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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/>

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Australian Government
Productivity Commission



Trade and assistance review 2020-21

Annual report series

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Foreword

Since 1974, the Commission and its predecessors have published an annual review of trade and assistance. In the early days of the *Trade and Assistance Review*, tariffs were the main form of assistance, imposing significant net costs on the Australian economy. Following several decades of reform, tariff assistance is now almost negligible and is far outweighed by budgetary assistance. The latter can have various effects on economic efficiency — while it can be motivated by a desire to address market failures, it distorts resource allocation and encourages rent-seeking behaviour which has its own direct costs and undermines innovation and productivity growth.

While the primary role of the *Review* has been to keep a record of assistance, an equally important role has been to view assistance in the context of the economic landscape of its time. These tasks are as vital and as challenging as ever, owing to three key developments.

First, the COVID-19 pandemic created a sudden and enormous disruption to the global economy and society. The Australian policy response has included major supports to businesses, which in 2020-21 were of an unprecedented scale. While the justification for these expenditures is well understood, they are not without risks: the discriminatory design of some assistance measures may have implications for resource allocation; and measures intended to provide temporary support risk outlasting their purpose and result in long-term costs.

Second, Australia's policy response to climate change has evolved over the past two decades, as has a global consensus, culminating in 2021 in adoption of the policy objective of reaching net-zero emissions by 2050. The justification for measures associated with the consequent energy transition are also well understood, but they will nonetheless entail ongoing risks in terms of both efficacy and efficiency, largely related to the design and choice of measures.

Third, global trade policy has seen a resurgence of protectionist sentiments, influenced by geopolitical volatility and national security concerns. While trade agreements continue to proliferate, there have been challenges to trading institutions, unilateral trade bans and tariff hikes, and increases to non-tariff barriers — all of which contribute to an uncertain environment. Many countries, including Australia, have moved toward more restrictive foreign investment regimes. Progress on the implementation of carbon border tariffs in Europe will also introduce further complexity in trade and risks to the free trade of goods and services across borders.

These changes in the global environment call for careful responses as Australia approaches full employment. In this phase, it is vital for Australian policy to aim to improve productivity, in part by minimising distortions to efficient resource allocation. It will also be important to leverage the benefits of open global trade and investment, including increased competition in product markets, reduced input costs, and the diffusion of innovation. Sound and transparent policy design and its implementation will be critical.

In this context, it will be of continuing importance that future issues of the *Review* provide an account of developments in assistance, trade and investment policy.

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1. Assistance estimates

Key points

- ✱ **The scope of the *Trade and Assistance Review 2020-21* (TAR) covers a period of exceptional economic circumstances brought on by COVID-19 and related policy responses.**
 - Not all COVID-19-related assistance programs fit the classification of *industry* or *trade assistance* captured by TAR. For instance, JobKeeper, Boosting Cashflow for Employers, Backing Business Investment, and the expansion of the Instant Asset Write-Off provided \$92 billion of broad assistance not designed to favour particular industries, sectors, types of businesses, or activities.
 - While these programs are excluded from estimates of industry assistance, they are noteworthy as context. The scale of JobKeeper and Boosting Cashflow for Employers in 2020-21 dominated all other Australian Government assistance during this period.
- ✱ **Excluding economy-wide COVID-19-related programs, there was still a material increase in assistance provided to industry compared with the previous year, rising to \$16.2 billion (compared with \$12 billion in the previous year).**
 - Existing programs grew by \$2.3 billion in 2020-21, and new programs contributed an additional \$1.8 billion. Almost 80 per cent of these new programs (\$1.4 billion) were undertaken in response to COVID-19
 - COVID-19-related assistance often took the form of industry-specific programs (such as those related to the manufacture of protective and preventive equipment), assistance to small business (such as the Regional Small Business Support Program) and funding to research and development.
- ✱ **The vast majority of assistance was provided through budgetary outlays and tax concessions, rather than through tariffs.**
 - Tariffs are increasingly narrow in their application, with benefits to particular industries (or parts thereof) being largely offset by costs to others through higher input prices. In the past five years, tariffs have declined in relevance as a form of assistance — this was exacerbated in 2020-21 by additional industry assistance in response to the COVID-19 pandemic.
 - No industry experienced a negative rate of net assistance, due to large increases in budgetary assistance across the board. However, many industries received negative rates of *tariff* assistance — particularly in the services sector and construction industry.
- ✱ **Estimated assistance varied widely by industry and sector.**
 - The services sector received the most assistance in absolute terms — about \$6.6 billion went to the services sector — both from COVID-19- and non-COVID-19-related programs. A much higher proportion of this assistance flowed to the transport and warehousing industry than in previous years, equivalent to \$1.2 billion (or 8 per cent of net assistance).

1.1 Introduction

The Australian Government assists industries and businesses through a broad range of programs, regulations and policies. Under s. 10 of the *Productivity Commission Act 1998* (Cwlth), the Commission has an obligation to report 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*. 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 recipient businesses, it invariably imposes costs on others.

- Subsidies must be funded through additional tax revenue, debt, or forgone government expenditure elsewhere.
- Tariffs increase the prices of imports and locally-produced substitutes, which affects consumers and business input users.
- Regulations can provide an implicit form of assistance, with implications for costs and prices. Examples include local procurement rules, often used in defence procurement policy, or statutory barriers to entry, such as applies to pharmacies.

Depending on their type and design, assistance can have varying effects on public wellbeing and the economy overall. The extent to which assistance is targeted or discriminatory (say, in favour of particular industries, sectors, types of businesses, or activities) will have implications for resource allocation in the economy.

The social and economic desirability of assistance varies. Some measures are intended to stimulate activities that markets under-provide (such as research and development, and certain environmental outcomes) and to promote social objectives. Others, like tariffs, unequivocally impose negative net impacts on the wider community. But whatever their net impacts, it is important to transparently monitor the magnitude and nature of measures that benefit industries — a task that the *Trade and Assistance Review* fulfils annually.

Accordingly, successive *Reviews* update and publish estimates of the assistance provided by:

- import tariffs
- budgetary outlays (predominantly subsidies, grants and concessional loans)
- tax concessions.

While the Commission sometimes considers regulations that provide assistance, it is not practical in this report to cover all regulation that might assist (or penalise) particular industries or businesses.

What is covered in this chapter?

This chapter presents an overview of the 2020-21 assistance estimates. The chapter:

- provides estimates of combined assistance to industry from tariffs, budgetary outlays and tax concessions, and examines effective rates of assistance (ERAs) for different industries (which indicate the amount of assistance an industry receives compared to its value added) (section 1.2)
- examines the assistance provided by tariffs in more detail, including by looking at which industries receive the greatest assistance from tariffs and which industries bear the greatest penalties (section 1.3)
- examines assistance provided by budgetary outlays and tax concessions (section 1.4).

This chapter should be read in conjunction with the *Methodological annex* and appendix B. The *Methodological annex* includes further detail on how the assistance estimates are produced and what types of assistance are typically within scope. Appendix B contains detailed tables of estimates covering four sectors and 34 industry groupings¹, which provide:

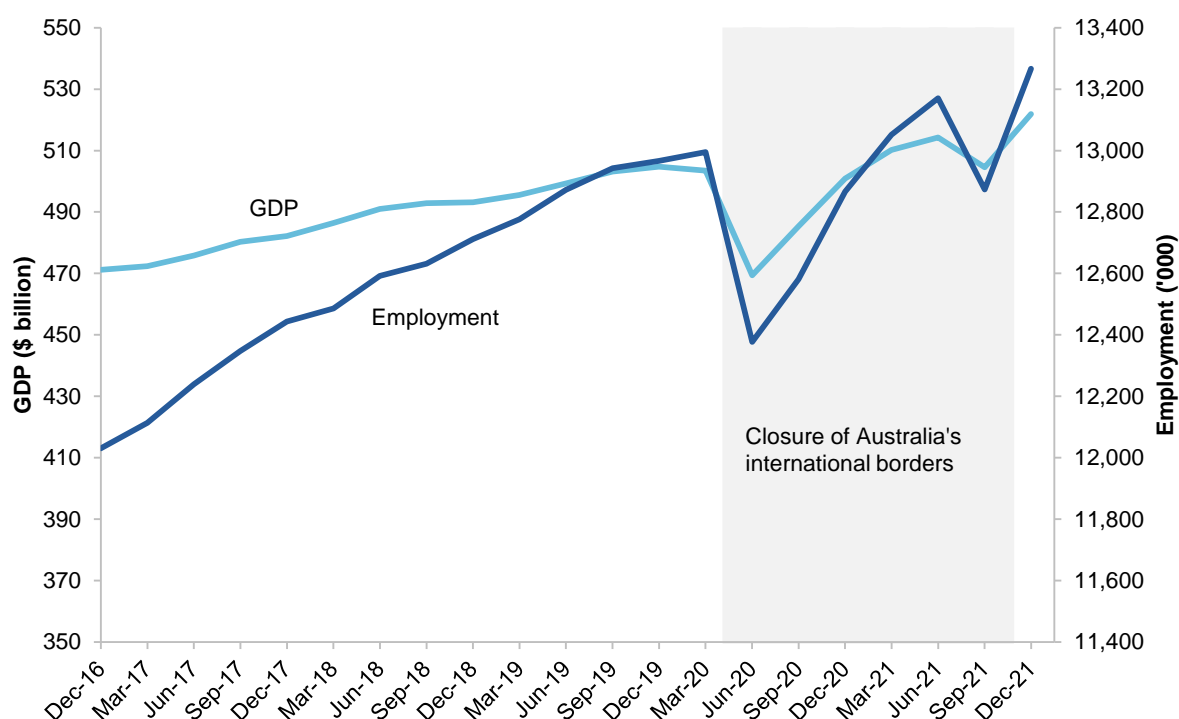
- a snapshot of tariff, budgetary and combined assistance to industries in 2020-21 (table B.3 to B.5)
- time series data on assistance to industries, including data on ERAs and the value of assistance received through tariffs, budgetary outlays and tax concessions (table B.1, B.2 and B.6 to B.15)
- time series data on the value of assistance provided by particular budgetary assistance measures by industry (table B.16 to B.20).

Assistance in the context of the COVID-19 pandemic

The scope of TAR 2020-21 covers a period of exceptional economic circumstances brought on by COVID-19 and related policy responses — as observed in both measures of economic activity and employment (figure 1.1). It was also a period of great uncertainty, posing unprecedented challenges for governments globally in terms of assistance and restrictions, serving both economic and health policy objectives. State and Territory Governments implemented various types of restrictions over this period, including prolonged ‘lockdowns’ and travel restrictions. At the time of writing, Australian Governments have collectively reduced both COVID-19-related assistance and restrictions.

Figure 1.1 – Exceptional economic conditions

Gross domestic product (\$ billion) and employment for 2020-21



Sources: ABS (*Australian National Accounts: National Income, Expenditure and Product, December 2021*. Cat. no. 5206.001; *Labour Force, Australia, February 2022*. Cat. no. 6202.001).

¹ The TAR industry groupings are based on ANZSIC 2006 industries. The approach to allocating ANZSIC industries to the TAR industry groupings is set out in the *Methodological annex*.

This chapter delivers estimates of assistance for the 2020-21 financial year — the period in which most of the substantial assistance was provided by Australian Governments in response to the economic impacts of the COVID-19 pandemic. Several examples of COVID-19-related expenditures are included in estimates of budgetary assistance and the effective rate of assistance for 2020-21, including programs that target specific industries and sectors.

However, not all COVID-19-related assistance fits the classification of *industry* or *trade assistance* traditionally captured by TAR.² For instance, several transitory programs could be described as ‘economy-wide assistance in response to COVID-19’ (PC 2021), such as:

- various wage subsidies (such as JobKeeper)
- payments to employing businesses broadly (such as Boosting Cashflow for Employers)
- accelerated depreciation arrangements (such as Backing Business Investment and the expanded eligibility for the Instant Asset Write-Off³).

The eligibility criteria for these programs were not designed to confer favour to businesses based on their *usual traits* (such as size, industry, sector, or type of assets).⁴ Rather, these programs were designed to provide broad and temporary supports to contribute to macroeconomic stabilisation. Given that these programs do not fit neatly as examples of the types of assistance to industry typically captured by TAR, and were designed to be temporary in nature for a period of the pandemic response, they have been excluded from TAR estimates of industry assistance and the effective rate of assistance.

Still, it would be difficult to provide a transparent account of public expenditures to industry in 2020-21 without acknowledging the scale of COVID-19-related expenditure programs. Where possible, this chapter presents figures on JobKeeper, Boosting Cashflow for Employers, and other economy-wide COVID-19-related programs separately to other forms of assistance (while excluding them from estimates of assistance).

This approach is implemented throughout the remainder of this chapter as follows:

- estimates of aggregate assistance are presented in section 1.2, excluding economy-wide COVID-19-related assistance programs (such as JobKeeper, Boosting Cashflow for Employers, Backing Business Investment, and the temporary expansion of the Instant Asset Write-Off)
- budgetary assistance to industry is investigated in greater detail in section 1.4 (with developments in industry policy discussed in chapter 2). Again, these estimates exclude economy-wide COVID-19-related assistance programs.

² The *Methodological annex* to TAR contains further details on how industry assistance is defined for TAR.

³ The Instant Asset Write-Off was first implemented in the *Budget 2015-16* and applied only to small businesses. As such, it meets the classification of discriminatory budgetary assistance captured by TAR estimates. Program eligibility was extended beyond small businesses in the *Budget 2020-21*, allowing businesses with aggregated turnover less than \$500 million to deduct the full cost of assets costing less than \$150 000 that are purchased by 31 December 2020 and first used or installed by 30 June 2021. Further extensions were announced in the *Budget 2021-22*.

⁴ Wage subsidies such as JobKeeper, for example, were designed as wide-spread, cross-industry support, in part to avoid the costs to businesses involved in firing and hiring as firms were facing uncertain futures, by maintaining the relationship between them and their workers. Moreover, JobKeeper is in many ways a support to employees themselves, while sharing some characteristics in common with industry assistance.

1.2 Aggregate assistance levels and rates

Net combined assistance was \$16.2 billion in 2020-21

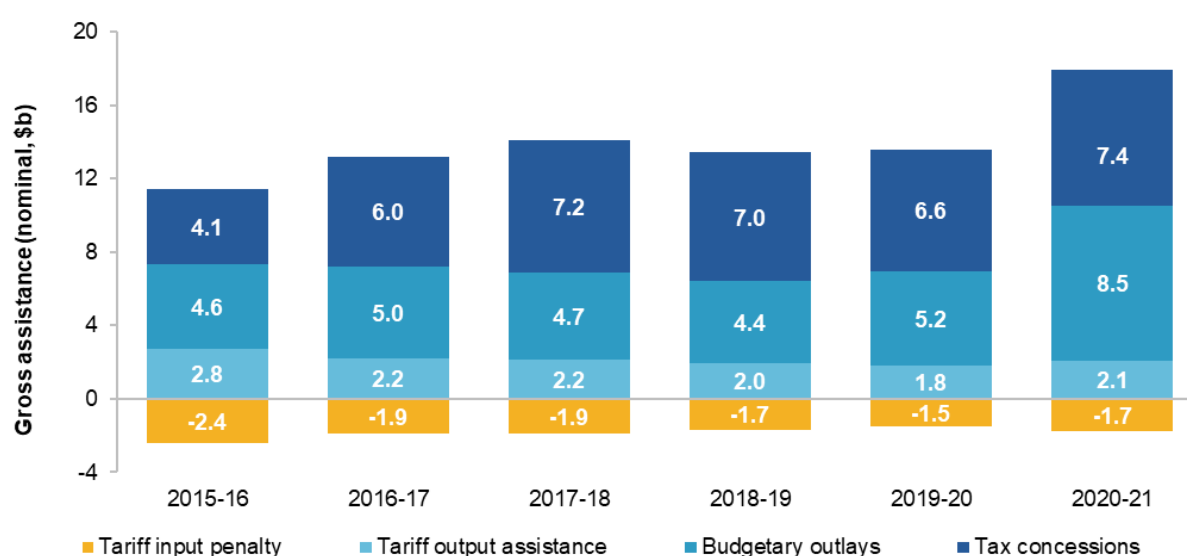
In gross terms, tariff and budgetary assistance to industry totalled about \$18 billion in 2020-21 — comprising \$2.1 billion of output tariff assistance, \$8.5 billion of budgetary outlays, and \$7.4 billion of tax concessions (figure 1.2). After allowing for the effects of tariffs on the cost of inputs (the tariff input penalty, section 1.3) — which totalled \$1.7 billion — estimated net assistance amounted to about \$16.2 billion in 2020-21. This was an increase of \$4.2 billion compared with the previous financial year, which is the result of a:

- \$0.1 billion increase in net tariff assistance
- \$3.3 billion increase in assistance provided by budgetary outlays
- \$0.8 billion increase in assistance provided through tax concessions.⁵

The assistance estimates for 2020-21 continue a longer-term trend that has seen assistance delivered increasingly through budgetary measures rather than through tariffs.

Figure 1.2 – Aggregate estimates of measurable assistance

Gross assistance (nominal) 2015-16 to 2020-21



Source: Commission estimates.

⁵ The Commission's estimates of budgetary assistance are in nominal values. Any discrepancy with editions of TAR prior to 2020-21 reflects modification in the assistance values provided by relevant agencies. The tariff assistance estimates, however, are indexed to a reference year series based on 2016-17 ABS input-output data (the latest available at the time of undertaking the exercise). These are adjusted to 2020-21 values by using growth over this period in ABS industry gross value added and supporting data at current prices. Because of this adjustment, the tariff and combined assistance results for the years from 2015-16 to 2019-20 do not match those in *Reviews*, although the same qualitative story holds. For details of the re-indexing process, see the *Trade and Assistance Review Estimates User Guide* (Salma, Wells and Forbes 2016).

Assistance varied across sectors, industries and businesses

In absolute terms, the services sector once again received the most assistance

Of the assistance that can be allocated to specific sectors, the largest amount went to the services sector (table 1.1). In the past five years, the industries receiving the most net assistance have been the property, professional and administrative services and the financial and insurance industries. In 2020-21, however, the industry with the second-highest amount of net assistance was the transport, postal and warehousing industry.

All service industries experienced a tariff input penalty (i.e. negative amounts of trade assistance). However, due to the large increases in both budgetary outlays and tax concessions across all industries, the significance of the tariff input penalty was greatly reduced compared with previous years. Indeed, no individual service industry experienced an overall negative amount of net assistance. The construction industry in particular, which had consistently experienced negative net assistance prior to 2020-21, received about \$500 million in net assistance, due largely to COVID-19-related measures (chapter 2).

Table 1.1 – Combined assistance by industry grouping, 2020-21^{a,b}

\$ million

	Net tariff assistance	Budgetary outlays	Tax concessions	Net combined assistance
Primary Industries	253.5	1436.1	449.5	2139.1
Horticulture and fruit growing	40.6	108.9	64.2	213.6
Sheep, beef cattle and grain farming	229.8	306.9	289.1	825.8
Other crop growing	1.5	54.9	25.1	81.5
Dairy cattle farming	-7.9	28.8	18.6	39.5
Other livestock farming	-4.1	28.5	11.8	36.2
Aquaculture and fishing	-4.0	97.6	10.2	103.9
Forestry and logging	-0.4	56.5	15.6	71.7
Primary production support services	-2.1	10.4	13.1	21.4
Unallocated primary production	–	743.7	1.8	745.5
Mining	-49.8	366.0	159.9	476.1
Manufacturing	1135.1	1097.7	571.4	2804.3
Food, beverages and tobacco	342.9	105.8	36.0	484.6
Textile, leather, clothing and footwear	28.1	31.1	5.5	64.7
Wood and paper products	138.5	8.6	9.5	156.6
Printing and recorded media	16.7	38.2	10.6	65.5
Petroleum, coal, chemical and rubber products	136.2	269.7	36.0	441.8
Non-metallic mineral products	65.3	21.9	7.6	94.9
Metal and fabricated metal products	190.1	115.8	102.2	408.1
Motor vehicle and parts	85.8	47.7	19.3	152.8
Other transport equipment	23.8	21.6	10.6	56.0
Machinery and equipment manufacturing	79.7	220.4	34.3	334.4
Furniture and other manufacturing	28.0	35.4	4.0	67.4
Unallocated manufacturing	–	181.5	295.9	477.4
Services	-988.2	5037.0	2571.7	6620.6
Electricity, gas, water and waste services	-17.6	174.1	20.7	177.1

	Net tariff assistance	Budgetary outlays	Tax concessions	Net combined assistance
Construction	-373.5	740.5	134.7	501.7
Wholesale trade	-64.2	90.0	80.7	106.5
Retail trade	-39.9	50.1	99.0	109.2
Accommodation and food services	-83.2	19.5	67.3	3.6
Transport, postal and warehousing	-33.8	1157.4	97.8	1221.4
Information, media and telecommunications	-13.8	361.1	37.0	384.3
Financial and insurance services	-3.3	141.1	903.7	1041.4
Property, professional and administrative services	-94.3	1223.1	555.0	1683.8
Public administration and safety	-49.9	45.5	6.0	1.6
Education and training	-20.0	53.0	11.7	44.7
Health care and social assistance	-80.5	136.2	96.9	152.6
Arts and recreation services	-29.0	356.2	410.6	737.8
Other services	-85.1	94.8	50.6	60.4
Unallocated services	—	394.5	—	394.5
Unallocated other	—	524.3	3626.3	4150.7
Grand total	350.7	8461.2	7378.9	16190.8

a. Totals may not add due to rounding. b. 'Unallocated' includes programs for which details of the initial benefitting industry cannot be readily identified.

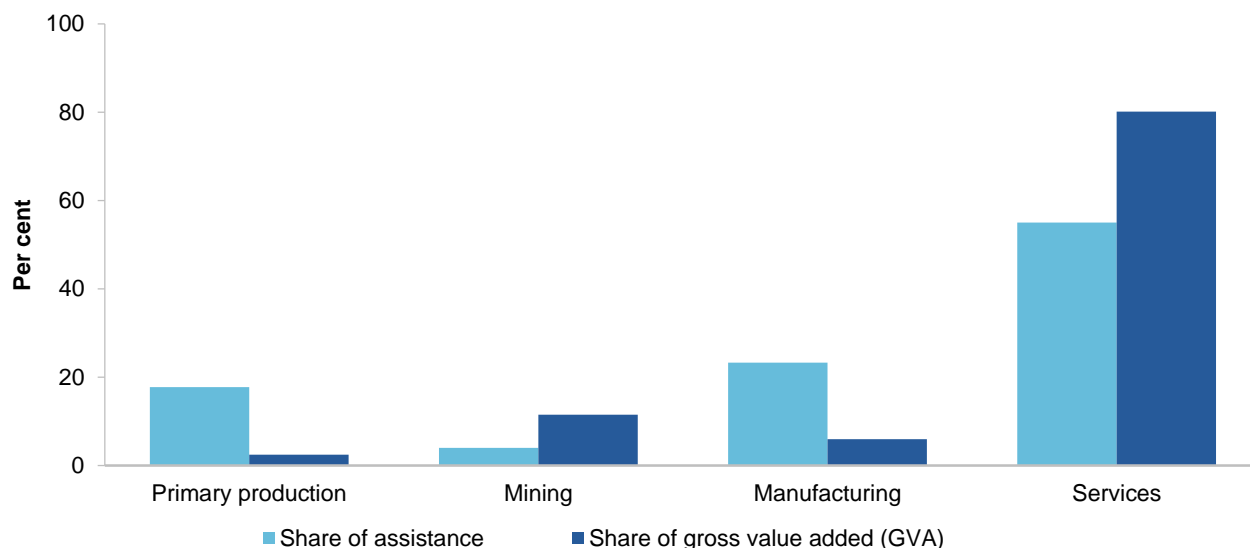
Source: Commission estimates.

... but the primary production and manufacturing industries received the most assistance relative to their value added

Relative to their value added, the primary production and manufacturing sectors received a disproportionately large amount of assistance (figure 1.3).

- The primary production sector (mostly agriculture) received 17.8 per cent of allocatable net assistance in 2020-21 (about \$2.1 billion), despite accounting for only 2.4 per cent of the economy's gross value added. About 88 per cent of this support was in the form of budgetary assistance.
- The manufacturing sector received 23.3 per cent of allocatable net assistance (about \$2.8 billion) despite accounting for only 6 per cent of value added. About 40 per cent of this support was in the form of tariff assistance.
- In contrast, while the services sector received about 55 per cent of allocatable net assistance (about \$6.6 billion), this was much smaller than its share of value added, which exceeded 80 per cent.
- Similarly, the mining sector received only 4 per cent of allocatable assistance (\$476 million), despite accounting for 11.5 per cent of value added — meaning it was the least assisted sector relative to its size.

Figure 1.3 – Assistance provided across sectors
Assistance and gross value added shares, 2020-21



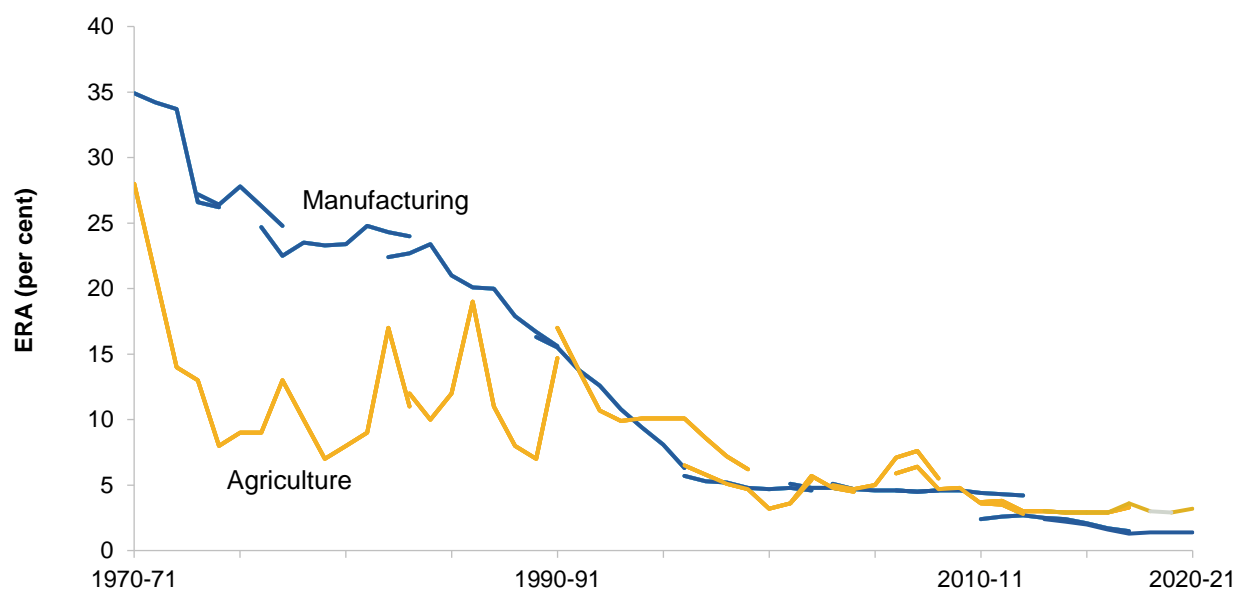
Source: Commission estimates.

The 'effective rate of assistance' (ERA) is a longstanding measure of the assistance provided to a particular sector or industry. It reflects the extent to which net government assistance discriminates in favour of a sector or industry — better enabling it to attract economic resources relative to others. The ERA for a particular industry is measured as the value of combined assistance expressed as a share of that industry's *unassisted* net output (that is, the industry's unassisted value added).⁶

Over the past half century, the ERA of the manufacturing sector has fallen steeply, particularly from the mid-1980s to the mid-1990s (figure 1.4). This reflects the decline in trade restrictions on manufactured imports — due in part to the abolition of import quotas for textiles, clothing and footwear in 1993 (Emmery 1999, p. 13). It also reflects the experience in the passenger motor vehicle industry, where tariffs were progressively reduced from nearly 60 per cent in the mid-1980s to 5 per cent by 2010 (DIIS 2020, p. 7). In 2020-21, the ERA for the manufacturing sector remained in line with the historically low levels observed in the past five years.

Assistance to the agriculture sector has fluctuated across the past few decades, in part because it has often been provided for a specific purpose (such as drought relief) rather than delivered through tariffs (IC 1995, p. 17). Assistance to the agricultural sector has been relatively stable in the past decade, growing marginally in 2020-21.

⁶ ERAs are not calculated for industries in the services sector.

Figure 1.4 – A long-run downward trend in protection^{a,b}**Effective rates of assistance to manufacturing and agriculture, 1970-71 to 2020-21**

a. '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). b. Breaks and overlapping series represent a change of methodology and/or data sources.

Source: Commission estimates.

Changes in ERAs at a sector level can hide variations and changes in assistance provided to industries and individual firms within sectors.

All manufacturing industries have an ERA below 3 per cent. There is considerably less variation in ERA between manufacturing industries than was the case just five years ago. This reflects, in part, the reduction in ERA for motor vehicles and parts in 2020-21 (figure 1.5; table B.6 in appendix B).

There is also variation in the assistance to agricultural industries.⁷ While assistance to some areas of agriculture has fallen consistently for several years (such as for dairy farming), assistance to others has increased (such as forestry and logging, and other crop growing) (figure 1.6).

The level of sector-wide assistance to agriculture is greater than that provided to manufacturing — this has been the case for the past decade on average. This stands in contrast to the 1970s and 1980s, when assistance to manufacturing was considerably higher, and to the 1990s and 2000s, when assistance was similarly declining in both sectors.

Assistance at a firm- or activity-level can also be distortionary

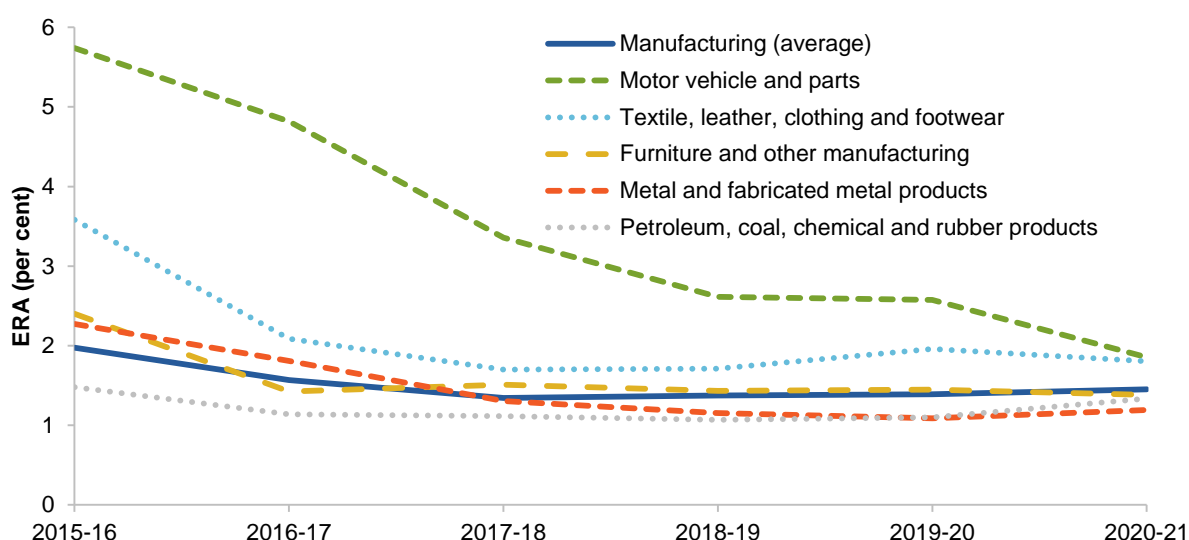
Where tariff or budgetary assistance is applied uniformly across a sector or industry, the estimated ERA provides some indication of the level of assistance received by individual businesses within those industries. However, governments may provide budgetary assistance (such as a grant or subsidy) to individual firms or

⁷ Some observed changes to ERA in agricultural industries may reflect the underlying volatility of assistance estimates. Volatility in agricultural estimates occurs because the assistance benchmarks are affected by variations in prices, while drought and other factors impact output. The volatility of estimates was particularly acute throughout the 1970s and 1980s (figure 1.4).

for particular activities.⁸ Such assistance can provide recipient firms with a significant competitive advantage (especially over other firms in their industry) and can be highly distortionary, as resources — such as finance, labour or equipment — may be redirected away from more productive businesses and activities that are not receiving the same level of assistance from government.

Figure 1.5 – Some manufacturing industries continue to receive more assistance than others ...

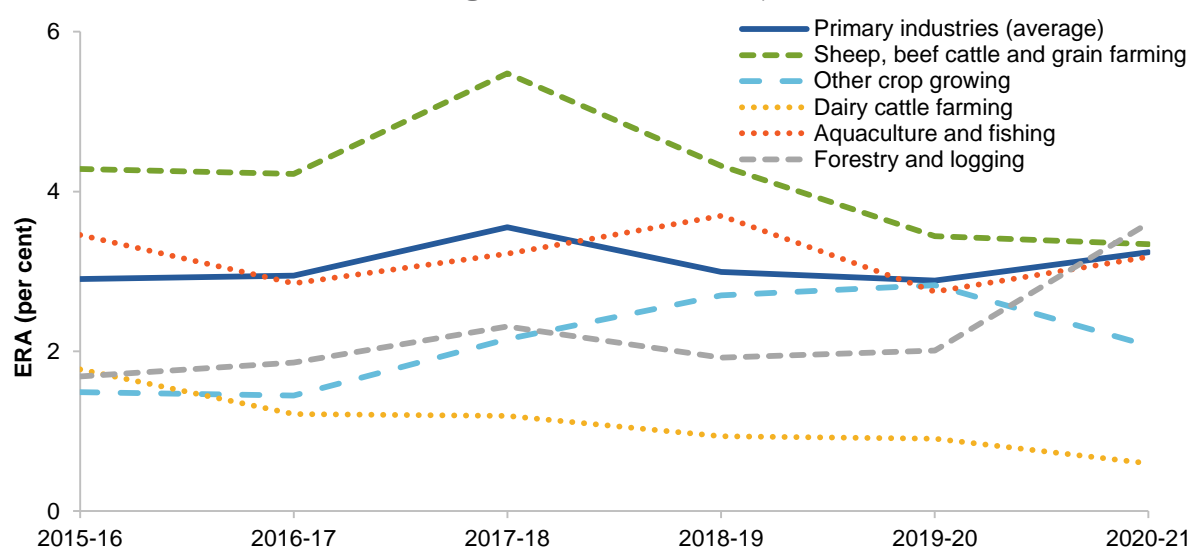
Effective rates of assistance to manufacturing industries, 2015-16 to 2020-21



Source: Commission estimates.

Figure 1.6 – ... while assistance to agricultural industries is more dispersed

Effective rates of assistance to agriculture industries, 2015-16 to 2020-21



Source: Commission estimates.

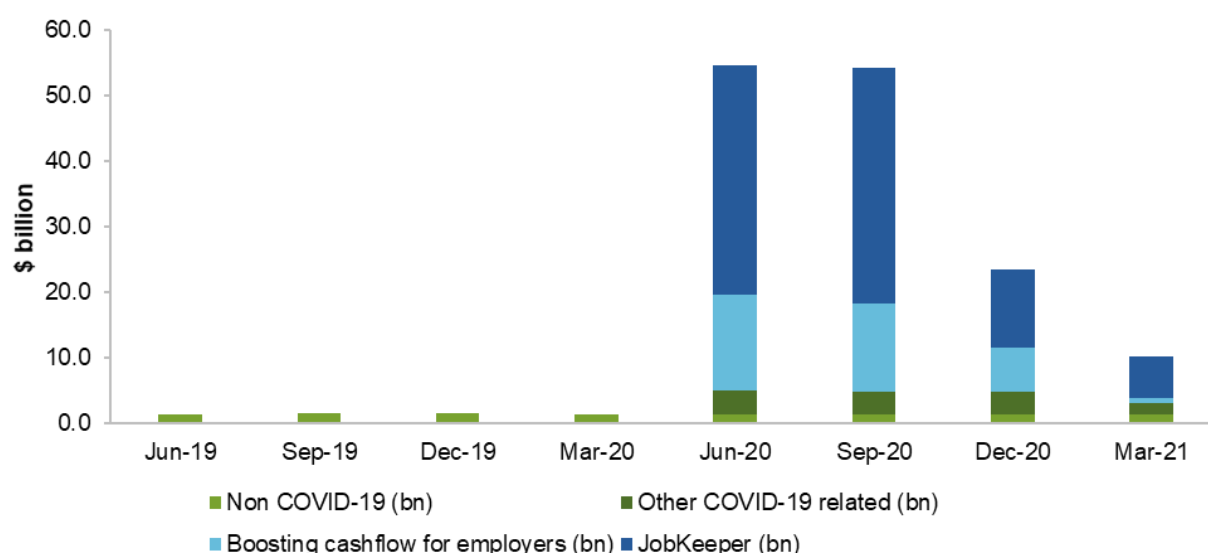
⁸ The Commission has previously identified measures with the potential to provide substantially higher levels of assistance to select firms, such as measures that subsidise freight to and from Tasmania (PC 2014) and government co-investment grants (PC 2015).

Aggregate assistance in the context of other COVID-19-related programs

As noted above, aggregate assistance for 2020-21 excludes key programs of economy-wide assistance related to COVID-19 — JobKeeper, Boosting Cashflow for Employers, Backing Business Investment, and the expansion to the Instant Asset Write-Off. These four programs amounted to about \$92 billion in 2020-21.

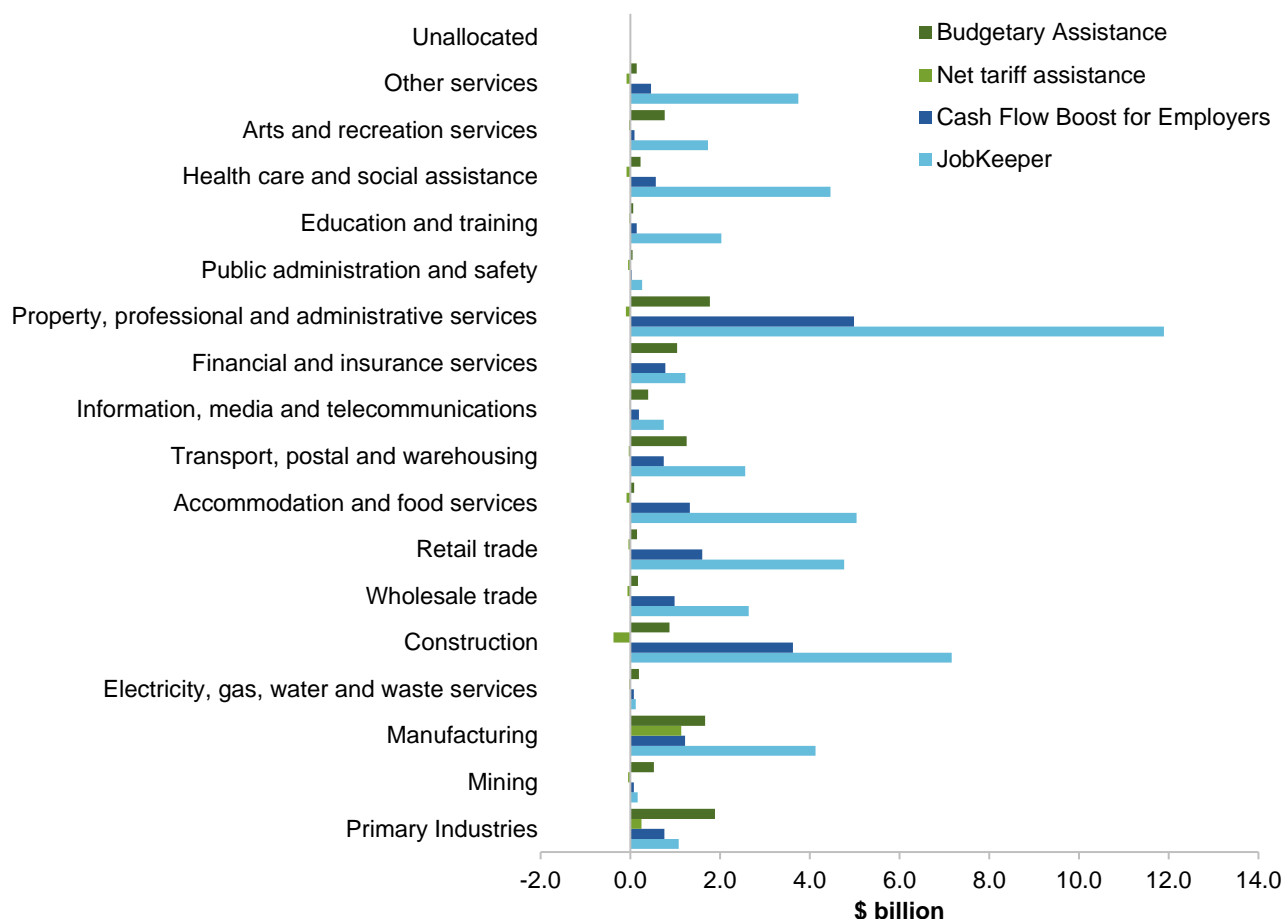
In particular, JobKeeper and Boosting Cashflow for Employers were two of the largest programs of public expenditure in Australian history. Each of these programs individually outweighed all other Australian Government assistance during this period (figure 1.7). Their impact on individual industries is typically far in excess of both budgetary and tariff assistance, despite significant growth in budgetary assistance over the same period (figure 1.8).

Figure 1.7 – The scale of Australian Government assistance related to COVID-19



Source: ABS (*Australian National Accounts: National Income, Expenditure and Product, Government support for business*, June 2020. Cat. no. 5206).

It will be particularly difficult to establish how tariff and budgetary assistance will affect the economy in 2020-21, in light of both the wide-ranging impacts of the COVID-19 pandemic (including related policy responses) and the scale of other public funding for employees and employers.

Figure 1.8 – Tariff and budgetary assistance in the context of JobKeeper and Boosting Cashflow for Employers

Source: Commission estimates.

1.3 A closer look at tariff assistance

The Commission's estimates of tariff assistance are comprised of output assistance, input penalties, and net assistance (box 1.1).

In 2020-21, the aggregate *gross* amount of assistance (output assistance) to businesses from tariffs totalled just over \$2.1 billion, similar to the prevailing level in 2017-18, and up from 1.8 billion in 2019-20 (figure 1.9). *Net* tariff assistance is much lower — about \$0.35 billion in 2020-21. This reflects the fact that tariffs designed to benefit one industry can cause higher input costs to many others. After decades of tariff reduction and streamlining, Australia's tariffs apply to a relatively narrow group of industries that account for a shrinking proportion of production by value. Tariff penalties, on the other hand, affect a wider range of industries, most notably in the services sector, which accounts for a growing majority of output.

Box 1.1 – Components of tariff assistance

The Commission's estimates of tariff assistance are equivalent to the budget outlay that would be expected to have the same effect on producer prices and volumes of production, not the amount of duty collected.

- *Output assistance* — by taxing imported goods, tariffs improve the price competitiveness of domestically produced goods that directly compete with imports in the Australian market, allowing domestic businesses to earn greater returns.
- *Input penalties* — the imposition of tariffs also increases the price of local and imported goods that are used as inputs for other firms and sectors, and thus penalises local industries that rely on goods subject to tariffs (although this can be reduced if concessions are available, effectively providing a refund for the embedded tariffs in purchased goods).

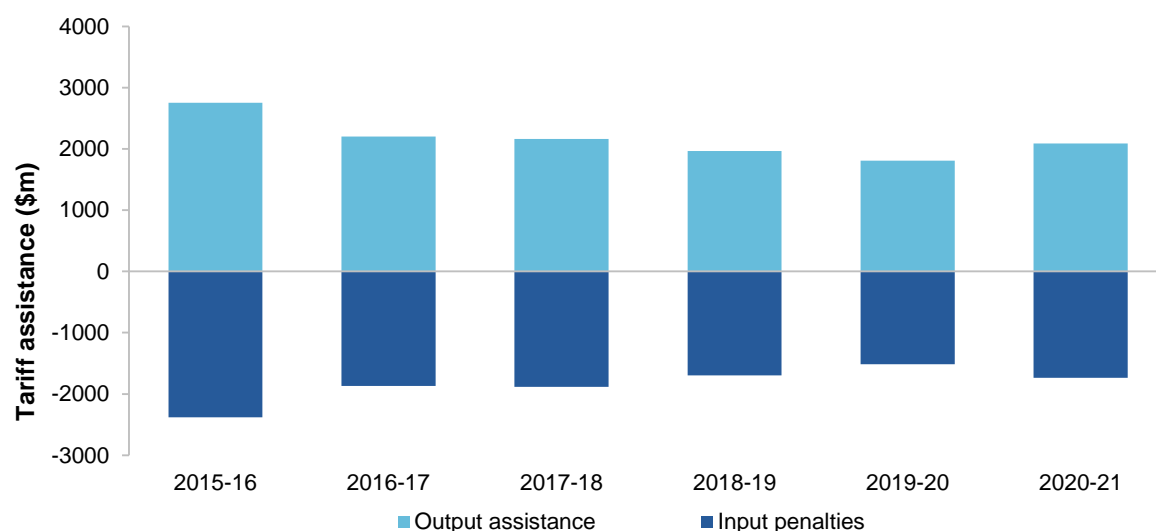
Net tariff assistance — calculated as output tariff assistance less the tariff input penalty for each industry.

Note: data on tariffs and imports are sourced from ABS (*International Trade in Goods and Services, Australia*, Cat. no. 5368.0). These data may exclude some confidential items of trade.

The decline in gross tariff assistance in the past decade can also be attributed in part to the growing share of Australia's imports covered by bilateral and regional trade agreements. For example, the share of Australia's merchandise imports from countries with which Australia has a free trade agreement in force has grown from less than 10 per cent in 2003-04 to almost 70 per cent in 2019-20 — this will likely rise to 90 per cent once trade agreements are implemented with the United Kingdom, the European Union, and India.⁹

Recent Commission (2022) estimates suggest that compliance costs (to businesses) involved with accessing tariff concessions and preferences are the predominant costs associated with the tariff system. In this context, the expanding coverage of regional and bilateral trade agreements will have significant implications for the role of tariffs in Australia (chapter 3).

Figure 1.9 – The assistance provided (and cost of) tariffs has fallen in the past five years
Output, input and net tariff assistance, 2015-16 to 2020-21



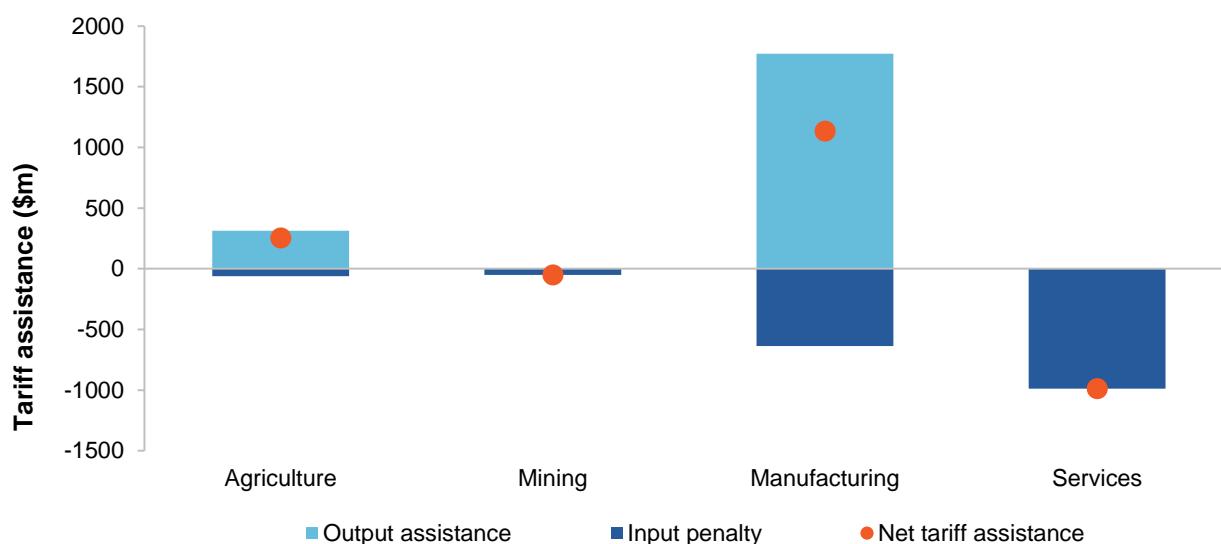
⁹ This figure was calculated by the Commission using an unpublished ABS import clearances dataset.

Source: Commission estimates.

Tariff assistance by sector

Nearly all output assistance from tariffs (\$1.8 billion or 85 per cent of the total) went to businesses in the manufacturing sector in 2020-21 (figure 1.10; table 1.2). As tariffs only apply to imported goods (not services), businesses in the services sector do not obtain *any* output assistance from tariffs. Yet the services sector bears most of the costs associated with tariffs because tariffs raise the cost of its inputs. The input penalty faced by the services sector was close to \$1 billion in 2020-21. The mining sector alone also faced a significant input penalty (\$50.1 million) while receiving little to no direct benefit from tariffs (less than \$1 million). Given the nature of Australia's mining industries as export-orientated price takers, tariff penalties have an adverse impact on their international competitiveness.

Figure 1.10 – Tariffs benefit manufacturing — and harm services — the most
Output, input and net tariff assistance by sector, 2020-21



Source: Commission estimates.

Table 1.2 – Tariff assistance by industry grouping, 2020-21^{a,b}
\$ million

	Output	Input penalty	Net tariff assistance
Primary production	314.4	-60.9	253.5
Horticulture and fruit growing	46.0	-5.4	40.6
Sheep, beef cattle and grain farming	259.6	-29.8	229.8
Other crop growing	2.9	-1.4	1.5
Dairy cattle farming	–	-7.9	-7.9
Other livestock farming	–	-4.1	-4.1
Aquaculture and fishing	0.2	-4.1	-4.0
Forestry and logging	0.2	-0.7	-0.4
Primary production support services	5.5	-7.6	-2.1
Unallocated primary production	–	–	–

	Output	Input penalty	Net tariff assistance
Mining	0.3	-50.1	-49.8
Manufacturing	1773.1	-637.9	1135.1
Food, beverages and tobacco	753.5	-410.6	342.9
Textile, leather, clothing and footwear	43.4	-15.3	28.1
Wood and paper products	166.6	-28.1	138.5
Printing and recorded media	19.5	-2.8	16.7
Petroleum, coal, chemical and rubber products	173.2	-37.0	136.2
Non-metallic mineral products	81.1	-15.8	65.3
Metal and fabricated metal products	237.6	-47.5	190.1
Motor vehicle and parts	113.5	-27.7	85.8
Other transport equipment	39.4	-15.7	23.8
Machinery and equipment manufacturing	102.3	-22.5	79.7
Furniture and other manufacturing	42.9	-14.9	28.0
Unallocated manufacturing	—	—	—
Services	—	-988.2	-988.2
Electricity, gas, water and waste services	—	-17.6	-17.6
Construction	—	-373.5	-373.5
Wholesale trade	—	-64.2	-64.2
Retail trade	—	-39.9	-39.9
Accommodation and food services	—	-83.2	-83.2
Transport, postal and warehousing	—	-33.8	-33.8
Information, media and telecommunications	—	-13.8	-13.8
Financial and insurance services	—	-3.3	-3.3
Property, professional and admin. services	—	-94.3	-94.3
Public administration and safety	—	-49.9	-49.9
Education and training	—	-20.0	-20.0
Health care and social assistance	—	-80.5	-80.5
Arts and recreation services	—	-29.0	-29.0
Other services	—	-85.1	-85.1
Unallocated services	—	—	—
Unallocated other	—	—	—
Total	2087.8	-1737.1	350.7

a. Totals may not add due to rounding. b. 'Unallocated' includes programs for which details of the initial benefitting industry cannot be readily identified.

Source: Commission estimates.

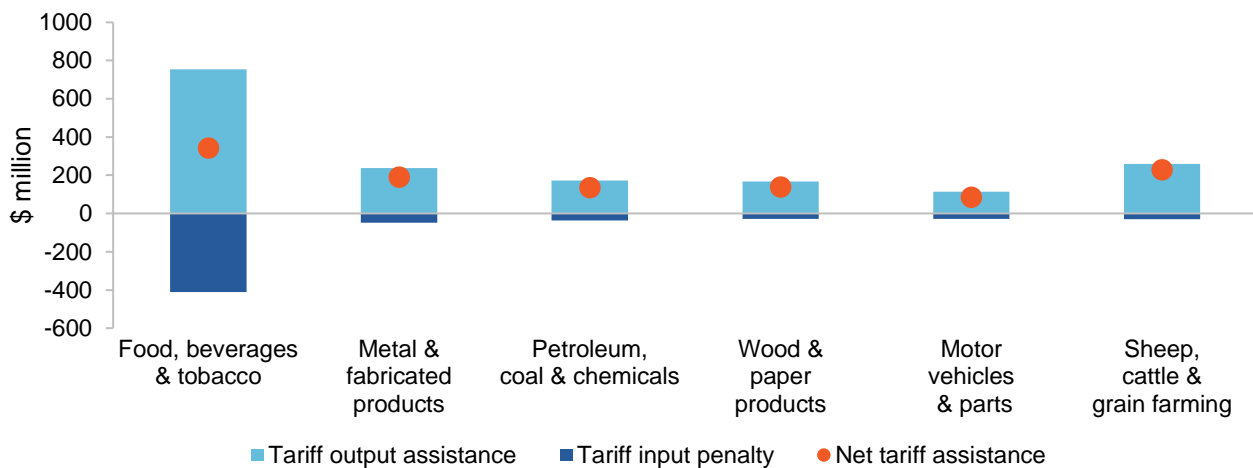
Tariff assistance by industry

In absolute terms, the food, beverages and tobacco industry received the most net assistance from tariffs in 2020-21, exceeding \$343 million (figure 1.11). However, the motor vehicles and parts industry received the highest rate of assistance as a proportion of its value added (figure 1.12).

As outlined above, most of the costs of tariffs are borne by businesses in the services sector, and all service industries received negative net tariff assistance. The largest cost was borne by the construction industry, which faced a \$373 million penalty from tariffs (figure 1.13).

Figure 1.11 – The food, beverage and tobacco industry was most assisted by tariffs in dollar terms ...

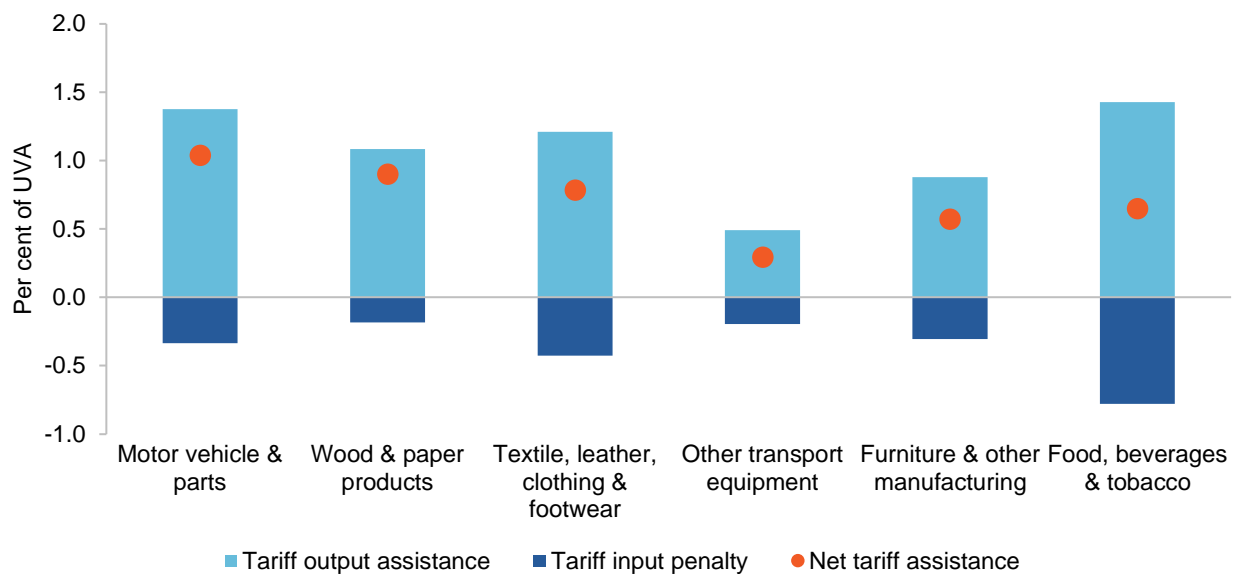
Tariff assistance, tariff input penalties and net tariff assistance, \$ million, 2020-21



Source: Commission estimates.

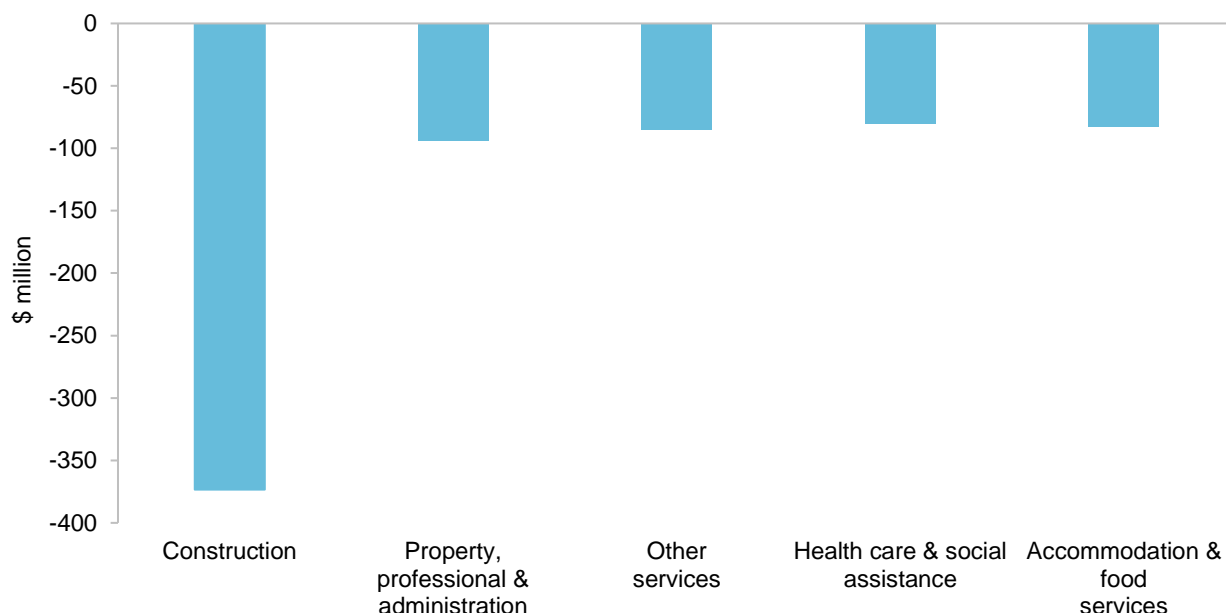
Figure 1.12 – ... and the motor vehicle and parts industry was most assisted by tariffs relative to its value added

Industries receiving the most tariff assistance as a proportion of their unassisted value added, 2020-21



Source: Commission estimates.

Figure 1.13 – The construction industry was penalised the most by tariffs
Industries with the largest net tariff assistance, 2020-21



Source: Commission estimates.

1.4 A closer look at budgetary assistance

The *Trade and Assistance Review* aims to provide a transparent and consistent estimate of the value of budgetary assistance and who benefits — which is essential for any discussions about the benefits and costs of particular programs or measures.

Budgetary outlays and tax concessions are included in the Commission's assistance estimates when they provide a pecuniary benefit to some businesses and not others (box 1.2). The inclusion of a particular budgetary outlay or tax concession in the Commission's estimates does not necessarily mean that the measure is undesirable. Rather, it provides some indication of how particular industries and sectors benefit from government assistance, relative to others.

Box 1.2 – 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 intermediate organisations such as through the rural research and development (R&D) corporations and the Commonwealth Scientific and Industrial Research Organisation (CSIRO).

Box 1.2 – Components of budgetary assistance

- 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, incorporated small businesses are subject to lower corporate tax rates than large businesses)
- the types of activities a business undertakes — for example, tax concessions are provided for R&D activities, which provides a benefit for businesses that undertake R&D but no benefit to those that do not
- the industry a business operates in — for example, financial incentives are provided for businesses in the film industry to assist them to make film and television productions in Australia
- where a business is located.

Where possible, the Commission allocates budgetary assistance to the industry 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 this *Review* 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 risks and challenges associated with the design of assistance programs can ultimately determine whether they result in adverse outcomes for the economy. For instance, the assistance may or may not target a material market failure. They may have poor additionality — providing funding for activities that would have occurred regardless. Their funding may have adverse efficiency impacts on investment and labour market supply (so-called ‘deadweight’ costs).

Budgetary assistance in 2020-21

In 2020-21, the Australian Government provided just over \$15.8 billion in budgetary assistance — 53 per cent of which being provided through budgetary outlays and 47 per cent by tax concessions (figure 1.14).

Of the \$15.8 billion of budgetary assistance, the Commission was able to allocate \$11.7 billion to particular sectors:

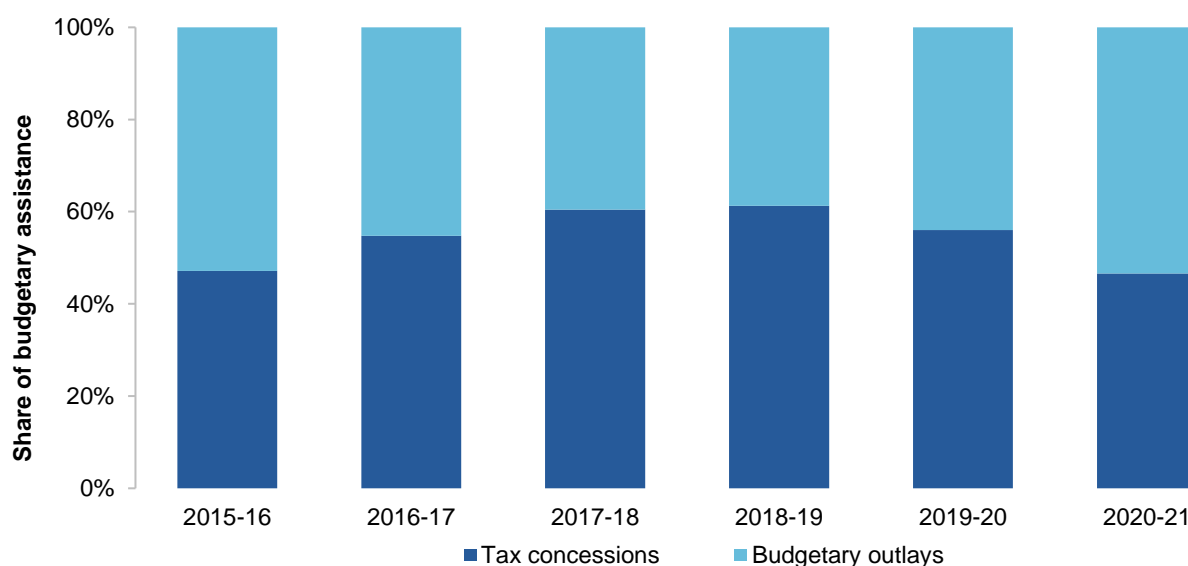
- about \$1.9 billion went to the agriculture sector (mostly to the sheep, beef cattle and grain farming industry)
- about \$0.5 billion went to the mining sector
- about \$1.7 billion went to the manufacturing sector
- about \$7.6 billion went to the services sector — a 44 per cent increase compared with the previous year
- about \$4 billion of assistance could not be easily allocated to a specific sector — a third more than in the previous year.

All sectors experienced an increase in budgetary assistance in 2020-21 compared with the previous year, due largely to the Australian Government’s response to COVID-19 (figure 1.15). Of the \$4 billion increase in budgetary assistance, more than half was specific to the services sector. This reflects in part the type of

assistance required during this period of the pandemic, where business activity in the services sector was adversely affected to a much greater degree than in other sectors.

Figure 1.14 – Most budgetary assistance is implemented via tax concessions

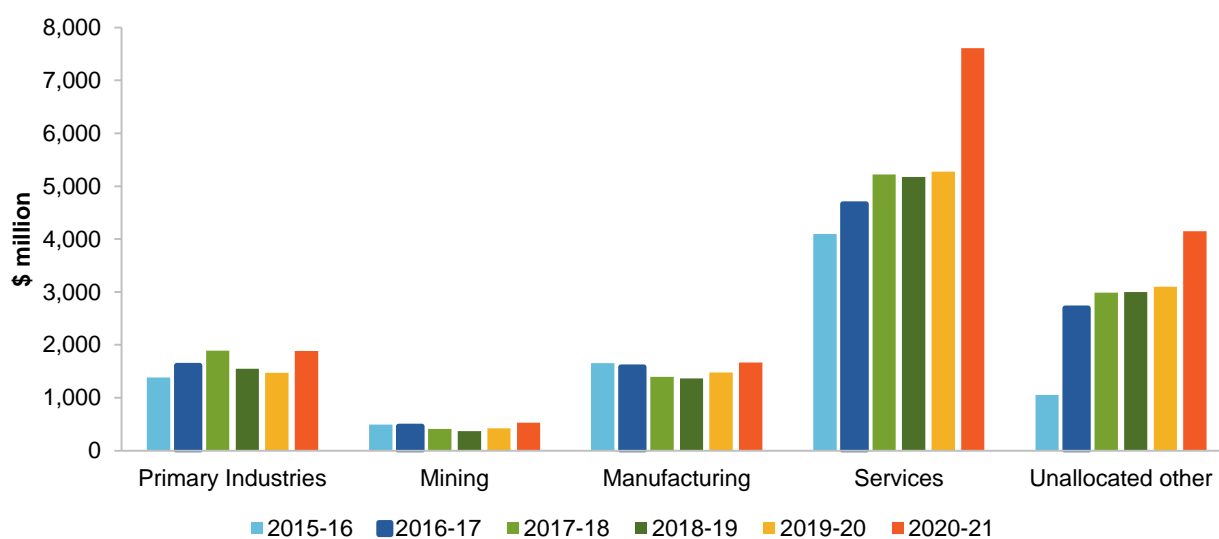
Share of budgetary assistance by assistance type, 2015-16 to 2020-21



Source: Commission estimates.

Figure 1.15 – Budgetary assistance to the primary industries and services sectors has grown in recent years

Budgetary assistance (budgetary outlays and tax concessions) by sector, 2015-16 to 2020-21



Source: Commission estimates.

In total, COVID-19-related programs accounted for 15 per cent of total budgetary assistance in 2020-21 (\$2.4 billion). This assistance is overwhelmingly concentrated in one category: industry-specific assistance (97 per cent). The most benefiting industries were transport, postal and warehousing (48 per cent), construction (29 per cent) and arts and recreation services industries (10 per cent) (table 1.3).

Table 1.3 – COVID-19-related budgetary assistance

TAR industry	Budgetary assistance (\$ million)	Per cent
Transport, postal and warehousing	1 119.6	48
Construction	680.0	29
Arts and recreation services	226.5	10
Unallocated services	156.4	7
Unallocated other	94.7	4
Information, media and telecommunications	73.1	3
Food, beverages and tobacco	4.0	<1
Machinery and equipment manufacturing	0.3	<1
Total COVID-19-related industry-specific grants	2354.6	100

Source: Commission estimates.

Increases to small business, R&D and industry-specific assistance

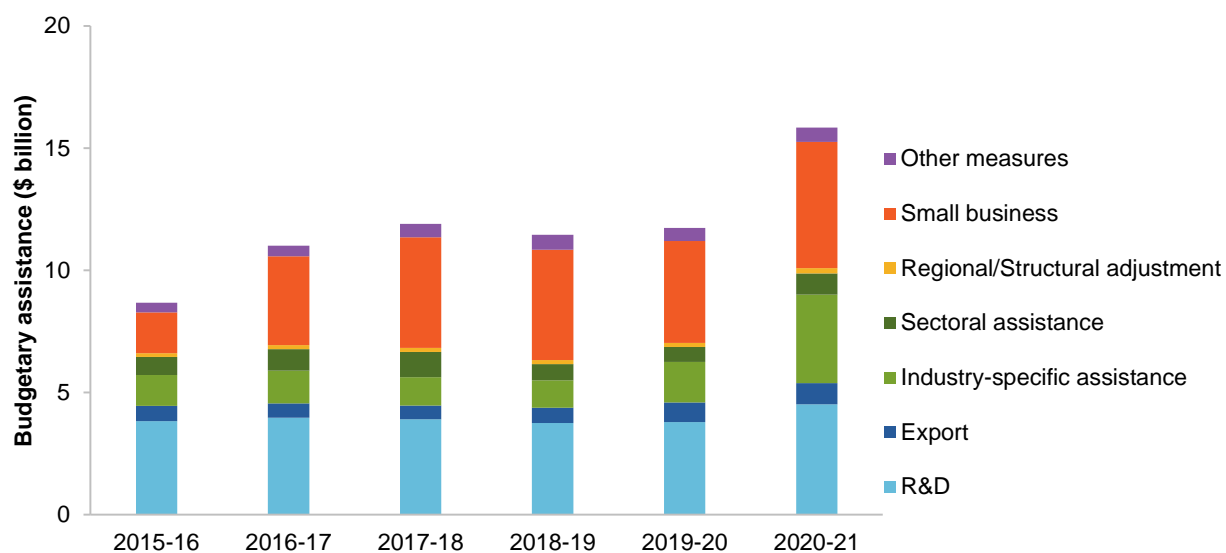
To enable more granular assessments of changes in the composition and nature of budgetary assistance, the Commission has categorised its estimates into seven groups (figure 1.16; table B.16 to B.20 in appendix B). This includes small business; R&D; industry specific assistance; sectoral assistance; assistance to regional areas; export assistance; and other measures.

Assistance to small businesses is often designed to be widely available (for example, across industries), but is included in the Commission's assistance estimates due to its discriminatory impact (and hence its potential to affect the allocation of resources). For instance, the Commission has included the value of the assistance provided to small businesses associated with their favourable tax treatment since 2016-17.¹⁰ If the corporate tax rate was the same for all businesses — as was originally proposed — then the advantage to small businesses would disappear, as would the rationale to include it in the assistance estimates.

The majority of budgetary assistance in 2020-21 was directed to small businesses (\$5.2 billion) and R&D (\$4.5 billion). However, the largest increase was in industry-specific assistance, which rose from \$1.7 billion in 2019-20 to \$3.6 billion in 2020-21.

¹⁰ In May 2016, the Australian Government announced its intention to reduce the company tax rate for all businesses to 25 per cent (from the prevailing rate of 30 per cent) by 2026-27. However, the Parliament only passed reforms to company tax rates for small businesses. The lower company tax rate, and the annual turnover ceiling for qualifying for this rate, have changed over time, but the advantage to small businesses remains. For 2019-20, an eligible incorporated business with a turnover of under \$50 million faced a corporate tax rate of 27.5 per cent (rather than 30 per cent for other incorporated businesses) — this was reduced to 26 per cent in 2020-21, resulting in additional tax concessions of \$900 million.

Figure 1.16 – Small business assistance is the largest type of budgetary assistance
Value of budgetary assistance by type of measure, 2020-21



Source: Commission estimates.

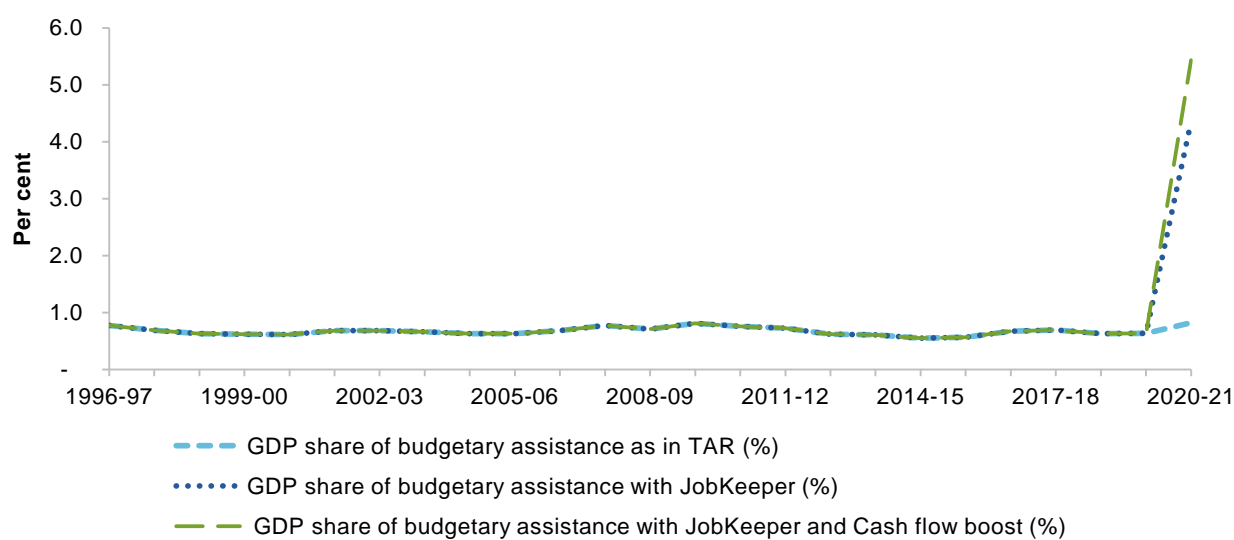
2. Industry assistance developments

Key points

- ✱ **The vast majority of industry assistance provided through the Australian Government's COVID-19 response was incurred in 2020-21.**
 - The extension of COVID-19-related programs beyond this financial year is generally geared towards a progressive phasing-out of that assistance.
 - The Term Funding Facility implemented by the Reserve Bank of Australia shares some characteristics with more traditional forms of industry assistance — and increasingly so as the cash rate rises.
- ✱ **To achieve net zero carbon emissions by 2050, the Australian Government is providing considerable amounts of industry assistance to support the development and deployment of low emissions technologies.**
 - The hydrogen industry has received nearly \$1 billion of assistance, while industries for carbon capture and storage, alternate fuels, soil carbon capture, and grid energy storage have also benefitted.
 - Although there can be sound rationales for government assistance to such new technologies — such as benefits from more rapid decarbonisation and a need for public investment to support early supply and demand growth — the challenge for governments is to choose the most appropriate quantum and type of assistance, to not crowd out potential alternatives, and for support to be measured.
 - Generally, supporting research and development carries risks that the selected technology fails to commercialise. Other risks of investing in clean technologies include that they may prove ineffective, have poor additionality, or reduce incentives for more immediate emissions reductions. Support should be regularly reviewed for its cost effectiveness and efficacy and removed when it fails these tests.
- ✱ **Whether fuel tax credits (FTCs) should be classified as industry assistance has material implications for the estimates of total Australian industry assistance, and for the fossil fuel industry in particular. In part, competing assessments of this issue reflect different judgements (explicit or implicit) about the appropriate policy 'baseline' against which FTCs should be viewed.**
 - Australia's fuel excise system taxes the consumption of fossil fuels. Consistent with Australia's general avoidance of taxing inputs to production, at least some of the fuel excise component of fuel prices can be refunded to businesses through the provision of fuel tax credits (FTCs), depending on a number of factors.
 - The Commission does not regard FTCs as industry assistance for the purposes of the *Trade and Assistance Review*. Fundamentally, their operation is consistent with Australia's general avoidance of taxing inputs to production. Moreover, they do not reduce the price of fossil fuels below their supply price (but simply reduce the degree to which they are taxed), nor do they provide a relative price advantage to fossil fuels. In addition, FTCs are available to all industries and sectors.

In 2020-21, Australian Government expenditures reached historic levels both in absolute terms and as a percentage of gross domestic product (GDP) (figure 2.1). A portion of this expenditure can be attributed to programs that, by design, discriminate in favour of a particular section of the economy (for example, by sector, industry, or business size). These programs are classified as *industry assistance* for the purposes of this report, as their discriminatory nature has the potential to distort resource allocation in the economy.

Figure 2.1 – Budgetary assistance as a share of GDP



Source: Commission estimates.

However, industry assistance is not always problematic. In particular circumstances, it can be an economically efficient response to market failure. Government also has a role in limiting the fallout from economic shocks. Both roles are notionally apparent in the two most significant drivers of new industry assistance, which are the subject of this chapter. They are:

- the continuing response to the COVID-19 pandemic (section 2.1)
- the Australian Government's approach to addressing climate change to 2050 (section 2.2).

In both cases, there are strong in-principle rationales for government intervention. However, the challenge for governments is not simply to determine whether to intervene, but to also ensure that the most effective and efficient policy responses are implemented. This depends on the choice of an appropriate quantum and type of assistance, as well as ensuring that the design of assistance measures is targeted and, where appropriate, temporary.

As part of the broader consideration of the Australian Government's approach to climate change policy, this chapter also examines the design of Australia's fuel tax credit system and assesses whether it should be considered a form of industry assistance (section 2.3 and 2.4).¹¹

¹¹ Additional detail on the Commission's approach to estimating assistance can be found in the *Methodological annex*.

2.1 An update on assistance during the pandemic

The *Trade and Assistance Review 2019-20* discussed in detail the assistance that formed the Australian Government's COVID-19 response, up to and including any assistance announced in the *Budget 2021-22*. For the most part, those expenditures were included in assistance estimates for 2020-21, as much of the expenditure was incurred during the 2020-21 financial year.

Several key programs from the COVID-19 response were discontinued during 2020-21, suggesting that the level of public expenditure broadly — and industry assistance in particular — would decline in the following years. Some areas of COVID-19-related industry assistance have been expanded or extended, with further assistance announced in both the *Mid-Year Economic and Fiscal Outlook 2021-22* and the *Budget 2022-23*.

Developments in COVID-19-related assistance

Some key programs of industry assistance were extended beyond the *Budget 2020-21*. However, these extensions were generally temporary, with the majority of COVID-19-related assistance to be phased out according to defined schedules. As noted in the *Mid-Year Economic and Fiscal Outlook 2021-22*:

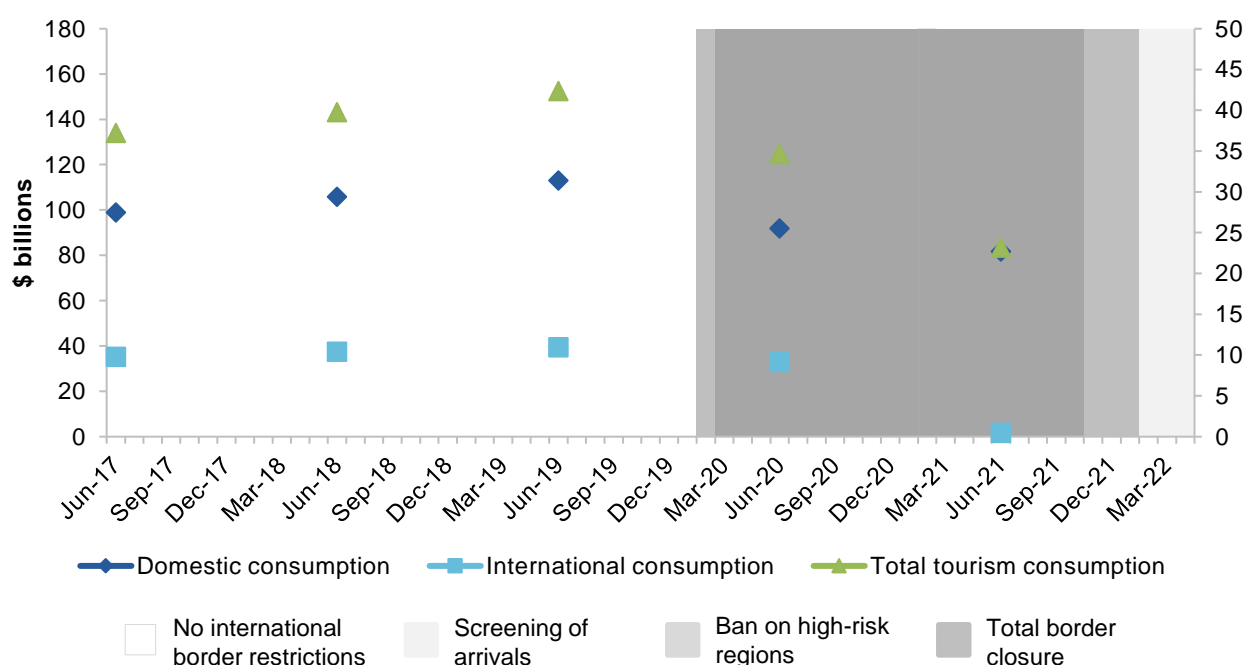
Commonwealth business support is being phased out as vaccination targets are reached, health restrictions are relaxed and economies are able to reopen safely. (Frydenberg and Birmingham 2021, p. 7)

These assistance programs focused on sections of the economy that continued to be affected by the pandemic despite the overall recovery during the 2020-21 financial year — such as tourism, aviation, the arts sector, and some human services.

In addition, the Reserve Bank of Australia (RBA) implemented its own policy response to COVID-19 for the banking sector, beyond the functions usually used in an economic downturn. While the *Trade and Assistance Review* (TAR) typically only assesses assistance provided by governments, the nature of the Term Funding Facility implemented by the RBA shares many features in common with other forms of industry assistance.

Extended assistance to aviation and tourism

Tourism and transport sectors — particularly aviation — suffered significant downturns in activity across 2020-21. Australia's international borders were closed for the duration of the financial year, aside from exceptional circumstances. During this time, international tourism consumption collapsed, while domestic tourism consumption fell marginally from 2019-20 levels (figure 2.2). Data are not yet available for tourism consumption for 2021-22, although given the opening of international borders in late 2021, there is likely to be some growth in international tourism consumption.

Figure 2.2 – Tourism consumption fell during the COVID-19 pandemic**Tourism consumption (\$ billion) and border restrictions from June 2017 to April 2022**

Sources: ABS (*Australian National Accounts: Tourism Satellite Account, December 2021*, Cat. no. 5249.0); University of Oxford (2022).

The Government will provide \$58.6 million over two years from 2021-22 to continue support for the Australian tourism sector as part of the Government's response to the COVID-19 pandemic (Frydenberg and Birmingham 2021, p. 234).

The Australian Government also provided funding of \$767.2 million over two years to support the aviation sector. This included funding up to December 2021 to support domestic aviation, including subsidies to preserve core domestic aviation capabilities; assistance to help domestic airports meet the costs of security services; extending a 50 per cent waiver for domestic air services charges to aircraft operators; and extending a 50 per cent subsidy of mandatory training, certification and accreditation for ground handling companies (Frydenberg and Birmingham 2021, p. 218).

The funding also extended assistance to international aviation, up to March 2022. This included an extension of the International Aviation Support program; the establishment of a new program to partially meet international airport operators' fixed costs associated with security screening.

Some assistance was also provided to freight transport via the International Freight Assistance Mechanism, which continued until 30 June 2022 and aimed to keep two-way supply chains open with key overseas markets (Frydenberg and Birmingham 2021, p. 218).

Human services

The Government provided \$361.9 million in 2021-22 to child care services (Frydenberg and Birmingham 2021, p. 223). This included \$288 million to support child care service providers that were impacted by COVID-19 lockdowns in Commonwealth-declared hotspots. It also included \$73.9 million for the

Inclusion Support Program, which will subsidise the cost of additional educators to support the inclusion of children with additional needs.

Rounding out arts sector support

The Government will provide an additional \$38.3 million over two years from 2021-22 in assistance to the arts sector (Australian Government 2022, p. 101). A significant portion of this funding relates to the gradual phasing out of larger assistance programs.

For example, across 2020-21 and 2021-22, the Restart Investment to Sustain and Expand program provided \$200 million of assistance to 'organisations with the primary purpose of the arts and entertainment' (DISER 2022e). The extension into 2022-23 consists of a further \$20 million to 'phase-down' the Fund (DITRDC 2022a).

The Australian Government will also provide \$9.3 million over two years from 2021-22 for the National Museum of Australia, and \$9 million in 2021-22 for a second round of support to independent cinemas affected by COVID-19. The Government also extended the Temporary Interruption Fund for a further six months to 30 June 2022 (DITRDC 2020, 2022b, p. 396).

Financial services

As an independent central bank that is accountable to the Australian Parliament, the RBA does not typically undertake anything akin to industry assistance in the setting of monetary policy. As part of its response to COVID-19, the RBA established the Term Funding Facility (TFF) in March 2020, which allowed low-cost three-year funding to authorised deposit-taking institutions (ADIs). 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 of funding was outstanding (RBA nd).

Essentially, the TFF allowed banks to lock in three-year fixed loans at borrowing rates of 0.25 per cent between March and November 2020, and then at 0.1 per cent 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; RBA nd). The RBA described the TFF as having two objectives:

- to reinforce the benefits to the economy of a lower cash rate, by reducing the funding costs of ADIs and in turn helping to reduce interest rates for borrowers. It complements the reduction in funding costs from the Reserve Bank's target for three-year Australian Government bond yields.
- to encourage ADIs to support businesses during a difficult period, ADIs could access additional low-cost funding if they expanded their lending to businesses. The scheme encouraged lending to all businesses, although the incentives were stronger for small and medium-sized enterprises (SMEs). (RBA nd)

Commercial banks, in turn, provided a COVID-19 response of their own to mortgage-holders, allowing deferrals on payments. As such, while the RBA effectively provided industry assistance to banks via favourable settings, it is not straightforward to classify this as industry assistance, let alone quantify any gains to financial institutions.

However, TFF participants may eventually receive something akin to a subsidy, depending on the RBA's cash rate decisions up to and including 30 June 2024.

The \$430 billion that commercial financial institutions have in their exchange settlement accounts at the RBA will resume earning interest above the current zero level. The banks are not lending the

excess liquidity, which will earn a risk-free return. ... The faster and higher the cash rate rises before the TFF gradually rolls off in 2023 and 2024, the bigger the subsidy will become. (Kehoe 2022)

The successive increases in the cash rate in May and June 2022 resulted in the equivalent of a public subsidy to the commercial banks that participated in the TFF. Over the next two financial years, the RBA's decisions concerning the cash rate will determine the extent of industry assistance that will arise via the TFF (with higher cash rates resulting in greater levels of assistance).

2.2 Assistance for clean technologies

The 2015 Paris Agreement contained an overarching goal of limiting global warming to well below 2 degrees celsius. In 2020, as part of its updated Nationally Determined Contribution to the Paris Agreement, Australia outlined its approach to emissions reductions, while affirming earlier commitments to reduce emissions by 26 to 28 per cent below 2005 levels by 2030. In 2021, a further update to the Nationally Determined Contribution included a commitment to net zero emissions by 2050 (DISER 2021e, p. 1).

In the 2021-22 budget, the Australian Government committed \$1.6 billion over ten years from 2021-22 (including \$761.9 million over four years from 2021-22) to incentivise private investment in technologies identified in the Government's Technology Investment Roadmap and Low Emissions Technology Statement (LETS). In October 2021, the Australian Government released Australia's Long-Term Emissions Reduction Plan ('The Plan') which committed \$20 billion to be spent on low emissions technologies by 2030 (DISER 2021d, p. 10).

The Plan was based on five key principles¹², two of which are particularly relevant to industry assistance: the focus on technology as the means of reducing carbon emissions without additional costs to households or businesses; and the reduction of costs of new energy technologies (DISER 2021d, p. 11). The Australian Government made several funding commitments to support the development, commercialisation and widespread adoption of specific technologies to reduce carbon emissions.

Climate and energy policy settings are likely to continue to change and will remain one of the main topics of interest of future reviews of the economic environment facing Australian businesses.

Why invest in clean technology?

There are several in-principle rationales for governments to invest in emerging clean technologies, given the market failures¹³ associated with climate change and emissions abatement.

- Greenhouse gas emissions are a negative externality.
- Research and development in clean technologies has 'public good' characteristics. Given that knowledge spillovers are not internalised in commercial returns, there is a risk of underinvestment without government intervention.

¹² The principles listed are: 'Technology not taxes'; 'Expand choices, not mandates'; 'Drive down the cost of a range of new energy technologies'; 'Keep energy prices down with affordable and reliable power'; and 'Be accountable for progress'.

¹³ The rationale for government intervention also requires that market failures be 'substantial and amenable to government action, without giving rise to even larger costs' (Banks 2008, p. 12).

- New technologies can also suffer from ‘infant industry’ issues, where a combination of low demand and low supply can limit incentives for firms to invest in an emerging industry, hindering development.¹⁴ Such arguments have been applied to hydrogen, where bulk supply is dependent on certainty about demand from developing industries, and vice versa (The Economist 2021).

More broadly, the prospect of climate change presents significant challenges for intergenerational welfare, complicating the short-term consideration of pollution as an externality. Given that the effects of climate change are estimated to compound over longer periods of time, decisions made today about pollution would have a greater effect on future generations than those currently living. While governments may be better placed than individuals to make decisions across a longer time horizon, climate policy entails potential trade-offs between the welfare of current and future citizens.

Indeed, relatively long time-horizons are inherent in climate policy and these entail greater uncertainty in a number of areas (such as future global economic conditions and the state of technology). It can be difficult to determine the extent of immediate action required.¹⁵

Current Australian Government modelling forecasts that the Technology Investment Roadmap will contribute 40 per cent of the emissions reductions to achieve net-zero emissions by 2050 — a further 15 per cent will be achieved via global technology trends, and a further 15 per cent from other (unspecified) technological breakthroughs (DISER 2021d, p. 15).

Given the strong public policy rationale for emissions abatement policy, the key decision for governments is how best to achieve its climate objectives. Public investment in emerging clean technologies should be subject to cost-benefit analysis, accounting for the likely social costs and benefits of those investments over time. Moreover, in determining how public funds should be used in carbon abatement, it is important to consider the net costs and benefits of alternative approaches.

Challenges of investing in clean technology

In general, public investment in emerging technologies comes with the risk of selecting technologies that fail to subsequently materialise on a commercial scale. This presents risks both for initial investment and ongoing policy choices — for instance, if governments are reluctant to admit that a technology has failed to develop as hoped, this may lead them to invest further taxpayer funds in the industry, to little avail (Banks 2008, p. 15; Emmerly 1999; Neely 1993; *The Economist* 2010; 2022).

The Australian Government sought to manage some of the risks inherent in emerging technologies by simultaneously allocating assistance to a number of technologies such as hydrogen, alternate biofuels and soil carbon capture. Its process for selecting and prioritising different technologies — the Technology Investment Roadmap — considered the varying risk profiles of different investments (box 2.1). In time, Australian Governments will face equally important decisions on which investments should be expanded and whether assistance should be reallocated.

¹⁴ The use of the ‘infant industry’ argument carries significant risks of ongoing discriminatory assistance, as exemplified by Australia’s history of protectionism (Banks 2008). However, there are theoretically circumstances where it may apply (PC 2020, pp. 14–15), such as where private capital markets are not willing to support large initial investment, or where public and private sectors differ significantly in how they evaluate the likely returns to an infant industry.

¹⁵ Complicating these considerations is the risk of triggering ‘tipping points’ in the climate system, positive feedback loops that threaten to compound the rate of warming, which have led some to emphasise the importance of near-term emissions abatement (Lenton et al. 2019).

Box 2.1 – Technology Investment Roadmap

The Roadmap ‘sets a process to develop and deploy low emissions technologies’, by:

- surveying new and emerging low emissions technologies
- identifying priority technologies (those with the largest impacts, where Australia has an advantage and where government can make a difference)
- setting a goal for each priority technology (such as targets to reduce costs to a level that is competitive with existing technologies)
- identifying pathways and mechanisms to meet those goals
- investing to help the technologies reach their respective goals
- measuring whether government investments are making a difference, and making changes in response.

In practice, the Roadmap is implemented through annual Low Emissions Technology Statements (LETS), which identify the prioritised technologies and specific goals for government assistance. The 2021 LETS identified six technologies — five from the first LETS in 2020, plus a new technology of ultra low cost solar — and their associated goals:

- clean hydrogen — production under \$2 per kg
- electrical energy storage for firming — under \$100 per MWh
- low emissions materials (steel and aluminium) — under \$700 and \$2200 per tonne (respectively)
- carbon capture and storage (CCS) — carbon dioxide (CO₂) compression, hub transport and storage under \$20 per tonne
- soil carbon measurement — under \$3 per hectare per year
- ultra low-cost solar electricity generation — \$15 per MWh.

Source: DISER (2021j, 2021g, p. 8).

Further risks apply more specifically to investments in *clean technology*, regarding whether the technology indeed contributes towards the overarching policy objective of achieving net zero carbon emissions by 2050. For example, the selected emerging technologies could prove commercially viable while being ineffective as a means of emissions abatement. Other assistance may have poor additionality, supporting actions that would have taken place without the assistance.

The absence of an economy-wide price on emissions only heightens the risk that assistance fails to reach those technologies that will promote least-cost abatement. In such cases, the assistance provided to these technologies might be regarded more as a form of industry assistance than emissions abatement policy. Moreover, they risk crowding out more effective alternative investments in emissions abatement.

The focus on frontier clean technologies aims to reduce the extent to which future production processes generate negative externalities, rather than using a pricing mechanism to create an incentive for businesses to avoid generating the externality. However, they are not ready substitutes. This is because of the reasons set out above, and because a focus on emerging technologies provides little incentive for emissions reduction in the period prior to large scale deployment of the new technology.

More specific risks and challenges apply to each broad form of carbon abatement technology (discussed below). For example, the prospect of using ‘negative emissions’ technology to draw down current carbon emissions at some point in the future may discourage governments and businesses from pursuing those emissions abatement options that are available today (Anderson and Peters 2016, p. 183; Lenzi 2018,

pp. 2–3). In some circumstances, this could result in a form of moral hazard.¹⁶ As the Global CCS Institute observed, ‘there is concern among policymakers that if emissions reductions are not prioritised, [the promise of future carbon dioxide removal] could be used to delay climate action’ (2021, p. 59).

Key assistance measures

In the 2021-22 budget, the Australian Government committed \$1.6 billion over ten years from 2021-22 (including \$761.9 million over four years from 2021-22) to incentivise private investment in technologies identified in the Government’s Technology Investment Roadmap and Low Emissions Technology Statement (Australian Government 2021, p. 138). These commitments exist alongside established climate-related assistance programs such as the Renewable Energy Target.

Priority areas in Australia’s Long-Term Emissions Reduction Plan centre around assistance to the development and implementation of cleaner fuel and energy sources as well as carbon offset technologies (table 2.1). This entails considerable assistance to the industries associated with each technology, with the vast majority of funding committed towards hydrogen fuel, carbon capture, use and storage (CCUS) and future fuels and vehicles. A significant proportion of the Plan centres on research and development.

The remainder of this section provides further detail on assistance to these priority areas and outlines some of the associated rationales and challenges.

Table 2.1 – Summary of assistance measures for clean technologies^{a,b}

	Program	Description
Assistance for cleaner fuel and energy	Hydrogen fuel	\$1 billion in direct Australian Government assistance (excluding CCUS). ^a State Governments have also provided funding to support hydrogen hubs in their own jurisdictions, including in NSW (\$70 million), WA (\$47.5 million), Victoria (\$10 million), and Tasmania (\$0.2 million). ^a
	Future fuels and vehicles	\$2.1 billion for low emission vehicle and future fuel technologies. ^b
	Large-scale energy storage	\$100 million in grants for large-scale battery energy storage projects for projects of 70 MW or larger. ^c
	Ultra low-cost solar	Up to \$40 million is being made available through the Australian Renewable Energy Agency (ARENA) to support research and development of solar photovoltaic (PV) technology. ^d
Assistance for carbon capture and ‘negative emissions’	Carbon capture and storage	\$300 million to fund carbon capture, use and storage (CCUS) projects and advance technologies, including establishing CCUS hubs near industrial areas. ^a
	Soil carbon	\$1.6 million in Downforce Technologies Limited to scale its technology to measure soil organic carbon. ^e

a. DISER (2021i, pp. 24, 34, 37, 40, 44). **b.** DISER (2021f, p. 10). **c.** ARENA (2022, pp. 3–4). **d.** DISER (2022b). **e.** Taylor (2022).

¹⁶ If there were complete equivalence between immediate emissions reductions and future ‘negative emissions’, there would not necessarily be any form of moral hazard in choosing between them. The delay between the two options could be accounted for on the basis of net present value. However, moral hazard may arise if the two options are not equivalent — for instance, if the efficacy of future ‘negative emissions’ is poor or highly uncertain, or if the immediacy of emissions reductions is relevant (such as where the social costs incur over time and cannot be reversed).

Cleaner fuel and energy

Hydrogen fuel

The extent to which hydrogen fuel might contribute to overall emissions abatement partly depends on how it is produced (box 2.2). However, the use of so-called ‘clean hydrogen’ could come to play a notable role in decarbonising a range of activities, including:

- as a fuel to either blend with or replace natural gas in homes and industry
- in fuel cells, to generate electricity for long-distance road, rail and marine transport
- as an industrial chemical feedstock for products such as ammonia and fertiliser
- as a combustion fuel for low-emissions steel and cement production (CEFC 2021, p. 6; DISER 2022c; *The Economist* 2021).

Hydrogen might also play an important role in energy storage for later use, which may be particularly important for intermittent renewable energy technologies.

Box 2.2 – Hydrogen production and decarbonisation

Hydrogen (H) is the lightest and most common element in the universe. It is (at standard conditions) a flammable gas that can be burned to produce energy, without producing carbon emissions (the only by-product is water). However, pure hydrogen (H₂) is not found naturally on Earth, so must be produced using energy. As such, ‘hydrogen is better thought of as an energy carrier than an energy source’ (COAG Energy Council 2019, p. 3).

Globally, most hydrogen that is used as fuel is ‘grey’ hydrogen, produced by burning fossil fuels with air and steam — referred to as ‘steam-methane reforming’ if it uses natural gas, or ‘gasification’ if it uses coal. These processes use 6 per cent of the world’s natural gas supply, 2 per cent of its coal and (because none of the resulting CO₂ emissions are currently captured and stored) emit more than 800 million tonnes of carbon dioxide. This makes the industry’s emissions similar to those of Germany (*The Economist* 2021).

The main alternative method of production is electrolysis, which splits water into hydrogen and oxygen. Although the electricity used in this process can be produced by fossil fuels, if it is sourced from renewable energy the resulting hydrogen is carbon-free (‘green’ hydrogen). Alternatively, if fossil fuel use is combined with large scale carbon capture and storage that is completely effective, the resulting hydrogen can be similarly carbon-free (known as ‘blue’ hydrogen). Together, the Australian, State and Territory Governments generally refer to both green and blue hydrogen as ‘clean’ hydrogen.¹⁷

Energy stored as hydrogen can also be transported, allowing regions with a surplus of potential renewable energy (such as Australia), to more easily export it to other countries (DISER 2022c). But the laws of thermodynamics also mean that producing, storing and transporting hydrogen always requires more energy than can be obtained from the hydrogen (Dias et al. 2020, pp. 5–6; *The Economist* 2021).¹⁸

¹⁷ Methane pyrolysis (known as ‘methane cracking’) can also be used to create ‘turquoise’ hydrogen, where methane (CH₄) is heated in a low-oxygen environment to separate hydrogen (H) from carbon (C).

¹⁸ A hypothetical exception would be where controlled nuclear fusion were to become a feasible and viable alternative.

Box 2.2 – Hydrogen production and decarbonisation

One key advantage of hydrogen as an energy source is its high energy density by *weight* — it has nearly three times the energy density of petrol, at 120 MJ per kg, compared with about 44 MJ per kg (*The Economist* 2021; US EERE 2022). However, it has a very low energy density by *volume*, and requires pressurisation or liquification. Liquid hydrogen is still less energy dense than most fossil fuels — by one estimate, a trans-Atlantic 747 flight would require filling the entire passenger and cargo space with liquid hydrogen. As a result, pure hydrogen is unlikely to be a major substitute for long-haul transportation, particularly in aviation and shipping (*The Economist* 2021; US EERE 2022).

As an alternative, hydrogen can be ‘stored’ in other materials through chemical processes. One example is through the production of ammonia (NH₃) using clean hydrogen, which has a much higher volumetric and gravimetric energy density than pure hydrogen, as well as existing global storage and transport systems. Another alternative is to mix clean hydrogen with captured carbon dioxide (discussed below) to create methanol (CH₃OH), which can be used as a fuel substitute. A similar process can be used to create synthetic natural gas — which mostly consists of methane (CH₄) — in order to utilise existing natural gas infrastructure (Advisian 2021, pp. 67, 77–79, 83–84; Dias et al. 2020).

Due to this potential as a low-carbon fuel, the hydrogen industry has attracted considerable assistance from the Australian, State and Territory Governments over the past few years. By the end of 2021, the Australian Government alone had committed about \$900 million¹⁹ to hydrogen industry development to support its goal of reducing production costs to less than \$2 per kg (DISER 2021i, pp. viii–ix). The focus of this assistance has been to ‘overcome any barriers to development’, with a particular focus on building demand, achieving low-cost hydrogen production at scale, and reducing hydrogen delivery costs (DISER 2021i, p. v).

To coordinate between the different jurisdictions, the then Council of Australian Government Energy Council (now the Energy National Cabinet Reform Committee and the Energy Ministers’ Meeting) released a National Hydrogen Strategy in 2019, to achieve a vision ‘for a clean, innovative, safe and competitive hydrogen industry that benefits all Australians and is a major global player by 2030’ (COAG Energy Council 2019, p. viii).

A key part of the assistance to the hydrogen industry has been support for ‘hydrogen hubs’ — industrial regions where ‘producers, users and potential exporters of hydrogen across industrial, transport, export and energy markets are co-located’ (DISER 2021i, p. viii). By the end of 2021, the Australian Government had committed \$464 million in grants over five years to support the development of hydrogen hubs around Australia, with seven priority regions identified. These priority regions are mostly areas with existing industrial energy demand, suitably-skilled workforces and established energy and export infrastructure, such as Darwin, the Pilbara region, Latrobe Valley and the Hunter Valley (DISER 2021b; Morrison and Taylor 2021). State Governments have also provided funding to support hydrogen hubs in their own jurisdictions, including in NSW (\$70 million), WA (\$47.5 million), Victoria (\$10 million), and Tasmania (\$0.2 million) (DISER 2021i, pp. 34, 37, 40, 44).

To reduce costs and increase demand through large-scale hydrogen production facilities, the Australian Renewable Energy Agency (ARENA) announced in May 2021 that it had conditionally approved \$103.3 million in Australian Government grants for three commercial-scale renewable hydrogen projects, as part of its Renewable Hydrogen Deployment Funding Round. The selected projects will enable the export of ammonia from the Pilbara, as well as hydrogen blending in domestic gas networks in Western Australia and

¹⁹ Not including funding for CCS projects.

Victoria, through the construction of three 10MW electrolyzers, comparable to the largest built in the world (ARENA 2021; DISER 2021i, p. 26).

The Clean Energy Finance Corporation (CEFC) has also earmarked up to \$300 million of its \$10 billion portfolio for project finance that supports the growth of the Australian hydrogen industry and aligns with the National Hydrogen Strategy. Eligible projects include those that advance hydrogen production, develop export supply chains and infrastructure, establish hydrogen hubs, or help build domestic demand (CEFC 2021, pp. 1, 6; DISER 2021i, p. 26).

The Australian Government is also providing \$24.9 million of assistance for the development and commercialisation of hydrogen-ready turbines and associated infrastructure in new gas generators. These turbines can use both hydrogen and natural gas in various blends, enabling an eventual transition from natural gas to hydrogen for power stations. The first project to receive funding under this program was the Tallawarra B power station under construction by EnergyAustralia, which received \$5 million, in addition to \$78 million of support provided by the NSW Government (DISER 2021i, pp. 28, 34; Taylor 2021b).²⁰

The CSIRO is also investing \$38 million over the next five years on research to help develop a hydrogen industry in Australia, in collaboration with industry partners. This spending is supported by an additional \$12 million from the Australian Government and \$18 million from industry partners. The goal of this research is to bring down the cost of production and distribution of clean hydrogen to less than \$2 per kilogram (DISER 2021i, pp. 29–30; Taylor and Porter 2021).

The Australian Government has also committed \$565.8 million for international partnerships on low emissions technology. Partnership agreements to build hydrogen supply chains and cooperate on research have already been signed with Germany, Singapore, Japan, South Korea and the United Kingdom. The most extensive of these is with Japan, which includes the Hydrogen Energy Supply Chain Pilot Project — a \$500 million facility (including \$100 million of Australian and Victorian Government funding) in the Latrobe Valley, exporting grey hydrogen to Japan — and the Clean Hydrogen Trade Program — \$150 million from the Australian Government for clean hydrogen supply chain projects that focus on exports to Japan (DISER 2021i, p. 27; Morrison and Taylor 2022; Turnbull, Cash and Frydenberg 2018).

Acting jointly, the Federal, State and Territory Governments have also:

- started a review of legal and regulatory frameworks for hydrogen
- agreed to amend the national gas regulatory framework to incorporate hydrogen
- started a National Hydrogen Infrastructure Assessment to assess future needs
- commenced work on industry development, including skills and training
- supported analysis to understand community attitudes towards hydrogen (DISER 2021i, p. viii).

State and Territory Governments are also separately committing significant amounts of assistance to the hydrogen industry in their jurisdictions. Examples include:

- the NSW Government's Hydrogen Strategy, providing \$3 billion of incentives to support industry development and reach 110 000 tonnes of green hydrogen production by 2030
- the Victorian Government's partnership with National Energy Resources Australia to co-fund and develop regional hydrogen technology clusters
- the Queensland Government's \$25 million Hydrogen Industry Development Fund, to fund green hydrogen projects

²⁰ The Snowy Hydro's planned \$600 million development of a gas turbine in Kurri Kurri in the Hunter Valley (funded by the Australian Government) will also be hydrogen-ready (DISER 2021i, p. 28).

- the WA Government's demonstration plant, using green hydrogen to firm up and support a regional microgrid
- the SA Government's \$4.9 million grant to support a demonstration plant blending green hydrogen into gas networks
- the ACT Government's support for zero-emissions vehicles (including hydrogen fuel cell vehicles) through tax and registrations exemptions and government fleet purchases (DISER 2021i, pp. 34–47).

Future fuels and vehicles

One potential application of hydrogen fuel is in transport. The transport sector is one of the most significant sources of economy-wide emissions — after accounting for less than 10 per cent of Australia's emissions in 1990, the transport sector now accounts for almost 19 per cent of total emissions (DISER 2022d). The transport sector stands to make an important contribution to Australia's long-term emissions reduction goals.

Broadly, decarbonising transport would require a transition away from established technologies that rely on internal combustion engines and fossil fuels, towards those powered by low emissions electricity and alternative fuels like hydrogen. Some of the key challenges for policy relate to the implementation of fuelling infrastructure and the uptake of new vehicles. Businesses and consumers could more easily take up electric or hydrogen-powered vehicles if there were a greater number of fuelling stations, and if the total cost²¹ of low emissions vehicles were comparable to internal combustion-powered vehicles. Greater consumer take-up would allow suppliers to leverage economies of scale²², to expand the provision of both vehicles and fuelling stations, resulting in reduced prices.

The evolution of transport technology is often driven by market forces as opposed to government intervention — consumer preferences help to drive improvements in features and quality among competitive manufacturers, while cost and efficiency are powerful incentives to household and commercial customers alike. However, governments intervene in aspects of transport technology that have implications for the environment or for safety. Examples include the mandated transition to unleaded fuel for road vehicles in 2002, Australian Design Rules on vehicle safety and pollution and attempts to influence the price of biofuel-blended fuels. The provision of subsidies for biofuels in Australia has been designed to heavily favour domestic production — in practice, a form of assistance for the agricultural sector (box 2.3).

The Australian Electric Vehicle Market Study (2018, p. 78) undertaken for ARENA and the CEFC suggested various levers that could be used to increase uptake of low-emissions vehicles, including:

- purchase incentives for consumers
- procurement targets for government fleets
- import regulation, including third party imports
- fuel efficiency regulation, such as the implementation of a 105 g/km fuel efficiency standard
- bans on internal combustion engine vehicles over a defined timeline.

In the absence of fuel efficiency standards, manufacturers have the incentive to divert their limited inventories of low-emissions vehicles to markets that are subject to fuel efficiency standards, in order to avoid penalties in those markets. As the only OECD country without fuel efficiency standards, there is a potential risk of being a 'dumping ground' for higher polluting vehicles (Electric Vehicle Council 2021). Having not adopted this approach, the evolution of fuel efficiency in Australia will partly depend on vehicle

²¹ The ratio between up-front vehicle costs (i.e. purchase price) and running costs (including fuel and maintenance) are likely to differ between electric vehicles and internal combustion-powered vehicles, due partly to the much lower costs of fuelling for electric vehicles. As such, consumer behaviour may not be determined by up-front costs alone.

²² Noting that this can be complicated in practice by differences in fuel efficiency standards and Australia's position as a small market for vehicle imports.

turnover — a potentially slow evolution, given the average age of vehicles in 2021 was 10.6 years and has increased marginally in the past five years (ABS 2021).

Direct financial incentives could influence consumers to adopt low-emissions vehicles earlier. However, this is also complicated by the lack of maturity in the electric vehicle market — the production of hydrogen-powered vehicles for commercial purposes is at a very early stage, and the range of commercially available electric vehicles remains considerably narrower than for internal combustion-powered vehicles. As such, there are likely to be non-financial barriers to consumers' uptake of low-emissions vehicles. In addition, given the relatively high up-front costs of electric vehicles, any subsidy would have significant distributional implications.

Box 2.3 – Assistance for biofuel

The Australian Government provides various forms of assistance to biofuel industries. For instance, in November 2021, it provided \$33.5 million for the Bioenergy Roadmap, which included research, development and deployment of advanced biofuels, particularly in sectors where abatement is difficult (such as aviation and marine transport) (Ludlow 2021).

Ethanol and biodiesel are also subject to a much lower tax rate when produced domestically — 14.2 cents and 8.7 cents per litre respectively, compared with 43.3 cents per litre when imported. The differential has been described as being due to 'the important role that domestic fuel ethanol and biodiesel producers play in the economy' (Frydenberg 2015). Ethanol producers have also benefitted from state government mandates, requiring 6 per cent of fuel sold in New South Wales and 4 per cent in Queensland to be ethanol (IPART 2021; Queensland Government 2019). An ancillary goal of current fuel tax settings is regional development and industry assistance, particularly through concessions and subsidies for biofuels produced from agricultural products (PC 2016, pp. 394–395; Trebeck, Landels and Hughes 2002, pp. 39–40).

However, despite this tax and regulatory support, Australian consumers have consistently shown a preference for non-ethanol fuels (Jackson 2020). For example, between 2010-11 and 2020-21, sales of ethanol-blended petrol fell from 3361 megalitres to 1932 megalitres — a drop of over 40 per cent, compared with a decline in total gasoline (petrol) sales of about 15 per cent over the same period — despite the introduction and expansion of ethanol mandates in Queensland and New South Wales during the decade (DISER 2021c, p. 13). For these and other reasons, in 2016 the Commission recommended that the Australian, New South Wales and Queensland Governments remove their supports for the ethanol and biodiesel industry (PC 2016, p. 398).

The Australian Government has committed \$2.1 billion for low emission vehicle and future fuel technologies (DISER 2021f). It does not involve a regulatory approach or emissions standards, nor does it provide consumers with incentives to use electric vehicles.

This includes a public investment of \$250 million in the Future Fuels Fund, which involves partnerships with industry to invest in battery charging and hydrogen refuelling infrastructure. It focuses on:

- public electric vehicle charging and hydrogen refuelling infrastructure
- heavy and long distance vehicle fleets
- light vehicle commercial fleets
- household smart charging.

It also includes investments of about \$360 million by 2026 for projects focused on new vehicle technologies and future fuel development, through the Australian Renewable Energy Agency (ARENA). Changes to the Emissions Reduction Fund method will aim to improve incentives for investment in electric vehicle charging and hydrogen refuelling infrastructure.

Large-scale energy storage and ultra low-cost solar

Emissions abatement in the electricity generation sector may also have implications for emissions abatement far beyond the sector itself, including through the use of renewable energy sources to power electric vehicles, and the production of green hydrogen for use in transport and industry. There is widespread consensus that wind and solar energy will play a significant role in meeting global climate policy objectives. For instance, the International Energy Agency (IEA) noted that:

Our pathway calls for scaling up solar and wind rapidly this decade, reaching annual additions of 630 gigawatts (GW) of solar photovoltaics (PV) and 390 GW of wind by 2030, four-times the record levels set in 2020. For solar PV, this is equivalent to installing the world's current largest solar park roughly every day (IEA 2021b, p. 14).

Industry assistance to renewable energy is longstanding in Australia, and includes the Renewable Energy Target (box 2.4). In addition, feed-in tariffs provide payments from energy retailers to owners of renewable energy sources for electricity fed into the grid. While feed-in tariffs are available in all states and territories, the regimes have varied considerably over time in terms of structure and price determination. Minimum rates for feed-in tariffs are no longer mandated in NSW, Queensland, or Western Australia (though IPART provides a benchmark price as a guide to retailers).

Box 2.4 – The Renewable Energy Target

The Renewable Energy Target (RET) has been in operation for over 20 years and has evolved over that period.

- In 2001, the initial aim of the 'Mandatory Renewable Energy Target' to source 2 per cent of the nation's electricity generation from renewable sources.
- In 2009, this was increased to ensure renewable energy made up the equivalent of 20 per cent of Australia's electricity (41 000 GWh).
- In January 2011 the RET was split into two parts. The Large-scale Renewable Energy Target (LRET) created a financial incentive to establish and expand renewable power stations such as solar farms, wind farms and hydro-electric power stations and deliver the majority of the 2020 target. The Small-scale Renewable Energy Scheme (SRES) created financial incentives to install solar panels, wind, hydro systems, solar water heaters and air source heat pumps.
- The Renewable Energy (Electricity) Amendment Bill 2015 was amended in June 2015, reducing the LRET from 41 000 GWh to 33 000 GWh in 2020 (with adjustments to both interim and post-2020 targets).

The RET works by allowing large-scale power stations and the owners of small-scale systems to create large-scale generation certificates and small-scale technology certificates, respectively, for every megawatt hour of power they generate. Certificates are then purchased by electricity retailers (who supply electricity to householders and businesses) and submitted to the Clean Energy Regulator to meet the retailers' legal obligations under the RET. This creates a market which provides financial incentives

Box 2.4 – The Renewable Energy Target

to both large-scale renewable energy power stations and the owners of small-scale renewable energy systems.

Various estimates have been made with regard to the cost of the RET. Principal Economics (2015) estimated the cost of the RET in 2013-14 at \$1.6 billion (\$668 million for the LRET; \$932 million for the SRES) (PC 2017a, p. 17). The AEMC (2021, p. 4) estimated that nationally, environmental policies collectively accounted for 9 per cent of residential retail electricity prices in Australia in 2020-21, with the RET contributing 67 per cent of this (the LRET and SRES contributed 26 percentage points and 41 percentage points, respectively).

Sources: CER (2022a, 2022b).

Historically, the two key issues facing renewable energy production have been:

- the cost of renewable energy, relative to fossil fuel-based generation, and
- intermittence: the potential for renewable energy technologies like solar and wind to not generate electricity when it is needed.

While renewable energy costs have fallen over time, particularly new-build generation (Ginn 2021), Australian Government support for research and development is targeting further cost reductions. The LETS has identified a stretch goal of \$15 per MWh for the levelised cost of energy for utility-scale solar PV. The Australian Government will provide up to \$40 million to support research and development of solar PV technology, again provided through ARENA. The aim is to deliver the Government's target of 30 per cent module efficiency and a cost of 30 cents per installed watt at utility scale by 2030 (DISER 2022b).

With regard to the latter, battery technology has enjoyed considerable improvements in cost and availability over the past decade. This has taken several forms, although the vast majority of use to date has been in the form of lithium-ion batteries (box 2.5).

Both large-scale storage facilities and small-scale residential storage systems have grown significantly in the past five years. Australia's first large-scale battery was installed in South Australia in 2017 and, since then, several more have been built, announced, or are in construction (figure 2.3).

Box 2.5 – Battery storage technologies

Energy storage can take several forms, including chemical processes or a pumped hydro system. Each form allows electrical energy to be used at a later time. Storage technology is likely to evolve as needs (and grid technologies) change. For instance, in a review of storage technologies for large scale PV plants, Bullich-Massague et al (2020, p. 1) conclude that:

- (i) the current grid codes require high power – medium energy storage, being Li-Ion batteries the most suitable technology, (ii) for complying future grid code requirements high power – low energy – fast response storage will be required, where super capacitors can be the preferred option, (iii) other technologies such as Lead Acid and Nickel Cadmium batteries are adequate for supporting the black start services, (iv) flow batteries and Lithium Ion technology

Box 2.5 – Battery storage technologies

can be used for market oriented services and (v) the best location of the energy storage within the photovoltaic power plays an important role and depends on the service, but still little research has been performed in this field.

Lithium-ion batteries are also the cheapest available form of grid-scale battery storage. Australian Government modelling estimates that these costs will continue to fall in response to further developments in battery cell technologies.

For 8 hour duration, the cost of electricity from storage for lithium-ion batteries is expected to decline from \$170 per MWh in 2021 to below \$100 per MWh over an 8 hour duration as early as 2025, and below \$40 per MWh in 2050 ...

Based on industry feedback that there is market demand for 4 hour storage over the medium term, energy storage costs were also analysed for 4 hour duration.

For 4 hour duration, the cost of electricity from storage for lithium-ion batteries could decline from \$150 per MWh in 2021 to below \$100 per MWh over a 4 hour duration before 2025, and below \$30 per MWh in 2050. (DISER 2022a, p. 20)

Sources: Bullich-Massagué et al. (2020); CEC (nd); DISER (2022a, pp. 20–21).

Figure 2.3 – Large-scale energy storage in Australia



Source: Renew Economy (2022).

In December 2021, the Australian Government announced that it would provide \$100 million in grants for large-scale battery energy storage projects (ARENA 2022, p. 3). The funding would be provided through the Australian Renewable Energy Agency (ARENA) for projects of 70 MW or larger — supporting three projects (ARENA 2021). This support is largely focused on implementation rather than research and development.

Carbon capture technologies

A functional system of ‘negative emissions’ technologies, such as carbon capture and storage (CCS), has been argued by some to be necessary to achieve global emissions-reduction objectives (Global CCS Institute 2018), in part due to its potential ability to offset emissions from economic activities that are difficult to decarbonise — such as livestock farming. Negative emissions technologies have also been identified as a key technology required beyond 2050, to reduce excess stocks of greenhouse gases in the atmosphere, thereby reducing the likelihood of the worst effects of climate change (IEA 2020; Johansson et al. 2020, pp. 1–2; van Vuuren et al. 2013, pp. 15–17). The Australian Government has committed significant assistance to further develop carbon capture, use and storage (CCUS) as well as soil carbon.

Carbon capture, use and storage

CCUS involves capturing carbon dioxide emissions, separating them from other gases, then compressing and permanently storing them.²³ There are many different methods available to capture emissions, and several ways to store the captured gas, each with different technical challenges and potential impacts on net emissions. Some of the most common methods are outlined in box 2.6.

At this stage of its development, there remain significant challenges to implementing CCUS.

For example, CCUS is costly to implement on a commercial-scale, making it unviable as a significant source of abatement in the near-term. In particular, retrofitting combustion sources (like power plants) with post-combustion capture mechanisms can be costly, while building new plants for oxy-fuel combustion or pre-combustion capture is even more costly. The CCUS process itself also uses energy, adding to these costs. And transportation to adequate storage sites (if the combustion source is not already located near one) can add significant additional costs, particularly to cool and compress the carbon dioxide after capture (Gonzales, Krupnick and Dunlap 2020).

Box 2.6 – Methods for carbon capture and storage

Industrial methods of capturing carbon dioxide generally fall into two categories — emissions source capture or direct air capture.

- Emissions source capture involves trapping carbon emissions near the point where they are created, in power plants or industrial process (including blue hydrogen production, discussed above). This can notionally result in zero emissions if the combustion fuel is a fossil fuel, or negative emissions if the fuel is biomass, such as wood pulp or wood waste. Capture can occur before combustion through the ‘gasification’ of fuel to produce hydrogen (discussed above). Or it can involve adding post-combustion carbon capture to existing facilities, by using a separation method on exhaust emissions (such as

²³ If captured carbon dioxide is used to create commercial products — such as carbonated beverages or synthetic natural gas (discussed above) — it is referred to as carbon capture, use and storage (CCUS) (DISER 2021h).

Box 2.6 – Methods for carbon capture and storage

solvents, sorbents, membranes or cryogenic systems). Oxy-fuel combustion systems can also be used to burn the fuel in an oxygen-rich environment, making subsequent separation easier.

- Direct air capture (DAC) involves removing carbon dioxide from the air, typically using industrial fans to concentrate airflow and then a solvent or other separation method. If powered by renewable energy, DAC can result in negative carbon emissions.

Once carbon dioxide has been captured, CCUS typically relies on geological storage, in porous rock layers deep underground. There are several types of geological formation amenable to storage, including:

- saline formations deep below freshwater aquifers
- depleted oil and natural gas reservoirs
- coal seams that are uneconomic to extract from
- igneous basalt formations, with concentrations of magnesium and calcium
- organic-rich shales with similar properties to coal.

Storage is typically made permanent by either a 'cap rock' layer that covers the reservoir or saline formation to prevent leakage, or by relying on chemical reactions between the carbon dioxide and basalt, coal or shale, to mineralise or absorb the carbon and permanently lock it in the stratum.

a. The incidental storage of carbon dioxide in reservoirs is a long-standing practice in the oil industry, through 'enhanced oil recovery' that uses carbon dioxide to push more oil or natural gas towards extraction wells.

Sources: ClearPath (2019); Global CCS Institute (2022b, 2022a); Gonzales, Krupnick and Dunlap (2020); IEA (2020); NETL (2022); *The Guardian* (2011).

Direct air capture (DAC) is also costly, largely due to the relatively low atmospheric concentration of carbon dioxide. Current cost estimates range from about US\$95 to US\$230 per tonne of carbon dioxide, with 'the lower end reflecting cost targets for future large-scale deployment' (IEA 2020). However, a number of pilot programs are trialling commercial DAC facilities — the largest relies on abundant geothermal energy and local basalt formations in Iceland (Carbfix 2022; Climeworks 2022).

Although some 'bioenergy with CCS' projects have achieved more competitive costs at about US\$25 per tonne of carbon sequestered, they also face deployment challenges that can limit their scale, due to constraints on the availability of sustainable biomass (IEA 2020).

Some storage methods also come with risks of leakage, potentially undoing much of the benefit of CCUS. These risks are greatest for CCUS that relies on storage in saline formations or depleted oil and gas reservoirs, which may be able to escape containment over a long time horizon, due to mildly permeable cap rocks, fractures or faults in the cap rock, or poorly-designed injection wells (Metz et al. 2005, pp. 242–243). Some forms of CCUS have also been associated with seismic activity (Verdon and Stork 2016, p. 928).

Another challenge to the commercial viability of CCUS is that no capture method near the combustion source is 100 per cent effective — this means that fossil fuel use relying on combustion-source capture methods can seldom achieve zero emissions in practice (Moseman 2021).

The Australian Government will provide \$300 million to fund CCUS projects, including the establishment of CCUS hubs near high-emitting industrial areas (DISER 2021i, p. 24). These hubs could potentially be used in the production of clean hydrogen from fossil fuels. The Government has also developed an Emissions Reduction Fund method to credit abatement from new CCS projects.

Soil carbon

Soil carbon focuses on organic means of capturing carbon, typically through the processes of plants taking in carbon from the atmosphere before eventually breaking it down and storing it in the soil (box 2.7). Analysis for the Plan suggests that soil carbon could reduce overall Australian emissions by between 4 and 16 per cent (Taylor 2022). Some of the key policy issues relating to soil carbon include how reliably it can store carbon, how reliably that storage can be measured, and the implications of its use for different sectors.

The ability for soil to store carbon depends heavily on environmental factors — desert soils, for example, may have less than 0.5 per cent carbon, while soils in wetlands or peat forests may contain 10 per cent carbon or more (Melillo and Gribkoff 2021). As such, the efficiency of soil carbon depends on rainfall patterns, which are highly variable across Australia, notwithstanding any increase in the influence of climate change. Modelling by the University of Melbourne and University of Tasmania found that within 30 years, carbon sequestration rates in soil will decline by 45-133 per cent (Dowler 2022).

Declining rates of soil carbon sequestration would have implications for the role of soil carbon in achieving policy objectives. Specifically, some scientists have raised doubts about the extent to which soil carbon in the agricultural sector could offset emissions from other sectors (Condon and Becker 2021). Rather, it may only contribute towards the goal of reaching carbon neutrality within the agricultural sector itself.

If climate policy objectives were to be achieved with a heavy reliance on soil carbon, it could require the agricultural sector to forgo other economic activities that use soil. If agricultural firms were to be provided with the incentive to reduce production in order to achieve climate policy objectives, this would raise questions as to whether similar incentives should apply to other sectors.

More immediate challenges for soil carbon relate to how accurately (and cost-effectively) sequestration rates can be measured. One of the priorities set in the Low Emissions Technology Statement is to reduce the cost of soil carbon measurement to less than \$3 per hectare per year (DISER 2021g, p. 8). The Australian Government has made funding commitments to further research into soil carbon measurement — for instance, through the Clean Energy Innovation Fund, it provided \$1.6 million to Downforce Technologies Limited to scale its measurement technology (Taylor 2022).

Given that investment in soil carbon is modest compared with some other technologies, the opportunity cost of public funds is negligible. The greater challenge for policy relates to how much reliance is put onto soil carbon to meet policy objectives. Assuming policy objectives concerning measurement are eventually met, it will be possible to better consider the role of soil carbon in meeting overall climate policy objectives. In the meantime, a key risk of both CCUS and soil carbon relates to potential complacency with regard to implementing other, more immediate forms of emissions reduction.

Box 2.7 – How soil carbon works

‘Soil carbon’ is a natural form of negative emissions ‘technology’, harnessing soil’s natural ability to store carbon. Soil is able to store carbon in two general forms.

- Particulate matter — particles of dead plants that are yet to completely decompose, holding in place the carbon they sequestered while growing.
- Mineralised matter — carbon that has been converted into mineralised material, commonly by bacteria, fungi, and microbial activity.

Box 2.7 – How soil carbon works

Mineralised matter is generally regarded as a more stable and enduring form of carbon storage, relative to particulate matter. While particulate matter has been estimated to store carbon in soil for between 1 and 50 years, mineralised material has been estimated to do so for between 10 and 1000 years (Lavallee and Cotrufo 2020).

The disruption of soils, through the conversion of natural ecosystems like forests and grasslands to farmland, disturbs soil structure and releases stored carbon. It has been estimated that the growth of global farmland over the past 12 000 years has released about 110 billion metric tons of carbon — roughly equivalent to 80 years' worth of present-day United States greenhouse gas emissions.

Similarly, the restoration of forests, grasslands, and wetlands has been pointed to as a means of restoring some of the carbon stocks once held in the global stock of soil. Carbon storage on agricultural lands can be improved through changed land management practices such as less intensive tilling, particular crop changes, and the addition of biochar to soils.

Sources: Lavallee and Cotrufo (2020); Lavallee, Soong, and Cotrufo (2019); Melillo and Gribkoff (2021).

Changes to the emissions reduction fund

In March 2022, the Australian Government announced changes to the operation of the Emissions Reduction Fund (ERF). The aim of the ERF is to provide incentives for participants to voluntarily reduce their emissions, providing Australian carbon credit units (ACCUs) in exchange for each tonne of emissions (box 2.8). In this way, the Australian Government provides public funds to participants in exchange for avoided emissions. Both the Future Fuels and Vehicles Strategy and the State of Hydrogen report made note of new ERF methods — to encourage refuelling infrastructure and to credit abatement from CCUS projects respectively (DISER 2021i, p. 24, 2021f, p. 14).

Increases in the Australian carbon credit unit (ACCU) price of about 200 per cent during 2021-22 led to a widening gap between ERF fixed-contract prices and secondary market prices. The Clean Energy Regulator considered the situation to be 'unsustainable', given that ERF participants increasingly had the incentive to default on their fixed-price contracts, incur relatively small damages outlined in their contracts, and seek to profit from historically high market prices (Calver 2022).

Changes to ERF rules announced in March 2022 allowed participants to opt out of fixed-delivery (fixed-price) government contracts and sell those credits on the open market. The most recent ERF auction excluded direct-delivery contracts, including only optional-delivery contracts. The changes allowed participants to benefit from historically high market prices, and led to a significant influx of ACCUs onto the market and a sharp fall in the market price (figure 2.4). The volatility of the ACCU price, and the uncertainty for market participants, may provide important context to the Plan in future years.

Box 2.8 – ACCUs and the Emissions Reduction Fund

The Emissions Reduction Fund (ERF) is a voluntary scheme that provides incentives for organisations and individuals to reduce their emissions by adopting new practices and technologies. Participants earn Australian carbon credit units (ACCUs) for emissions reductions, where each ACCU represents one tonne of stored or avoided carbon dioxide equivalent. ACCUs can be sold to generate income, either to the Government through a carbon abatement contract, or in the secondary market.

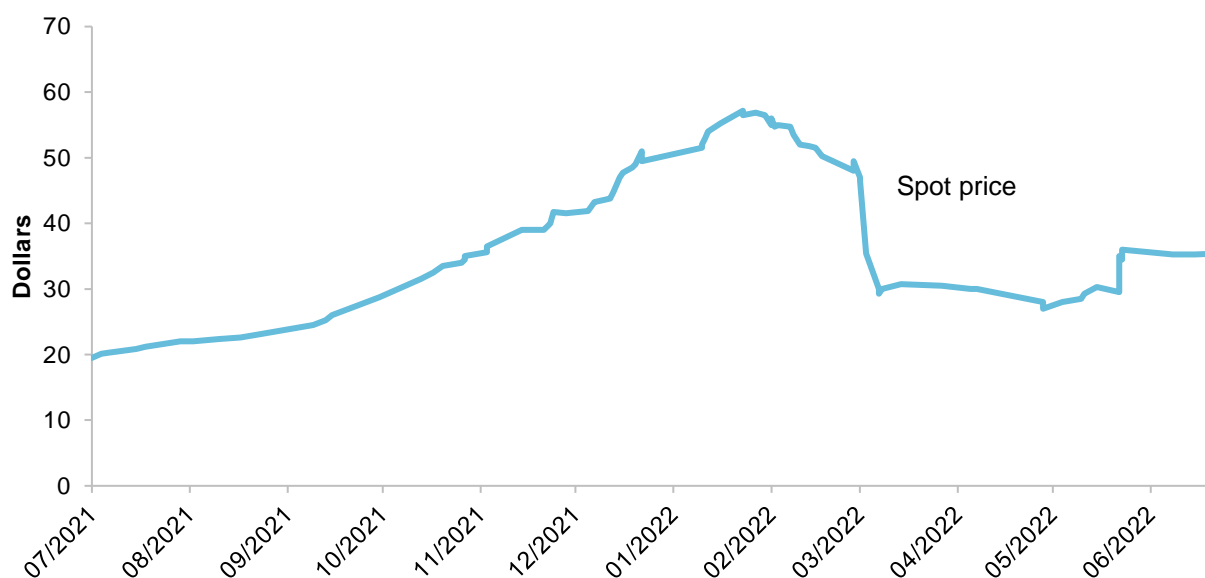
To ensure emissions reductions are not displaced by increases elsewhere in the economy, the Emissions Reduction Fund also includes a safeguard mechanism, which encourages large businesses to keep their emissions within historical levels.

Under the ERF, participants enter into a contractual arrangement to sell ACCUs to the Government, subject to an ERF auction. This is referred to as a carbon abatement contract (a contract), which could be based on a Fixed or Optional Delivery.

- A Fixed Delivery contract (previously referred to as a standard contract) involves agreement to sell a number of ACCUs to the Australian Government at a set price for the duration of the contract.
- An Optional Delivery contract involves the right, but not the obligation, to sell ACCUs to the Australian Government at an agreed price, within a set time.

Sources: CER (2021; 2021).

Figure 2.4 – The price of ACCUs fell following rule changes
ACCU spot price (\$), July 2021 to June 2022



Source: Demand Manager (2022).

2.3 Estimates of fossil fuel subsidies

In recent years, a number of organisations have claimed that the Australian Government provides substantial levels of industry support to the fossil fuel sector. By contrast, the International Energy Agency does not record any subsidies to fossil fuel consumption in Australia. Similarly, while this year's *Trade and Assistance Review* does identify individual programs that benefit the fossil fuel sector, its estimates of assistance to the sector are markedly lower than those of the IMF, the OECD, and the Australia Institute (table 2.2).

Table 2.2 – Estimates of Australian fossil fuel subsidies

Organisation	Latest estimate	Methodology ^a
International Energy Agency (IEA)		— 'Price-gap' approach
International Monetary Fund (IMF)	US\$44 billion	'Price-gap' approach
Organisation for Economic Cooperation and Development (OECD)	A\$10.4 billion	'Inventory' approach
Australia Institute	A\$10.3 billion	'Inventory' approach

a. The IEA's 'price-gap' approach measures the difference between prevailing market prices in individual countries and the supply price of fossil fuels. The IMF's 'price-gap' approach measures the difference between current fossil fuel prices and 'optimal' (externality-inclusive) prices. An 'inventory' approach tallies up specific government measures that the authors judge to support the production and consumption of fossil fuels.

Sources: Campbell et. al (2021, p. 1); OECD (2021); Parry et. al. (2021, p. 38).

This divergence largely reflects methodological differences between the various estimates, particularly with regard to the definition of 'assistance' or 'subsidies'. To an extent, these differences reflect the varied 'baselines' — what might be implicitly or explicitly regarded as 'normal' policy settings, departures from which may be judged to be industry assistance for a particular activity — that are used in the different assessments. This section examines the different methodologies used by each organisation.

A notable proportion of the divergence in estimates reflects the decision to either include or exclude fuel tax credits (FTCs) as a form of industry assistance. Section 2.4 explains why the Commission does not regard FTCs as industry assistance.

International Energy Agency (IEA) estimates

The International Energy Agency (IEA) conducts a top-down 'price-gap' analysis of fossil fuel-related energy subsidies. Its methodology considers the extent to which consumption subsidies in individual countries reduce fossil fuel prices for end-users below prevailing global market prices, which are generally taken to be the supply price of those fossil fuels (Parry, Black and Vernon 2021, p. 34).

The fuel subsidies that the IEA monitors are relatively common in developing economies and oil producing nations. As a result, the IEA identifies Libya, Venezuela, Uzbekistan, Algeria and Iran as the largest subsidy providers (as a proportion of GDP). By contrast, the IEA does not record any subsidies provided by Australia or other developed economies (IEA 2021a).

International Monetary Fund (IMF) estimates

IMF staff working papers also periodically estimate global and country-level fossil fuel subsidies using a top-down price-gap methodology. These estimates are divided between 'explicit' and 'implicit' subsidies.

- *Explicit subsidies* are broadly comparable to the IEA's price-gap measure discussed above, measuring the difference between the supply price for each fuel type and the prices paid by end-users. If user prices are above or equal to supply prices, the IMF defines explicit subsidies as being zero.

- Implicit subsidies cover the gap between the ‘efficient price’ of fuels and the end-user price. Efficient prices are calculated with reference to the supply price of fossil fuels, the externalities generated by the consumption of fossil fuels, and prevailing consumption tax rates.²⁴ External costs include estimates of the externalities associated with carbon emissions, local air pollution, road congestion, traffic accidents and road damage (Parry, Black and Vernon 2021, pp. 10–17).

In 2020, this analysis estimated that Australia’s fossil fuel subsidies totalled US\$44 billion. This equates to US\$1729 per capita, which was second only to the United States (US\$2006) among OECD countries. Given the absence of explicit Australian subsidies that would reduce fossil fuel prices below their supply price, the IMF’s estimate relates only to implicit subsidies. The major source of implicit subsidies for coal and natural gas was unpriced greenhouse gas emissions; for petrol and diesel; the main source was road congestion (Parry, Black and Vernon 2021, pp. 18, 38).

Previous iterations of this analysis estimated Australia’s fossil fuel subsidies at US\$29 billion in 2015 (Coady et al. 2019, p. 35). The difference over time appears to be partly due to changes in the assumed price on carbon, which increased from US\$40 per tonne in 2015 to US\$60 per tonne in 2020.

The Commission does not include any figure equivalent to the IMF’s implicit subsidies in the *Trade and Assistance Review*. The IMF working papers are largely measuring an under-pricing of externalities, which the Commission does not regard as ‘assistance’. Nevertheless, estimates of the value of negative externalities from fossil fuel consumption are useful for considering the merits of broader policy settings.

Organisation for Economic Cooperation and Development (OECD) estimates

The OECD has published annual data on fossil fuel support measures since 1994, using a ‘bottom-up’ approach (also referred to as an ‘inventory approach’) that identifies, quantifies and tallies individual policy measures that it judges to support fossil fuel production and consumption (Parry, Black and Vernon 2021, p. 34). This includes all direct budgetary transfers and tax expenditures that provide a benefit to, or preference for, fossil fuel production or consumption, either at a national level or in specific states and territories (OECD n.d.).²⁵

For Australia, the OECD estimated that total fossil fuel support measures were equal to \$10.6 billion in 2020-21, up from \$5.9 billion in 2010 (figure 2.5). The majority of this consists of fuel tax credits (FTCs) from the Australian Government, estimated at \$7.6 billion in 2020-21. In fact, the amount of non-FTC support estimated by the OECD fell over the ten years to 2020-21, from \$3.6 billion to just under \$3 billion. Over the same period, the OECD’s measure of fuel tax credit (FTC) expenditure grew significantly (from \$2.3 billion in 2010-11), with a particularly large increase in 2016-17.²⁶ The OECD argues that their methodology is consistent with the World Trade Organization (WTO) *Agreement on Subsidies and Countervailing Measures*, section 1.1 (a)(1)(ii) which states that ‘a subsidy shall be deemed to exist if ... government revenue that is otherwise due is foregone or not collected (e.g. fiscal incentives such as tax credits)’ (WTO n.d., p. 229).

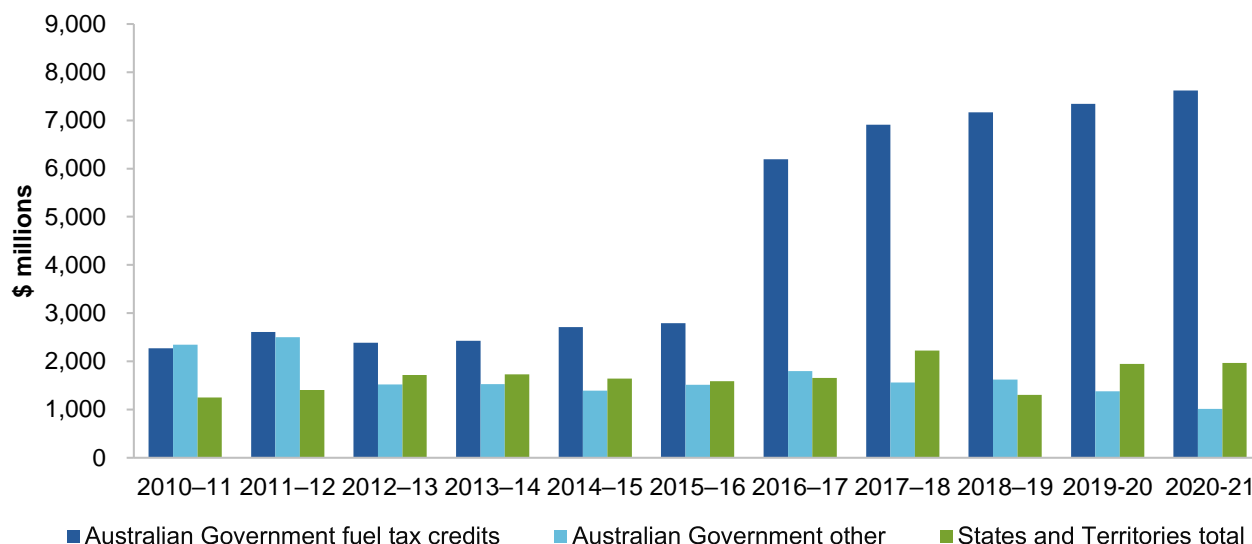
²⁴ Standard IMF practice is to apply the same value added tax (VAT) to all household products to avoid distorting relative consumer prices (Parry, Black and Vernon 2021, p. 12). This results in an increase in the estimate of Australia’s implicit subsidies, given Australia’s relatively low rate of VAT (the goods and service tax).

²⁵ Data from the OECD were also used by the International Institute for Sustainable Development for country-by-country estimates on the *Fossil fuel subsidy tracker* website (IISD and OECD 2021).

²⁶ It is not clear what caused the jump in 2016-17, as comparable Australian Taxation Office (ATO) data on FTC claims paid do not exhibit any similar increase in 2016-17. OECD figures were consistently about \$3 billion lower than ATO data prior to 2016-17 (ATO 2021b).

However, the Commission does not regard FTCs as a form of government support for fossil fuel production or consumption, the rationale for which is discussed in more detail in section 2.4.

Figure 2.5 – OECD estimates of Australian fossil fuel supports
2010-11 to 2020-21, \$ million



Source: OECD (2021).

In addition to FTCs, the OECD also includes a number of Australian Government budgetary outlays and tax expenditures that are already part of the Commission's assistance estimates (chapter 1). For example, the OECD's 2020-21 estimates include the coal-related portion of the *Exploration Development Incentive* (named the *Junior Mineral Exploration Incentive* since 2017-18), whereas the Commission's 2020-21 assistance estimates include both the fossil fuel and non-fossil fuel components of the incentive program. Likewise, the OECD includes new programs in 2020-21 for the *Gas-fired Recovery* (\$53.8 million) and *Securing Australia's Liquid Fuel Stocks* (\$17.8 million).²⁷ Also included are about \$810 million of reduced or concessional excise for aviation, alternative and gaseous fuels (OECD 2021).

The OECD also includes the *Exploring for the Future* program in its estimates of fossil fuel subsidies, worth \$20.4 million in 2020-21. The program — run by Geoscience Australia and originally funded for \$100 million in 2016, before expanding by another \$125 million in 2020 — gathers, analyses and publishes geological and geophysical data on minerals, energy and groundwater resources in Australia, in order to 'support regional development' and 'speed up new mining and agricultural activities' (Geoscience Australia 2021; Pitt 2020). Although the Commission did not initially consider the *Exploring for the Future* program as industry assistance, its inclusion by the OECD and Australia Institute (below) led to a review of this decision and it has now been retrospectively added to the Commission's assistance estimates.

The OECD's estimates also include considerable assistance from State and Territory Governments, equivalent to nearly \$2 billion in 2020-21 (OECD 2021). There is no comparable figure in the Commission's assistance estimates, as State and Territory assistance is not within the Commission's remit.

²⁷ The Commission's assistance estimates often have slightly different estimated values for relevant programs, as the Commission aims to quantify actual funding outlays each year, leading to some differences in timing and outcomes.

Australia Institute estimates

In April 2021, the Australia Institute published their own estimate of fossil fuel subsidies, tallying up \$10.3 billion of support in 2020-21. It also separately estimated \$8.3 billion of Federal and State Government capital expenditure supporting fossil fuels over the longer term (Campbell, Littleton and Armistead 2021, pp. 10, 14).

Like the OECD, the Australia Institute used an 'inventory approach' to identify and quantify individual policy measures at both the Australian, and State and Territory Government levels. Unlike the OECD, the Australia Institute included the *total* value of support that only 'partly' or 'primarily' supported fossil fuel consumption or production, rather than assistance programs that were 'wholly' targeted towards fossil fuels (Campbell, Littleton and Armistead 2021, pp. 6–7). In addition, unlike OECD estimates, the Australia Institute excludes consumer supports (such as price concessions and rebates for disadvantaged consumers).

Also like the OECD, the largest item in the Australia Institute's estimate was the Australian Government's spending on FTCs, forecast at \$7.8 billion in 2020-21. The Australia Institute also included \$810 million for excise concessions on aviation, alternative and gaseous fuels (Campbell, Littleton and Armistead 2021, pp. 15–18). As noted above, the Commission does not regard FTCs as a form of government support for fossil fuel production or consumption, the reasons for which are discussed in section 2.4.

Like the Commission and the OECD, the Australia Institute also categorised the Australian Government's *Gas-fired Recovery* program as assistance to the gas industry (box 2.9), estimating that it was worth \$24 million in 2020-21 (or \$53 million over four years) (Campbell, Littleton and Armistead 2021, p. 19).

Box 2.9 – The Gas-fired Recovery

In September 2020, the Australian Government announced significant spending on a 'gas-fired recovery' plan, as part of the JobMaker plan for economic recovery after the COVID-19 pandemic. Between the *Budget 2020-21* in October 2020 and the *Budget 2021-22* in May 2021, the Government committed \$163.6 million in funding to the gas-fired recovery plan (Australian Government 2020a, p. 116, 2020b, pp. 166–167, 2021, p. 135). Much of this spending constitutes assistance to the gas industry, including:

- funds to develop and implement strategic plans to 'unlock' gas supplies in five basins around Australia
- support for the CSIRO's Gas Industry Social and Environmental Research Alliance with industry, to provide research and information to communities in gas development regions
- grants to 'accelerate' gas exploration activities in the Beetaloo basin in the Northern Territory
- support for gas infrastructure projects (including two storage projects, a pipeline expansion and an import terminal project) to alleviate forecast gas supply shortfalls
- development of the Wallumbilla Gas Supply Hub in Queensland (CSIRO 2022; Morrison, Taylor and Pitt 2020; Taylor 2021a).

The gas-fired recovery plan has been criticised for being an ineffectual mechanism for economic recovery, given it is unlikely to reduce gas prices and there are only low levels of employment in gas-reliant industries (Ogge 2021, p. 1). For example, the Grattan Institute has observed that a hoped-for 'manufacturing renaissance' due to low gas supplies will not occur, partly because policy measures are unlikely to make any difference to east-coast gas prices, but also because manufacturing sectors reliant on gas 'employ only a little more than 10 000 workers and make up just over 0.1 per cent of the national economy' (Wood and Dundas 2020, pp. 15, 25).

Box 2.9 – The Gas-fired Recovery

A number of commentators have also raised concerns that the gas-fired recovery is not compatible with climate change objectives or the industry's long-term direction, risking stranded assets as fossil fuel demand declines (Hepburn 2020; Morton 2020; Verrender 2021). For instance, the Australian Energy Market Operator has observed that 'the gas sector in eastern and south-eastern Australia is on the cusp of transformation' as 'industrial demand for natural gas is not forecast to grow in the next 20 years, and could potentially reduce significantly as industrial users ... start to decarbonise' (AEMO 2021, p. 4).

In addition, the Australia Institute counted all support for carbon capture and storage (CCS) as a fossil fuel subsidy, as:

'the intended purpose of most CCS projects ... is to enable the continued operation of fossil fuel industries'. (Campbell, Littleton and Armistead 2021, p. 9)

This included Australian Government expenditure of \$50 million over three years, as well as \$100 million in funding from NSW Coal Innovation Fund for ongoing CCS research, and \$177 million of joint funding from the Victorian and Australian Governments for CCS in the La Trobe Valley. Similarly, the Australia Institute also classified some spending on the hydrogen industry — including \$70 million over five years from the Australian Government — as a fossil fuel subsidy, as it includes support for blue hydrogen using CCS (Campbell, Littleton and Armistead 2021, pp. 20, 51–52, 58–59).

The Australia Institute also labels concessional financing from the Australian Government to the fossil fuel industry as another form of support. This includes nearly \$700 million of loans from Export Finance Australia to the liquefied natural gas (LNG) industry, and over \$300 million from the Northern Australian Infrastructure Fund for infrastructure upgrades (Campbell, Littleton and Armistead 2021, pp. 22–23). Funds for concessional financing are not included in the Commission's assistance estimates, as it is difficult to calculate the size of the subsidy provided or contingent liability incurred. However, the Commission has previously noted that concessional financing facilities can effectively subsidise activities that would have occurred anyway, or create risks that taxpayer funds will not be repaid (PC 2017b, pp. 40, 45–48). The Commission has also recommended that export financing not be provided to domestic resource-related projects (PC 2012, pp. 303–304, 307).

Unlike the Commission's methodology for assistance estimates, the Australia Institute's methodology includes support from State and Territory Governments, totalling \$1.2 billion in 2020-21, and \$6.4 billion in capital expenditure over the long term. Queensland provided the most subsidies in 2020-21 (\$831 million), while the Northern Territory provided the most support over the long term, due to its \$3.8 billion agreement to purchase gas from the offshore Blacktip project. Only the ACT and Tasmania had no identifiable spending on fossil fuel assistance in 2020-21 (Campbell, Littleton and Armistead 2021, pp. 10, 14).

Much of the expenditure by State and Territory Governments was on infrastructure, often only partly attributed to fossil fuels. The Australia Institute argued that these inclusions were warranted on the basis that:

The provision of infrastructure represents a major subsidy to fossil fuel industries in Australia. Governments spend significant amounts of money on ports, railways, pipelines, power stations and other infrastructure that assists the production, transport and consumption of fossil fuels. While the users of this infrastructure often pay to use it, and the management bodies may return surplus money to the government that owns the asset, the acceptance of risk and up-front costs

by government-owned entities provides benefit to industry and imposes costs on the community. (Campbell, Littleton and Armistead 2021, p. 5)

Australian Treasury estimates

The Australian Treasury produces an annual *Tax Benchmark and Variations Statement* (TBAVS), which provides estimates of tax expenditures in Australia's tax system. This publication is an annual requirement of Australia's *Charter of Budget Honesty*. In contrast to the OECD's Inventory, TBAVS does not classify fuel tax credits as a tax expenditure, or 'variation' in the language of TBAVS. Technically, this reflects the budget classification of FTCs as a budget expense, which takes their operation outside of the tax system, and thereby beyond the purview of TBAVS.

However, if FTCs were accounted for as foregone revenue in the Commonwealth budget (rather than as a budget expense), it is possible that TBAVS would still not classify FTCs as a tax expenditure.²⁸ This is because FTCs arguably meet two of the general criteria used to assess whether a given tax policy setting should be considered a 'baseline' treatment, and thereby not a 'variation' or tax expenditure in TBAVS. Namely, that FTCs are available to all industry sectors; and the provision of FTCs are arguably structural, insofar as they are consistent with the general principle of not taxing inputs to production.

Whose estimates are right?

The divergence in the various Australian and International estimates reflects a number of methodological differences, which largely stem from differences in the purpose and scope of those estimates. Rather than considering these estimates to be either right or wrong per se, observers should understand the methodologies being used, exercise caution when interpreting their results, and consider what questions and insights each estimate might meaningfully provide about prevailing policy settings.

The key methodological issues include: scope by jurisdiction and level of government; scope of assistance by recipient (i.e. industry or consumers); choices in whether to account partly or wholly for assistance programs; conceptual interpretations of particular programs, and the 'baseline' against which these measures are assessed. The latter is apparent in the varied treatment of FTCs.

2.4 Are fuel tax credits a form of industry assistance?

One of the largest components of both the OECD's and the Australia Institute's estimates of assistance to the fossil fuel sector is fuel tax credits (FTCs) (section 2.3). However, whether FTCs should be considered industry assistance is ultimately a question of the appropriate 'baseline' — what might be regarded as 'normal' policy settings — against which the design and effects of Australia's fuel excise and FTC system should be assessed. The Commission does not regard the baseline used in the OECD's and the Australia Institutes methodologies as a compelling approach to identifying industry assistance for the TAR. By contrast, the baseline used in the TAR's methodology does not identify FTCs as industry assistance.

²⁸ This categorisation would be for Treasury to decide through its usual TBAVS processes, were such a hypothetical scenario to eventuate.

Australia's fuel excise and fuel tax credit systems

Australia taxes the consumption of liquid fuels like petrol, diesel, biofuels, and liquified petroleum gas (LPG) through the levying of fuel excise. This excise is levied on fuel wholesalers on a per litre basis, who pass on the cost to final consumers (box 2.10).

Operating alongside Australia's fuel excise system is a fuel tax credit (FTC) system. For businesses using liquid fuels as inputs to production, the FTC system provides payments that effectively refund some portion of the fuel excise component of their liquid fuel costs, depending on a number of factors.²⁹ The provision of FTCs is consistent with Australia's general principle of not taxing inputs to production, which is generally regarded as a less efficient form of taxation than alternatives like income and consumption taxation.³⁰

The degree to which the fuel excise component of fuel prices is refunded to businesses depends on:

- the kind of liquid fuel used
- what the fuel is used for
- if used to power a vehicle, the size of the vehicle, and whether the vehicle is used on a public road.

FTCs are available for both light commercial vehicles (LCVs) (vehicles below 4.5 tonnes) and heavy commercial vehicles (4.5 tonnes and above) driving on private roads. By contrast, LCVs on public roads are not eligible for FTCs³¹, while heavy vehicles travelling on public roads are only eligible for FTCs equivalent to about 40 per cent of fuel excise paid. The approximately 60 per cent of excise not refunded to heavy vehicles users on public roads is retained by the Australian Taxation Office (ATO) as a designated 'Road User Charge.' Finally, all fuel excise is refunded through FTCs for fuel used by businesses for auxiliary equipment, such as generators, tractors, lawn mowers, and whipper snippers (table 2.3).

Box 2.10 – Fuel excise in Australia

Fuel excise is generally equal across different liquid fuel types, but for some variation for domestic biofuel blends, and LPG. Fuel excise is indexed bi-annually by the Consumer Price Index.

Fuel excise by liquid fuel type, 1 February–30 March 2022

Fuel type	Excise (\$ per litre)
Petrol	\$0.442
E10 (imported ethanol)	\$0.442
E10 (domestic ethanol)	\$0.412
Diesel	\$0.442
B20 (imported biodiesel)	\$0.442
B20 (domestic biodiesel)	\$0.371
LPG	\$0.144

Sources: Commission estimates based on ATO (2021a) and ATO pers. comm., 21 April 2022.

²⁹ FTCs are not direct refunds for tax paid, as it is liquid fuel wholesalers that pay fuel excise to the Australian Tax Office, not businesses that use those fuels. However, FTCs are effectively a refund of fuel excise in so far as wholesalers pass on fuel excise to downstream users through higher fuel prices.

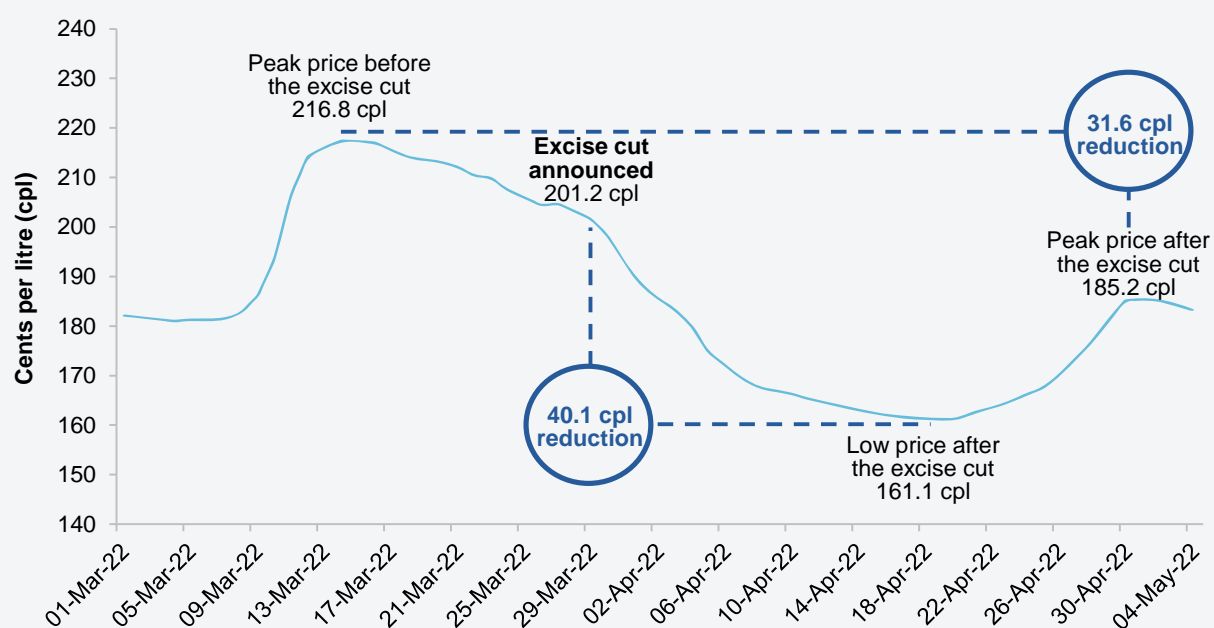
³⁰ In addition to distorting input choices, input taxation can impede the supply-side responsiveness of markets, by taxing new entrants as soon as they enter the market, rather than only once they have begun to generate income.

³¹ FTCs are not available to LCVs travelling on public roads. This may reflect practical concerns about tax system integrity, given that there can be a greater degree of overlap between business and personal travel in light vehicles.

Box 2.10 – Fuel excise in Australia

From 30 March, all fuel excise rates were halved for a period of six months, in an attempt to cushion the price pressures of sharply rising oil prices (caused by disruptions in supply associated with conflict in the Ukraine). The value of FTCs was also adjusted as part of these temporary changes.

Fuel prices for Sydney, 1 March 2022 to 4 May 2022



Source: ACCC (2022).

Table 2.3 – Fuel tax credit eligibility, by use and location of use

Vehicle type	Public road	Private road	Other business uses
LCVs	No FTCs	FTCs	FTCs
Heavy vehicles	≈40 per cent FTC	FTCs	FTCs
Auxiliary equipment	FTCs	FTCs	FTCs

Sources: Commission estimates based on ATO (2021a) and ATO pers. comm., 21 April 2022.

The availability of FTCs is generally equal across different fuel types, being set at 17.8 cents per litre for all fuels but LPG used by heavy vehicles driving on public roads. This leaves net fuel excise at 26.4 cents per litre for all fuels but those blended with domestically produced biofuel, and LPG, which enjoy lower rates of net excise per litre (table 2.4).³² The FTC ineligibility of LCVs driving on public roads ensures higher rates of net excise on these fuels, though with the same descending profile for fuels blended with domestically produced biofuels, and LPG (table 2.5).

³² This analysis does not reflect the temporary six-month reduction in fuel excise implemented from 30 March 2022. Rather, it focuses on settings that apply on a more permanent basis, as they stood prior to 30 March 2022.

Table 2.4 – Heavy vehicles on public roads, cents per litre
1 February–30 March 2022

Fuel type	Excise	FTC	Net excise paid
Petrol	44.2	17.8	26.4
E10 (imported ethanol)	44.2	17.8	26.4
E10 (domestic ethanol)	41.2	17.8	23.4
Diesel	44.2	17.8	26.4
B20 (imported biodiesel)	44.2	17.8	26.4
B20 (domestic biodiesel)	37.1	17.8	19.3
LPG	14.4	0	14.4

Sources: Commission estimates based on ATO (2021a) and ATO pers. comm., 21 April 2022.

Table 2.5 – Net excise for LCVs on public roads, cents per litre
1 February–30 March 2022

Fuel type	Excise	FTC	Net excise paid
Petrol	44.2	0	44.2
E10 (imported ethanol)	44.2	0	44.2
E10 (domestic ethanol)	41.2	0	41.2
Diesel	44.2	0	44.2
B20 (imported biodiesel)	44.2	0	44.2
B20 (domestic biodiesel)	37.1	0	37.1
LPG	14.4	0	14.4

Sources: Commission estimates based on ATO (2022b, 2022a).

Fuel tax credits in the context of Australia's tax system

Baselines for assessing fuel tax credits

As explored in section 2.3, Australia's annual *Tax Baseline and Variation Statement* (TBAVS) differs from the OECD's annual *Inventory of Fossil Fuel Support Measures* (the *Inventory*) by not classifying FTCs as a tax expenditure (or 'variation' in the language of TBAVS). Technically, this reflects the classification of FTCs as an expense in the Commonwealth budget, which takes their operation outside of the tax system, and thereby beyond the purview of TBAVS.

However, if FTCs were accounted for as foregone revenue in the Commonwealth budget (rather than as an expense), it is possible that FTCs would still not be considered a tax expenditure. This is because FTCs arguably meet two general criteria used by Treasury to assess whether a given tax policy setting should be considered a 'baseline' treatment, and thereby not a 'variation' or tax expenditure in TBAVS. Namely:

- the provision of FTCs are arguably structural, insofar as they are consistent with the general principle of not taxing inputs to production.
- FTCs are neutral to industry sector, being available to all industry sectors.

While this categorisation would be one for the Australian Treasury to make (were such a hypothetical scenario to eventuate), if the above logic was to hold, the competing categorisations of the OECD's Inventory and TBAVS would simply reflect the different 'baselines' — what might be implicitly or explicitly regarded as 'normal' policy settings, departures from which may be judged to be industry assistance — used by the two publications. While the OECD's baseline is, implicitly, 'what would otherwise be the case', the TBAVS baseline is, effectively, 'structural tax settings that are available to all sectors'.

That is, FTCs are tax expenditures in the eyes of the OECD because FTCs make fuel less expensive for businesses than would otherwise be the case.³³ However, against the TBAVS baseline, FTCs might not be considered a tax expenditure because they are consistent with the general features of Australia's tax system and are available to all sectors.

Nevertheless, while different *classifications*, their *characterisations* may not be as different as the competing baselines might first suggest. Indeed, the OECD states that inclusion in the Inventory need not imply that a particular policy measure is a subsidy. According to the Inventory:

The OECD uses a bottom-up method of estimating government support to fossil fuels by identifying and quantifying individual policy measures. This approach measures fossil fuel support as all direct budgetary transfers and tax expenditures that provide a benefit or preference for fossil-fuel production or consumption. The definition of *support*, as opposed to *subsidy*, is a deliberately broader one, which encompasses policies that can induce changes in the relative prices of fossil fuels. The Inventory casts a wide net, in line with its objective of promoting the transparency of public policies ... The measures captured in the Inventory are classified as support without reference to the purpose for which they were first put in place or their economic or environmental effects. No judgment is therefore made as to whether or not such measures ... ought to be reformed. (OECD n.d.)

Despite the OECD's interpretative cautions, the inclusion of FTCs in the OECD's *Inventory* is frequently invoked as evidence of FTCs operating as a 'subsidy' for fossil fuel consumption and/or production in Australia (RMIT ABC Fact Check 2022).

A compelling baseline for the TAR?

All baselines require some degree of judgement. This is explicitly recognised by Australia's Tax Benchmarks and Variation Statement, which notes:

The benchmarks in the Statement have been chosen in a way that attempts to apply a consistent tax treatment to similar taxpayers and similar activities. The choice of tax benchmark unavoidably involves judgement and therefore may be contentious in some cases. These judgements are informed by long-standing features of the tax system, practice in tax expenditure publications in other jurisdiction and consultation with stakeholders. The tax benchmark should not be interpreted as an indication of the way activities or taxpayers ought to be taxed. (Treasury 2022, p. 1)

³³ The OECD classifies FTCs as a tax expenditure, one of its two classes of 'support measures', each year in its annual Inventory of Fossil Fuel Support Measures. The OECD argues that the methodology they use for identifying fossil fuel support measures is consistent with the WTO's *Agreement on Subsidies and Countervailing Measures*, section 1.1 (a)(1)(ii), which states that '...a subsidy shall be deemed to exist if...government revenue that is otherwise due is foregone or not collected (e.g. fiscal incentives such as tax credits)' (WTO n.d.). By this definition, it appears that the OECD judges FTCs to be a support measure for fossil fuels because effective fossil fuel prices faced by businesses would be higher in the absence of FTCs.

However, the baseline implicitly used by the OECD's *Inventory* present a number of conceptual challenges.

First, it risks presenting a **false equivalence** between policy measures that reduce the price of fossil fuels below the price required by suppliers (the supply price), and policy measures that reduce the degree to which fossil fuels are taxed. For example, if \$10 billion worth of coupons were issued to consumers to allow them to purchase fuel for less than the supply price, that expenditure would be treated the same as a policy setting that reduced the overall level of fossil fuel taxation by \$10 billion — the former allows consumers to access petrol at prices lower than the supply price, while the latter simply reduces the degree to which taxation raises domestic prices above the supply price. This issue is implicitly recognised by the International Energy Agency's (IEA's) 'price-gap' approach to the identification of fossil fuel subsidies, which measures the degree to which the tax and transfer system of a particular country adds to, or subtracts from, the fuel prices paid by domestic households and businesses, relative to their supply price. It is also recognised by the IMF's approach to identifying explicit subsidies (section 2.3).

The OECD's baseline also risks presenting a **false distinction** between the crediting or effective refunding of taxes, and reductions in the tax that is being credited or refunded. For example, if Australia wished to avoid the taxation of fuel inputs to production, it could remove fuel excise altogether. Alternatively, it could make FTCs available for business users. The former would not be considered a 'support measure' under the OECD/WTO definition, while the latter would. This is despite the fact that the elimination of fuel excise altogether would actually reduce the taxation of fossil fuels by more than the provision of FTCs.

This example is timely. The Australian Government's recent announcement that fuel excise will be halved for a period of six months will also produce a fall in the value of FTCs. This will likely appear as a reduction in Australian support measures for the fossil fuel industry in the forthcoming OECD *Inventory*, even though the overall *taxation* of fossil fuels in Australia will have actually fallen over the period.

In addition, the OECD's baseline **does not consider whether a particular measure actually confers a competitive advantage** to fossil fuels, over alternative fuels. While the inclusion of FTCs in the OECD's inventory suggests that FTCs support the consumption or production of fossil fuels in Australia, biofuels are also subject to the fuel excise and FTC system when used as an input to production, rendering the system notionally 'neutral' between these different fuel types. Moreover, excise on domestically produced biofuels is lower than that on petrol and diesel, and fuel excise is not levied on the electricity used to power electric vehicles (figure 2.6). As a result, Australia's fuel excise and fuel tax credit system does not provide a relative price advantage to liquid fossil fuels, relative to non-fossil fuel alternatives.

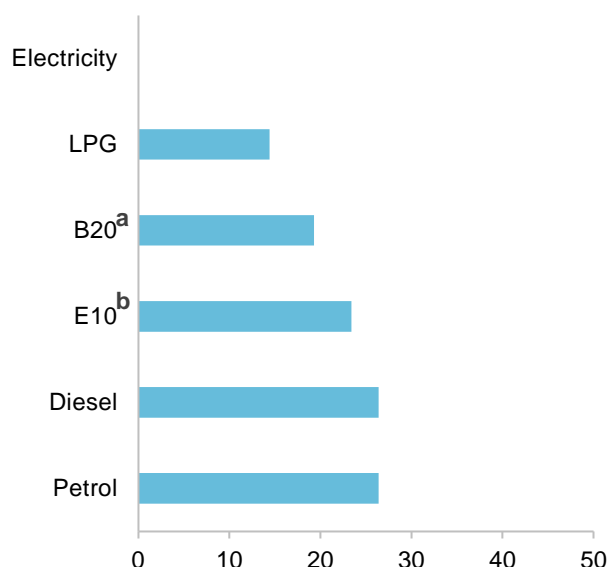
While it might be argued that the differential treatment of LCVs relative to heavy commercial vehicles might encourage businesses to switch from light commercial vehicles to heavy vehicles with larger engines, potentially increasing the consumption of fossil fuel in the process, this is unlikely to occur in practice. Heavy and light commercial vehicles are suited to different types of freight activities, and are therefore imperfect substitutes. Even if multiple LCVs were replaced with a smaller number of heavy vehicles, it is not clear that overall fuel consumption would increase.

Finally, the OECD's *Inventory* appears to **selectively focus on FTCs**. If FTCs are to be considered a 'support measure' then so too, presumably, should input tax credits under Australia's Goods and Services Tax (GST) and the general tax deductibility of fuel expenses under Australia's income tax system, given that they too make business fossil fuel use cheaper than would otherwise be the case.

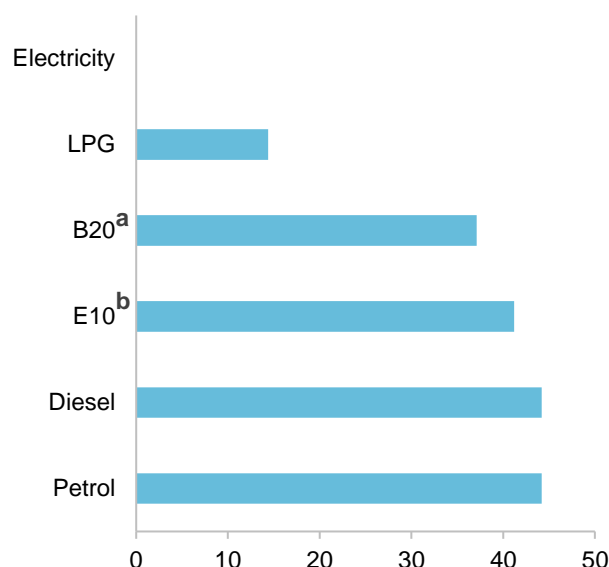
Given these shortcomings, the Commission does not regard the baseline used in the OECD's *Inventory* as a compelling approach to identifying industry assistance for the TAR.

Figure 2.6 – Net fuel excise for vehicles on public roads, cents per litre

a) Heavy commercial vehicles



b) Light commercial vehicles



a. Domestically produced biodiesel. b. Domestically produced ethanol.

Sources: Commission estimates based on ATO (2022a, 2022b).

Conceptualising fuel excise as an input price or an input tax

Whether FTCs could be considered a form of industry assistance might also depend on the purpose of fuel excise. For instance, so long as fuel excise is considered a tax, then it would be consistent with general tax policy settings to refund businesses for the fuel excise component of business fuel costs — it follows that FTCs would not be regarded as industry assistance for the purposes of the TAR.

Alternatively, if fuel excise were conceptualised as the price *for* a business input (rather than a tax on a business input) then the effective refunding of that charge might be considered a subsidy for that input to production. For example, if fuel excise were conceptualised as a form of carbon pricing, and there existed broadly equivalent carbon pricing in other sectors of the economy, then its refunding might be more readily considered a form of industry assistance.³⁴

However, given the absence of an economy wide carbon pricing system in Australia, there are practical limits to how readily fuel excise can be considered a price on carbon or particulate pollution. Moreover, fuel excise does not vary with the carbon intensity of the fuels (table 2.6). As a result, Australia's fuel excise system cannot be meaningfully regarded as a form of carbon pricing, and FTCs cannot be meaningfully regarded as a form of carbon pricing-related industry assistance.

Table 2.6 – Implicit carbon price (\$/tCO₂e), public roads, by fuel

³⁴ This subsidy would not be as much as the value of the FTC, given that the carbon prices would otherwise constitute a tax-deductible expense, but could nevertheless be regarded as a form of industry assistance.

Fuel type	Heavy vehicles	LCVs
Petrol	110.91	185.69
E10 (imported ethanol)	122.90	205.76
E10 (domestic ethanol)	109.07	191.93
Diesel	97.15	162.65
B20 (imported biodiesel)	120.48	201.71
B20 (domestic biodiesel)	88.17	169.40
LPG	89.37	89.37
Electricity	—	—

Sources: Commission estimates based on ATO (2022a) and National Greenhouse Account Factors (2021a).

Similarly, if fuel excise were conceptualised strictly as a road user charge, then having that excise refunded through FTCs might be considered more akin to a subsidy for road use.³⁵ However, there are also limits to how readily fuel excise can be meaningfully regarded as a form of road user pricing. For example, fuel excise does not account for differences in the wear and tear caused by different vehicle types, nor does it apply to Australia's growing fleet of electric vehicles, nor are excise revenues explicitly linked to road-related expenditure. Moreover, irrespective of the extent to which fuel excise can be meaningfully regarded as a form of road user pricing, Australia's fuel tax credit system does not refund the 'Road User Charge' component of fuel excise for heavy vehicles (and FTCs are not available to LCVs) on public roads.

To the extent that Australia's fuel excise system constitutes neither a meaningful form of road user charging or carbon pricing, FTCs are not regarded as industry assistance for the purposes of the TAR.

Characterising FTCs in their current context

The stated rationale for particular taxes can evolve over time. Perhaps the most straightforward way to conceptualise fuel excise (or other charges) would be to consider how it operates in practice, rather than focusing on its stated intent. Taking this approach, fuel excise might be most simply considered as an extension to Australia's consumption tax system.

Given that Australia's FTC system is consistent with Australia's general non-taxation of inputs to production, is available to all industries, does not reduce the price of fossil fuels below their supply price (but simply reduces the degree to which tax raises the price of fossil fuels above their supply price), and does not provide a relative price advantage to liquid fossil fuels over alternative fuels, the Commission does not regard FTCs as a form of industry assistance.³⁶

³⁵ If this were the case, only a portion of the FTC could be considered a subsidy, given that road user charges would otherwise constitute a tax-deductible expense.

³⁶ However, the lower rate of fuel excise levied on domestically produced biofuels, relative to imported biofuels, is regarded as industry assistance by the TAR.

3. Trade policy developments

Key points

- * **Australia's trade in goods and services began to recover in 2020-21 relative to 2019-20, though exports of services remained suppressed due to ongoing restrictions on international travel.**
- * **Calls to reform the WTO dispute settlement process continue, as the Appellate Body remains incapacitated. An interim appeals body is operational but has yet to hear any appeals.**
- * **More progress has been made on Australia's bilateral and regional trade agreements.**
 - The Regional Comprehensive Economic Partnership came into force in January 2022, and the Australia-United Kingdom free trade agreement is expected to come into force later in 2022.
 - Negotiations have progressed for trade agreements with the United Arab Emirates, the European Union and India, and an interim agreement was signed with India in April 2022.
- * **With the impending implementation of the Australia-UK Free Trade Agreement (FTA), and with negotiations progressing with the European Union and India, preferential trade agreements (PTAs) could soon cover a large majority of Australia's imports. This raises questions about the role of tariffs, given the costs involved with utilising PTAs.**
 - The compliance costs associated with accessing preferences is already estimated to possibly outweigh tariff revenue. This will increasingly be the case as further PTAs are implemented — rising to over \$2 in costs per dollar of tariff revenue once PTAs are implemented for the EU, India, and the UK.
 - While tariffs have value as leverage in trade negotiations, it is not clear that this would outweigh their costs to Australian consumers. There would be value in both reducing tariffs to zero and ensuring Rules of Origin are not binding.
- * **Internationally, carbon border tariffs (CBTs) have gained renewed attention and are being considered by some of Australia's trading partners.**
 - CBTs have been proposed to create a level playing field between domestic producers that pay a carbon price, and foreign competitors that do not, and to discourage displacement of domestic emissions offshore.
 - CBT compliance with WTO rules will depend on how the policy is designed. A key factor will be how the CBT treats domestic producers relative to foreign producers of the same products.
 - The EU proposed a CBT in July 2021, which is planned to commence in 2026. Under its current design, it will apply to direct emissions from imports of steel, aluminium, cement, fertilisers and electricity. Several other countries have expressed openness to CBTs.
 - The EU's CBT will likely have minor direct effects on Australian exports due to the small amount of affected trade, but may change if the scope of the CBT increased, and if other countries also implemented CBTs. Australian exporters may be more affected by broader overseas emission reduction policies that reduce demand for emissions-intensive products, than CBTs.

The landscape for trade in 2020-21 was shaped by a series of global trends. As trade began to recover from the initial effects of the COVID-19 pandemic, the emergence of new variants led to ongoing disruptions to global production and supply chains. At the same time, trade flows were increasingly affected by geopolitical tensions, with increasing flows between allied nations to the exclusion of others. There are further challenges on the horizon, as countries explore the potential for trade measures to support emissions-reduction efforts — in particular, the European Union’s exploration of carbon border tariffs.

This chapter reports on trade policy developments since the *2019-20 Trade and Assistance Review* (published in July 2021). It covers:

- an update on Australia’s trading environment (section 3.1)
- developments in Australia’s multilateral and plurilateral agreements (section 3.2)
- developments in Australia’s bilateral and regional agreements (section 3.3)
- Australia’s World Trade Organization (WTO) trade disputes (section 3.4)
- developments in Australia’s anti-dumping and countervailing activity (section 3.5)
- discussion of carbon border tariffs and what they might mean for Australia (section 3.6).

3.1 Australia’s trading environment is recovering

In 2020-21, world trade began to recover despite ongoing economic disruptions related to the COVID-19 pandemic. Trade in goods recovered more strongly than trade in services, due to constraints on supply chains and increased demand, which increased the value of goods trade. Trade in services remained suppressed due to ongoing international travel restrictions. However, the recovery of trade was also temporarily held back by several new COVID-19 variants through late 2020 and 2021. The emergence of these new variants affected demand for traded goods due to increases in unemployment, and affected the ability of countries to supply goods and services amid lockdowns, border restrictions and temporary closures of some ports.

Australian trade largely reflected the global conditions experienced in 2020-21. Australia’s trade in goods experienced some growth in 2020-21 due to increased demand and constraints on some international supply chains, which raised prices of goods. This growth marked an improvement relative to 2019-20, when trade in goods declined due to the early effects of the pandemic. Australian trade in services also stabilised in 2020-21, though remained modest due to the effects of ongoing restrictions on international travel.

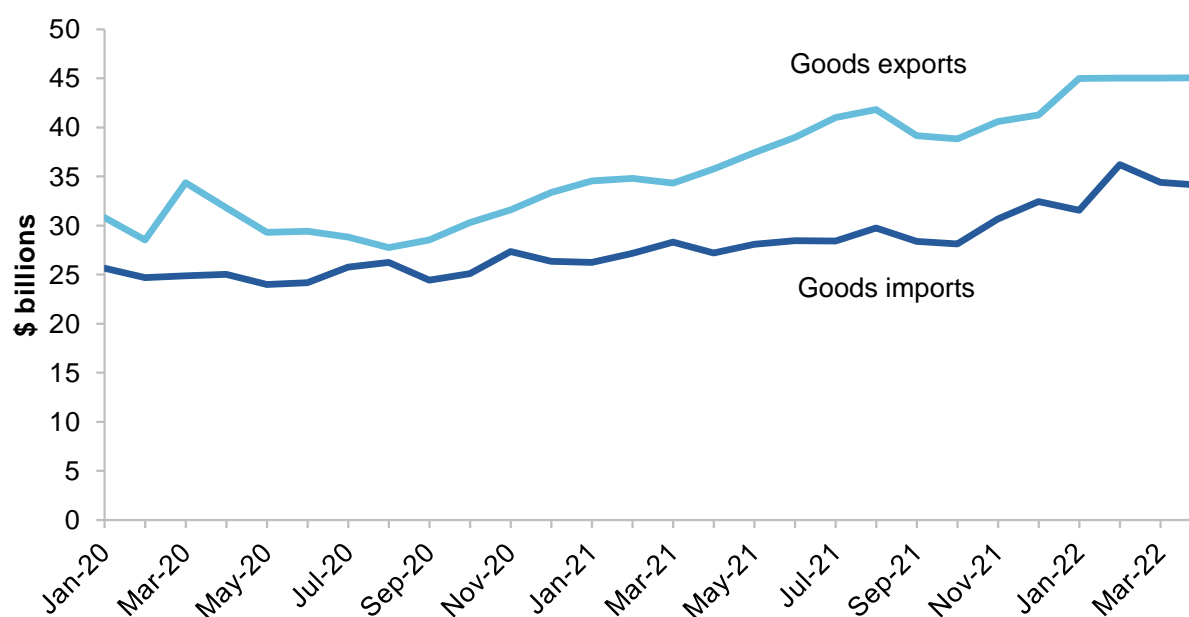
In the first quarter of 2022, world trade appeared to be less disrupted by the pandemic than in 2021, though lockdowns in China hindered the supply of some goods. However, the Ukraine-Russia war has begun to place upward pressure on commodity prices and disrupt the supply of some products, leading to higher prices for fuel and food products (IMF 2022, p. 1).

Goods trade: a steady recovery from the pandemic

Australia’s trade in goods continued to recover from the effects of the COVID-19 pandemic (figure 3.1). In the financial year ending June 2021, goods exports grew by 35 per cent. This signalled a recovery from the previous year, during which they had declined by about 16 per cent. Major categories of Australian exports — such as *general merchandise* and *metal ores and minerals* — grew by 46 and 62 per cent, respectively (ABS 2022). This is in part due to the combination of strong global demand for goods, which increased commodity demands and prices, and strained global supply chains, which increased producer costs (RBA 2021, p. 1). Exports of agricultural goods also grew overall, with some smaller sectors, such as cereal grains and wool products, experiencing strong recoveries (236 and 77 per cent, respectively) (ABS 2022).

Improved growing and pasture conditions increased supply, and strong global demand for grains, meat and wool increased prices that Australian farmers received (RBA 2021, p. 35).

Figure 3.1 – Goods imports and exports grew despite the pandemic continuing into 2021
Value of Australian exports and imports of goods, seasonally adjusted, current prices



Source: ABS (*International Trade in Goods and Services, Australia, April 2022*, Cat. no. 5368.0).

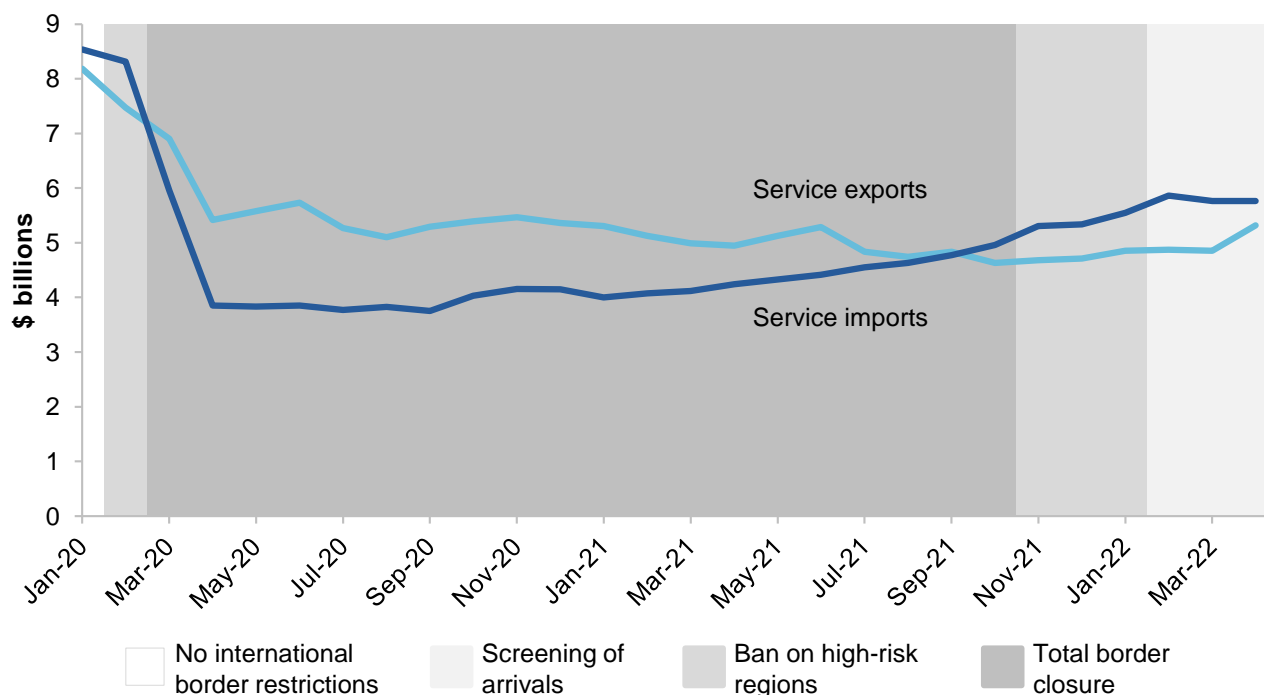
Imports of goods into Australia also recovered, albeit more modestly than goods exports. Goods imports grew by 10 per cent to the year ending June 2021, whereas goods imports declined by 9 per cent in the previous year (ABS 2022). This in part reflects modest growth in imports of consumption goods, likely due to ongoing supply chain issues (Mizen 2021). Some of Australia's major goods imports, such as general merchandise, consumption and intermediate goods, grew modestly (by 13, 9 and 21 per cent, respectively), driving the moderate overall growth rate of imported goods (ABS 2022).

Services trade: stability reflects barriers to travel

In 2021, Australian trade in services began to stabilise after declining during the onset of the COVID-19 pandemic in early 2020 (figure 3.2). Australian exports of services remained approximately constant across 2020-21, which indicated some stabilisation following the previous year, in which services exports declined by 33 per cent (ABS 2022). The slow recovery of services exports relative to goods exports partly reflects ongoing travel restrictions, which have affected exports of education services and tourism (RBA 2020, p. 46).

Figure 3.2 – Services trade has stabilised since 2020

Value of Australian imports and exports of services, seasonally adjusted and Australian international border restrictions

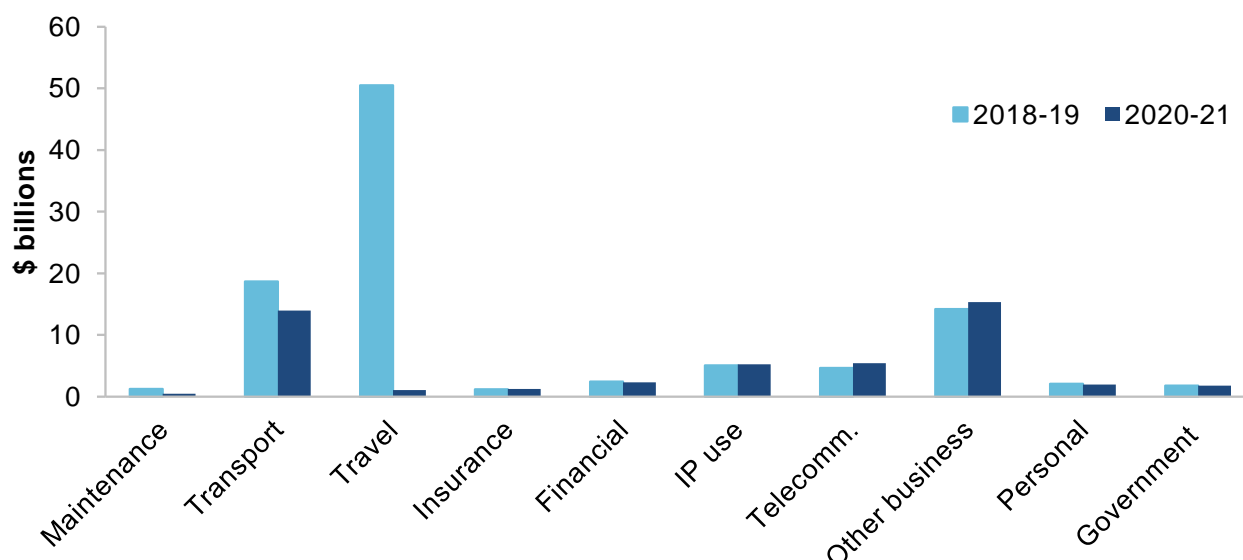


Sources: ABS (*International Trade in Goods and Services, Australia, April 2022*, Cat. no. 5368.0); University of Oxford (2022).

Australian service imports grew by 17 per cent in the year to June 2021. This is a marked change from the previous year, when service imports declined by 55 per cent. The growth in imports of services in 2020-21 was mostly driven by transport services (for example, Australians travelling overseas on foreign airlines), which grew by 44 per cent over the period, though every category of service import grew relative to 2019-20 (ABS 2022).

One of the key trends since the onset of the COVID-19 pandemic in 2020 has been the declining share of travel in imports and exports of services (figure 3.3). Almost two-thirds of all Australian service exports were related to travel in the years before the pandemic, after which it declined to 39 per cent by July 2021, and reached a low of 34 per cent in late 2021 (ABS 2022). Similarly, Australian travel imports declined significantly as a share of total service imports, from about 50 per cent pre-pandemic, to a low of 1-2 per cent for most of 2020 and 2021. These patterns reflect restrictions that the Australian Government imposed on international borders (figure 3.2). In February 2020, Australia banned international arrivals from high-risk countries, and the international border closed the following month. This affected both imports and exports of travel, since border restrictions had implications for returning travellers. Border restrictions eased in November 2021, and further in February 2022, which is expected to increase travel to and from Australia, increasing imports and exports of travel services and tourism expenditures.

Figure 3.3 – Travel imports were most affected by the pandemic
Value of Australian service imports by category, 2018-19 and 2020-21



Source: ABS (*International Trade in Goods and Services, Australia, April 2022, Cat. no. 5368.0*).

3.2 Developments in multilateral and plurilateral agreements

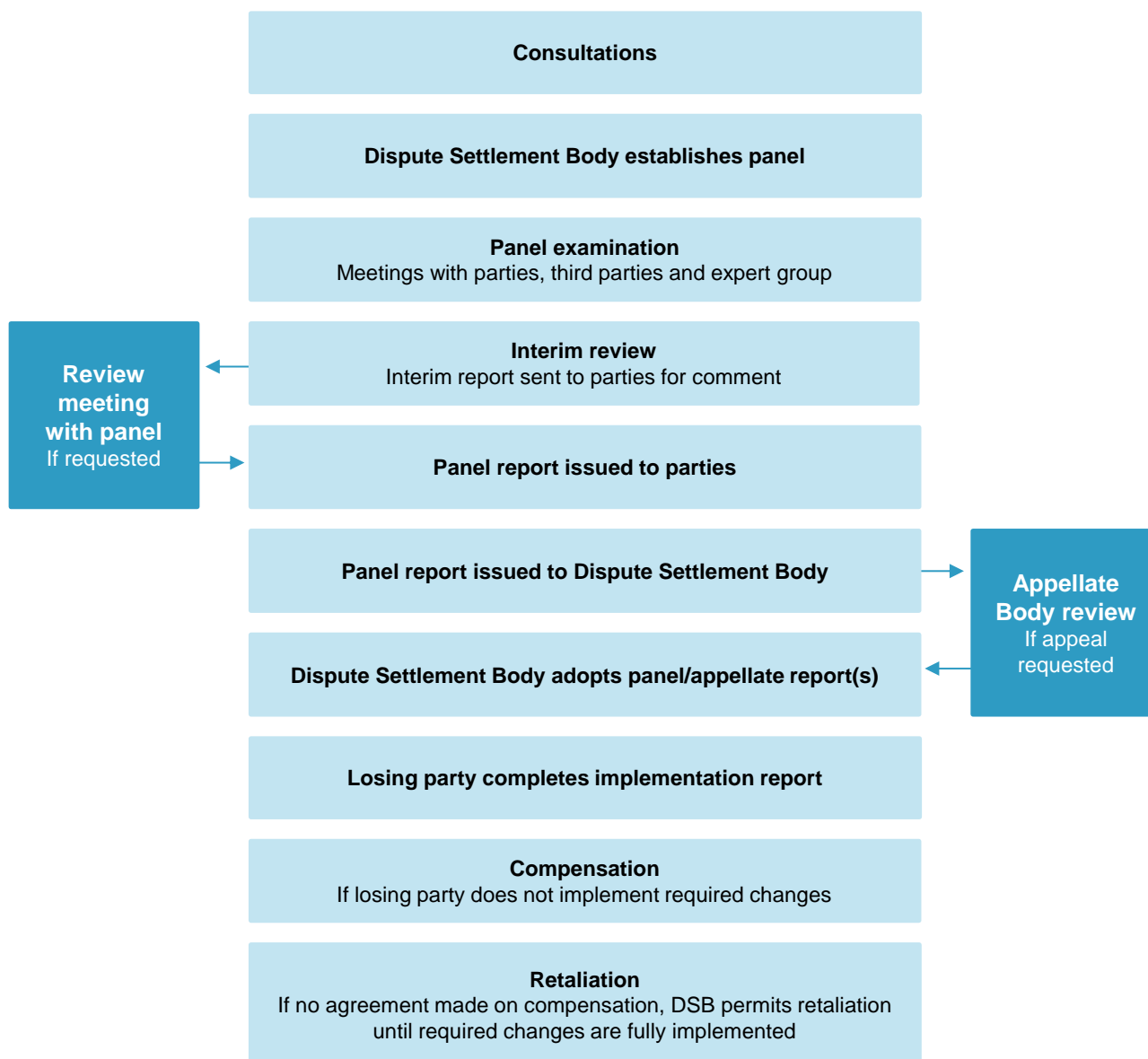
The World Trade Organization (WTO) continued to face significant challenges that have impeded its ability to settle trade disputes and progress multilateral trade agreements. The interim appeals body established by a subset of WTO members is operational, though it is yet to hear any appeals. Broader calls for WTO reform have increased, and concerns about the dispute settlement process were discussed at the twelfth WTO ministerial conference in June 2022 (WTO 2022y).

WTO disputes process still reliant on interim body

The WTO has several roles, including to implement global trade rules, to assist members to negotiate trade agreements, and to resolve trade disputes (WTO 2022x). Typically, a trade dispute can be settled by the parties finding a mutually agreed solution, or through a process of adjudication, in which a panel will determine and implement a ruling (figure 3.4). When the dispute settlement process operates as intended, parties can appeal the ruling through the Appellate Body, which is the WTO's highest dispute resolution body (Titievskaja 2021, p. 2; WTO 2022u). About two-thirds of trade disputes lodged with the WTO reach the Appellate Body (Hopewell 2021).

However, the functioning of the Appellate Body has been impeded since 2017, 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 of the Body expiring in November 2020. This means that although the WTO could still process trade disputes, no appeals could be heard — and any country in a trade dispute could block a ruling simply by launching a formal appeal (Hopewell 2021; WTO 2022d).

Figure 3.4 – The intended WTO dispute settlement process^a
Simplified representation



a. At present, the incapacitation of the Appellate Body means that if the findings of the panel report are appealed, they are unable to be heard and resolved. An interim measure, the Multi-Party Interim Appeal Arbitration Arrangement (MPIA) can be used in place of the Appellate Body to consider appeals.

Source: WTO (2022u).

In April 2020, 47 WTO members (including Australia) announced the establishment of a temporary, separate appeal system for trade disputes, known as the Multi-Party Interim Appeal Arbitration Arrangement (MPIA). The MPIA became operational in July 2020, with 27 members as parties to the agreement (including major economies such as China and the European Union but excluding the United States). So far, parties in nine trade disputes have indicated that they will or are likely to use the MPIA to resolve appeals (where both parties are also in the MPIA) (GTP 2022).

There have been increasing calls for reform to the WTO dispute settlement process. In a 2020 report, the US Government outlined its concerns with the Appellate Body, including that the Body had overstepped its

authority, relied too heavily on the ‘precedent’ of previous cases and did not meet deadlines for deciding appeals (US Government 2020, p. 1). The European Commission agreed with many of these concerns and indicated that ‘the most urgent of WTO reforms is finding an agreed basis to restore a functioning dispute settlement system and to proceed to the appointment of the members of the Appellate Body’ (EC 2021e, p. 9). In the meeting of the Dispute Settlement Body in May 2022, 123 members outlined a proposal to begin filling vacancies for the Body. It is the 54th time the proposal has been made at a Dispute Settlement Body meeting, with the US confirming that it will not support the proposal given ongoing concerns with the function of the Body (WTO 2022q). This outcome has been recurring because the WTO members must make decisions by reaching a consensus, and the US is not satisfied that its concerns have been addressed. At the twelfth WTO ministerial conference in June 2022, members agreed to undertake a review of the WTO’s functions and confirmed their intention for a functioning dispute settlement system by 2024 (WTO 2022r, 2022y).

Negotiations for the Trade in Services Agreement stalled

Twenty-three WTO members (including Australia, and representing 70 per cent of global trade in services) initiated negotiations for the Trade in Services Agreement in March 2013 (DFAT n.d.; SICE 2022; US Government n.d.).

The agreement is intended to reduce barriers to international trade in services (DFAT n.d.). It is also expected to deal with modern trade concerns such as cross-border data flows (US Government n.d.). However, progress on the Agreement has been slow, with no new rounds of negotiations between WTO members since 2016, and no further negotiation rounds on the horizon (DFAT n.d.).

Little progress on the Environmental Goods Agreement

Australia is chairing negotiations on the Environmental Goods Agreement, between 46 WTO-member economies (DFAT n.d.; WTO 2022k). The purpose of the Agreement is to reduce tariffs on goods that provide environmental benefits, such as renewable bamboo wood products, and equipment that converts pollutants into less harmful products (APEC 2012). Negotiations commenced in 2014, and stalled in 2016, as participants were unable to reach an agreement on the definition of an ‘environmental good’. However, in 2021 there was renewed discussion in the US Congress regarding potential recommencement of negotiations (Reinsch, Benson and Puga 2021, pp. 1–2).

3.3 Developments in bilateral and regional agreements

There have been several developments in Australia’s bilateral and regional agreements in 2021 and 2022. The largest free trade agreement in the world — the Regional Comprehensive Economic Partnership — came into force at the start of 2022. Australia has also made progress on negotiations of the Comprehensive Economic Partnership with the United Arab Emirates, the European Union Free Trade Agreement and the Economic Cooperation Trade Agreement and Comprehensive Economic Cooperation Agreement with India. Progress on these agreements are discussed in more detail below.

The expansion in the coverage of Australia’s free trade agreements in the past decade has also contributed to large reductions in the average tariff rates that affect Australian imports. However, many importers face higher compliance costs when accessing discounted tariffs and preferential trade agreements. These costs likely outweigh the revenue collected from the remaining import tariffs, meaning there is an opportunity for considerable reform (PC 2022).

The Regional Comprehensive Economic Partnership is now in force

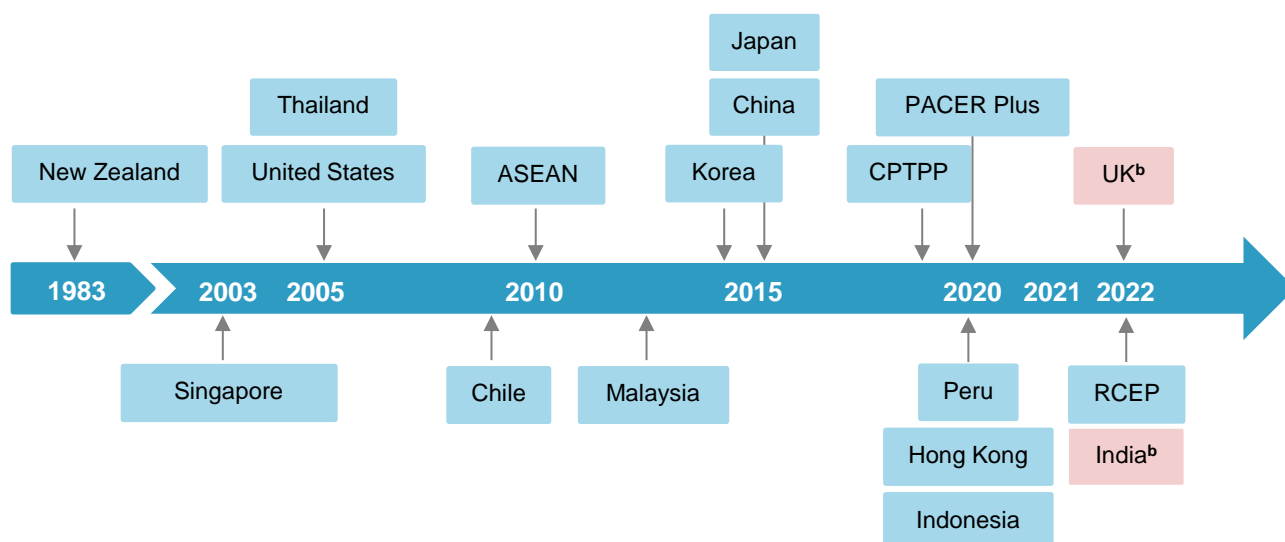
The Regional Comprehensive Economic Partnership (RCEP) came into force on 1 January 2022 (DFAT 2022b), after negotiations started in 2012. The RCEP aims to increase economic integration, employment, investment and living standards in south-east Asia, by reducing trade barriers for goods, services and investment between south-east Asian nations and their free trade partners (Australia, Brunei, Cambodia, China, Indonesia, Japan, Republic of Korea, Laos, Malaysia, Myanmar, New Zealand, the Philippines, Singapore, Thailand and Vietnam) (ASEAN 2020d, p. 1, 2020c, pp. 1–2, 2020b). As part of the RCEP, Australia will reduce tariffs on some imported products (such as some food and beverage products and some electrical and automotive components) to zero over the course of 20 years (ASEAN 2020a, pp. 1–159). It is the largest free trade agreement in the world at present, covering about 30 per cent of global gross domestic product, of global trade and of the world population (ASEAN 2020d, p. 1; Tehan 2022c). No other agreements involving Australia have come into force since the *2019-20 Trade and Assistance Review*.

Agreements being negotiated or in force

Australia currently has 16 bilateral and regional free trade agreements in force (figure 3.5) and two agreements — the Australia-United Kingdom Free Trade Agreement (A-UKFTA) and the Australia-India Economic Cooperation and Trade Agreement (AI-ECTA) — not yet in force (DFAT 2022b). Australia and the United Kingdom signed an agreement in December 2021, which was tabled in Australian Parliament in February 2022 (DFAT 2022c). The A-UKFTA will enter into force 30 days after the completion of all domestic procedures in Australia and in the United Kingdom (DFAT 2021d).

Figure 3.5 – 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. **b.** Not yet in force. The agreement with the United Kingdom is an 'Agreement in Principle'.

Source: DFAT (2022b).

Australia is negotiating several other bilateral and regional agreements, with progress in the past year.

- 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 (DFAT 2022e). 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 2021c).
- The eleventh round of negotiations for the Australia-European Union Free Trade Agreement was held in June 2021, followed by the twelfth round of negotiations in February 2022, after being postponed from 2021 (DFAT 2021b, 2022a).
- Australia and India began negotiations for a Comprehensive Economic Cooperation Agreement in 2011; negotiations were suspended in 2015 before being formally re-launched in 2021. The negotiations for the agreement are ongoing and expected to conclude by the end of 2022 (DFAT 2021a). In April 2022, Australia and India signed an interim agreement — the Australia-India Economic Cooperation Trade Agreement.

The future of Australia's trade agreements and tariffs

The coverage of Australia's trade agreements has expanded significantly in the past decade. Collectively, trade agreements have complemented other concessional instruments and unilateral tariff reform to achieve a drastic reduction in the import tariffs paid by Australian importers. About 90 per cent of imports enter Australia duty free, with the vast majority of remaining imports subject to the statutory rate of 5 per cent (PC 2022). The combination of low rate and low coverage mean that both the level of tariff revenue and the protection afforded by tariffs to domestic industries are low by historical levels.

While this means that Australia's tariffs are less distortionary than in the past, businesses still need to devote resources to interact with the tariff system, especially when accessing preferences (box 3.1). In a recent report of the 'nuisance' costs of the tariff (2022), the Commission estimated that businesses incurred compliance costs in the order of 0.9–2.8 per cent of the value of the imports that benefited from a preference. These costs are usually passed on along supply chains, raising the costs of Australian users and consumers. These costs amount to \$0.48–\$1.44 per dollar of tariff revenue collected. This implies that once compliance costs are accounted for, tariffs are not a particularly efficient tax. Their cost is likely to increase as further trade agreements are implemented, given the increased system complexity and reduced tariff revenue.

Box 3.1 – Key findings on the Nuisance Costs of Tariffs

Having reduced its tariff levels over successive decades, there are virtually no Australian tariffs that lie between zero and 5 per cent. As such, 'nuisance tariffs' as defined by the WTO (2022n) are not a feature of the Australian tariff schedule. The Commission (2022) examined the nuisance costs that attach to the entire tariff system, providing the most recent evidence on estimates of costs and distortions.

The distortion costs of Australia's low-tariff regime are small ...

The commission estimated that tariffs impose distortion costs on the Australian economy in the order of -\$0.10 per dollar of revenue collected.

Box 3.1 – Key findings on the Nuisance Costs of Tariffs**... but businesses incur considerable compliance costs**

Businesses incur significant compliance costs when importing goods into Australia, mostly when businesses access discounted tariffs (via preferences and concessions). For instance, the tariff concession system generates compliance costs of at least \$5 million in 2019-20. However, it is the prevalence of preferential trade agreements (PTAs) that contributes most significantly to both reducing tariffs and increasing compliance costs for Australian importers.

PTA-related compliance costs are estimated to have been \$0.7–2.2 billion in 2019-20. These costs come from the ‘paperwork’ needed to demonstrate eligibility for a preference or concession, as well as the costs of adapting production to meet eligibility criteria. When the tariff system imposes costs on foreign producers who adapt their production processes, these compliance costs are borne by Australian businesses and consumers when they are passed along the supply chain.

The use of preferences also reduces the amount of revenue generated by tariffs, particularly as more PTAs are implemented. Tariff revenues are estimated to fall by \$106–134 million once the PTA with the UK is implemented, by a further \$61–68 million once the PTA with India is implemented, and by a further \$704–774 million once the PTA with the EU is signed and implemented (PC 2022).

Source: PC (2022).

As more bilateral and regional trade agreements are implemented, an increasing majority of Australia’s trade will be covered by preferences, further reducing the revenue and protection associated with tariffs. For instance, once agreements with the United Kingdom, European Union, and India are implemented, preferences will cover roughly 90 per cent of Australia’s imports. The UK and EU Preferential Trade Agreements (PTAs) alone will see revenues fall from \$1.5 billion to between \$636 million and \$733 million, while compliance PTA-related costs are estimated to grow by about 20 per cent. This results in compliance costs being equivalent to over \$2 per dollar of tariff revenue raised.

The role of tariffs into the future

The Commission’s estimates of the nuisance costs of tariffs for 2019-20 suggest that the costs to Australian importers of accessing preferences is likely similar to the amount of tariff revenue collected. Once PTAs are in place between Australia and all of its major trading partners, compliance costs would far outweigh the revenue raised by import tariffs. As such, there is a considerable case for reform that will only strengthen in the medium term.

One avenue for reform would involve significantly reducing the compliance costs associated with preferences. This would be aided, in part, by streamlining the interface between businesses and the tariff system. To this end, a taskforce was announced in June 2021 to work towards a Simplified Trade System, and the 2022-23 budget included \$187.1 million to ‘lay the foundations’ for its delivery (DESE 2021; Tehan 2022a).

Reducing compliance costs of tariffs could also be achieved by removing Rules of Origin (RoO) from Australia’s PTAs. This would remove the need for foreign producers to alter their production processes for the sake of obtaining a preference, and allow importers to select more efficient producers. In the UK-Australia FTA, for example, RoO are flexible, such that businesses would not need to overhaul their supply chains in order to qualify for preferential (zero) tariff rates (UK Government 2021a, p. 1). To the extent

that RoO are sufficiently flexible so as to be non-binding currently and into the future, this would remove a significant source of PTA-related compliance costs — the part that requires foreign producers to adapt their production processes to comply with the RoO. That said, some compliance costs would remain if businesses still had to provide evidence that their products comply with the RoO.

Another avenue could involve tariff reform — such as the reduction of all statutory tariff rates to zero, thereby removing both tariff revenue and associated administrative and compliance costs.

Unilateral tariff reform is subject to the contention that Australia's tariffs have value as leverage in trade negotiations (box 3.2). If the promise of tariff reduction were the deciding factor upon which a PTA were agreed, the value of Australia's tariffs as leverage would include all gains that Australian exporters realise once they gain preferential access to the foreign market being negotiated. However, it is difficult to accurately estimate the importance of domestic tariffs in negotiations among other factors (box 3.2). Indeed, trade agreements have been signed by nations with little to no import tariffs (such as Singapore). Other nations, such as New Zealand and China, have negotiated upgrades to existing PTAs with regard to non-tariff issues. Moreover, Switzerland, a country with traditionally high tariff barriers will eliminate tariffs on all industrial products by 1 January 2024 (box 3.3).

Box 3.2 – Leverage in trade negotiations

The question of whether Australia would benefit from additional PTAs, greater tariff reform, or both, is subject to countervailing forces.

- **PTAs provide significant gains for Australians.** It has been argued that the majority of the gains from PTAs arise from domestic tariff reduction. The Australia-UK FTA is estimated to reduce the cost of imports by \$200 million (Tehan 2022b). These estimates do not account for compliance costs associated with accessing a preference. Hypothetically, the same savings could have been incurred by unilaterally removing tariffs (which would come without the compliance costs that are associated with PTAs).
- **PTAs establish market access for Australian exporters.** It has long been argued that Australia's tariffs serve a purpose as leverage in negotiating increased access for Australian exporters in foreign markets. Australian exports to the UK were valued at over \$9 billion per year (prior to the implementation of the agreement) (Tehan 2022b). The value of open access would not only include foregone tariffs that would have been otherwise paid by Australian exporters, but also the potential increase in exports to the UK.

However, tariffs are not the only form of leverage used in negotiations. For instance, Australia's **foreign investment review framework** allows more lenient thresholds for screening of some investments from nations that are party to PTAs with Australia (chapter 4).

Others have also argued that binding commitments to **economic reform** is itself a form of leverage in negotiations. This is because such reform:

... enables the economy to be more competitive and thereby enables economic actors to be able to compete in global markets. Second, it provides a valuable demonstration effect. Domestic reforms give Australia credibility in trade negotiations. Agreeing to bind such reforms provides useful negotiating coin. (DFAT 2010, p. 3)

Box 3.2 – Leverage in trade negotiations

Indeed arguments have been put forward over the past few decades on whether or not tariffs serve as leverage in trade negotiations and, if so, whether this justified their retention (PC 2010, pp. 214–216). In practice, Australia's experiences in the 1980s and 1990s have shown that unilateral tariff reductions make an overwhelmingly positive and material contribution to the domestic economy, without preventing Australia from participating in both multilateral and bilateral trade agreements.

A more recent history of trade agreements suggests that negotiations are about much more than tariffs. Several **non-tariff issues** are likely to hold significant value as negotiating leverage.

- The Australia-UK trade agreement covers a range of non-tariff issues, including the ability for UK firms to compete for Australian Government contracts on an equal footing with Australian companies (UK Government 2021a, p. 2)
- In 2022, the agreement between New Zealand and China (originally signed in 2008) was upgraded with regard to areas not previously covered, including technical barriers to trade; customs procedures; cooperation and trade facilitation; rules of origin; services; competition policy; e-commerce; agricultural cooperation; environment; and government procurement (NZ Government 2022)

Singapore has no import tariffs (only charging excise on cigarettes, alcohol, petroleum and motor vehicles) but has 15 bilateral trade agreements in operation, including with Australia, the European Union, the United Kingdom, China, and the United States. The European Union-Singapore Free Trade Agreement saw the EU remove tariffs on 84 per cent of Singaporean exports, with the remaining 16 per cent removed over a period of 3-5 years (Singapore Government 2022c, 2022b, 2022a).

Box 3.3 – Leverage in trade negotiations

Switzerland has historically imposed high tariffs in primary goods and lower tariffs on manufactured goods. It had previously imposed a relatively low tariff rate — the simple average tariff rate was 3.96 per cent in 2020, which comprised an average tariff rate of less than 1 per cent for manufactured goods and 19.87 per cent on primary goods.

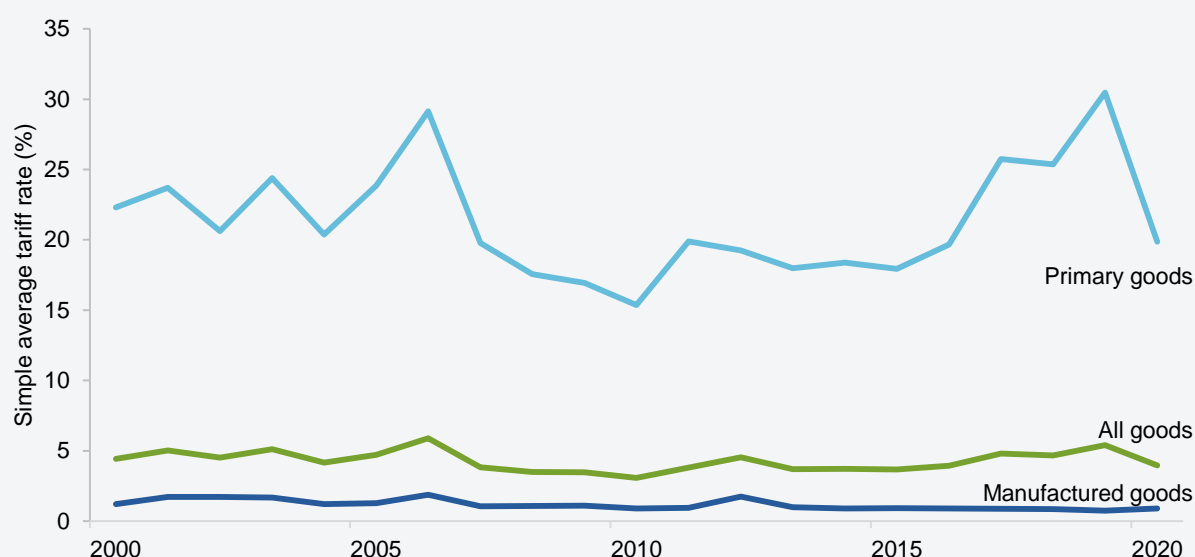
In October 2021, Switzerland legislated to change the statutory rate for all imported goods in Harmonised System code chapters 25-97 to zero on 1 January 2024. Imports of all other Harmonised System codes would still retain positive tariffs — including the relatively high tariffs levied on agricultural goods.

Modelling by the Swiss Government showed that foregone tariff revenue would total CHF 500 million per year on average, but the overall economic benefit of tariff removal would be equivalent to CHF 860 million per year (Sinha, Baumeler and Blöchliger 2021). Further benefits were expected from growth in economic activity.

Box 3.3 – Leverage in trade negotiations

Average Swiss tariff rates

Simple average tariff rate (per cent)



Source: World Bank (2022a).

The argument for unilateral tariff removal has only strengthened as the coverage of PTAs has grown. Given that all of Australia's major trading partners will soon be subject to PTAs, it is increasingly clear that there would be considerable gains for unilaterally adopting a reform schedule to reduce import tariffs to zero.

Yet, as exemplified by Switzerland, removing tariffs results in a material reduction in compliance costs, but not their complete elimination (box 3.3).

In general, it can be said that the import clearance for companies would be less burdensome as tariff classification would be simplified and companies would no longer need proofs of origin to benefit from duty reductions in Switzerland. However, companies that manufacture with pre-materials, re-sell or process products sourced from other countries still have to be compliant with preferential origin related rules of Free Trade Agreements (FTAs) in case their customers request certain proofs of origin. Thus, preferential proofs of origin are still needed and have to be declared for imported goods to ensure origin compliance accordingly. (EY 2021)

Similarly, if Australia were to remove its tariffs, Australian importers and foreign exporters would not need to engage with RoO in order to avoid the cost of tariffs. However, if those imports were used in production for a final good to be exported, the Australian firm may need proof of RoO for its imported inputs, in order to avoid tariffs in the destination country. As such, simplifying or removing RoO should be a focus of future PTA negotiations.

3.4 Australia's WTO disputes

As noted above, one of the core functions of the WTO is to hear and settle trade disputes. This has continued despite complications with the Appellate Body that first arose in 2017, and reliance on the Multi-Party Interim

Appeal Arbitration Arrangement, the MPIA (section 3.2). Since 1995, the WTO has received 612 trade disputes, with over 350 rulings given on cases (WTO 2022j). To date, Australia has raised 11 cases (as a complainant), and Australia has been subject to 17 cases (as a respondent) (table 3.1 and table 3.2).

At present, Australia has filed three complaints.

- In 2020, Australia lodged a complaint about China's anti-dumping and countervailing duties on Australian barley (WTO 2022h). China imposed these duties on Australian barley following an 18-month investigation, imposing a tariff of 80.5 per cent (Cao and Greenville 2021). The WTO established a panel in May 2021, and it was composed in September 2021³⁷ (WTO 2022h).
- 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 per cent 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 (WTO 2022i).
- In 2019, Australia lodged a complaint with the WTO about India allegedly providing domestic support measures and export subsidies to sugar and sugarcane producers. In December 2021, the WTO Dispute Settlement Body ruled in Australia's favour, and India appealed the decision to the Appellate Body (WTO 2022o). 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 to hear the case was established in February 2022, but is yet to be composed (WTO 2022e).

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 composed September 2021
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
2003	European Communities	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

³⁷ The WTO dispute settlement process allows the complainant to request that a panel be established, if prior consultations between parties were unsuccessful (figure 3.4). Once the complainant files a request for a panel, the Dispute Settlement Body (DSB) establishes a panel. The WTO Secretariat proposes panellists from a list of candidates, based on their relevant experience and their independence. Panellists are often trade delegates of WTO members or other trade officials, but can also include former Secretariat officials, retired government officials and academics (WTO 2022a).

Year	Country	Issue	Outcome
			Dispute Settlement Body's recommendations had been fully implemented
2002	European Communities	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 Communities, India, Indonesia, Japan, Republic of Korea and Thailand.

b. Joint complainant with Argentina, Canada, New Zealand, Thailand and the United States.

Sources: WTO (2001, 2010j, 2010i, 2022h, 2022i, 2022o, 2022f, 2022g, 2022m, 2022l, 2022v, 2022w).

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 established, but not yet composed
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 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

Year	Country	Issue	Outcome
2003	European Communities	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 in 2003, but not composed. Philippines did not pursue dispute beyond panel request
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 US 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.

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

3.5 Anti-dumping and countervailing activity

'Dumping' refers to a situation where 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 (Australian Government 2020; WTO 2022t). 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 (PC 2016, p. 61). For example, domestic producers may be unable to compete with imported products that are sold at lower prices than in their country of origin (European Parliament 2018).

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.

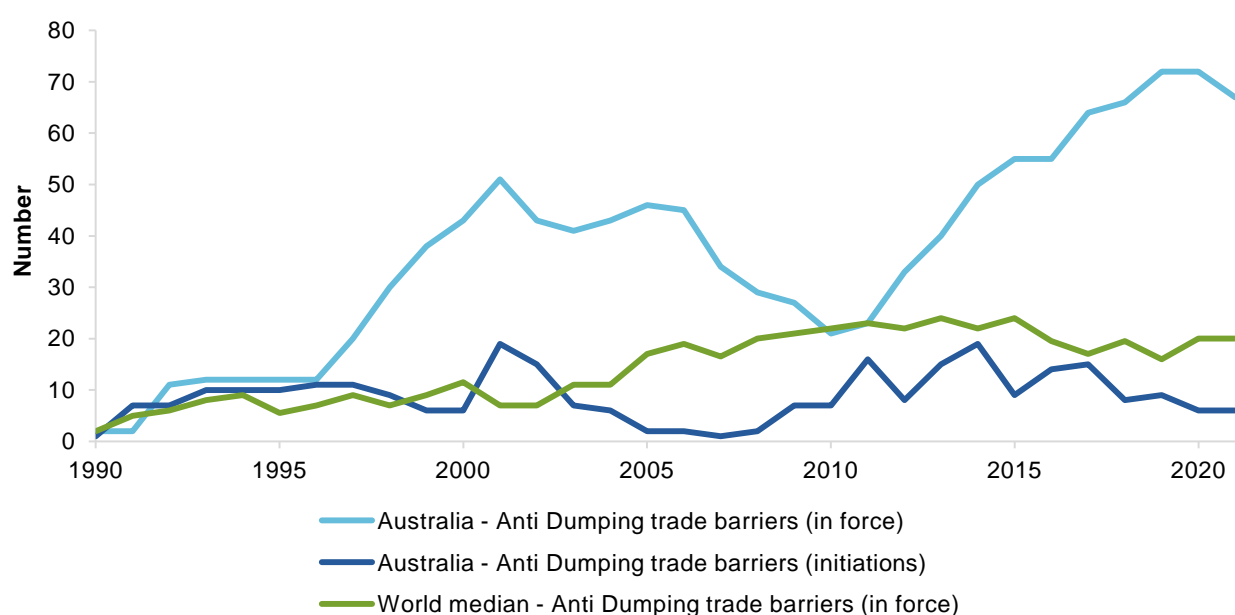
While the WTO rules do not regulate dumping behaviours, how members respond to dumping is regulated, under the Anti-Dumping Agreement (WTO 2022b). Anti-dumping measures are only permitted when a government can demonstrate:

- 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 2022c).

The number of products subject to anti-dumping measures in Australia has increased since 2010 (figure 3.6). In 2021, there were 67 anti-dumping measures in force in Australia and 6 new investigations were initiated. This contrasts with the world median number of anti-dumping measures (20 in 2021), which has mostly declined in the past decade (World Bank 2022b).

Figure 3.6 – Australia's anti-dumping measures continue to grow
Anti-dumping measures, 1990–2021



Sources: World Bank (2022b); WTO (2022p).

Anti-dumping measures benefit specific industries and impose costs on others. Anti-dumping measures encourage greater activity, employment and investment in the industry of the firms that benefit from them. Other domestic industries that use inputs that are subject to anti-dumping measures are penalised due to increased production costs. Reductions in activity, employment and investment in industries that are penalised by anti-dumping measures can outweigh any benefits accrued to recipient industries (PC 2016, p. 51).

3.6 Carbon-related tariffs and adjustment mechanisms

The major economies have steadily increased their emissions reduction efforts over recent years. Despite this, global greenhouse gas emissions have continued to grow, partly supported by growth in emissions generated from the production and transportation of internationally-traded products — which now accounts for 20 to 30 per cent of global greenhouse gas emissions (WTO 2021c, p. 1). Industries that are emissions-intensive and trade-exposed (EITE) often face less stringent emissions reduction obligations than domestic industries, which has traditionally been justified due to concerns about ‘carbon leakage’ (box 3.4). A desire for EITE industries to make a greater contribution to emissions reduction efforts has prompted some governments to consider alternative responses to carbon leakage concerns. Carbon border tariffs are one such approach, which seek to level the playing field between domestic EITE industries and their foreign

competitors, by making importers pay tariffs that are broadly equivalent to the carbon costs faced by their domestic competitors.

While no government has yet implemented a carbon border tariff, plans to do so are well advanced in the European Union, and the United Kingdom, Canada and Japan have expressed some openness to such a policy. This section discusses how countries might implement carbon border tariffs, and their potential implications for Australia.

What are carbon border tariffs and what is their purpose?

Carbon border tariffs (CBTs) are taxes or charges levied on the carbon content of imported products (Muller, Saddler and Melville-Rea 2021, p. 5). They are also sometimes referred to as a 'carbon border tax', a 'carbon border levy' or a 'carbon border adjustment mechanism'.

Proponents of CBTs have suggested such measures could address competitive concerns that can arise when domestic producers pay a carbon price for their emissions, but competing importers do not, while incentivising emissions reductions for domestic and foreign producers. By charging importers for their carbon emissions, a CBT could help level the playing field between domestic producers and those foreign producers that face less stringent carbon constraints in their home country (Muller, Saddler and Melville-Rea 2021, pp. 6, 32).

- When domestic producers face a cost for any carbon they emit, they can be at a competitive disadvantage compared with foreign producers that do not face carbon constraints.³⁸ With free trade, such competitive disadvantages could limit the effectiveness of carbon constraints — with imports from low carbon-constraint economies replacing domestic production in higher carbon constraint economies. This can encourage the transfer of emissions-intensive industries from high carbon constraint economies to lower carbon constraint economies, and undermine emissions reduction efforts by high carbon constraint economies (known as 'carbon leakage').
- Traditionally, governments have responded to carbon leakage concerns by giving discounts (or exemptions) on carbon constraints to producers of goods at risk of carbon leakage (namely EITE goods). For example, the European Union gives free emissions permits to EITE industries under its Emissions Trading System (ETS). While this can discourage carbon leakage, it also provides modest incentives for these producers to reduce their emissions, relative to when they incur direct costs for the carbon they emit.
- An alternative way to address carbon leakage concerns is to make both domestic EITE industries and their foreign competitors subject to similar carbon constraints (as opposed to providing exemptions). A CBT would require importers to pay for each tonne of emissions embedded in the imports, while removing discounts or exemptions on carbon constraints for domestic producers so that they faced similar carbon costs to their foreign competitors. In this way, CBTs might help to discourage carbon leakage while creating incentives for both domestic and foreign producers to reduce emissions.

CBTs can contribute to emissions reduction in several ways. First, CBTs provide an incentive for foreign producers to reduce emissions, in order to reduce their exposure to CBTs. Second, by imposing a CBT, governments could impose stronger carbon constraints on their EITE industries, encouraging them to reduce emissions. Third, CBTs can discourage EITE industries from relocating to countries with less stringent carbon constraints on producers to reduce their production costs (carbon leakage) (box 3.4), which may prevent increases in global emissions due to relocation. Finally, CBTs may also encourage other countries to implement policies to constrain carbon emissions (such as a carbon pricing system or regulations that limit

³⁸ Such carbon-related costs refer to both *explicit* carbon prices (such as a carbon tax or emissions permits that producers are required to purchase) and *implicit* carbon prices (additional costs faced by producers as a result of broader climate policies, such as renewable energy targets or production technology mandates).

emissions). When a country's exports incur a CBT in the destination country, the exporting country may opt to impose a domestic carbon price on its producers. This would allow revenue that would otherwise be paid to the destination country for the CBT to instead be collected domestically by the exporting country, while exempting exporters from paying a CBT.

One of the merits of CBTs is that it does not matter where products that are consumed domestically are produced — any carbon emissions embedded in the products would incur carbon costs (Pomerleau 2017), thereby discouraging carbon leakage (box 3.4). Specifically, measures such as CBTs or free allocation of emissions allowances to domestic producers are used to discourage the carbon leakage that occurs in *direct* response to climate policies. However, they do not target offshoring of carbon emissions that occurs for reasons unrelated to climate policies (box 3.5). For example, businesses may choose to locate overseas (and produce emissions overseas) due to labour costs (other reasons are outlined in box 3.5). This type of carbon offshoring is difficult to target with CBTs, given that it reflects complex factors that determine where businesses base their production.

Box 3.4 – Characterising carbon leakage

Carbon leakage refers to the situation when domestic climate policies (such as carbon pricing) cause a reduction in domestic emissions but an increase in overseas emissions. It can undermine a country's efforts to reduce emissions, by simply displacing production and emissions offshore (EC 2021b). Carbon leakage can occur through several channels:

- when domestic carbon pricing raises the price of domestic products relative to imports that do not incur carbon pricing, it can cause consumers to switch from lower-emission domestic products to higher-emission foreign products, causing an increase in emissions overseas (Lockwood and Whalley 2008, p. 7)
- when businesses respond to domestic climate policies by moving production to other countries with less stringent emissions policies. This partly reflects businesses' desire to minimise production costs, but also to avoid a competitive disadvantage relative to producers in countries with more relaxed climate policies (Sato and Burke 2021)
- if a large economy imposes domestic carbon pricing, this can cause a decrease in demand for fossil fuels that depresses the world prices of fossil fuels, leading to an expansion in their use in countries with no carbon pricing (this is referred to as *indirect* carbon leakage) (Felbermayr and Peterson 2020, p. 6).

There is a risk of carbon leakage when countries take different approaches to emissions policy (including when they impose no emissions policies). The extent of this risk depends on several factors:

- the number of countries that impose carbon policies (such as a carbon price). When only a small number of countries use carbon pricing (or they use a significantly lower carbon price), there is a greater incentive for domestic producers to move production offshore compared with when a majority of countries impose similar levels of carbon pricing
- the carbon-intensity of domestic production. The risk of carbon leakage increases when domestic producers are relatively carbon-intensive, since their liabilities under a carbon price would be relatively high, increasing the incentive to relocate offshore
- the degree of substitutability between domestic and foreign products. When domestic and foreign products are highly substitutable, an increase in the price of domestic products following a carbon policy is more likely to prompt consumers to switch to foreign products that do not incur carbon costs

Box 3.4 – Characterising carbon leakage

- the degree of substitutability between countries for producers. Factors including institutional settings, level of education of the workforce, access to inputs to production, proximity to export markets, and broader input costs can differ across countries and affect the ease with which domestic producers could relocate, should they incur a domestic carbon constraint.
- the degree of competition among domestic producers. If competition is relatively high, producers may be unable to pass on the costs of carbon to consumers, increasing incentives to relocate (Felbermayr and Peterson 2020, pp. 9–10).

Box 3.5 – What evidence is there of carbon leakage?

Carbon leakage may be detected when the carbon-intensity of a country's imports increases after carbon constraints are introduced. This can be done either by modelling the effects of a hypothetical climate policy, or by assessing the effects of actual climate policies after they are implemented, to determine the cause of any increases in imported emissions (or the emissions-intensity of imports).

Some studies that have modelled the effects of hypothetical climate policies have predicted that moderate carbon leakage would occur, particularly for EITE industries such as steel (Böhringer, Carbone and Rutherford 2018, p. 199; Branger and Quirion 2014, p. 1). But in studies that compare the emissions-intensity of a country's imports before and after a new climate policy was implemented, evidence of carbon leakage is usually limited (Branger, Quirion and Chevallier 2016, p. 130; EC 2021d, pp. 115–116). This may reflect a number of factors:

- many existing climate policies such as carbon pricing provide free carbon allowances to industries deemed to be at high risk of carbon leakage (namely, EITE industries)
- carbon prices in some countries may not be high enough to drive production offshore
- it is difficult to separate the effects on trade flows of a climate policy when many determinants affect trade flows at any given time (Sato and Burke 2021).

While carbon leakage may be difficult to observe after a single policy such as a carbon price, there is some evidence to suggest it occurs in response to broader climate policies, such as net-zero emission targets. For example, some countries that have net zero targets have recorded increases in imports and the emission-intensity of their imports (Felbermayr and Peterson 2020, p. 2).

However, the broader offshoring of emissions for reasons unrelated to climate policies can be more readily observed (Sato and Burke 2021). Emissions may be displaced offshore due to wider determinants of international trade and investment, rather than in response to differences in climate policies between countries (for example, businesses may decide where to locate production based on the cost of land, labour and equipment, access to raw materials, non-climate policies such as corporate taxation rates, environmental regulations, trade tariffs and transport costs, among others, which affects where emissions are generated). For example, after the European Union's ETS was implemented in 2005, some sectors recorded an increase in imports or a decrease in exports in the first two trading phases of the ETS. This was found not to be directly linked to the introduction of the ETS, but rather the result of developments in global demand for the products and differences in input prices (such as energy costs unrelated to emissions) (Bolscher et al. 2013, pp. 11–14). This also reflects that the EU ETS

Box 3.5 – What evidence is there of carbon leakage?

provides free carbon allocations to domestic EITE industries, which likely minimised carbon leakage as a direct response to the introduction of the ETS.

However, depending on the design of CBTs (box 3.6), they may resemble a form of trade protection. For instance, if a CBT imposed higher per-unit costs of carbon on imports than on domestically-produced products, this would constitute a form of protection for domestic firms.

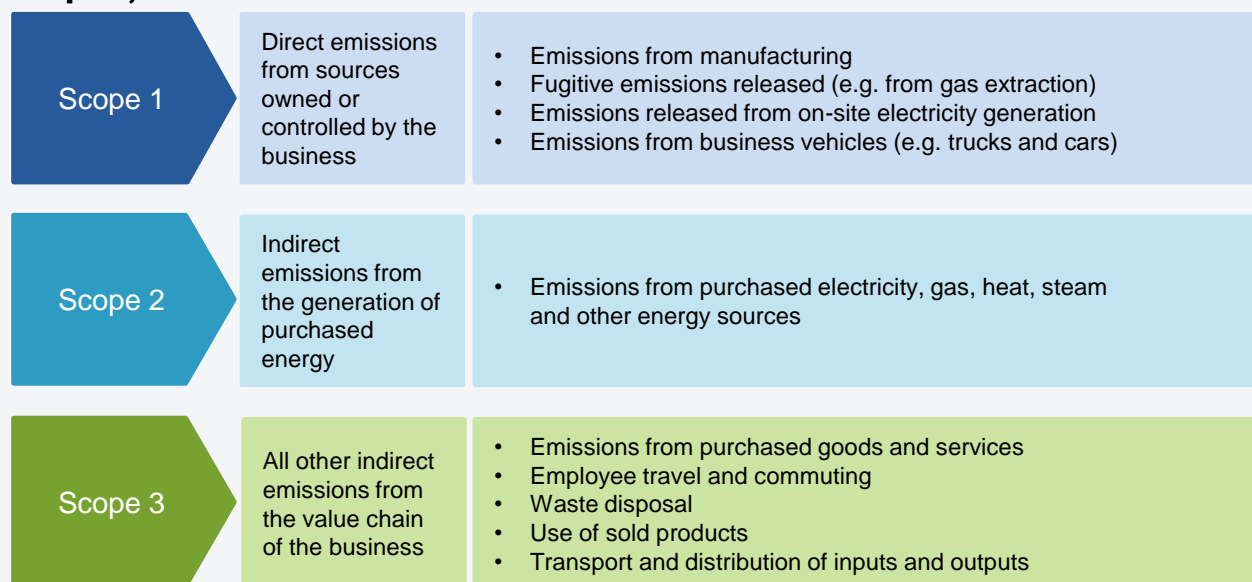
Box 3.6 – How might a carbon border tariff be designed?

There are several ways a CBT could be designed. For instance, a CBT could:

- be imposed as a tax on imports when they cross an international border, based on the carbon intensity of the products (Keen, Parry and Roaf 2021, p. 4).
- require importers to purchase carbon allowances through the domestic country's emissions trading system³⁹, to cover emissions from the production of the imported products (this approach is currently being proposed by the European Union)
- imposed punitively as a tariff on imports from countries deemed to have lower climate ambitions. The design of a CBT may depend on the type of domestic carbon pricing system in place (such as a domestic carbon tax or emissions trading system). For example, a country with an ETS may implement a CBT by extending the ETS to include importers.

The scope of a CBT could also vary. For example, a government would need to decide what products would be subject to a CBT, and the type of emissions that importers would pay for (such as the type of greenhouse gases covered, and whether Scope 1 (direct) or also Scope 2 and Scope 3 (indirect) emissions would be included (figure below)).

³⁹ An emissions trading system (ETS) is a market in which certificates to pollute a fixed amount of emissions are traded. Producers purchase certificates to cover the amount of emissions they emit. Over time, a government or market operator may decrease the total number of certificates available in the market, to decrease total emissions. This places upwards pressure on the price of pollution allowances, encouraging producers to find lower-emission means of production.

Box 3.6 – How might a carbon border tariff be designed?**Scope 1, 2 and 3 emissions**

Sources: CER (2021); Carbon Trust (2022); Greenhouse Gas Protocol (n.d., p. 1).

Another consideration in the design of a CBT is whether it would also provide domestic producers of exported products with rebates for their carbon costs (to preserve export competitiveness in international markets where prices may not reflect carbon costs).

Finally, a CBT mechanism may be designed to offer exemptions or discounts for any carbon costs already incurred in the country of origin, to ensure that all producers (domestic and foreign) face equivalent carbon-related production costs. This discount could reflect both explicit carbon prices (carbon taxes or the cost of emissions trading system permits) and implicit carbon prices (additional costs faced by producers as a result of broader climate policy settings, such as technology mandates and renewable energy targets). All these factors could affect how a CBT works in practice, and whether it is likely to comply with World Trade Organization rules.

The effects of a CBT on domestic consumers will likely depend on the extent to which the carbon costs of imports are reflected in the prices paid by consumers. This rate of 'pass-through' of a CBT to consumers depends on various factors:

- the sensitivity of consumer demand to a change in the product's price — there is more scope to pass carbon costs on to consumers whose demand is relatively insensitive to price changes
- the nature and extent of competition between domestic and foreign producers in a market — when there is significant competition in a market, producers may be less able to pass carbon costs on to consumers through higher product prices (though producers that use similar technology and production processes may incur similar carbon costs, in which case they may be passed on to consumers) (Demailly and Quirion 2008, p. 2019)
- the substitutability of emissions-intensive products with lower-emission alternatives — if consumers cannot easily switch to lower-emission products, producers are more able to pass on carbon costs to product prices.

Carbon border tariffs and WTO rules

Some have criticised CBT measures as being protectionist, and creating barriers to competition in international markets (Galloway and Harris 2021; Harris and Galloway 2021; Simon 2021). In 2021, the then Australian Trade Minister raised the concern that the European Union's proposed Carbon Border Adjustment Mechanism (CBAM) could protect domestic industry and treat competing producers overseas unfavourably, and would therefore violate WTO rules (Kelly 2021). In the same year, trade ministers from Brazil, South Africa, China and India expressed 'grave concern' for unilateral CBTs, on the grounds that they would be discriminatory and inequitable, and act as trade barriers (South African Government 2021).

CBT compliance with WTO rules will depend on how the policy is designed (Pauwelyn and Kleimann 2020, p. 6). A CBT is less likely to comply with WTO rules if it protects domestic industry and disadvantages foreign competitors. This could happen if, for example, the carbon costs imposed on foreign products were higher than for equivalent domestic products, per unit of carbon emitted. In contrast, a CBT could arguably comply with WTO rules if it was solely applied based on the carbon content of products, and imposed equal carbon prices on domestic and imported products.

The 'most favoured nation' principle in the WTO rules (Article I, GATT) means that a country must treat the same types of imported products from different countries equally (WTO 1986, pp. 2–3). Whether a CBT would violate this rule depends partly on design. In principle, a CBT that charged importers a set price for each tonne of carbon emissions (such as under a carbon tariff, or by making importers purchase emission allowance certificates through an ETS) would not violate this principle, given all importers would pay the same per-unit cost for emissions. However, when a country implements a CBT, it must decide whether foreign producers will receive a discount for the carbon-related costs they already face in their home country, and whether that discount will reflect all climate policy-related costs (implicit carbon pricing) or just explicit carbon prices. The latter approach would discriminate against countries that rely upon non-price emissions reduction measures to achieve their emissions targets. More broadly, countries that impose a CBT may choose to exempt countries that they judge to have comparable climate policy settings. In the extreme, a CBT that simply applied a tax to other countries' imports based on judgements about their climate actions or emissions (rather than the carbon content of imports) would likely more blatantly violate this rule against discrimination (Ai Group 2021, p. 67; Pauwelyn and Kleimann 2020, p. 12).

Article II of the General Agreement on Tariffs and Trade (GATT) implements tariff 'binding', whereby countries set a maximum level of tariffs for specific products (WTO 1986, pp. 3–4). A CBT that applies a set charge per tonne of emissions could be more easily bound to a set level, whereas a CBT that requires importers to purchase carbon allowances through a market system may fluctuate (and likely rise over time), making it more difficult to agree to not exceeding a binding.

Under the 'national treatment' rule, countries should treat domestic products and competing imports equally. In countries with a domestic carbon price, imposing a CBT seems likely to comply with this rule in principle, so long as the price paid per unit of emissions is comparable between domestic producers and importers, after taking into consideration both the explicit and implicit carbon costs imposed by the country of origin of imports. In contrast, it seems unlikely that a CBT would comply with this rule if it was imposed by a country with no domestic carbon constraints on its producers. And for CBTs such as the EU's proposed CBAM, the way in which free carbon allocations for domestic producers are phased out will be important. For example, if the free carbon allowances of domestic producers were not phased out in proportion to the phasing-in of the CBAM, domestic producers may be unfairly advantaged during the transition phase and this rule may be violated (Bacchus 2021, pp. 3–4).

Another common concern is that a CBT could unfairly penalise developing countries that are not yet in a position to invest in significant emissions reduction measures. The Chinese Government expressed this view

in 2021, stating that each country's response to climate change should take into account its level of economic development (Xu and Stanway 2021). A CBT could be designed to give concessions or some exceptions to imports from developing countries, under the 'Special and differential treatment provisions' in the WTO rules, which permit developed countries to give developing countries special rights and/or more favourable treatment than other WTO members (WTO 2022s). However, this may inadvertently encourage carbon leakage, competitively disadvantage domestic producers, and not give due regard to the emissions reduction opportunities open to developing countries.

If a CBT violates WTO rules, it might be possible to allow it under a general exception (Bacchus 2021, pp. 4–5; Pauwelyn and Kleimann 2020, pp. 6–7). The GATT includes general exceptions for measures that are 'necessary to protect human, animal or plant life or health' (WTO 1986, p. 37). However, a CBT would only be allowed under a general exception if any resulting discrimination between countries with the same conditions could be justified (Bacchus 2021, p. 5; WTO 2021a). Under a general exception, a CBT could not be protectionist; it would need to be based on a clear objective and applied equitably (WTO 1986, p. 37). For example, some restrictions on trade of products that affect human health (such as cigarettes and asbestos products) can be justified provided they do not result in unfair discrimination or protectionism. Accordingly, a more protectionist CBT would be less likely to meet these requirements, compared with an objective and more equitable CBT arrangement (Pauwelyn and Kleimann 2020, p. 12).

The compliance of a CBT with WTO rules is not guaranteed, as such a policy is yet to be implemented and tested through the WTO dispute settlement process. However, it seems likely that a CBT could comply with WTO rules if it was designed to avoid discrimination between foreign producers and domestic producers.

What is the EU proposing?

In July 2021, the European Union announced a proposal for a Carbon Border Adjustment Mechanism (CBAM) as part of the European Green Deal, which seeks to reach a 55 per cent reduction on greenhouse gas emissions relative to 1990 levels by 2030, and carbon-neutrality by 2050 (EC 2021a). While the exact design of the CBAM is still being developed, the proposed policy would require some foreign companies that export to the European Union to purchase carbon allowances for emissions generated in the production of their goods. Carbon allowances for imports would be purchased at an equivalent price to that paid by EU producers in the EU's ETS (EC 2021a). It is the most advanced proposal for a CBAM of any country considering such a policy (box 3.7).

Box 3.7 – Consideration of carbon border tariffs around the world

While the European Union's proposed CBAM is the most advanced carbon border tariff policy to date, several other countries have expressed openness to carbon border tariffs, to varying degrees.

The **Canadian** Government announced in 2020 that it would explore the possible use of CBTs as part of its plans to reduce carbon emissions. A consultation process concluded in 2021, with the specific details of the CBT design still open for discussion. Currently, most Canadian provinces and territories have implemented some form of carbon pricing (either a provincial system, or a federal backstop system, or a combination of both where a local system does not meet the federal benchmark for carbon pricing). Most industries at risk of carbon leakage receive some discount on emissions costs.

In September 2021, the **United Kingdom** Environmental Audit Committee announced an inquiry into the role of CBAMs in emissions reduction and in preventing carbon leakage. A submission process and oral

Box 3.7 – Consideration of carbon border tariffs around the world

evidence hearings have concluded; the specific design of the CBAM has not yet been decided. The UK has operated an Emission Trading System (ETS) since January 2021, in which it applies carbon pricing to domestic producers, with some free allocation to carbon-intensive industries. It participated in the EU ETS before leaving the EU.

The **Japanese** Government began discussions in early 2021 to consider introducing a national ETS, that may also include a CBT arrangement. At present there is no national carbon pricing system in Japan, but a carbon tax has been imposed on oil, gas and coal imports since 2012. Tokyo has imposed a city-level ETS since 2010, and Saitama introduced an ETS in 2011.

In the **US** 2020 presidential election, the Biden campaign proposed ‘carbon adjustment fees or quotas on carbon-intensive goods from countries that are failing to meet their climate and environmental obligations’. In July 2021, senators introduced a plan to impose a 12 per cent tariff on imports of petroleum, natural gas, coal and other carbon intensive-products, from countries deemed to be making inadequate emission reduction progress. The US does not have a federal carbon price, though California imposes an ETS, and eleven states in the north-east and mid-Atlantic jointly impose a carbon price on electricity via a regional program. The US Government has not yet released any further details on the how a CBT would be designed or implemented, and the matter has received little consideration since 2021.

Sources: Biden Harris Democrats (2021); Canadian Government (2018, 2021b, 2021a); Friedman (2021); Government of California (2021); ICAP (2021); Okazaki et. al. (2021); RGGI (2021); Siripala (2021); Takezawa (2021); Timperley (2018); UK Government (2021b); UK House of Commons (2021); UK Parliament (2021a, 2021b); US Government (2021, p. 3).

Exporters to the European Union would be exempt from the CBAM if the EU-equivalent cost of carbon emissions had already been paid before export. This would include exports from countries that impose a carbon pricing system that is linked to the EU ETS, or those with a separate carbon pricing systems that demonstrate equivalence (EC 2021c, pp. 26–27). If EU importers had paid a lower carbon cost than is imposed in the EU ETS, this cost would be deducted from the CBAM liability. It is not yet clear whether the EU CBAM will also provide a discount for any implicit carbon costs faced by foreign producers in their home countries. The initial scope of the proposed CBAM will include direct carbon emissions, for products considered to be at high risk of carbon leakage: iron, steel, cement, fertiliser, aluminium and electricity generation (EC 2021a, pp. 2–3; box 3.8).

One of the key objectives of a CBAM is to help the European Union meet its emissions reduction targets by creating further incentives for domestic producers to reduce their carbon intensity (EC 2021d, pp. 2–3). Under current settings, special allowances are made for some EU firms in carbon-intensive trade-exposed industries, such as mining of coal and iron ores and manufacture of fertilisers, plastics and cement. These firms receive some free carbon allocations, rather than having to purchase allowances through the ETS for all their emissions (EC 2018, pp. 6–7). While the provision of free carbon allocations reduces the incentive for firms to relocate their production to countries without carbon pricing, it does little to encourage emissions reduction among EU producers (EC 2021a, p. 2). Under the proposed CBAM, these free allocations may be phased out, so that both domestic and overseas producers of carbon-intensive goods would incur the cost of carbon emissions when the products are consumed in the European Union (EC 2021d, p. 3). This would reinforce a ‘level playing field’ between EU and foreign producers, while incentivising EU producers to reduce emissions. It is also intended to encourage foreign producers that export to the European Union to reduce their costs from the CBAM by reducing their emissions (EC 2021d, p. 2).

Box 3.8 – EU method of calculating emissions intensity, trade exposure and risk of carbon leakage

The EU calculates the emissions intensity of an industry as:

$$\frac{[direct\ emissions + (electricity\ consumption \times electricity\ emission\ factor)]}{gross\ value\ added\ of\ the\ industry}$$

Trade intensity of an industry is calculated as:

$$\frac{(imports + exports)}{(imports + value\ of\ domestic\ production)}$$

The risk of carbon leakage (the 'carbon leakage indicator') in each industry is assessed as follows:

$$carbon\ leakage\ indicator = emissions\ intensity \times trade\ intensity$$

Carbon leakage indicator ^a	Classification
>0.2	Product is at risk of carbon leakage
>0.15, ≤0.2	Product will be qualitatively assessed for carbon leakage risk

a. Industries with an emissions intensity above 1.5 may also be assessed (quantitatively or qualitatively) for carbon leakage risk.

Source: European Commission (2018, pp. 3–4).

The proposed CBAM would be phased in over a number of years. Countries that export products covered by the CBAM to Europe will be required to begin reporting on the level of carbon emissions in their products from 2023, and will begin paying carbon costs from 2026 (EC 2021a). Simultaneously, EU industries covered in the CBAM would have their free allocation reduced to zero by 2035 (EC 2021a). After the transition period, the EU has indicated that more products at risk of carbon leakage (EITE products such as coal, iron ores and chemicals)⁴⁰ may be added to the CBAM, and indirect emissions may also be included (EC 2021d, p. 22).

The initial scope of the EU CBAM is unlikely to hurt aggregate exports ...

Under the initial scope of the EU's proposed carbon border adjustment mechanism (CBAM), the overall economic effects for Australia will likely be minor. The EU was the sixth greatest destination for Australian exports by value in 2019-20 (receiving about \$18.8 billion or a four per cent share of the total value of Australian exports) (DFAT 2021e, p. 18). Of the products covered in the initial scope of the CBAM, Australia exports iron and steel, fertiliser and aluminium to the EU, and the EU receives a small portion of all Australian exports of these goods (in 2020-21, the portions were 4, 0.4 and 0.4 per cent, respectively)⁴¹ (DFAT 2022d). This means that, based on 2020-21 trade values, the initial scope of the CBAM would directly impact only about 0.013 per cent of Australian goods exports (worth about \$51.5 million) (DFAT 2022d). Early modelling of a CBT in

⁴⁰ The European Commission (2018, pp. 5–9) has published a list of sectors deemed to be at high, moderate or low risk of carbon leakage for 2021-2030 (box 3.8 outlines how this risk is calculated).

⁴¹ Based on Commission estimates. In 2020-21, Australia also exported some cement and related building materials to the EU. However, the proportion of cement exports that went to the EU cannot be determined as the data groups cement with products such as lime and other construction materials. For the category, about 3 per cent of exports from Australia went to the EU in 2020-21 (DFAT 2022d).

the EU also suggests that the overall effects on Australia's national income, production, trade balance and exchange rates would be negligible (McKibbin and Wilcoxon 2009, pp. 27–29).

It is possible that the EU CBAM will have more significant effects for specific industries or individual exporters, where they are geared heavily towards exporting to the EU. The impact on relevant industries — namely aluminium, iron and steel, and fertilisers — will likely depend on several factors:

- whether direct or also indirect emissions will be counted. If the CBAM only counts Scope 1 (direct) emissions, Australian producers of steel will face relatively higher costs than producers of aluminium, which is more electricity-intensive (the carbon intensity of electricity would be counted in indirect emissions). However, including Scope 2 (indirect) emissions will likely cause a greater rise in costs for aluminium producers relative to steel producers (Ai Group 2021, pp. 61–64)
- what emissions data the EU will accept from Australia. If the EU accepts data on emissions from individual Australian producers, relatively less carbon-intensive producers will benefit relative to if only industry-level, or EU benchmark emissions data is used to estimate the emissions from Australian exports. This is partly because Australia's direct emissions-intensity for products such as aluminium and steel is lower than the EU-average (Ai Group 2021, pp. 61–64).

Expanding the product scope of the EU CBAM could create more significant costs for Australian exporters. Currently, over 40 manufacturing processes in Australia are classified as emissions-intensive and trade-exposed (EITE), accounting for about five per cent of the total value of Australia's goods exports in 2019-20 (Muller, Saddler and Melville-Rea 2021, p. 1). Ai Group has noted that of the major Australian exports to the EU, it is possible that coal and lead could be included in the CBAM in the future, but unlikely that other top exports such as gold, oil seeds, and wine and beverages, will be included (Ai Group 2021, p. 58). However, its analysis predicted that the final impact on Australian exporters would be minor.

While it appears likely that the EU CBAM will have minor direct effects on Australia, in practice the ways in which it may affect Australia will be complex. This includes possible indirect impacts on Australia, such as when Australian exports are used as inputs into other countries' exports to the EU. For example, if a given country produces steel using Australian coal in a process that is relatively less expensive but more emission-intensive than its competitors, it would face larger CBAM liabilities when exporting steel to the European Union than had previously been the case, which may lead to decreased demand for Australian coal (Scott and Tunny 2021). It is difficult to determine the extent to which Australia will be indirectly impacted by the CBAM. There are often large markets in which multiple countries export the same products to the EU, and the CBAM may affect prices in goods markets that in turn affect the supply, demand and prices for these products outside of the EU.

... but emissions policies in major trading partners might have bigger effects

The EU's proposed CBAM is likely to have a minor impact on Australian exports for the foreseeable future. However, costs on Australian exporters could become significant if similar measures are adopted in other major destinations for Australian exports. For example, in 2019-20, 83 per cent of alumina and 92 per cent of aluminium produced in Australia were exported, making up over half the total value of EITE exports (Muller, Saddler and Melville-Rea 2021, pp. 1–2). And in 2020, 64 per cent of aluminium and 40 per cent of steel was exported to countries where a carbon price is either in place or being considered, noting that Australian alumina and aluminium are emissions-intensive relative to most other competitors (Muller, Saddler and Melville-Rea 2021, p. 2). If Australia's major trading partners were to adopt a cross-border tax similar to the CBAM, this could leave Australia's alumina and aluminium producers exposed to significant costs.

It is likely that broader efforts overseas to reduce emissions (for example, by setting targets to reach net zero emissions) pose a larger risk of harm to Australian exports than CBTs (Ai Group 2021, p. 70). In 2020-21,

about 22 per cent of Australian goods exports by value went to countries that have expressed some openness to a CBT (namely the European Union, United Kingdom, United States, Japan and Canada) (ABS 2022; Muller, Saddler and Melville-Rea 2021, p. 9). And 74 per cent of the value of Australian exports of goods went to countries that currently impose a national carbon price (and thus may be candidates for a CBT in the future) (ABS 2022; Muller, Saddler and Melville-Rea 2021, p. 9). While these figures are sizable, nearly all of the major destinations for Australian goods have set a target for net zero emissions (DFAT 2021e, p. 18; ECIU 2022). This means that if Australian exporters are relatively emissions-intensive relative to competing producers overseas, other countries may divert to lower-emission producers. This may have more far-reaching consequences for Australian exporters than the direct cost of CBTs themselves.

4. Foreign investment policy developments

Key points

- ✱ **Australia holds a net financial liability position with the rest of the world.**
 - Historically, there has been more overseas investment in Australia than Australian investment overseas, reflecting the large number of investment opportunities in Australia, relative to domestic savings.
 - This net liability position stood at 37.2 per cent of GDP at the end of 2021, down from 50.4 per cent at the end of 2020.
- ✱ **Australia's net financial liability position is now predominantly in debt-based financial instruments. Australia has in fact held a growing net asset position in equity financing since 2013.**
 - This net asset position grew further in 2021, rising to 18.2 per cent of GDP, from 10.2 per cent in 2020.
- ✱ **As an overall net importer of debt-based financing, and net exporter of equity-based financing, Australia has an interest in promoting the free flow of capital internationally. At the same time, Australia is among several countries that have implemented more stringent screening processes for foreign investment in recent years.**
 - A new foreign investment screening process began operation in Australia on 1 January 2021, designed to manage the emergence of national security concerns in a growing range of sectors. The implementation of this new screening framework has occurred alongside a notable increase in foreign investment application fees, increasing the cost of making foreign direct investments (FDI) in Australia. These fees recover more than administration costs, and thereby amount to a tax on foreign investment applications.
 - All else equal, it seems reasonable to anticipate that the new screening process, and the net increase in foreign investment application fees, might, at the margin, affect overall FDI flows and/or alter its composition, though the magnitude of any impacts will only become discernible over time.
- ✱ **FDI into Australia is volatile year to year, making it difficult to meaningfully attribute causality to particular policy changes. Moreover, both 2019-20 and 2020-21 were affected by COVID-19.**
 - The Foreign Investment Review Board (FIRB) reported an increase in the value of inbound FDI proposals in 2020-21 relative to 2019-20. While this seems to suggest that the new foreign investment screening framework had little impact on FDI into Australia, meaningful assessment of the impacts of the new framework will require empirical analysis of foreign investment patterns over the years ahead.
 - Future *Trade and Assistance Reviews* may wish to assess the extent to which the new screening process, and increase in foreign investment application fees, have coincided with a structural change in FDI patterns.

Foreign investment is an important source of productivity and growth. It increases the stock of capital beyond the level possible if only domestic savings were available to finance investment. By doing so, foreign investment increases the stock of capital available to workers, promoting labour productivity, and labour income growth in the process. Moreover, foreign investment can spur innovation in productive processes and supply chains (PC 2020, p. 7). Recent analysis of Australian business data suggests that foreign investment in large Australian firms increases the probability of those firms undertaking ‘novel’ innovations, to a similar extent as firms undertaking their own research and development (Majeed and Breunig 2021, pp. 12–13).

While it is clear that foreign investment has made positive contributions to Australian living standards, it is not without policy challenges. For example, individual foreign investment proposals can reduce competition in some markets, and foreign ownership of assets with strategic value can raise national security concerns.

For much of its history the Australian Government has required that foreigners wishing to invest in Australia seek, and be granted, government approval. Since 1986, this foreign investment screening process has been operationalised through a national interest test. On 1 January 2021, a standalone national security test was added to Australia’s foreign investment screening process.

A key function of the *Trade and Assistance Review* is to provide an update on foreign investment developments in Australia. This role reflects the Australian Government’s agreement to implement a recommendation from the Commission’s 2016 *Regulation of Australian Agriculture* inquiry (box 4.1).

Accordingly, this chapter provides:

- a snapshot of inbound and outbound foreign investment in Australia, along with an exploration of inbound foreign direct investment (FDI) (section 4.1)
- a review of recent developments in foreign investment policy and a discussion of potential impacts on inbound foreign direct investment (section 4.2).

Box 4.1 – Foreign investment is now a feature of *Trade and Assistance Reviews*

As part of its 2016 inquiry into the *Regulation of Australian Agriculture*, the Productivity Commission recommended that the Australian Government request that the trends, drivers and effects of foreign investment be analysed and reported on in future *Trade and Assistance Reviews* (PC 2016, p. 562). The Australian Government supported this recommendation in 2019 (Australian Government 2019, pp. 19–20).

This year’s *Review* is the second to examine foreign investment and follows the June 2020 publication of a Commission research paper on *Foreign Investment in Australia* (PC 2020). That paper examined the trends and drivers of foreign investment, the benefits and costs of foreign investment in Australia, and the prevailing policy settings of the time. The paper also examined some opportunities to amend Australia’s foreign investment framework that would further contribute to ‘getting the balance right’ between harnessing the benefits of foreign investment while also managing its potential risks.

4.1 A snapshot of foreign investment

Foreign investment can take several forms (box 4.2). Portfolio investment, for instance, occurs when an investor purchases the shares or debt of a company, but not a high enough proportion to capture a controlling stake in that enterprise. Direct investment, on the other hand, occurs when an investor purchases

a sufficient proportion of shares or other securities in an enterprise to give that investor a controlling stake in that enterprise. Because of a direct investor's ability to influence the operation of an enterprise, foreign direct investment proposals are generally subject to foreign investment screening in Australia.

Box 4.2 – Forms of foreign investment

Foreign Direct Investment (FDI) is investment in an enterprise or asset where the foreign investor has control, or a significant degree of influence, over its management. Generally, investment is considered to be direct investment when an investor holds 10 per cent or more of the voting power in an organisation, but can also involve situations where the foreign investor has the ability to affect the decisions of the enterprise, such as might occur if they were granted, for example, a seat on the company's board.

FDI is normally of more interest to policymakers than other types of foreign investment, because it entails some degree of direct control by a foreign investor. For example, FDI provides an investor with more scope to influence the operations of a business (and gives them greater access to potentially sensitive information) than other forms of investment. But FDI also typically yields the greatest benefits — it has a long-term focus, with the most direct effects on capital formation and with the greatest scope for the transfer of technology, innovative management practices and other valuable knowledge.

Portfolio investment is investment in an enterprise or asset where the investor does not have a controlling interest. This might include a foreign investor purchasing shares or bonds issued by an Australian company, but not in a sufficiently large quantity to gain a controlling interest in the company. While FDI is assumed to provide economic benefits through the transfer of technology and knowledge, portfolio investment flows provide economic benefits by acting as an additional source of investable funds than would otherwise be available through domestic savings alone. By providing access to a deeper pool of investable funds, portfolio investment can support the efficient pricing of assets and reduce the perceived risk of making investments through primary markets, in so far as deeper secondary markets increase the perceived likelihood of subsequently being able to on-sell those assets. All else equal, these characteristics should reduce financing costs.

While FDI and portfolio investment constitute the main forms of foreign investment, there are other investment types. For example, foreign investment may occur through **financial derivatives**, which are financial instruments whose value is linked to the value of other financial instruments, indicators or commodities. Investment in derivatives is often undertaken to manage (or hedge) risks but can also be undertaken by financial market traders, seeking to position themselves to profit from price movements in linked asset markets. The Australian Bureau of Statistics also measures investment involving **reserve assets** (that is, assets controlled by the Reserve Bank of Australia), and **other investment** (which is a residual category for foreign investment that does not readily fit into the other categories).

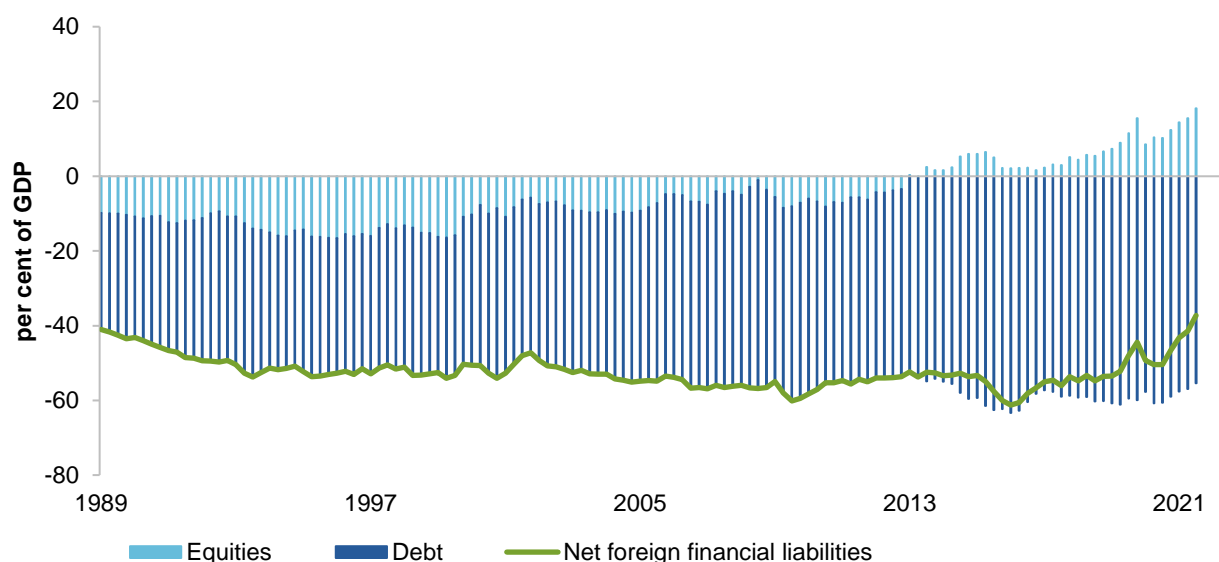
Source: PC (2020, pp. 25–26).

Australia's stocks of foreign investment

Australia holds a net financial liability position with the rest of the world (figure 4.1 and table 4.1). Historically, there has been more overseas investment in Australia than Australian investment overseas, reflecting the large number of investment opportunities in Australia, relative to domestic savings. Australia's net liability position stood at 37.2 per cent of GDP at the end of 2021, down from 50.4 per cent at the end of 2020.

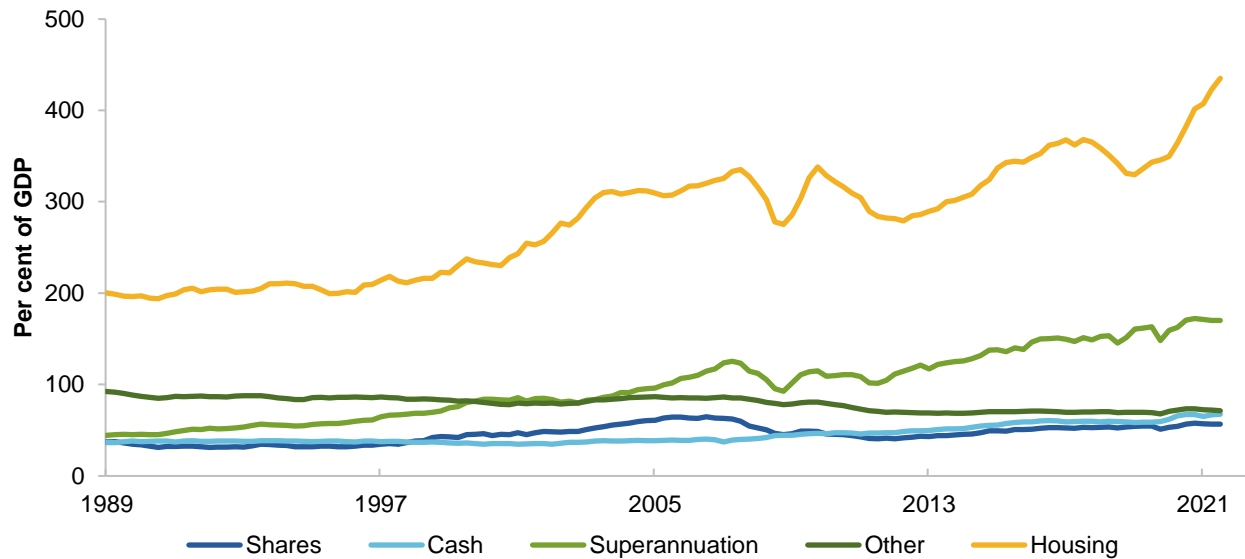
Australia's net financial liability position is now predominantly in debt-based financial instruments. In fact, Australia has held a growing net asset position in equity financing since 2013 (figure 4.1). This net asset position stood at 18.2 per cent of GDP at the end of 2021, up from 10.2 per cent at the close of 2020. Australia also has a small net asset position in reserve assets, slightly offset by a minor net liability position in financial derivatives (table 4.1).

Figure 4.1 – Australia's net investment position, by debt and equity
Net assets, to 31 December 2021

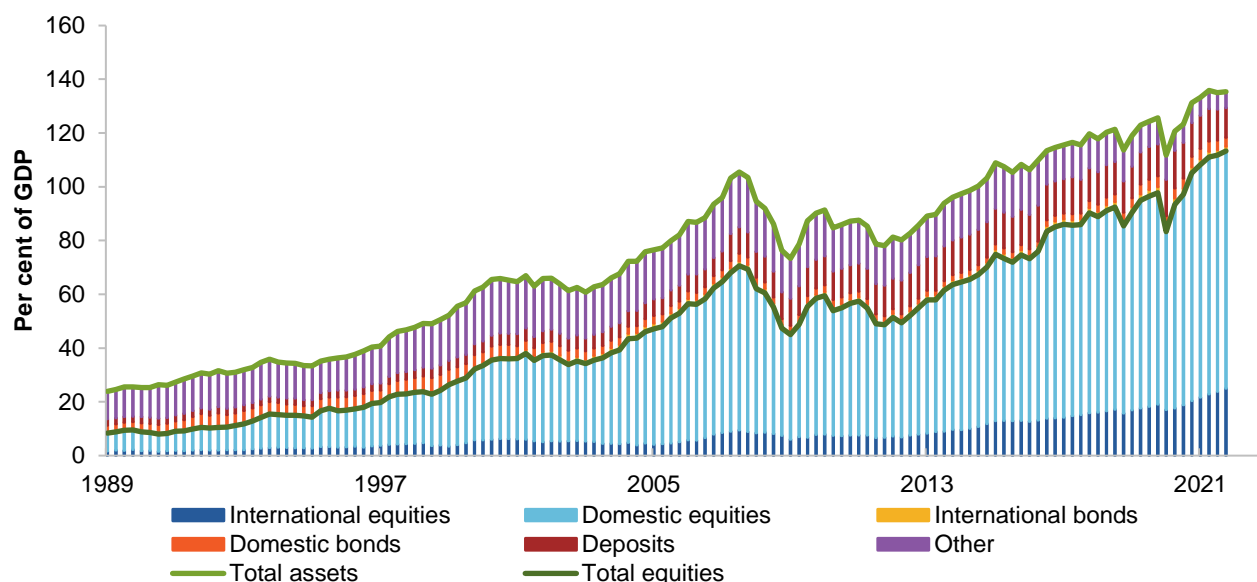


Sources: Commission estimates based on ABS (*Australian National Accounts: National Income, Expenditure and Product, March 2022*, Cat. no. 5206.0; *Balance of Payments and International Investment Position, Australia, March 2022*, Cat. no. 5302.0).

Australia's growing net asset position in equities partly reflects the growth of superannuation over recent decades (figure 4.2). The bulk of superannuation funds under management are now invested in Australian shares, and a growing amount of funds under management have also been invested in foreign shares (figure 4.3), as Australia's superannuation funds have grown ahead of Australia's economy. While Australia is the thirteenth largest economy, it has the world's fourth largest pool of funds under management in US dollar terms (Hodgson et al. 2022, p. 15; World Bank 2022, p. 1).

Figure 4.2 – Australian household sector balance sheet**Gross assets, to 31 December 2021**

Sources: Commission estimates based on ABS (*Australian National Accounts: National Income, Expenditure and Product*, March 2022, Cat. no. 5206.0; *Australian National Accounts: Finance and Wealth*, March 2022, Cat. no. 5232.0).

Figure 4.3 – Aggregate asset holdings of Australian pension funds**Gross assets, to 31 December 2021**

Sources: Commission estimates based on ABS (*Australian National Accounts: National Income, Expenditure and Product*, March 2022, Cat. no. 5206.0; *Australian National Accounts: Finance and Wealth*, March 2022, Cat. no. 5232.0).

Table 4.1 – Australia's foreign investment stocks (levels)
As of 31 December 2021, \$ million

	Foreign investment in Australia (A)	Australian investment abroad (B)	Net investment (A-B)
Direct investment	1 123 975	914 106	209 869
Equity investment	851 653	846 357	5 296
Other investment	272 322	67 749	204 573
Portfolio investment	2 163 859	1 608 971	554 888
Equity investment	807 434	1 208 540	-401 106
Other investment	1 356 425	400 431	955 994
Financial derivatives	312 363	301 716	10 647
Other investment	597 203	477 927	119 276
Reserve Assets	-	84 938	-84 938
Total	4 197 400	3 387 658	809 742

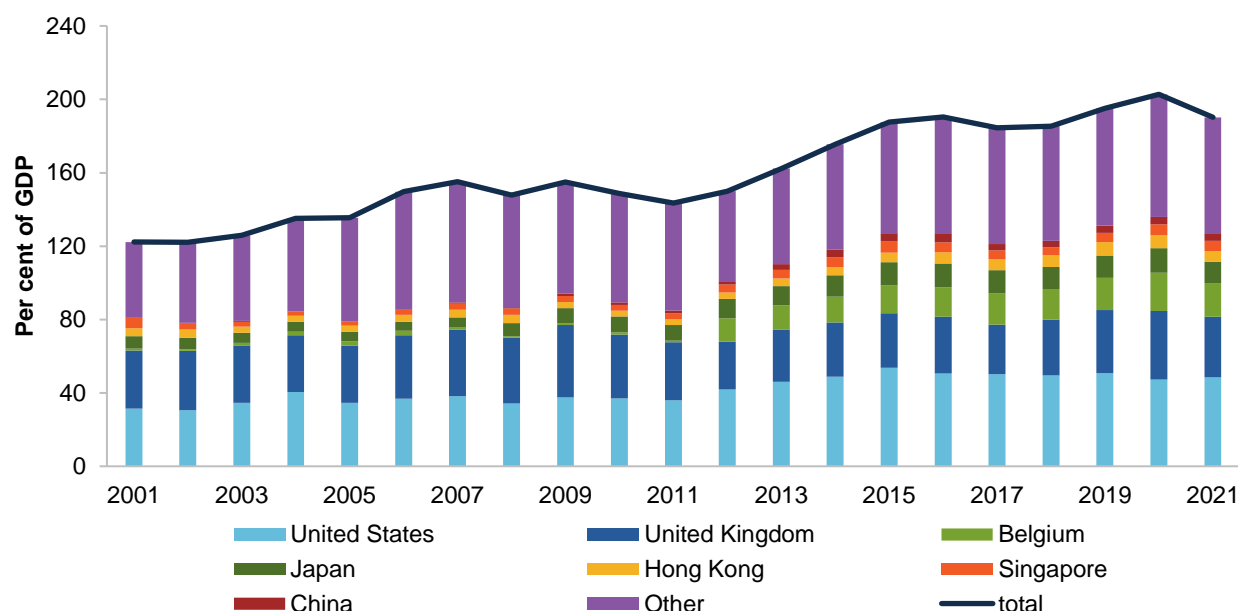
Source: ABS (*Balance of Payments and International Investment Position, Australia, March 2022*, Cat. no. 5302.0).

Sources and destinations for Australia's foreign investment

The United States, United Kingdom, Belgium and Japan collectively account for more than half of the outstanding level of foreign investment in Australia (figure 4.4). It should be noted that these data reflect the immediate source country of the invested funds which, in some circumstances, may differ from the ultimate source (beneficial ownership source) of those funds.⁴² This would occur whenever an investor from one country used a third country as a channel to invest in Australian assets.

⁴² Estimates based on outbound investment data collected from the source country (such as that used by Ferguson et al. (2022)) can differ significantly from estimates based on inbound investment collected at the destination (such as those published by the ABS and analysed in this *Review*).

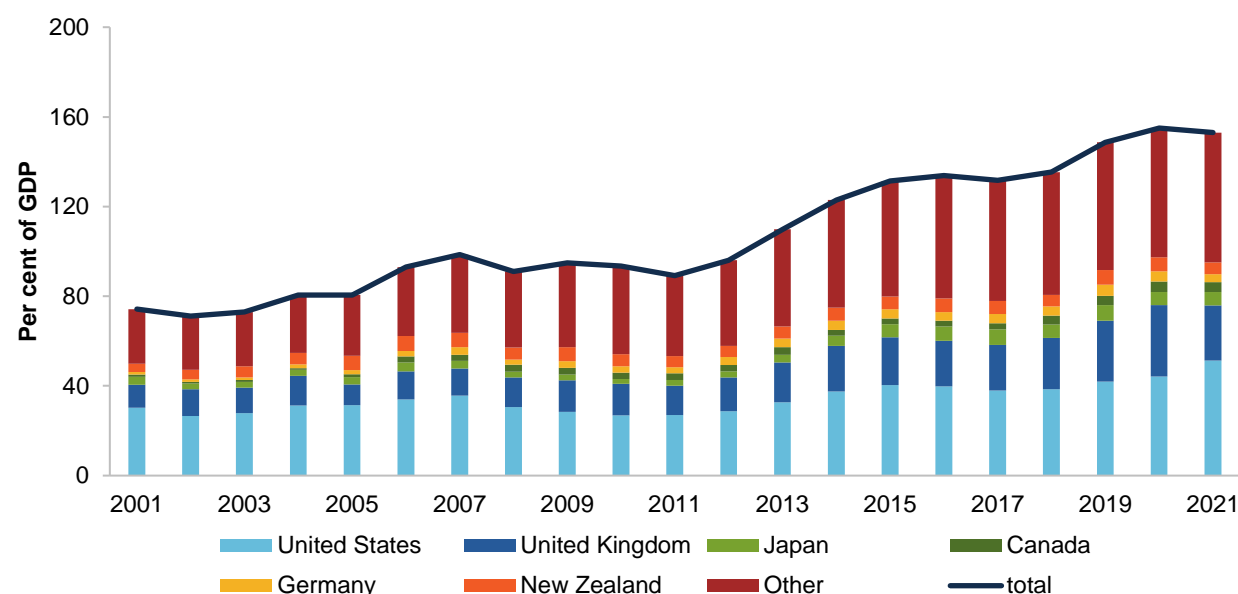
Figure 4.4 – Stock of foreign investment in Australia, by source country
Gross liabilities, to 31 December 2021



Sources: Commission estimates based on ABS (*Australian National Accounts: National Income, Expenditure and Product*, March 2022, Cat. no. 5206.0; *International Investment Position, Australia: Supplementary Statistics*, 2021, Cat. no. 5352.0).

Similar to inbound investment, about half of the money that Australians have invested overseas is invested in the United States and the United Kingdom, with smaller amounts invested in Japan, Germany, Canada, New Zealand, and the rest of the world (figure 4.5).

Figure 4.5 – Foreign investment by Australia, by destination country
Gross assets, to 31 December 2021



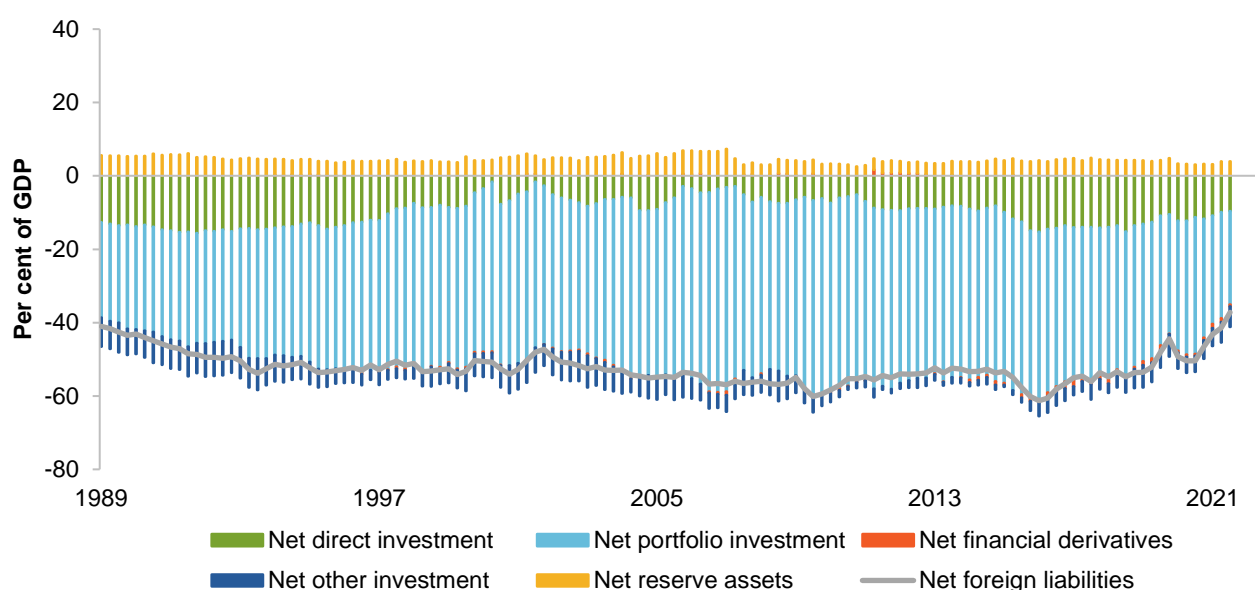
Sources: Commission estimates based on ABS (*Australian National Accounts: National Income, Expenditure and Product*, March 2022, Cat. no. 5206.0; *International Investment Position, Australia: Supplementary Statistics*, 2021, Cat. no. 5352.0).

The bulk of inbound foreign investment in Australia is *portfolio investment*, where the investor does not hold a sufficient share of ownership to exert influence over the operation of the company (figure 4.6).

The proportion of overall inbound investment that has come in the form of direct investment varies by country. The United States, United Kingdom, and Belgium have a lower than average direct investment share of total investment in Australia. France, Germany, Japan, and China have an above average direct investment share of total investment in Australia. Over recent years, China has mostly had the highest direct investment share of overall investment into Australia (figure 4.7), though, according to ABS data, it remains a relatively modest immediate source country for overall direct investment in Australia (figure 4.8).⁴³

It is unclear to what extent China's high FDI share of total inbound investment is elevated by a low level of outbound portfolio investment by households, which might be expected from a country with a relatively closed capital account, where household investment options are constrained. Nevertheless, according to ABS data, the US, UK, and Japan remain the largest sources of FDI in Australia (figure 4.8).

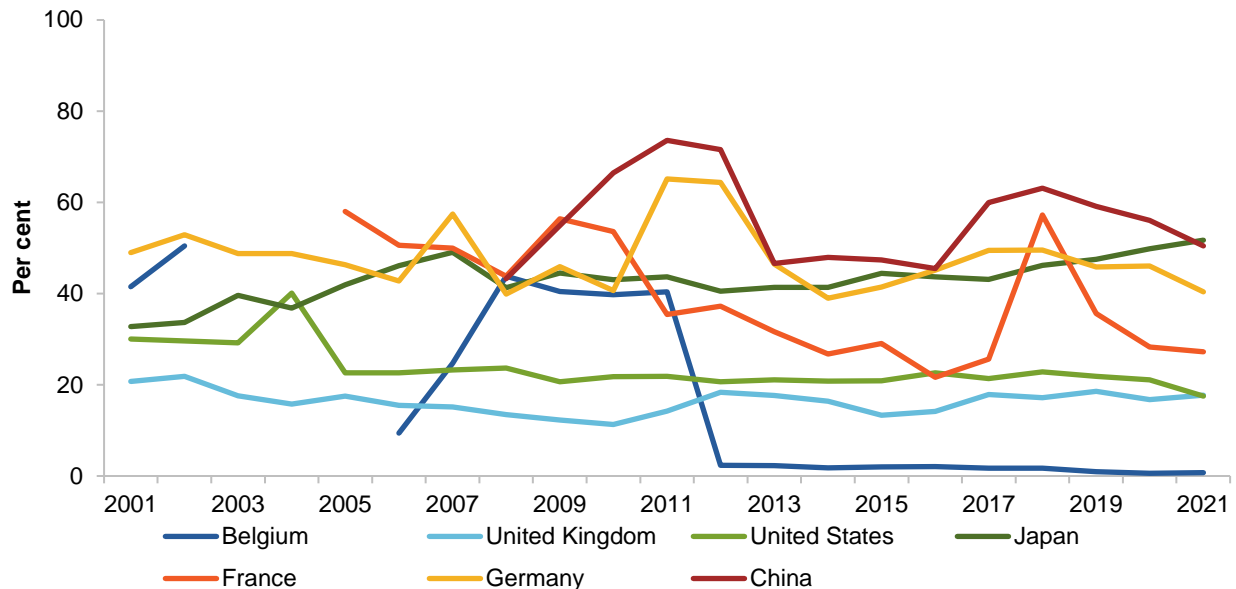
Figure 4.6 – Foreign investment in Australia, by type
Net foreign liabilities, to 31 December 2021



Sources: Commission estimates based on ABS (*Australian National Accounts: National Income, Expenditure and Product, March 2022*, Cat. no. 5206.0; *Balance of Payments and International Investment Position, Australia, March 2022*, Cat. no. 5302.0).

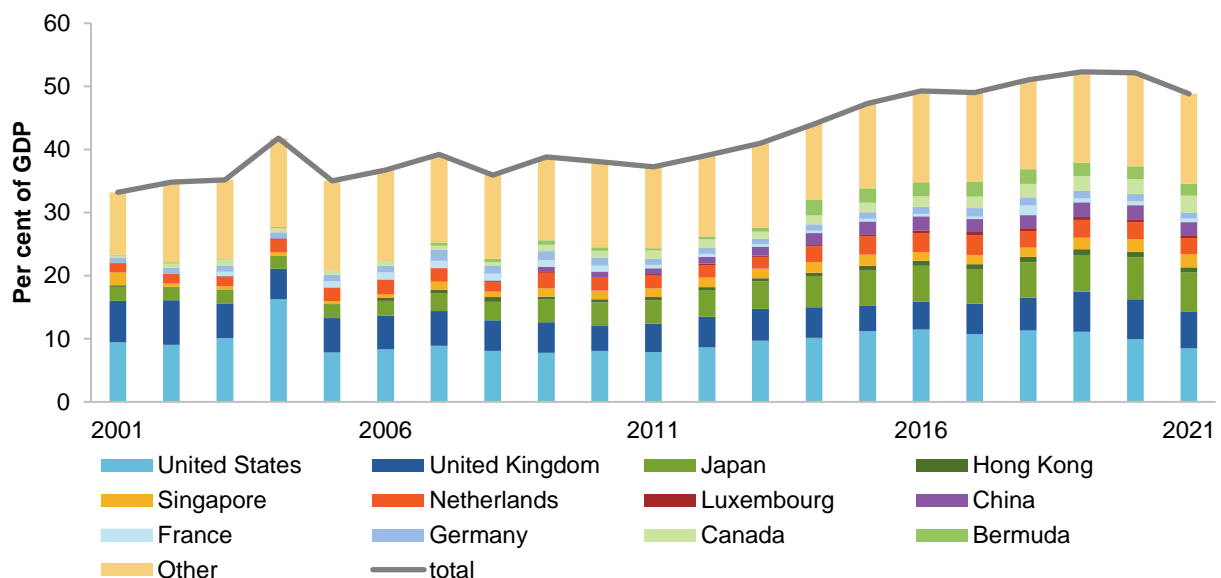
⁴³ Some alternative datasets like that published in the annual *Demystifying Chinese Investment in Australia* series estimate a more significant role for China in overall inbound FDI in Australia (Ferguson et al. 2022).

Figure 4.7 – Direct investment share of inbound investment
Direct investment share of gross liabilities, to 31 December 2021



Sources: Commission estimates based on ABS (*Australian National Accounts: National Income, Expenditure and Product*, March 2022, Cat. no. 5206.0; *Balance of Payments and International Investment Position, Australia*, March 2022, Cat. no. 5302.0).

Figure 4.8 – Direct investment in Australia, by country
Gross liabilities, to 31 December 2021

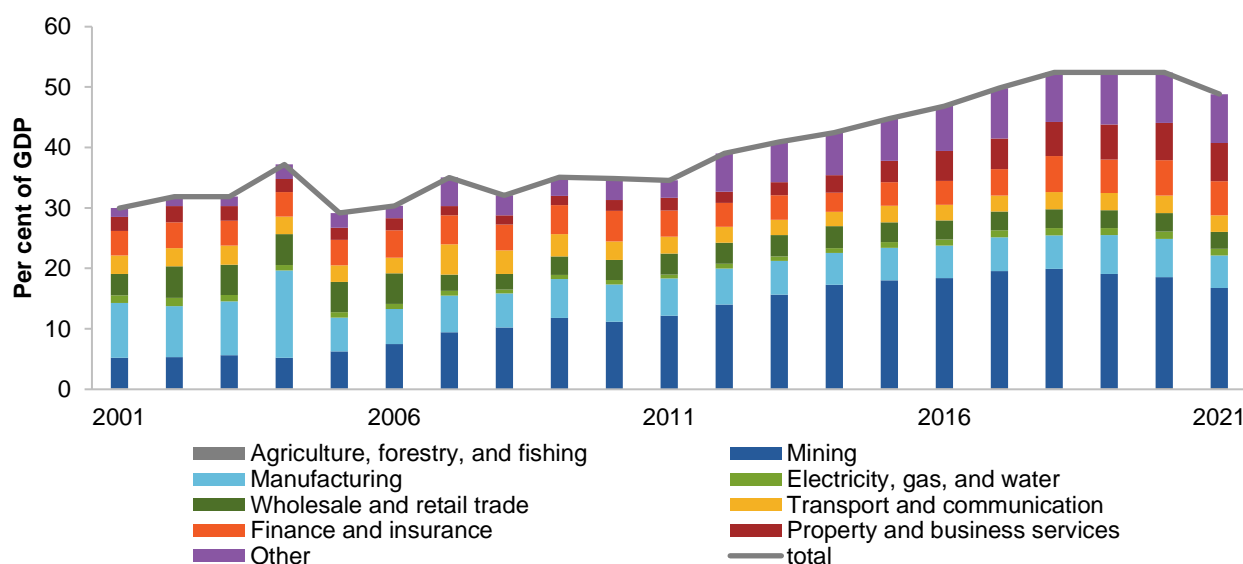


Sources: Commission estimates based on ABS (*Australian National Accounts: National Income, Expenditure and Product*, March 2022, Cat. no. 5206.0; *International Investment Position, Australia: Supplementary Statistics*, 2021, Cat. no. 5352.0).

By industry, the largest share of existing FDI is in Australia's mining sector, equivalent to 16.6 per cent of GDP in 2021. The second largest share of existing FDI is in Australia's *property and business services* sector, equivalent to 6.3 per cent. This is closely followed by the *finance and insurance* and *manufacturing*

sectors, at 5.6 and 5.4 per cent of GDP respectively. The existing stock of FDI in the *agriculture; electricity, gas, and water utility; and transport and communication* sectors remains relatively modest in dollar value terms (figure 4.9), though likely remains significant for each individual sector.

Figure 4.9 – Direct investment in Australia, by sector
Gross liabilities, to 31 December 2021



Sources: Commission estimates based on ABS (*Australian National Accounts: National Income, Expenditure and Product*, March 2022, Cat. no. 5206.0; *International Investment Position, Australia: Supplementary Statistics*, 2021, Cat. no. 5352.0).

Australia's foreign investment policy settings

Foreign investment has made a positive contribution to Australian living standards, allowing for a larger and more productive economy than would have otherwise been the case. However, it can present some challenges. For example, the extension of national security frontiers into a broad range of sectors can raise national security questions when foreign investment is present, and individual foreign investment proposals can risk reducing competition in the Australian market.

For these reasons, the Australian Government requires foreign investors to first seek approval before proceeding with certain direct investment plans.⁴⁴ While Australia required government approval for some forms of foreign investment for much of the twentieth century (with the degree of openness varying with the policy concerns of the day), the foundations of Australia's current foreign investment screening mechanism were laid in 1975 with the passage of the *Commonwealth Foreign Acquisitions and Takeovers Act 1975*.⁴⁵ The subsequent 1976 establishment of the Foreign Investment Review Board (FIRB), tasked with advising

⁴⁴ These application requirements generally relate to equity investments of sufficient magnitude to give foreign investors a controlling stake in that enterprise. Foreign loans to a business, including though the purchase of corporate bonds, is generally exempt from foreign investment screening requirements. However, any subsequent conversion of that debt into a controlling stake would trigger the normal foreign investment screening processes.

⁴⁵ Hanratty (1996, pp. 5–7) includes discussion of pre-1975 foreign investment policy settings.

the Treasurer on foreign investment policy and proposals, bolstered Australia's ability to assess the various foreign investment proposals put to government.⁴⁶

Until 1986 this foreign investment screening process was operationalised through a number of tests. This included a requirement for foreign investors to demonstrate that their investment would generate net economic benefits for Australia; requirements for various degrees of Australian involvement in the investment (at director, employee, or shareholder level); and an 'opportunities test', which considered the degree to which Australians had the first opportunity to invest in particular projects or businesses before foreigner investors (FIRB 1988, p. 2; Hanratty 1996, pp. 10–11).

These tests were replaced in 1986 by a 'national interest' test, which has been in place since that time. The test presumes that foreign investment proposals should proceed unless they are judged to be contrary to the national interest. This change in posture occurred amidst broader efforts to liberalise financial markets and institutions in Australia.

What constitutes the 'national interest' is not explicitly defined. It is a judgement-based test.⁴⁷ This provides the Australian Government with the flexibility to respond to new concerns, and to avoid blocking foreign investment proposals on the basis of old concerns — concerns that might have been deemed relevant in the past, but which no longer are. However, it can also create ambiguity for foreign investors, a possibility that is partly addressed by the voluntary publication of the rationale for the blocking of particular investment proposals by the Treasurer.

4.2 Developments in foreign investment

Foreign investment patterns over 2020-21 are likely to have been heavily impacted by the public policy response to the COVID-19 pandemic. Foreign investment in Australia may have also been affected by the January 2021 commencement of the new foreign investment screening framework described in the 2019-20 *Trade and Assistance Review*, and introduced as a response to 'rapid technological change and changes in the international security environment' (Sukkar 2020).

These changes occurred alongside a notable increase in foreign investment application fees, and the temporary introduction of a 'zero-dollar threshold' for foreign investment applications between 29 March 2020 and 1 January 2021 (Treasury 2021, p. 7). While the value of foreign investment approvals increased over 2020-21 relative to 2019-20, meaningful assessments of the impact of these policy changes will only be possible over time. However, it seems reasonable to expect that these changes will alter, at least at the margin, the overall value and/or composition of inbound investment over future years, relative to what would otherwise be the case.

⁴⁶ The Commission would like to acknowledge the long public service of Mr. David Irvine AO who died on 30 March 2022 while serving as the FIRB's Chair.

⁴⁷ Under the national interest test, the Australian Government generally considers factors such as national security, competition, other Australian Government policies (including tax), potential impacts on the economy and the community, and the character of the investor when weighing whether the proposed investment is consistent with the national interest (FIRB 2020, p. 2).

Developments in foreign investment policy

On 1 January 2021, a new national security test was added to Australia's foreign investment screening framework. This stand-alone national security test has been designed to complement the national security considerations that form part of the longer-standing national interest test.

These reforms have had the effect of increasing the degree to which foreign investment proposals can be screened in Australia. This increase has occurred along several margins:

- *Reducing the investment thresholds that make private investment plans subject to approval* — from 20 per cent of a company under the national interest test, to 10 per cent of a 'national security business' (box 4.3), or position of influence, such as a seat on the company's board, under the new stand-alone national security test (FIRB 2022a, pp. 2–3).
- *Expanding the sectors in which proposed investments are subject to approval* — from more traditional defence industries under the existing national interest test, to a broader range of National Security Businesses, under the new national security test.
- *Increasing the scope of powers that the Treasurer has over proposed and taken investments* — these include the Treasurer's new 'call in' and 'last resort' powers.
 - *Call-in power* — the call-in power provides the Treasurer with the capability to review a foreign investment that was not initially required to be submitted for approval, if the Treasurer considers that the investment may pose national security risks. This can occur up to ten years after the investment has been made. Once 'called in', an investment is reviewed against the national security test, and if sufficient national security concerns are found that cannot be subsequently allayed, the investment can be blocked if it is yet to occur, or undergo forced divestment, if the investment has already taken place.
 - *Last-resort power* — the last resort power allows the Treasurer to review previously approved foreign investment actions. The exercise of this last-resort power is conditional upon a number of requirements being met, but gives the Treasurer the ability to apply new conditions on an existing investment, or to require divestment by foreign investors.

Box 4.3 – National security businesses and land

National security businesses are businesses that, if disrupted or carried out in a certain way, may create national security risks. A national security business includes, but is not limited to, a business that:

- is a responsible entity, within the meaning of the *Security of Critical Infrastructure Act 2018* (Cwlth) (SOCI Act), for an asset
- is an entity that is a direct interest holder in relation to a critical infrastructure asset (within the meaning of the SOCI Act)
- is a carrier or nominated carriage service provider to which the *Telecommunications Act 1997* (Cwlth) applies
- develops, manufactures or supplies critical goods or critical technology that are (or are intended to be) for military or intelligence use
- stores or has access to information that has a security classification.

Prior to recent amendments to the SOCI Act (2018), 'critical infrastructure assets' included critical electricity, port, water and gas assets, as well as any other assets declared by the Minister. However, the 2021 amendments to the SOCI Act have substantially broadened the definition of what is a 'critical

Box 4.3 – National security businesses and land

infrastructure asset’ to include — among other things — critical telecommunications, broadcasting, data storage and processing, banking, payment services, liquid fuels, education, food and grocery, aviation, and defence industry assets.

National security land includes land that is:

- ‘defence premises’ within the meaning of the *Defence Act 1903* (Cwlth)
- land in which an agency in the national intelligence community has an interest, if the existence of the interest is publicly known or could be known upon making reasonable inquiries.

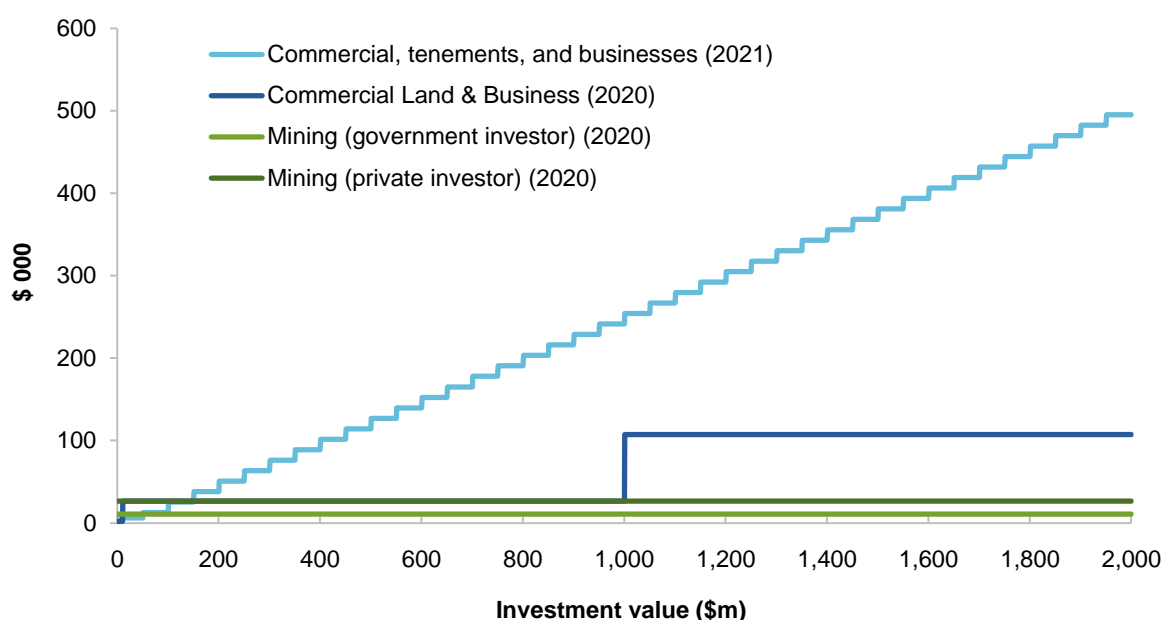
Sources: FIRB (2022b, pp. 4–5, 9); *Security Legislation Amendment (Critical Infrastructure) Act 2021*; *Security of Critical Infrastructure Act 2018*.

Application fees and other costs

The increase in foreign investment proposal screening has occurred alongside a notable increase in headline foreign investment application fees, particularly for foreign investment proposals in Australian businesses (figure 4.10).⁴⁸ These fees are levied as taxes by the ATO, being beyond what is required to recover the costs of processing foreign investment applications, and thereby act as a tax on foreign investment applications (box 4.4).

Figure 4.10 – Foreign investment application fees in 2020 and 2021^a

Single action



a. Changes to the fee structure for investment applications were implemented from 1 January 2021. Further changes announced on 1 July 2022 are not represented in this chart.

Sources: FIRB (2020a, 2020b).

⁴⁸ The changes to application fees discussed in this report pertain to the 2020-21 financial year. Further increases to fees were announced in July 2022 are not included in this analysis.

The combined effect of the new foreign investment screening process and the increase in foreign investment application fees has increased the cost of investing in Australia. This increase in costs has occurred in several ways, including:

- a greater likelihood of a foreign investor having to lodge a foreign investment application
- a potential increase in foreign investment application fees, particularly for proposed business investments
- a potential increase in the number of conditions attached to individual investment proposals
- the increased potential for government to intervene in an investment after an investment has been made, via the Treasurer's new 'call-in' power
- the increased potential for government to intervene in an investment after it has been approved, via the Treasurer's new 'last resort' power.

All else equal, the increase in transaction costs associated with the new foreign investment screening framework may, at least at the margin, reduce the overall level of foreign investment, or alter its composition, relative to what would otherwise be the case.

Box 4.4 – Foreign investment application fees

The Commission has previously identified that the fees paid by foreign investors outstrip the cost of administering Australia's foreign investment regulatory regime, meaning that fees paid by investors are, in effect, a tax on foreign investment, rather than a genuine fee for service (PC 2020, pp. 21–22).

Australia's taxation of foreign investment applications was also acknowledged by Treasury's *Evaluation of the 2021 Foreign Investment Reforms* which noted that 'the imposition of fees is achieved through general taxation and not by way of cost recovery or fees for service' (2021, p. 24).

In 2020-21 — the most recent year for which data are available — fees paid by foreign investors were \$85.6 million, while the operational costs of the FIRB and its secretariats in the Treasury and the Australian Taxation Office totalled about \$36.1 million (FIRB 2021, pp. 10, 39).

Both transaction taxation and mobile capital taxation are generally recognised as two of the less efficient ways of raising tax revenues in modern economies.

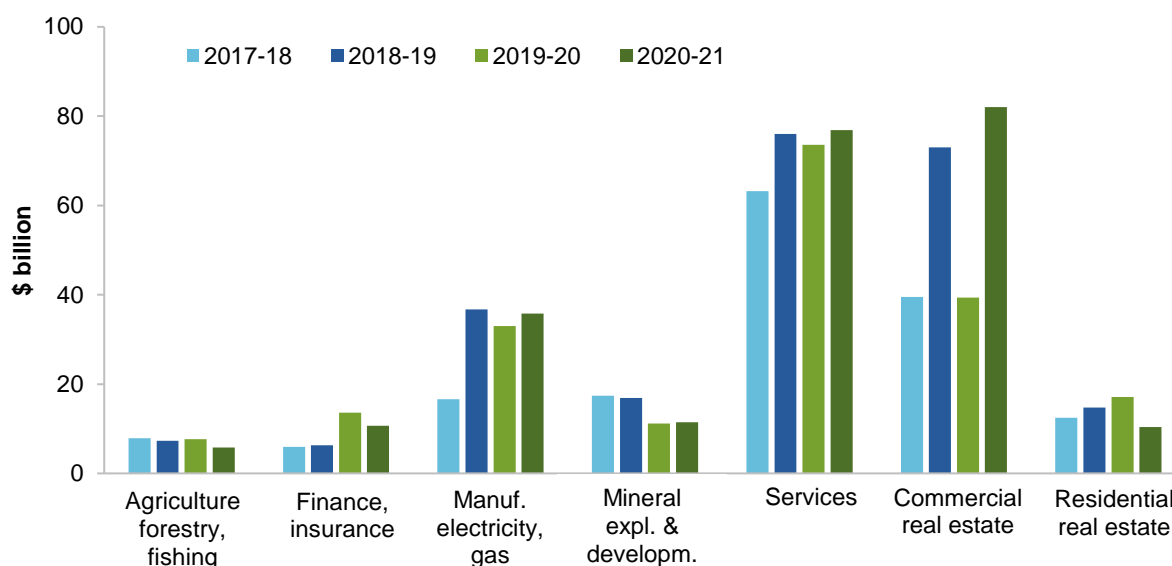
Developments in foreign investment flows and applications

The stock of FDI in Australia rose by \$36.5 billion in 2021, rising from \$1.09 trillion at the end of 2020 to \$1.12 trillion by the end of 2021. This represents a fall as a percentage of GDP, from 55.2 per cent of GDP in 2020 to 51.7 per cent of GDP in 2021. The overall dollar value increase in FDI in Australia was led by increased investment in the *property and business services*, and *finance and insurance* sectors, with other sectors contributing more modest gains. These dollar value increases were partly offset by reduced FDI in *manufacturing*, along with marginal declines in the *mining*, and *construction* sectors. All sectors other than *property and business services* experienced reductions in overall FDI as a percentage of GDP (figure 4.9).

With regard to future FDI intentions, the total value of foreign investment approvals over 2020-21 rose to \$233 billion in 2020-21 from \$195.5 billion in 2019-20 (FIRB 2021, p. 20). Most FDI proposals continued to relate to the *services*, *commercial real estate*, and *manufacturing, electricity, and gas* sectors. There were broadly comparable levels of foreign investment applications in the *finance and insurance, mineral*

exploration and development, and *residential real estate* sectors. The lowest value of foreign investment applications was in the *agriculture, forestry, and fishing* sector (figure 4.11).

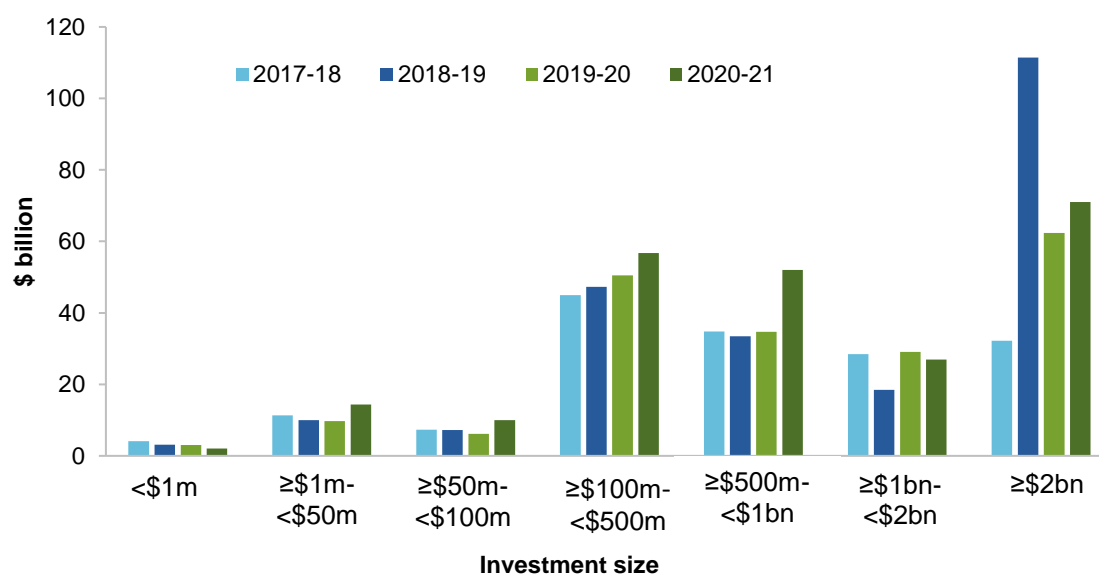
Figure 4.11 – Value of foreign investment approvals by sector



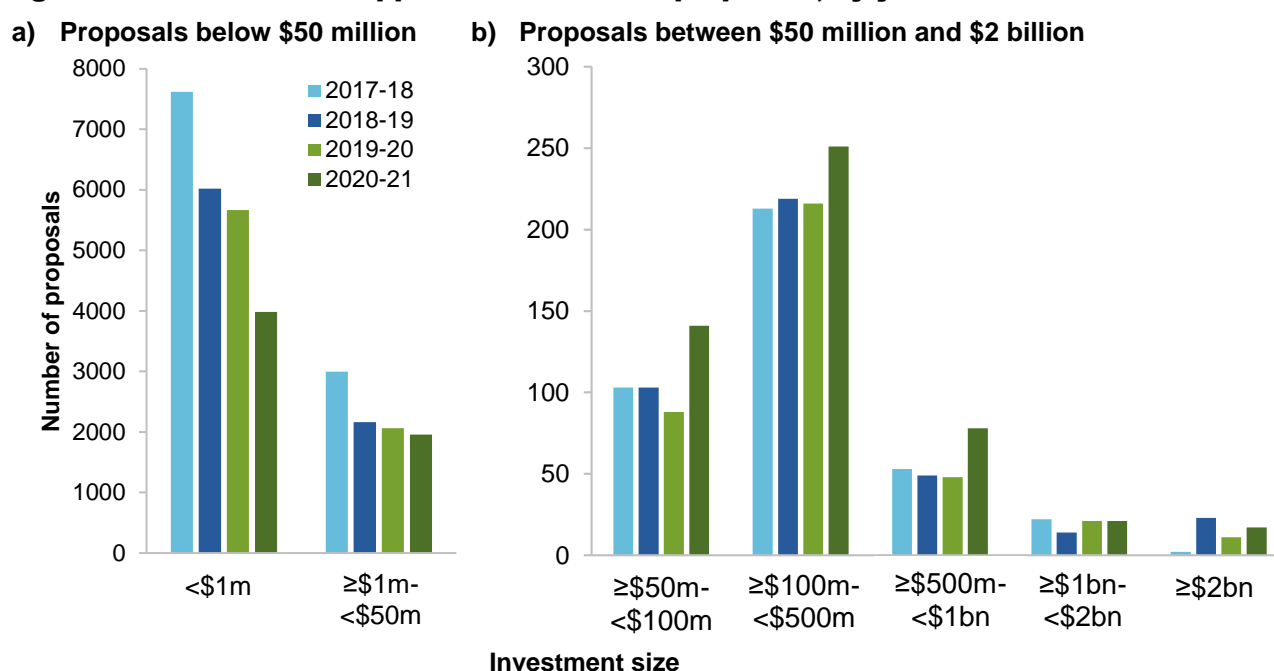
Source: FIRB (2021, p. 24).

While the value of foreign investment approvals increased in 2021, relative to 2020 (figure 4.12), it would be premature to conclude that the new foreign investment screening framework, and the increase in foreign investment application fees, has not impacted inbound FDI intentions. FDI can be volatile from year to year, both 2020 and 2021 were affected by COVID-19, the latest available FIRB data is for the 2020-21 financial year (which covers both the new and the old foreign investment screening frameworks), and the increase in the value of foreign investment approvals was driven by relatively large investment proposals (figure 4.12 and figure 4.13).

In addition, 2020-21 was a financial year with varying monetary thresholds on acquisitions subject to FIRB screening. This involved the temporary reduction of monetary thresholds to \$0 between 29 March 2020 and 1 January 2021, which was implemented due to concerns that pandemic-related financial pressures might cause rushed sales of domestic assets to foreign investors that could run counter to the national interest. It remains too early to determine the impacts of the new framework. Any meaningful analysis of the impacts of the new foreign investment screening framework, and changes in foreign investment application fees, will require analysis of FDI patterns over the years ahead.

Figure 4.12 – Value of approved investment proposals, by year and size

Source: FIRB (2021, p. 21).

Figure 4.13 – Number of approved investment proposals, by year and size

Source: FIRB (2021, p. 21).

The impact of the new foreign investment framework can be seen in the proportion of proposed foreign investments that were approved with conditions attached to them. By number, the majority of foreign investment applications approved in 2020-21 had conditions attached to them, rising to 50.8 per cent, from 45.2 per cent in 2019-20 (FIRB 2021, p. 19). According to Treasury's *Evaluation of the 2021 Foreign Investment Reforms*, the new foreign investment screening framework captured 89 more proposed

investments than would have been captured by the previous screening framework — none of which were rejected, although 17 were approved with conditions attached (Treasury 2021, p. 17).

Nevertheless, any meaningful assessment of the impacts of Australia's new foreign investment screening framework will require empirical analysis of foreign investment data over the years ahead. Future issues of the *Trade and Assistance Review* may be better placed to assess the degree to which the increase in transaction costs associated with Australia's new foreign investment screening framework has coincided with a structural change in the level or composition of FDI in Australia.

Other developments

The Senate Economics References Committee Inquiry into Foreign Investment Proposals was concluded and its final report, *Greenfields, Cash Cows, and the Regulation of Foreign Investment in Australia*, was released in August 2021 (Australian Parliament 2021a).

The inquiry was initially due to report in September 2020. However, this deadline was extended five times, and finally to late August 2021 (Australian Parliament 2021b). The inquiry's terms of reference requested the review of foreign investment proposals against the national interest test, with particular reference to potential effects on competition, money laundering, the role of the FIRB, the imposition of conditions on foreign investments, and protections from market manipulation (Australian Parliament 2020).

The Committee ultimately made three recommendations, to which the Australian Government officially responded in April 2022. One recommendation (that was not supported) was for regulations to be amended so that undertakings made as part of a foreign investment application could be enforced as conditions on an investment approval.

A second recommendation (supported in principle) was for an audit of the expertise required by foreign investment regulators to 'thoroughly assess applications against the national interest', as well as a plan for appropriate staffing of the regulators (Australian Government 2022, pp. 3–4).

A further recommendation was for the Australian Government to:

... [take] note of the Productivity Commission recommendation that consideration be given to the most suitable institutional design to support decision-making on foreign investment and monitoring and enforcement of compliance, and conducts a review to determine the structure necessary for an effective and efficient foreign investment regulator (Australian Government 2022, p. 4).

In its response, the Australian Government noted the Commission's recommendation.

A. Fuel taxes and fuel tax credits

This appendix outlines the existing system for the taxation of fuels such as petrol and diesel, as well as the current settings related to fuel tax credits.

Current fuel tax and FTC settings

Fuel excise and customs duties

All fuels are subject to excise or excise -equivalent customs duties (hereafter referred to collectively as 'fuel tax'). Fuel tax is levied at different rates per litre (or kilogram), depending on the type of fuel (table A.1).

The fuel tax system started with petrol, subject to customs duty and then (after domestic production started in 1929) excise duty. In 1957, fuel tax was extended to diesel for equivalency between vehicle fuels to fund roads. Then in 1983, fuel tax was extended to fuel oil, heating oil and kerosene to avoid further substitution (James 1996, p. 7,9; Webb 2000, p. 2). Between 2011 and 2015, fuel tax on liquefied petroleum gas (LPG), liquefied natural gas (LNG) and compressed natural gas (CNG) was also phased in (Shorten 2011).

During the 1950s, aviation gasoline was differentiated from other forms of gasoline, while aviation turbine kerosene was brought into the excise and customs duty system (James 1996, pp. 10–11). In 1988, the system of informally allocating aviation fuel tax to aviation facilities was replaced with formal hypothecation (James 1996). At present, under the *Aviation Fuel Revenues (Special Appropriation) Act 1988* (Cwlth), all aviation fuel tax revenue is provided to the Civil Aviation Safety Authority (CASA) — equal to \$122 million in 2018-19 (prior to the pandemic), or 67 per cent of CASA's total revenue (CASA 2019, pp. 21, 141).

In September 2002, fuel ethanol was brought into the fuel tax system at the same rate as petrol and diesel, but with a grant scheme for domestic production equal to the excise rate (making the effective excise zero). This was followed by similar arrangements for biodiesel in September 2003, although the Cleaner Fuel Grant Scheme for biodiesel also covered imports (Webb 2006, pp. 18–19). In 2015, both grants schemes were abolished and the excise rates for domestic ethanol and biodiesel were reduced to zero and then gradually increased to their full rate (Frydenberg 2015).⁴⁹

Table A.1 – Fuel tax rates

As at 1 September 2021

⁴⁹ Under the *Excise Tariff Amendment (Ethanol and Biodiesel) Act 2015* (Cwlth), the full tax rate for ethanol (as a proportion of the rate for petrol) was reached on 1 July 2020. The full rate for biodiesel is still being phased in and will not be reached until 1 July 2030.

Fuel type	Measurement	Excise and excise-equivalent customs duty rate
Gasoline (petrol)	L	\$0.433
Diesel	L	\$0.433
Heating oil, kerosene or fuel oil	L	\$0.433
Liquefied petroleum gas (LPG)	L	\$0.141
Liquefied natural gas (LNG) or compressed natural gas (CNG)	kg	\$0.297
Fuel ethanol (denatured) ^a	L	\$0.142 (domestic) \$0.433 (imported)
Biodiesel ^a	L	\$0.087 (domestic) \$0.433 (imported)
Aviation gasoline or aviation kerosene	L	\$0.03556
Other petroleum products (e.g. mineral turpentine)	L	\$0.433

a. Domestically-produced ethanol and biodiesel have lower rates of excise than imported ethanol and biodiesel subject to excise-equivalent customs duty.

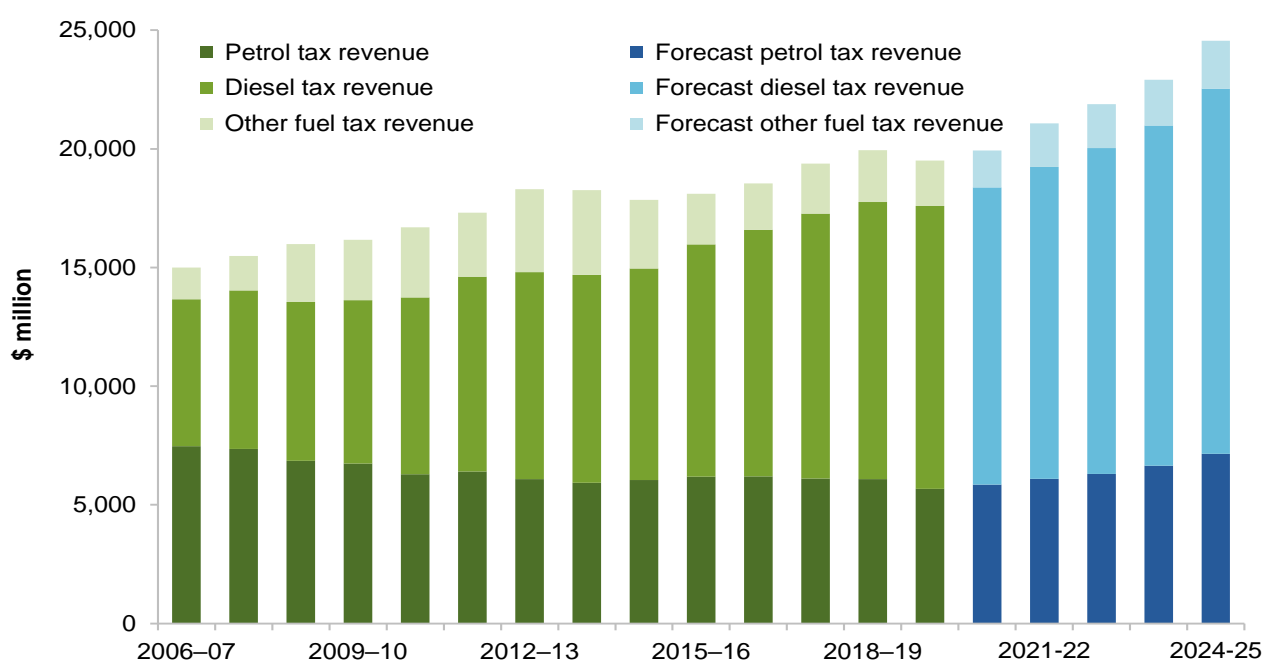
Sources: Commission estimates based on data from ABF (2021) and ATO (2021a).

Since 2004, fuel tax policy has aimed to base tax rates on the energy content of the relevant fuel, with fuels categorised into high, medium and low energy bands. The highest energy band (over 30 megajoules per litre) includes gasoline (petrol), diesel and biodiesel, with most other fuels in the middle band (20 to 30 megajoules per litre), including LPG, LNG, CNG and fuel ethanol (Australian Government 2004, p. 96; Howard 2003). In addition to these bands, all 'alternative' fuels — covering biodiesel, ethanol, LPG, LNG and CNG — receive a further 50 per cent discount 'to recognise the fuel security, potential environmental, and regional development benefits arising from their use' (Shorten 2011).

Overall, the Australian Government raised over \$19.5 billion revenue from fuel tax in 2019-20, with the majority from diesel (\$11.9 billion) and petrol (\$5.7 billion) (Frydenberg and Cormann 2020, p. 10). The amount of petrol subject to fuel tax has been declining over time, falling from over 19 billion litres in 2006-07 to less than 14 billion litres in 2019-20. By contrast, diesel use has been climbing, growing from nearly 17 billion litres to more than 28 billion litres over the same period (ATO 2021b).

Primarily due to this growth in diesel consumption, fuel excise receipts have been growing steadily — up by one third (from \$14.3 billion) since 2006-07 (figure A.1) — and are expected to continue growing over the forward estimates, rising by nearly 30 per cent to \$24.6 billion in 2024-25. (ATO 2021b; Australian Government 2021, p. 148).

Beyond increased consumption, another driver behind the recent and forecast growth in fuel tax receipts is the re-introduction of automatic inflation indexation on 10 November 2014. Indexation of fuel tax rates to the consumer price index had been halted in March 2001, after public pressure due to significant fuel price increases after the introduction of the GST and as a result of rising global oil prices (Australian Government 2014, p. 156; Howard and Anderson 2001; Webb 2006, p. 15).

Figure A.1 – Fuel excise revenue

Sources: Australian Government (2021, p. 148); Treasury, pers. comm. 28 January 2022.

Fuel tax credits

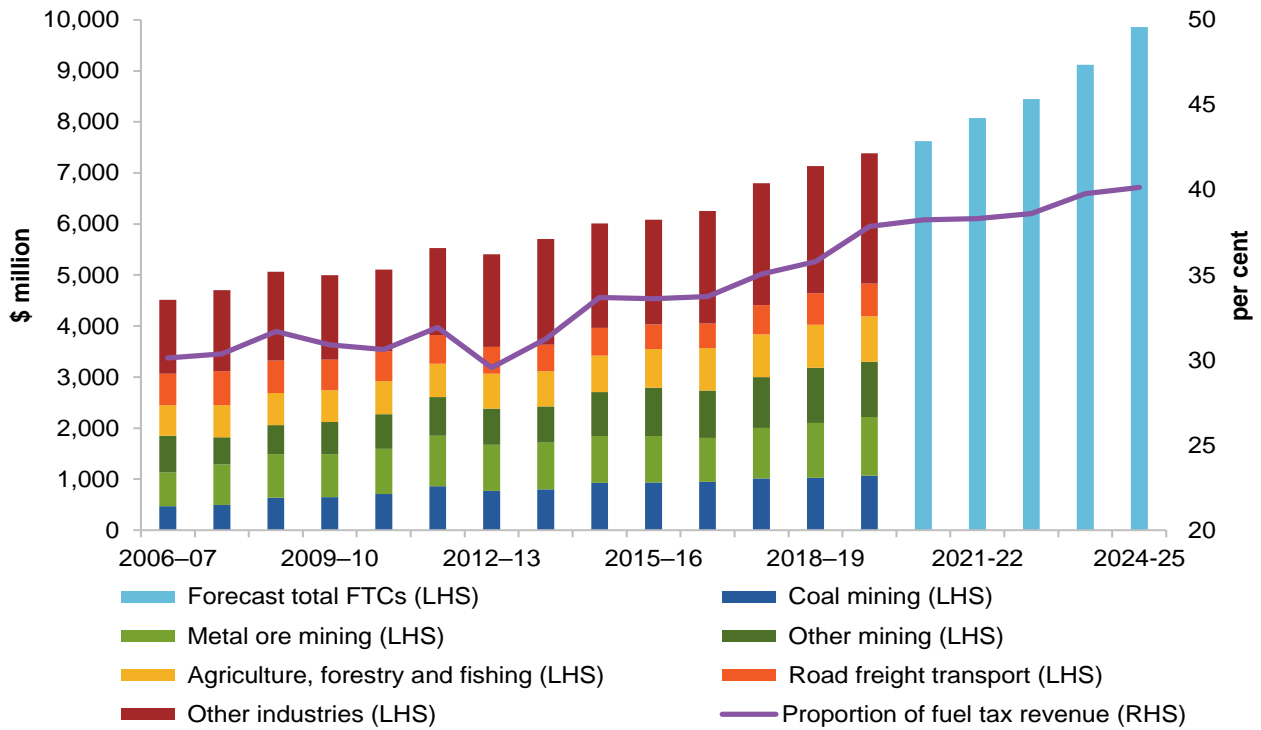
Fuel tax credits (FTCs) are available under the *Fuel Tax Act 2006* (Cwlth) to refund the fuel tax embedded in prices if the fuel is used by a business off-road, in a heavy vehicle or for some residential purposes (such as diesel generators).

Under the current FTC scheme, off-road fuel users can claim 100 per cent of the fuel tax embedded in the price as an FTC. Heavy on-road vehicles (over 4.5 tonnes) have their rate of FTC reduced by a 'road user charge' (RUC), under s. 43-10 on the Fuel Tax Act. The RUC is currently 26.4 cents per litre, meaning that diesel and petrol used in heavy vehicles is eligible for a 16.9 cent per litre FTC, whereas gaseous fuels (such as LPG, LNG and CNG) are not eligible for any FTC if used in heavy vehicles (as their tax rates are less than 26.4 cents per litre). The rate of the RUC is determined by the National Transport Commission, based on a formula that reflects the road maintenance and construction costs attributable to heavy vehicles, which is then split between the RUC and state and territory registration fees for different types of heavy vehicles (NTC 2021, pp. 6, 9, 23).

Overall, nearly \$7.4 billion in FTCs were paid in 2019-20, to over 700 000 claimants. The largest recipient industry was the mining industry — receiving nearly \$3.3 billion (45 per cent) — while the industry with the largest number of claimants was the agriculture, forestry and fishing industry (over 300 000 claimants) (ATO 2021c).

In recent years, the value of FTC claims has been growing strongly (figure A.2), increasing by 63 per cent since 2006-07, and is expected to grow to nearly \$10 billion by 2024-25 — an increase of about one-third over five years. This growth has outpaced increases in fuel tax — in 2006-07, FTC claims were worth about 31.6 per cent of fuel tax revenue, but are now worth 38.7 per cent and are expected to grow to over 40 per cent by 2024-25 (ATO 2021b, 2021c; Australian Government 2021, p. 164).

Figure A.2 – The value of FTCs are forecast to grow



Sources: Australian Government (2021, p. 164) and ATO (2021c).

Abbreviations

A-UKFTA	Australia-United Kingdom Free Trade Agreement
ABS	Australian Bureau of Statistics
ACCU	Australian carbon credit unit
ADI	authorised deposit-taking institution
AEMC	Australian Energy Market Commission
AI-ECTA	Australia-India Economic Cooperation and Trade Agreement
ANZSIC	Australian and New Zealand Standard Industrial Classification
ARENA	Australian Renewable Energy Agency
ASEAN	Association of Southeast Asian Nations
ATO	Australian Taxation Office
CASA	Civil Aviation Safety Authority
CBAM	carbon border adjustment mechanism
CBT	carbon border tariff
CCS	carbon capture and storage
CCUS	carbon capture, use and storage
CEFC	Clean Energy Finance Corporation
CH₃OH	methanol
CH₄	methane
CHF	Swiss francs
CNG	compressed natural gas
CO₂	carbon dioxide
COVID-19	Coronavirus Disease 2019
CPTPP	Comprehensive and Progressive Agreement for Trans-Pacific Partnership
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DAC	direct air capture
DSB	Dispute Settlement Body
EITE	emissions-intensive trade-exposed
ERA	effective rate of assistance
ERF	Emissions Reduction Fund
ETS	emissions trading system
EU	European Union
FDI	foreign direct investment
FIRB	Foreign Investment Review Board
FTA	free trade agreement
FTC	fuel tax credit
GATT	General Agreement on Tariffs and Trade
GDP	gross domestic product
GST	goods and services tax
GVA	gross value added

GW	gigawatt
GWh	gigawatt hour
IBI	initial benefitting industry
IEA	International Energy Agency
IMF	International Monetary Fund
IO	input-output
IOIG	Input-Output Industry Groups
IOPG	Input-Output Product Groups
kg	kilogram
L	litre
LCV	light commercial vehicle
LETS	Low Emissions Technology Statement
LNG	liquefied natural gas
LPG	liquefied petroleum gas
LRET	Large-scale Renewable Energy Target
MJ	megajoule
MPIA	Multi-Party Interim Appeal Arbitration Arrangement
MW	megawatt
MWh	megawatt hour
NH₃	ammonia
OECD	Organisation for Economic Co-operation and Development
PACER	Pacific Agreement on Closer Economic Relations
PTA	preferential trade agreement
PV	photovoltaic
R&D	research and development
RBA	Reserve Bank of Australia
RCEP	Regional Comprehensive Economic Partnership
RET	Renewable Energy Target
RoO	Rules of Origin
RUC	road user charge
SOCI Act	Security of Critical Infrastructure Act 2018 (Cwlth)
SRES	Small-scale Renewable Energy Scheme
SITC	Standard International Trade Classification
TAR	Trade and Assistance Review
TBAVS	Tax Benchmark and Variations Statement
tCO_{2e}	tonne of carbon dioxide emissions
TFF	Term Funding Facility
TIDES	Tariff and Import Database and Estimating System
UK	United Kingdom
US	United States of America
VAT	value-added tax
WTO	World Trade Organization

References

- ABF (Australian Border Force) 2021, *Current Tariff Classification - Schedule 3 - Section V - Chapter 27*, www.abf.gov.au/importing-exporting-and-manufacturing/tariff-classification/current-tariff/schedule-3/section-v/chapter-27 (accessed 16 December 2021).
- ABS (Australian Bureau of Statistics) 2021, *Motor Vehicle Census, Australia, 31st January 2021*, Cat. no. 9309.0.
- 2022, 5368 - *International Trade in Goods and Services, March 2022*, Data release.
- ACCC (Australian Competition and Consumer Commission) 2022, *Monitoring fuel prices following the excise cut*, <https://www.accc.gov.au/consumers/petrol-diesel-lpg/monitoring-fuel-prices-following-the-excise-cut> (accessed 2 June 2022).
- Advisian 2021, *Australian hydrogen market study: Sector analysis summary*, Prepared for the Clean Energy Finance Corporation.
- AEMC 2021, *Residential Electricity Price Trends 2021: Final Report*, https://www.aemc.gov.au/sites/default/files/2021-11/2021_residential_electricity_price_trends_report.pdf (accessed 21 July 2022).
- AEMO (Australian Energy Market Operator) 2021, *2021 Gas Statement of Opportunities*, March.
- Ai Group (The Australian Industry Group) 2021, *Swings and Roundabouts: the Unexpected Effects of Carbon Border Adjustments on Australia*, Policy paper, pp. 1–73.
- Alston, M., Black, S., Jackman, B. and Schwartz, C. 2020, *The Term Funding Facility*, Reserve Bank of Australia.
- Anderson, K. and Peters, G. 2016, 'The trouble with negative emissions', *American Association for the Advancement of Science, Science*, vol. 354, no. 6309, pp. 182–183.
- APEC (Asia-Pacific Economic Cooperation) 2012, *Annex C - APEC List of Environmental Goods*, 2012 Leaders' Declaration.
- ARENA (Australian Renewable Energy Agency) 2021, *Over \$100 million to build Australia's first large-scale hydrogen plants*, Media Release, 5 May.
- 2022, *Large Scale Battery Storage Funding Round - Updated Funding Announcement (full Application Stage)*.
- ASEAN (Association of Southeast Asian Nations Secretariat) 2020a, *Annex I - Schedule of Tariff Commitments, Australia*.
- 2020b, *ASEAN member states*, <https://asean.org/about-asean/member-states/> (accessed 5 July 2022).
- 2020c, *Regional Comprehensive Economic Partnership Agreement*.
- 2020d, *Summary of the Regional Comprehensive Economic Partnership Agreement*.
- ATO (Australian Taxation Office) 2021a, *Historical excise rates: Excise data*.
- 2021b, *Table 1: Excise and fuel schemes - Excisable products and excise liabilities, 2003-04 to 2019-20 financial years*, June.
- 2021c, *Table 4: Excise and fuel schemes - Fuel tax credits scheme – claims paid, by industry, 2006-07 to 2019-20 financial years*.
- 2022a, *Excise duty rates for fuel and petroleum products*, <https://www.ato.gov.au/business/excise-on-fuel-and-petroleum-products/lodging-paying-and-rates---excisable-fuel/excise-duty-rates-for-fuel-and-petroleum-products/> (accessed 23 June 2022).
- 2022b, *Fuel tax credits: From 30 March 2022 to 30 June 2022*, <https://www.ato.gov.au/Business/Fuel-schemes/Fuel-tax-credits---business/Rates---business/From-30-March-2022/> (accessed 23 June 2022).
- Australian Government 2004, *Securing Australia's Energy Future*, White Paper.
- 2014, *Budget Review 2014-15*, Research Paper, Australian Parliamentary Library, Canberra, pp. 1–162, https://parlinfo.aph.gov.au/parlInfo/download/library/prspub/3221329/upload_binary/3221329.pdf;fileType=application/pdf (accessed 19 July 2022).
- 2019, *Productivity Commission Inquiry into the Regulation of Australian Agriculture: Australian Government response*, <https://www.pc.gov.au/inquiries/completed/agriculture/agriculture-re-government-response.pdf> (accessed 20 July 2022).
- 2020a, *Budget Paper No. 2: Budget 2020-21*, October.
- 2020b, *Dumping, subsidisation and anti-dumping and countervailing*, <https://business.gov.au/products-and-services/exporting/dumping-subsidisation-and-anti-dumping-and-countervailing#:~:text=What%20is%20dumping%3F,as%20%27dumping%27%20the%20product.> (accessed 29 April 2022).
- 2020c, *Mid-Year Economic and Fiscal Outlook 2020-21*, December.
- 2021a, *Budget Paper No. 1: Budget 2021-22*, May.
- 2021b, *Budget Paper No. 2: Budget 2021-22*, May.
- 2022a, *Australian Government response to the Senate Economics References Committee report: Greenfields, cash cows and the regulation of foreign investment in Australia*, https://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Economics/Foreigninvestment/Government_Response (accessed 21 July 2022).
- 2022b, *Budget Paper No. 2: Budget 2022-23*, https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Fbudget.gov.au%2F2022-23%2Fcontent%2Fbp2%2Fdownload%2Fbp2_03_payment.docx&wdOrigin=BROWSELINK (accessed 21 July 2022).
- Australian Parliament 2020, *Terms of reference*, Senate Standing Committees on Economics, https://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Economics/Foreigninvestment/Terms_of_Reference (accessed 27 July 2022).
- 2021a, *Greenfields, cash cows and the regulation of foreign investment in Australia*, Economics References Committee, Parliament of Australia.
- 2021b, *Inquiry into foreign investment proposals*, Senate Standing Committees on Economics, <https://www.aph.gov.au/>

- Parliamentary_Business/Committees/Senate/Economics/Foreign_investment (accessed 21 July 2022).
- Bacchus, J. 2021, *Legal issues with the European Carbon Border Adjustment Mechanism*, Briefing Paper 125, The Cato Institute, Florida.
- Banks, G. 2008, *Industry Policy for A Productive Australia*, Productivity Commission Chairman's Speech, Canberra.
- Biden Harris Democrats 2021, *The Biden plan for a clean energy revolution and environmental justice*, <https://joebiden.com/climate-plan/> (accessed 8 December 2021).
- Böhringer, C., Carbone, J. and Rutherford, T. 2018, 'Embodied carbon tariffs', *The Scandinavian Journal of Economics*, vol. 120, no. 1, pp. 183–210.
- Bolscher, H., Graichen, V., Hay, G., Healy, S., Lenstra, J., Meindert, L., Regeczi, D., von Schickfus, M.-T., Schumacher, K. and Timmons-Smakman, F. 2013, *Carbon Leakage Evidence Project: Factsheets for Selected Sectors*, Ecorys, Rotterdam.
- Branger, F. and Quirion, P. 2014, 'Would border carbon adjustments prevent carbon leakage and heavy industry competitiveness losses? Insights from a meta-analysis of recent economic studies', *Ecological Economics*, vol. 99, no. 1, pp. 29–39.
- , — and Chevallier, J. 2016, 'Carbon leakage and competitiveness of cement and steel industries under the EU ETS: Much ado about nothing', *The Energy Journal*, vol. 37, no. 3, pp. 109–135.
- Bullich-Massagué, E., Cifuentes-García, F.-J., Glenny-Crende, I., Aragüés-Peñalba, M., Díaz-González, F. and Gomis-Bellmunt, O. 2020, 'A review of energy storage technologies for large scale photovoltaic power plants', *Applied Energy*, vol. 274, no. 115213, <https://reader.elsevier.com/reader/sd/pii/S030626192030725X?token=B4AF497292EB94BF44808EF1BF5189560FB2252A43BCE99B2F556A68A62D95EB0E0B66C1C05B4AD558B8A09AA08B2399&originRegion=us-east-1&originCreation=20220721001711> (accessed 21 July 2022).
- Calver, O. 2022, 'Carbon credit price plunges after federal government policy change', *ABC News*.
- Campbell, R., Littleton, E. and Armistead, A. 2021, *Fossil Fuel Subsidies in Australia: Federal and State Government Assistance to Fossil Fuel Producers and Major Users 2020-21*, April, 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.
- Carbfix 2022, *Current Operations*, carbfix.com/currentoperations (accessed 9 February 2022).
- Carbon Trust 2022, *Briefing: What are Scope 3 emissions?*, <https://www.carbontrust.com/resources/briefing-what-are-scope-3-emissions/> (accessed 6 May 2022).
- CASA (Civil Aviation Safety Authority) 2019, *2018-19 Annual Report*.
- CEC (Clean Energy Council) nd, *Energy Storage*, <https://www.cleanenergycouncil.org.au/resources/technologies/energy-storage> (accessed 1 May 2022).
- CEFC (Clean Energy Finance Corporation) 2021, *CEFC Advancing Hydrogen Fund*, CEFC Investment Insights Factsheet.
- CER (Australian Government Clean Energy Regulator) 2021a, *Greenhouse gases and energy*, <http://www.cleanenergyregulator.gov.au/NGER/About-the-National-Greenhouse-and-Energy-Reporting-scheme/Greenhouse-gases-and-energy#:~:text=Scope%201%20emissions,Scope%201%20greenhouse&text=Examples%20are%3A,emissions%20from%20coal%20mines%2C%20or> (accessed 6 May 2022).
- 2021b, *Understanding carbon abatement contracts*, <http://www.cleanenergyregulator.gov.au/ERF/Want-to-participate-in-the-Emissions-Reduction-Fund/Step-2-Contracts-and-auctions/understanding-carbon-abatement-contracts> (accessed 1 May 2022).
- 2022a, *About the Renewable Energy Target*, <http://www.cleanenergyregulator.gov.au/RET/About-the-Renewable-Energy-Target#:~:text=In%20June%202015%2C%20the%20Australian,post%2D2020%20targets%20adjusted%20accordingly> (accessed 1 May 2022).
- 2022b, *History of the scheme*, <http://www.cleanenergyregulator.gov.au/RET/About-the-Renewable-Energy-Target/History-of-the-scheme#:~:text=In%20January%202011%20the%20Renewable,majority%20of%20the%202020%20target> (accessed 1 May 2022).
- Clean Energy Regulator 2021, *About the Emissions Reduction Fund*, <http://www.cleanenergyregulator.gov.au/ERF/About-the-Emissions-Reduction-Fund> (accessed 1 May 2022).
- ClearPath 2019, *The Many Exciting Types of Carbon Capture*, clearpath.org/tech-101/the-many-exciting-types-of-carbon-capture/ (accessed 8 February 2022).
- Climeworks 2022, *How is carbon dioxide removed from the atmosphere?*, climeworks.com/co2-removal (accessed 9 February 2022).
- Coady, D., Parry, I., Le, N.-P. and Shang, B. 2019, *Global Fossil Fuel Subsidies Remain Large: An Update Based on Country-Level Estimates*, IMF Working Paper 19/89, International Monetary Fund.
- COAG Energy Council 2019, *Australia's National Hydrogen Strategy*.
- Condon, M. and Becker, J. 2021, 'Soils can't hold enough carbon to offset Australian emissions, experts say', *ABC Rural*.
- CSIRO (Commonwealth Scientific and Industrial Research Organisation) 2022, *GISERA – Gas Industry Social & Environment Research Alliance*, gisera.csiro.au (accessed 9 February 2022).
- Demailly, D. and Quirion, P. 2008, 'European Emission Trading Scheme and competitiveness: A case study on the iron and steel industry', *Energy Economics*, vol. 30, no. 4, pp. 2009–2027.
- Demand Manager 2022, *Certificate prices: Spot prices*, <https://www.demandmanager.com.au/certificate-prices/> (accessed 22 June 2022).
- DESE (Australian Ministers of the Education, Skills and Employment Portfolio) 2021, *New taskforce to simplify trade - Joint Media Release*, <https://ministers.desse.gov.au/tehan/new-taskforce-simplify-trade> (accessed 20 May 2022).
- DFAT (Australian Department of Foreign Affairs and Trade) 2021a, *About the Australia-India Comprehensive Economic Cooperation Agreement negotiations*, <https://www.dfat.gov.au/trade/agreements/negotiations/aifta/australia-india-comprehensive-economic-cooperation-agreement> (accessed 24 March 2022).

- 2021b, *Australia-EU FTA - Report on Negotiating Round Eleven*, 1-11 June 2021, <https://www.dfat.gov.au/trade/agreements/negotiations/aeufta/news/australia-eu-fta-report-negotiating-round-eleven-1-11-jun-e-2021> (accessed 24 March 2022).
- 2021c, *Australia-Gulf Cooperation Council (GCC) FTA*, <https://www.dfat.gov.au/trade/agreements/negotiations/agccfta/australia-gulf-cooperation-council-gcc-fta> (accessed 24 March 2022).
- 2021d, *Next steps following signature*, <https://www.dfat.gov.au/sites/default/files/a-ukfta-next-steps.pdf> (accessed 24 March 2022).
- 2022a, *Australia-EU FTA - Report on Negotiating Round Twelve*, 7-18 February 2022, <https://www.dfat.gov.au/trade-and-investment/australia-eu-fta-report-negotiating-round-twelve-7-18-february-2022> (accessed 24 March 2022).
- 2022b, *Australia's free trade agreements (FTAs)*, <https://www.dfat.gov.au/trade/agreements/trade-agreements> (accessed 24 March 2022).
- 2022c, *Australia-United Kingdom Free Trade Agreement*, <https://www.dfat.gov.au/trade/agreements/not-yet-in-force/aukfta> (accessed 24 March 2022).
- 2022d, *Country and commodity pivot table 2005-06 to 2020-21*, <https://www.dfat.gov.au/about-us/publications/trade-statistical-pivot-tables> (accessed 5 May 2022).
- 2022e, *Working towards a Comprehensive Economic Partnership Agreement*, <https://www.dfat.gov.au/trade/agreements/negotiations/australia-uae-comprehensive-economic-partnership-agreement> (accessed 24 March 2022).
- n.d., *About the Environmental Goods Agreement (EGA)*, [https://www.dfat.gov.au/trade/organisations/wto/negotiations/ega/environmental-goods-agreement#:~:text=The%20Environmental%20Goods%20Agreement%20\(EGA,for%20tariff%20reduction%20in%202012.](https://www.dfat.gov.au/trade/organisations/wto/negotiations/ega/environmental-goods-agreement#:~:text=The%20Environmental%20Goods%20Agreement%20(EGA,for%20tariff%20reduction%20in%202012.) (accessed 23 March 2022a).
- n.d., *Trade in Services Agreement (TiSA)*, <https://www.dfat.gov.au/trade/agreements/negotiations/tisa/trade-in-services-agreement#:~:text=The%20Trade%20in%20Services%20Agreement,cent%20of%20global%20services%20trade.> (accessed 23 March 2022b).
- 2010, *Submission to the Australian Productivity Commission: Review of Bilateral and Regional Trade Agreements*.
- 2021e, *Trade and Investment at a Glance 2021*.
- Dias, V., Pochet, M., Contino, F. and Jeanmart, H. 2020, 'Energy and Economic Costs of Chemical Storage', *Frontiers, Frontiers in Mechanical Engineering*, vol. 6.
- DIIS (Department of Industry, Innovation and Science) 2020, *Australian Automotive Industry - Transition Following the End of Australia Motor Vehicle Production*, January, Canberra.
- DISER (Australian Department of Industry, Science, Energy and Resources) 2021a, *National Greenhouse Accounts Factors: 2021*, <https://www.industry.gov.au/data-and-publications/national-greenhouse-accounts-factors-2021> (accessed 23 June 2022).
- 2021b, *Activating a Regional Hydrogen Industry – Clean Hydrogen Industrial Hubs: Hub Development and Design Grants*, Grant Opportunity Guidelines, 20 September.
- 2021c, *Australian Petroleum Statistics*, September, 302.
- 2021d, *Australia's Long-Term Emissions Reduction Plan: A whole-of-economy plan to achieve net zero emissions by 2050*, October.
- 2021e, *Australia's Nationally Determined Contribution: Communication 2021*.
- 2021f, *Future fuels and vehicles strategy: Powering choice*.
- 2021g, *Low Emissions Technology Statement 2021*, November.
- 2021h, *Reducing emissions through carbon capture, use and storage*, www.industry.gov.au/policies-and-initiatives/australias-climate-change-strategies/reducing-emissions-through-carbon-capture-use-and-storage (accessed 8 February 2022).
- 2021i, *State of Hydrogen 2021*, 10 December, Department of Industry, Science, Energy and Resources.
- 2021j, *Technology Investment Roadmap*, www.industry.gov.au/data-and-publications/technology-investment-roadmap (accessed 14 January 2022).
- 2022a, *Australia's Long-Term Emissions Reduction Plan: Modelling and Analysis*.
- 2022b, *Funding ultra low cost solar technology*, <https://www.energy.gov.au/news-media/news/funding-ultra-low-cost-solar-technology> (accessed 1 May 2022).
- 2022c, *Growing Australia's hydrogen industry*, www.industry.gov.au/policies-and-initiatives/growing-australias-hydrogen-industry (accessed 12 January 2022).
- 2022d, *National Greenhouse Gas Inventory Quarterly Update: September 2021*.
- 2022e, *Restart Investment to Sustain and Expand (RISE) Fund*, <https://www.arts.gov.au/funding-and-support/rise-fund> (accessed 1 May 2022).
- DITRDC (Department of Infrastructure, Transport, Regional Development and Communications) 2020, *Government support for the cultural and creative sector in response to COVID-19*, <https://www.arts.gov.au/covid-19-update> (accessed 24 June 2022).
- 2022a, *\$20 million to restart arts and entertainment*, <https://www.arts.gov.au/departmental-news/20-million-restart-arts-and-entertainment> (accessed 5 July 2022).
- 2022b, *Portfolio Budget Statements 2022-23: Budget Related Paper No. 1.10*.
- Dowler, K. 2022, *New study proves soil carbon sequestration to plummet by 2050*, Tasmanian Institute of Agriculture, <https://www.utas.edu.au/tia/news-events/news-items/2022/new-study-proves-soil-carbon-sequestration-to-plummet-by-2050> (accessed 1 May 2022).
- EC (European Commission) 2018, 'Preliminary Carbon Leakage List, 2021–2030', *Official Journal of the European Union*, vol. 61, no. 1, pp. 1–32.
- (European Commission) 2021a, *Carbon Border Adjustment Mechanism: Questions and answers*, https://ec.europa.eu/commission/presscorner/detail/en/qanda_21_3661 (accessed 6 December 2021).
- 2021b, *Carbon leakage*, Climate Action: EU Action, https://ec.europa.eu/clima/eu-action/eu-emissions-trading-system-eu-ets/free-allocation/carbon-leakage_en (accessed 24 November 2021).
- 2021c, *Impact assessment report: Proposal for a regulation of the European Parliament and of the Council establishing a carbon border adjustment mechanism*, Impact assessment report, Brussels, pp. 1–89.

- 2021d, *Proposal for a regulation of the European Parliament and of the council establishing a carbon border adjustment mechanism*.
- 2021e, *Reforming the WTO: Towards a Sustainable and Effective Multilateral Trading System*, Trade.
- ECIU (Energy & Climate Intelligence Unit) 2022, *Net zero scorecard*, <https://eciu.net/netzerotracker> (accessed 11 April 2022).
- Electric Vehicle Council 2021, *Future Fuels a fizzer: Government's strategy misses opportunity to electrify Australian transport*, <https://electricvehiclecouncil.com.au/future-fuels-a-fizzer-governments-strategy-misses-opportunity-to-electrify-australian-transport/> (accessed 1 May 2022).
- Emmery, M. 1999a, *Australian Manufacturing: A Brief History of Industry Policy and Trade Liberalisation*, Research Paper, October, No. 7 1999–2000, Department of the Parliamentary Library, Canberra.
- 1999b, *Industry Policy in Australia*, Research Paper 3 1999–2000, 21 September, Parliamentary Library.
- Energia 2018, *Australian Electric Vehicle Market Study*, Final Report.
- European Parliament 2018, *Dumping explained: definition and effects*, <https://www.europarl.europa.eu/news/en/headlines/economy/20180621STO06336/dumping-explained-definition-and-effects#:~:text=Why%20is%20it%20a%20bad,and%20workers%20losing%20their%20job>. (accessed 11 April 2022).
- EY (Ernst and Young) 2021, *Swiss Parliament acts to eliminate import customs duties on industrial goods as soon as 1 January 2022*, <https://taxnews.ey.com/news/2021-1726-swiss-parliament-acts-to-eliminate-import-customs-duties-on-industrial-goods-as-soon-as-1-january-2022?uAlertID=Sd%2FG8rua1oj6%2FI58EZ2AiA%3D#:~:text=Swiss%20Parliament%20acts%20to%20eliminate,soon%20as%201%20January%202022&text=The%20Swiss%20Federal%20Parliament%20has,for%20consumers%20and%20companies%20alike>. (accessed 20 May 2022).
- Felbermayr, G. and Peterson, S. 2020, *Economic assessment of Carbon Leakage and Carbon Border Adjustment*, Briefing, European Parliament, Brussels.
- Ferguson, D., Dent, H.Z., Qian, S., Hendrischke, H. and Li, W. 2022, *Demystifying Chinese Investment in Australia*, KPMG and the University of Sydney.
- FIRB (Foreign Investment Review Board) 1988, *Foreign Investment Review Board: Report 1986-87*, Annual Report.
- 2020, *Protecting the National Interest: Guiding Principles for Developing Conditions*, https://firb.gov.au/sites/firb.gov.au/files/guidance-notes/G11Principlesfordevelopingconditions_0_0.pdf (accessed 20 July 2022).
- 2021, *Annual Report 2020-21*, pp. 1–64.
- 2022a, *Australia's Foreign Investment Policy*, Australian Government, https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Ffirb.gov.au%2Fsites%2Ffirb.gov.au%2Ffiles%2F2022-01%2FAustralias_Foreign_Investment_Policy-20220114.docx&wdOrigin=BROWSELINK (accessed 21 July 2022).
- 2022b, *National Security: Guidance: 8*.
- Foreign Investment Review Board 2020a, *Fees on Foreign Investment Applications: Guidance 10*, 18 December 2020.
- 2020b, *Fees on Foreign Investment Applications: Guidance Note 30*, 1 July 2020, https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Fsites%2Ffirb.gov.au%2Ffiles%2Fguidance-notes%2FGN10_Fees_1.docx&wdOrigin=BROWSELINK (accessed 26 July 2022).
- Friedman, L. 2021, 'Democrats propose a border tax based on countries' greenhouse gas emissions', *New York Times*, 17 October.
- Frydenberg, J. 2015, *Excise Tariff Amendment (Ethanol and Biodiesel) Bill 2015*, Second Reading Speech, 4 June.
- and Burmingham, S. 2021, *Mid-Year Economic Fiscal Outlook 2021-22*.
- and Cormann, M. 2020, *Final Budget Outcome 2019-20*, Australian Government, Canberra, pp. 1–107, <https://archive.budget.gov.au/2019-20/fbo/download/FBO-2019-20.pdf> (accessed 19 July 2022).
- Galloway, A. and Harris, R. 2021, 'Liberalisation not protectionist': Australia to fight EU's carbon tariffs with its own plan', *The Sydney Morning Herald*, 12 March.
- Geoscience Australia 2021, *Exploring for the Future*, www.ga.gov.au/efft (accessed 8 February 2022).
- GGP (Greenhouse Gas Protocol) n.d., *GHG Protocol - FAQ*.
- Ginn, C. 2021, *GenCost report finds renewables holding steady as cheapest new-build power*, <https://www.csiro.au/en/news/news-releases/2021/gencost-report-finds-renewables-holding-steady-as-cheapest-new-build-power> (accessed 21 June 2022).
- 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.
- Global CCS Institute 2018, *Understanding Carbon Capture and Storage: What the experts say about CCS*.
- 2021, *Global Status of CCS 2021: CCS Accelerating to Net Zero*, 12 October.
- 2022a, *Capture - Capturing carbon dioxide (CO₂)*, www.globalccsinstitute.com/about/what-is-ccs/capture/ (accessed 8 February 2022).
- 2022b, *Storage - Storing carbon dioxide*, www.globalccsinstitute.com/about/what-is-ccs/storage/ (accessed 8 February 2022).
- Gonzales, V., Krupnick, A. and Dunlap, L. 2020, *Carbon Capture and Storage 101*, Explainer, May, Resources for the Future.
- Government of California 2021, <https://ww2.arb.ca.gov/our-work/programs/cap-and-trade-program> (accessed 8 December 2021).
- Government of Canada 2018, *Technical paper on the federal carbon pricing backstop*, Technical Paper, Environment and Climate Change Canada.
- 2021a, *Consultation on border carbon adjustments*, <https://www.canada.ca/en/department-finance/programs/consultations/2021/border-carbon-adjustments.html> (accessed 7 December 2021).
- 2021b, *Exploring Border Carbon Adjustments for Canada*, <https://www.canada.ca/en/department-finance/programs/consultations/2021/border-carbon-adjustments/exploring-border-carbon-adjustments-canada.html> (accessed 25 November 2021).
- GTP (Geneva Trade Platform) 2022, *Multi-Party Interim Appeal Arbitration Arrangement (MPIA)*, https://wtoplurilaterals.info/plural_initiative/the-mpia/#:~:text=Known%20as%20the%20Multiparty%20Interim,and%20staffed%20WTO%20Appellate%20Body. (accessed 18 March 2022).

- Hanratty, P. 1996, *Inward Direct Foreign Investment in Australia: Policy Controls and Economic Outcomes*, Research Paper 32 1995-96, 32, Parliament of Australia, Canberra.
- Harris, R. and Galloway, A. 2021, "'New protectionism': Australia to fight Boris Johnson's green tariff bid", *The Sydney Morning Herald*, 11 February.
- Hepburn, S. 2020, '4 reasons why a gas-led economic recovery is a terrible, naïve idea', *The Conversation*, 25 August.
- Hodgson, T., Hall, M., Urwin, R., Gao, J., Khanna, S., Johnson, A. and Deane-Williams, P. 2022, *Global Pension Assets Study 2022*, Thinking Ahead Institute, United Kingdom.
- Hopewell, K. 2021, 'EU the new kingpin in global trade order', *The Interpreter*, 15 July.
- Howard, J. 2003, *Fuel Excise Reforms*, Media release, 16 December, <https://pmtranscripts.pmc.gov.au/release/transcript-21046> (accessed 18 July 2022).
- and Anderson, J. 2001, *Transcript of the Prime Minister*, Press conference, 1 March.
- IC (Industry Commission) 1995, *Assistance to Agricultural and Manufacturing Industries*, Information Paper, Canberra.
- ICAP (International Carbon Action Partnership) 2021, *Japan - Saitama target setting Emissions Trading System*, International Carbon Action Partnership.
- IEA (International Energy Agency) 2020, *Going carbon negative: What are the technology options?*, www.iea.org/commentaries/going-carbon-negative-what-are-the-technology-options (accessed 9 February 2022).
- 2021a, *Energy subsidies: Tracking the impact of fossil-fuel subsidies*, www.iea.org/topics/energy-subsidies (accessed 2 December 2021).
- 2021b, *Net Zero by 2050 A Roadmap for the Global Energy Sector*.
- IISD and OECD (International Institute for Sustainable Development and Organisation for Economic Co-operation and Development) 2021, *Methodology - Fossil Fuel Subsidy Tracker*, fossilfuelsubsidytracker.org/methodology/ (accessed 7 December 2021).
- IMF (International Monetary Fund) 2022, *World Economic Outlook, April 2022: War Sets Back the Global Recovery*, World Economic Outlook, Washington, D.C., pp. 1–178.
- IPART 2021, *Determining ethanol wholesale prices and monitoring the retail market for E10: Final Report*, Sydney.
- Jackson, D. 2020, 'Australian motorists shun biofuels against global trend', *Convenience & Impulse Retailing*, 10 November.
- James, D. 1996, *'Beer and Cigs Up!': A Recent History of Excise in Australia*, April, Background Paper 5 1995-96, Parliamentary Library.
- Johansson, D.J.A., Azar, C., Lehtveer, M. and Peters, G.P. 2020, 'The role of negative carbon emissions in reaching the Paris climate targets: The impact of target formulation in integrated assessment models', IOP Publishing, *Environmental Research Letters*, vol. 15, no. 12, p. 124024.
- Keen, M., Parry, I. and Roaf, J. 2021, *Border Carbon Adjustments: Rationale, Design and Impact*, IMF Working Paper, 239, International Monetary Fund, Fiscal Affairs, pp. 1–42.
- Kehoe, J. 2022, 'Should banks now repay their multibillion-dollar RBA subsidy?', *Australian Financial Review*.
- Kelly, F. 2021, 'The Hon Dan Tehan MP Interview with Fran Kelly', ABC, *ABC Radio National Breakfast*, Transcript, <https://www.trademinister.gov.au/minister/dan-tehan/transcript/interview-fran-kelly-abc-radio-national-breakfast-0> (accessed 7 December 2021).
- Lavallee, J. and Cotrufo, F. 2020, 'Soil carbon is a valuable resource, but all soil carbon is not created equal', *The Conversation*, 7 February.
- , Soong, J. and Cotrufo, F. 2019, 'Conceptualizing soil organic matter into particulate and mineral-associated forms to address global change in the 21st century', *Global Change Biology*, vol. 26, no. 1, pp. 261–273.
- Lenton, T., Rockström, J., Gaffney, O., Rahmstorf, S., Richardson, K., Steffen, W. and Schellnhuber, H.J. 2019, *Climate Tipping Points - Too Risky to Bet Against Nature*, <https://www.nature.com/articles/d41586-019-03595-0> (accessed 15 June 2022).
- Lenzi, D. 2018, 'The ethics of negative emissions', Cambridge University Press, *Global Sustainability*, vol. 1, no. e7, pp. 1–8.
- Lockwood, B. and Whalley, J. 2008, 'Carbon motivated border tax adjustments: Old wine in green bottles?', *National Bureau of Economic Research, Massachusetts*, no. 14025, pp. 1–20.
- Ludlow, M. 2021, 'ARENA receives \$33m to boost bioenergy industry', *Australian Financial Review*, 18 November.
- 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.
- McKibbin, W. and Wilcoxen, P. 2009, *The economic and environmental effects of border tax adjustments for climate policy*, Working paper 9/2009, CAMA Working Paper Series.
- Melillo, J. and Gribkoff, E. 2021, *Soil-Based Carbon Sequestration*, <https://climate.mit.edu/explainers/soil-based-carbon-sequestration> (accessed 1 May 2022).
- Metz, B., Davidson, O., de Coninck, H., Loos, M. and Meyer, L. 2005, *IPCC Special Report on Carbon Dioxide Capture and Storage*, Intergovernmental Panel on Climate Change.
- Mizen, R. 2021, 'Coal, gas boost fails to offset 23pc iron ore export slump', *Australian Financial Review*, 2 December.
- Morrison, S. and Taylor, A. 2021, *Future hydrogen industry to create jobs, lower emissions and boost regional Australia*, Media Release, 20 September.
- and — 2022, *Australia Japan Clean Hydrogen Trade Partnership*, Media Release, 7 January.
- , — and Pitt, K. 2020, *Gas-fired recovery*, Media Release, 15 September.
- Morton, A. 2020, 'Scott Morrison's "gas-led recovery": what is it and will it really make energy cheaper?', *The Guardian*, 17 September.
- Moseman, A. 2021, *How efficient is carbon capture and storage?*, climate.mit.edu/ask-mit/how-efficient-carbon-capture-and-storage (accessed 9 February 2022).
- Muller, F., Saddler, H. and Melville-Rea, H. 2021, *Carbon Border Adjustments: What Are They and How Will They Impact Australia?*, Discussion paper, The Australia Institute, Canberra, pp. 1–33.
- Neely, M.C. 1993, *The Pitfalls of Industrial Policy*, April, Regional Economist, Federal Reserve Bank of St. Louis.
- NETL (National Energy Technology Laboratory) 2022, *Carbon Storage FAQs*, netl.doe.gov/coal/carbon-storage/faqs/carbon-storage-faqs (accessed 8 February 2022).

NTC (National Transport Commission) 2021, *Heavy vehicle charges consultation report*, January.

NZ Government (New Zealand Department of Foreign Affairs and Trade) 2022, *New Zealand - China Free Trade Agreement upgrade*, <https://www.mfat.govt.nz/kr/trade/free-trade-agreements/free-trade-agreements-concluded-but-not-in-force/nz-china-free-trade-agreement-upgrade/overview/> (accessed 20 May 2022).

OECD (Organisation for Economic Co-operation and Development) 2021, *Fossil Fuel Support - AUS*, stats.oecd.org/Index.aspx?DataSetCode=FFS_AUS (accessed 3 December 2021).

— n.d., *OECD Work on Support for Fossil Fuels - Methodology*, www.oecd.org/fossil-fuels/methodology/ (accessed 3 December 2021).

Ogge, M. 2021, *Wrong way, go back*, Submission, March, The Australia Institute.

Okazaki, K., Kuwahara, M., Miwa, T., Motomura, M. and Wako, J. 2021, *Japan begins discussions on carbon pricing framework*, <https://www.nomuraconnects.com/focused-thinking-posts/japan-begins-discussions-on-carbon-pricing-framework/#:~:text=In%20Japan%2C%20the%20Ministry%20of,on%20from%20previous%20MOE%20discussions.> (accessed 8 December 2021).

Oxford University 2022, *International travel controls during the COVID-19 pandemic*, <https://ourworldindata.org/grapher/international-travel-covid> (accessed 12 April 2022).

Parry, I., Black, S. and Vernon, N. 2021, *Still Not Getting Energy Prices Right: A Global and Country Update of Fossil Fuel Subsidies*, IMF Working Paper 2021/236, 24 September, International Monetary Fund.

Pauwelyn, J. and Kleimann, D. 2020, *Trade Related Aspects of a Carbon Border Adjustment Mechanism. A Legal Assessment*, Briefing European Parliamentary Research Service, PE603502, European Parliament, pp. 1–18.

PC (Productivity Commission) 2010, *Bilateral and Regional Trade Agreements*, Research Report, Canberra.

— 2012, *Australia's Export Credit Arrangements*, Report no. 58, Canberra.

— 2014, *Tasmanian Shipping and Freight*, Report no. 69.

— 2015, *Trade and Assistance Review 2013-14*, Annual Report Series, July.

— 2016a, *Developments in Anti-Dumping Arrangements*, Commission Research Paper, Canberra.

— 2016b, *Regulation of Australian Agriculture*, Report no. 79, Canberra.

— 2017a, *Energy*, Shifting the Dial: 5 year Productivity Review, Supporting Paper no. 11.

— 2017b, *Trade and Assistance Review 2015-16*, Annual Report Series, Canberra.

— 2020a, *Foreign Investment in Australia*, Commission Research Paper, Canberra.

— 2020b, *Productivity Insights 2020: Australia's long term productivity experience*, Appendices A–E, November.

— 2021, *Trade and Assistance Review 2019-20*, Annual Report Series.

— 2022, *Compliance Costs of 'Nuisance' Tariffs*, Research Report.

Pitt, K. 2020, *Unlocking new resource corridors to drive economic recovery*, Media Release, 13 August.

Pomerleau, K. 2017, *How a destination-based tax system reduces tax avoidance*, <https://taxfoundation.org/destination-based-tax-system-reduces-tax-avoidance/> (accessed 18 May 2022).

Queensland Government 2019, *Review of the Queensland Biofuels Mandates: Discussion Paper*, https://www.epw.qld.gov.au/__data/assets/pdf_file/0021/15924/biofuels-discussion-paper.pdf (accessed 21 July 2022).

RBA (Reserve Bank of Australia) 2020, *Statement on Monetary Policy: November 2020*, Statement on Monetary Policy, Sydney, pp. 1–89.

— 2021, *Statement on Monetary Policy: November 2021*, Statement on Monetary Policy, Sydney, pp. 1–71.

— nd, *Term Funding Facility to Support the Australian Economy*, <https://www.rba.gov.au/mkt-operations/term-funding-facility/overview.html> (accessed 1 May 2022).

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.

Renew Economy 2022, *Big Battery Storage Map of Australia*, <https://reneweconomy.com.au/big-battery-storage-map-of-australia/> (accessed 1 May 2022).

RGGI (The Regional Greenhouse Gas Initiative) 2021, *Welcome*, [https://www.rggi.org/#:~:text=The%20Regional%20Greenhouse%20Gas%20Initiative%20\(RGGI\)%20is%20a%20cooperative%2C,emissions%20from%20the%20power%20sector.](https://www.rggi.org/#:~:text=The%20Regional%20Greenhouse%20Gas%20Initiative%20(RGGI)%20is%20a%20cooperative%2C,emissions%20from%20the%20power%20sector.) (accessed 8 December 2021).

RMIT ABC Fact Check 2022, 'Adam Bandt says the fossil fuel industry receives \$10b in federal subsidies a year. Is that correct?', *Australian Broadcasting Commission*, 19 May.

Salma, U., Wells, R. and Forbes, M. 2016, *Trade and Assistance Review Estimates User Guide*, October, Productivity Commission, Canberra.

Sato, M. and Burke, J. 2021, 'What is carbon leakage? Clarifying misconceptions for a better mitigation effort', *Grantham Research Institute on Climate Change and the Environment*, London School of Economics, 8 December.

Scott, B. and Tunny, G. 2021, *What does the EU's carbon border tax mean for Australia?*, <https://adepteconomics.com.au/what-does-the-eus-carbon-border-tax-mean-for-australia/> (accessed 25 November 2021).

Shorten, W. 2011, *Taxation of Alternative Fuels Legislation Amendment Bill 2011 - Second Reading Speech*.

SICE (Organization of American States) 2022, *Trade in Services Agreement (TISA): Background and negotiations*, http://www.sice.oas.org/TPD/TISA/TISA_e.ASP (accessed 15 June 2022).

Simon, F. 2021, 'Asian countries see EU carbon border levy as protectionist: survey', *Euractiv*, 10 March.

Singapore Government 2022a, *Duties & dutiable goods*, <https://www.customs.gov.sg/businesses/valuation-duties-taxes-and-fees/duties-and-dutiable-goods> (accessed 16 June 2022).

— (Enterprise Singapore) 2022b, *European Union - Singapore Free Trade Agreement (EUSFTA)*, <https://www.enterprisesg.gov.sg/non-financial-assistance/for-singapore-companies/free-trade-agreements/ftas/singapore-ftas/eusfta> (accessed 20 May 2022).

— (Enterprise Singapore) 2022c, *Singapore FTAs: Bilateral FTAs*, <https://www.enterprisesg.gov.sg/non-financial-assistance/for-singapore-companies/free-trade-agreements/ftas/singapore-ftas> (accessed 20 May 2022).

- Sinha, A., Baumeler, J. and Blöchliger, M. 2021, *Import duties on industrial products to be abolished in Switzerland*, https://www.ey.com/en_ch/tax/import-duties-on-industrial-products-to-be-abolished-in-switzerland (accessed 20 May 2022).
- Siripala, T. 2021, 'Japan's carbon neutral future divided over climate pricing', *Tokyo Review*, 1 April.
- South African Government 2021, *Joint statement issued at the conclusion of the 30th BASIC Ministerial Meeting on Climate Change hosted by India on 8th April 2021*, <https://www.gov.za/nr/speeches/joint-statement-issued-conclusion-30th-basic-ministerial-meeting-climate-change-hosted> (accessed 7 December 2021).
- Sukkar, M. 2020, 'BILLS: Foreign Investment Reform (Protecting Australia's National Security) Bill 2020: Second Reading'.
- Takezawa, S. 2021, 'Japan mulls carbon border tax for polluters, Nikkei says', *Bloomberg Tax*, 11 February.
- Taylor, A. 2021a, *Advancing Australia's gas-fired recovery*, Media Release, 7 May.
- 2021b, *Tallawarra B power station to be built*, Media Release, 4 May.
- 2022, *New investment in innovative Australian soil carbon measurement technology*.
- and Porter, C. 2021, *CSIRO Mission to accelerate Australia's hydrogen industry*, Media Release, 26 May.
- Tehan, D. 2022a, *2022-23 Budget supports Australia's trade, investment and visitor economy to build a stronger future*, <https://www.trademinister.gov.au/minister/dan-tehan/media-release/2022-23-budget-supports-australias-trade-investment-and-visitor-economy-build-stronger-future> (accessed 20 May 2022).
- 2022b, *Statement by the Minister for Trade, Tourism and Investment, the Hon Dan Tehan MP on the Australia-United Kingdom Free Trade Agreement*, <https://www.dfat.gov.au/trade/agreements/not-yet-in-force/aukfta/statement-minister-trade-tourism-and-investment-hon-dan-tehan-mp-australia-united-kingdom-free-trade-agreement> (accessed 20 May 2022).
- 2022c, *World's largest free trade agreement enters into force*, <https://www.trademinister.gov.au/minister/dan-tehan/media-release/worlds-largest-free-trade-agreement-enters-force> (accessed 24 March 2022).
- The Economist* 2010, 'Picking winners, saving losers', 5 August.
- 2021, 'Creating the new hydrogen economy is a massive undertaking', 9 October.
- 2022, 'Many countries are seeing a revival of industrial policy', 10 January.
- The Guardian* 2011, 'What are the main types of carbon capture and storage technology?', 19 March.
- Timperley, J. 2018, 'The Carbon Brief profile: Japan', *Carbon Brief*, 25 June.
- Titievskaja, J. 2021, *International trade dispute settlement: WTO Appellate Body crisis and the multiparty interim appeal arrangement*, 14 April, European Parliamentary Research Service.
- Treasury 2021, *Evaluation of the 2021 foreign investment reforms*, Final Report.
- 2022, *2021 Tax Benchmarks and Variations Statement*.
- Trebeck, D., Landels, J. and Hughes, K. 2002, *Fuel Tax Inquiry Report*, March, Commonwealth of Australia.
- Turnbull, M., Cash, M. and Frydenberg, J. 2018, *Local jobs and a new energy industry for the LaTrobe Valley*, Media Release, 12 April.
- UK Government (United Kingdom Department for International Trade) 2021a, *Ten key benefits of the UK-Australia Free Trade Agreement*.
- (United Kingdom Government) 2021b, *Participating in the UK ETS*, <https://www.gov.uk/government/publications/participating-in-the-uk-ets/participating-in-the-uk-ets> (accessed 8 December 2021).
- UK Parliament (United Kingdom Parliament) 2021a, *EAC launches new inquiry weighing up carbon border tax measures*, <https://committees.parliament.uk/committee/62/environmental-audit-committee/news/157728/eac-launches-new-inquiry-weighing-up-carbon-border-tax-measures/> (accessed 25 November 2021).
- 2021b, *Formal meeting (oral evidence session): Carbon border adjustment mechanisms*, <https://committees.parliament.uk/event/6395/formal-meeting-oral-evidence-session/> (accessed 7 December 2021).
- United Kingdom House of Commons 2021, *Carbon border adjustment mechanism*, 1, United Kingdom Parliament, London, pp. 1–41.
- US EERE (United States Office of Energy Efficiency and Renewable Energy) 2022, *Hydrogen Storage*, www.energy.gov/eere/fuelcells/hydrogen-storage (accessed 13 January 2022).
- US Government 2020, *Report on the Appellate Body of the World Trade Organization*, United States Trade Representative.
- (Office of the United States Trade Representative) 2021, *2021 Trade Policy Agenda and 2020 Annual Report of the President of the United States on the Trade Agreements Program*, Office of the United States Trade Representative, Washington, D.C., pp. 1–182.
- (Office of the United States Trade Representative) n.d., *Trade in Services Agreement*, <https://ustr.gov/TiSA> (accessed 23 March 2022).
- Verdon, J.P. and Stork, A.L. 2016, 'Carbon capture and storage, geomechanics and induced seismic activity', *Journal of Rock Mechanics and Geotechnical Engineering*, vol. 8, no. 6, pp. 928–935.
- Verrinder, I. 2021, 'Has Australia's gas-fired recovery run out of steam before it even began?', *ABC News*, 31 May.
- van Vuuren, D.P., Deetman, S., van Vliet, J., van den Berg, M., van Ruijven, B.J. and Koelbl, B. 2013, 'The role of negative CO₂ emissions for reaching 2 °C — insights from integrated assessment modelling', *Climatic Change*, vol. 118, no. 1, pp. 15–27.
- Webb, R. 2000, *Petrol and Diesel Excises*, Research Paper 6, October, Parliamentary Library.
- 2006, *Excise taxation: developments since the mid-1990s*, Parliamentary Library Research Brief, 13 April, No. 15, 2005–06, Parliament of Australia.
- Wood, T. and Dundas, G. 2020, *Flame out: the future of natural gas*, November, Grattan Institute.
- World Bank 2022a, *Gross domestic product 2021*, <https://databank.worldbank.org/data/download/GDP.pdf> (accessed 20 July 2022).
- 2022b, *Tariff rate, applied, simple mean, all products (%) - Switzerland*,

<https://data.worldbank.org/indicator/TM.TAX.MRCH.SM.AR.ZS?locations=CH> (accessed 20 May 2022).

— 2022c, *TCdata360: Anti Dumping trade barriers*, https://tcdata360.worldbank.org/indicators/dump.trade.barr.fc?country=ZAF&indicator=40030&viz=line_chart&years=1990,2021 (accessed 11 April 2022).

WTO (The World Trade Organisation) 2021a, *WTO rules and environmental policies: GATT exceptions*, https://www.wto.org/english/tratop_e/envir_e/envt_rules_exceptions_e.htm (accessed 15 December 2021).

— 1986, *The Text of the General Agreement on Tariffs and Trade*, General Agreement on Tariffs and Trade, Geneva.

— 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).

— 2010a, *Australia - Anti-Dumping Measures on Imports of Coated Woodfree Paper Sheets*, https://www.wto.org/english/tratop_e/dispu_e/cases_e/ds119_e.htm (accessed 16 June 2022).

— 2010b, *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).

— 2010c, *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).

— 2010d, *Australia - Measures Affecting Importation of Salmon*, https://www.wto.org/english/tratop_e/dispu_e/cases_e/ds18_e.htm (accessed 16 June 2022).

— 2010e, *Australia - Quarantine Regime for Imports*, https://www.wto.org/english/tratop_e/dispu_e/cases_e/ds287_e.htm (accessed 16 June 2022).

— 2010f, *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).

— 2010g, *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).

— 2010h, *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).

— 2010i, *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).

— 2010j, *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).

— 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).

— 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).

— 2018, *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).

— 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).

— 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).

— 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).

— 2021b, *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).

— 2021c, *Trade and Climate Change*, Information Brief 4, World Trade Organisation.

— 2022a, *6.3 The panel stage*, https://www.wto.org/english/tratop_e/dispu_e/dispute_settlement_cbt_e/c6s3p2_e.htm (accessed 5 July 2022).

— 2022b, *Anti-dumping*, https://www.wto.org/english/tratop_e/adp_e/adp_e.htm#:~:text=The%20WTO%20Agreement%20does%20not,%E2%80%9CAnti%20Dumping%20Agreement%E2%80%9D. (accessed 11 April 2022).

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

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

— 2022e, *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).

— 2022f, *Australia and the WTO*, https://www.wto.org/english/thewto_e/countries_e/australia_e.htm (accessed 22 March 2022).

— 2022g, *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).

— 2022h, *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 22 March 2022).

— 2022i, *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 22 March 2022).

— 2022j, *Dispute Settlement*, https://www.wto.org/english/tratop_e/dispu_e/dispu_e.htm (accessed 23 March 2022).

— 2022k, *Environmental Goods Agreement (EGA)*, https://www.wto.org/english/tratop_e/envir_e/ega_e.htm (accessed 13 April 2022).

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

— 2022m, *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).
- 2022n, *Glossary*, https://www.wto.org/english/thewto_e/glossary_e/nuisance_tariff_e.htm (accessed 16 June 2022).
- 2022o, *India - Measures Concerning Sugar and Sugarcane*, https://www.wto.org/english/tratop_e/dispu_e/cases_e/ds580_e.htm (accessed 22 March 2022).
- 2022p, *I-TIP Goods: Integrated analysis and retrieval of non-tariff measures*, <https://i-tip.wto.org/goods/> (accessed 11 April 2022).
- 2022q, *Members adopt panel reports in fresh avocados, steel safeguards disputes*, https://www.wto.org/english/news_e/news22_e/dsb_31may22_e.htm (accessed 15 June 2022).
- 2022r, *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).
- 2022s, *Special and differential treatment provisions*, https://www.wto.org/english/tratop_e/devel_e/dev_special_differential_provisions_e.htm (accessed 8 April 2022).
- 2022t, *Technical information on anti-dumping*, https://www.wto.org/english/tratop_e/adp_e/adp_info_e.htm (accessed 11 April 2022).
- 2022u, *The process - Stages in a typical WTO dispute settlement case*, https://www.wto.org/english/tratop_e/dispu_e/disp_settlement_cbt_e/c6s1p1_e.htm (accessed 18 March 2022).
- 2022v, *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).
- 2022w, *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).
- 2022x, *Who we are*, https://www.wto.org/english/thewto_e/whatis_e/who_we_are_e.htm (accessed 18 March 2022).
- 2022y, *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).
- n.d., *Agreement on subsidies and countervailing measures*.
- Xu, M. and Stanway, D. 2021, 'China says EU's planned carbon border tax violates trade principles', *Australian Financial Review*, 26 July.