of economic complexity in panel (a).

Interestingly, the modelling results show that WA emerges as the top-ranked jurisdiction nationally in the green complexity index, and the state's global ranking soars to 12th (Figure 47 panel b).

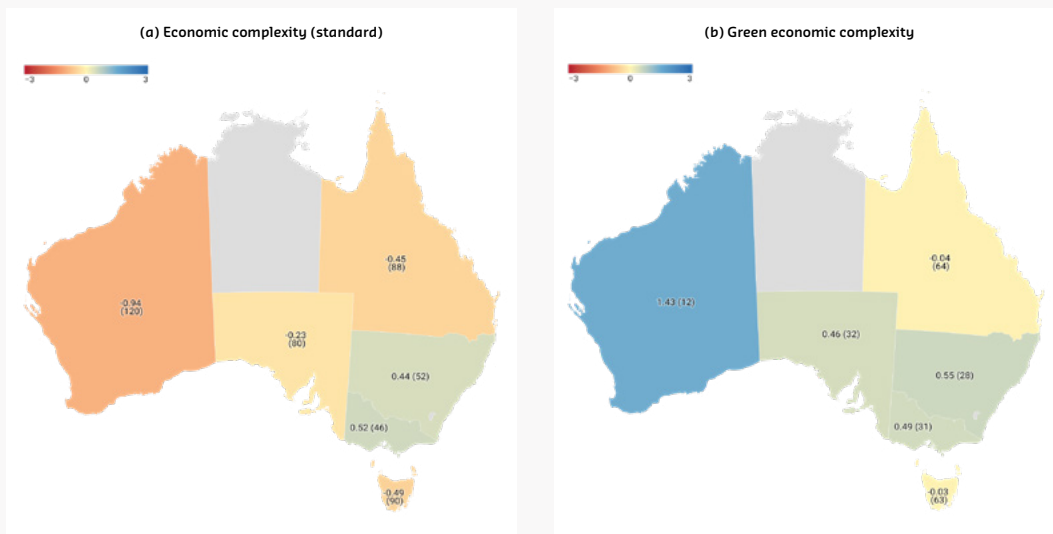
NSW ranks second in Australia and 28th globally, followed by Victoria and SA. The results suggest that WA is well positioned in green products capability. It is important that the required policy and infrastructure supports are in place to ensure that the benefits of the global green transition are maximised by the state.



WA ranks 12th in the global green complexity index, the best across Australian states.

**FIGURE 47**

Green complexity indices of major Australian states, 2021



Note: Global ranking in parentheses.

Source: Bankwest Curtin Economics Centre | Authors' calculations from UNCOMTRADE Data and National Freight Data Hub International Merchandise Trade Data.

A striking feature of the findings from modelling a green complexity index is that WA is not only top-ranked among Australian jurisdictions, but also climbs the ladder in the global ranking of green complexity index as compared to the major economies.

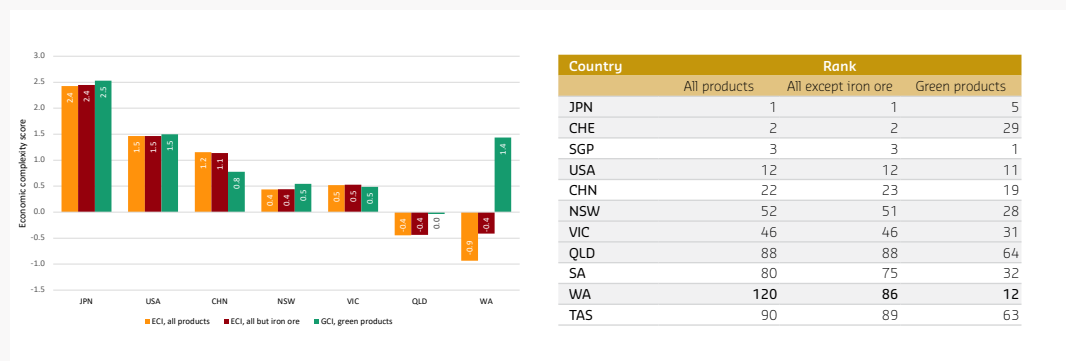
As depicted in Figure 48, the key takeaway from the findings of this study is that although WA is ranked least in terms of

the traditional economic complexity index, it ranks first in terms of green complexity index compared to other Australian states.

The findings shed light on the optimistic future of the WA economy in green trade and growth and show that it is well positioned to be the engine room of Australian prosperity in a decarbonised world.

**FIGURE 48**

Economic complexity and green complexity indices, including global rankings, selected states and countries, 2021



Source: Bankwest Curtin Economics Centre | Authors' calculations from UNCOMTRADE Data and National Freight Data Hub International Merchandise Trade Data.



**Trends in the index of green complexity**

Figure 49 (panel b) shows the trends in green complexity indices for major Australian states for the period spanning from 2015 to 2021. This shows that Western Australia sits on the top for all years in terms of green complexity index (panel b), and again highlights the strong contrast to the standard index of economic complexity (panel a). Although there was a decline in the trend of WA's green complexity index from 2016 to 2020, it has returned to higher global rankings in the year to 2021.

**Challenges and downside risks**

While it is evident that decarbonisation offers opportunities for WA, it is worth noting that the benefits cannot be fully realised without the required infrastructure and policy that will enable WA to compete in the global race for green growth.

More importantly, there is fierce competition in developing clean energy production and transmission among leading economies

which is demonstrated through a number of policy supports and financial incentives packages. For example, the USA government has allocated a package of about US\$2 trillion through the Inflation Reduction Act (IRA), the Bipartisan Infrastructure Law (BIL), and the CHIPS and Science Act, to support projects that promote clean energy transformation and critical infrastructure.

The EU Net Zero Industry Act, the Japanese Green Transformation (GX) Policy, and the Indian Production Linked Incentive Scheme, as well as the Canadian Growth Fund and Refundable Investment Tax Credits are some of the global schemes also designed to support investment in clean energy transformation and decarbonisation projects.

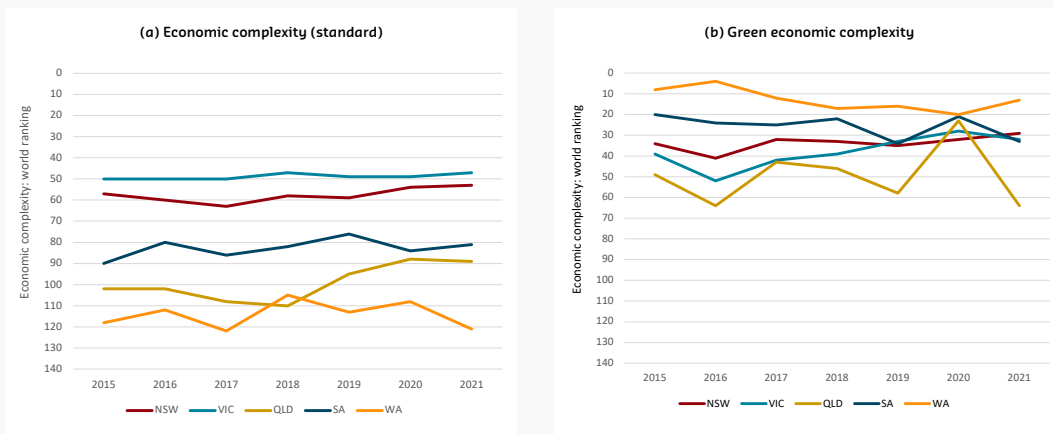
The size of these economies and the planned support programmes could distort global investment and trade by attracting capital and resources from elsewhere. These programmes could negatively affect the competitiveness of Australia, particularly as it relates to the energy sector.



There is fierce competition in developing clean energy production and transmission among leading economies.

**FIGURE 49**

Green complexity index over time, 2015 to 2021



Source: Bankwest Curtin Economics Centre | Authors' calculations from UNCOMTRADE Data and National Freight Data Hub International Merchandise Trade Data.

"WESTERN  
AUSTRALIA'S  
TRADE POSITION  
FORMS A **CRITICAL**  
**PART OF THE**  
**DIVERSIFICATION**  
**STRATEGY** AND  
FUTURE STATE OF  
THE ECONOMY."





# **SUMMARY AND** POLICY DISCUSSION

## SUMMARY AND POLICY DISCUSSION

Western Australia's trade position forms a critical part of the diversification strategy and future state of the economy. With a focus on trade, this Bankwest Curtin Economics Centre *Focus on Industry* report provides information to support discussions and decisions related to diversifying the WA economy and positioning the state to benefit from the opportunities presented in a decarbonised global economy.

### Economic contribution of trade

Western Australia's exports contribute significantly to both the state and national economy. In the year to April 2023, WA's merchandise exports accounted for 45 per cent of Australian exports and were valued at almost \$273Bn (\$606Bn nationally).

Over the course of the COVID-19 pandemic many of WA's merchandise exports remained strong. Border protections and business policies enabled mine sites to maintain production cycles. Demand for iron ore and supply issues from competing economies kept iron ore prices high, and in turn, WA maintained strong export values.

Border restrictions did impact other sectors both in WA and nationally, such as international education and tourism, while tariffs from China impacted export industries to varying degrees. However, there is evidence of a recovery in these sectors.

### Importance of free trade agreements and international trade and investment relations

Australia's active pursuit of free trade agreements (FTAs) has brought major benefits. Compared to a counterfactual scenario without the free trade agreements, this report estimates that, since the FTAs came into force, exports to China have increased by \$275.4 billion, exports to Japan by \$99.1 billion, and exports to Korea

by \$40.7 billion, with exports to Thailand increasing by \$57 billion.

Furthermore, this report estimates that the total amount of real household disposable income attributed to overall trade in 2022 was \$16,200 per household and \$6,400 per person in WA. On aggregate, this translates to \$17.9 billion for WA households in 2022.

The federal government must continue to secure free trade agreements and maintain positive economic ties with key trading partners, particularly as they relate to the nation's position in the Indian Ocean.

It is essential that the needs and emerging opportunities of the Western Australian economy are appropriately represented in national agreements, particularly as they relate to the decarbonisation agenda.

The Western Australian government has done a lot to build and re-engage with key markets on the back of borders reopening after the COVID-19 pandemic, including for critical service industries such as international education and tourism.

Over 25 Ministerial Missions and more than 100 inbound delegations have occurred since borders reopened. These initiatives are supported by the successful establishment of Invest and Trade WA (ITWA), with a focus on key industries with potential to expand trade growth.

The Western Australian Investment and Trade Plan 2022-24 is another welcome initiative, with the Perth hub-and-spoke network focusing on key markets across the globe. New offices in locations such as Austin, Texas will be important, particularly with the opportunities that emerge from the Inflation Reduction Act (IRA).

It is important that the WA government continues to build on existing national and state relationships and seeks out

new opportunities, particularly towards supporting existing strengths demonstrated by businesses in WA. The government's role of connecting businesses to international partners and investors is essential, with current momentum a welcome sight.

### **Businesses cannot put all of their eggs in one basket**

The introduction of trade tariffs on Australian imports to China gave additional impetus for business flexibility, adaptability and market diversification. Various tariffs and embargos were imposed on barley, wine, and coal, as well as lobsters, lumber, and several other goods.

These tariffs displayed notable impacts on the composition of Australia's exports for the goods in question, with exports of many products to China almost disappearing.

Some markets were able to adapt to the trade restrictions, finding new markets that could compete with the prices and demand China offered. Barley is one commodity that quickly pivoted to other markets. A major increase in exports from Australia to Saudi Arabia occurred, with some additional exports of barley to Japan.

Other goods, such as crustaceans, faced a more difficult path. Many exporters were forced to pivot some of their products to the frozen food market, which carried lower prices.

With soaring iron ore prices, and a shortage of workers across the state, many of these industries also had to compete for workers with the prosperous mining industry. Many were unable to do so, leading to additional constraints and a need to switch to more automated production processes. The ongoing issue of labour and skills shortages is one that impacts long-term export diversification, and impacts too on the viability of many industries, and in turn communities, across the regions of WA.

Businesses need to be export ready, and continuously looking towards new markets and trade opportunities. Together with the enablers provided by government, business must look to upskill workers and technological capabilities to ensure that production processes and products are positioned to be at the forefront of global innovation.

### **Trade and household prices**

In addition to household income, trade brings price benefits to Western Australian households.

Among the manufactured goods consumed by households in Western Australia, imported goods constitute 29 per cent of the overall total.

Modelling in this report shows that, on average, households in WA would experience a 4.3 per cent rise in expenses if they were to consume the same products obtained from countries outside of Australia's primary trading partners.

This highlights the important role of trade in meeting the nation's long term inflationary goals. The full weight of tackling inflation cannot, and should not, lie with monetary policy and the RBA's cash rate.

Supporting trade partnerships and agreements is not a quick inflationary fix. But supply side pressures are a key aspect of the inflationary narrative. And protectionist strategies are not the solution. Free trade is critical over the longer term to both consumer welfare and towards impacting the cost of inputs for business production processes.

This gives further weight to the imperative that trade relationships are maintained and diversification in both export and import markets are further established. This is a critical element of the diversification narrative.

### **Western Australia is well positioned in a decarbonised world economy...**

On the course to net zero transition by 2050, decarbonisation offers opportunities for radical transformation of productions in an economy, in turn, creating new industries and markets. A key contribution of this report relates to an examination of how Australian states are positioned in a decarbonised global economy.

Both Australia and WA are shifting towards a greener economy. There was a sharp increase in the index of exports of green products from 2018 onwards across the nation. Green products are broadly defined as goods that have environmental benefits, and support the transition to net zero emissions.

Western Australia has a far stronger trade profile in products connected to environmental improvements than the equivalent national profile. WA's green exports increased from just below 50 per cent of total exports in 2015 to more than 65 per cent by 2021. This translates to a more than threefold increase in value terms from \$51 billion in 2015 to \$157 billion by 2021.

### **...and is ranked 12th globally for green products**

Across all goods, WA has the lowest economic complexity across the states, and is ranked 120th globally. WA's heavy dependence on the mining sector is the primary factor that drives the state's index of economic complexity to the lower end. In fact, WA's rank rises to 86th in the world when iron ore is excluded from the products list.

In this report the BCEC estimated a green complexity index for WA and compares the state against other Australian states and countries.

Results show that WA emerges as the top-ranked jurisdiction nationally in the green complexity index, and the state's global ranking soars from 120th for all products to 12th for green products. NSW ranks second in Australia (28th globally) in the green complexity index, followed by Victoria and South Australia.

The findings shed light on the optimistic future of the WA economy in green trade and growth and show that the state is well positioned to remain at the forefront of Australian trade in a decarbonised world.

However, it is important that the required policy and infrastructure supports are in place to ensure that the benefits of the global green transition are maximised by the state. The WA government's steps to accelerate the Diversify WA agenda are a welcome initiative.

The scale of investment in the green economy across Europe and the USA is enormous. But, WA's positioning in the green complexity index serves well to promote the state as a critical part of the global agenda, and a place to invest. The active pursuit and success in pursuing such investment is critical to maximise on the opportunities presented.

Now is the time for the Western Australian economy to 'trade up', securing the future of the state's economic growth, and the prosperity of generations to come.



# APPENDIX

## APPENDIX

**FIGURE 50**

List of countries in key trading groups

APEC	ASEAN	EEA
Brunei	Brunei	Austria
Canada	Cambodia	Belgium
Indonesia	Indonesia	Bulgaria
Japan	Laos	Croatia
Republic of Korea	Malaysia	Cyprus
Malaysia	Myanmar	Czech Republic
New Zealand	Philippines	Denmark
Philippines	Singapore	Estonia
Singapore	Thailand	Finland
Thailand	Vietnam	France
United States		Germany
Taiwan		Greece
Hong Kong (SAR of China)		Hungary
China		Ireland
Mexico		Italy
Papua New Guinea		Latvia
Chile		Lithuania
Peru		Luxembourg
Russian Federation		Malta
Vietnam		Netherlands
		Poland
		Portugal
		Romania
		Slovak Republic
		Slovenia
		Spain
		Sweden
		Iceland
		Liechtenstein
		Norway

Source: Bankwest Curtin Economics Centre | Author's calculations from UNCOMTRADE Data and National Freight Data Hub International Merchandise Trade Data.



## The Gravity Model

The Gravity Model, since its conception (Tinbergen, 1962), has been widely used to estimate the impact of free trade agreements (FTA) on trade. Following the previous literature, this modelling exercise examines the effects of Australia's free trade agreements on overall trade creation and diversion (Timsina and Culas, 2020a; 2020b; 2022). This model utilises data from the CEPII Gravity database on bilateral trade flows including 38 of Australia's major trading partner countries<sup>12</sup> from 1980 to 2020 (Conte *et al.*, 2022). The baseline specification is presented below:

$$\begin{aligned}
 TradeFlows_{ijt} = \exp \left\{ \alpha_0 + \beta_1 LnGDP_i + \alpha_2 LnGDP_j + \alpha_3 LnPopulation_i + \alpha_4 LnPopulation_j \right. \\
 + \alpha_5 LnDistance_{ij} + \alpha_6 Controls_{ij} + \sum_r \beta_r FTAintra_{ijt} + \sum_r \gamma_r FTAexp_{ijt} \\
 \left. + \sum_r \delta_r FTAimp_{ijt} + \tau_t + \theta_{ij} + \varepsilon_{ijt} \right\} \quad (1)
 \end{aligned}$$

where *TradeFlows* represents the trade flows from country *i* to country *j* at time *t*. *LnGDP<sub>i</sub>* denotes the natural logarithm of the gross domestic product of the exporting country *i* and *LnGDP<sub>j</sub>* denotes the natural logarithm of the gross domestic product of the importing country *j*. Similarly, *LnPopulation<sub>i</sub>* and *LnPopulation<sub>j</sub>* are variables representing the natural logarithm of the total population of exporting and importing countries *i* and *j*. *LnDistance<sub>ij</sub>* measures the distance between most populated cities in countries *i* and *j*, whereas *Controls* includes a rich set of covariates such as a common official language dummy, a language spoken by at least 90 per cent of the population dummy, a common religion dummy, a pair ever / currently in a sibling relationship dummy, a pair ever / currently in a colonial or dependency relationship dummy, a GATT membership dummy, a WTO membership binary indicator and a belonging to a FTA dummy.

To estimate the trade creation as well as the trade diversion effects of Australia's free trade agreement on Australian trade, three dummy variables are included for each of the following agreements: *ChAFTA*, *JAEPa*, *KAFTA*, *ANZCERTA*, *SAFTA*, *AUSFTA*, *TAFTA*, and *ACIFTA*. The variable capturing *intra-regional trade effects (FTAintra)* of a trade agreement is a binary indicator equal to one if both importing and exporting countries are members of the free trade agreement at time *t* and zero otherwise. On the other hand, two dummy variables have been used to capture the *extra-regional trade effects*. *FTAimp* is a binary indicator equal to one if the importing country belongs to the trade agreement, but the exporting country does not and zero otherwise while *FTAexp* is equal to one if the exporting country belongs to the trade agreement, but the importing country does not and zero otherwise.

<sup>12</sup> These 38 countries are Brazil, Canada, Chile, China, Germany, France, United Kingdom, Hong Kong, India, Indonesia, Italy, Japan, Republic of Korea, Mexico, New Zealand, Philippines, Papua New Guinea, Russia, Singapore, Thailand, United States, Vietnam, South Africa, Netherlands, Peru, United Arab Emirates, Turkey, Switzerland, Saudi Arabia, Qatar, Egypt, Bahrain, Belgium, Bangladesh, Pakistan, Kuwait, Fiji, and Finland.

$\beta_r$ ,  $\gamma_r$ , and  $\delta_r$  are the coefficients of interest. Table 10 presents ways of interpreting the estimates depending on their sign. For example, a free trade agreement would imply pure trade creation effects in terms of imports and exports if  $\beta_r > 0$ ,  $\gamma_r > 0$ , and  $\delta_r > 0$ .

The parameter  $\tau_t$  denotes year fixed effects to account for global shocks over time whereas  $\theta_{ij}$  denotes country-pair fixed effects that account for time invariant characteristics across countries.

Specifications where country-pair fixed effects have been replaced by exporter and importer fixed effects were also estimated.  $\varepsilon_{ijt}$  represents the error term.

Equation (1) is estimated by employing a Poisson Pseudo-Maximum Likelihood (Quasi-ML) estimator to account for zero trade (Silva and Tenreyro, 2006; 2011). Standard errors are clustered at the country pair level and are robust to heteroskedasticity. A RESET test confirms the adequacy of the models (Ramsey, 1969). Complete results are presented in Table 10. Column 4 is the preferred specification since its results are measures against a counterfactual scenario where trade determinants, year-specific events and all observable and unobservable characteristics across countries are accounted for.

**TABLE 9**

Interpretation of the FTA trade creation and diversion effects

		Intra-regional	
Extra-regional		$\beta_r$	$\beta_r$
	Sign	+	-
Imports ( $\delta_r$ )	+	Pure trade creation in terms of imports	Extra regional import expansion
	-	Trade creation and Import diversion if $\beta_r > \delta_r$ , or Import diversion if $\beta_r < \delta_r$	Import diversion and intra-regional import contraction
Exports ( $\gamma_r$ )	+	Pure trade creation in terms of exports	Extra regional export expansion
	-	Trade creation and Export diversion if $\beta_r > \gamma_r$ , or Export diversion if $\beta_r < \gamma_r$	Import diversion and intra-regional export contraction

Source: Kahouli and Maktouf (2013).

**TABLE 10**

Estimating the effect of Australia's FTAs on trade creation and diversion

	Trade Flows			
	(1)	(2)	(3)	(4)
<b>ChAFTA</b>				
Intra-Trade	0.847*** (3.78)	0.641*** (3.01)	0.766*** (3.80)	0.316*** (4.03)
Extra-Trade <sub>imp</sub>	-0.101 (0.99)	-0.0302 (0.32)	-0.213*** (3.13)	-0.153*** (3.13)
Extra-Trade <sub>exp</sub>	-0.202** (2.08)	-0.0943 (1.03)	-0.201*** (4.54)	-0.169*** (3.44)
<b>JAEPA</b>				
Intra-Trade	0.804*** (3.42)	0.828*** (3.79)	0.882*** (3.90)	0.250*** (2.85)
Extra-Trade <sub>imp</sub>	-0.289** (2.47)	-0.119 (1.00)	-0.144** (2.06)	-0.0862* (1.66)
Extra-Trade <sub>exp</sub>	0.0216 (0.20)	0.182* (1.67)	-0.162*** (2.84)	-0.140*** (3.26)
<b>KAFTA</b>				
Intra-Trade	0.322 (1.33)	0.326 (1.38)	0.524** (2.52)	0.193** (2.50)
Extra-Trade <sub>imp</sub>	-0.303** (2.19)	-0.182 (1.18)	-0.318*** (3.54)	-0.115** (1.99)
Extra-Trade <sub>exp</sub>	0.0325 (0.17)	0.146 (0.76)	-0.100 (1.29)	-0.0673 (1.00)
<b>ANZCERTA</b>				
Intra-Trade	-0.140 (0.54)	-0.413 (1.55)	0.704*** (2.66)	-0.212 (1.30)
Extra-Trade <sub>imp</sub>	-0.670*** (3.26)	-0.899*** (4.02)	0.0444 (0.43)	-0.00907 (0.09)
Extra-Trade <sub>exp</sub>	-0.506* (1.90)	-0.745*** (2.64)	0.0219 (0.20)	0.00102 (0.01)
<b>SAFTA</b>				
Intra-Trade	1.453*** (2.93)	1.402*** (2.79)	-0.774 (1.54)	-0.224 (0.76)
Extra-Trade <sub>imp</sub>	0.821*** (5.10)	0.843*** (5.09)	-0.489*** (3.79)	-0.349*** (3.71)
Extra-Trade <sub>exp</sub>	0.730*** (3.48)	0.740*** (3.33)	-0.280* (1.69)	-0.227 (1.59)
<b>AUSFTA</b>				
Intra-Trade	-0.550 (0.99)	-0.416 (0.77)	-0.337 (0.64)	-0.377*** (3.23)
Extra-Trade <sub>imp</sub>	0.0860 (0.50)	0.243 (1.58)	-0.0640 (0.58)	-0.104 (1.15)
Extra-Trade <sub>exp</sub>	-0.241** (2.10)	-0.0889 (0.87)	-0.162*** (2.65)	-0.183*** (3.17)
<b>TAFTA</b>				
Intra-Trade	1.822*** (5.65)	1.916*** (6.08)	1.061*** (3.07)	1.001*** (3.78)
Extra-Trade <sub>imp</sub>	0.362* (1.83)	0.449** (2.21)	0.0376 (0.35)	0.171** (2.52)
Extra-Trade <sub>exp</sub>	0.668*** (4.92)	0.778*** (6.06)	0.235** (2.16)	0.266*** (2.83)

**TABLE 10 (continued)**

Estimating the effect of Australia's FTAs on trade creation and diversion

	Trade Flows			
	(1)	(2)	(3)	(4)
<b>ACIFTA</b>				
<b>Intra-Trade</b>	-1.294*** (3.31)	-1.216*** (3.00)	-0.147 (0.38)	0.592 (1.62)
<b>Extra-Trade<sub>imp</sub></b>	-0.574*** (3.91)	-0.524*** (3.46)	0.139* (1.70)	0.0685 (1.16)
<b>Extra-Trade<sub>exp</sub></b>	-0.423 (1.61)	-0.387 (1.42)	0.194* (1.84)	0.109 (1.52)
<i>LnPopulation<sub>i</sub></i>	-0.0104 (0.25)	-0.0503 (1.32)	0.0497 (0.36)	0.0831 (0.80)
<i>LnPopulation<sub>j</sub></i>	-0.0323 (1.05)	-0.0663** (2.18)	-0.0120 (0.10)	0.136 (1.35)
<i>LnGDP<sub>i</sub></i>	0.759*** (18.98)	0.796*** (21.31)	0.673*** (10.59)	0.655*** (11.49)
<i>LnGDP<sub>j</sub></i>	0.768*** (20.24)	0.797*** (22.81)	0.735*** (15.66)	0.709*** (16.46)
<i>LnDistance<sub>ij</sub></i>	-0.546*** (10.23)	-0.528*** (9.86)	-0.607*** (17.70)	-1.056 (1.48)
Controls	Yes	Yes	Yes	Yes
Year FE	No	Yes	Yes	Yes
Exporter FE	No	No	Yes	No
Importer FE	No	No	Yes	No
Country Pair FE	No	No	No	Yes
Number of Observations	44482	44482	44482	44482
R-squared	0.93	0.95	0.97	0.97
RESET	<i>chi2(1) = 1.69</i> <i>Prob&gt;chi2 = 0.193</i>	<i>chi2(1) = 0.48</i> <i>Prob&gt;chi2 = 0.491</i>	<i>chi2(1) = 0.70</i> <i>Prob&gt;chi2 = 0.404</i>	<i>chi2(1) = 1.48</i> <i>Prob&gt;chi2 = 0.223</i>

Notes: Gravity model estimated using Poisson Pseudo-Maximum Likelihood (Quasi-ML) estimator. Data from 1980 to 2020 covering 38 countries. Controls include dummy variables such as common official language, language spoken by at least 9% of the population, common religion dummy, pair ever / currently in a sibling relationship, pair ever / currently in a colonial or dependency relationship, GATT membership, WTO membership, and belonging to a FTA dummy. Absolute t statistics in parentheses; \*, \*\* and \*\*\* indicate statistical significance at the 10%, 5% and 1% level respectively. Standard errors are clustered at the country-pair level and are robust for heteroskedasticity. R-squared is the squared correlation between actual and fitted values of trade flows. For brevity, we do not report the coefficients for all control variables, but results are available upon request. Source: Bankwest Curtin Economics Centre | Authors' estimates using IMF, DFAT and CEPII data.

Following previous studies (Frankel and Romer, 1999) the effect of trade on income is estimated using the following specification:

$$\ln Y_{st} = \alpha + \beta \ln T_{sct} + \theta_s + \delta_c + \tau_t + \varepsilon_{sct} \quad (2)$$

where  $Y_{st}$  is income per person (GSP per capita) in state  $s$  at time  $t$  and  $T_{sct}$  is the measure of the trade intensity between state  $s$  and country  $c$  at time  $t$ .  $\theta_s$  and  $\delta_c$  denote state and country fixed effects to account for time invariant characteristics across states and countries while the parameter  $\tau_t$  denotes year fixed effects that account for global shocks over time.  $\varepsilon_{sct}$  is the error term. Equation (2) is estimated using Ordinary Least Squares (OLS) whereas standard errors are clustered at the state level and are robust to heteroskedasticity. Sample includes data from 2000 to 2022 on 16 of Australia's major trading partners<sup>13</sup>.

In equation (2),  $\beta$  measures the impact of trade intensity on GSP per capita. Utilising this measure, the gains from trading to WA households in terms of gross disposable income per capita can be estimated.

The modelling exercise reveals that a one percentage point increase in trade intensity is associated with a 0.156 per cent increase in real GSP per capita. Using this relationship, the increase in WA's GSP per capita as well as the gains in real disposable income per capita due to trade with FTA partners can be computed. To calculate the real disposable income per individual, the rise in GSP per capita is multiplied by the ratio of per capita gross disposable income to GSP per capita. Next, the gross disposable income per household is determined by multiplying this result by the average number of individuals in a Western Australian household, as indicated by census data.

Following Jaravel and Sager (2019), the effect of trade on inflation rate is estimated using the specification below:

$$CPI_{s,t} = \alpha + \beta IPR_{partners,s,t} + \theta_s + \delta_c + \tau_t + \varepsilon_{s,t} \quad (3)$$

where  $CPI_{st}$  represents the annual inflation rate in state  $s$  at time  $t$ .  $IPR_{sct}$  denotes the import penetration rate from major trading partners in state  $s$  at time  $t$  and is calculated as follows:

$$IPR_{partners,s,t} = \frac{Imports_{partners,s,t}}{Domestic\ Production_{s,t} + All\ Imports_{s,c,t} - All\ Exports_{s,c,t}}$$

$\theta_s$  and  $\delta_c$  denote state and country fixed effects whereas  $\tau_t$  denotes year fixed effects.  $\varepsilon_{s,t}$  is the error term.

<sup>13</sup> These are countries that Australia has a free trade agreement with and include Canada, Chile, China, Hong Kong, Indonesia, Japan, Republic of Korea, Mexico, Malaysia, New Zealand, Peru, Philippines, Singapore, Thailand, USA and Vietnam.

$\beta$  is the estimate of interest and reflects the impact of import penetration rate on inflation rate. To address endogeneity, an instrumental variable approach is adopted. The instrument is the difference between the average MFN tariff rates and the weighted average applied tariff rates of imports in Australia. The intuition behind the construction of this variable is that Australian imports from FTA partners will be subject to preferential tariff rates under free trade agreements while imports from other countries will be subject to MFN tariff rates. Hence, it is expected that the tariff rate gap will be positively correlated with the import penetration rate from countries Australia has an agreement with. A similar instrumental variable approach has been utilised by Pierce and Schott (2016), however, in a different context.

Using this instrument, the following first stage equation is estimated:

$$IPR_{partners,s,t} = \tilde{\alpha} + \tilde{\beta}Tariff\ Diff_t + \tilde{\theta}_s + \tilde{\delta}_c + \tilde{\tau}_t + \tilde{\varepsilon}_{s,t} \quad (4)$$

where  $Tariff\ Diff_t$  is the difference between MFN tariff rates and applied tariff rates at time  $t$ . Rest of the variables and fixed effects in equation (4) remain the same as in equation (3). The sign of  $\tilde{\beta}$  is expected to be positive. Both specifications are estimated using OLS. Standard errors are robust to heteroskedasticity. Sample includes data at the state level from 2000 to 2020.

Results are presented in Table 11. First stage regression in column (1) reveals that a one percentage point increase in tariff difference leads to a 0.32 percent increase in import penetration rate. The IV regression in column (3) suggests that a one percentage point increase in the import penetration rate from FTA partners results in a 0.15 per cent fall in inflation rate.

**TABLE 11**

The effects of trade on inflation rate

	Import Penetration Rate		Inflation Rate	
	OLS (1)		OLS (2)	IV (3)
<i>Tariff Diff</i>	0.320***			
	(0.0923)			
<i>Import Penetration Rate</i>			-0.0159***	-0.154***
			(0.00267)	(0.0154)
<b>First-stage F</b>				56.52
State FE	Yes		Yes	Yes
Country FE	Yes		Yes	Yes
Year FE	Yes		Yes	Yes
Number of Observations	2,249		2,249	2,249
R-squared	0.330		0.821	0.836

Notes: \* \*\* and \*\*\* indicate statistical significance at the 10%, 5% and 1% level respectively.

Source: Bankwest Curtin Economics Centre | Authors' estimates based on various ABS and World Bank data.



# GLOSSARY

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### APEC

The Asia-Pacific Economic Cooperation (APEC) is a forum founded in 1989. It consists of 21 member nations, including Australia and New Zealand, and aims to harness the increasing interdependence of the Asia-Pacific region (DFAT, 2023). Its primary goal is to foster balanced, inclusive, sustainable, innovative, and secure growth while promoting regional economic integration (DFAT, 2023).

### ASEAN

ASEAN, established in 1967, is a regional organisation comprising 10 member countries in Southeast Asia. Its objectives are to promote political, economic, and social cooperation, while fostering regional stability through consultation, consensus, and cooperation (DFAT, 2023).

### Complexity

The level of diversity and sophistication of productive know-how required to produce a product. Products that are of a high complexity are typically produced in very few countries and tend to require many intermediate steps of production. Meanwhile, products of a low level of complexity can and often are produced in many places around the world and require very few steps of production, if they are transformed in any way at all.

### Diversity

Diversity is a measure of a country's ability in making different types of products or the amount of collective know-how held within that country.

### Dutch Disease

Dutch Disease refers to a phenomenon in which a country's currency experiences appreciation due to rapid growth in its capital intensive resources sector, resulting in a decline in competitiveness within labour intensive industries (Brahmbhatt *et al.*, 2012). The term originated from the resource-driven boom in the Netherlands after the discovery of natural gas in 1959, which led to a substantial appreciation of the Dutch currency and a severe decline in the country's manufacturing industry (Brahmbhatt *et al.*, 2012).

### Economic complexity index (ECI)

ECI captures the knowledge in a society as expressed in the products it makes. It indicates how diversified and complex a country's export basket is. It is computed based on the diversity of exports a nation produces and their ubiquity (the number of countries that can produce them). Mathematically,

$$ECI = \frac{\vec{K} - \langle \vec{K} \rangle}{Stdev(\vec{K})}$$

where,  $\vec{K}$  denotes economic complexity index,  $\vec{K}$  is the eigenvector of the product matrix  $(B) = (M^T * M)$  associated with the second largest eigenvalue and  $M$  is the binary adjacency matrix of the Balassa index,  $\langle \rangle$  represents an average, and  $Stdev$  stands for the standard deviation.

### Embargo

A prohibition on commerce. In the context of international trade, this can mean a prohibition on certain foreign goods entering the country, or a prohibition of all forms of trade with a certain partner country.



### Employment-to-population ratio

Employment-to-population ratio is defined as the number of people aged 15 years and over that are employed as a percentage of the civilian population aged 15 years and over.

### Exporter

An exporter is defined as the owner of the exported good or the provider of the exported service (ABS, 2020). In accordance with balance of payments principles, if an export takes place it must involve an Australian resident selling a good or a service to a non-resident (i.e. it involves a change of ownership) (ABS, 2020). International trade in services statistics is compiled on a balance of payments basis and only cover transactions between Australian residents and non-residents.

### Green complexity index (GCI)

GCI measures the knowledge in a society as expressed in the green products it manufactures. It captures the degree to which countries can competitively export green and technologically sophisticated products. It is computed using a similar approach for ECI.

### Import-penetration ratio

Chinese manufacturing import penetration to WA is calculated as manufacturing imports to Australia from China divided by the sum of gross manufacturing output of WA plus imports minus exports.

### Inter-Industry Trade

Inter-industry trade captures the degree of complementarity of trade between countries and refers to the exchange of goods and services between countries across different industry sectors.

### Intra-Industry Trade

Intra-industry trade captures the extent of cross-country exchange of the same products and is measured by quantifying the value of exports and imports of similar goods and/or services between countries within the same industry sector.

### Intra-Industry Trade Index

An index calculation that can be used to estimate the intensity of intra-industry or inter-industry trade for a particular product or industry. The index is calculated as the sum of per-industry exports and imports, less per-industry net exports, as a share of the per-industry sum of exports and imports. It is calculated as:

$$GL_i = \sum_{j=1}^n GL_{ij} \left[ \frac{|X_{ij} - M_{ij}|}{\sum_{j=1}^n (X_{ij} + M_{ij})} \right], B_j = 1 - \frac{\sum_{i=1}^n |X_i + M_i|}{\sum_{i=1}^n (X_i + M_i)}$$

### Net exports

Net exports refers to total exports minus total imports.

### Revealed comparative advantage

The revealed comparative advantage ( $RCA_{cp}$ ) indicates the industries or products that a country or region is relatively good at. It is calculated as:

$$RCA_{cp} = \frac{X_{cp} / \sum_p X_{cp}}{\sum_c X_{cp} / \sum_{cp} X_{cp}}$$

where  $X_{cp}$  represents the exports of product  $p$  by country  $c$ . A country has revealed comparative advantage in a product if it exports more than its "fair share" ( $RCA_{cp} > 1$ ).

### **State of origin of exports**

The state of origin refers to the place where the exported goods were finally produced or manufactured. It is determined by the last stage of production. However, it can be challenging to pinpoint a single state of origin when the manufacturing process involves multiple stages across different states. For instance, a fruit may be grown in one state, canned in another, and exported from yet another state.

### **Tariffs**

A tax or duty on goods sold by foreign exporters.

### **Trade intensity**

Trade intensity is a measure of the economic integration of a jurisdiction (either country, state or region) with the world economy. An index of trade intensity can be calculated as the sum of the jurisdiction's imports and exports expressed as a share of gross domestic product (or gross state product). The higher the share the greater the trade intensity.

### **Unemployment rate**

The unemployment rate is the number of unemployed persons expressed as a percentage of the labour force (employed plus unemployed).

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