

DIGITALES ARCHIV

ZBW – Leibniz-Informationszentrum Wirtschaft
ZBW – Leibniz Information Centre for Economics

Periodical Part

Trade and assistance review / Productivity Commission. 2021/2022

Provided in Cooperation with:
Australian Government

Reference: In: Trade and assistance review / Productivity Commission Trade and assistance review / Productivity Commission. 2021/2022 (2023).
<https://www.pc.gov.au/ongoing/trade-assistance/2021-22/tar-2021-22.pdf>.

This Version is available at:
<http://hdl.handle.net/11159/652805>

Kontakt/Contact

ZBW – Leibniz-Informationszentrum Wirtschaft/Leibniz Information Centre for Economics
Düsternbrooker Weg 120
24105 Kiel (Germany)
E-Mail: [rights\[at\]zbw.eu](mailto:rights[at]zbw.eu)
<https://www.zbw.eu/econis-archiv/>

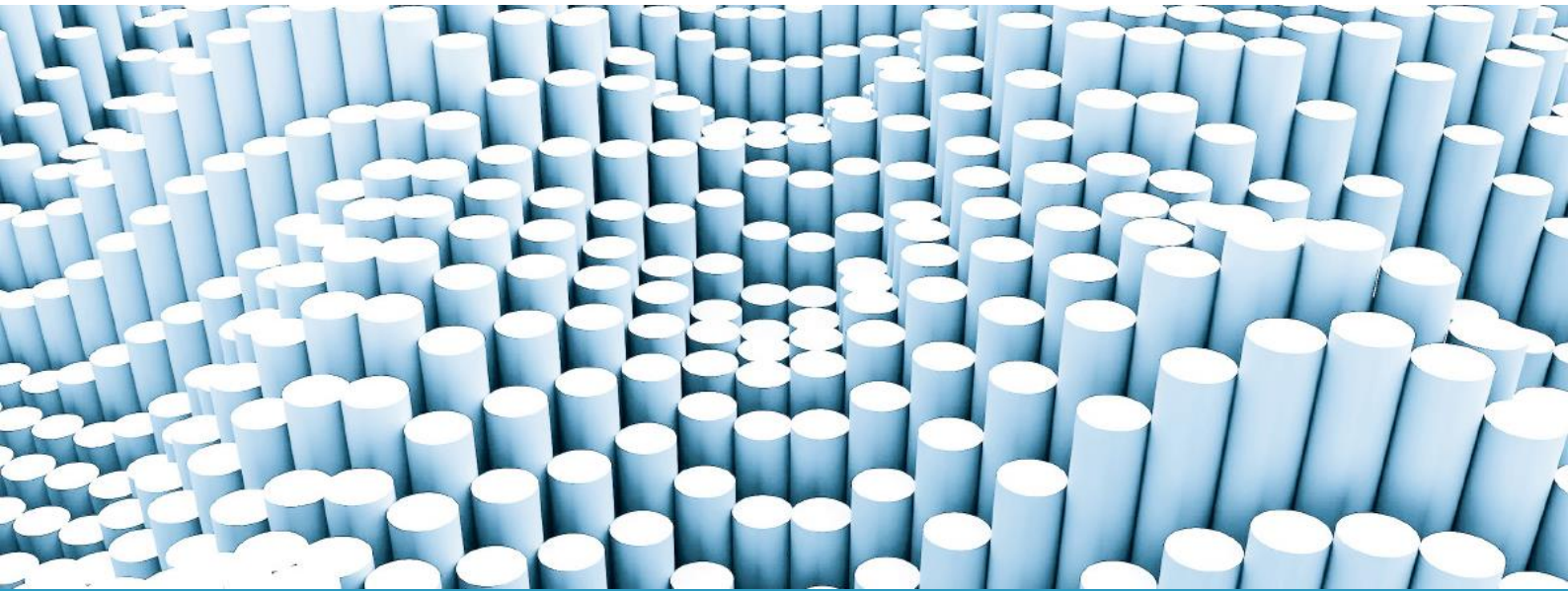
Standard-Nutzungsbedingungen:

Dieses Dokument darf zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden. Sie dürfen dieses Dokument nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, aufführen, vertreiben oder anderweitig nutzen. Sofern für das Dokument eine Open-Content-Lizenz verwendet wurde, so gelten abweichend von diesen Nutzungsbedingungen die in der Lizenz gewährten Nutzungsrechte.

<https://zbw.eu/econis-archiv/termsfuse>

Terms of use:

This document may be saved and copied for your personal and scholarly purposes. You are not to copy it for public or commercial purposes, to exhibit the document in public, to perform, distribute or otherwise use the document in public. If the document is made available under a Creative Commons Licence you may exercise further usage rights as specified in the licence.



Trade and assistance review 2021-22

Annual report series

The Productivity Commission acknowledges the Traditional Owners of Country throughout Australia and their continuing connection to land, waters and community. We pay our respects to their Cultures, Country and Elders past and present.

The Productivity Commission

The Productivity Commission is the Australian Government's independent research and advisory body on a range of economic, social and environmental issues affecting the welfare of Australians. Its role, expressed most simply, is to help governments make better policies, in the long term interest of the Australian community.

The Commission's independence is underpinned by an Act of Parliament. Its processes and outputs are open to public scrutiny and are driven by concern for the wellbeing of the community as a whole.

Further information on the Productivity Commission can be obtained from the Commission's website (www.pc.gov.au).

© Commonwealth of Australia 2023



With the exception of the Commonwealth Coat of Arms and content supplied by third parties, this copyright work is licensed under a Creative Commons Attribution 4.0 International licence. In essence, you are free to copy, communicate and adapt the work, as long as you attribute the work to the Productivity Commission (but not in any way that suggests the Commission endorses you or your use) and abide by the other licence terms. The licence can be viewed at: <https://creativecommons.org/licenses/by/4.0>.

The terms under which the Coat of Arms can be used are detailed at: www.pmc.gov.au/government/commonwealth-coat-arms.

Wherever a third party holds copyright in this material the copyright remains with that party. Their permission may be required to use the material, please contact them directly.

ISSN 2652-2454 (online)

ISSN 1329-9123 (print)

An appropriate reference for this publication is:

Productivity Commission 2023, *Trade and assistance review 2021-22*, Annual report series, Canberra

Publication enquiries:

Phone 03 9653 2244 | Email publications@pc.gov.au

Foreword

This Trade and Assistance Review (TAR) is released at an important time for the world economy. After more than 60 years of falling trade barriers and increasing global economic integration, industry policy and trade protectionism are back on the rise. The shift is being driven by a resurgence in strategic competition between the major economies, public memory of COVID-19-related supply chain disruptions, and national positioning to benefit from the global clean energy transition.

This is particularly apparent in the world's major economies, with the passage of the US Inflation Reduction Act and the CHIPS and Science Act in 2022, and the release of the draft EU Net Zero Industry Act and Chips Act in 2023 – each jostling to capture market share in favoured sectors.

Some have called for Australia to follow suit. The development of Australia's Critical Minerals Strategy, Hydrogen Headstart Program, National Reconstruction Fund, and National Battery Strategy, constitute steps in this direction.

Industry assistance in Australia and overseas no longer principally takes the form of the 'at the border' quotas and tariffs as it has in decades past. Industry assistance is increasingly implemented in less visible forms 'behind the border' – subsidies, tax concessions, tax credits, budget spending on favoured sectors, concessional finance, domestic reservation policies, and local content rules. Collectively, these measures risk winding back some of the gains in living standards of recent decades, by encouraging countries to direct their scarce national resources towards sectors that are not a natural fit for their economies.

The TAR has revealed these patterns through its 49 annual stocktakes of industry assistance in Australia, with tariffs and quotas being increasingly replaced by these less transparent forms of industry assistance. The vast majority of industry assistance in Australia now comes from 'behind the border' measures such as tax concessions, and government spending programs, totalling \$13.8 billion in 2021-22.

Keeping pace with these developments, this year's TAR explores how two growing sources of government intervention in Australia – concessional finance and climate change policy – can act as a form of industry assistance and how their value could potentially be incorporated into future TARs.

As a resurgence of major economy industry policy sees countries engage in increasingly hidden trade wars, waged through the provision of increasingly opaque forms of industry assistance, the TAR helps identify the extent to which Australia chooses to enter this renewed conflict, and help inform public debate about the policy merits of doing so.

Alex Robson

Deputy Chair, Productivity Commission

July 2023

Acknowledgements

The Commission acknowledges and thanks the staff who worked on this year's TAR, including Patrick Jomini, Benjamin Mitra-Kahn, Cameron Eren, Annie Savvas, Umme Salma, Jeremy Kamil, Holly Creek, Vivikth Narayanan and Xiao-Guang Zhang. The Commission also acknowledges and thanks Commissioner Catherine de Fontenay for her assistance with this year's TAR.

Contents

Foreword	iii
Executive summary	1
1. Estimates of assistance and costs	5
1.1 A closer look at budgetary assistance	8
1.2 A new framework for monitoring the effects of tariffs	16
2. Industry assistance developments	17
2.1 Endurance of ‘temporary’ COVID-19-related assistance	19
2.2 How Australian climate policy might act as a form of industry assistance	20
2.3 Concessional finance	31
3. Trade policy developments	37
3.1 Australia’s trade environment has continued to recover from recent disruptions	38
3.2 WTO dispute issues persist, but some progress has been made in bilateral trade agreements	42
3.3 Globalisation is not dead	49
3.4 A resurgence in major economy industry policy	52
3.5 Update on carbon border tariffs	59
4. Foreign investment policy developments	61
4.1 Foreign investment developments	62
4.2 Developments in foreign investment policy	67
4.3 Foreign direct investment applications	67
Appendices	69
A. A new framework for monitoring the effects of tariffs	71
B. Analysing Australian responses to US Inflation Reduction Act	75
B.1 Industry policy developments in the major economies	75
B.2 Potential Australian responses to major economy industry policy	76
B.3 Possible further erosion of the rules-based global trading system	81

C. Adjustments to trade disruptions	83
C.1 Trade policy disruptions	83
C.2 The broader impacts of coercive trade measures	89
D. Assistance estimates (available online)	
Abbreviations	95
References	99

Executive summary

The Trade and Assistance Review (TAR) attempts to shed light on policies that act as industry assistance in Australia. It is an instrument of transparency and sound governance, providing the Australian community with information on how policy settings selectively assist some industries relative to others, and protect some from international competition. The focus of the TAR has evolved over the course of its 49 annual publications, reflecting the fall in the importance of ‘at the border’ tariff protection and the rise in the importance of ‘behind the border’ budgetary assistance such as subsidies and tax concessions in Australia.

Combined industry assistance was estimated at \$13.8 billion (in nominal terms) in 2021-22, \$460 million more than in 2020-21. Budgetary assistance accounted for the vast majority of this assistance (chapter 1). The protectionist impact of what remains of Australia’s tariff regime is now principally due to the complexity of the *tariff system* itself, with the costs of navigating the system for business estimated to be between \$1.2 billion and \$3.6 billion, for the government to collect \$1.8 billion in tariff revenue. The system thus represents a complex labyrinth of protection, favouring some domestic producers as imports are artificially more expensive, an unnecessary source of costs to Australian businesses, and an additional cost of living burden for Australian households. The difficulty of estimating the little industry assistance equivalent value of this ‘nuisance cost’ of Australia’s tariff system prevents its direct inclusion in the TAR.

Consistent with its evolving focus over time, this year’s TAR explores two growing sources of industry assistance in Australia – concessional finance and climate change policy (chapter 2).

Concessional finance is a growing source of Australian industry assistance, and may grow further with Australia’s \$15 billion National Reconstruction Fund expected to begin operation in 2023. While some government-owned finance providers like the Clean Energy Finance Corporation and the National Housing Finance and Investment Corporation provide estimates of the value of concessional finance that they provide to industry, others do not, limiting the Productivity Commission’s ability to report on the industry assistance value of concessional finance. This year’s TAR includes an estimation method that could be applied in the absence of improvements in reporting by government-owned concessional finance entities. We find that the industry assistance value of Australia’s five main concessional finance entities likely ranged from \$64.8 to \$220.2 million in 2021-22, depending on the assumed credit quality of their outstanding loan portfolios. Greater transparency by government-owned concessional finance entities will allow better estimates to be included in future TARs.

Pursuing Australian emissions reduction goals in the absence of an explicit economy-wide carbon pricing scheme has led to a proliferation of piecemeal sectoral abatement policies. Many of these abatement measures appear to possess some of the characteristics of more conventional forms of industry assistance – selectively available tax concessions, government grants, concessional finance schemes, and regulatory obligations that only apply to some sectors. Ideally, estimating the industry assistance value of these policies would account for the extent to which they act to indirectly price greenhouse gas emissions. The greater the fiscal cost per tonne of emissions reductions, the greater the likelihood the policy will act more as a form industry assistance than a cost-effective means of credibly contributing to Australian emissions reduction goals. These issues, along with other ways in which climate policies risk acting as a form of industry assistance are explored in chapter 2.

The 2021-22 TAR is released at an important point in time for global economic integration. After decades of progressive trade and investment liberalisation, and associated gains in global living standards, renewed strategic competition between the major economies, and increased concern about supply chain resilience have led to renewed calls for greater self-reliance in some goods and services. These motivations have so far culminated in the expansion of major economy industry policy, through the 2022 US Inflation Reduction Act and CHIPS and Sciences Acts, related draft EU legislation, and associated calls for Australia to follow suit.

Chapter 3 explores these developments, along with other developments in international trade policy that condition the environment in which Australia trades. It also explores potential Australian responses to major economy industry policy, as well as the merits of using increased domestic production as a means of reducing our vulnerability to international supply chain disruptions. Increased domestic production of some goods is notionally akin to buying an insurance policy against future supply chain disruptions. But when thinking about buying an insurance policy, it is important to weigh the ongoing costs of the ‘insurance premium’ against the expected costs of the precise event or events that one is trying to insure against. It is also important to understand that not all risks can be covered under a single insurance policy, and that domestic production may increase our exposure to a different set of risks. While frequently pointed to as a source of vulnerability, the flexibility of the global trading system is itself a source of resilience and of risk management. By providing access to a more diversified set of suppliers and customers, international trade can help moderate demand and supply shocks that emerge from time to time.

The value of this flexibility was demonstrated from early 2020 when Australian exports to China were disrupted. While costly to some sectors, alternative markets were readily found for many exports, reducing the impacts on Australian businesses. Similar dynamics were observed during the initial phases of the pandemic and during the *Ever Given* accidental six-day blockade of the Suez Canal when global trade was disrupted, and the global trading system was able to adjust via short-term price adjustments. Although some crises have been prominent, it is worth noting that demand and supply disruptions occur on a daily basis and logistics systems and producers continuously manage risks, all with little fanfare.

Considerations regarding the promotion of domestic production capacity in particular goods should also take into account the diversification that is already being driven by the expansion of industry policy in the US and the EU. A case in point is advanced microprocessors, of which over 90% of the world’s production is currently concentrated in Taiwan, but which the US and EU Chips Acts are seeking to change (chapter 3). In this context, the additional diversification benefits of an Australian domestic production capacity in advanced microprocessors are likely to be marginal. The same is likely to be true for clean energy technologies that are currently concentrated in a small number of countries.

While the costs of disruptions to Australia are likely to be limited, the costs of building and maintaining a domestic production capacity in non-comparative advantage sectors are likely to be large. Each dollar spent on subsidising domestic production capacity in non-comparative advantage sectors is a dollar taken away from sectors in which we enjoy a comparative advantage. This trade-off is particularly binding in a near full employment economy where the redirection of labour towards one sector inevitably comes at the expense of another. Eschewing international trade ties and increasing reliance on domestic production capacity comes with its own risks. By contrast, continuing to focus on our comparative advantage is likely to build a broader and more enduring form of resilience – providing the high-income levels that can help deal with, and manage the fallout from, any unforeseen supply chain issues that might arise in the future.

Doing so will require judging where Australia is best placed to position itself within global production patterns – where it fits best in global supply chains. That will be true regardless of whether those global production patterns reflect the underlying comparative advantage of all individual nations, or whether those global production patterns are marginally distorted by major economy industry policy. For small open trading nations like Australia, that means resisting domestic calls to match, or to compete with, major economy industry policy, and to instead identify where Australia’s existing comparative advantages can complement any changes to global production patterns driven by major economy industry policy.

These considerations are as relevant to the international flow of financial capital, explored in chapter 4, as they are to the free flow of goods and services. As a growing net exporter of equity investment, and a net importer of debt finance, Australia has a particular interest in the free international flow of capital. Despite

this, inbound foreign direct investment has been subject to a stricter screening regime since 1 January 2021, and foreign investment application fees have increased notably since that time. These developments risk impacting the quantum and composition of inbound foreign direct investment over coming years, and risk favouring domestic investors over their international counterparts. While the value of foreign direct investment applications increased to \$338.1 billion in 2021-22, from \$233 billion in 2020-21, it remains too early to assess the effect of these policy changes. Estimating their impact requires outcomes to be compared to a well specified counterfactual – a task complicated by the year-to-year volatility of foreign direct investment applications in Australia, and the relatively recent introduction of these policy changes. Future TARs may wish to assess the extent to which these changes have coincided with a structural change in the quantum or composition of inbound foreign direct investment patterns.

1. Estimates of assistance and costs

Key points

- ✱ **Industry assistance increased by 3.4% to \$13.8 billion (nominal) in 2021-22, from \$13.3 billion in 2020-21.**
 - Tax concessions contributed \$5.6 billion and budgetary outlays contributed \$8.1 billion.
 - New measures contributed an additional \$160 million to the assistance estimates.
 - COVID-19-related assistance endured, mainly driven by continuing HomeBuilder payments.
- ✱ **The services sector received the most assistance in absolute terms.**
 - About \$7.7 billion of assistance was provided to the services sector. Of this, the construction sector received about 21% (driven by HomeBuilder) and property, professional and insurance services about 24%.
- ✱ **‘Behind the border’ budgetary assistance – budgetary outlays and tax concessions – accounted for the vast majority of industry assistance in 2021-22, laying bare the diminishing role of ‘at the border’ tariffs in Australian industry assistance.**
- ✱ **What remains of Australia’s tariff regime is estimated to have imposed compliance costs of between \$1.2 and \$3.6 billion on Australian businesses in 2021-22, while collecting \$1.8 billion in revenue.**
 - Nearly 90% of imports enter Australia duty-free due to the large number of preferential trade agreements.
 - Where tariffs still apply, the complexity of navigating trade agreements and domestic tariff concessions increases the cost of engaging in international trade for importers.
 - The Productivity Commission will continue to monitor the ‘nuisance costs’ of Australia’s tariff system, rather than estimating the small amount of remaining assistance from tariffs.

The Australian Government assists industries and businesses through a broad range of programs, regulations and policies. Following s. 10 of the *Productivity Commission Act 1998* (Cth), the Productivity Commission reports annually on the effect of assistance on industry and on the economy as a whole, and fulfills this obligation through the *Trade and Assistance Review* (TAR). The Act defines government assistance to industry as:

... any act that, directly or indirectly, assists a person to carry on a business or activity; or confers a pecuniary benefit on, or results in a pecuniary benefit accruing to, a person in respect of carrying on a business or activity.

While government assistance benefits the businesses that receive it, there are costs to others.

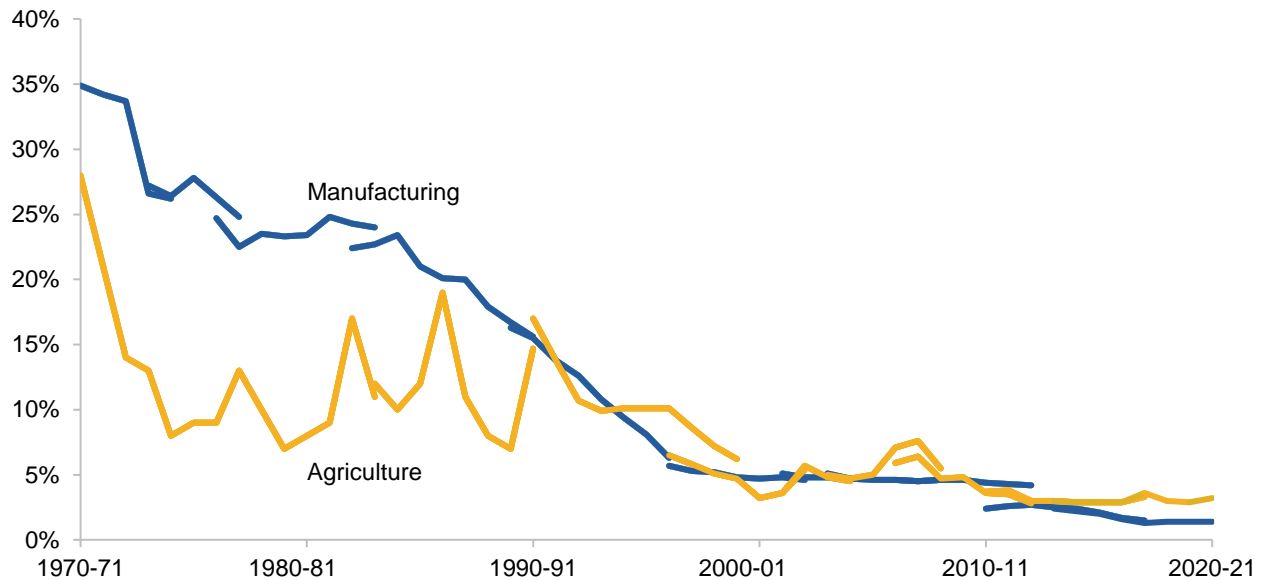
- Budgetary outlays and tax concessions must be funded through tax revenue, debt or forgone government expenditure elsewhere.
- Tariffs increase the prices of imports and locally-produced substitutes, and impose compliance costs on businesses, which affects consumers and business input users.
- Regulation can provide implicit assistance, with implications for costs and prices. Examples include local procurement rules, often used in defence or in other government procurement policies, domestic reservation policies, or statutory barriers to entry, such as applies to pharmacies.
- The costs of services provided by government agencies at concessional prices and other government measures that provide favourable business conditions must also be funded. It can be difficult to quantify this type of assistance, and the use of these types of measures is increasing (section 2.3).

The effect of assistance on community wellbeing and the economy overall varies depending on how well it has been designed. Where assistance is selective, that is, only available to particular types of businesses, industries or locations, there are implications for resource allocation in the economy. Some assistance aims to address market failures by promoting activities that markets can under-provide, such as research and development. Other assistance aims to promote social, environmental or national security objectives. But whatever the net effect of assistance, reporting the nature and magnitude of selective industry assistance provides a starting point to monitor and assess potential distortions. The added transparency also provides a starting point to assess whether taxpayer dollars are being well spent.

Each year the TAR documents measures that meet the definition of selective assistance to industry. Accordingly, successive TARs have published estimates of the assistance provided by import tariffs, budgetary outlays (predominantly subsidies and grants) and tax concessions.

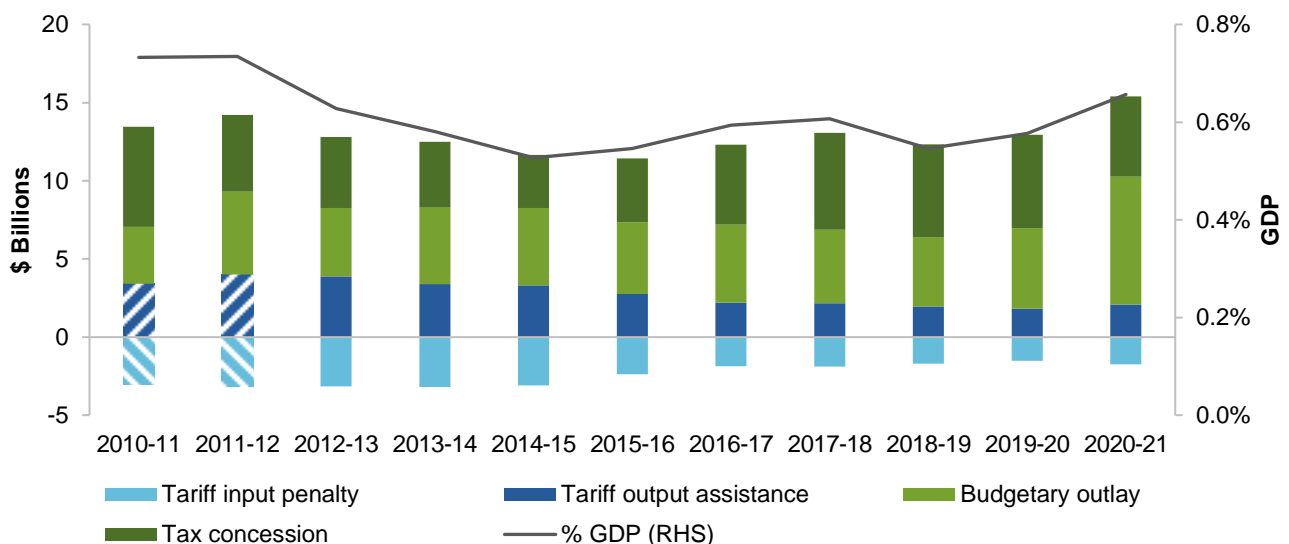
Compared to the early 1970s, industry assistance has decreased dramatically in the manufacturing and agriculture sectors (figure 1.1). Assistance then was mainly provided through tariffs, but for more than 20 years, budgetary assistance has accounted for the vast majority of assistance to Australian businesses.

Since 2010, tariffs have declined in relevance as a form of assistance, both in their dollar value and as a proportion of all estimated assistance. Additional budgetary assistance in response to the COVID-19 pandemic exacerbated this during 2020-21 (figure 1.2). Although it might be expected that assistance related to the pandemic would decline, net assistance from tariffs is still expected to account for only a small and decreasing part of assistance.

Figure 1.1 – A long-run downward trend in combined assistance^{a,b,c}**Effective rates of assistance to manufacturing and agriculture, 1970-71 to 2020-21**

a. Effective rates of assistance is combined tariff assistance and budgetary assistance. b. 'Agriculture' refers to selected agriculture activities up to and including the year 2000-01. From 2001-02, estimates refer to division A of the Australian and New Zealand standard industrial classification, which covers agriculture, forestry, fishing and hunting activities (ABS 2013). c. Breaks and overlapping series represent a change of methodology and/or data sources.

Source: Productivity Commission estimates.

Figure 1.2 – Assistance provided by tariffs is small^a**Budgetary and tariff assistance, current dollars and share of GDP, 2010-11 to 2020-21**

a. Estimates of assistance are re-benchmarked every few years. The methodology for calculating the tariff assistance estimates changed in 2012-13. Definitions and methodology for calculating tariff assistance, budgetary outlays and tax concessions can be found in the *Methodological annex* (PC 2022c, pp. 7–12).

Source: Productivity Commission estimates.

For 2021-22, the TAR focuses on estimates of the cost of complying with the tariff system (section 1.2), rather than estimating the assistance provided by import tariffs. Changing the focus from tariff assistance to the administrative and compliance costs of tariffs for business and consumers adds to the transparency of tariffs and supports policymakers to undertake further reforms to Australia's tariff arrangements. A more detailed explanation of the change in approach is in section 1.2 and appendix A.

This chapter should be read in conjunction with both the *Methodological annex* (PC 2022c) – which includes further detail on how the assistance estimates are produced and what types of assistance measures are in scope – and the detailed tables of estimates (appendix D).

1.1 A closer look at budgetary assistance

The TAR aims to provide a transparent and consistent estimate of the value of budgetary assistance to industry, and which industries benefit. The estimates – the amount of expenditure, where it is spent and how it changes over time – shed light on Australian policy settings, and provide a starting point for discussions about the benefits and costs of particular programs or measures, and the role of government spending more generally.

Budgetary outlays and tax concessions are included in the Commission's assistance estimates when they provide a benefit to some businesses and not others (box 1.1). The inclusion of a particular measure in the Commission's estimates does not necessarily mean that it is undesirable. Rather, it provides some indication of how particular industries and sectors benefit from government assistance, relative to others.

The risks and challenges associated with the design of assistance measures can ultimately determine whether they result in adverse outcomes for the economy. For instance, measures may or may not target a material market failure; they may have poor additionality, providing funding for activities that would have occurred regardless; and they may have adverse efficiency impacts on investment and labour market supply (so-called 'deadweight' costs).

Box 1.1 – Components of budgetary assistance

The Commission's estimates of budgetary assistance are divided into two categories:

- budgetary outlays – program funding provided by the Australian Government that assists businesses. Budgetary outlays most commonly take the form of grants, subsidies, loans, guarantees or funding for organisations to perform commercially beneficial services. Budgetary outlays may provide financial assistance directly to businesses – as is the case with the Automotive Transformation Scheme for example – or deliver assistance indirectly via organisations such as through the rural research and development (R&D) corporations and the Commonwealth Scientific and Industrial Research Organisation (CSIRO).
- tax concessions – assistance by way of differential tax treatment that provides benefits to some businesses but not others.

This differential treatment can arise across a range of dimensions, including:

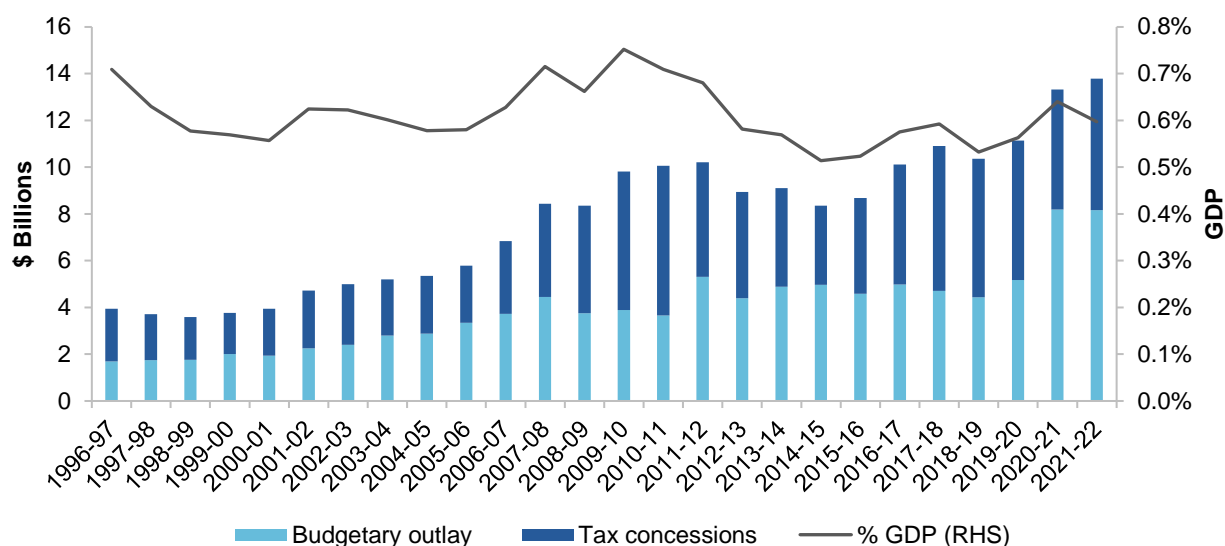
- business size – for example, small businesses are eligible for some government grants, while large businesses are not
- industry or sector – for example, financial incentives are provided for businesses in the film industry to assist them to make film and television productions in Australia
- location of a business such as the Murray-Darling Basin Regional Economic Diversification Program.

Where possible, the Commission allocates budgetary assistance to the industry or sector that benefits from it. This is undertaken on an 'initial benefiting industry' basis – that is, assistance is allocated to the industry that 'hosts' the business(es) that initially benefits from a program or measure. For some measures, such as assistance provided through rural R&D corporations and the R&D Tax Incentive, the Commission typically uses the industry allocation provided by the department or agency that oversees these measures. The *Methodological annex* that accompanies the TAR (PC 2022c) provides more information on the budgetary outlays and tax concessions that are included in the estimates of assistance and how this assistance is allocated across industries.

The Commission has categorised measures into different 'types' to enable examine changes in the composition and nature of budgetary assistance. This includes industry-specific assistance, assistance for small business, R&D, exporters, investment, assistance to regional areas, including to facilitate structural adjustment and assistance for specific sectors (figure 1.6; table D.6 in appendix D).

Budgetary assistance in 2021-22

In 2021-22, the Australian Government provided about \$13.8 billion in budgetary assistance – about 60% of which is provided through budgetary outlays and 40% by tax concessions (figure 1.3). The contribution of budgetary outlays has risen since the COVID-19 pandemic. As a share of the economy, budgetary assistance has been small but steady (box 1.2, figure 1.3).

Figure 1.3 – Budgetary outlays provide more assistance than tax concessions**Budgetary outlays and tax concessions, current dollars and share of GDP, 1996-97 to 2021-22**

GDP = gross domestic product.

Source: Productivity Commission estimates.

Box 1.2 – Assistance in current dollars and as a ratio to GDP

In previous editions of the TAR, estimates of assistance over time have been reported in current (nominal) dollars and as shares of the sectors receiving assistance compared with their shares of the economy (figure 1.5). In a low inflation environment, in which prices increase slowly, an increase in nominal assistance is a reasonable representation of an increase in real assistance.

As prices increase, it would be appropriate to adjust (deflate) estimates of nominal assistance when comparing them over time to report changes in real terms, so as not to overstate increases. Choosing an appropriate deflator is not an easy task. A suitable deflator would benchmark assistance to changes in prices of the goods and services used to deliver assistance. The consumer price index or the GDP deflator measure are commonly used to adjust in other contexts, but they are not appropriate in this context.

Instead of deflating estimates, we report a time series of the ratio of nominal assistance to nominal GDP along with current value estimates of assistance (figures 1.2 and 1.3). This shows that assistance as a proportion of GDP has remained within a band of 0.5–0.8% of GDP in the past 25 years, consistent with assistance growing roughly at a similar rate as the economy.

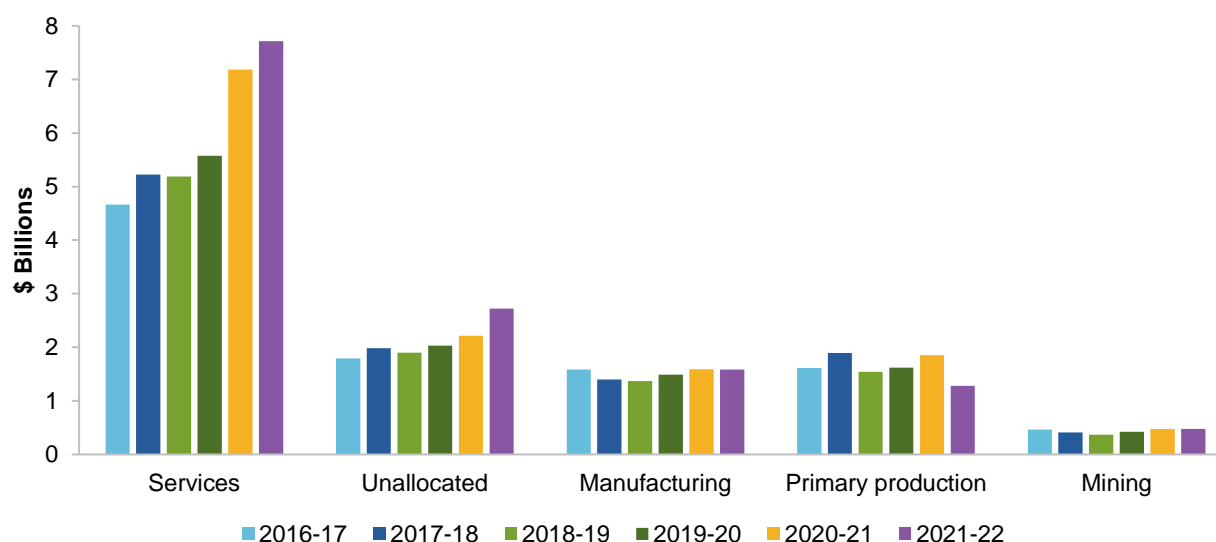
Some measures included in the estimates for 2020-21, worth \$490.8 million in assistance, ended during 2021-22. In addition, at the time of publication, there was no information on expenditure published for measures worth about \$600 million in 2020-21.¹

Assistance by sector and industry

Of the \$13.8 billion in budgetary assistance, the Commission was able to allocate \$11 billion to specific sectors. Most assistance went to the services sector (about \$7.7 billion, or 56%). About \$2.7 billion of assistance could not be easily allocated to a specific sector. All sectors except services and the 'unallocated' sector experienced a nominal decrease in budgetary assistance in 2021-22 compared with the previous year (figure 1.4).

Figure 1.4 – Services attracts the most budgetary assistance

Budgetary assistance by sector, current dollars, 2016-17 to 2021-22



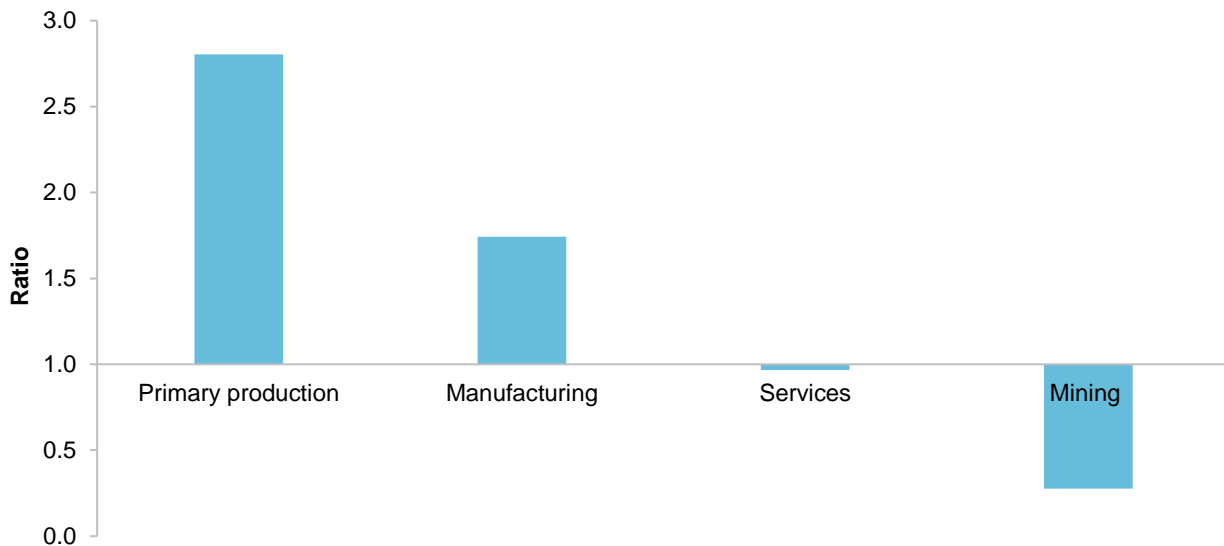
Source: Productivity Commission estimates.

Relative to their share of the economy, the primary production and manufacturing sectors received a disproportionately large amount of assistance (figure 1.5).

¹ These measures were the Domestic Aviation Network Support (\$201.5 million in 2020-21), Tourism Aviation Network Supports (\$215.4 million), the Farm Business Resilience Program (\$16 million) and the Income Tax Averaging Provisions (\$160 million).

Figure 1.5 – Primary production and manufacturing attract large shares of budgetary assistance relative to their size^a

Ratio of sectoral shares of allocated assistance to sectoral share of industry gross value added, 2021-22



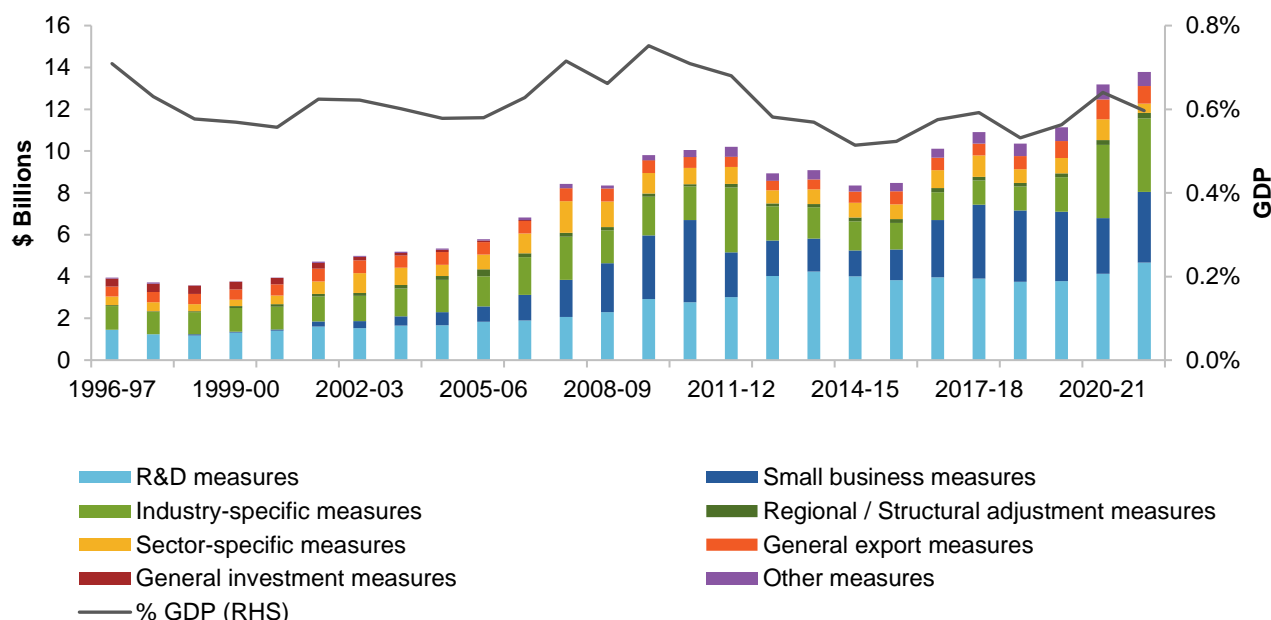
IGVA = industry gross value added, which is the sectoral share of GDP. **a.** The ratio of share of assistance to share of IGVA is the share of each sector's budgetary assistance divided by the sector's share of IGVA. Share of total assistance excludes unallocated assistance, which accounts for about 25% of all assistance. A ratio greater than 1 indicates that the sector received a share of assistance greater than its share of IGVA.

Source: Productivity Commission estimates.

Budgetary assistance by type of measure

The majority of budgetary assistance in 2021-22 was directed to R&D (\$5 billion). However, the largest increase was for small business assistance, which rose to \$3.4 billion in 2021-22 from \$2.7 billion in 2020-21 (figure 1.6).

Assistance to small businesses is identified in the Commission's budgetary assistance estimates due to its potential to provide more support to small businesses relative to large businesses. In previous years, the Commission has included some tax measures for small businesses in its estimates of budgetary assistance. However, from 2021-22 two of these tax measures will not be included (box 1.3).

Figure 1.6 – Assistance for R&D is the largest type of budgetary assistance^{a,b}**Value of budgetary assistance in current dollars by type of measure and share of GDP**

a. See table D.6 for definitions of types of measures. b. GDP is current prices.

Source: Productivity Commission estimates.

Box 1.3 – Why the lower tax rate for small business is removed from TAR estimates

The Commission's analysis suggests that Australia's dividend imputation neutralises much of the tax advantage for domestic investors of the lower company tax rate for small businesses. As the definition of who is eligible to pay the lower company tax rate as a small business has grown to include two-thirds of Australian companies in 2021-22, and at least 55% by gross value added (ASBFEO 2023; ATO 2023), the lower tax rate itself is not applied as selectively as typical forms of industry assistance.

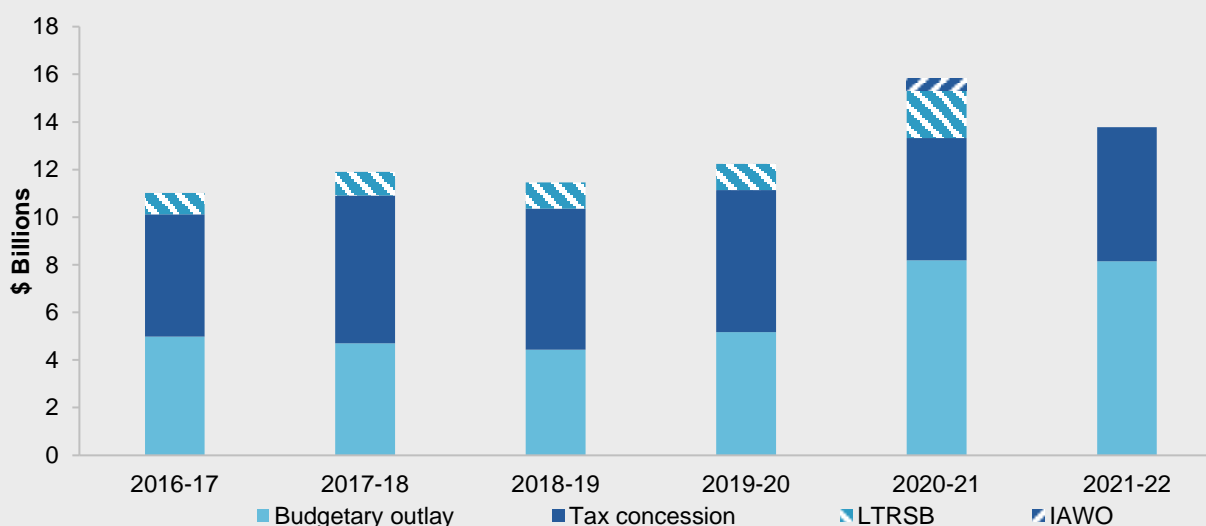
These facts together mean that the Commission no longer regards the 25% company tax rate for small business as industry assistance. We therefore exclude the value of the small business tax concession in this year's estimates of budgetary assistance, and adjust earlier estimates accordingly.

To reach this conclusion the Commission focused on the extent to which the difference in the two company tax rates actually translate to a lower overall level of tax paid by small business owners. We considered the way Australia's dividend imputation system simply makes company tax a pre-payment of personal income tax of company owners. Dividend imputation means that dividend payments from companies to owners that are Australian tax residents are ultimately taxed at the marginal personal income tax rate of the domestic investor. The lower tax rate for small business does not change the ultimate level of tax paid on dividends to domestic shareholders, and foreign ownership of 'small' business is modest. Combined, this means that the lower company tax rate should not reduce the user cost of capital for small business, and thereby does not confer assistance to the small business sector.

Box 1.3 – Why the lower tax rate for small business is removed from TAR estimates

The impact of this change is to reduce the level of estimated industry assistance. In 2020-21 the assistance attributed to the lower rate was estimated to be about \$2 billion, based on company tax foregone (The Treasury 2023).

Similarly, we exclude the value of the Instant Asset Write Off (IAWO) in this year's estimates of budgetary assistance and have adjusted the estimate for 2020-21. During the pandemic, measures to help business recover were introduced that effectively replaced the IAWO, and these measures were available to businesses with annual turnover under \$5 billion. The chart below shows the effect of excluding the lower tax rate for small businesses (LTRSB) and IAWO in the budgetary assistance estimates.

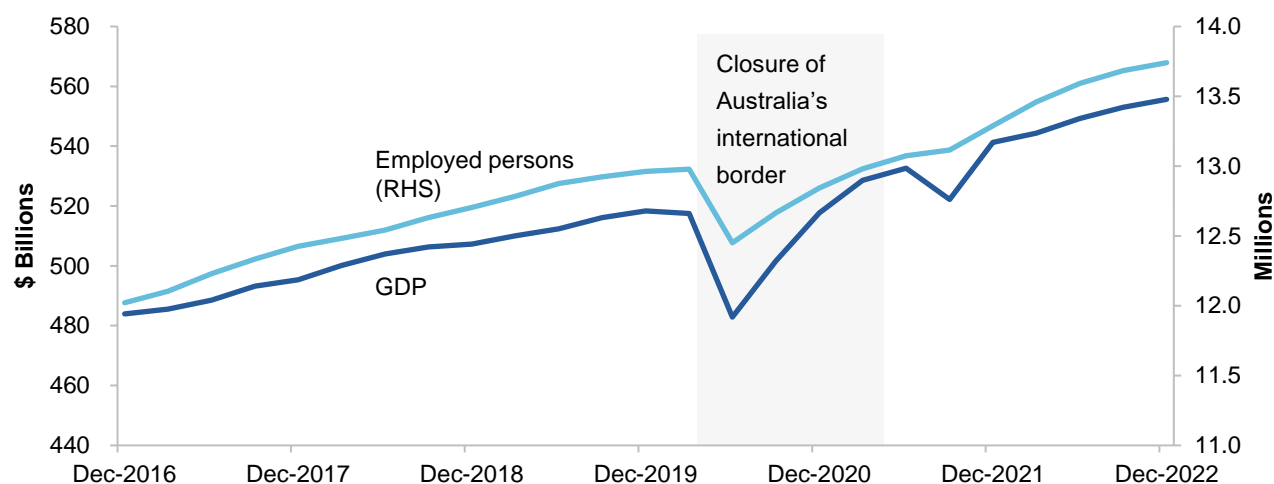


Assistance in the context of the COVID-19 pandemic

While many of the COVID-19-related measures ended in 2020-21, some persisted, and are therefore in the 2021-22 estimates of budgetary assistance. The 2021-22 estimates include several measures designed to respond to economic disruptions caused by the pandemic, but we exclude economy-wide COVID-19-related assistance programs.² While the justification for expenditure during the pandemic is well understood, some measures intended to provide temporary support have outlasted their purpose – especially since the Australian economy has, for the most part, rebounded (figure 1.7).

² Such as JobKeeper, Boosting Cashflow for Employers, Backing Business Investment, and the expansion of the Instant Asset Write Off.

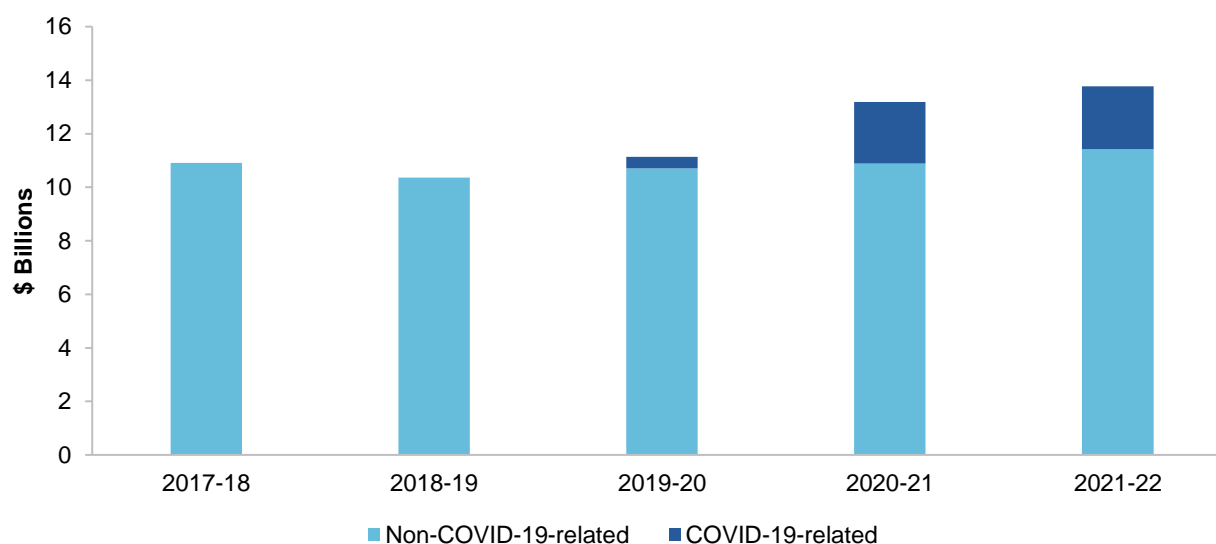
Figure 1.7 – The COVID-19 pandemic disruption to output and employment has passed
Gross domestic product and employment, 2016 to 2022



Source: Productivity Commission estimates.

Many COVID-19-related measures have been discontinued, including the large economy-wide measures such as JobKeeper, Boosting Cashflow for Employers, Backing Business Investment. But others remain, and the Commission's budgetary assistance estimates include 19 measures with expenditure of \$2.3 billion in COVID-19-related assistance in 2021-22, including \$1.5 billion expenditure on HomeBuilder (figure 1.8).

Figure 1.8 – Some COVID-19-related assistance has endured
Value of budgetary assistance by type of measure, current dollars



a. COVID-19-related assistance excludes JobKeeper, Boosting Cashflow for Employers, Backing Business Investment, and the expansion of the Instant Asset Write Off.

Source: Productivity Commission estimates.

1.2 A new framework for monitoring the effects of tariffs

While declining assistance provided by tariffs means that Australia's tariffs are less distortionary in the conventional sense than in the past, businesses still incur costs when interacting with the *tariff system as a whole*. To the extent that these costs are passed on along supply chains, they raise prices for Australian businesses and consumers. The relatively small amount of net tariff assistance raises the question of the purpose of Australia's tariff regime as assistance and as a source of revenue in the modern era, and whether the benefits outweigh the costs that they generate for businesses and consumers. The Commission has recommended promoting open and resilient trade in goods by reducing Australia's statutory import tariff rates to zero (PC 2023b, p. 85).

In a recent report on the 'nuisance' costs of tariffs, the Commission estimated that businesses incurred compliance costs between 0.9% and 2.8% of the value of the imports that benefited from a preference or concession³ which added between \$0.7 and \$2.2 billion to the cost of imports in 2019-20 (PC 2022b, p. 37). In 2021-22 these costs are estimated to be between \$1.2 and \$3.6 billion, based on the same methodology (appendix A).

Compliance costs increase as the number of preferential trade agreements increases and the system becomes more complicated. Compliance costs that importers incur when accessing preferences increase the relative cost of imports, and therefore act as a form of assistance by protecting import-competing domestic producers. Where importers face compliance costs, their domestic competitors are less exposed to competition from the import, potentially leading to a misallocation of resources in the economy.⁴

In this edition, the TAR reports on the cost of tariffs using the cost framework that emphasises the effects of tariffs on business costs and on cost of living (explained in more detail in appendix A), rather than the traditional assistance framework, which emphasises the protective effect of tariffs. In future editions the Commission will consider whether there are other approaches to accounting for the costs of the complex tariff system and the benefits of further unilateral reductions in tariffs.

The importance of a productivity-friendly business environment, including through openness to trade and foreign investment, was also examined in the Commission's *5-year Productivity Inquiry: Advancing Prosperity* (PC 2023b).

³ Tariffs on imports into Australia are levied at the statutory rate. Many imports are eligible for a reduced rate of customs duty (usually 'Free'), via a preference or concession (PC 2022b, pp. 9–11).

⁴ When importers choose to incur compliance costs to access the preference rather than pay a tariff, tariff revenue will also be lower.

2. Industry assistance developments

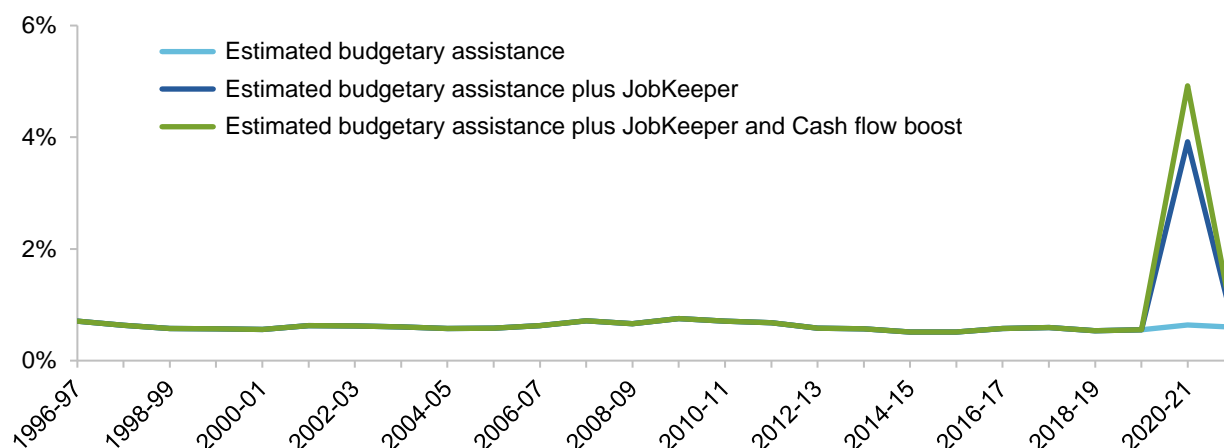
Key points

- ✳ **The vast majority of Australia's COVID-19-related industry assistance was provided in 2020-21. However, some COVID-19-related assistance measures endured into 2021-22.**
 - Measures like the HomeBuilder program, the Term Funding Facility, and some aviation sector measures provide an example of the way in which 'temporary' assistance measures can endure longer than anticipated, and longer than ultimately required.
- ✳ **The *Trade and Assistance Review* (TAR) periodically explores emerging forms of industry assistance. This year's TAR explores two growing source of industry assistance in Australia – climate change policy and concessional finance.**
- ✳ **In the absence of economy-wide carbon pricing, Australian governments are pursuing emissions reduction goals through a variety of measures that have the features of more traditional forms of industry assistance – selectively available grants, subsidies, concessional finance, and tax concessions.**
 - While such measures can notionally act as an indirect form of carbon pricing, they can increasingly act as a form of industry assistance once their indirect carbon prices move beyond broadly efficient levels.
 - Policies aimed at helping industry adapt to a changing climate or transition out of climate-exposed, and climate policy constrained, sectors risks acting as a form of industry assistance over coming years.
- ✳ **Concessional finance is also a growing form of industry assistance in Australia and may grow further, with the National Reconstruction Fund expected to begin operation in 2023.**
 - The Productivity Commission estimates that the industry assistance value of Australia's five main concessional finance entities likely ranged from \$64.8 to \$220.2 million in 2021-22, depending on the assumed credit quality of their outstanding loan portfolio.
 - Greater transparency by government-owned concessional finance entities would allow for inclusion of potentially more precise estimates in future TARs.

Australian Government budgetary assistance to industry in 2020-21 was dominated by the Cashflow Boost and JobKeeper programs, designed to assist businesses through the COVID-19 pandemic and to maintain existing links between workers and their employees. While these programs did not continue into 2021-22, some, such as HomeBuilder, did, contributing to the increase in budgetary assistance (excluding JobKeeper and Cashflow Boost) recorded in 2021-22 (figure 2.1) (section 2.1).

The budgetary assistance estimate in the *Trade and Assistance Review* (TAR) is comprised of programs that were selectively available to some sectors, activities and business sizes in 2021-22. These programs are regarded as *industry assistance* for the purposes of the TAR, as their selective nature has the potential to distort resource allocation in the economy, increasing the size of these sectors and activities relative to what would otherwise be the case (PC 2022c).

Figure 2.1 – Budgetary assistance as a share of GDP



Source: Productivity Commission estimates.

There can be a legitimate public policy case for some forms of industry assistance. For example, industry assistance can be an economically efficient response to market failure, helping to correct for factors that would constrain the scale and quality of activities affected by market failure, helping to improve broader living standards in the process. Government may also have a role in limiting the fallout from economic shocks. While this is principally undertaken through macroeconomic policy, more targeted interventions can also be used. These types of interventions can exhibit some of the characteristics of industry assistance.

Industry assistance can however distort economic outcomes to the detriment of living standards. It can do so by directing scarce resources towards sectors that nations do not have a comparative advantage in, or by increasing the size of sectors beyond what is desired by individuals, households and businesses in that country. The latter can occur when industry assistance artificially lowers the perceived costs of some goods and services. Interventions that transfer costs from firms to taxpayers can increase the size of the sector beyond what individuals, households and businesses would demand were they to directly face the full cost of the sector's goods and services. 'Temporary' assistance measures that prove more enduring than required by economic stimulus (section 2.1) can not only be macroeconomically counterproductive; they can distort resource allocation, as can policy measures that are designed to address market failures but that direct resources to particular sectors above and beyond their contribution to socially efficient outcomes (section 2.2).

While industry assistance can generate costs for the broader community, it can deliver substantial private gains to the industries that receive them. The ability for policy decisions to deliver substantial gains to private interests, the costs of which can be defrayed across the broader Australian community, often passing largely unnoticed, can make the policy making process vulnerable to socially costly lobbying and rent seeking.

For this reason, the TAR acts as a transparency device, helping to shed light on the various forms of industry assistance in Australia, and highlighting how they can distort economic outcomes to the detriment of broader living standards. Industry assistance has evolved over the course of Australia's economic history – starting with 'at the border' trade protection measures such as quotas and tariffs, to 'behind the border' measures

such as government grants, subsidies, tax concessions ('budgetary assistance' in the language of the TAR), domestic reservation policies, local content rules, as well as selective exemptions from regulatory obligations and access to concessional finance. Accordingly, the TAR's focus has evolved from a focus on tariff assistance to a range of 'behind the border' policy settings that made up the vast majority of estimated industry assistance in 2021-22 (chapter 1).

Consistent with this evolution, this year's TAR explores two growing sources of potential industry assistance in Australia – climate change policy (section 2.2) and concessional finance (section 2.3).

2.1 Endurance of 'temporary' COVID-19-related assistance

As noted in chapter 1, the two primary COVID-19 pandemic stimulus measures, JobKeeper and Cashflow Boost, finished in 2020-21. A number of smaller COVID-19 pandemic assistance measures continued into 2021-22. These included the HomeBuilder program, the Term Funding Facility (TFF), and assistance measures for the aviation industry.⁵ These measures provide an example of the way in which temporary assistance measures can prove more enduring than initially anticipated, providing economic stimulus beyond the period intended by the original policy decision.

While applications for HomeBuilder grants closed in April 2021, payments to recipients in 2021-22 came to \$1.5 billion, and are expected to continue to 2024-25 (Collins 2023). The endurance of the HomeBuilder program into 2021-22 reflects the uncapped, demand driven, support it provided for residential construction projects with potentially long lead times. What was intended to be a counter-cyclical stimulus measure ended up acting as a procyclical intervention. Indeed, as a demand-side measure operating within a labour and materials supply constrained residential construction sector, HomeBuilder likely achieved limited additionality and contributed to excess demand for construction inputs.

The TFF implemented by the Reserve Bank of Australia (RBA) (box 2.1) lowered the wholesale borrowing costs of the banking sector. By allowing banks to lock in low fixed rate loans for three years, from as late as June 2021, the industry assistance value of the TFF has endured beyond the period it was required as a stimulus measure. The RBA's successive – and rapid – increases to the cash rate during 2022 and 2023 has increased the value of the TFF subsidy to the commercial banks that participated in the TFF. The RBA's future decisions on the cash rate will determine the extent of industry assistance that will arise via the TFF, with further increases to the cash rate resulting in greater levels of assistance.

While these assistance measures have endured beyond the time required by COVID-19-related economic stimulus largely due to original policy design, temporary measures risk becoming more permanent settings over time, as sectional interests coalesce around the policy and lobby for its continuation. The Productivity Commission does not suggest that this is proving to be true for Australia's COVID-19-related assistance measures. However, ongoing monitoring of these temporary measures by the TAR will be important in safeguarding against the possibility.

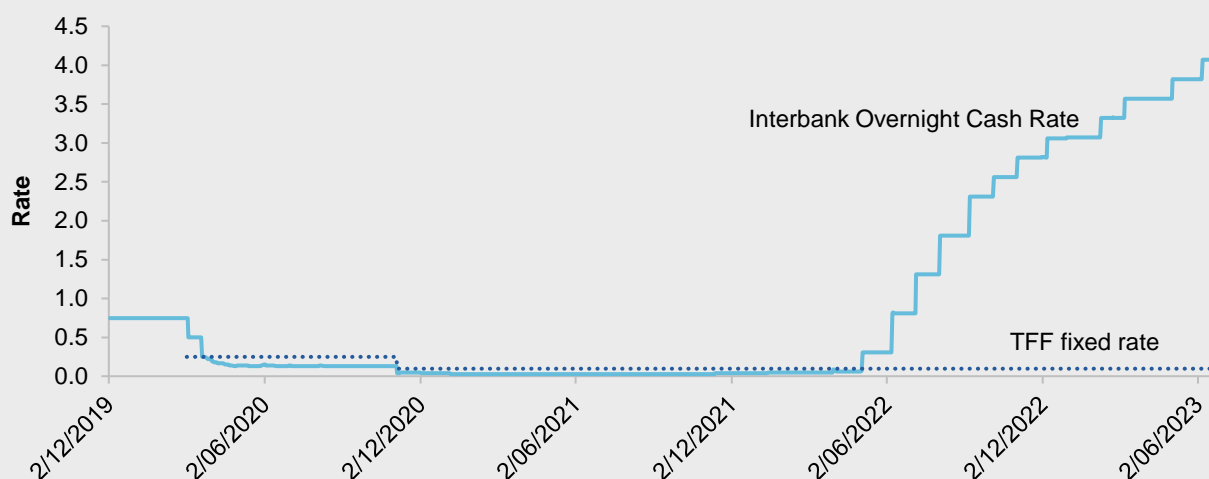
⁵ COVID-19-related assistance to the aviation industry included in the budgetary assistance estimates in 2021-22 was \$394 million. This does not include COVID-19-related assistance to the aviation industry that had not ended but the amount spent is not for publication, estimated to be \$417 million in 2020-21 (section 1.1).

Box 2.1 – RBA Term Funding Facility

As part of its response to the COVID-19 pandemic, the RBA established the Term Funding Facility (TFF) in March 2020, which allowed low-cost three-year funding to authorised deposit taking institutions. The TFF was extended in September 2020, and a reduction in the pricing rate was announced in November 2020. The facility was available until 30 June 2021, at which time \$188 billion in funding was outstanding (RBA 2021b).

Essentially, the TFF allowed banks to lock in three-year fixed loans at borrowing rates of 0.25% between March and November 2020, and then at 0.1% until June 2021. As the facility provided low-cost fixed rate funding for 3 years, it will continue to support low borrowing costs until mid-2024 (Alston et al. 2020, p. 2).

Increases to the cash rate during 2022 and 2023 has increased the value of the TFF subsidy



Source: RBA (2023b).

2.2 How Australian climate policy might act as a form of industry assistance

Australian climate change-related policies share several features of industry assistance.

This is particularly apparent in the case of sectoral emissions reduction policies that rely on tax concessions, government grants, concessional finance schemes and regulatory emissions controls that are imposed on some sectors and not others. In time, these features might also become apparent in measures designed to assist some sectors to adapt to the physical impacts of climate change, and in taxpayer funded transitional assistance packages for particularly carbon-intensive or climate-impacted industries and regions.

Being able to identify which of these policies principally act to address climate-related policy goals, and those which include a large component of industry assistance, will be important for understanding Australia's climate change policy settings. As set out in chapter 1, the tracking exercise provided by the TAR is principally undertaken as a transparency exercise, not in judgement of individual policy choices *per se*, but as a starting point for consideration of the desirability of particular policy settings in Australia.

The following discussion identifies some approaches to distinguishing between policies that principally act as a form of climate policy and those policies that might act as a form of industry assistance:

- Policies that prioritise markedly high-cost emissions reduction options, where credible lower cost abatement options are readily available.
- Emissions reduction policies that selectively provide support to some emissions reduction technologies and deliberately exclude others when market failures do not selectively constrain their uptake.
- Regulated emissions controls that selectively apply to some businesses and sectors and not others.
- Adaptation policies that selectively support the ongoing viability of some sectors and regions against physical climate impacts and not others.
- Transitional assistance packages for climate-affected and climate policy exposed sectors that are selectively available to some sectors and regions and not others.

This chapter also explores options for estimating the industry assistance value of these measures for the purpose of future TARs.

Australia has set a goal of decarbonising its economy by 2050

The Australian Government has set a goal of reducing Australian greenhouse gas emissions to zero, in net terms, by 2050, and an interim target of reducing greenhouse gas emissions by 43% below 2005 emissions levels by 2030 (Albanese and Bowen 2022). These targets constitute Australia's Nationally Determined Contribution to the Paris Agreement, the global treaty that seeks to hold 'the increase in global average temperatures to well below 2°C above pre-industrial levels' and pursue efforts 'to limit the temperature increase to 1.5°C above pre-industrial levels' (Australian Government 2022, p. 12). Several Australian states and territories have also announced more ambitious emissions reduction targets (table 2.1).

Table 2.1 – Australian, state and territory emissions targets
2030 targets and net zero year

Jurisdiction	2030 target below 2005 levels	Net zero target year
Tasmania	100%	2030
Australian Capital Territory	65–75% ^a	2045
Victoria	45–50%	2045
South Australia	50%	2050
New South Wales	50%	2050
Australian Government	43%	2050
Queensland	30%	2050
Western Australia	.. ^b	2050
Northern Territory	.. ^c	2050

.. not applicable. **a.** Below 1990 levels. **b.** The Western Australian Government has not set a 2030 emissions reduction target, but plans to set interim targets every 5 years, starting in 2028 or 2029 (Hastie 2023). **c.** The Northern Territory Government has not set a 2030 emissions reduction target, but has set a target of 50% renewable energy for electricity supply by 2030.

Sources: ACT Government (2021, p. 4); Albanese (2022); NT Government (2020, pp. 8–9); NSW Government (2023, p. 8); Queensland Government (2021); Department for Environment and Water (SA) (2021); Tasmanian Government (2021); Victoria State Government (2023, p. 5).

Australia's current approach to emissions reduction shares some features with industry policy

Australian, state, territory and local governments have implemented a range of policies to help deliver on these emissions reduction goals. To the extent that economy-wide emissions abatement mechanisms apply a common emissions price across sectors and activities, they are generally regarded as the lowest cost way of achieving emissions reduction goals. Australia's political experience with explicit carbon pricing has led Australian, state and territory governments to implement a suite of alternative sectoral abatement policies – renewable energy targets, feed-in tariffs, energy efficiency trading schemes, government grants for abatement projects, tax concessions for domestic biofuel production, tax concessions for electric vehicles, concessional finance for abatement projects, and a Safeguard Mechanism (SM) that imposes emissions intensity limitations on some emissions sources, and not others.⁶ Considered in isolation, these measures appear to share many features of policies commonly considered to be industry assistance for the purposes of the TAR – subsidies, tax concessions, and grants that are selectively available to some sectors and not others, and regulatory obligations that are imposed on some businesses, but from which other businesses are exempt.

Yes, grants, tax concessions and subsidies can be an indirect (albeit inefficient) way of pricing externalities

When considered within the context of Australia's emissions reduction goals, these sectoral emissions reduction measures can be considered, *prima facie*, an indirect form of pricing carbon, in that they reflect the cost paid by society for the social benefits of avoided greenhouse gas emissions. While these sectoral measures do not place an explicit price on carbon, they all impose indirect or implicit carbon prices on the Australian economy, given by the annual fiscal cost of the emissions abatement policy divided by the annual emissions abatement generated by the policy.⁷ To the extent that these measures simply approximate an efficient form of carbon pricing, they should not be regarded as industry assistance.

However, high-cost abatement measures can act as a form of industry assistance

Many of Australia's sectoral abatement measures do not currently approximate an efficient form of carbon pricing, and selectively confer significant advantages on some activities, at high cost to taxpayers. If nothing else, the pursuit of significantly high-cost abatement policies – when lower cost credible abatement options are available – suggests the activity might be given industry assistance for reasons other than their potential contribution to national emissions reduction goals. For example, this might include a desire to build a domestic manufacturing capacity in a low or zero emissions sector – which should be considered distinct from emissions abatement to the extent that Australia's emissions abatement targets can be readily achieved by importing the same technologies.

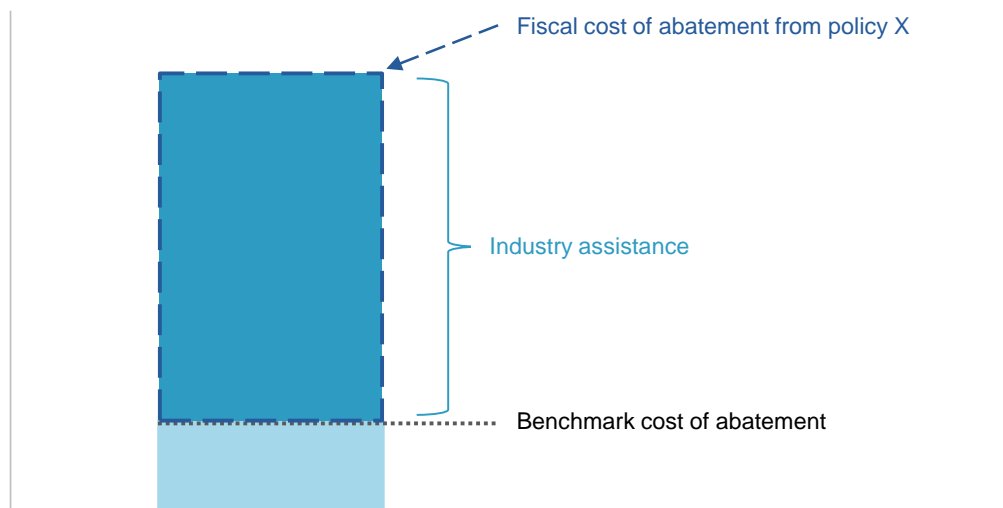
The wide range of indirect carbon prices imposed by Australia's suite of emissions abatement policy interventions (table 2.2) gives some idea of the potential inefficiencies of the current policy framework and the risk that some industries are being favoured over others in trying to achieve emission reduction targets. For

⁶ The Commission's *5-year Productivity Inquiry: Advancing Prosperity* provided a number of recommendations to transition Australia's existing climate policy settings towards a lower cost, productivity growth enhancing, approach to achieving Australia's emissions reductions goals. The principal concern of the TAR is cataloguing policy settings that act as a form of industry assistance.

⁷ Indirect fiscal costs of carbon differ from 'shadow carbon prices', which factor in the broader economic costs and benefits of the policy measure. For example, the shadow carbon price of a tax concession would also include the avoided deadweight loss of that taxation, while the indirect fiscal cost of carbon of that measure would not.

illustration, a policy setting that was notionally designed to contribute to Australian emissions abatement goals, but which did so at a fiscal cost of \$1,000 per tonne of carbon dioxide equivalent, while a similar quantum of emissions abatement was readily available at \$50 per tonne of abatement, could be reasonably regarded as a form of industry assistance to the higher cost abatement technology, to the value of \$950 per tonne (figure 2.2).

Figure 2.2 – Conceptualising the industry assistance value of indirect carbon price measures



Ideally, the estimation of the potential industry assistance value of a measure would be relative to a reasonable benchmark carbon price (box 2.2). Theoretically, the social cost of carbon, which measures the value of each avoided tonne of carbon dioxide equivalent emissions, would be the appropriate benchmark for judging socially efficient emissions reductions levels.⁸ When assessing the industry assistance value of a particular policy measure, the cost of other available abatement options might be the more appropriate benchmark. Given that Australia's Emissions Reduction Fund underwrites the achievement of Australia's emissions reduction goals, by allowing the Australian Government to purchase the number of Australian Carbon Credit Units (ACCUs) required to achieve Australia's emissions reduction goals, the ACCU price can be considered the cost of abatement that would otherwise be paid in the absence of the high-cost policy.

A more conservative approach to estimating the potential industry assistance value of Australian emissions abatement policies would be to set the benchmark carbon price at the top end of the marginal cost of abatement curve for near-term emission reduction goals, a price beyond which a measure could not be reasonably regarded as being pursued for emissions abatement reasons alone (box 2.2).

Nevertheless, the data required to estimate the industry assistance value of emissions reduction policies in this way is generally not published by government departments. Implementing the Commission's *5-year Productivity Inquiry: Advancing Prosperity* recommendation that government departments independently estimate and publicly report the indirect carbon prices of the emissions reduction programs that they administer (table 2.2) (PC 2023b, p. 31) would help to address this data deficiency. In the absence of such

⁸ A full assessment would also consider the value of any broader social benefits – beyond greenhouse gas emissions abatement – that they delivered. For example, improvements to local air quality arising from increased electric vehicle uptake, or the broader biodiversity benefits of forestry projects that sequester carbon and promote ecosystem regeneration. It would also acknowledge the extent to which they addressed non-price market failures to abatement, such as the public good nature of research and development into frontier low or zero emissions technologies.

estimates, or publication of the data required to estimate them, including all emissions reduction program spending in the TAR could serve as an interim measure.

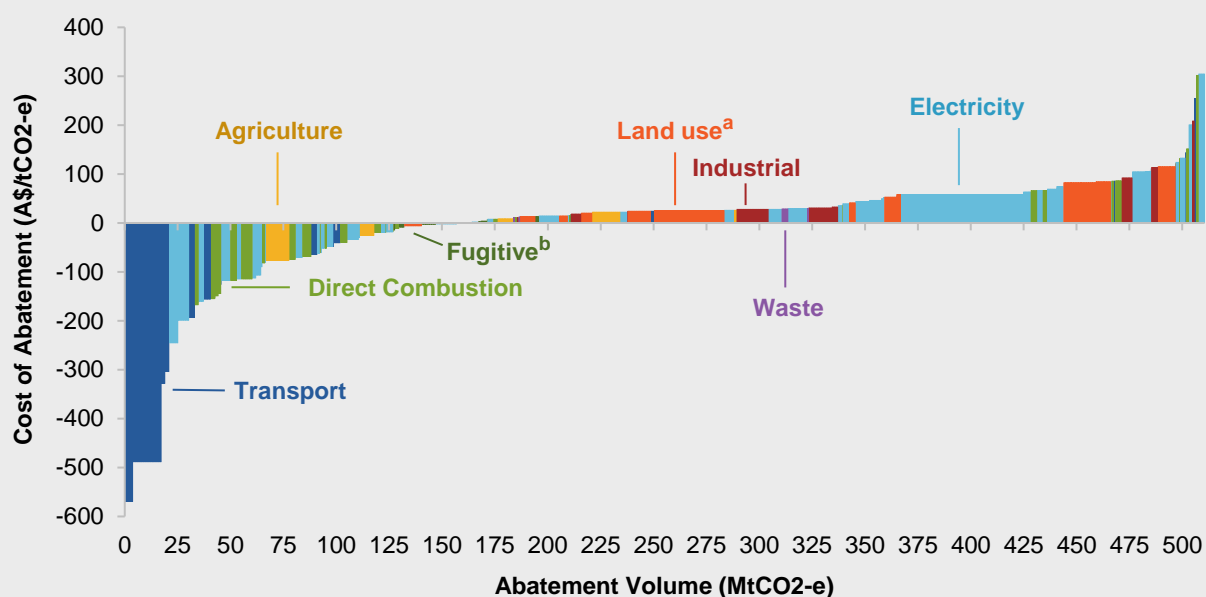
Box 2.2 – Choosing an appropriate carbon price benchmark

The Australian Government funds a variety of measures to achieve emissions abatement, though most measures differ in their implicit carbon price – the cost of avoiding an additional tonne of carbon emissions through that measure. A benchmark carbon price helps evaluate the cost-effectiveness of individual emissions abatement measures. Theoretically, the social cost of carbon, which is the value of each avoided tonne of carbon dioxide equivalent emissions, is the appropriate benchmark against which socially efficient levels of emissions reductions should be assessed. However, given that the TAR measures industry assistance, the social cost of carbon is unlikely to be the most relevant benchmark.

An alternative is a market price of carbon. In Australia, the most relevant carbon price would be the market price for Australian Carbon Credit Units (ACCU). Each issued ACCU represents the abatement of one tonne of carbon dioxide equivalent. Given that the Australian Government purchases emissions abatement at the ACCU price through the Emissions Reduction Fund, the ACCU price represents what the Australian Government could otherwise purchase abatement for in the absence of the policy being assessed by the TAR.

Not all abatement required to achieve our 2030 and 2050 emissions reduction targets can be purchased at the prevailing ACCU price, with the marginal cost of abatement rising as deeper emissions reductions are pursued. This can be illustrated by Australia's estimated marginal cost of abatement curve, which shows the differing costs of abatement for different sectors (figure below). Using the top end of the marginal cost of abatement curve as the benchmark price, would help to identify those policies that appear to be pursuing goals other than emissions abatement – the top end of the marginal cost of abatement curve being the upper bound of policies that can be expected to be pursued strictly for emissions abatement reasons.

Australia's projected marginal cost of abatement curve in 2030



a. 'Land use' includes land use change and forestry. b. Fugitive emissions are emissions associated with production of natural gas, oil and coal.

Source: Reputex Energy (2019).

Table 2.2 – Indirect carbon prices in Australia, selected policies

Government	Policy	\$ per tonne of CO ₂ -e ^{a,b}
Commonwealth	Exemption of EVs from fringe benefits tax	\$987 – 20,084 ^c (\$905 – 13,580)
	Renewable energy target – Small-scale technology certificates	\$57 – 209 ^d
	Renewable energy target — Large-scale generation certificates	\$60 – 220 ^d
	Emissions Reduction Fund (ACCUs)	
	— Average fixed-delivery price ^e	\$12 – 59 ^g
	— Spot price ^f	\$29 – 144 ^g
	Discounted excise for E10 ^h	\$128 – 274 ⁱ
	Discounted excise for B20 ^h	\$135 – 152 ⁱ
New South Wales	Energy savings certificates ^j	\$41 in range \$32 – 59
	\$3,000 EV subsidy and stamp duty exemption	\$271 – 4,914 ^c (\$222 – 3,323)
Victoria	Victorian energy efficiency certificates ^k	\$69
	\$3,000 EV subsidy and registration discount	\$287 – 4,807 ^c (\$217 – 3,250)
Queensland	\$3,000 EV subsidy, stamp duty discount, registration discount	\$282 – 4,933 ^c (\$222 – 3,335)
Tasmania	EV stamp duty exemption	\$134 – 2,137 ^c (\$96 – 1,445)
South Australia	\$3,000 EV subsidy and registration exemption for three years	\$209 – 3,647 ^c (\$164 – 2,466)

a. Estimates rounded to the nearest dollar. **b.** Bracketed prices reflect incorporation of 100% renewable energy assumption, provided for sensitivity analysis. Given the opportunity cost of using renewable energy for EV charging, the unbracketed prices are arguably more relevant. **c.** For simplicity, this estimate reflects fiscal costs per tonne of abatement, not the broader economic cost per tonne of abatement. The latter would also incorporate the impact of reduced taxation on the economy provided by tax concessions. Some of these differ from the preliminary estimates provided in the interim report, reflecting greater consideration of abatement generated by EVs once in the secondary market, and a slightly narrower range of additionality assumptions (75% to 5%). The high *level* of estimates for demand-side EV policies reflect their generosity relative to their abatement benefits, while the notable *range* in prices reflects a spectrum of additionality and bring-forward assumptions ahead of assumed mainstreaming of EVs in new car sales by 2035. See PC (2023c), appendix A for further details on the estimation approach. **d.** The range presented reflects three different emissions intensity factors as well as additionality ranging from 50–100% (PC 2023c, app. A). **e.** The most relevant ACCU price for the Emissions Reduction Fund – the biggest buyer of ACCUs – is the average fixed delivery contract price, which is \$11.70. **f.** The spot ACCU price might be more relevant for offset sellers and private buyers and was equal to \$28.75 on 5 September 2022. **g.** The upper bound estimate accounts for additionality concerns relating to common emissions reduction methods. Macintosh, Butler and Evans (2022) suggest that up to 80% of credits issued under three of the Emission Reduction Fund's most popular methods (which account for about 75% of total credits issued) do not represent genuine emissions cuts that would not have happened otherwise. **h.** The discounted rate of excise only applies to domestically produced ethanol and biodiesel. **i.** Lower bound estimate considers only scope 1 greenhouse gas emissions. Upper bound estimate considers lifecycle emissions and is consistent with PC (2011)). The excise rates used are those that were in place prior to the reduction that took place on 30 March 2022. **j.** The certificate price used is the penalty rate, which should represent an upper bound, though the spot price sometimes exceeds the penalty rate. A range is calculated using the emissions intensity of Australian coal generation as a lower bound, the average emissions intensity of

electricity generation in New South Wales in 2019-20 as a central estimate and the emissions intensity of gas generation as an upper bound. **k.** Spot price, likely higher than the price involved in long-term contracts.

Source: PC (2023c)

Policies can also act as a form of industry assistance if they are only selectively available to some sectors

Even if some policy settings notionally acted as an indirect form of carbon pricing, delivered broader non-carbon abatement social benefits or addressed non-price market failures impeding the achievement of Australia's 2030 and 2050 emissions reduction targets, they would still act as a form of industry assistance if they were only made available to some emissions abatement technologies and not others. For example, while there may be a case for supporting research and development (R&D) into frontier technologies in the broad, skewing R&D support towards some frontier technologies, such as Carbon Capture Use and Storage (CCUS) and hydrogen is regarded as industry assistance for the purposes of the TAR (table 2.3), because they are allocated selectively to specific technologies and sectors.

Table 2.3 – Summary of assistance measures for clean technologies

	Program	2020-21 assistance	2021-22 assistance	Cumulative assistance
Assistance for cleaner fuel and energy	Hydrogen fuel	\$957 million in direct government assistance (excluding CCUS) ^a . State governments have also provided funding to support hydrogen hubs, including in NSW (\$70 million), WA (\$47.5 million), Victoria (\$10 million) and Tasmania (\$0.2 million) ^a .	\$716 million in direct Australian Government assistance (excluding CCUS) ^b . State governments have also provided funding to support hydrogen hubs in their own jurisdictions, including in NSW (\$150 million), WA (\$136 million), Tasmania (\$70 million), SA (\$30 million), Queensland (\$20 million), and Victoria (\$10 million) ^b .	\$3.6 billion of hydrogen investment since 2017 ^c .
	Large-scaled energy storage	\$81 million in grants for large-scale battery energy storage for projects of 70 MW or larger ^d .	\$176 million in grants for large-scale battery energy storage for projects of 70 MW or larger ^d .	\$257 million committed in grants for large-scale energy storage projects since 2020 ^d .
	Ultra low-cost solar	Up to \$40 million is being made available through the Australian Renewable Energy Agency (ARENA) to support research and	\$41.5 million in grants for low-cost solar research and commercialisation projects ^f .	\$300 million in funding for solar research and development programs since 2009 ^g

	Program	2020-21 assistance	2021-22 assistance	Cumulative assistance
		development of solar PV technology ^e .		
Assistance for carbon capture and 'negative emissions'	Soil carbon	\$1.6 million in Downforce Technologies Ltd to scale its technology to measure soil organic carbon ^h .	Up to \$20 million is being made available to develop technology for soil carbon measurement ⁱ .	\$50 million is available through the soil carbon innovation challenge ^j .
	Carbon capture and storage	\$300 million to fund CCUS projects and advance technologies, including establishing CCUS hubs near industrial areas ^a .	The CCUS hubs program has been discontinued as of the October 2022 budget ^l .	Over \$1.3 billion worth of funding has been provided to CCUS by the Australian Government between 2003 and 2017 ^k .

a. DISER (2021b, pp. 24, 34, 37, 40, 44). b. DCCEEW (2023c, pp. 68–75). c. CSIRO (2023). d. ARENA (2022). e. DISER (2022c). f. ARENA (2023a). g. ARENA (2023b). h. Taylor (2022). i. Bowen (2023). j. Australian Government (2023). k. While CCUS has made over \$3.5 billion worth of funding announcements, only \$1.3 billion has been distributed (Browne and Swann 2017, p. 1). l. The 2020-21 and 2021-22 assistance amounts exclude announced funding programs.

Exemptions from emissions controls can also act as a form of industry assistance

In addition to the range of tax concessions, subsidies, and government grants provided to eligible emissions reduction activities, Australia's Safeguard Mechanism (SM) constitutes an emerging system of regulatory controls on the emissions of some businesses. The SM imposes 'baselines' — effectively emissions budgets — on some greenhouse gas producing facilities. These emissions budgets are set in emissions intensity terms (emissions per unit of output) and can be met either by pursuing internal emission reductions at the facility, or by purchasing ACCUs to bring net emissions into line with facility baselines. These baselines are scheduled to decrease by 4.9% per annum for all facilities other than those facilities judged to be Emissions-Intensive Trade-Exposed Industries (EITEIs) which can apply for a more modest baseline decline path of as little as 2% per annum (DCCEEW 2023b, p. 45).

The SM applies to facilities that produce 100,000 tonnes of carbon dioxide equivalent (CO₂-e) per annum, spanning several sectors. Facilities covered by the SM operate in mining, oil and gas, manufacturing, construction, waste and some transport subsectors (large rail companies and domestic airlines, but not road transport). The electricity sector is notionally included in the SM but is treated differently than other sectors, having its baseline imposed at the sectoral level, rather than at the level of individual electricity generators. The sectoral baseline is set above the current emissions of the sector, and since the sector is rapidly decarbonising, it is unlikely that the current sectoral baseline will ever become binding on the electricity sector.

Given that the SM only applies to some sectors, and because it only applies to some facilities in those sectors, it can benefit those sectors and companies that are exempt from its emissions controls, relative to those it covers. This form of industry assistance, broadly equivalent to sectoral tax exemptions and concessions, is compounded by the ability of some sectors to generate and sell ACCUs. Some ACCU generating sectors, such as agriculture, benefit from both avoiding emission reduction obligations and being granted new income generation opportunities through ACCU generation possibilities (table 2.4).

Table 2.4 – Sectors have differential obligations under the Safeguard Mechanism

Sector	Covered by Safeguard Mechanism? ^a	Can sell ACCUs? ^b	Industry baseline decline rate
Agriculture, forestry, and fishing	No	Yes	..
Mining	Yes	Yes	4.9%
Manufacturing	Yes	No	4.9%
Electricity and gas	Yes	Yes	4.9%
Waste	Yes	Yes	4.9%
Transport	Yes	Yes	4.9%
Domestic aviation	Yes	No	4.9%
Rail transport	Yes	No	4.9%
Road transport	No	No	..
Other	No	Yes	..
EITEI ^c	Yes	No	2-4.9% ^e

.. not applicable. **a.** The Safeguard Mechanism only applies to facilities that generate 100,000 tonnes of CO₂-e per annum. As the Safeguard Mechanism draws on the *National Greenhouse and Energy Reporting Act 2007* (Cth), only scope 1 (direct) emissions are covered by the mechanism (Spooner 2008, p. 5). **b.** Only sectors with an eligible ACCU generation method can sell ACCUs (Clean Energy Regulator 2023a). **c.** Emissions-Intensive Trade-Exposed Industry (EITEI) facilities. These facilities may operate in any sector. **d.** EITEI facilities can apply to the Clean Energy Regulator for a reduced baseline, with a minimum possible baseline of 2% (DCCEEW 2023b, p. 45).

Sources: Clean Energy Regulator (2023a, 2023b); DCCEEW (2023b, p. 45); Spooner (2008, p. 5).

Adaptation-related policies

Even if Australia and other signatories to the Paris Agreement were to immediately achieve net zero emissions, an additional 0.3 to 1.7 degrees of global warming by 2100 is estimated to be already ‘locked in’, reflecting the lag between annual emissions flows (a given increase in atmospheric stocks of greenhouse gas emissions) and an increase in the average surface temperature of the earth (Zhou et al. 2021). This means that regardless of the speed of emissions reductions over coming years, individuals, households and businesses will need to adapt to a changing climate over coming decades.

Governments have a role in providing climate-related information to help inform private adaptation decisions, avoiding policy settings that constrain them, supporting public and some private research into adaptation, and undertaking climate-related infrastructure investment where it is sensible to do so. The Commission’s *5-year Productivity Inquiry: Advancing Prosperity* (PC 2023a) made several recommendations to ensure that adaptation policy does not unduly weigh on productivity growth over coming years. However, adaptation policy risks acting as a form of industry assistance when it is sector or region specific, enabling that sector or region to comprise a greater share of the economy than it would otherwise be. Potential examples include:

- **Policies that transfer some risk of climate variability from businesses to the general community** – for example some farm assistance programs, including concessional loan programs, that transfer the cost of adverse weather and climatic conditions to the Australian public.
- **Infrastructure investment programs that increase the viability of particular industries in some regions** – for example, publicly funded irrigation programs designed to defend an existing region’s agriculture industry from changing weather patterns.

- **Infrastructure investment programs that cannot be justified by a broad-ranging cost benefit analysis** – for example, a large sea wall construction program could be regarded as industry assistance for the construction sector, or incumbent local industries, where more cost-effective alternatives, such as moving existing settlements to higher ground were available.

Transitional assistance for particularly impacted sectors and regions

While the bulk of climate change adaptation decisions will likely be made by individuals, households and businesses, calls for sector specific assistance are likely to emerge where climate-affected industries comprise a large proportion of a local or regional economy. Examples include agricultural regions rendered unviable by rising temperatures, altered rainfall patterns, expanded geographical range of crop pests and diseases, and communities reliant upon coastal fisheries impacted by ocean acidification, deoxygenation and altered ocean currents.

Calls for transitional assistance are also likely to emerge where domestic emissions reduction policies challenge the financial viability of existing emissions-intensive industries. Examples include regions with a disproportionate reliance on thermal coal extraction and exposure to emissions-intensive trade-exposed industries. (These observations relate to industries, not to employees and communities, where policy measures may well be required to reduce the human costs of the energy transition.)

The case for providing transitional assistance to some sectors is strongest when events are largely unforeseeable, where the sectors would not have had the time to make private adaptation and transition decisions. Emissions abatement has been part of Australia's public discourse for several decades (IC 1992).⁹ Moreover, abatement has been incremental, with decarbonisation expected to be achieved over a multi-decade timeline. This reduces the rationale for transitional assistance to some sectors. The provision of transitional assistance risks penalising 'early movers' who have previously made investments to ease their transition into a low carbon and climate change-affected future.

If governments choose to provide transitional assistance to particularly climate-affected regions and industries, it will act as a form of industry assistance in at least two circumstances. The first is where transitional assistance is only provided to some sectors and regions, and not others; the second is where access to that assistance is contingent upon the recipients committing to remain in that region or sector. Doing so would risk constraining potentially productivity-enhancing movements between sectors and regions as Australia enters a climate change-affected and carbon constrained future.

For these reasons, the Commission's *5-year Productivity Inquiry: Advancing Prosperity* recommended that where governments choose to provide transitional assistance it should be structured in a way that allows people to decide which regions, sectors and occupations they are best placed to transition to; and that it should not be made conditional on recipients committing to live or work in a particular region, sector or occupation (PC 2023c, p. 9).

Transitional assistance packages that deviate from these principles, being made selectively available to some sectors and regions, and/or tying recipients to particular regions or sectors, are likely to act as a form of industry assistance, and potentially included in future editions of the TAR.

These features are apparent in the proposed treatment of EITEIs under the SM, scheduled to apply from 1 July 2023. EITEIs may apply to enjoy lower carbon constraints under the scheme, and to gain access to an initial \$600 million Safeguard Transformation Stream under the Powering the Regions Fund to help finance their transition to a lower carbon future (DCCEEW 2023b, p. 4). They may also be apparent in

⁹ See for example IC (1991) *The Costs and Benefits of Reducing Greenhouse Gas Emissions*.

transitional assistance packages that may be proposed by the new Net Zero Authority, which began operation on 1 July 2023.

Estimating the industry assistance value of Australian emissions reduction policy settings

The preceding discussion has explored ways in which Australian climate policy settings might act as a form of industry assistance over coming years. Table 2.5 summarises potential approaches to estimating the value of each of these forms of industry assistance, which future TARs could potentially implement to track developments in industry assistance over time, depending on the degree to which required data becomes available over coming years.

Table 2.5 – Valuation methodologies for climate-related industry assistance

Form of industry assistance	Valuation methodology
1. High indirect carbon price measures	<p>(Estimated indirect carbon price of policy measure <i>minus</i> benchmark carbon price) <i>multiplied by</i> emissions abatement estimated to be generated by policy measure in TAR reporting year.</p> <p>Where:</p> <ul style="list-style-type: none"> Indirect carbon price is annual fiscal cost of program divided by annual tonnes of abatement attributed to that program in TAR reporting year. The benchmark carbon price is either the average annual ACCU price in TAR reporting year, or upper bound of medium-run marginal cost of abatement curve. <p>In the absence of the data required for these estimates, an interim measure could be to use the annual fiscal cost of the policy, without adjusting for its indirect carbon price.</p>
2. Exclusion from Safeguard Mechanism	Value of required ACCU purchase liability if all facilities that report their emissions under the National Greenhouse and Energy Reporting Act were subject to the Safeguard Mechanism.
3. Selective R&D measures	Aggregate amount of funding provided by technology or sector specific support programs in TAR reporting year.
4. Selectively available adaptation support	Annual expenditure on such programs.
5. Selectively available transitional assistance packages	Annual expenditure on such programs.

Assistance categories 3, 4, and 5 are likely to be readily reportable, given their general inclusion in budgets and other public reports. Estimating assistance categories 1 and 2 is likely to be more complex, involving a number of assumptions. A move towards publishing the indirect carbon price of individual policy measures by the responsible government departments, as recommended by the Commission's *5-year Productivity Inquiry: Advancing Prosperity*, would assist with the estimation of the first category of assistance, while increasing the transparency of policy settings. Similarly, estimating the second category of assistance would require making a number of assumptions to estimate the baseline currently uncovered facilities would face were they to be covered by the SM. A longer-run move towards absolute emissions baselines under the SM, as recommended by the Commission's *5-year Productivity Inquiry: Advancing Prosperity*, would simplify

estimation. Publication of facility level emissions intensities under the National Greenhouse and Energy Reporting Scheme would also assist with estimation.

2.3 Concessional finance

Concessional finance is a growing form of industry assistance in Australia and may grow further, with Australia's National Reconstruction Fund expected to begin operation in 2023. Concessional finance refers to subsidised loans and equity investments – finance provided by government on more favourable terms than would otherwise be made available by households, managed funds and private financial institutions. This concessionality often comes in the form of lower interest rates than would otherwise be available to the borrower but can also include more favourable loan terms like repayment holidays.

From the perspective of a business borrowing to fund their growth plans, lower financing costs can be the equivalent of cash grants or tax concessions. Every thousand dollars saved in interest costs is equivalent to a thousand dollars of government grants or a thousand dollars of tax savings.

Concessional finance can act as a form of industry assistance when it reduces the costs of domestic firms, relative to their international competitors, or is available to some domestic firms and sectors, and not others, increasing the share of the economy these firms and sectors would otherwise occupy. A key exception is where subsidies provided through concessional finance programs efficiently price positive externalities that are generated, or negative externalities that are avoided, by the concessionally financed activity. For example, subsidising finance for low emissions technologies might not constitute industry assistance where the level of the subsidy is designed to account for the social cost of greenhouse gas emissions.

Concessional finance is a growing form of government intervention in Australia

Export Finance Australia (EFA) (formerly the Export Finance and Insurance Corporation (EFIC)) has provided finance to Australian exporters since 1991, the Clean Energy Finance Corporation (CEFC) has provided finance to clean energy and low emissions technology businesses since 2012, the Northern Australia Infrastructure Facility (NAIF) has provided finance to some businesses in Western Australia, the Northern Territory and Queensland since 2016, the National Housing Finance and Investment Corporation (NHFIC) has been providing finance to community housing providers since 2018, and the Regional Investment Corporation (RIC) has been providing low interest loans to farm businesses since 2018 (table 2.6). This list of entities offers some examples of concessional finance in Australia, but is not exhaustive. Additional concessional loans are provided by the Australian Government – for example, EFA's national interest account (loans made by EFA on the request of the Australian Government) and the Australian Government's \$19.5 billion loan to NBN Co¹⁰ are further examples of concessional finance provided by the Australian Government.

Australia's \$15 billion National Reconstruction Fund (NRF), expected to begin operation in 2023 might also provide concessional finance to a range of sectors including renewables and low emissions technologies, medical science, transport, and 'value-adding' in the resources, and agriculture, forestry and fisheries sectors.

¹⁰ A competitive neutrality investigation found the interest rate on this loan was over four percentage points lower than a reasonable benchmark cost of debt for NBN Co (PC 2022a, p. 30).

Table 2.6 – Concessional Finance Entities in Australia

Entity	Finance approved at 30 June 2022 (\$b)	Targeted sector/s	Year established
EFA	11.9 ^a	Exporting businesses	1991
CEFC	10.8	Clean energy and low emissions technology	2012
NAIF	3.5	Northern Australia businesses	2016
NHFIC	3.4	Community housing providers	2018
RIC	3.0	Farm businesses	2018

a. Loans only – estimates only include loans from EFA's commercial account and exclude loan guarantees previously provided by EFIC.

Sources: EFA (2022) and earlier years, CEFC (2022, p. 8), NAIF (2022, p. 6), NHFIC (2022, p. 2), RIC (2022, p. 5) .

Government ownership allows these entities to offer concessional finance

The ability of these entities to provide concessional finance is ultimately derived from their government ownership. Government ownership can mean that there is limited pressure for these entities to earn a commercial rate of return. Government sets the investment mandate of these entities, which can vary from earning a stipulated rate of return above a given benchmark (such as prevailing government bond yields), through to simply covering the operating costs of the entity (table 2). This contrasts with private financial institutions where private shareholders ultimately decide investment mandates, and where market forces drive financing towards risk-adjusted market rates of return.

The concessionality that can be authorised by government investment mandates can be compounded by the ability of these entities to raise capital at a lower cost than their private sector peers, and because they are exempt from taxation. Government-owned financing entities that do not raise their own capital benefit directly from the lower borrowing costs available to government, being capitalised through the federal budget. Government-owned finance entities that raise their own capital in bond markets can also benefit from lower interest rates, to the extent that government ownership is judged to provide an implicit or explicit government guarantees of their bonds. Government-owned finance entities are also sometimes exempt from taxation. These lower costs provide entities with a competitive advantage over their private sector counterparts.

Applying competitive neutrality policy to government-owned finance entities could go some way to reducing this degree of concessionality, assuming that investment mandates remained unchanged. Governments can apply a notionally offsetting debt neutrality charge, to the value of the lower borrowing costs enjoyed by entities that raise their own capital, and a notionally offsetting tax neutrality charge, to the value of the tax they would have to pay if they were private sector entities. These charges are only applicable to entities that are not exempt from competitive neutrality policy (of the government-owned finance entities noted earlier, only the EFA falls into this category).¹¹ Not all government-owned finance entities face such charges

¹¹ The Commonwealth government's competitive neutrality (CN) policy requires that significant government business activities apply a debt neutrality charge equal to any cost-of-debt savings, given by the difference between their actual

(table 2.7) and in practice debt neutrality fees need not automatically reflect the borrowing cost savings these entities may enjoy in capital markets.

Table 2.7 – Characteristics of select government-owned finance entities

Entity	Investment mandate	Source of capital	Tax status	Debt neutrality charge	Tax neutrality charge
EFA ^a	'Commercial' in 'market gaps' ^b	Capital markets	Tax exempt	Yes	Yes
NHFIC ^c	Cost recovery (operating costs)	Capital markets	Tax exempt	No	No
CEFC	Benchmark ^d +3-4% ^e	Budget appropriation	Tax exempt	No	No
RIC	Cost recovery (administrative and borrowing costs)	Budget appropriation	Tax exempt	No	No
NAIF	Not lower than the Commonwealth borrowing rate ^f	Budget appropriation	Tax exempt	No	No

a. Commercial Account, excluding National Interest Account. **b.** The Ministerial Statement of Expectations for EFA requires that it focus on 'market gaps', market segments that private financial institutions have a demonstrated unwillingness to provide finance to, and to price its loans on an undefined 'commercial' basis. **c.** These characteristics relate to NHFIC's Affordable Housing Bond Aggregator facility (which comprises the majority of NHFIC's loan portfolio). The National Housing Infrastructure Facility sources funds from the government and has slightly different investment rules. **d.** Benchmark is equal to the Australian Government 5-year bond rate. **e.** Investments made under CEFC's Clean Energy Innovation Fund and Advancing Hydrogen Fund are not included in the portfolio rate of return. These funds have their own target returns. **f.** NAIF may offer lower interest rates (not lower than the Commonwealth borrowing rate), but will only do so with regard to the concessional necessary for the investment to proceed and the extent of the projects' public benefit. NAIF also offer 'equity-like investments' which have a target rate of return equal to the five-year Australian Government bond rate plus a premium of 3 per cent per annum.

Sources: Investment mandate direction, Select Legislative Instrument (2020) No. L00552, Investment mandate direction, Select Legislative Instrument (2021) No. L00942, Investment mandate direction, Select Legislative Instrument (2022) No. C01229, Australian Government cost recovery policy (Department of Finance 2023).

Estimating the value of concessional finance to industry

As a growing form of industry assistance, the Commission is considering incorporating the industry assistance value of concessional finance in its estimates of industry assistance in future TARs. There are several potential ways to do so.

Some entities like CEFC and NHFIC publish estimates of the degree of concessional finance of their financing activities. Others, such as EFA, do not. This could reflect a long-standing claim that much of EFA's activity is undertaken on a commercial basis, a position that was previously found to be at odds with the findings of the Commission's 2012 inquiry into *Australia's Export Credit Arrangements* (PC 2012).

Entities that publicly report on the value of their concessional finance activity principally do so through the reporting of concessional loan charges in their annual reports. Unwinding these charges over the life of

cost of debt and what they would otherwise pay were they not a government-owned business, to entities to which the CN policy applies. That same policy requires that, where such entities are exempt from taxation, they should make tax neutrality adjustment payments equal in value to the tax they would have to pay if they were a private sector entity. Under certain conditions, government can choose to exempt entities from CN policy.

individual loans can provide an indicative estimate of the industry assistance value of their lending activities. In these cases, concessional loan charges are estimated on a bottom-up basis, with the value of concessions estimated on a loan-by-loan basis, before being aggregated into an overall figure.

However, not all entities report concessional loan charges. This means there is an incomplete account of the industry assistance value of their concessional finance activities, making it difficult to obtain an overall estimate of the value of assistance associated with concessional lending activity.¹²

An alternative, top-down approach involves calculating the rate of return that could notionally be earned on an entity's loan portfolio were those loans made at prevailing market interest rates and comparing it to the rate of return actually earned on that loan portfolio. The estimated portfolio 'return gap' can then be applied to the entity's loan portfolio to produce an indicative estimate of the dollar value of concessional finance granted by these entities.

The principal benefits of a top-down approach are that it can be applied to all concessional finance entities and implicitly accounts for a broader range of sources of concessionality than are included in concessional loan charges (box 2.3).

The estimates produced by both methodologies are set out in table 2.8. The bottom-up estimates self-reported by some entities generally fall within the indicative range of estimates produced by the top-down portfolio rate of return gap methodology. For interpretation, the results suggest that had the total outstanding stock of EFA loans been invested at market interest rates over 2021-22 EFA would have earned 179 to 334 basis points more than it did earn in that year, depending on whether that money would have been invested in 5-year A rated debt securities or 10-year BBB rated debt securities. In dollar terms, that difference in returns would have amounted to between \$20.6 and \$38.3 million in 2021-22. This can be taken as an indicative estimate of the concessional value of these loans in 2021-22.

These estimates are made on the basis of the outstanding loan portfolios of these entities. They do not include equity investments that these entities have undertaken. Given that government shareholders enjoy the same dividend yields and capital gains as private shareholders, the degree of concessionality of government equity investment principally derives from the ability of government capital to be a more 'patient' shareholder than private capital – being less demanding of firms in which they have invested in, relative to private shareholders. The value of 'patient capital' can be difficult to estimate at the portfolio level. Moreover, more than 90% of the finance provided to businesses through the government-owned finance entities included in table 2.6 has been in the form of loans rather than equity investments.

Future editions of the TAR may seek to draw on available information to estimate a weighted credit rating of the loan portfolio of each entity. This would enable the Commission to arrive at a preferred estimate of the dollar value of the concessional component of lending by government-owned finance activities, using the top-down portfolio 'return gap' methodology. Greater consistency in the public reporting of the value of concessional finance to industry would also be a welcome development for the transparency of Australian policy settings, helping to more completely communicate the overall level of policy support provided to industry. If reported at a sufficiently disaggregated level, along with estimates of the value of externalities promoted or avoided by concessional

¹² Only NHFIC and CEFC report concessional loan charges. Financial statements for RIC and NAIF are consolidated with the financial statements for the Department of Agriculture, Fisheries and Forestry and the Department of Infrastructure, Transport, Regional Development, Communications and the Arts respectively, with separate information for RIC and NAIF not provided consistently. This provides an incomplete account of the industry assistance value of their concessional finance activities, making it difficult to obtain an overall estimate of the value of assistance associated with concessional lending activity.

financed activities, such self-disclosure could also help to identify those concessional finance programs that constitute an efficient pricing of externalities, rather than industry assistance *per se*.

Table 2.8 – Value of concessional finance to industry, 2021-22

Entity	Outstanding loan amount (\$m) ^a	Top-down 'return gap' range (basis points) ^b	Top-down 'return gap' estimate range (\$m) ^{c,d}	Bottom-up concessional loan charges (\$m) ^e
EFA	1,148	179 – 334	20.6 – 38.3	na
NHFIC	2,237	59 – 213	13.1 – 47.7	21.0
CEFC ^f	3,331	-117 – 38	-38.9 – 12.7	5.3
RIC	2,666	256 – 411	68.2 – 109.5	74.9
NAIF	665	25 – 180	1.7 – 11.9	3.1–10.8 ^g
Total	10,047	64 – 219^h	64.8 – 220.2	na

na Not available. **a.** Stock of outstanding loans provided by each entity, drawn from the annual report of each entity, gross of concessions and impairments. For RIC, this is a best estimate based on information provided in the Department of Agriculture's annual report. **b.** Basis point difference between the rate of return the portfolio would have earned had those funds being invested at prevailing market interest rates, and the rate of return actually earned on that portfolio of loans. A positive number implies concessionality. The range of estimates reflects the range of tenor and credit rating assumptions used for the commercial portfolio return comparator, ranging from the average rate of return on an A rated 5-year tenor (2.87%) to a BBB rated 10-year tenor (4.42%) that prevailed during 2021-22. **c.** The rate of return actually earned is estimated using interest income provided in each entities annual report. However, for EFA, RIC and NAIF, interest income earned on the portfolio of loans of interest to this analysis is not provided. For these entities, the rate of return is the Commissions best estimate, based on available data and a number of assumptions. **d.** Dollar value of the return gap range applied to the outstanding stock of loans held by each entity. **e.** For comparison, annual unwind of concessional loan charges¹³ reported by each entity in their Annual Report. **f.** A negative sign could reflect that entities are earning more than they would at market rates, although it is more likely it reflects that the risk profile of the entities loan book lies outside the assumed range (A to BBB) provided in this table. **g.** Expressed as a range due to data limitations. **h.** Weighted average of basis point gaps of individual entities.

Sources: EFA (2022), CEFC (2022), DAFF (2022), NHFIC (2022), DITRDC (2022), DISER (2021a), RBA (2023b), Productivity Commission estimates.

¹³ A number of approaches were considered for the 'bottom-up' approach. Ultimately in the treatment of concessional loans, there are three key items entities tend to track. The **total value of the concession** on all outstanding loans (a stock) – the lifetime value of the discount on all outstanding loans. The **concessional loan expense** – the total lifetime discount on new loans issued that year. Essentially the gross increase in the value of the lifetime concessional value on all outstanding loans. The **unwind of the concessional loan expense** – the decline in the value of the concession over the year. The unwind is considered to be of most relevance to the TAR, for the following reasons. Every year, the total value of the concession on outstanding loans decreases (or unwinds). As the concessional loans tend to maturity, there is less concessional value for the borrower to benefit from (for example, a 10 year loan with a 5 percentage point interest rate discount is more valuable to a borrower, relative to a one year loan with a 5 percentage point interest rate discount). The amount the concessional stock decreases by (the unwind) is considered to be the amount of the concession 'used' in that year. As the TAR is focussed on the benefits provided to industry *in any given year*, the unwind is considered to be the most appropriate figure for this table. The use of the unwind is analogous to an asset depreciating: the asset represents a stock, while the depreciation represents the decrease in the value of that stock. Here, the value of the concession is the stock, and the unwind represent the decrease in the value of that stock.

Box 2.3 – Approaches to estimating the value of concessional finance

The Commission considered two approaches to estimating the industry assistance value of concessional finance. The first involved using the annual unwind of concessional loan charges, published by a number of government-owned finance entities. The second involved estimating the ‘return gap’ of these entities, the difference between what these loan portfolios earned in a given year, relative to what they would have earned had those funds been invested at prevailing market rates of interest.

Method 1: Annual unwind of bottom-up concessional loan charges

Some government-owned finance entities like NHFIC, CEFC, and RIC publish concessional loan charges in their annual reports.

These concessional loan charges are calculated by taking the difference between the net present value of a concessional loan were it to be provided at commercial rates and the net present value of the loan given the concessional terms on which it is offered. It is thereby an estimate of the overall value of the concessional component of the concessional loan activities of the entity.

The annual decrease in the value of the concessional loan charge is expressed as a concessional loan charge ‘unwind’ and can be taken as an indicative annual value of the concessional component of the outstanding stock of concessional loan activity in that year.

Method 2: Top-down portfolio ‘return gap’ methodology

The top-down portfolio ‘return gap’ approach to estimating the concessional value of government-owned finance entities is calculated using the following formula.

$$\begin{aligned} & \text{Concessional value of loan portfolio} \\ &= ((\text{stock of outstanding loans})(\text{benchmark market interest rate}/100)) \\ &\quad - ((\text{stock of outstanding loans})(\text{portfolio rate of return}/100)) \end{aligned}$$

Where:

- *Stock of outstanding loans* = stock of loans reported as assets in annual reports of government-owned finance entities
- *Benchmark interest rate* = average market yields reported in RBA F2 tables (more below)
- *Portfolio rate of return* = (interest earnings/stock of outstanding loans)(100) reported in annual reports of government-owned finance entities.

The range of estimates is calculated using the 5-year A rated debt security yield series from the RBA F2 tables for the lower bound and the 10-year BBB rated debt security yield series from the RBA F2 tables for the upper bound.

3. Trade policy developments

Key points

- ✱ **Australia's trade environment has continued to recover from the pandemic. Australia's goods trade continued to grow, aided by strong commodity prices in 2022. Services trade also continued to recover, with strong growth in services imports supported by a rebound in travel.**
 - Part of the relatively strong growth in the value of Australia's trade reflects increases in price levels in a high inflation environment – Australia's trade as a share of national GDP has increased modestly over the last decade.
- ✱ **International trade institutions made limited progress towards normalisation. While calls to reform the WTO dispute settlement process continued, as the Appellate Body remained incapacitated, the interim Multi Party Interim Appeal Arbitration Arrangement (MPIA) issued its first ruling in December 2022.**
 - More progress has been made on Australia's bilateral trade agreements, including free trade agreements with the United Kingdom and India coming into force.
- ✱ **While rolling disruptions to international trade have elevated public consciousness of the potential vulnerability of supply chains over recent years, it has also demonstrated the resilience of the international trading system. Global economic integration is not dead.**
 - The ability of Australian exporters to find alternative markets when China markedly reduced its demand for key exports from early 2020 provides a demonstration of the way in which the international trading system can provide a stabilising source of resilience.
- ✱ **Nevertheless, public memory of these disruptions, national emissions reduction goals, and a resurgence in strategic competition between the major economies, has underpinned a return to more overt industry policy. This is particularly apparent in the US Inflation Reduction Act and CHIPS and Science Act, and their draft EU counterparts.**
 - Attempting to compete with major economy industry policy is likely to prove a net negative for small open economies like Australia. Living standards in small open economies will be best served by continuing to focus where they are best placed to fit within global production patterns.
- ✱ **Relatedly, the European Union also took further steps towards the introduction of a Carbon Border Adjustment Mechanism (CBAM) in 2023, and in early 2023 the Australian Government announced its intention to undertake a review into the merits of an Australian CBAM.**
 - Properly designed, CBAMs can help to reduce the risk of 'carbon leakage' arising from domestic climate policy, but they can act as protectionist trade barriers if they are poorly designed.

3.1 Australia's trade environment has continued to recover from recent disruptions

Australia's trade performance continued to recover in 2022 from COVID-19-related disruptions, and to weather more recent disruptions to global trade. These included increases in the price of food and energy associated with the war in Ukraine, the effects of monetary policy tightening in many major economies, and geopolitically motivated disruptions to trade between individual nations (RBA 2022, pp. 5–7; UN 2023; Zhou and Satherley 2022).

Despite these challenges, the overall value of global trade continued to recover in 2022 – growing by 12% for goods and by 15% for services trade in the 2022 calendar year – this mostly reflected growth in the value of trade in fuels, mining products, and travel and transport services, as well as the rising prices of some goods, especially energy (WTO 2023i, pp. 11–13). The volume of trade in goods also grew moderately by 2.7% in 2022, but began to decline in the last quarter of the year due to the rise in commodity prices, and historically high food and energy prices (WTO 2023i, pp. 3–4). And – more positively – after peaking in February 2022, freight costs have returned to early 2021 levels (box 3.1).

The ability of the global trade system to weather the rolling disruptions of recent years reflects the diversification benefits of global economic integration. International trade gives nations access to a wider range of buyers, and a greater number of suppliers, than would otherwise be the case. This diversification generally means that disruptions to the supply of a particular good or service from one nation can be quickly overcome by sourcing substitute products from others. Similarly, reduced demand for one country's exports by another can be quickly overcome by selling to alternative markets (WTO 2023k, p. 4).

When global demand for, and supply of, goods and services remains broadly unchanged, individual disruptions generally lead to a *reorganisation* of trade between individual countries, rather than a *reduction* in overall global trade. For example, the imposition of trade restrictions on one country by another generally results in a redirection of trade between available importing and exporting nations – albeit with some costs – rather than an overall reduction in global trade.

These dynamics were observed when restrictions were placed on selected Australian exports to China in early 2020, including barley, beef, cotton, wine, lobsters, timber and coal. Australian exports of these goods were largely resilient to these trade measures, with many affected export categories able to find alternative markets. While some exports such as lobsters and wine fell, with some substantial effects on the Australian businesses that exported these products, it did not impose significant economy-wide costs on Australia (appendix C, box C.2). These dynamics were also observed in response to the economic disruptions caused by the war in the Ukraine. Trade in products by countries significantly affected by the war remained fairly resilient, with alternative suppliers filling the gaps for most products affected by the conflict.

The worst scenarios foreseen at the onset of the [Russia-Ukraine] war for food prices and security have so far not materialized. Instead, the initial impacts have been contained thanks in part due to the openness of the multilateral trading system and the transparency and commitments it requires from its members ... resilience will ultimately be best served by fostering deeper and more diverse international markets, anchored in open and predictable trade rules. (WTO 2023k, p. 18)

More broadly, while trade restrictions tend to garner the most media attention, the number of trade facilitating measures introduced on goods since the start of the COVID-19 pandemic has exceeded the number of trade restricting measures on goods over the period to mid-2022 (WTO 2022h, p. 2).

Box 3.1 – International freight costs have eased

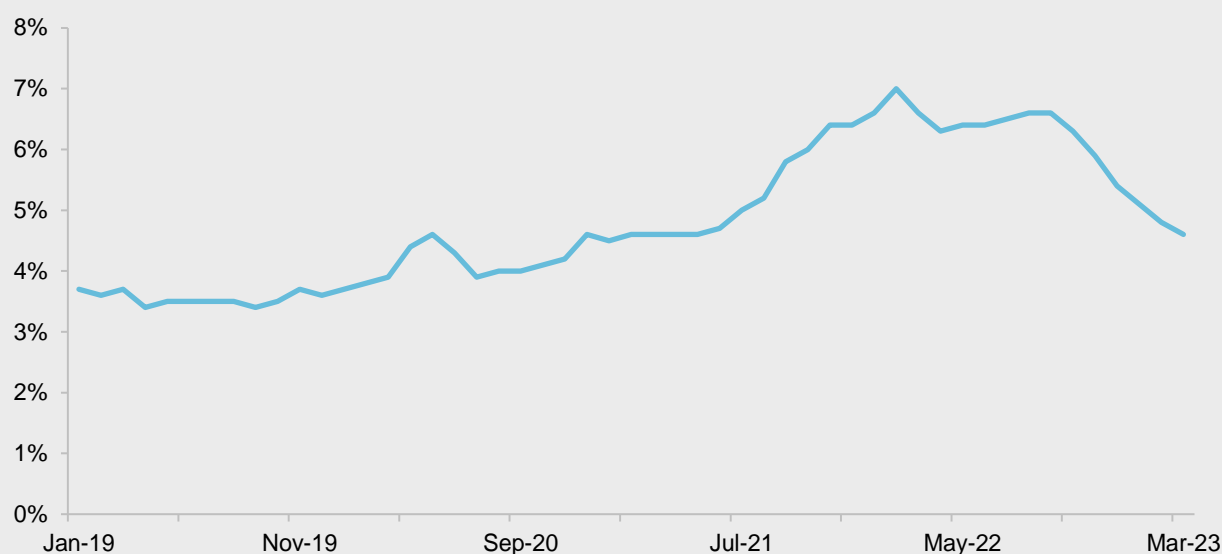
The cost of international freight services increased strongly during the COVID-19 pandemic due to global supply chain disruptions. These disruptions were initially due to restrictions on individual and commercial activities to limit the spread of COVID-19 (especially in the first half of 2020) and subsequently compounded by transportation issues from late 2020. These transportation issues were largely due to shortages of sea shipping containers, mismatches in the location of containers, and port congestion.

Freight costs can act as a quasi-tariff that raises the cost of imported products relative to domestically produced products – effectively offering protection to domestic producers. This effect was further increased during the pandemic when international freight costs increased significantly (figure below).

However, freight costs began to decline in late 2022, and continued to decline through early 2023. This trend has reflected both the easing in some supply chain disruptions that occurred during the pandemic, as well as softening demand for goods (partly due to the conflict in the Ukraine, rising inflation and monetary policy tightening in many major economies).

Freight costs have returned to 2021 levels ^a

Cost of freight as a share of total import value, Australia



a. Includes the cost of insurance for goods while in transit.

Source: ABS (*International Trade in Goods and Services, Australia*, May 2023, Cat. no. 5368.0).

Source: ABS (2023b); RBA (2021a).

High commodity prices boosted the value of goods exports

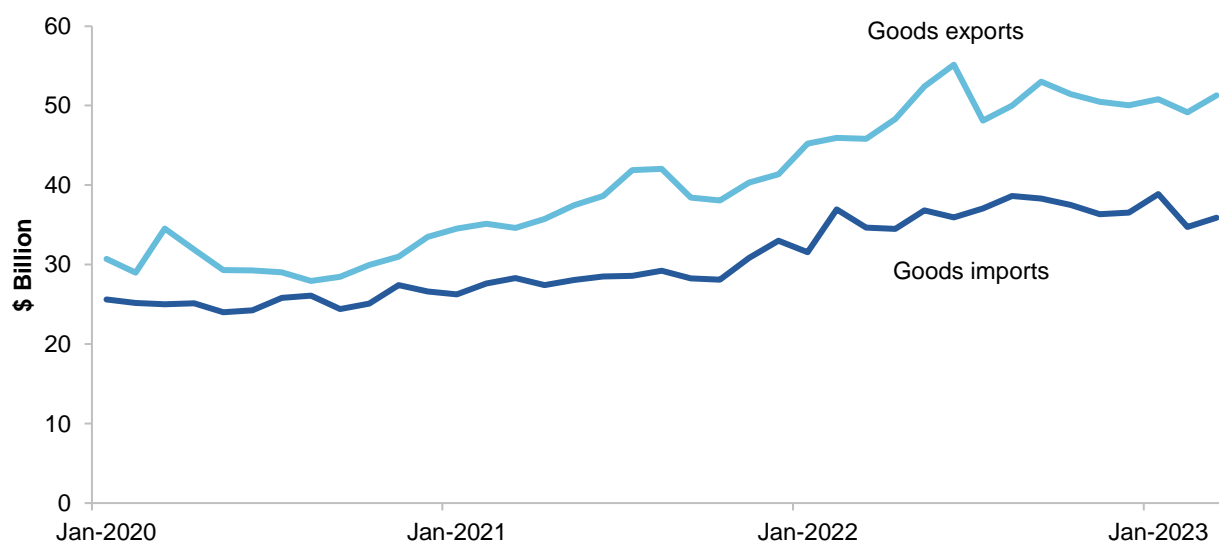
Australia's goods exports and imports continued to recover in 2021-22 from the effects of the COVID-19 pandemic (figure 3.1). In the 2021-22 financial year, the value of goods exports grew by 32% and the value of goods imports grew by 26%. In the 2022 calendar year, goods exports grew by 11% in value, and goods imports by 16% (Productivity Commission estimates based on ABS (2023a)).

Much of this growth in goods exports reflected favourable prices in 2022 for key commodities such as iron ore and coal. There was a brief decline in goods exports in June and July 2022, which was mostly driven by a decrease in exports of coal, coke and briquettes and metal ores and minerals, as well as a decrease in the value of exports of other mineral fuels (including LNG). For example, Australia's iron ore exports dropped from about \$12.6 billion in June 2022 to \$10 billion in July 2022, before rising to about \$11 billion in December 2022 (ABS 2023a). The world price of iron ore dropped from about US\$214 per dry metric tonne in July 2021, to about US\$96 in November 2021. It then rose temporarily to about US\$152 by March 2022, before steadily declining again until October 2022 (US\$93) (Statista 2023). China also implemented COVID-19 pandemic restrictions that led to slowing growth and demand for Australian exports.

Australia's goods trade grew more modestly in early 2023. For goods exports, this was mostly driven by declines in most commodity prices from February 2023 (however, prices for thermal coal and gas remained about twice their average level before the COVID-19 pandemic, mostly due to reduced gas supply from Russia) (RBA 2023c, p. 11). And for goods imports, much of this modest growth came from increases in the value of household goods, machinery and industrial equipment (ABS 2023a).

Figure 3.1 – Goods imports and exports kept growing in 2022

Value of Australian exports and imports of goods, seasonally adjusted, current prices



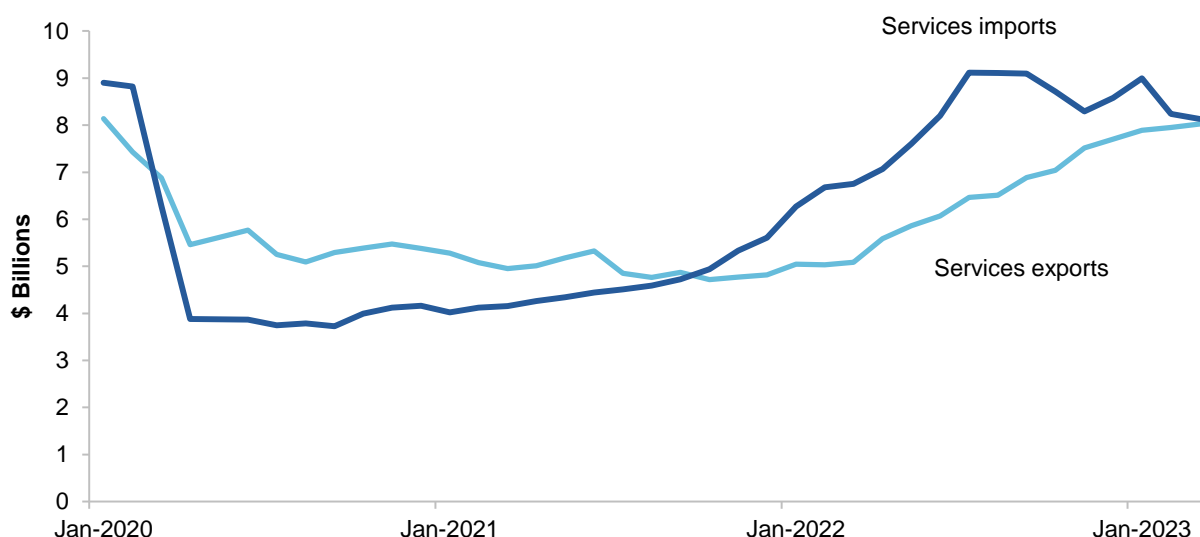
Source: ABS (*International Trade in Goods and Services, Australia, March 2023*, Cat. no. 5368.0).

Services trade also continued to recover

Australia's services trade also continued to recover from the effects of the COVID-19 pandemic. In March 2023, services trade had approximately returned to the pre-pandemic levels last seen in early 2020 (figure 3.2).

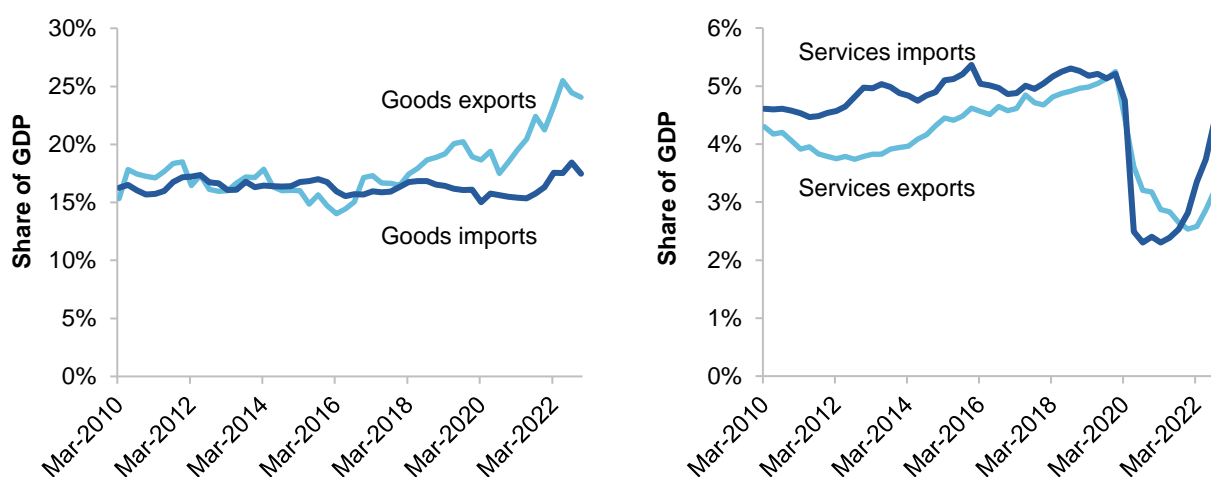
Services imports grew particularly strongly – by 82% in the 2021-22 financial year, and by 37% across the 2022 calendar year. This was a marked increase from the previous financial year, in which service imports grew by 18%. This increase mostly reflected the relatively strong recovery of travel services after the lifting of travel restrictions imposed during the initial phase of the COVID-19 pandemic response, as well as some growth in 'other' services from mid-2022 (such as health and education).

Services exports also grew in value, by 25% in the 2021-22 financial year, and by 53% in the 2022 calendar year. This mostly reflected recovery in exports of travel services, which made up over half the total value of service exports in March 2023 (from about 37% in January 2022).

Figure 3.2 – Services trade has recovered**Value of Australian imports and exports of services, seasonally adjusted**

Source: ABS (*International Trade in Goods and Services, Australia, March 2023*, Cat. no. 5368.0).

Part of this growth in the value of Australia's exports and imports of goods and services reflects increases in the prices of these goods and services. However, as a share of Australian GDP, the value of exports and imports of goods and services has only grown modestly over the last decade, and this was mostly driven by growth in goods exports (figure 3.3).

Figure 3.3 – Australian trade has modestly increased as a share of GDP**Trade as a proportion of nominal GDP, seasonally adjusted, 2010 to 2022**

Source: ABS (*International Trade in Goods and Services, Australia, 2023*, Cat. no. 5368.0, tables 5, 6, 10; *Australian National Accounts: National Income, Expenditure and Product, Australia, 2022*, Cat. no. 5206.0, table 3).

3.2 WTO dispute issues persist, but some progress has been made in bilateral trade agreements

In 2021-22 and into 2023, international trade institutions made some limited progress towards normalisation. While calls to reform the WTO dispute settlement process continued, the WTO's Appellate Body remained incapacitated. However, the interim appeal body – the Multi Party Interim Appeal Arbitration Arrangement (MPIA) – began to issue rulings on trade disputes between some WTO members in late 2022 (Pauwelyn 2023, p. 1).

Although about 150 new trade-restrictive measures on goods have been implemented by WTO members and observers from the start of the COVID-19 pandemic to mid-2022, these were far outweighed by the implementation of about 290 new trade-facilitating measures on goods in that time (representing about two-thirds of all trade-related measures introduced on goods) (WTO 2022h, p. 2).

While there was little progress in Australia's multilateral and plurilateral trade agreements in 2021-22, two new bilateral free trade agreements (FTA) – one with India and one with the United Kingdom – came into force in late 2022 and early 2023. The number of anti-dumping measures in Australia declined slightly in 2022, though not enough to reverse the long-term growth trend, and remaining well above the world median.

Few developments in multilateral and plurilateral agreements

There have been few developments in Australia's multilateral and bilateral trade agreements in the last year. Negotiations continue to be stalled on the Trade in Services Agreement and the Environmental Goods Agreement. The WTO's Appellate Body is still incapacitated and unable to hear appeals, though WTO members have continued to discuss reforms to the dispute settlement system.

WTO dispute process issues continue

One of the core functions of the WTO – which is to resolve trade disputes between member governments – has continued to be impeded by the inability of the Appellate Body to hear appeals (WTO 2022c). The Appellate Body is the WTO's highest dispute resolution body and is designed to hear appeals from parties as part of the dispute resolution process – normally, about two-thirds of trade disputes lodged with the WTO reach the Appellate Body (Hopewell 2021). However, the Body has been impeded since 2011, when the United States began blocking the appointment of new judges to the Body due to concerns about the dispute settlement process (Titievskaja 2021, p. 2). Since 2019, the Body has been unable to review appeals due to its ongoing inability to fill vacancies, with the term of the last sitting member expiring in November 2020 (WTO 2022c).

The incapacitation of the Appellate Body has meant that although the WTO can still process trade disputes via its Dispute Settlement Body, no appeals can be heard. This has meant that any country in a trade dispute could lodge a formal appeal to block a ruling by the WTO (Hopewell 2021).

In July 2020, the Multi-Party Interim Appeal Arbitration Arrangement (MPIA) began operating to help resolve disputes among WTO members where an appeal had been made. The MPIA is a temporary, separate appeal system for trade disputes that WTO members can opt to use, provided that all parties in the dispute are also parties to the MPIA. As at March 2023, 25 WTO members were parties to the MPIA, and it had issued rulings on two dispute cases from the WTO. A further 7 ongoing cases were likely to be referred to the MPIA as both parties were also parties to the MPIA (GTP 2022).

Numerous groups have called for reform to the WTO dispute settlement process. At the twelfth WTO ministerial conference in June 2022, members agreed to conduct a review of the WTO's functions and confirmed their intention to establish a functioning dispute settlement system by 2024 (WTO 2022g, 2022i). And at a meeting of the WTO's General Council in December 2022, the participants noted that almost all delegations considered

dispute settlement reform a priority (WTO 2022e). Reforms to the dispute settlement system will also be discussed at the thirteenth WTO ministerial conference, scheduled for February 2024 (WTO 2023e).

No recent progress on the Trade in Services Agreement or Environmental Goods Agreement

There has been little progress on negotiations for the Trade in Services Agreement or the Environmental Goods Agreement in the last year.

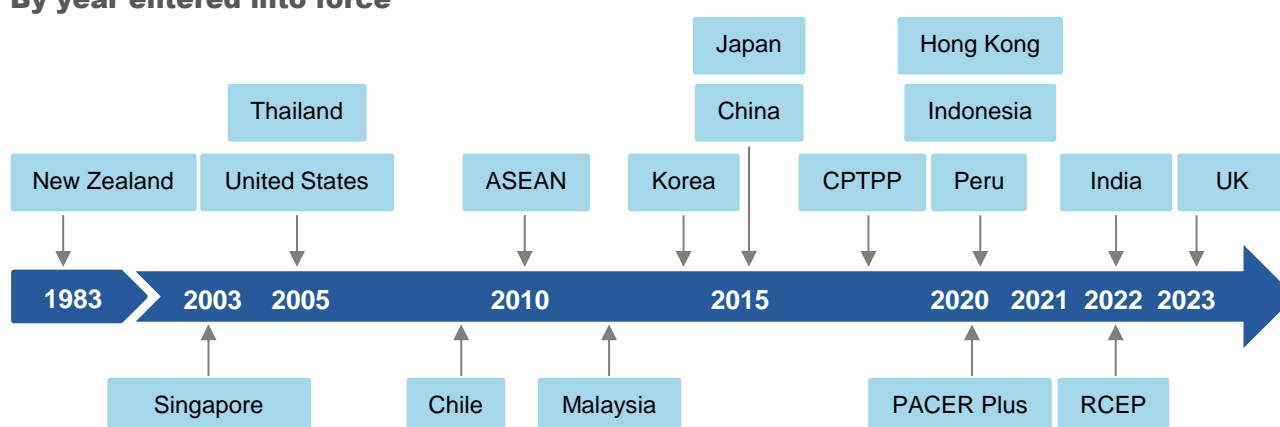
Negotiations for the Trade in Services Agreement commenced in March 2013 among 23 WTO members, including Australia. The Trade in Services Agreement is intended to reduce barriers to international trade in services. It is also expected to deal with modern trade concerns such as cross-border data flows. Progress on the agreement has been slow, with no new rounds of negotiations between WTO members since December 2016 (DFAT 2023g; US Government n.d.).

Despite some renewed discussion in 2021 in the US Congress regarding the potential recommencement of negotiations for the Environmental Goods Agreement, little progress has been made since (Reinsch, Benson and Puga 2021, pp. 1–2). Australia was chairing the negotiations for the agreement between 46 WTO members (DFAT 2016). The purpose of the agreement is to reduce tariffs on goods that provide environmental benefits, such as products made from renewable materials, and equipment that captures emissions (APEC 2012). Negotiations began in 2014 and stalled in 2016, after participants were unable to reach an agreement on the definition of an ‘environmental good’ (Reinsch, Benson and Puga 2021, pp. 1–2).

Some developments in bilateral and regional agreements

Despite little recent progress in Australia’s multilateral and plurilateral trade agreements, there have been some new developments in our bilateral and regional trade agreements. As of June 2023, Australia had 18 bilateral and regional free trade agreements in force (figure 3.4).

Figure 3.4 – Australia’s bilateral and regional trade agreements^a
By year entered into force



a. ASEAN = Association of Southeast Asian Nations. CPTPP = Comprehensive and Progressive Agreement for Trans-Pacific Partnership (replacing the former Trans-Pacific Partnership Agreement). PACER = Pacific Agreement on Closer Economic Relations. RCEP = Regional Comprehensive Economic Partnership.

Source: DFAT (2022b).

There have been some broader developments in certain regional trade agreements. In September 2021, both China and Taiwan formally applied to join the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) (Australian Parliament 2021). The CPTPP is a free trade agreement between

Australia, Brunei Darussalam, Canada, Chile, Japan, Malaysia, Mexico, Peru, New Zealand, Singapore and Vietnam. It entered into force in December 2018, with Chile joining most recently in 2023, and Malaysia joining in late 2022. The United Kingdom has also applied to join the partnership, with negotiations concluding in March 2023. Members of the CPTPP are still negotiating how to proceed with the membership applications from China and Taiwan, given decisions must be made by consensus between all parties (Australian Parliament 2021; DFAT 2023f).

The Australia-India Economic Cooperation and Trade Agreement has commenced

In December 2022, the Australia-India Economic Cooperation and Trade Agreement (ECTA) came into force. Under the ECTA, over 85% of the value of Australian exports to India now do not incur tariffs (such as wool, lamb, barley, oats, fresh lobsters, cosmetics and some critical minerals and metals), and this will rise to 90% by the start of 2026. It has also reduced tariffs on some agricultural products, as well as for pharmaceuticals and some machinery equipment. Under the ECTA, 96% of imports from India are now tariff-free, and this is set to increase to 100% by the start of 2026 (DFAT 2023c; Farrell 2022).

The Australia-United Kingdom Free Trade Agreement is now in force

The Australia-UK Free Trade Agreement (A-UK FTA) came into force on 31 May 2023, after Australia and the UK signed an agreement in December 2021. The A-UK FTA will remove tariffs on over 99% of Australian goods exports to the United Kingdom (including Australian wine, rice, sugar, honey, nuts, olive oil, some seafood, fruit and vegetables). It will also include duty-free transitional quotas and gradual removal of tariffs on beef, sheep meat, sugar and dairy (DFAT 2023e; Farrell 2023).

Some agreements are being negotiated

Australia is also part of negotiations for some other free trade agreements. In April 2023, the 15th round of negotiations for the Australia-European Union Free Trade Agreement concluded. Key factors in the negotiation concern trade barriers to services and agricultural products, government procurement, and adherence to the 2015 Paris Agreement. This follows some previous progress, including the Australia-European Union Framework Agreement, which came into force in October 2022. This agreement included cooperation on foreign policy and security matters, global development and humanitarian aid, education and health policy and climate change (DFAT 2022d, 2023a; Moens and de Lorenzo 2023). Negotiations for the Australia-European Union Free Trade Agreement are set to continue through 2023, following unsuccessful discussions in July (Bourke 2023).

Australia and India re-commenced negotiations in late 2022 for the Comprehensive Economic Cooperation Agreement (CECA). The CECA is intended to build on the ECTA and increase economic connections between Australia and India. It may include further agreements on the trade in goods and services, as well as consideration of digital trade, government procurement and other areas of cooperation. The Australian Government commenced consultations with Australian exporters in late 2022, which continued in the first half of 2023 (DFAT 2023b, 2023d; Farrell and Albanese 2022).

In March 2022, the Australian and United Arab Emirates trade ministers declared their intention to negotiate a Comprehensive Economic Partnership Agreement. Australia and the United Arab Emirates first began negotiating a free trade agreement in 2005; this later merged with negotiations on the Australia-Gulf Cooperation Council Free Trade Agreement, though negotiations ceased in 2009. However, the Gulf Cooperation Council expressed interest in developing an agreement with Australia during the Gulf Cooperation Council Leader's Summit in January 2021, and Australia has since restarted internal consultations (DFAT 2022a; Tehan 2022).

Australia's WTO disputes

The WTO has continued to hear and settle trade disputes in the past year, despite ongoing difficulties with the Appellate Body. Since 1995, the WTO has received 617 trade disputes, with over 350 rulings given on cases (WTO 2023f). To date, Australia has raised 11 cases (as a complainant) and has been subject to 17 cases (as a respondent) (table 3.1 and 3.2). Currently, Australia has filed three complaints.

- In 2020, Australia lodged a complaint against China's anti-dumping and countervailing duties on Australian barley. China imposed these duties on Australian barley following an 18 month investigation, imposing a tariff of 80.5%. The WTO established a panel in May 2021, and it was composed in September 2021. In March 2022, the panel announced that their final report would be issued to the parties by the end of 2022, due to the complexity and number of claims involved in the dispute (Cao and Greenville 2021; WTO 2023c). In April 2023, China agreed to undertake a review of the duties imposed on Australian barley, and Australia and China agreed to suspend the WTO dispute for three months while this review occurs (Wong, Farrell and Watt 2023).
- In 2021, Australia lodged a second complaint against China, for anti-dumping and countervailing duties on Australian wine. China announced it would apply anti-dumping duties ranging between 116.2% and 218.4% on Australian wine for five years, from March 2021, and opted not to apply countervailing duties (Gleeson, Addai and Cao 2021, p. 1). The WTO established a panel for the case in October 2021, and the panel was composed in March 2022. In October 2022, the panel announced that it did not expect to release its final report before mid-2023 (WTO 2023d).
- In 2019, Australia lodged a complaint with the WTO against India allegedly providing domestic support measures and export subsidies to sugar and sugarcane producers. In December 2021, the WTO Dispute Settlement Body (DSB) ruled in Australia's favour, and India appealed the decision to the Appellate Body (WTO 2023j). Due to the current crisis with the Appellate Body, it is unlikely that a decision will be made on the appeal in the near future. The MPIA cannot be used to resolve the dispute as it requires both parties in the dispute to also be parties to the MPIA.

Australia is a respondent to one case that is currently before the WTO. In June 2021, China requested a consultation with Australia regarding Australian anti-dumping and countervailing measures on certain products including wind towers, stainless steel sinks and railway wheels. A panel was established in February 2022 to hear the case, and the panel was composed in September 2022 (WTO 2022d).

Table 3.1 – Australia as the complainant at the WTO

Year	Country	Issue	Outcome
2021	China	Anti-Dumping and Countervailing Duty Measures on Wine from Australia	Panel composed March 2022
2020	China	Anti-Dumping and Countervailing Duty Measures on Barley from Australia	Panel agreed to suspend its work for three months at the joint request of Australia and China, in April 2023
2019	India	Measures Concerning Sugar and Sugarcane	Panel ruled in favour of Australia in December 2021. India appealed to the Appellate Body
2018	Canada	Measures Governing the Sale of Wine	A mutually agreed solution was reached in May 2021

Year	Country	Issue	Outcome
2003	European Union	Protection of Trademarks and Geographical Indications for Agricultural Products and Foodstuffs	The European Communities changed their regulations in March 2006. Australia informed the WTO that it did not consider that the Dispute Settlement Body's recommendations had been fully implemented
2002	European Union	Export Subsidies on Sugar	In favour of Australia
2000	United States ^a	Continued Dumping and Subsidy Offset Act of 2000	In favour of Australia. In December 2004, Australia reached an understanding with the United States with respect to the dispute
1999	United States	Safeguard Measure on Imports of Fresh, Chilled or Frozen Lamb from Australia	In favour of Australia. Implementation notified in November 2001
1999	Republic of Korea	Measures Affecting Imports of Fresh, Chilled and Frozen Beef	In favour of Australia. Implementation completed by September 2001
1997	India	Quantitative Restrictions on Imports of Agricultural, Textile and Industrial Products	Mutually agreed solution before request for a panel in 1998
1996	Hungary ^b	Export Subsidies in respect of Agricultural Products	Mutually agreed solution in 1997 after a panel was established. Hungary was required to seek a waiver of certain WTO obligations

a. Joint complainant with Brazil, Chile, European Union, India, Indonesia, Japan, Republic of Korea and Thailand. **b.** Joint complainant with Argentina, Canada, New Zealand, Thailand and the United States.

Source: WTO (2001, 2010i, 2010h, 2023d, 2023c, 2023j, 2023b, 2023h, 2023g, 2023l, 2023m).

Table 3.2 – Australia as the respondent at the WTO

Year	Country	Issue	Outcome
2021	China	Anti-Dumping and Countervailing Duty Measures on Certain Products from China	Panel composed on 5 September 2022
2017	Indonesia	Anti-Dumping Measures on A4 Copy Paper	Indonesia was successful in its appeal and the Panel recommended Australia bring its obligations into conformity with WTO rules. Implementation notified in September 2020
2012 to 2013	Indonesia, Cuba, Dominican Republic, Honduras, Ukraine ^a	Certain Measures Concerning Trademarks, Geographical Indications and Other Plain Packaging Requirements Applicable to Tobacco Products and Packaging	Panel report in favour of Australia. The Panel reports in the disputes initiated by Cuba and Indonesia were adopted by the Dispute Settlement Body in August 2018. The Dominican Republic and Honduras appealed the Panel's decision in 2018. The Panel decision was upheld in June

Year	Country	Issue	Outcome
			2020. The dispute with the Ukraine lapsed in 2016
2007	New Zealand	Measures Affecting the Importation of Apples from New Zealand	Panel report and Appellate Body report in favour of New Zealand. Implementation notified in 2011
2003	European Union	Quarantine Regime for Imports	Panel established in 2003 but did not proceed. Mutually agreed solution notified in 2007
2002	Philippines	Certain Measures Affecting the Importation of Fresh Pineapple	Philippines did not pursue beyond consultations
2002	Philippines	Certain Measures Affecting the Importation of Fresh Fruit and Vegetables	Panel established but not composed in 2003, Philippines did not pursue further
1998	United States	Subsidies Provided to Producers and Exporters of Automotive Leather	Panel report in favour of the United States. Mutually agreed solution reached in 2000
1998	Switzerland	Anti-Dumping Measures on Imports of Coated Woodfree Paper Sheets	Mutually agreed solution notified in 1998, after Australia terminated the measures in dispute
1997	United States	Subsidies Provided to Producers and Exporters of Automotive Leather	Panel established in 1998, but United States request withdrawn to pursue parallel complaint (above)
1996	United States	Textile, Clothing and Footwear Import Credit Scheme	Not pursued beyond the request for consultations
1995	United States	Measures Affecting the Importation of Salmonids	Panel established and then suspended after amendments to the measures in dispute. Mutually agreed solution notified in 2000
1995	Canada	Measures Affecting Importation of Salmon	Panel report and Appellate Body report in favour of Canada. Compliance notified in 2000

a. Separate cases on the same issue brought by each country independently.

Source: WTO (2010d, 2010b, 2010a, 2010e, 2010f, 2010g, 2010c, 2011, 2016, 2018b, 2018a, 2020a, 2020b, 2020c, 2021, 2022d).

Anti-dumping and countervailing activity

‘Dumping’ refers to a situation when the price of a product when sold in the importing country is less than the price of that product in the market of the exporting country, or below the cost of manufacture. Although it is common for firms to vary prices between markets, governments are concerned about the practice of dumping because it is perceived as unfair on domestic producers. For example, domestic producers may be unable to compete with imported products that are sold at lower prices than in their country of origin.

Governments attempt to counteract the effects of dumping by imposing anti-dumping measures on imported products. These anti-dumping measures are applied to imported products in the destination country. The

measures increase the price of the imported product to reflect its price in the country of origin, to improve the ability of domestic producers to compete. Therefore, anti-dumping measures are a form of protection for domestic businesses.

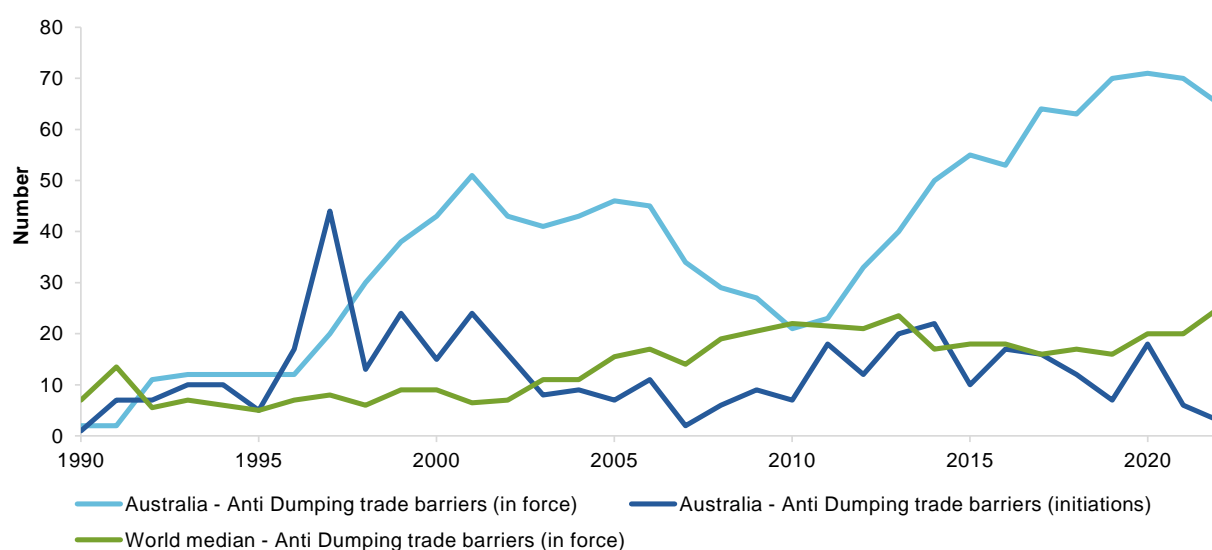
While the WTO rules do not regulate dumping behaviours, how members respond to dumping is regulated, under the Anti-Dumping Agreement (WTO 2022a). Anti-dumping measures are only permitted when a government can demonstrate:

- that dumping is taking place
- the difference between the price of the import in the country of origin and the price of the same product in the destination country
- that dumping is causing harm to domestic businesses or risks doing so (WTO 2022b).

The number of products subject to anti-dumping measures in Australia steadily increased to a peak of 71 measures in force at the end of 2020 (figure 3.5). Since then, the number of measures in force and initiated have declined moderately – in 2022, there were 65 anti-dumping measures in force in Australia and three new investigations were initiated. This is significantly higher than the world median number of anti-dumping measures in force (25 in 2022), which has begun to increase in recent years.

Figure 3.5 – Australia's anti-dumping measures are declining, but remain well above the world median

Anti-dumping measures, 1990-2022



Source: Australian Anti-Dumping Commission (pers. comm., 22 June 2023); WTO (2022f, 2023a).

The protection that Australia's anti-dumping measures afford to some domestic businesses is offset by the costs to others – such as businesses that use imported products subject to anti-dumping measures as inputs, and Australian households that use imported products subject to these measures. The Productivity Commission's 2016 research paper *Developments in Anti-Dumping Arrangements* similarly stated 'there is no compelling economic rationale for [Australia's anti-dumping system] and it is clear that current anti-dumping arrangements are making Australia, on a national welfare basis, worse off' (PC 2016a, p. 2).

3.3 Globalisation is not dead

As explored in section 3.1 and 3.2, there have been a range of disruptions to international trade over recent years. These have included escalating trade restrictions between the United States and China, disruptions to the ability of the WTO to adjudicate trade disputes, COVID-19 related disruptions to global supply chains, and the disruptions to global commodity markets that followed Russia's invasion of Ukraine. Australia also faced restrictions on key exports to China from early 2020 (appendix C).

More recently, related concerns about supply chain resilience have fed ambitions for increased domestic production capacity in some goods and services, driving an expansion of domestic industry policy in the US (through the Creating Helpful Incentives to Produce Semiconductors (CHIPS) and Science Act and the Inflation Reduction Act), and in the European Union through their own proposed Chips Act, Net Zero Industry Act, and European Critical Raw Materials Act. Australia's National Reconstruction Fund (NRF) shares some of the domestic production capacity ambitions of these policies (section 3.4). At the same time, several countries – including Australia – have tightened restrictions on foreign direct investment in a growing range of sectors (chapter 4).

Geopolitical considerations have loomed large amidst these developments. Longer-standing talk of moving production capacity back to the home country of companies ('onshoring' and 'reshoring') has been joined by calls to move production capacity to geopolitically aligned countries ('friendshoring').

These developments have led some to question whether globalisation is now in decline, or whether its patterns are being notably altered along geopolitical lines (box 3.2).

Despite these disruptions, the moderate declines in global trade as a proportion of global GDP of recent years have not been enough to reverse longer-term trends of increasing trade globalisation (figure 3.6). This is itself a continuation of the long-run trend towards greater economic integration observed since the 16th century, when trade accounted for less than 3% of world GDP (Estevadeordal, Frantz and Taylor 2003, p. 360).

Global trade has remained largely resilient to these various disruptions because it is organised around relatively robust institutions. Moreover, when global demand and supply are left broadly unchanged by a particular disruption, they principally lead to a *reorganisation* of trade between individual countries, rather than a *reduction* in overall global trade. For example, the imposition of trade restrictions on one country by another has often resulted in a redirection of trade between available importing and exporting nations – albeit with some costs – rather than an overall reduction in global trade. These dynamics were observed when restrictions were placed on selected Australian exports to China in 2020 (appendix C).

Box 3.2 – Recent commentary on the state of globalisation

Some commentators have questioned whether global economic integration has peaked.

At least two things have put paid to globalisation. First, global economic growth has slowed, and as a result, the growth has become more “financialised”: debt has increased and there has been more “monetary activism” ... Second, the side effects, or rather the perceived side effects, of globalisation are more apparent: wealth inequality, the dominance of multinationals and the dispersion of global supply chains ... (The Economist 2019)

While others have judged that globalisation is only facing temporary disruptions.

...the benefits of globalisation are so great that self-interest will see it restored, even if the scenery changes and players switch roles. (Grenville 2020)

...we must acknowledge that many of the relationships built over the past several decades are too deep to unwind and the benefits too great to relinquish. Trade, data and capital flows suggest globalisation is here to stay. (Bloomberg 2023)

There is not a major deglobalisation going on here. There are clearly shifts and changes. But let's just take one example. The huge shock disruptive effect of the [Russia-Ukraine] war. You would think that's hugely reduced Russia's trade with, say, Europe, but you'd be wrong. ... in dollar terms or euro terms, it's going up because the price of the Russian exports have gone up. So I would just caution against this whole narrative of deglobalisation. (Bremmer et al. 2023)

Indeed, others have highlighted the possibility that global economic integration is poised to expand in new directions, as digitalisation and the rise of remote work allows increased trade in services

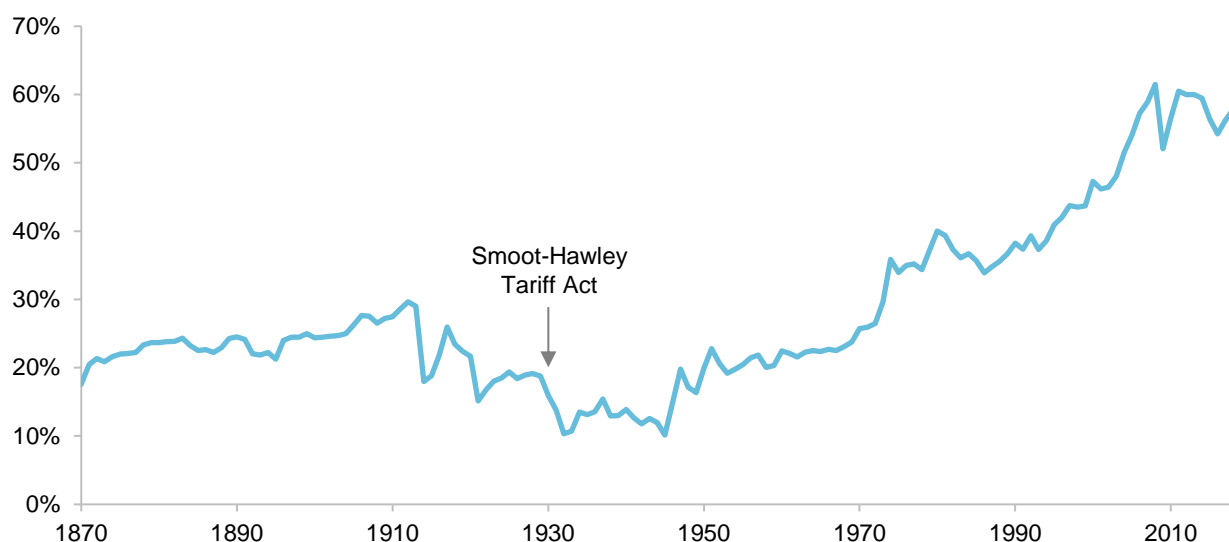
While the first three waves of globalization represented the trade of goods, there's another important component in our economy: the services sector. Until recently, the services sector—including knowledge industries like software development, consulting, design, and marketing—did not experience globalization. Today, however, the digital economy and the ability of companies to hire remote workers have ushered in Globalization 4.0. This wave...has moved beyond the buying and selling of goods to include the *services* industry. (Georgaris 2023)

Nevertheless, some fear that global economic integration is starting to splinter along geopolitical lines

One view is that we are entering a period of 'deglobalization', in which global trade volumes decline and cross-border capital flows recede. An alternative and more likely outcome is that the global economy starts to splinter into competing blocs. (Shearing 2023)

Figure 3.6 – Recent disruptions have not reversed historic patterns of increasing globalisation^a

Global trade as a share of world GDP

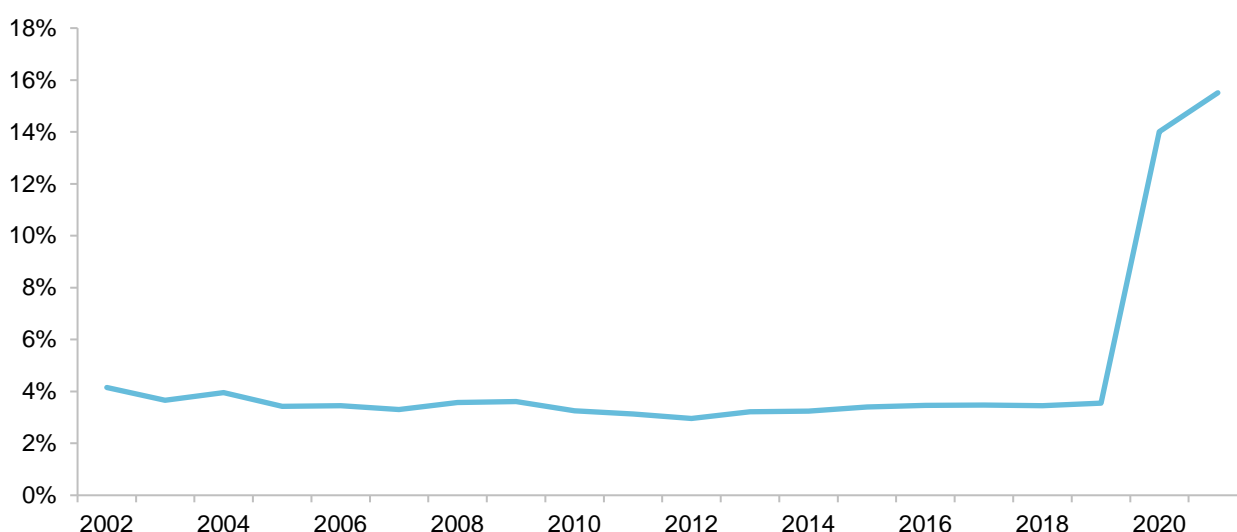


a. Klasing and Milionis covers 1870-1949 and Feenstra et al covers 1950-2019.

Source: Feenstra et al (2015); Klasing and Milionis (2014).

While some periods of history have proven less friendly to global trade than others, the economic costs of these periods have tended to lay the groundwork for subsequent periods of trade liberalisation. A key historical example was the near halving of world trade as a percentage of GDP during the Great Depression and following the passage of the Smoot-Hawley Tariff Act in 1930 – legislation that raised tariffs on a wide range of goods and services in the United States, and which resulted in the subsequent imposition of retaliatory trade tariffs on many US products. The economic costs of this legislation exacerbated the Great Depression, leading to its subsequent repeal in 1934, after which time global trade began to recover – a recovery subsequently interrupted by World War II (figure 3.6; Kenton 2021).

More generally, the nature of global economic integration has evolved considerably over time, undergoing several phases. The initial trade in goods, soon expanded to trade in services, then to foreign investment, and to the subsequent development of global supply chains. The new frontiers of global economic integration will likely include real-time data sharing between countries, and the growing international tradability of labour. The demonstrated viability of 'working-from-home' during the COVID-19 pandemic may evolve into a 'work from anywhere' approach to labour sourcing by companies over time (figure 3.7). Associated growth in the international tradability of labour, beyond the trade in accounting or IT services witnessed over the past 20 years, will likely see a broader range of workers participating in foreign labour markets from their own countries, increasing global economic integration in the process.

Figure 3.7 – Proportion of employed persons working all hours at home, Australia

Source: Productivity Commission estimates based on *Household, Income and Labour Dynamics of Australia*, Waves 1-21.

These dynamics suggest that the various disruptions to world trade witnessed over recent years are unlikely to reverse the longer-term trend towards global economic integration. They also counsel against implementing policy measures – trade restrictions or industry assistance more generally – that distort incentives, move production patterns away from economies’ comparative advantage, and reduce the gains from specialisation and trade. Domestic policies implemented on the assumption that global economic integration will recede over coming decades are likely to prove costly and ill-judged in time (section 3.4; appendix B).

3.4 A resurgence in major economy industry policy

Industry policy has made a marked return to the United States and the European Union over the past year, underpinned by the confluence of several factors, including: a sharpening of strategic competition between the major economies; a tightening of 2030 greenhouse gas emissions reduction targets; public memory of the string of international trade disruptions of recent years; and a political impetus to ostensibly address cost of living pressures. All four factors are apparent in US Inflation Reduction Act 2022-related efforts to build greater domestic production capacity in low emissions technologies, and to increase reliance on international supply chains shared between geopolitically aligned nations. Some of these factors are also apparent in policy efforts to increase United States and European Union production of advanced microprocessors.

How Australia chooses to respond to industry policy developments in major economies will have material implications for our future productivity growth and living standards. While Australia stands to benefit from some aspects of major economy industry policy, attempts to imitate these industry policies are likely to prove a net negative for a small open economy like Australia. While the costs of attempting to distort Australian production patterns away from our comparative advantage are clear, the benefits are less so. By contrast, continuing to focus on our comparative advantage is likely to build a broader and more enduring form of resilience in Australia – providing the high-income levels that can help deal with, and manage the fallout from, the unforeseen trade disputes and supply chain issues that will inevitably arise from time to time.

More generally, policy steps that contribute to a broader global trend towards industry policy risk indirectly impacting Australia by weighing on global income growth.

Recent developments in major economy industry policy

Industry policy has gained renewed traction in the world's major economies over the past year. Notably, the United States signed both the Inflation Reduction Act and the CHIPS and Science Act into law in August 2022 (The White House 2022; US Government 2023). The CHIPS and Science Act is aimed at increasing US manufacturing of advanced microprocessors, in an attempt to reduce US reliance on imported advanced microprocessors – over 90% of which are currently produced in Taiwan (Varas et al. 2021, p. 5). The CHIPS and Science Act includes about US\$280 billion for research, development, manufacturing and workforce development for semiconductors, and for associated scientific research and innovation (box 3.3).

The Inflation Reduction Act is a broader ranging piece of legislation, including a corporate minimum tax, changes to Medicare and subsidies for medical care, and a range of sectoral subsidies. Its centrepiece is US\$369 billion in subsidies and loans provided for the deployment of clean energy technology over 10 years. This includes tax credits for businesses and consumers for clean energy purchases. The main industries affected are solar equipment manufacturing, batteries, electric vehicle (EV) manufacturing and energy-intensive manufacturing. Subsidies are also provided to the hydrogen and nuclear energy sectors.

The Inflation Reduction Act has also introduced a system of local content-related 'bonus' tax credits in the United States – additional subsidies to businesses and households if they invest in clean energy technology made in the United States, North America, or countries that have a free trade agreement with the United States. For example, prior to its passage, households that purchased EV's were eligible for up to a \$7,500 tax credit regardless of where that EV was produced. The Act changed that to make the \$7,500 tax credit conditional on final assembly of the EV taking place in North America (United States, Canada, or Mexico), and at least 40% of the critical minerals used in the battery coming from either the United States or from a country with which the United States has a free trade agreement (Internal Revenue Service nd). That 40% is scheduled to rise to 50% in 2024, 60% in 2025, 70% in 2026 and 80% in 2027 (International Energy Agency 2023). Similarly, it increased the tax credit for households that install solar panels from 26% to 30% (Department of Energy nd). An additional 10% of tax credits is potentially available if produced in the United States in a way that satisfies certain domestic content requirements (US Department of the Treasury 2023).

These preferential content-related tax credits are effectively trade barriers, created not by imposing tariffs on imported goods, but by providing additional subsidies for the purchase of goods produced locally or in preferred locations – United States for solar panels; Canada, United States or Mexico (North American Free Trade Agreement countries) for final assembly of EVs; and in the United States and its free trade agreement partners for EV batteries.

Partly in response to concerns that some European manufacturers might move to the United States to benefit from the Inflation Reduction Act, the European Commission has proposed an EU Net Zero Industry Act and European Critical Raw Materials Act, and is seeking to set a 40% minimum domestic production target for clean energy technologies by 2030 (European Commission 2023b). On 18 April 2023, the European Parliament provisionally agreed to a European Commission proposal for an EU Chips Act which will subsidise the development of an advanced chip manufacturing capacity in the EU, with a target of producing 20% of the world's advanced microchip output by 2030 (European Council 2023).

Box 3.3 – Key features of major economy industry policy

Several major economies have implemented industry assistance policies over the past year.

The United States enacted the Creating Helpful Incentives to Produce Semiconductors (CHIPS) and Science Act on 9 August 2022. The Act seeks to stimulate investment in US semiconductor manufacturing, clean energy and other new technologies, while creating a larger, more inclusive STEM workforce. It includes:

- US\$52.7 billion for American semiconductor, research and development, manufacturing, and workforce expansion
- a 25% investment tax credit for capital expenses related to manufacturing semiconductors and associated equipment
- US\$10 billion for investment in regional innovation and technology hubs.

Afterwards, the US Inflation Reduction Act was signed into law on 16 August 2022. The objective of that Act is to promote clean energy while reducing inflation, the US budget deficit and prescription drug prices. The Inflation Reduction Act provides approximately US\$500 billion to achieve these goals, comprising:

- US\$369 billion in clean energy funding, including clean energy, manufacturing, transportation and electric vehicles. Most of this funding is provided via tax credits – approximately US\$259 billion
- health care provisions that allow the US Medicare program to negotiate lower prescription drug prices and inflation-indexed caps on prices. These provisions are estimated to save US\$173 billion
- revenue raising measures, including an increased minimum tax on large corporations and an excise tax on stock buybacks, alongside increased funding for the US internal revenue service.

In the long term, the Inflation Reduction Act is expected to yield US\$237 billion in deficit savings.

The European Commission proposed a similar EU Chips Act in February 2022, with the aim of enhancing European technology capabilities and ensuring supply chain security and resilience by attracting investment. The Act proposes EUR43 billion of policy-driven investment, including:

- an EUR11 billion 'Chips for Europe' initiative, which seeks to bolster existing research, development and innovation on semiconductor technology
- a new framework to facilitate startup finance access and attract investment
- a coordination mechanism between member states to monitor the supply and anticipate shortages for semiconductors.

The EU parliament reached a provisional political agreement over the EU Chips Act on 18 April 2023.

Source: Badlam et. al. (2022); European Commission (2022); European Council (2023); Maschek et al (2022); McKinsey (2022); US Department of Energy (2022); The White House (2022, 2023).

Major economy industry policy will likely affect Australia

Australia stands to benefit both directly and indirectly from the US Inflation Reduction Act and CHIPS and Science Acts, and their EU counterparts, though there will be costs for some sectors.

Perhaps most directly, Australia stands to benefit from the linking of US Inflation Reduction Act bonus tax credit eligibility to inputs being sourced from US FTA partners. This is apparent in the case of the tax credits for EV purchases by US consumers, where eligibility for the maximum \$7,500 tax credit is contingent on at

least 40% of the critical minerals used in the EV battery being sourced from the United States, or from US FTA partners like Australia. These gains would be compounded by United States Congressional approval of designating Australia as a ‘domestic source’ under the US Defence Production Act, thereby providing preferential access for Australia to the US market.¹⁴

More generally, if successful, these policies could create larger manufacturing sectors in the United States and European Union, allocating resources away from their services sectors. Were this to occur, it would likely raise US and EU import demand for services and for inputs to manufacturing. Given that resources and services are amongst Australia’s top exports (DFAT 2022c), Australia stands to enjoy increased export demand from these economies. While these gains might be partly offset by reduced manufacturing exports, the fact that manufactured goods constitute less than 7% of Australian exports by type (RBA 2023a) limits this potential effect.

In addition, to the extent that Australia shares the supply chain vulnerability concerns invoked by the US and the EU in the development of these policies, Australia stands to benefit from the global diversification of supply chains these policies are intended to create. That is, increased microprocessor and clean energy technology production capacity in the United States and in Europe will diversify the number of international suppliers for all countries, including Australia.

While the Inflation Reduction Act will likely lower the gains from developing some clean energy technologies in Australia (causing some firms to re-evaluate their investment plans in Australia), those resources will flow to other promising sectors. And if Australia’s hopes for a domestic clean energy sector were primarily environmental – developing the technologies capable of speeding the transition to net zero – the Inflation Reduction Act would advance those same goals at a global level, at no direct cost to Australia.

Small open economies like Australia should think carefully before replicating major economy industry policy

Some commentators have called on the Australian government to implement countervailing policies in Australia, so that some sections of Australian industry can remain internationally competitive. Others have pointed to the promise of establishing a clean energy industry cluster in Australia, capable of capturing a share of the growing clean energy market. Elements of Australia’s National Reconstruction Fund, National Battery Strategy, Critical Mineral Strategy, and Hydrogen Headstart Program constitute early steps in this direction (box 3.4).

While it is natural – albeit sometimes unwise – for an individual firm to respond aggressively to a new strategy by a competitor, the same does not apply to countries. Trade is driven by *differences* in what countries produce, not *similarities*. Attempting to imitate major economy industry policy is likely to prove a net negative for a small open economy like Australia.

While the costs of distorting Australian production patterns away from our comparative advantages are clear, the benefits of doing so are less obvious. While some proponents of Australian industry policy invoke concerns about the resilience of international supply chains, the Commission’s 2021 report into *Vulnerable Supply Chains* (PC 2021b) found that Australia is relatively resilient to international supply chain disruptions. To the extent that policymakers continue to hold concerns about supply chain resilience, nevertheless, it is likely that US and EU industry policy itself will be diversifying away some of these risks for Australia. That is,

¹⁴ On 20 May 2023, a joint press release from US President Biden and Australian Prime Minister Anthony Albanese announced the US President’s intention to seek Congressional approval for recognition of Australia as a ‘domestic supplier’ under the US Defence Production Act (White House and Prime Minister of Australia 2023).

increased microprocessor and clean energy technology production capacity in the United States and in Europe will create additional supply alternatives for all countries, including Australia.

Box 3.4 – Australian industry policy responses

The Australian Government has launched several policies aimed at supporting domestic production capacity in what are currently regarded as strategic sectors. These include the National Reconstruction Fund, a Critical Minerals Strategy, and a Hydrogen Strategy. In addition, a National Battery Strategy is currently being developed.

National Reconstruction Fund

The National Reconstruction Fund (NRF) is a \$15 billion fund that has been designed by the Australian Government to invest in favoured sectors, which is expected to begin operation in 2023. It has been developed to ‘support, diversify, and transform Australia’s industry and economy to ... be successful in a net zero economy and more resilient against supply chain vulnerabilities’ (Husic 2022, p. 6). Of the \$15 billion in investable funds, the Government has announced a target investment level of up to \$3 billion for renewable and low emissions technologies, \$1.5 billion for medical manufacturing, \$1 billion for value-adding in resources, \$1 billion for critical technologies, \$1 billion for advanced manufacturing and \$500 million for supporting value-adding in agriculture, forestry, fisheries, food, and fibre (DISR 2022b).

Critical Minerals Strategy

Australia’s Critical Minerals Strategy released in June 2023, seeks to ‘build sovereign capability in critical minerals processing’ and help ‘create diverse, resilient and sustainable supply chains through strong and secure international partnerships’ (DISR 2023a, p. 4). The strategy aims to coordinate existing measures such as: the \$225 million Exploring for the Future program (supporting minerals exploration); the \$100 million Critical Minerals Development Program (supporting early to mid-stage projects); the \$2 billion Critical Minerals Facility administered by Export Finance Australia (EFA); the \$2.3 billion in loans already provided to the critical sector by the EFA, Northern Australia Infrastructure Facility (NAIF) and the Clean Energy Finance Corporation (CEFC); with new support measures like an additional \$500 million earmarked to be provided to the sector by the NAIF, and a target investment level of \$1 billion and up to \$3 billion from the National Reconstruction Fund respectively for value-adding in resources, and renewable and low emissions technologies (DISR 2023a, p. 23).

In addition, the strategy appears to signal an openness to future policy measures that reserve some critical mineral output for domestic processing and manufacture, noting that:

Foreign companies are securing ownership and offtake agreements for a large share of Australian minerals...In this context, Australian processors and manufacturers may struggle to access supplies of Australian minerals in future. This would affect our strategic and energy security...The Government is ... considering policy options that enable domestic supply of Australian critical minerals for Australian projects. (DISR 2023a, p. 24)

National Battery Strategy

In February 2023 the Australian Government launched public consultations on a National Battery Strategy. An associated consultation paper closed for submissions in mid-March 2023. While Government is yet to announce its preferred policy options, the consultation paper signalled an openness

Box 3.4 – Australian industry policy responses

to imposing local content requirements, and expressed the Government's interest in developing a 'Battery Manufacturing Precinct', in addition to the availability of '\$6 billion in NRF finance to areas which cut across the battery value chain' comprised of the \$1 billion for advanced manufacturing, up to \$3 billion for renewables and low emissions technologies, \$1 billion for value-adding in resources, and \$1 billion for critical technologies (DISR 2023b, p. 15).

Hydrogen Headstart Program

The Australian Government announced the establishment of a \$2 billion Hydrogen Headstart program in the 2023–24 Federal Budget. The program aims to help make 'Australia a global leader in green hydrogen' (Chalmers, Bowen and McAllister 2023). The \$2 billion is intended to provide production credits to eligible projects to narrow the gap between the cost of production of conventional hydrogen and that of hydrogen produced using renewable energy (DCCEEW 2023a).

Supply chain issues that do emerge will likely arise from shocks – events that are unknowable in advance – making it difficult to anticipate which goods a country will need to build domestic production capacity in to insure against international supply disruptions. Subsidising the development of a domestic industry in the production of that good is likely to be a markedly more expensive form of insurance than other available options, such as simply maintaining a stockpile of that good.

It is unclear to what extent Australian industry policy could create domestic industries capable of capturing meaningful market share from competing industries in the major economies. Not only are the major economies likely to outspend and out-subsidise Australia in their pursuit of these sectors, but the existence of industry clusters in these countries makes them even harder to compete with. Industry clusters tend to compound the *pre-existing* comparative advantage of nations, they are less successful in *creating* a comparative advantage in that good or service. Finally, the clean energy and advanced technology sectors being targeted by industry policy are likely to be subject to considerable technological change over coming years, meaning that national 'bets' on which technology will ultimately prevail may well prove wrong.

More broadly, an Australian industry policy response to US and EU industry policy could encourage other small open economies to respond in a similar manner. The greater the number of countries that do so, the greater the erosion of the rules-based global trading system, and the lower the collective gains from international trade. As a small open economy, Australia benefits greatly from international trade and would lose significant income if trade barriers were erected across many countries to promote their local sovereign production capability. Recent WTO modelling estimated that the costs of the world decoupling into two rival trade blocs (relative to more trade liberalisation) at 8.7% of real global income, varying between 6.4% for developed countries, 10.1% for developing countries and more than 11.3% for least-developed countries (2023k, pp. 2–3).

While some proponents of Australian industry policy might counter that it still has a role in the case of goods and services judged to be 'critical' to a nation's economy or security, the number of sectors regarded as critical risks growing over time, as industry policy is progressively normalised in the minds of policy makers. Australia's *Security of Critical Infrastructure Act 2018* is a potential case in point, with the number of sectors with assets regarded as critical under the Act increasing from four to 11 over the space of two years. The longer the list of critical sectors, the greater the potential costs to Australia will be. The same can be potentially said of 'critical minerals' for which there is no fixed chemical definition, there being no 'critical minerals' category on the periodic table of elements. Instead, a growing practice is for countries to identify which minerals or resources they judge to be 'critical', either to their economy or their security, on national 'critical mineral' lists. This list has been growing in

the United States and the European Union over recent years, and the Australian Government recently announced its desire to update Australia's 'Critical Minerals List' (box 3.5).

By contrast, remaining open to trade while continuing to focus on those sectors in which Australia enjoys a comparative advantage is likely to build a broader and more enduring form of resilience – the high-income levels that can help deal with, and manage the fallout from, those unforeseen supply chain issues that will inevitably arise from time to time. Further discussion of potential policy considerations for an Australian response to major economy industry policy is provided in appendix B.

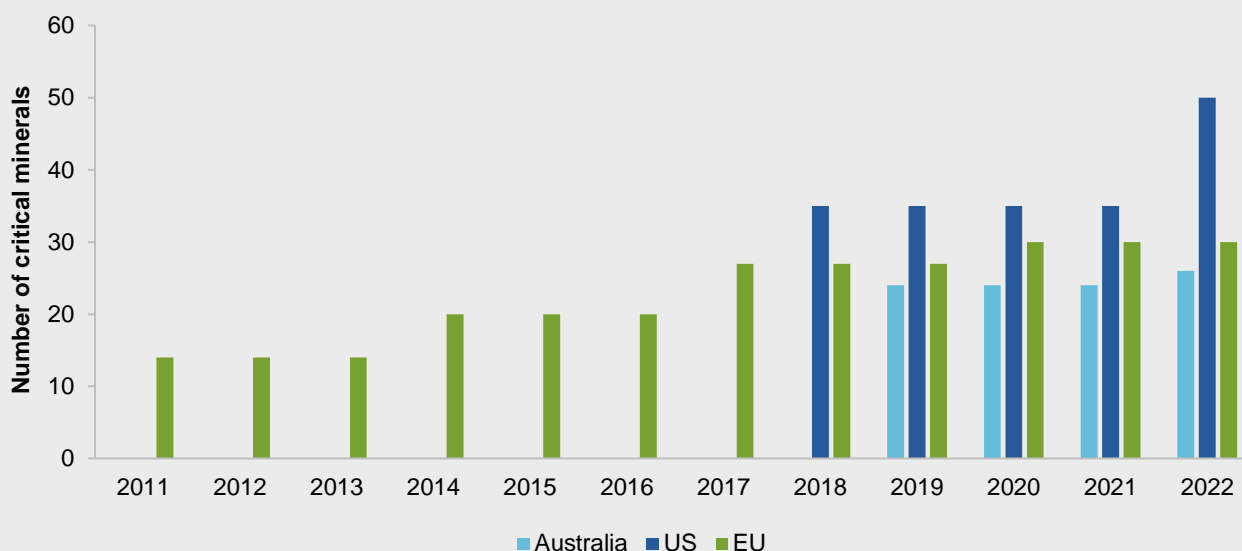
Box 3.5 – Critical minerals lists

There is no fixed chemical definition of 'critical minerals' - there being no 'critical mineral' category in the periodic table of elements. Instead, nations decide for themselves which minerals they regard as critical. This judgement is generally based on at least two criteria:

1. the mineral is necessary for a country's economy or national security to function properly
2. the supply chain of the mineral is judged susceptible to disruption (Geoscience Australia 2023).

The likelihood of these criteria being judged subjectively, the likelihood of these judgements changing in response to technological developments and shifting geopolitical contexts, and the potential for individual industries to benefit from industry assistance after being included on critical mineral list, means that national critical mineral lists are likely to be revised periodically. Indeed, critical minerals lists have been growing longer in the United States and European Union over recent years (see figure below). While growth of Australia's critical minerals list has been more limited, Australia's *Critical Minerals Strategy* set out the Government's desire to 'establish a process to update Australia's Critical Minerals List' (DISR 2023a, p. 52).

National 'critical minerals' lists are growing longer



Source: Austrade (2019, p. 11, 2022, pp. 8–9); European Commission (2011, pp. 21–22, 2014, pp. 5–6, 2017, pp. 4–7, 2020, p. 3, 2023a, p. 1); US Geological Survey (2018, 2022).

3.5 Update on carbon border tariffs

As well as a resurgence in major economy industry policy in recent years, some countries are exploring ways to meet their emissions reduction targets while not making domestic industry vulnerable to ‘carbon leakage’. Concerns about ‘carbon leakage’ commonly arise when a country chooses to impose carbon constraints on domestic industry that risk placing domestic producers at a competitive disadvantage relative to foreign producers that do not face comparable carbon constraints. When one country imposes carbon constraints on domestic industry and another does not, domestic producers in the carbon constrained country run the risk of losing market share to foreign producers that do not face carbon constraints, with associated emissions simply being transferred to (or ‘leaking’ out of) the carbon constrained economy – with no benefit to global emissions. The possibility of carbon leakage is most pronounced for emissions intensive businesses that face international competition, so called Emissions-Intensive Trade-Exposed Industries (EITEIs).

Common responses to carbon leakage concerns have been to make EITEIs at least partly exempt from domestic climate policy. In countries with emissions trading schemes (ETS), this commonly takes the form of providing a percentage of emissions permits required by EITEIs for free. It can also take the form of exemption from non-ETS emissions abatement policies, such as Australia’s renewable energy target (RET), under which the additional costs are not passed on to EITEIs.

Carbon Border Tariffs (CBTs) are an alternative approach to addressing carbon leakage concerns, not by protecting domestic producers from domestic climate policy, but by also subjecting foreign producers to the domestic climate policy of the importing nation – through the levying of import tariffs that are broadly equivalent to the carbon costs faced by domestic producers. A range of countries have expressed some degree of openness to the CBTs, and in January 2023 the Australian Government announced its intention to undertake a review of the suitability of a Carbon Border Adjustment Mechanism (CBAM) for Australia (DCCEEW 2023b). Nevertheless, the most advanced proposal is the European Union’s CBAM, which is planned to be progressively implemented between 2023 and 2026.

There are questions about the extent to which carbon leakage will occur in response to domestic climate policy, given that production location decisions are based on a range of factors, and that many countries have adopted carbon constraints – as of January 2023, 133 countries representing 91% of global GDP and 83% of global carbon emissions had adopted net zero emissions targets (OECD 2023). Moreover, as the world’s major economies pursue emissions reduction goals it is plausible that products produced under carbon constraints will come to enjoy a competitive advantage over those that are not.

In addition, if major economies are to meet their net zero emissions targets, EITEIs will need to collectively contribute to emissions abatement. Failing to impose carbon constraints on EITEIs will simply transfer the cost of emissions abatement to other sections of the economy, or to taxpayers if government is left to purchase a greater number of offsets to achieve national net zero targets. Any special treatment of EITEIs under Australia’s Safeguard Mechanism should weigh the risks of carbon leakage against the costs of transferring additional abatement burdens to non-EITEI producers.

While the Australian Government has announced its intention to review the merits of an Australian CBAM, note that Australia’s Safeguard Mechanism is effectively a 100% free emissions permit allocation system, up to the emissions budget (‘baseline’) granted to each facility covered by the scheme. That is, the Safeguard Mechanism caps facility emissions and requires those facilities to either pursue internal abatement options or purchase ACCU offsets to bring emissions down to their relevant baseline. Facilities do not need to pay for emissions below this baseline. This treatment is provided to all captured facilities regardless of whether they are considered EITEIs or not.

Over time, Australian EITEs will need to pay for a growing proportion of their carbon emissions as baselines are progressively reduced in line with Australia's nation-wide emissions reduction goals. However, this is broadly the same treatment as is commonly applied to EITEs captured by emissions trading schemes, with the percentage of free permits allocated under emissions trading schemes progressively falling over time.

For example, under Australia's Carbon Pricing Mechanism, which operated between 1 July 2012 and 30 June 2014, EITEs were divided into two categories, highly emissions intensive trade exposed ('high EITEs') and moderately emissions intensive trade exposed ('moderate EITEs'). When the Carbon Pricing Mechanism began operating on 1 July 2012, high EITEs received 94.5% of average sectoral emissions for free, and moderate EITEs received 66% of average sectoral emissions for free. Both rates of free permit allocation were scheduled to fall by 1.3% per annum (Talberg and Swoboda 2013, p. 12). At that rate, high EITEs would have received 81.5% of average emission for free by 2022-23, and moderate EITEs would have received 53% of average sectoral emission for free in the same year.

Similarly, the EU emissions trading scheme (EU ETS) distinguishes between 'highly exposed' EITEs and 'less exposed' EITEs (European Commission 2021). The former currently receive 100% of permits up to their relevant benchmark for free, and the latter receive 30% of permits up to their relevant benchmark for free. However, the 'relevant benchmark' under the EU ETS is the average emissions intensity of the sectors best performing 10% (least emissions intensive) facilities (IEA 2020). Similar to the Carbon Pricing Mechanism, this approach helps ensure that those facilities that have previously invested in emissions abatement technologies and processes are not placed at a competitive disadvantage for having done so, while also ensuring that some abatement incentives are placed on the less efficient facilities in the sector. However, by choosing the average emissions of the best performing 10% of the sector, these effects were greater than that elicited by the Carbon Pricing Mechanism's average sectoral emissions intensity benchmark.

It follows that the Safeguard Mechanism's current system of providing 100% free emissions up to facility baselines is more generous than the EITEs provisions of both the EU ETS and Australia's former Carbon Pricing Mechanism, casting doubt on the need for further EITEs assistance under the Safeguard Mechanism.

Finally, providing special treatment to EITEs is unlikely to protect Australian EITEs from carbon prices in markets that impose carbon border tariffs. For example, the European Union's planned CBAM appears set to only recognise explicit carbon prices borne by foreign producers in their home market. To the extent that some of Australia's carbon-intensive exports to the European Union are captured by the CBAM, the Australian Government should consider measures that ensure this revenue is collected by the Australian Government, not the European Union. Provisions that further lower the effective carbon price imposed by the Safeguard Mechanism on Australian exporters to the European Union, may be simply offset by higher border adjustments under the CBAM. If a carbon price will be imposed on Australian exports to the European Union in any case, the welfare of the Australian community will be best served by the Australian Government being the one to collect the associated revenue.

Given these features, the policy case for additional EITEI protections through an Australian CBAM is not compelling and would risk simply acting as a form of trade protectionism for Australian industry.

4. Foreign investment policy developments

Key points

- ✱ **Australia's net financial liability position with the rest of the world fell modestly in 2022.**
 - Net foreign liabilities declined to 35% of GDP at the end of 2022 from 35.4% at the end of 2021, a continuation of the narrowing of Australia's net financial liability position over recent years.
- ✱ **This overall net financial liability masks an important distinction in Australia's investment position. While Australia has a net liability position in debt, it has a growing net asset position in equity.**
 - Australia has a net liability position in debt equivalent to 47% of GDP, and a net asset position in equity equivalent to 12% of GDP.
- ✱ **Australia's status as a net importer of debt investment, and net exporter of equity investment, means Australia has a particular interest in promoting the free flow of international capital.**
 - Foreign investment has enabled the Australian economy to develop at a faster pace than would have otherwise been the case, and our growing investment in other economies stands to contribute to the diversification of Australian income sources over time.
- ✱ **Despite this, foreign direct investors have faced increased screening since 2021, and increases in foreign investment application fees over the period.**
 - Foreign direct investors have faced a more stringent screening regime since 2021, designed to manage emerging national security concerns in a growing range of sectors within the Australian economy.
 - Foreign investment application fees have increased significantly over recent years. Further increases were implemented over 2022. These fees amount to a tax on foreign investment applications.
- ✱ **Volatility in year-to-year foreign direct investment applications makes it premature to meaningfully assess the impact of higher fees and screening on inbound foreign investment intentions.**
 - While it is plausible that Australia's new foreign direct investment screening regime and increased foreign application fees might alter the overall quantum, and underlying composition, of foreign direct investment into Australia, year-to-year volatility means it is too early to assess the impact of these policy changes.

Foreign investment is an important enabler of productivity growth for countries. It increases the stock of capital beyond what would be possible through the deployment of domestic savings alone, promoting growth in labour productivity, employment and real wages in the process. Foreign investment can also promote productivity

growth through the transfer of knowledge and practices between countries. Majeed and Breunig (2021, pp. 12–13) found that foreign investment in large Australian firms increased the probability of those firms achieving ‘novel’ innovations by broadly as much as those firms undertaking their own research and development.

As Australian income levels have grown, the ability to invest growing household savings in other economies has contributed to the diversification of national income sources. The growth of superannuation in Australia has helped build the fourth largest pool of funds under management in the world, well ahead of Australia’s status as the world’s 13th largest economy. This growth has contributed to the growth in Australia’s net asset position in equities over the past decade. Australian holdings of shares in overseas companies are now greater than foreign holdings of shares in Australian companies. Australia has an enduring interest in the free flow of international capital.

Foreign direct investment – that is, foreign investment that allows some degree of direct influence over the operational decisions of domestic firms – is not without its challenges. It can potentially reduce competition in domestic markets if large foreign firms take control of smaller domestic competitors. Foreign control of assets with strategic value can also raise national security concerns.

Attempts to realise the benefits of foreign investment, while guarding against its potential challenges, has led Australian governments to require that foreign investors seeking to make direct investment in Australian companies first seek, and gain, government approval before doing so. These foreign investment application requirements have evolved alongside the particular policy concerns of the day, with an explicit national interest test being added to Australia’s foreign investment screening regime in 1986 and a standalone national security test added in 2021.

In much the same way that the *Trade and Assistance Review* (TAR) seeks to shed light on policy settings that impede the free flow of goods and services into Australia, and which act as domestic industry assistance more generally, it also seeks to shed light on impediments to the free flow of investment into Australia. This is in response to the Australian Government’s agreement to implement a recommendation of the Commission’s 2016 inquiry into the *Regulation of Australian Agriculture* (PC 2016b).

A comprehensive summary of Australia’s foreign investment patterns, foreign investment approval processes, and foreign investment application fee structures was provided in chapter 4 of the 2020-21 TAR. This year’s TAR does not seek to replicate that analysis, but instead focuses on key developments over the subsequent year – namely, developments in the foreign investment policy landscape, foreign direct investment applications, and foreign investment flows more generally.

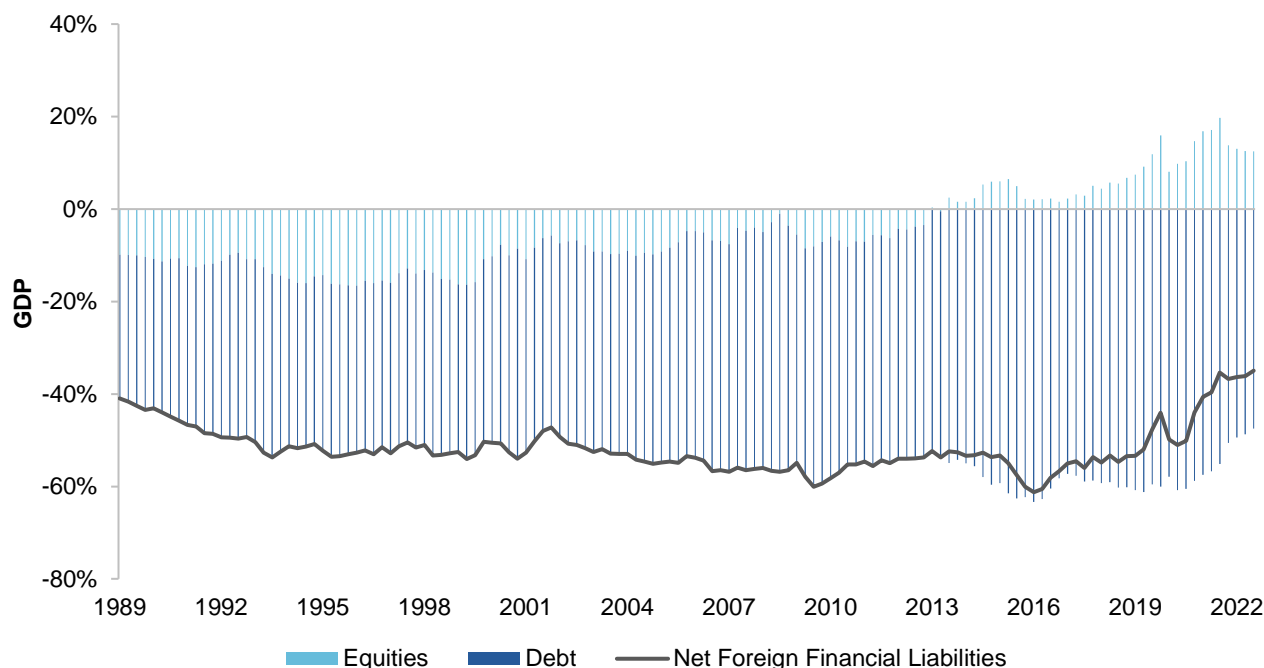
4.1 Foreign investment developments

As explored in the 2020-21 TAR, Australia holds a net financial liability with the rest of the world (figure 4.1). Historically, there has been more foreign investment in Australia than there has been Australian investment overseas, reflecting the large number of investment opportunities over the course of Australia’s development, relative to domestic savings. Australia’s net financial liability position, comprised of both debt and equity holdings, declined to 35% at the end of 2022 from 35.4% of GDP at the end of 2021, a continuation of its narrowing trend over recent years (figure 4.1).

This overall net financial liability masks an important distinction in Australia’s investment position. While Australia continues to hold a net financial liability position in debt, it has had a net asset position in equities since 2012. As explored in the 2020-21 TAR, the emergence of Australia’s net asset position in equities partly reflects the growth of superannuation over recent decades, a notable proportion of which has been invested in Australian and international equities.

Both Australia's net foreign liability position in debt and net foreign asset position in equity as a share of GDP moderated as a share of GDP over 2022. Our net foreign liability position in debt fell to 47.4% in December 2022 from 55.1% of GDP in December 2021, and our net foreign asset position in equities falling to 12.5% from 19.7% of GDP over the same period.

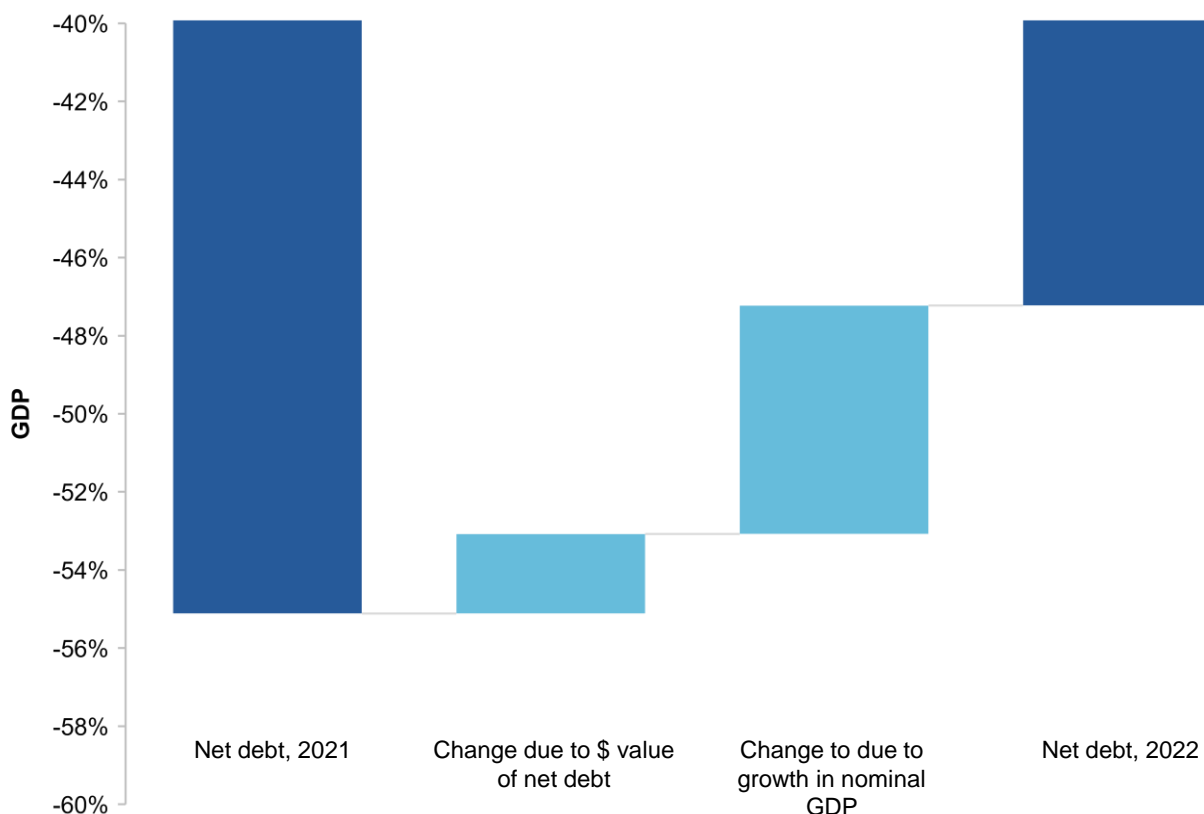
Figure 4.1 – Australia's net investment position, by debt and equity
Net foreign liabilities as a share of GDP, to 31 December 2022



Source: Productivity Commission estimates based on ABS (*Australian National Accounts: National Income, Expenditure and Product, March 2023*, Cat. no. 5206.0; *Balance of Payments and International Investment Position, Australia, March 2023*, Cat. no. 5302.0).

The decline in both our net debt and net equity holdings as a share of GDP was not due to a marked decline in net holdings of debt and equity securities. It was principally the denominator effect of notable nominal GDP growth over 2022, associated with sustained inflationary pressures over the year. The valuation effects of rising international interest rates also contributed. Generally, higher interest rates tend to be associated with lower share and bond prices, as future cash flows are discounted at a higher rate. Figure 4.2 illustrates the relative contribution of the denominator effect of the notable growth in nominal GDP, and the increase in the dollar value of debt held which is in part attributable to the valuation effect of higher interest rates on Australian holdings of foreign debt over the past year, as well as changes in the volumes of transactions.

Figure 4.2 – The fall in our net debt position was largely due to nominal GDP growth
Contribution to changes in foreign net debt as a share of GDP^a

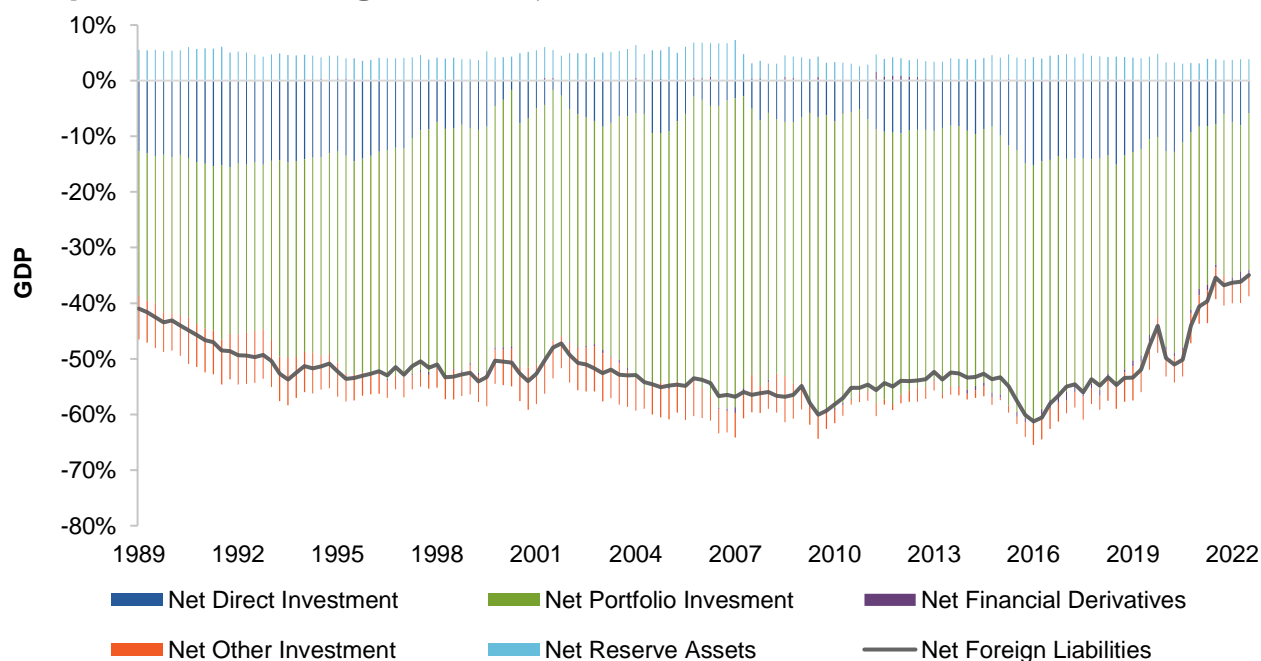


a. Change components do not sum exactly to change in net debt levels in 2022, as movements in net debt and GDP occur simultaneously.

Source: Productivity Commission estimates based on ABS (*Australian National Accounts: National Income, Expenditure and Product, March 2023*, Cat. no. 5206.0; *Balance of Payments and International Investment Position, Australia, March 2023*, Cat. no. 5302.0).

The bulk of foreign investment in Australia, both inbound and outbound, comes in the form of portfolio investment – that is, investment that does not come with a controlling interest in firms or assets (figure 4.3). Foreign direct investment (FDI) – investment that grants the foreign investor control, or a significant degree of influence over a firm's management – makes up a smaller proportion of overall investment in Australia. Despite being smaller in overall scale, it is this ability to control or influence the operations of firms in Australia that makes FDI of more interest to policymakers. Australia's net liability position in FDI moderated to 5.9% of GDP in 2022 from 7.9% in 2021. In dollar terms, the outstanding stock of inbound FDI increased. However, this was more than offset by an increase in the value of outbound FDI, and the denominator effect of an inflation driven increase in nominal GDP, to produce an overall decrease in net direct investment as a percentage of GDP.

Figure 4.3 – Foreign investment in Australia is largely through portfolio investment
Components of net foreign liabilities, to 31 December 2022

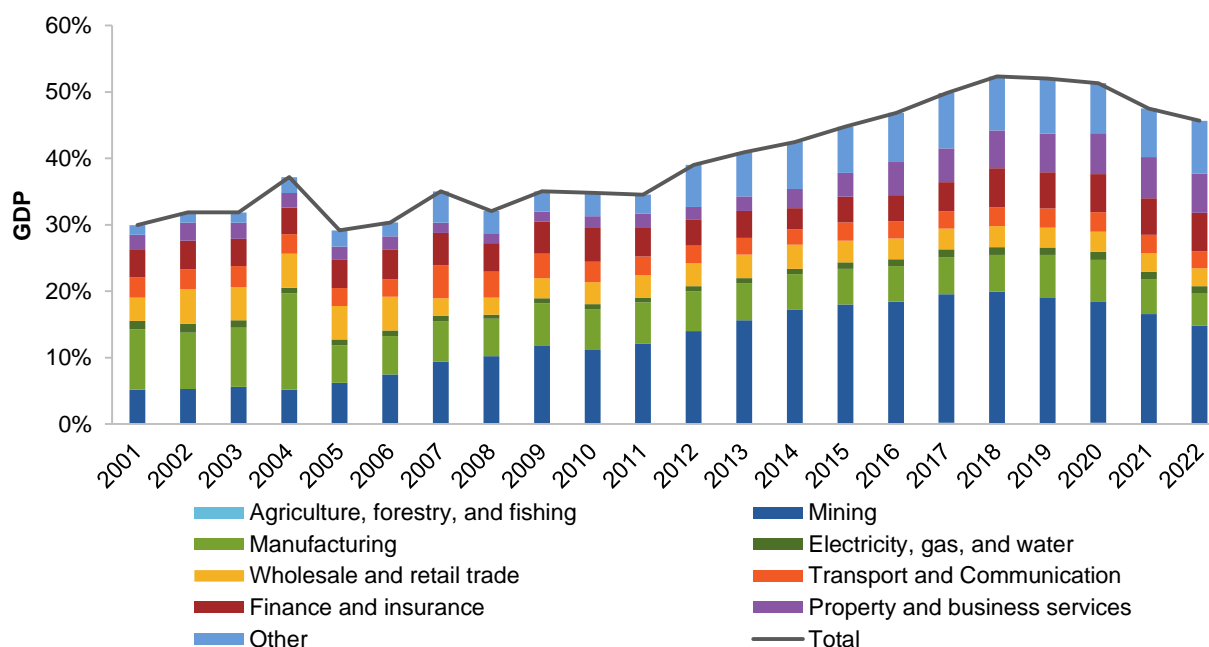


Source: Productivity Commission estimates based on ABS (*Australian National Accounts: National Income, Expenditure and Product*, March 2023, Cat. no. 5206).

By industry, the four largest recipients of outstanding inbound FDI remained Australia's mining, property and business services, finance and insurance, and manufacturing sectors. This ranking is unchanged from 2021. The dollar value of outstanding inbound FDI in the mining sector was broadly unchanged over the year but declined as a percentage of GDP. Outstanding inbound FDI increased in dollar terms in property and business services, finance and insurance, and manufacturing, though fell in percentage of GDP terms in property and business services, and manufacturing (figure 4.4). Similarly, the United States, the United Kingdom, and Japan remained biggest FDI sources, collectively accounting for around half of Australia's stock of inbound FDI (figure 4.5).¹⁵

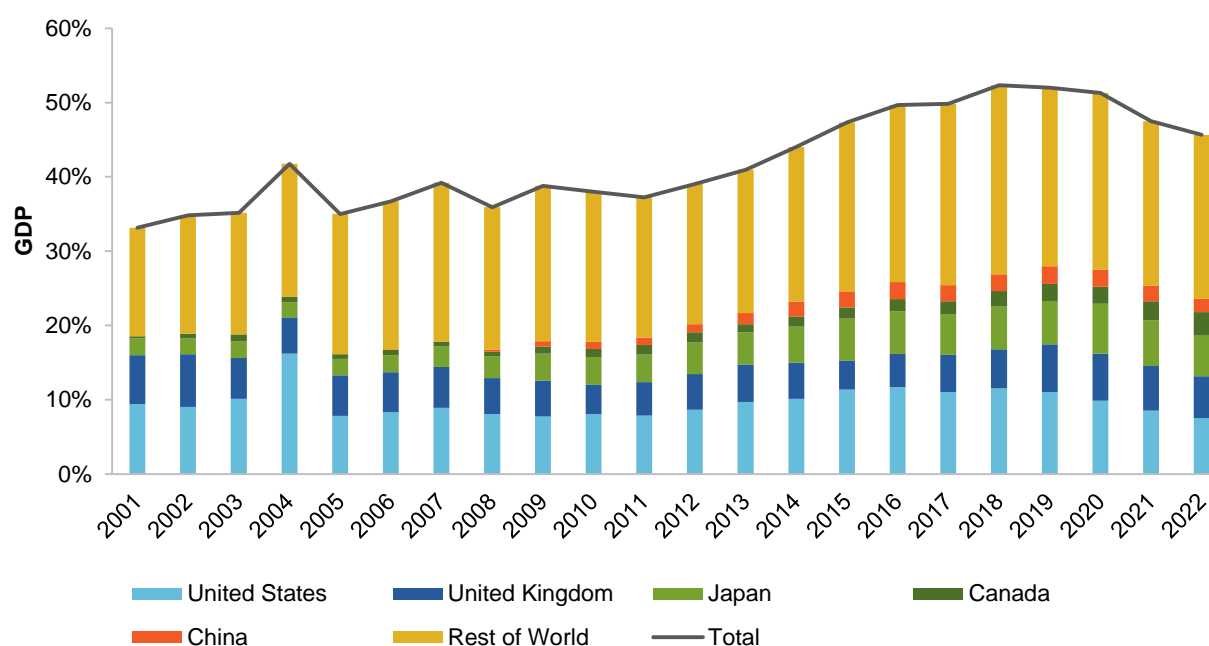
¹⁵ This data reflects the immediate source country of the invested funds which, in some circumstances, may differ from the ultimate source (beneficial ownership source) of those funds.

Figure 4.4 – Direct investment in Australia, by sector
Gross liabilities, to 31 December 2022



Source: Productivity Commission estimates based on ABS (*Australian National Accounts: National Income, Expenditure and Product*, March 2023, Cat. no. 5206).

Figure 4.5 – Direct investment in Australia, by source country
Gross liabilities, to 31 December 2022



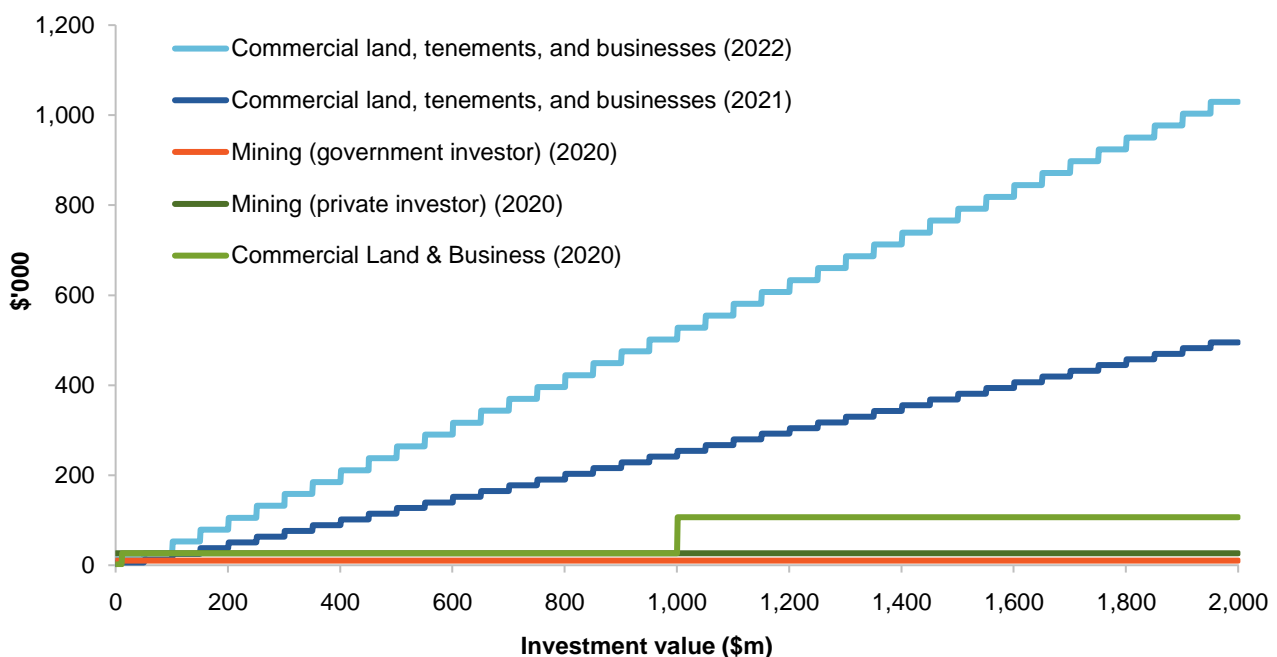
Source: Productivity Commission estimates based on ABS (*Australian National Accounts: National Income, Expenditure and Product*, March 2023, Cat. no. 5206).

4.2 Developments in foreign investment policy

The 2020-21 TAR examined the national security motivated changes to Australia's foreign investment screening regime, which began operation on 1 January 2021. These changes increased the level of screening faced by foreign investors, in at least three ways – expanding the range of sectors that proposed investments require approval; lowering the threshold at which investment in these sectors triggers approval requirements; and increasing the powers that the Treasurer has over proposed investments, and over investments that have been approved in the past.

The 2020-21 TAR also explored the way in which foreign investment fees have increased markedly over recent years and have come to raise more revenue than required to fund the costs of the foreign investment screening process – thereby amounting to a tax on foreign investment intentions and, by extension, foreign investment itself. While the foreign investment screening process has remained largely unchanged over the past year, foreign investment application fees doubled on 29 July 2022 (figure 4.6).

Figure 4.6 – Foreign investment application fees have increased markedly since 2020
Single action fees in 2020, 2021 and 2022



Source: Productivity Commission estimates based on FIRB (2023a) and FIRB (2021).

4.3 Foreign direct investment applications

It is plausible that Australia's new foreign investment screening regime and increased foreign application fees might alter the overall quantum, and underlying composition, of inbound foreign direct investment over time. The first indication of these potential effects is likely to be found in Australia's foreign investment applications data. The fact that the value of approved foreign investment applications has increased to \$338.1 billion in 2021-22 from \$233 billion in 2020-21 might suggest that the effect of these changes has been modest (table 4.1). To estimate the effect of policy changes, outcomes would need to be compared with a well specified counterfactual. In addition, there is typically volatility of year-to-year FDI data

(figure 4.7). This means that at this stage it is too early to meaningfully assess the impact of higher fees and more stringent screening of inbound foreign investment applications.

Table 4.1 – Foreign investment applications

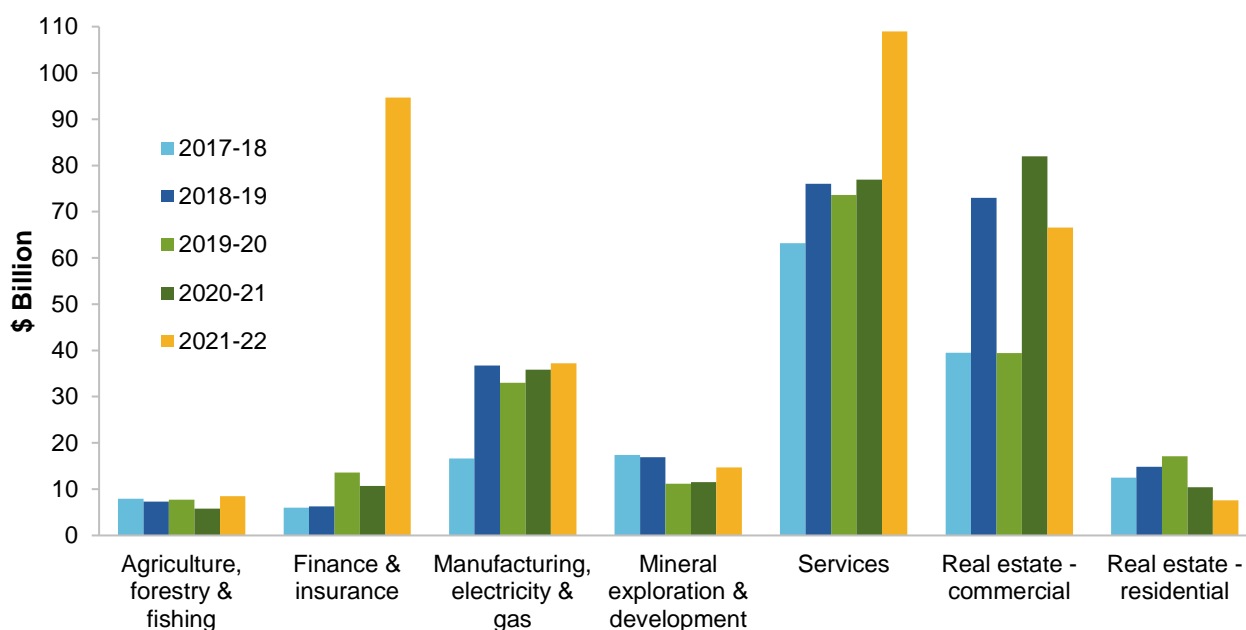
\$ Billions

Outcome	2017-18	2018-19	2019-20	2020-21	2021-22
Approved without conditions	40.1	45.9	56.5	66.0	62.0
Approved with conditions	123.0	185.1	139.0	167.1	276.1
Total approved	163.1	231.0	195.5	233.0	338.1
Rejected	0.1	10.0	–	–	–
Declined	3.0	–	–	–	–
Total decided	166.1	241.0	195.5	233.0	338.1

– Nil or rounded to zero.

Source: Treasury (2022) FIRB (2021).

Figure 4.7 – Value of foreign investment applications, by sector and year



Source: FIRB (2023b), FIRB (2021).

Appendices

A. A new framework for monitoring the effects of tariffs

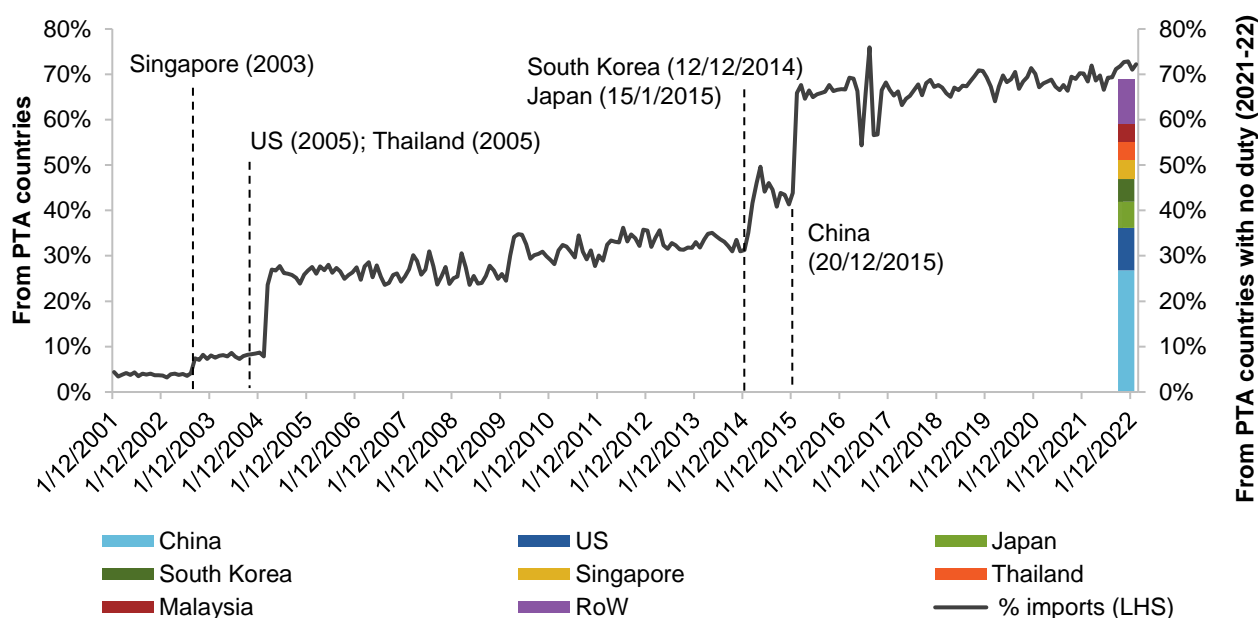
Tariffs have been disappearing

Since the 1970s, tariffs have declined from rates in excess of 50% of import value, applied to many imports (IC 1997, p. 200), to 5%, applied to a relatively small number of imports (PC 2022b). As tariff rates and the number of products subject to tariffs have declined, their protective effects for some Australian producers have also fallen. This has led to a more efficient allocation of resources across the economy.

The proportion of trade that qualifies for preferential treatment has expanded significantly since 2000 as the number of preferential trade agreements (PTAs) that Australia has signed has increased (figure A.1). Almost all imports from countries with which Australia has a PTA attract no tariffs, whether because the import attracts no tariff because the statutory tariff rate is zero, or because it is imported under a PTA (the column in figure A.1 account for almost all imports from PTA countries).

Figure A.1 – Trade with PTA countries has increased^{a,b}

Value of imports from PTA countries as a percentage of total value of imports



a. PTA = preferential trade agreement. PTA countries are countries that Australia has a preferential trade agreement with. Imports from these countries that would otherwise be subject to a tariff may still attract a tariff if importers choose not to access a preference due to compliance costs (PC 2022b). **b.** Between 1983 and 2001 ANZCERTA (with New Zealand) was the only PTA in force.

Source: Productivity Commission estimates based on ABS International Trade in Goods and Services, Cat. No. 5368.0 (table 14b) and International Merchandise Trade, Customised table, 2023.

The combination of unilateral tariff reform, trade agreements and various concessional instruments has dramatically reduced the tariffs that Australian importers pay. About 90% of imports enter Australia duty free, with almost all remaining imports subject to the statutory rate of 5% (PC 2022b, p. 10). The combination of low rate and low coverage mean that both the tariff revenue and the protection provided by tariffs to domestic producers is small and is likely to directly distort decisions for only a small number of Australian businesses, constituting a small part of the economy. In contrast to the assistance that tariffs afforded import competing businesses in the past, the influence that tariffs now have on businesses and the economy is shaped more by the administrative and compliance costs that parties incur from interacting with the tariff system as a whole.¹⁶

Because the assistance effects of tariff have waned, the Productivity Commission has begun to monitor the effects of tariffs on the compliance or 'nuisance' costs that they impose on Australian consumers and businesses.

The cost of tariffs arises from the complexity of the tariff system

While Australia's tariff rates are low and only levied on a narrow range of goods, the tariff system as a whole creates costs for businesses when they pay a tariff or when they interact with the system to obtain a preference or a concession. These costs are not immediately visible to government or readily recorded by administrative systems. Moreover, businesses do not always keep records of the costs of interacting with the tariff system, unless they have employed third party customs agents.

The Commission has estimated the compliance costs that businesses incurred for 2019-20 (box A.1). Using this same methodology, we estimate the nuisance cost of tariffs for 2021-22 to be between \$1.2 and \$3.6 billion (table A.1). The change in the estimated cost is due to the change in the value of imports that benefitted from a preference as the compliance cost rate is the same as used in our earlier research report. This rate may be revised when significant new trade agreements are finalised.

Table A.1 – Estimated cost of the tariff system^{a,b,c,d}

Year	Value of imports under PTAs	Compliance costs from accessing preferences	TCS-related compliance costs	Total compliance costs (C)	Tariff revenue (R)	Value of imports that attract tariffs (V)	Measure of cost (C+R)/V
2019-20	\$84 billion	\$0.9–2.7 billion	At least \$5 million	\$0.9–2.7 billion	\$1.5 billion	\$31 billion	7.8–13.5%
2021-22	\$114 billion	\$1.2–3.6 billion	At least \$5 million	\$1.2–3.6 billion	\$1.8 billion	\$37 billion	8.1–14.6%

TCS = tariff concession system. **a.** Value of imports under PTAs is the value of imported goods that do not attract tariffs because they are covered by a preferential trade agreement. **b.** Compliance costs associated with accessing a preference is calculated by multiplying the value of imports that benefitted from a preference by the estimated compliance costs as a percentage of value of imports, which is 2.1% (PC 2022b, p. 66). Given the uncertainty of point estimates, a range of 1.05-3.15% (50% range around 2.1%) is used to estimate compliance costs. **c.** Tariff revenue is the tariff levied on goods that are subject to a non-zero statutory rate and are not subject to a preference or where a concession has not been applied. **d.** Estimates differ from those in the research report due to revised data.

Source: Commission estimates.

¹⁶ As explained below, increasing the relative cost of an import creates some protection and assistance for any domestic producers whose products might compete with the import.

Box A.1 – Estimating the compliance cost of tariffs

In 2022 the Commission researched the nuisance costs of tariffs (PC 2022b). As part of this research we estimated the compliance costs incurred by businesses when they import goods that are subject to tariffs but a preferential rate or concession can be accessed.

- These compliance costs arise because businesses devote resources to accessing preferential and concessional rates of customs duty.
- Compliance costs come in two forms: the costs of generating and dealing with the ‘paperwork’ (now often electronic) needed to demonstrate eligibility for a preference or concession, and the costs that foreign producers incur in adapting their production to make the imports eligible for a preference.
- Most of these costs are passed on along the supply chain to Australian consumers in the form of increased prices, at least in the short run.

Compliance costs are not readily available in administrative records, and estimating them is not straightforward. The Commission estimated compliance costs incurred in 2019-20 against a counterfactual of costs that would not have been incurred had the statutory rate been ‘Free’. We limited the estimation to the costs of complying with preferential trade agreements (PTAs) and with the tariff concession system (TCS), as these are the most common ways in which businesses reduce their tariff liabilities to zero.¹⁷

We estimated the compliance costs of PTAs and the TCS in 2021-22.

- We estimate annual TCS related compliance costs to be at least \$5 million. The \$5 million calculation understates the true costs, because of the uncosted components outlined in the research paper.
- We estimated compliance costs associated with accessing preferences as a percentage of the value of imports that benefitted from a preference (2.1%) (PC 2022b, p. 66). This cost can be expected to be lower than the 5% statutory rate – if the compliance costs were higher, importers would just pay the tariff.

More detail on the methodology can be found in the research report, section 4.1 and appendix C.

While the prevalence of tariffs has been declining at an economy-wide level, their impact on resource allocation is still relevant to policymaking. When assistance is different across businesses, there is a risk of inefficient resource allocation by encouraging resources to flow towards businesses that receive assistance disproportionate to their value added and away from those subject to relatively large tariff input penalties. This means that there is still value in eliminating tariffs, even if they are low.

How do tariff assistance estimates and system compliance costs relate to each other?

Tariffs and compliance costs share a key feature: they both can act as protection. They allow domestic producers who compete with imports to increase prices by the amount of the tariff or of the compliance cost. For example, a 5% tariff allows a domestic producer to increase the price of its products from \$100 to \$105 while still competing on price with an importer paying a 5% tariff. The additional 5%, or \$5, can be taken as additional profit by the domestic producer or absorbed by inputs or labour that might be more expensive than

¹⁷ In 2019-20, 28% of imports entered under a PTA, 11% entered under the tariff concession system, and a different instrument was used to reduce the tariff to ‘Free’ for only 1% of imports (PC 2022b, p. 9).

abroad; the net effect is to increase costs for consumers or business that might use the product as an intermediate input.

A key difference is who benefits from the decision to pay tariffs or incur compliance costs. When an importer pays the tariff, the government collects tariff revenue. When an importer incurs the costs associated with accessing a preference or concession, the additional cost is dissipated in increased activity in the form of work performed by a customs agent or by internal staff.

B. Analysing Australian responses to the US Inflation Reduction Act

B.1 Industry policy developments in the major economies

Industry policy has made a marked return to the United States (US) and the European Union (EU) over the past year, underpinned by the confluence of a number of factors, including: a sharpening of strategic competition between the major economies; a tightening of 2030 greenhouse gas emissions reduction targets; public memory of the string of international trade disruptions of recent years; and a political impetus to ostensibly address cost of living pressures. Central amongst these policies is the US Inflation Reduction Act, which was signed into law on 16 August 2022. The Inflation Reduction Act is a broad ranging piece of legislation, including a corporate minimum tax, changes to Medicare, and subsidies for medical care. Its centrepiece is US\$369 billion in subsidies and loans for the deployment of clean energy technology over ten years. This includes tax credits for businesses and consumers for clean energy purchases (UNCTAD 2022).

Two elements of the Inflation Reduction Act are likely to feature notably in Australia's trade environment over coming years. The first is the large business and household subsidies for clean energy technology, including solar equipment manufacturing, battery and electric vehicle (EV) manufacturing, green hydrogen production, direct air capture technologies, as well as energy-intensive manufacturing more generally. The second is the system of local content related bonus' tax credits created by the Act – additional subsidies that are provided to businesses and households if they invest in clean energy technology either made in the US, North America or countries that have a Free Trade Agreement (FTA) with the US.

For example, prior to the Inflation Reduction Act, households in the US that installed solar panels were eligible for a 26% tax credit. The Inflation Reduction Act increased this tax credit to 30% and provided a 10% bonus credit if at least 40% of those solar panels were produced in the US (Weaver 2022). Similarly, prior to the Inflation Reduction Act, households that purchased EVs were eligible for a \$7,500 tax credit, regardless of which country that EV was produced in. The Inflation Reduction Act made the \$7,500 tax credit conditional on final assembly of the EV in the US, Canada or Mexico, and at least 40% of the critical minerals used in the EV battery coming from either the US or from a country with which the US had an FTA, such as Australia. This 40% minimum content for EV batteries is scheduled to rise to 50% in 2024, 60% in 2025, 70% in 2026 and 80% in 2027 (Baldwin 2022).

These local content conditional tax credits are effectively trade assistance, created not by imposing tariffs on imported goods, but by providing additional subsidies for goods when they are produced in the US, and their inputs sourced from certain countries. The Inflation Reduction Act follows other legislation that provides industry assistance to US firms, notably the Creating Helpful Incentives to Produce Semiconductors (CHIPS) and Science Act that subsidises the production of advanced microprocessor chips in the US.

Similar motivations, as well as a desire to defend market share for EU producers of these goods, have underpinned the drafting of similar EU legislation – an EU Chips Act, Net Zero Industry Act, and European Critical Raw Materials Act. In addition, the EU is seeking a 40% minimum domestic production target for

clean energy technologies by 2030 (Blenkinsop 2023). Some commentators and industry participants have called for a similarly countervailing policy response by Australia (box B.1).

Box B.1 – Calls have emerged for an Australian response to the Inflation Reduction Act

Australia has a prime opportunity to become a clean energy superpower, but the brightest minds and the biggest wallets are now looking to the US for their best opportunity. It is immediately clear the US package dwarfs the level of support Australian governments provide for the clean energy transition. The consequences of inaction have the potential to damage Australian competitiveness across all industries for decades to come. Taking the next step in Australia's clean energy transformation requires even stronger action and support for the industry. (Clean Energy Council 2023)

Try and re-level that playing field a little bit, on a targeted policy response to improve the competitiveness of Australian green energy. We can't match the [Inflation Reduction Act] across the board but I think a more targeted response to it ... is achievable particularly if we think about it as an investment future. It's not just money out the door, it's investment. (Guy Debelle, quoted in Poljak and Tran 2023)

B.2 Potential Australian responses to major economy industry policy

Consideration of Australian policy responses to major economy industry policy like the US Inflation Reduction Act, and its draft EU counterparts, can benefit from consideration of a number of important international trade principles, and weighing the extent to which deviating from these principles might impact broader policy goals. In addition, consideration of how Australia's trading partners might respond to subsequent Australian policy developments would be helpful. Each of these considerations are explored below.

International trade principles suggest advantages in some sectors, but not others

Comparative advantage

Countries have significant differences in their endowments – differences in their share of the world's highly educated workers, high-school educated workers, buildings and equipment, infrastructure, and natural resources. Global and national income gains are possible from distributing global production between countries based on their ability to produce some goods and services at lower opportunity cost, relative to other goods and services, and relative to other countries. This generally means producing advanced services in countries with highly educated workers, undertaking basic manufacturing in countries with high-school educated workers, and undertaking natural resource extraction and primary production activities in countries with the natural resources to do so. This process of 'allocating' parts of the global production task to individual countries occurs in a largely decentralised way, with countries that have an initial cost advantage in, say, manufacturing, progressively securing a greater market share in the sector, a transition process that largely ends when the forces of adjustment (such as rising wages) leave several nations equally

competitive in the production of those manufactured goods. Globally, incomes will rise as a result of the re-allocation, as the output of manufactures, high-end services, and other goods and services increases and thereby become more affordable. This process of specialisation and trade, whereby countries focus on the production of goods and services in which they have a comparative advantage and trade their surplus production for goods and services more efficiently produced by other countries, has been the primary force behind rising living standards over the post-war period.

The comparative advantage of nations is principally a function of their endowments – their workforces, their natural resources, their stock of physical capital etc – and the presence of institutions that enable the realisation of their potential. Policy settings that selectively provide a cost advantage to one domestic sector over another – such as sectoral subsidies, government grants and tax concessions – can reduce the market price at which the subsidised sector's goods or services are sold, thereby helping a country to capture global market share in that good or service. This can lead to a second round of cost reductions through economies of scale, learning-by-doing, and through the potential emergence of industry clusters.

However, the initial reduction in market prices allowed by the subsidies conceals the true societal cost of producing the subsidised goods and services, with the rest of the economy having to subsidise the industry to achieve them. It would also risk creating domestic constituencies that exert political pressure to maintain the existence of these subsidies over time, and to press for their expansion (Grossman and Helpman 1994). For these reasons, it is unlikely that a country would be able to use subsidies and concessions to generate a comparative advantage in a sector not suggested by its underlying endowments. For example, a low-skill manufacturing industry is unlikely to remain in a highly educated country.

In the case of the Inflation Reduction Act, tax credits for businesses and households to purchase clean energy technologies produced in the US (or North American Free Trade Agreement countries in the case of EVs) using inputs from the US and other preferred source countries, stand to lower production costs for beneficiary countries through greater economies of scale and learning-by-doing. Globally, consumers will purchase more US produced clean energy equipment than in the absence of the policy, and hence fewer from other countries. Similarly, the rebates conditional on domestic content will encourage US firms and consumers to buy US products. However, this change in purchasing patterns will come at significant cost to US taxpayers, whose income will be lower as a result. While some of this spending constitutes potentially welfare-enhancing investments in emissions reductions, it is questionable whether it will be able to generate a comparative advantage in sectors not supported by the underlying endowments of the US.

Nevertheless, when thinking about potential Australian responses to the Inflation Reduction Act, it is worth returning to the principle that all countries should focus where they fit best within global production patterns. This will be true regardless of whether global production patterns reflect the underlying comparative advantage of nations, or whether they are distorted by major economy industry policy.

Importantly, the Inflation Reduction Act does not materially alter Australia's existing comparative advantage in supplying natural resources and production of high-skill services. Australia's top exports are resources and information/financial/professional services (DFAT 2022c). As discussed in the next section, the Inflation Reduction Act will likely boost demand for Australia's critical minerals, as Australia has an FTA with the US and satisfies the preferential content requirement rules. Indeed, Australia's mining *and* critical mineral processing sectors are likely to become more internationally competitive as a result of the Inflation Reduction Act. Australia has resources that could be further developed, several of which will be valuable for battery and EV production (table B.1).

Table B.1 – Australia is well positioned to benefit from increased global demand for critical minerals

Critical Mineral	Geological potential	Economic reserves ranking	Production ranking
Lithium	High	2 nd in the world	World's largest producer
Rare earths	High	6 th in the world	4 th largest producer
Cobalt	High	2 nd in the world	3 rd largest producer
Graphite	Moderate	8 th in the world	-
Manganese	High	4 th in the world	3 rd largest producer
Bauxite (for High Purity Alumina)	Moderate	2 nd in the world	World's largest producer
Silica	High	-	15 th largest <i>silicon</i> producer
Vanadium	High	2 nd in the world	-

Source: DISR (2022a).

It has been suggested that the presence of critical minerals extraction would create a cost advantage for upstream processing and manufacture of processed minerals into end products like EV batteries, and the Australian Government is currently in the process of developing a National Battery Strategy (chapter 3). The presence of critical minerals mining in Australia suggests that there might be a cost advantage for processing in Australia, because (for many of these minerals) large volumes of earth need to be processed to generate small quantities of processed minerals. However, to the extent that these critical minerals are low-volume once processed and refined, and thereby low-cost to transport, a domestic processing capacity is unlikely to create an appreciable cost advantage for a domestic battery industry. That is, the comparative advantage in resource extraction presented by Australia's resource endowments is more suggestive of a comparative advantage in the processing of low concentration minerals than in final battery production.

Industry agglomeration (or clusters)

Many industries are clustered around one or several key locations: the information technology cluster in Silicon Valley, the automobile industry in Germany, the biotechnology industry in Melbourne, and so on. Benefits of clusters include deep labour markets for specific skills, specialised intermediate goods (such as venture capital), and information spillovers between firms (Krugman 1991). These advantages often confer a productivity advantage on firms in those locations. Trade between countries with similar resources allows clusters to develop, as they build scale and expertise by supplying customers in several countries. Rising international trade in the 1980s and 1990s was primarily driven by trade between similarly-resourced wealthy countries, with gains from increased product range and the development of clusters (The Economist 2013, p. 20).

These clusters start from the presence of a few firms in a location with strong comparative advantage; for example, Stanford University in Silicon Valley has been a vital source of skilled engineers and innovative ideas. Consequently, despite the enthusiasm of governments for developing clusters, government policy aiming to create a competing cluster where none previously exists has been notoriously unsuccessful (Kerr and Robert-Nicoud 2020).

The story is a little more nuanced when it comes to new industries. It is possible that an early start in one of these industries can help a country gain an advantage over other countries with a similar mix of resources (skilled labour, capital, and so on), because the forces of learning-by-doing create local knowledge and a pool of experienced specialist labour (Krugman 1991). Thus government contracts or other forms of support could influence the development of clusters in a new industry. But without a long-term source of comparative

advantage, clusters are very unlikely to persist. Thus, for example, clusters in wind and solar power equipment manufacturing industries have developed in Germany and Denmark, in part due to significant government support (Cook and Lin Lawell 2020). But unless research and development (R&D) remains a significant part of the development process for equipment (for example, automobiles), those clusters may eventually move to locations with lower labour costs. Production with a strong R&D component will continue to have a comparative advantage in high-income countries with strong R&D capabilities.

These challenges are likely to be particularly apparent in the case of product categories where technological change is likely to be rapid and where the difficulty of government ‘picking winners’ is likely to be constrained. In a constrained fiscal environment, providing support to some new industries inevitably means forgoing support to others, and the opportunity cost of particular choices could be high.

What are the implications of international trade principles for a possible battery manufacturing industry in Australia? At the moment, there is a small number of battery producers, generally drawing on university research and receiving some government support (Investment NSW 2023). Interestingly, so far the battery industry is clustered by country, but not highly clustered at a regional level, perhaps reflecting incentives to locate near electric vehicle factories and avoid battery transport costs. This may suggest that the forces that create clustering are not as strong in the battery/electric vehicle industry, and that traditional comparative advantage is more relevant. But the Inflation Reduction Act incentives make it much more likely that a battery industry will rapidly develop and grow in the US, possibly with clustering effects. Such a development would reduce the likelihood that Australia develops an economically efficient battery industry and raises the likelihood that its resources earn better returns in other industries (such as services). And if the Australian Government were to support such an industry, the cost of that support may outweigh the benefits for GDP and economic growth. It may also entrench an inefficient industry that relies on lobbying for more support to sustain itself over time, rather than on relying on its inherent economic advantages.

More directly challenging for Australia are risks in the biotechnology and medical industry. US pharmaceutical firms have been advocating for ‘Chips Act-style’ subsidies (Smyth 2023). If these subsidies were to be implemented, Australia’s biotechnology and medical industry would face a disadvantage relative to biotechnology clusters in the US. Firms in the cluster may choose to focus on niches that are not exploited in the US, or to compete head-on; but with or without government support, the net benefit to Australia from a directly competing cluster would be lower.

Sovereign production capacity may not be an effective way of addressing broader policy concerns

Reducing emissions and environmental damage

In determining welfare-enhancing policy for Australia, policymakers may consider broader goals beyond simply maximising national income through trade. Many of those goals are environmental: reducing global emissions is a top priority for most countries, and reducing other types of environmental harm is also important. However, it is important to distinguish between national emissions reductions and developing a domestic production capacity in emissions reduction technologies. The former need not imply the latter, given Australia’s ability to import these technologies from overseas.

Relatedly, the Inflation Reduction Act provides strong incentives for US firms to develop new clean energy technology and to adopt clean energy technology. As the world’s second largest producer of greenhouse gas emissions, that will likely prove important in avoiding the worst impacts of climate change. And the notable levels of domestic clean technology investments that will flow from the Inflation Reduction Act will likely produce a meaningful domestic industrial constituency for emissions reductions in the US, which will likely

defend against potential emission reduction policy reversals in the future. As such, it is likely to significantly accelerate the global transition to low emissions technology.

As such, the Inflation Reduction Act is likely to prove a net positive for Australian emissions reductions, both from a trade perspective (more affordable clean energy products) and an environmental perspective (more affordable clean energy and a faster global transition to low emissions). While Australian, state and territory government support for batteries or electric vehicles in Australia would also accelerate the transition to net zero, providing such support would not be the lowest-cost way to achieve emissions reductions (PC 2023c).

Are there separate environmental reasons for Australia to invest in critical minerals or battery production? These industries have the potential to create environmental harms if not undertaken with appropriate environmental regulation and oversight. One argument for support relies on a form of environmental 'leakage'. Some countries might gain an artificial 'comparative advantage' through lax environmental regulation or poor oversight (Leonard 1988). Producers could end up having lower costs in those locations, with activity 'leaking' into those countries (relative to the counterfactual). This might motivate other governments to support critical minerals mining and processing in other ways, particularly if the judgement is that such industries could not develop locally without government support. It is true that if more critical minerals processing takes place in Australia, the US and other high income countries, the environmental harms may be potentially lower. However, the critical minerals industry is already receiving significant implicit assistance through the Inflation Reduction Act's requirement that critical minerals be supplied by a Free Trade Agreement partner of the US. Furthermore, the same environmental goals could be achieved through international environmental agreements with any lower-income countries undertaking processing. In addition, the US is already developing some capability in rare earths mining and processing (Easley 2023). Likewise, the Inflation Reduction Act and draft legislation in the EU will increase the share of battery production that takes place in those high-income locations, with reduced risk of environmental harm.

Ensuring Australia's supply of economically important goods

Global supply chains have experienced rolling disruptions over recent years, including with COVID-19-related developments causing significant disruptions, and the war in Ukraine causing further upheaval (chapter 3). A sharpening of strategic competition between the major economies has also raised concerns about the potential for the supply of some goods being disrupted during periods of geopolitical tensions. This has led to requests for support to develop sovereign capability in some goods, such as critical minerals and advanced microprocessors, in Australia.

However, Australia's supply chains are more resilient than is generally acknowledged. The issue has been addressed at length in the Productivity Commission's 2021 study on *Vulnerable Supply Chains* (PC 2021b). Our reliance on a rules-based global trading system provides diversified sources for most of our essential goods. That trading system provides many potential sources of goods in the event of a shock: for example, at the start of the COVID-19 pandemic, when demand for face masks exploded, the world supply of face masks expanded by a factor of ten and met demand in a month and a half; it is not clear that every individual country would have had the ability to expand domestic production at that speed.

Moreover, if particular concerns were held for goods regarded as 'critical' by some governments, the Inflation Reduction Act and its draft EU counterparts stand to drive much of the global diversification of the supply of these goods. To the extent that these new sources are reliable, this global diversification exercise stands to benefit countries such as Australia. For example, if the Inflation Reduction Act, and its draft EU counterparts are successful, Australia will enjoy a diverse range of sources of clean energy technologies and advanced microprocessors in the future. In this context, the additional diversification benefits of building an Australian domestic production capacity in these goods is likely to be marginal.

Likewise, Australia's investment in critical minerals processing will benefit a wide range of countries by diversifying global critical minerals supply. Many of these minerals are regarded as critical by a range of countries, being an important input to a range of technologies. It is not clear therefore why (if government support is needed) that support should come exclusively from the Australian Government, unless if in exchange for industry support to other parts of the supply chain. The Japanese Government has already provided support to the Australian rare earths mining industry through supply contracts (PC 2021b), and other sources of support may be available.

Transitioning regional economies

Battery manufacturing and other new industries have been proposed as a solution to the disruptions caused by transitioning to net zero. Closing power stations and resource projects could result in significant losses of income and employment in some locations. Mining and manufacturing projects that made use of the skilled labour released by these changes could soften the transition. However, there are a few concerns. First, if this transition is supported by government funding, there may be differences in the level of support for a region where transition is feasible, relative to other regions experiencing closures. Second, unless that skilled labour is a major source of comparative advantage, the manufacturing industry may relocate to outer urban regions, where transport costs are less; in that case any government support is merely postponing the transition.

B.3 Possible further erosion of the rules-based global trading system

The rules-based trading system has suffered some setbacks over recent years (chapter 3). Some of these setbacks included export controls imposed in some countries during the initial months of the COVID-19 pandemic, but these were short-lived. However, the Inflation Reduction Act and other sovereign capability policies could undermine that rules-based order more fundamentally by starting a new era of increased protectionism along geoeconomic lines, thus reducing the gains from trade for all countries, and ultimately leading to lower incomes globally. Recent World Trade Organization modelling estimated that the costs of the world decoupling into two rival trade blocs (relative to more trade liberalisation) at 8.7% of real global income, varying between 6.4% for developed countries, 10.1% for developing countries and more than 11.3% for least-developed countries (WTO 2023k, pp. 2–3).

C. Adjustments to trade disruptions

This appendix uses disruptions to Australia's trade with China in 2020 to illustrate how the international trade system redirects trade flows in response to disruptions. The data analysis in section C.1 shows that trade was resilient. Modelling in section C.2 shows how trade flows adjust globally and the impacts on the Australian economy as a whole.

C.1 Trade policy disruptions

Many events and actions affect global trade, and some of these affect the trade environment that Australian exporters and importers face. For example, recent natural disasters, the war in Ukraine and the COVID-19 pandemic have disrupted production and trade in Australia and its trading partners.

Foreign governments' policy decisions also influence the trading environment. Recent trade policy disruptions include various types of trade sanctions and coercive measures (box C.1), policies to promote supply chain resilience – sometimes by supporting domestic production 'sovereignty' – and bilateral and regional agreements, including 'friendshoring' arrangements.

Foreign investment can also be disrupted, including private sector investment, with the goal of changing behaviour. For example, during 2022 many businesses withdrew operations from Russia in response to its invasion of Ukraine.

Box C.1 – Trade sanctions and coercion

Coercive trade measures are typically part of a set of tools that are designed to influence a country's behaviour. They can be:

- formal sanctions that a broad set of countries impose on all trade to and from a target country, such as UN Security Council (UNSC)
- informal restrictions on trade of particular types of goods and services, such as some of the measures that China's customs authorities placed on Australian exports of coal and live lobsters
- targeted at specific people (typically political leaders) or organisations.

Sanctions can vary on many different dimensions, including:

- the breadth of activities covered, such as comprehensive restrictions on all activities, for example, trade, finance, foreign aid, travel, and sporting and cultural activities
- the entities affected, whether they are imposed on a country, or particular entities or people
- whether they are formal or informal.

Box C.1 – Trade sanctions and coercion

Formal trade sanctions

Formal measures are often supported by domestic or international law. They are usually aimed at being a proportional response to geopolitical or humanitarian challenges that do not justify the use of armed force. Australian sanctions laws are structured in accordance with UNSC sanctions regimes. The Australian Government also has an autonomous sanctions regime. Examples of Australian sanctions include:

- implementing the UNSC's sanctions on Iran in response to its uranium enrichment program, commencing in 2006
- an arms embargo on Myanmar
- implementing the G7's 2022 and 2023 price cap on Russian oil products, prohibiting the import of Russian gold and the export of luxury goods to Russia in response to its invasion of Ukraine
- Magnitsky-style sanctions¹⁸ on individuals from Russian and Iranian regimes in response to human rights violations (DFAT nd).

Coercive trade measures

These are measures – both formal and informal – that restrict trade between two countries. For example, during 2020 various Chinese authorities initiated restrictions on some Australian exports, including:

- large tariff increases on barley and wine, which are subjects of disputes in the World Trade Organization
- reports of increased inspection measures on lobsters, coal and wheat, with many shipments delayed at Chinese ports
- bans on beef imports from some abattoirs (PC 2021a, p. 59).

Trade sanctions and other coercive measures generate costs and benefits for the initiator of the sanctions and for the target country. Costs to the initiators are offset against the benefit of reinforcing behavioural norms and calling out concerning behaviour more broadly and demonstrating preparedness to respond to it. Whether sanctions and other coercive measures have a net benefit depends on how effective they are at changing the target's behaviour.

In many cases, trade has proven to be resilient to disruptions, including to policy-induced disruptions. When a disruption occurs and trade policy settings are open and stable, trade patterns adapt as new suppliers or markets are found. There can be some costs, often in the form of reduced prices (for exports) or increased prices (for imports), additional transport costs or spoilage in some cases. That said, despite short-term costs, there are often long-term gains from diversification, which supports supply chain resilience and risk management.

By affecting global trade patterns – especially when widespread – trade disruptions can also affect third countries. For example, by reducing its demand for Russian gas the European Union has increased its reliance on other sources, which has increased the price of gas globally – including in domestic Australian markets. Similarly, the decision by China to limit imports of coal from Australia increased China's demand for coal from other sources – including from Russia and Indonesia (IEA 2022, p. 54).

¹⁸ Magnitsky laws impose sanctions on individuals and entities involved in human rights abuses. They typically restrict the movement of targeted individuals and their assets.

Recent measures targeting Australian exports

Historically, global trade sanctions (such as against Iran), and more limited sanctions (such as the United States against Cuba) have affected Australia's trade only marginally. In contrast, the measures that China imposed on some Australian exports from 2020 significantly affected the trade environment that some Australian businesses faced (table C.1).

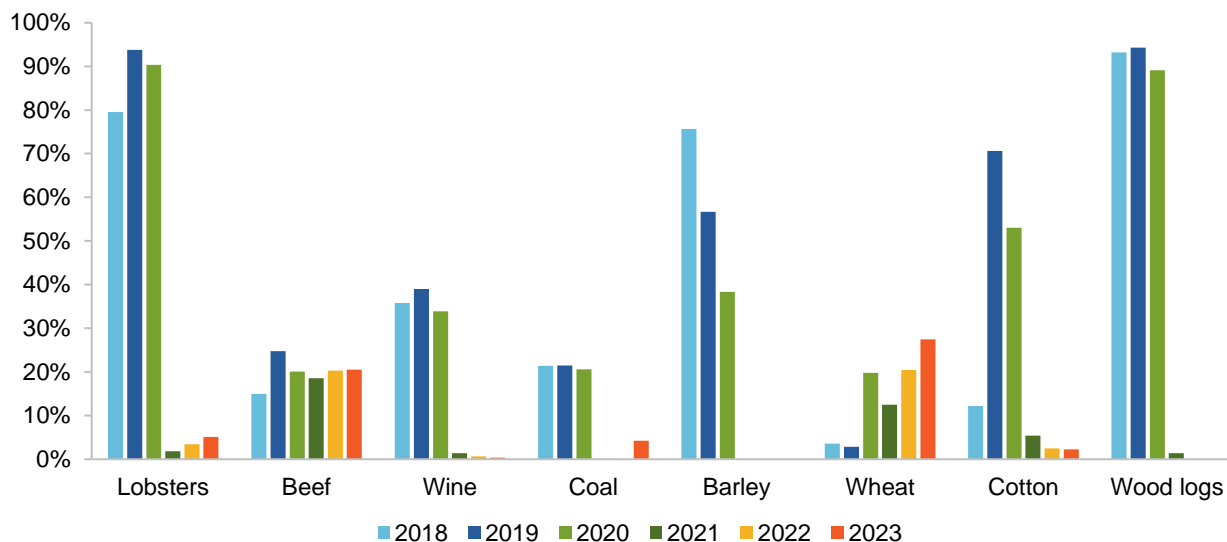
Table C.1 – China's trade measures on Australian exports

Date	Australian export	Nature of measure	Status in 2023
May 2020	Barley	Tariffs of 73.6% and 6.9%, citing anti dumping and anti subsidy measures respectively. These measures were instituted after an 18 month investigation by China, and are expected to be in place for five years	Australia withdrew its complaint to the World Trade Organization (WTO) in mid April 2023 in response to China's promise to conduct an 'expedited review' of the tariffs over the following three months
May 2020	Beef	An import ban on some Australian abattoirs citing labelling and health certificate requirements	In February 2023 there were reports of 'confidence' that trade will resume
September 2020	Wheat	Reports of increased inspection measures on shipments arriving from Australia	There is evidence that wheat exports to China have continued, with record volumes despite trade tensions
October 2020	Cotton	Order to Chinese cotton mills to stop buying Australian cotton	Reports that Chinese buyers are buying Australian cotton in anticipation of lifting unofficial ban
November 2020	Wine	107–212% tariff citing anti dumping measures. In March 2021, China announced that anti-dumping measures would be in place for five years	A WTO panel has been composed but does not expect to report before mid 2023
November 2020	Lobsters	Increased inspection measures, which includes checks for minerals and metals, on shipments arriving from Australia	There were reports that an application to trade fresh lobster from Australia was not rejected in February 2023
November 2020	Timber	A ban on timber from some parts of Australia claiming pests had been detected	Exports of logs resumed in May 2023
November 2020	Coal	A ban on imports from Australia after claims some coal failed to meet China's environmental standards	China allowed some coal imports in January 2023

Source: ABC News (2023), Dziedzic, Breen and Miles (2023), Gu (2022), Honan, Bernasconi and Felton-Taylor (2023), Jackson and Patton (2023), Sullivan and Prendergast (2023), Wong, Farrell and Watts (2023), WTO (2023d).

The trade measures affected Australia's trade with China, although the impact varied across commodities (figure C.1).

Figure C.1 – Exports to China of some commodities fell^{a,b}
Share of export value to China



a. Commodities are classified according to the ABS Australian Harmonized Export Commodity Classification (AHECC). Beef includes fresh, chilled and frozen meat of bovine animals (AHECC 201, 202). Lobster includes frozen, live, fresh, or chilled lobster, rock lobster and other sea crawfish (AHECC 030611, 030612, 030631, 030632). Wheat includes durum and other wheat, seeds and other (AHECC 100111, 100119, 100191, 100199). Barley includes seed, malting and other (AHECC 10021000, 10039010, 10039020). Wine includes sparkling wine, wine in containers not exceeding 2 litres and other table wine (AHECC 220410, 220421, 220429). Wood logs includes wood in the rough, whether or not stripped of bark or sapwood, or roughly squared (AHECC 4403). Cotton (AHECC 52). Coal includes coal; briquettes, ovoids and similar solid fuels manufactured from coal and coke and semi-coke of coal, of lignite or of peat, whether or not agglomerated; retort carbon (AHECC 2701, 2704). **b.** Data for 2023 is only for the March quarter.

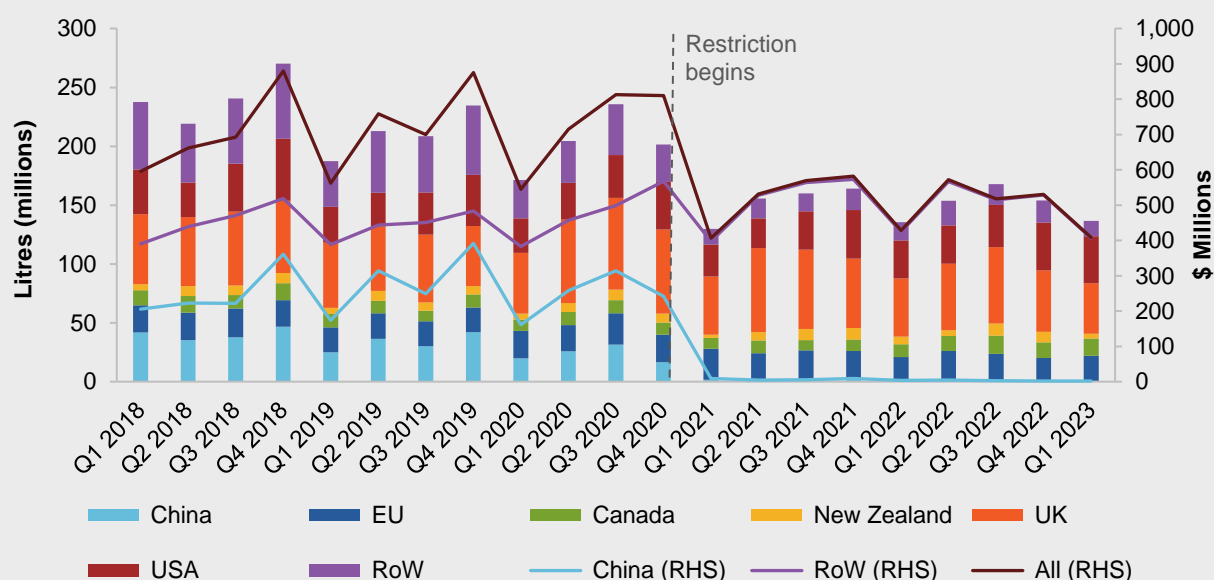
Source: ABS 2023 (International Merchandise Trade: Customised Report).

Australian exports proved to be mostly resilient against these trade measures. For example, barley and coal exporters were successful in finding other markets. The value of beef and wheat exports to China did not experience significant falls – likely due to the partial nature of the measure, which was limited to certain abattoirs and shipments.

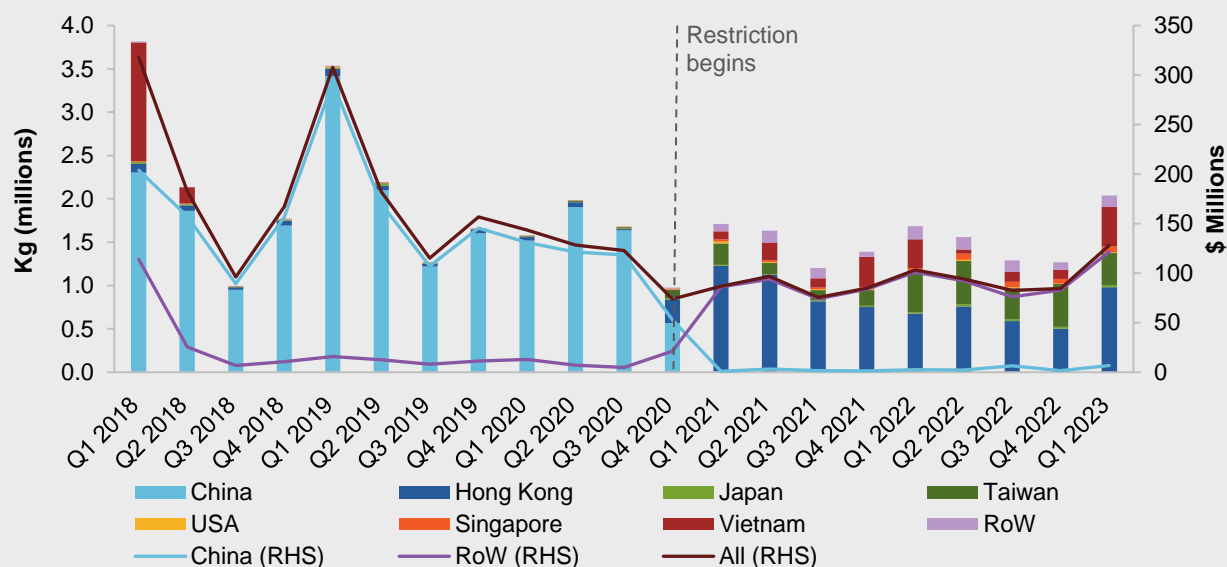
On the other hand, there were falls in exports of Australian lobsters and wine, affecting producers whose exports were concentrated on the Chinese market. That said, after initially increasing exports to their original markets, wine exporters developed new markets. In the case of products with limited perishability, like wine, the costs to exporters might be from deferred sales, rather than not being able to sell the good at all. And some exporters may have even enjoyed an increase in the value of stock that ages well. While these measures do not appear to have imposed substantial costs on the Australian economy as a whole, some businesses paid a heavy price (box C.2).

Box C.2 – The effect of China’s trade measures on Australian exports

Exports of bottled wine fell in response to increased tariffs on Australian exports to China

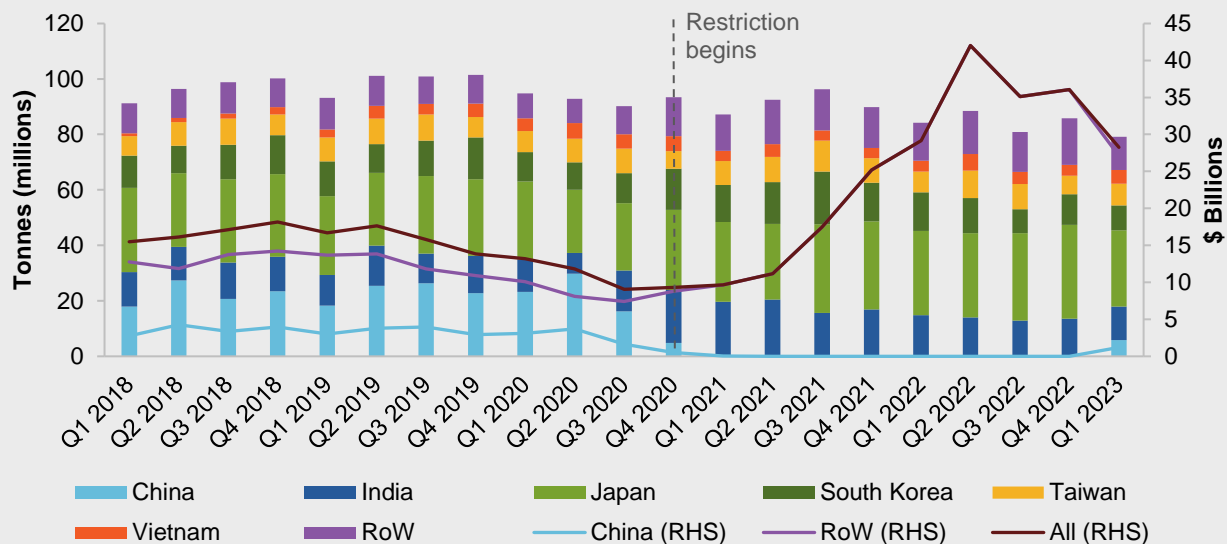


Exports of lobsters diverted to new markets

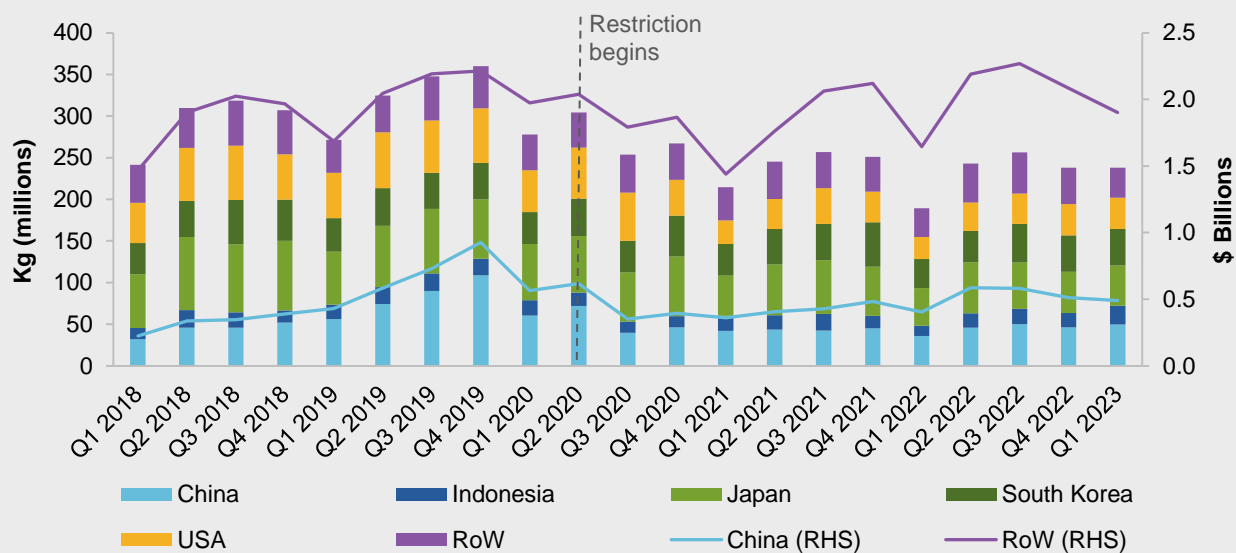


Box C.2 – The effect of China’s trade measures on Australian exports

Exports of coal diverted to India and Japan, and prices increased in 2021



Beef exports were hardly disrupted because the measure was limited to a small number of abattoirs



Source: ABS 2023 (International Merchandise Trade: Customised Report).

C.2 The broader impacts of coercive trade measures

The effect of China's trade measures on some Australian exporters could have had broader implications on the Australian and world economy after businesses, consumers, governments, workers and capital owners adjusted to changes in the trade environment. The Productivity Commission modelled the economy-wide effects of the trade measures. This section presents the results of this modelling.

Modelling isolates the effects of the modelled change from all other effects. The data analysed in section C.1, which shows observed trade outcomes, reflects everything that occurred over the period examined, for example, changes in supplies or demand that are not related to the policies under investigation. Although the modelling results illustrate the effects of the modelled changes holding everything else constant, they are predicated on the many simplifying assumptions and data that underlies the model. They do not include the transition costs of adjustments.¹⁹ Conceptually, they show the contribution of the trade measures to the changes observed in the data presented in section C.1. For these reasons, the modelling results in this section are best interpreted as illustrating the mechanisms at work and the orders of magnitude involved, as trade flows are reorganised across the world in response to the disruption modelled.

The results indicate how trade adjusts to the disruptions and that although some industries might have incurred significant costs as they adjusted, economy-wide and global effects tend to be limited. Although the actual restrictions took many different forms (table C.1), they are modelled here as a tax imposed on Australian exports of the relevant goods to China; the tax is calibrated to increase the tax-inclusive export price to the point of making the export prohibitive. The model is designed to illustrate how Australian and global production and trade reorganised to adapt to the disruption.

Modelling framework

The model used in this analysis is PC Global,²⁰ a computable general equilibrium (CGE) model of global trade based on version 9 of the Global Trade Analysis Project (GTAP) database.²¹ It augments the GTAP database and equations by accounting for bilateral capital flows and changes to global capital allocation in response to the modelled shock. The model is comparative-static and simulates how the allocation of each economy's capital stock (and all other variables) differs from that in the base case, in response to a modelled shock that changes the structure of trade and production across the world.

PC Global was used to model the impacts of a disruption in Australia's exports of cotton, lobster, coal, wine and wood to China.²² The results are presented in terms of percentage changes relative to the base case. They are best interpreted as indicating how a shock affects the global and national economies after industries, consumers, governments, workers and capital owners have adjusted to changes in the trade environment.

¹⁹ Such costs would have to be modelled explicitly as additional search, marketing, etc costs. Such modelling would be best done in a dynamic, year-on-year model, rather than in the comparative static framework used here.

²⁰ PC Global was used in the report on *Rising Protectionism: Challenges, Threats and Opportunities for Australia* (PC 2017b). The related Technical Supplement (PC 2017a) has more details.

²¹ The database represents the global economy in 2011. Although somewhat dated, the structure of global trade and of the Australian economy in the database are sufficient to illustrate the mechanisms at work and the relevant orders of magnitude.

²² These are represented by the following four GTAP categories: (7) Plant-based fibres, (14) Fishery, (15) Coal, (26) Beverages and tobacco products and (30) Wood products. Although some might be broader than the specific goods affected, they are reasonable approximations for the purposes of the simulation, especially since the specific goods account for a large proportion of the broader good in terms of the trade flows to China.

Effect on exports and outputs

In the model, China's prohibitive tariffs reduce the prices that Australian producers receive and leads Australian exporters to reallocating production to domestic and foreign markets. The value of Australian exports of the five affected goods declines. This leads to a reduction in outputs and a reallocation of resources away from the production of these goods (table C.2).

Table C.2 – Effect on Australian exports and production

Changes in volumes from base case, %

	Exports to the RoW	Exports to the world ^a	Australian production
Cotton (Plant-based fibres)	1.431	-57.494	-46.747
Seafood (Fishery)	1.144	-13.644	-2.522
Coal	2.074	-6.955	-5.674
Wine (Beverages and tobacco products)	0.526	-7.637	-1.399
Wood (Wood products)	1.656	-18.845	-1.766

RoW = countries other than China. a. Exports to the world is the weighted average of decreases in exports to China (-100%) and increases in exports to the RoW.

Source: Productivity Commission estimates.

In the simulation, the prohibitive tariff reduces the value of Australia's total exports to China by 6.701% (table C.3). As China's demand for Australian exports declines, prices decline. This makes the targeted exports more attractive to other trading partners, who increase demand for Australian exports by 2.192%. This trade diversion results in a small decline in the value of Australia's total exports of only 0.194%. Globally, there is no appreciable net effect on trade, but there is some reallocation, as China's imports from other sources increase (about 0.307%).

Table C.3 – Effects on bilateral trade

Changes in values from base case, %

Exporter ↓ / Importer →	Australia	China	RoW	World
Australia	..	-6.701	2.192	-0.194
China	-0.567	..	-0.039	-0.050
RoW	-0.549	0.307	-0.022	–
World	-0.552	-0.035	0.002	-0.008

– Nil or rounded to zero.

Source: Productivity Commission estimates.

Effect of disruption on the Australian economy

There are several aggregate indicators of changes in the broader economy (box C.3). The reduction of China's demand for the affected Australian products reduces the demand for inputs to these products, which in turn reduces their price, and therefore the cost of production in Australia. This makes Australian products cheaper in world markets: lower production of exports to China is offset by higher production of exports to other destinations. Increased production attracts foreign capital. The inflow of foreign capital offsets the

decline in gross domestic product (GDP) that would have occurred, had there been no reallocation to other destinations. This small inflow of foreign capital means that Australia's real GDP remains stable (decrease of 0.009%, table C.4). With more foreign capital, total returns to foreign capital (payments to foreigners) increase, and as a result, Australia's real income (gross national product, or GNP) falls slightly by 0.011%. The fall in Australian export prices implies a deterioration of Australia's terms of trade (-0.37%), and a fall in the purchasing power of national income. As a result, Australia's real national expenditure (gross national absorption, GNA) declines by 0.081%.

Box C.3 – GDP, GNP and GNA

With capital reallocating across economies, it is important to distinguish between changes in activity (as measured by real GDP) and changes in income (real GNP). Further, changes in relative prices change the purchasing power of incomes – this is measured as changes in real GNA. Each measure is 'real' in that the nominal value is deflated by the appropriate deflator.

GDP – gross domestic product – accounts production activity. Its change is calculated as the change in the sum of the value added of industries, which in turn change as labour and capital are reallocated across industries. It is also a measure of income generated within an economy, that is, the sum of returns to labour and capital used in production. Changes in real GDP are obtained by deflating the change in the nominal value by the weighted changes in wages and in returns to capital used in the production GDP.

GNP – gross national product – accounts for all income that accrues to an economy, including net income transfers from abroad. PC National accounts explicitly for the bilateral ownership of capital. Any changes in the way capital owners allocate their capital stock across the world changes net returns to capital to an economy. Changes in real GNP are obtained by deflating the change in the nominal value by the weighted changes in wages and in returns to capital, including changes in returns to foreign capital that residents own.

GNA – gross national absorption – is a measure of how much residents in an economy spend on private and government current consumption and investment expenditures. In nominal terms, it is equal to GNP. Changes in real GNA are obtained by deflating the nominal value by changes in the prices of goods and services that are included in private and government consumption and investment expenditures, including changes in the terms of trade and foreign investment.

Source: PC (2017a); Zhang (2019).

Overall, reducing Australia's exports of the affected products results in a reorganisation of economic activity globally and within Australia. Although there are some costs, they are relatively small once all economies have adjusted to the new relative prices. Within Australia, the most noticeable effects are that resources are reallocated from the affected producers in the primary sector to the rest of the economy. The 1.421% decrease in output in the primary production sector is a combination of the decrease in activity for the producers of the affected products offset by an increase in activity for the other primary producers. The reallocation of resources out of the primary sector increases manufacturing output (0.369%).

Despite relatively small economy-wide adjustments, adjustments for the targeted producers are relatively large. The analysis does not take into account the costs to those directly targeted businesses of seeking new

markets. That said, the simulation shows that a flexible international trading system is important in facilitating the adjustments required to minimise the effects of the original disruption.

Table C.4 – Effects on aggregate indicators

Changes from base case

Indicator	% Change
Real GDP	-0.009
Real GNP	-0.011
Real GNA	-0.081
Primary production sector output	-1.421
Manufacturing sector output	0.369
Service sector output	-0.056
Exports	-0.195
Imports	-0.547
Domestic demand	-0.023
Capital inflow	0.007
Capital outflow	-0.025
Terms of trade	-0.370
Real exchange rate	-0.329

Source: Productivity Commission estimates.

D. Assistance estimates

A spreadsheet with the assistance estimates data is available online at: www.pc.gov.au/ongoing/trade-assistance/2021-22.

Abbreviations

A-UK FTA	Australia-United Kingdom Free Trade Agreement
ABS	Australian Bureau of Statistics
ACCU	Australian carbon credit unit
AHECC	Australian Harmonized Export Commodity Classification
AI-ECTA	Australia-India Economic Cooperation and Trade Agreement
ANZSIC	Australian and New Zealand Standard Industrial Classification
ANZCERTA	Australia-New Zealand Closer Economic Relations Trade Agreement
APEC	Asia-Pacific Economic Cooperation
ARENA	Australian Renewable Energy Agency
ASBFEO	Australian Small Business and Family Enterprise Ombudsman
ASEAN	Association of Southeast Asian Nations
ATO	Australian Taxation Office
CBAM	Carbon Border Adjustment Mechanism
CBT	carbon border tariff
CCUS	carbon capture use and storage
CGE	computable general equilibrium
CECA	Comprehensive Economic Cooperation Agreement
CEFC	Clean Energy Finance Corporation
CHIPS Act	Creating Helpful Incentives to Produce Semiconductors Act (US)
CN	competitive neutrality
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CO₂-e	carbon dioxide equivalent
COVID-19	Coronavirus Disease 2019
CPTPP	Comprehensive and Progressive Agreement for Trans-Pacific Partnership
DAFF	Department of Agriculture, Fisheries and Forestry
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DFAT	Department of Foreign Affairs and Trade
DISER	Department of Industry, Science and Resources
DITRDC	Department of Infrastructure, Transport, Regional Development, Communications and the Arts
DSB	Dispute Settlement Body
ECTA	Australia-India Economic Cooperation and Trade Agreement

EFA	Export Finance Australia
EFIC	Export Finance and Insurance Corporation
EITE	emissions-intensive trade-exposed industry
ETS	emissions trading scheme
EV	electric vehicle
FDI	foreign direct investment
FIRB	Foreign Investment Review Board
FTA	free trade agreement
GDP	gross domestic product
GTAP	Global Trade Analysis Project
GNP	gross national product
GNA	gross national absorption
GST	goods and services tax
IAWO	instant asset write off
IC	Industry Commission
IEA	International Energy Agency
IGVA	industry gross value added
IT	information technology
LTRSB	lower tax rate for small businesses
LNG	liquefied natural gas
MPIA	Multi-Party Interim Appeal Arbitration Arrangement
MW	megawatt
NAIF	Northern Australia Infrastructure Facility
NHFIC	National Housing Finance and Investment Corporation
NRF	National Reconstruction Fund
NBN co	National Broadband Network Company Limited
PACER	Pacific Agreement on Closer Economic Relations
PTA	preferential trade agreement
R&D	research and development
RBA	Reserve Bank of Australia
RCEP	Regional Comprehensive Economic Partnership
RET	renewable energy target
RIC	Regional Investment Corporation
SM	Safeguard Mechanism
STEM	science, technology, engineering, and mathematics
TAR	Trade and Assistance Review

TCS	tariff concession system
TFF	Term Funding Facility
UNSC	UN Security Council
UNCTAD	UN Conference on Trade and Development
WTO	World Trade Organization

References

- ABC News 2023, 'China reportedly gives green light to limited Australian coal imports after two-year ban', 5 January.
- ABS (Australian Bureau of Statistics) 2013, *Australian and New Zealand standard industrial classification (ANZSIC)*.
- 2023a, *5368.0 - International Trade in Goods and Services, March 2022*, Data release, Australian Government, Canberra.
- 2023b, *Spotlight on recent trends in freight costs*, Australian Government, Articles, <https://www.abs.gov.au/articles/spotlight-recent-trends-freight-costs> (accessed 3 July 2023).
- ACT Government 2021, *ACT Climate Change Strategy*.
- Albanese, A. and Bowen, C. (Prime Minister of Australia and Australian Government Minister for Climate Change and Energy) 2022, *Australia Legislates Emissions Reduction Targets*, Media Release, 8 September.
- APEC (Asia-Pacific Economic Cooperation) 2012, *Annex C - APEC List of Environmental Goods*, 2012 Leaders' Declaration, https://www.apec.org/Meeting-Papers/Leaders-Declarations/2012/2012_aelm/2012_aelm_annexC (accessed 11 July 2023).
- ARENA (Australian Renewable Energy Agency) 2022, *ARENA backs eight grid scale batteries worth \$2.7 billion*, <https://arena.gov.au/news/arena-backs-eight-grid-scale-batteries-worth-2-7-billion/> (accessed 6 May 2023).
- (Australian Renewable Energy Agency) 2023a, *\$41.5 million in funding for ultra low cost solar research*, Australian Renewable Energy Agency, <https://arena.gov.au/news/funding-for-ultra-low-cost-solar-research/> (accessed 6 May 2023).
- (Australian Renewable Energy Agency) 2023b, *Solar PV*, <https://arena.gov.au/renewable-energy/solar-pv-rd/> (accessed 6 May 2023).
- ASBFEO (Australian Small Business and Family Enterprise Ombudsman) 2023, *Contribution to Australian Gross Domestic Product*.
- ATO (Australian Taxation Office) 2023, *Taxation Statistics 2020-21*.
- Austrade (Australian Trade and Investment Commission) 2019, *Australian Critical Minerals Prospectus 2019*, Australian Government, Canberra.
- (Australian Trade and Investment Commission) 2022, *Australian Critical Minerals Prospectus 2022*, Australian Government.
- Australian Government 2022, *Australia's Nationally Determined Contribution*, Communication.
- 2023, *Carbon Capture, Use and Storage Hubs and Technologies Program – Technologies Stream*, <https://business.gov.au/grants-and-programs/carbon-capture-use-and-storage-hubs-and-technologies-program-technologies-stream> (accessed 6 June 2023).
- Australian Parliament 2021, *4. Applications to the CPTPP: the United Kingdom, China, Taiwan and South Korea*, Australian Government, Parliamentary Business, https://www.aph.gov.au/Parliamentary_Business/Committees/Joint/Foreign_Affairs_Defence_and_Trade/CPTPPMembership/Report/section?id=committees%2Freportjnt%2F024826%2F78218 (accessed 7 July 2023).
- Badlam, J., Clark, S., Gajendragadkar, S., Kumar, A., O'Rourke, S. and Swartz, D. 2022, 'The CHIPS and Science Act: Here's what's in it', New York, *McKinsey & Company*, 4 October.
- Baldwin, S. 2022, *Inflation Reduction Act Benefits: Electric Vehicle Tax Incentives For Consumers And U.S. Automakers*, <https://www.forbes.com/sites/energyinnovation/2022/09/07/inflation-reduction-act-benefits-electric-vehicle-tax-incentives-for-consumers-and-us-automakers/> (accessed 10 July 2023).
- Blenkinsop, P. 2023, *EU announces plans to lead green industrial revolution*, <https://www.reuters.com/business/sustainable-business/eu-unveil-plans-leadership-green-industrial-revolution-2023-03-16/> (accessed 10 July 2023).
- Bloomberg 2023, *Globalisation isn't dead, it needs a reset*, <https://sponsored.bloomberg.com/article/sc/globalisation-isn-t-dead-it-needs-a-reset?sref=Vefqd1fk> (accessed 11 July 2023).
- Bourke, L. 2023, "Disappointed": Australia and EU fail to resolve trade deadlock, pledge to resume talks in August', Sydney, *The Sydney Morning Herald*, 12 July, <https://www.smh.com.au/world/europe/australia-and-eu-fail-to-resolve-deadlock-pledge-to-resume-talks-in-august-20230711-p5dnk0.html> (accessed 12 July 2023).
- Bowen, C. and Watt, M. (Australian Government Minister for Climate Change and Energy and Australian Government Minister for Agriculture, Fisheries and Forestry) 2023, *Joint media release: \$20 million for technology to help farmers store carbon*, Media Release, 24 February.
- Bremmer, I., Tooze, A., Woods, N., Niall, F. and Szijjártó, P. 2023, 'Davos 2023: De-globalization or re-globalization?', Panel discussion, <https://www.weforum.org/podcasts/agenda-dialogues/episodes/de-globalization-or-re-globalization> (accessed 11 July 2023).
- Browne, B. and Swann, T. 2017, *Money for Nothing*, Discussion paper, The Australia Institute.
- Cao, L. and Greenville, J. 2021, *Understanding how China's tariff on Australian barley exports will affect the agricultural sector*, ABARES Research Report 20.14, Department of Agriculture, Water and the Environment.
- CEFC (Clean Energy Finance Corporation) 2022, *Annual Report 2021-22*.
- Chalmers, J., Bowen, C. and McAllister, J. 2023, *Hydrogen Headstart to power new jobs & industry*, Media release, Ministers: Treasury portfolio, <https://ministers.treasury.gov.au/ministers/jim-chalmers-2022/media-releases/hydrogen-headstart-power-new-jobs-industry> (accessed 11 July 2023).
- Clean Energy Council 2023, *Biden's clean energy arms race puts Australian economy on the back foot*, Media release.
- Clean Energy Regulator 2023a, *Emissions Reduction Fund methods*,

<https://www.cleanenergyregulator.gov.au/ERF/Pages/Method-development.aspx> (accessed 5 August 2023).

— 2023b, *The Safeguard Mechanism*, <https://www.cleanenergyregulator.gov.au/NGER/The-safeguard-mechanism> (accessed 5 August 2023).

Collins, J. (Minister for Housing, Minister for Homelessness, and Minister for Small Business) 2023, *Albanese Government finalises HomeBuilder extension*, Media release, 23 June.

Cook, J.A. and Lin Lawell, C.-Y.C. 2020, 'Wind Turbine Shutdowns and Upgrades in Denmark: Timing Decisions and the Impact of Government Policy', *The Energy Journal*, vol. 41, no. 3.

CSIRO (Commonwealth Scientific and Industrial Research Organisation) 2023, *Hydrogen-related public support programs & initiatives*, <https://research.csiro.au/hyresource/funding/> (accessed 19 May 2023).

DAFF (Department of Agriculture, Fisheries and Forestry) 2022, *Annual Report 2021-22*.

DCCEEW (Department of Climate Change, Energy, the Environment and Water) 2023a, *Hydrogen Headstart program*, Australian Government, <https://www.dcceew.gov.au/energy/hydrogen/hydrogen-headstart-program> (accessed 5 July 2023).

— (Department of Climate Change, Energy, the Environment and Water) 2023b, *Safeguard Mechanism Reforms: Position Paper*.

— (Department of Climate Change, Energy, the Environment and Water) 2023c, *State of Hydrogen 2022*.

Department for Environment and Water (SA) 2021, *South Australia's greenhouse gas emissions reporting*, <https://www.environment.sa.gov.au/topics/climate-change/greenhouse-gas-emissions> (accessed 31 May 2023).

Department of Energy nd, *Homeowner's Guide to the Federal Tax Credit for Solar Photovoltaics*, Department of Energy, United States, <https://www.energy.gov/eere/solar/homeowners-guide-federal-tax-credit-solar-photovoltaics> (accessed 10 July 2023).

Department of Finance 2023, *Australian Government Cost Recovery Policy*.

DFAT (Department of Foreign Affairs and Trade) 2016, *Environmental Goods Agreement*, Australian Government, <https://www.dfat.gov.au/news/news/Pages/environmental-goods-agreement> (accessed 11 July 2023).

— (Department of Foreign Affairs and Trade) 2022a, *Australia-Gulf Cooperation Council (GCC) FTA*, Australian Government, <https://www.dfat.gov.au/trade/agreements/trade-agreements/ftas-under-consideration/australia-gulf-cooperation-council-gcc-fta> (accessed 11 July 2023).

— (Department of Foreign Affairs and Trade) 2022b, *Australia's free trade agreements (FTAs)*, Australian Government, <https://www.dfat.gov.au/trade/agreements/trade-agreements> (accessed 24 March 2022).

— (Department of Foreign Affairs and Trade) 2022c, *Country and commodity pivot table 2005-06 to 2020-21*, Australian Government, <https://www.dfat.gov.au/about-us/publications/trade-statistical-pivot-tables> (accessed 6 May 2022).

— (Department of Foreign Affairs and Trade) 2022d, *Framework Agreement between the European Union and Australia*, Australian Government, [https://www.dfat.gov.au/geo/europe/european-union/australia-](https://www.dfat.gov.au/geo/europe/european-union/australia-european-union-eu-framework-agreement)

[european-union-eu-framework-agreement](https://www.dfat.gov.au/geo/europe/european-union/australia-european-union-eu-framework-agreement) (accessed 11 July 2023).

— (Department of Foreign Affairs and Trade) 2023a, *Australia-EU FTA - Report on 15th negotiating round, 24-28 April 2023*, Australian Government, FTAs under negotiation, <https://www.dfat.gov.au/trade/agreements/negotiations/aeufta/aeufta-news/negotiating-round-fifteen-24-28-april-2023> (accessed 7 July 2023).

— (Department of Foreign Affairs and Trade) 2023b, *Australia-India Comprehensive Economic Cooperation Agreement (CECA)*, Australian Government, FTAs under negotiation, <https://www.dfat.gov.au/trade/agreements/negotiations/aifta/australia-india-comprehensive-economic-cooperation-agreement> (accessed 7 July 2023).

— (Department of Foreign Affairs and Trade) 2023c, *Australia-India Economic Cooperation and Trade Agreement (ECTA)*, Australian Government, Free trade agreements in force, <https://www.dfat.gov.au/trade/agreements/in-force/australia-india-ecta> (accessed 7 July 2023).

— (Department of Foreign Affairs and Trade) 2023d, *Australia-India trade negotiations - Make a submission*, Australian Government, FTAs under negotiation, <https://www.dfat.gov.au/trade/agreements/negotiations/aifta/submissions/australia-india-trade-negotiations-make-submission> (accessed 11 July 2023).

— (Department of Foreign Affairs and Trade) 2023e, *Australia-United Kingdom Free Trade Agreement*, Australian Government, Free trade agreements in force, <https://www.dfat.gov.au/trade/agreements/not-yet-in-force/aukfta> (accessed 24 March 2022).

— (Department of Foreign Affairs and Trade) 2023f, *Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP): CPTPP post implementation review: Call for submissions*, Australian Government, Trade and Investment, <https://www.dfat.gov.au/trade/agreements/in-force/cptpp/comprehensive-and-progressive-agreement-for-trans-pacific-partnership> (accessed 7 July 2023).

— (Department of Foreign Affairs and Trade) 2023g, *Trade in Services Agreement (TiSA)*, Australian Government.

— (Department of Foreign Affairs and Trade) nd, *Sanctions regimes*, <https://www.dfat.gov.au/international-relations/security/sanctions/sanctions-regimes> (accessed 22 June 2023).

DISR (Department of Industry, Science and Resources) 2022a, *Australia's Critical Minerals Strategy: Discussion Paper*, Canberra.

— (Department of Industry, Science and Resources) 2022b, *National Reconstruction Fund: Diversifying and transforming Australia's industry and economy*, Australian Government, <https://www.industry.gov.au/news/national-reconstruction-fund-diversifying-and-transforming-australias-industry-and-economy> (accessed 11 July 2023).

— (Department of Industry, Science and Resources) 2023a, *Critical Minerals Strategy 2023-2030*, Australian Government, Canberra, pp. 1–64.

— (Department of Industry, Science and Resources) 2023b, *National Battery Strategy: Issues Paper*, Australian Government, Canberra, pp. 1–21.

— (Department of Industry, Science, Energy and Resources) 2021a, *Annual Report 2020-2021*.

- (Department of Industry, Science, Energy and Resources) 2021b, *State of Hydrogen 2021*.
- (Department of Industry, Science, Energy and Resources) 2022c, *Funding ultra low cost solar technology*, <https://www.energy.gov.au/news-media/news/funding-ultra-low-cost-solar-technology> (accessed 1 May 2022).
- DITRDC (Department of Infrastructure, Transport, Regional Development and Communication) 2022, *Annual Report 2021-22*.
- Dziedzic, S., Breen, F. and Miles, D. 2023, 'China will resume Australian timber trade imports from Thursday, ambassador says', *ABC News*.
- Easley, M. 2023, *U.S. Begins Forging Rare Earth Supply Chain*, <https://www.nationaldefensemagazine.org/articles/2023/2/10/u-s-begins-forging-rare-earth-supply-chain> (accessed 3 July 2023).
- EFA (Export Finance Australia) 2022, *Annual report 2021-22*.
- Estevadeordal, A., Frantz, B. and Taylor, A. 2003, 'The rise and fall of world trade, 1870-1939', *The Quarterly Journal of Economics*, vol. 118, no. 2, pp. 359–407.
- European Commission 2011, *Tackling the Challenges in Commodity Markets and on Raw Materials*, European Commission, Brussels.
- 2014, *On the review of the list of critical raw materials for the EU and the implementation of the Raw Materials Initiative*, European Commission, Brussels.
- 2017, *On the 2017 list of Critical Raw Materials for the EU*, European Commission, Brussels.
- 2020, *Critical Raw Materials Resilience: Charting a Path towards greater Security and Sustainability*, Brussels.
- 2021, *Carbon leakage*, https://ec.europa.eu/clima/eu-action/eu-emissions-trading-system-eu-ets/free-allocation/carbon-leakage_en (accessed 15 September 2022).
- 2022, *European Chips Act - Questions and Answers*, https://ec.europa.eu/commission/presscorner/detail/en/QANDA_22_730 (accessed 11 July 2023).
- 2023a, *Establishing a framework for ensuring a secure and sustainable supply of critical raw materials and amending Regulations (EU) 168/2013, (EU) 2018/858, 2018/1724 and (EU) 2019/1020*, European Commission, Brussels.
- 2023b, *Net-Zero Industry Act: Making the EU the home of clean technologies manufacturing and green jobs*, 16 March, European Commission.
- European Council 2023, *Chips Act: Council and European Parliament strike provisional deal*.
- Farell, D. 2022, *Trade deal unlocks access to India*, Media release, Minister for Trade and Tourism; Special Minister of State.
- 2023, *UK trade deal delivers from today*, Media release, Minister for Trade and Tourism; Special Minister of State.
- and Albanese, A. 2022, *Trade deal with India delivers from 29 December*, Australian Government, Minister for Trade and Tourism; Special Minister of State.
- Feenstra, R., Inklaar, R. and Timmer, M. 2015, 'The next generation of the Penn World Table', *American Economic Review*, vol. 105, no. 10, pp. 3150–3182.
- FIRB (Foreign Investment Review Board) 2021, *Annual Report 2020-21*, pp. 1–64.
- (Foreign Investment Review Board) 2023a, *Guidance Note 10: Fees on Foreign Investment Applications*, Australian Government.
- (Foreign Investment Review Board) 2023b, *Quarterly Report on Foreign Investment - 1 October to 31 December 2022*.
- Georgaris, K. 2023, *Remote work and the globalization of services*, Toptal Insights, <https://www.toptal.com/insights/rise-of-remote/globalization-of-services> (accessed 5 July 2023).
- Geoscience Australia 2023, *Critical Minerals at Geoscience Australia*, Geoscience Australia, <https://www.ga.gov.au/scientific-topics/minerals/critical-minerals> (accessed 12 July 2023).
- Gleeson, T., Addai, D. and Cao, L. 2021, *Australian wine in China: Impact of China's anti-dumping duties*, Australian Bureau of Agricultural and Resource Economics and Sciences, Department of Agriculture, Water and the Environment.
- Grenville, S. 2020, *Globalisation: The drawbridge has been raised, but not permanently*, Lowy Institute, <https://interactives.lowyinstitute.org/features/covid19/issues/globalisation/> (accessed 11 July 2023).
- Grossman, G.M. and Helpman, E. 1994, 'Protection for Sale', *American Economic Association, The American Economic Review*, vol. 84, no. 4, pp. 833–850.
- GTP (Geneva Trade Platform) 2022, *Multi-Party Interim Appeal Arbitration Arrangement (MPIA)*.
- Gu, H. 2022, 'China buying more Australian wheat than ever despite trade row', *Bloomberg*, 21 November.
- Hastie, H. 2023, *WA to enshrine pollution targets in law – but they won't be enforced*.
- Honan, K., Bernasconi, A. and Felton-Taylor, A. 2023, *Australian beef producers confident China trade suspensions will be lifted soon*, Press release, 10 February, ABC News.
- Hopewell, K. 2021, 'EU the new kingpin in global trade order', *The Interpreter*, 15 July.
- Husic, E. (Minister for Industry and Science) 2022, *National Reconstruction Fund Corporation Bill 2022*, Explanatory Memorandum.
- IC (Industry Commission) 1992, *Costs and Benefits of Reducing Greenhouse Gas Emissions*, Report no. 15, Canberra.
- (Industry Commission) 1997, *The Textiles, Clothing and Footwear Industries*, Report no. 59, Canberra.
- IEA (International Energy Agency) 2020, *ETS in industry – Implementing Effective Emissions Trading Systems – Analysis*, <https://www.iea.org/reports/implementing-effective-emissions-trading-systems/ets-in-industry> (accessed 5 July 2023).
- (International Energy Agency) 2022, *Coal 2022: Analysis and forecast to 2025*.
- Internal Revenue Service nd, *Credits for New Clean Vehicles Purchased in 2023 or After*, Internal Revenue Service, <https://www.irs.gov/credits-deductions/credits-for-new-clean-vehicles-purchased-in-2023-or-after> (accessed 10 July 2023).
- International Energy Agency 2023, *Global EV Outlook 2023 - Catching Up With Climate Ambitions*, International Energy Agency.
- Investment NSW 2023, *Case study: Australia's first lithium-ion battery manufacturer*.

- Jackson, L. and Patton, D. 2023, 'Australian cotton clears Chinese customs on bets sanctions will end', *ABC News*, 22 February.
- Kenton, W. 2021, *What is the Smoot-Hawley Tariff Act? History, effect and reaction*, Investopedia, <https://www.investopedia.com/terms/s/smoot-hawley-tariff-act.asp> (accessed 11 July 2023).
- Kerr, W.R. and Robert-Nicoud, F. 2020, 'Tech Clusters', *Journal of Economic Perspectives*, vol. 34, no. 3, pp. 50–76.
- Klasing, M. and Milionis, P. 2014, 'Quantifying the evolution of world trade, 1870-1949', *Journal of International Economics*, vol. 92, no. 1, pp. 185–197.
- Krugman, P.R. 1991, *Geography and trade*, Gaston Eyskens lecture series, Leuven University Press ; MIT Press, Leuven, Belgium : Cambridge, Mass.
- Leonard, H.J. 1988, *Pollution and the struggle for the world product: multinational corporations, environment, and international comparative advantage*, Cambridge University Press, Cambridge [England] ; New York.
- Macintosh, A., Butler, D. and Evans, M.C. 2022, 'We blew the whistle on Australia's central climate policy. Here's what a new federal government probe must fix', *The Conversation*, 1 July.
- Majeed, O. and Breunig, R. 2021, *Determinants of innovation novelty: Evidence from Australian administrative data*, Working Paper, Tax and Transfer Policy Institute, The Australian National University, Canberra, pp. 1–48.
- Maschek, W., Kirk, M., Serentschy, G., Liberatore, F., Economides, C. and Cimino, F.Z. 2022, *The European Chips Act: Reducing Europe's Dependence on Third-country Semiconductors?*, Squire Patton Boggs.
- McKinsey 2022, *The Inflation Reduction Act: Here's what's in it*.
- Moens, B. and de Lorenzo, D. 2023, 'EU nears endgame of trade talks with Australia', United States of America, *Politico*, 24 April.
- NAIF (Northern Australia Infrastructure Facility) 2022, *Annual report 2021-22*.
- NHFIC (National Housing Finance and Investment Corporation) 2022, *Annual Report 2021-22*.
- Northern Territory Government 2020, *Northern Territory Climate Change Response: Towards 2050*.
- NSW Government 2023, *NSW Climate Change Adaptation Strategy*.
- OECD (Organisation for Economic Cooperation and Development) 2023, *Inclusive Forum on Carbon Mitigation Approaches*, <https://www.oecd.org/climate-change/inclusive-forum-on-carbon-mitigation-approaches/> (accessed 5 July 2023).
- Pauwelyn, J. 2023, 'The WTO's Multi-Party Interim Appeal Arbitration Arrangement (MPIA): What's new?', *World Trade Review*, pp. 1–9.
- PC (Productivity Commission) 2011, *Carbon Policy Assistance Reviews: the Commission's Tasks*, Consultation Paper, Canberra.
- (Productivity Commission) 2012, *Australia's Export Credit Arrangements*, Inquiry Report, 31 May, 58.
- (Productivity Commission) 2016a, *Developments in Anti-Dumping Arrangements*, Commission Research Paper, Canberra.
- (Productivity Commission) 2016b, *Regulation of Australian Agriculture*, Report no. 79, Canberra.
- (Productivity Commission) 2017a, *Modelling protectionist trade policies*, Rising Protectionism Technical Supplement to the Research Paper.
- (Productivity Commission) 2017b, *Rising Protectionism: Challenges, threats and opportunities for Australia*, Commission Research Paper, Canberra.
- (Productivity Commission) 2021a, *Trade and Assistance Review 2019-20*, Annual Report Series, Canberra.
- (Productivity Commission) 2021b, *Vulnerable Supply Chains*, Study Report.
- (Productivity Commission) 2022a, *NBN Co*, November, Australian Government Competitive Neutrality Complaints Office.
- (Productivity Commission) 2022b, *The nuisance cost of tariffs*, Research paper, Canberra.
- (Productivity Commission) 2022c, *Trade and Assistance Review: Methodological annex*, Annual Report Series, Canberra.
- (Productivity Commission) 2023a, *5-year Productivity Inquiry: Advancing Prosperity Recommendations and Reform Directives*, Inquiry Report no. 100, Canberra.
- (Productivity Commission) 2023b, *5-year Productivity Inquiry: Advancing Prosperity*, Inquiry Report no. 100, Vol. 1, Canberra.
- (Productivity Commission) 2023c, *5-year Productivity Inquiry: Managing the climate transition*, Inquiry Report no. 100, Vol. 6, Canberra.
- Poljak, V. and Tran, J. 2023, 'Debele bemoans distortion created by Biden's \$US1trn green bill', Sydney, *Australian Financial Review*, 15 February.
- Queensland Government 2021, *Queensland Climate Action*, <https://www.des.qld.gov.au/climateaction/home> (accessed 31 May 2023).
- RBA (Reserve Bank of Australia) 2021a, *Box B: Supply chains during the COVID-19 pandemic*, Statement on Monetary Policy - May 2021, <https://www.rba.gov.au/publications/smp/2021/may/box-b-supply-chains-during-the-covid-19-pandemic.html> (accessed 3 July 2023).
- (Reserve Bank of Australia) 2021b, *Term Funding Facility to Support the Australian Economy*.
- (Reserve Bank of Australia) 2022, *Statement on Monetary Policy, November 2022*, Australian Government, Sydney, pp. 1–85.
- (Reserve Bank of Australia) 2023a, *Composition of the Australian Economy: Snapshot 5 July 2023*, Fact sheet, Reserve Bank of Australia, Sydney, p. 1.
- (Reserve Bank of Australia) 2023b, *Interest rates and yields - money market*.
- (Reserve Bank of Australia) 2023c, *Statement on Monetary Policy: May 2023*, Australian Government, Sydney, pp. 1–84.
- Reinsch, W., Benson, E. and Puga, C. 2021, *Environmental Goods Agreement: A New Frontier or an Old Stalemate?*, Center for Strategic and International Studies, pp. 1–23.
- Reputex Energy 2019, *The Cost of Net-Zero Emissions Under Paris: A Marginal Abatement Cost (MAC) curve for Australia*.

- RIC (Regional Investment Corporation) 2022, *Annual report 2021-22*.
- Shearing, N. 2023, *World economy is fracturing, not deglobalizing*, Chatham House, <https://www.chathamhouse.org/2023/02/world-economy-fracturing-not-deglobalizing> (accessed 5 July 2023).
- Smyth, J. 2023, 'Big Pharma lobbies for "Chips Act" style tax breaks', *Financial Times*, 20 March.
- Spooner, D. 2008, *National Greenhouse and Energy Reporting Amendment Bill 2008*, Bills Digest, Parliamentary Library.
- Statista 2023, *Iron ore price worldwide from September 2016 to May 2023*, US dollars per dry metric tonne, <https://www.statista.com/statistics/300419/monthly-iron-ore-prices/> (accessed 11 July 2023).
- Sullivan, K. and Prendergast, J. 2023, 'Australia's live rock lobster trade with China hoped to restart', *ABC News*, 9 February.
- Talberg, A. and Swoboda, K. 2013, *Emissions trading schemes around the world*, Department of Parliamentary Services.
- Tasmanian Government 2021, *Reducing our greenhouse gas emissions*, https://www.stategrowth.tas.gov.au/recfit/climate/reducing_our_emissions (accessed 6 May 2023).
- Taylor, A. and Wilson, T. (Minister for Industry and Assistant Minister to the Minister for Industry, Energy and Emissions Reduction) 2022, *New investment in innovative Australian soil carbon measurement technology*, Media Release, 1 March.
- Tehan, D. 2022, *Expanding trade and investment with the United Arab Emirates*, Australian Government, (Former) Minister for Trade, Tourism and Investment.
- The Economist 2013, 'Hyperglobalisation and metropolitan gravity', *The Economist*.
- 2019, 'Globalisation is dead and we need to invest a new world', 28 June.
- The Treasury 2023, *Tax expenditures and insights statement*, Canberra.
- The White House 2022, *FACT SHEET: CHIPS and Science Act Will Lower Costs, Create Jobs, Strengthen Supply Chains, and Counter China*, Statements and Releases.
- 2023, *Building a Clean Energy Economy: A Guidebook to the Inflation Reduction Act's Investments in Clean Energy and Climate Action*, US Government, Washington, D.C., pp. 1–184.
- Titievskaia, J. 2021, *International trade dispute settlement: WTO Appellate Body crisis and the multiparty interim appeal arrangement*, 14 April, European Parliamentary Research Service.
- Treasury (Treasury) 2022, *Treasury Annual Report*, Annual Report, 6 October, Commonwealth of Australia.
- UN (United Nations) 2023, *One year of the war in Ukraine leaves lasting scars on the global economy*, Department of Economic and Social Affairs, <https://www.un.org/en/desa/one-year-war-ukraine-leaves-lasting-scars-global-economy> (accessed 30 June 2023).
- UNCTAD (United Nations Conference on Trade and Development) 2022, *United States of America - \$369 billion in investment incentives to address energy security and climate change*, <https://investmentpolicy.unctad.org/investment-policy-monitor/measures/4004/-369-billion-in-investment-incentives-to-address-energy-security-and-climate-change-> (accessed 10 July 2023).
- US Department of Energy 2022, *The Inflation Reduction Act Drives Significant Emissions Reductions and Positions America to Reach our Climate Goals*, Fact sheet, US Government, Washington, D.C., pp. 1–6.
- US Department of the Treasury 2023, *Treasury Department Releases Guidance to Boost American Clean Energy Manufacturing*, 12 May, US Department of the Treasury.
- US Geological Survey 2018, *Interior Releases 2018's Final List of 35 Minerals Deemed Critical to U.S. National Security and the Economy* | U.S. Geological Survey, <https://www.usgs.gov/news/national-news-release/interior-releases-2018s-final-list-35-minerals-deemed-critical-us> (accessed 26 June 2023).
- 2022, *US Geological Survey Releases 2022 List of Critical Minerals*, <https://www.usgs.gov/news/national-news-release/us-geological-survey-releases-2022-list-critical-minerals> (accessed 26 June 2023).
- US Government 2023, *Inflation Reduction Act Guidebook*, Guidebook, The White House, Washington, D.C., pp. 1–184.
- (Office of the United States Trade Representative) n.d., *Trade in Services Agreement*, <https://ustr.gov/TiSA> (accessed 23 March 2022).
- Varas, A., Varadarajan, R., Goodrich, J. and Yinug, F. 2021, *Strengthening the Global Semiconductor Supply Chain in an Uncertain Era*, Boston Consulting Group, Boston, pp. 1–53.
- Victoria State Government 2023, *Climate action targets*, <https://www.climatechange.vic.gov.au/climate-action-targets> (accessed 31 May 2023).
- Weaver, J.F. 2022, *What's in the Inflation Reduction Act for the solar industry?*, <https://www.pv-magazine.com/2022/08/15/whats-in-the-inflation-reduction-act-for-the-solar-industry/> (accessed 10 July 2023).
- White House and Prime Minister of Australia 2023, *Australia-United States Joint Leaders' Statement - An Alliance for our Times*, Press release, 20 May, The White House.
- Wong, P., Farrell, D. and Watt, M. 2023, *Step forward to resolve barley dispute with China*, Australian Government, press release.
- WTO (World Trade Organization) 2001, *Korea - Measures affecting imports of fresh, chilled and frozen beef*, https://www.wto.org/english/tratop_e/dispu_e/cases_e/ds169_e.htm (accessed 16 June 2022).
- (World Trade Organization) 2010a, *Australia - Certain Measures Affecting the Importation of Fresh Fruit and Vegetables*, https://www.wto.org/english/tratop_e/dispu_e/cases_e/ds270_e.htm (accessed 16 June 2022).
- (World Trade Organization) 2010b, *Australia - Certain Measures Affecting the Importation of Fresh Pineapple*, https://www.wto.org/english/tratop_e/dispu_e/cases_e/ds271_e.htm (accessed 16 June 2022).
- (World Trade Organization) 2010c, *Australia - Measures Affecting Importation of Salmon*, https://www.wto.org/english/tratop_e/dispu_e/cases_e/ds18_e.htm (accessed 16 June 2022).
- (World Trade Organization) 2010d, *Australia - Quarantine Regime for Imports*, https://www.wto.org/english/tratop_e/dispu_e/cases_e/ds287_e.htm (accessed 16 June 2022).
- (World Trade Organization) 2010e, *Australia - Subsidies Provided to Producers and Exporters of Automotive Leather DS106*,

https://www.wto.org/english/tratop_e/dispu_e/cases_e/ds106_e.htm (accessed 16 June 2022).

— (World Trade Organization) 2010f, *Australia - Subsidies Provided to Producers and Exporters of Automotive Leather DS126*, https://www.wto.org/english/tratop_e/dispu_e/cases_e/ds126_e.htm (accessed 16 June 2022).

— (World Trade Organization) 2010g, *Australia - Textile, Clothing and Footwear Import Credit Scheme*, https://www.wto.org/english/tratop_e/dispu_e/cases_e/ds57_e.htm (accessed 16 June 2022).

— (World Trade Organization) 2010h, *Hungary - Export Subsidies in respect of Agricultural Products*, https://www.wto.org/english/tratop_e/dispu_e/cases_e/ds35_e.htm (accessed 16 June 2022).

— (World Trade Organization) 2010i, *India - Quantitative Restrictions on Imports of Agricultural, Textile and Industrial Products*, https://www.wto.org/english/tratop_e/dispu_e/cases_e/ds91_e.htm (accessed 16 June 2022).

— (World Trade Organization) 2011, *Australia - Measures Affecting the Importation of Apples from New Zealand*, https://www.wto.org/english/tratop_e/dispu_e/cases_e/ds367_e.htm (accessed 16 June 2022).

— (World Trade Organization) 2016, *Australia - Certain Measures Concerning Trademarks and Other Plain Packaging Requirements Applicable to Tobacco Products and Packaging (Ukraine)*, https://www.wto.org/english/tratop_e/dispu_e/cases_e/ds434_e.htm (accessed 16 June 2022).

— (World Trade Organization) 2018a, *Australia - Certain Measures Concerning Trademarks, Geographical Indications and Other Plain Packaging Requirements Applicable to Tobacco Products and Packaging (Cuba)*, https://www.wto.org/english/tratop_e/dispu_e/cases_e/ds458_e.htm (accessed 16 June 2022).

— (World Trade Organization) 2018b, *Australia - Certain Measures Concerning Trademarks, Geographical Indications and Other Plain Packaging Requirements Applicable to Tobacco Products and Packaging (Indonesia)*, https://www.wto.org/english/tratop_e/dispu_e/cases_e/ds467_e.htm (accessed 16 June 2022).

— (World Trade Organization) 2020a, *Australia - Certain Measures Concerning Trademarks, Geographical Indications and Other Plain Packaging Requirements Applicable to Tobacco Products and Packaging (Dominican Republic)*, https://www.wto.org/english/tratop_e/dispu_e/cases_e/ds441_e.htm (accessed 16 June 2022).

— (World Trade Organization) 2020b, *Australia - Certain Measures Concerning Trademarks, Geographical Indications and Other Plain Packaging Requirements Applicable to Tobacco Products and Packaging (Honduras)*, https://www.wto.org/english/tratop_e/dispu_e/cases_e/ds435_e.htm (accessed 16 June 2022).

— (World Trade Organization) 2020c, *Australia - Measures Affecting the Importation of Salmonids*, https://www.wto.org/english/tratop_e/dispu_e/cases_e/ds21_e.htm (accessed 16 June 2022).

— (World Trade Organization) 2021, *Australia - Anti-Dumping Measures on A4 Copy Paper*, https://www.wto.org/english/tratop_e/dispu_e/cases_e/ds529_e.htm (accessed 16 June 2022).

— (World Trade Organization) 2022a, *Anti-dumping*, https://www.wto.org/english/tratop_e/adp_e/adp_e.htm#:~:text=The%20WTO%20Agreement%20does%20not,%E2%80%9C Anti%2Ddumping%20Agreement%E2%80%9D (accessed 11 April 2022).

— (World Trade Organization) 2022b, *Anti-dumping, subsidies, safeguards: contingencies, etc*, https://www.wto.org/english/thewto_e/whatis_e/tif_e/agrm8_e.htm?msclid=e572730bb97611ec894ef4247db7b256 (accessed 11 April 2022).

— (World Trade Organization) 2022c, *Appellate Body*, https://www.wto.org/english/tratop_e/dispu_e/appellate_body_e.htm (accessed 18 March 2022).

— (World Trade Organization) 2022d, *Australia - Anti-Dumping and Countervailing Duty Measures on Certain Products from China*, https://www.wto.org/english/tratop_e/dispu_e/cases_e/ds603_e.htm (accessed 22 March 2022).

— (World Trade Organization) 2022e, *DG Okonjo-Iweala: During these difficult times, the WTO 'cannot afford to stand aside'*, 2022 news, https://www.wto.org/english/news_e/news22_e/dgno_20dec22_e.htm (accessed 8 March 2023).

— (World Trade Organization) 2022f, *I-TIP Goods: Integrated analysis and retrieval of non-tariff measures*, <https://i-tip.wto.org/goods/> (accessed 11 April 2022).

— (World Trade Organization) 2022g, *Members continue push to commence Appellate Body appointment process*, https://www.wto.org/english/news_e/news22_e/dsb_28mar22_e.htm (accessed 1 April 2022).

— (World Trade Organization) 2022h, *Report of the TPRB from the Director-General on Trade-Related Developments*, Trade Policy Review Body, Geneva, pp. 1–70.

— (World Trade Organization) 2022i, *WTO reform - an overview*, https://www.wto.org/english/thewto_e/minist_e/mc12_e/briefing_notes_e/bfwtoreform_e.htm (accessed 5 July 2022).

— (World Trade Organization) 2023a, *Anti-Dumping Initiations by Reporting Member 01/01/1995-31/12/2022*, Geneva, p. 1.

— (World Trade Organization) 2023b, *Canada - Measures Governing the Sale of Wine*, https://www.wto.org/english/tratop_e/dispu_e/cases_e/ds537_e.htm (accessed 16 June 2022).

— (World Trade Organization) 2023c, *China - Anti-Dumping and Countervailing Duty Measures on Barley from Australia*, https://www.wto.org/english/tratop_e/dispu_e/cases_e/ds598_e.htm (accessed 11 July 2023).

— (World Trade Organization) 2023d, *China - Anti-Dumping and Countervailing Duty Measures on Wine from Australia*, https://www.wto.org/english/tratop_e/dispu_e/cases_e/ds602_e.htm (accessed 11 July 2023).

— (World Trade Organization) 2023e, *DG Okonjo-Iweala: Delivering meaningful outcomes at MC13 'not beyond our reach'*, General Council.

— (World Trade Organization) 2023f, *Dispute Settlement*, https://www.wto.org/english/tratop_e/dispu_e/dispu_e.htm (accessed 6 February 2023).

— (World Trade Organization) 2023g, *European Communities - Export subsidies on sugar*, https://www.wto.org/english/tratop_e/dispu_e/cases_e/ds265_e.htm (accessed 16 June 2022).

—— (World Trade Organization) 2023h, *European Communities - Protection of trademarks and geographical indications for agricultural products and foodstuffs*, https://www.wto.org/english/tratop_e/dispu_e/cases_e/ds290_e.htm (accessed 16 June 2022).

—— (World Trade Organization) 2023i, *Global Trade Outlook and Statistics*, Geneva.

—— (World Trade Organization) 2023j, *India - Measures Concerning Sugar and Sugarcane*, https://www.wto.org/english/tratop_e/dispu_e/cases_e/ds580_e.htm (accessed 22 March 2022).

—— (World Trade Organization) 2023k, *One Year of War in Ukraine: Assessing the Impact on Global Trade and Development*, Geneva.

—— (World Trade Organization) 2023l, *United States - Continued Dumping and Subsidy Offset Act of 2000*, https://www.wto.org/english/tratop_e/dispu_e/cases_e/ds217_e.htm (accessed 16 June 2022).

—— (World Trade Organization) 2023m, *United States - Safeguard Measure on Imports of Fresh, Chilled or Frozen Lamb from Australia*, https://www.wto.org/english/tratop_e/dispu_e/cases_e/ds178_e.htm (accessed 16 June 2022).

Zhang, X. 2019, *Using real expenditure to assess policy impacts*, Productivity Commission Staff Research Note, Canberra.

Zhou, C., Zelinka, M.D., Dessler, A.E. and Wang, M. 2021, 'Greater committed warming after accounting for the pattern effect', *Nature Climate Change*, vol. 11, no. 2, pp. 132–136.

Zhou, I. and Satherley, T. 2022, *Global trade risks and opportunities*, Australian Government, Parliament of Australia, https://www.aph.gov.au/About_Parliament/Parliamentary_departments/Parliamentary_Library/pubs/BriefingBook47p/GlobalTradeRisksAndOpportunities (accessed 10 July 2023).