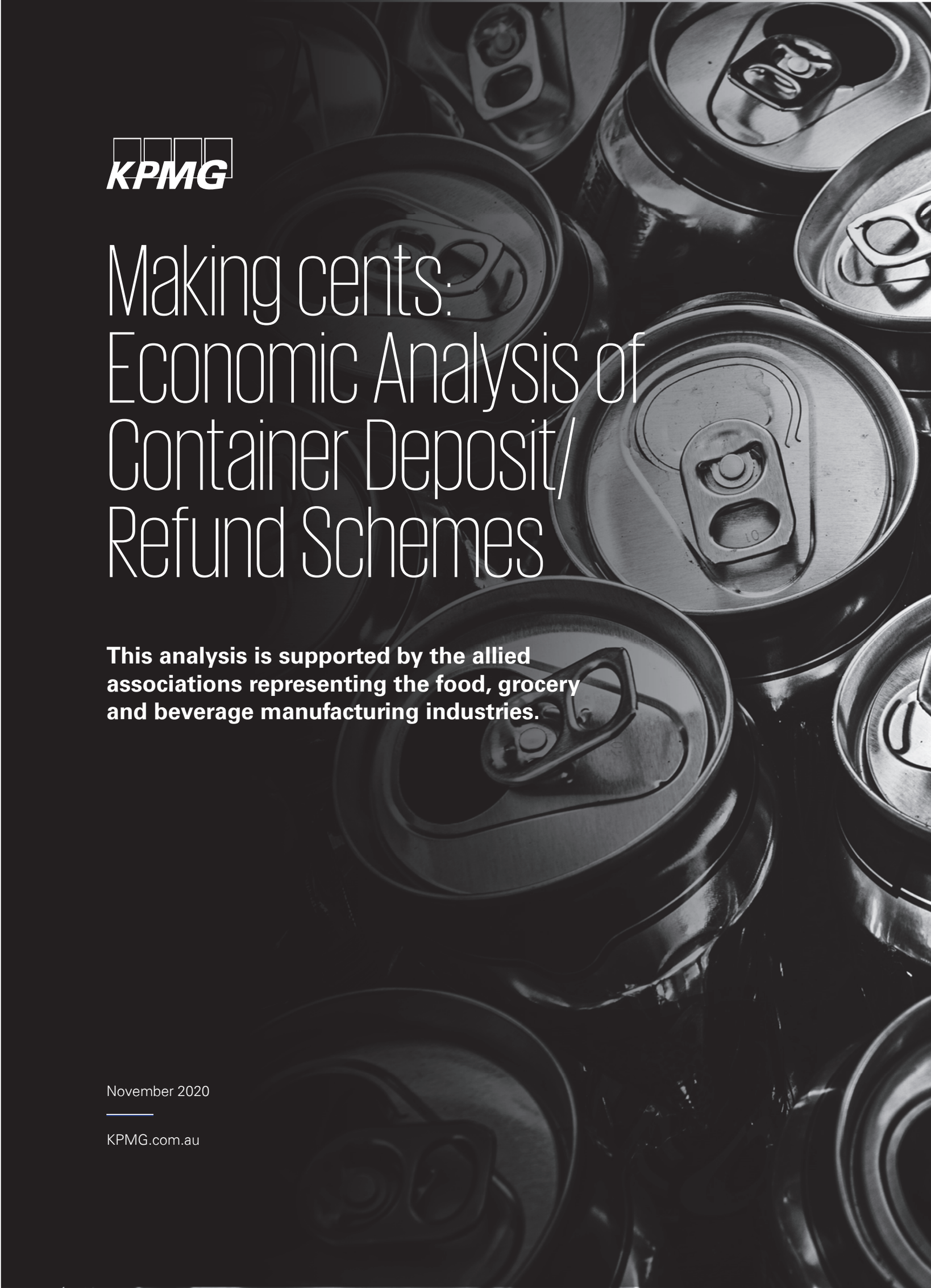

KPMG

Making cents: Economic Analysis of Container Deposit/ Refund Schemes

This analysis is supported by the allied associations representing the food, grocery and beverage manufacturing industries.

November 2020

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Inherent Limitations

This report has been prepared at the request of the Brewers Association of Australia, the Australian Beverages Council Limited and the Australian Food and Grocery Council, as outlined in the Scope Section of the engagement letter with the Brewers Association of Australia, dated 4 August 2020. The services provided in connection with this engagement comprise an advisory engagement, which is not subject to assurance or other standards issued by the Australian Auditing and Assurance Standards Board and, consequently no opinions or conclusions intended to convey assurance have been expressed.

No warranty of completeness, accuracy or reliability is given in relation to the statements and representations made by, and the information and documentation provided by, the Brewers Association of Australia, the Australian Beverages Council Limited and the Australian Food and Grocery Council personnel and stakeholders consulted as part of the process.

KPMG have indicated within this report the sources of the information provided. We have not sought to independently verify those sources unless otherwise noted within the report.

KPMG is under no obligation in any circumstance to update this report, in either oral or written form, for events occurring after the report has been issued in final form.

Third Party Reliance

This report is solely for the purpose set out in the Introduction section and for the Brewers Association of Australia, the Australian Beverages Council Limited and the Australian Food and Grocery Council's information, and is not to be used for any purpose not contemplated in the engagement letter or to be distributed to any third party without KPMG's prior written consent.

This report has been prepared at the request of the Brewers Association of Australia, Australian Beverages Council Limited and Australian Food and Grocery Council in accordance with the terms of KPMG's Engagement Letter dated 4 August 2020. Other than our responsibility to the Brewers Association of Australia, neither KPMG nor any member or employee of KPMG undertakes responsibility arising in any way from reliance placed by a third party on this report. Any reliance placed is that party's sole responsibility.

Contents

Executive summary

Container Deposit Schemes (CDS), also known as Container Refund Schemes, are principally designed to change behaviour to meet objectives related to reducing the volume of beverage containers that end up in landfill or that are discarded in the environment. Together with other policies, this change in behaviour facilitates reuse of materials through recycling and provides a number of financial, social and environmental benefits to communities across Australia.

This report has analysed the economic impacts of CDS in Australia. The main findings are:

- The mechanisms of the CDS, when working as intended, have complex economic impacts. Some of these impacts are intended and central to the fundamental objectives of the schemes in recovering recyclable containers. Other economic impacts are **unavoidable by-products** of achieving the central goal.
- Despite their immaturity and lack of consistency, the Australian CDS appear **capable of achieving high redemption rates**.
- Caution is warranted in considering any increase in the refund amount. The broader economic costs of doing this are not well understood and the benefits may be marginal, especially as the specific objectives of the schemes are not clear.
- Whether the redemption rates could be achieved at lower cost remains an open question. Alternative policy levers may provide a better benefit-cost trade-off in achieving the desired objectives.
- Changes should not be made to the refund amount of CDS until there is more clarity around scheme objectives and until the implemented and soon-to-be introduced CDS in Australia have had a chance to mature.
- A premium should be placed on collecting the data necessary to properly understand both the extent of the unavoidable costs under existing settings and if objectives can be achieved with smaller costs using alternative policy levers.

What are the costs? More than just the 10 cent refund

Achieving the desired change in behaviour comes at a cost. While the refund amount is set at 10 cents, the cost to the community and industry can be significantly higher, depending on scheme running costs (which can be more than the 10 cents per container collected and are on top of the refund amounts) and on redemption rates. The final cost burden of the CDS falls on consumers who purchase beverages and on businesses that manufacture and sell beverages.

- **Consumers pay more** for their beverages. This affects their whole consumption basket: first, it unavoidably distorts their consumption decision away from beverages and towards other goods and services, including those using containers not covered by the CDS; and second, it reduces the purchasing power of the consumer's budget resulting in lower demand for all goods and services.
- **Beverage producers face higher costs** and they may be unable to pass all of these on to consumers. Beverage businesses operating in competitive markets will need to reduce the size of their operations to restore margins to rates dictated by global capital markets. This will invariably result in reducing workforce size and reducing investment in fixed assets.

What are the benefits? The need for measurable targets to determine effectiveness

Measurable targets and efficient schemes need to align with broader environmental and waste management strategies. For example, states and territories should know the scheme redemption rate required, amongst other waste policies, to meet the national target of an 80% average resource recovery rate from all waste streams by 2030 set in the National Waste Policy Action Plan 2019. Although states and territories have legislated varying targets related to waste and recycling, only Queensland and Western Australia have legislated explicit redemption targets for their CDS. Success against these measurable targets needs to be evaluated before any change to CDS can be considered.

Insofar as redemption rates are a key summary measure of the effectiveness of CDS, it appears that the current settings are capable of achieving high redemption rates. It is also apparent that other factors are critical drivers of redemption rates. These include awareness of the CDS, ease and convenience of community access to container collection points (both in terms of proximity and the convenience of interacting with the container collection point itself), opportunities to support causes that matter to the community (such as schools, charities and local football clubs), as well as the evolving community standards in relation to the environmental consequences of production and consumption decisions. The roll-out of schemes across the entire country is expected to heighten awareness and start to develop the return of containers as a habit across the country.

Balancing community engagement and community cost

The change in community standards poses an interesting dilemma for the CDS. An unavoidable consequence of CDS is to distort behaviour in a way that increases the cost of achieving a given redemption rate. This will occur, for example, if there is a diversion of containers away from lower cost recovery channels such as material recovery facility (MRF) kerbside collections towards the higher cost scheme channel. This distortion will be exacerbated the higher the refund amount and/or the ease and convenience of obtaining the refund amount.

Now is not the time to make uninformed changes: the need for evidence and policy context

Changes made to the schemes should be based on robust evidence relating to the scheme costs and benefits and commensurate with the standards in good public policy. It should also include how the CDS interact with other policies. In this context, scheme costs include those that are explicit and transparent as well as those that involve negative, but unavoidable, distortions to consumer and business behaviour.

Evidence about the nature and magnitude of scheme costs are limited, which means that the consequences of any proposed changes to scheme settings are unlikely to be well understood. This places a premium on building up a robust evidence base as the various CDS are rolled out across the country and as they mature. Such evidence will also be important for considering the benefits of increasing the consistency of the schemes across jurisdictions and adopting a national approach to the recovery and recycling of containers.

Implicit in this consideration is the benefit of having objectives for the schemes that are clear and well-understood and consistent with the objectives of other related policies, such as recycling. This type of clarity and consistency of objectives is necessary if the costs of achieving environmental objectives are to be minimised.

Glossary

- PET – polyethylene terephthalate
- HDPE – high-density polyethylene
- LPB – liquid paperboard, or cartons
- MRFs – materials recovery facilities
- Return rate^ – the number of containers returned as a share of total number of containers sold
- Redemption rate, collection rate, container recovery rate – see return rate
- Recycling rate^ – recycling as a share of waste generated
- Resource recovery rate^ – the sum of recycling and energy recovery as a share of waste generated
- rPET – recycled polyethylene terephthalate
- Energy recovery^ – the process of recovering energy that is embodied in solid waste
- Processor# – collects containers from collection points, processes them into recyclable material for sale by crushing into bales ready to be auctioned, and transfers sold materials to purchaser
- Recycler# – re-manufactures processed recycled waste

Sources:

^ http://www.environment.gov.au/system/files/pages/3e0d2374-3a39-478c-b069-df4e34d924bc/files/faqs.pdf

 # https://www.containerexchange.com.au/partners/

01

Introduction

1. Introduction

In Australia, all but two states (Tasmania and Victoria), have implemented a container deposit scheme. The first container deposit scheme in Australia was implemented in 1977 in South Australia. This was followed by the Northern Territory in 2012, New South Wales in 2017, and ACT and Queensland in 2018. The scheme in Western Australia has commenced in October 2020, with Tasmania anticipated to commence its scheme in 2022 and Victoria soon after that in 2022-23. The refund amount across all jurisdictions with an implemented container deposit scheme is currently 10 cents.

The Brewers Association of Australia (Brewers), the Australian Beverages Council Limited (ABCL) and the Australian Food and Grocery Council (AFGC) have commissioned a best practice report on CDS to deepen the understanding of the economic implications associated with the design features of the schemes. Together, the three industry associations support industries that contribute over $127 billion in turnover per year to the Australian economy and support 274,835 jobs across the nationa.[1] Members of the associations have also been supporters of schemes that improve product stewardship.[2]

This report analyses the economic impacts of Container Deposit Schemes (CDS), also known as Container Refund Schemes (CRS), in Australia. The mechanisms of the CDS, when working as intended, have complex economic impacts. Some of these impacts are intended and central to the fundamental objectives of the schemes in recovering recyclable containers. Other economic impacts are unavoidable by-products of achieving the central goal. Despite their lack of consistency, the Australian CDS appear capable of achieving high redemption rates. Whether these redemption rates could be achieved at lower cost with policy mechanisms other than CDS remains an open question and one that is beyond the scope of this report.

This report suggests that caution is warranted in considering any increase in the CDS refund amount. While the current and impending CDS structures appear to be capable of achieving high redemption rates, they do come at a cost, which will be exacerbated if the refund amount is increased. Further, these broader economic impacts are not well understood and the benefits may be marginal, especially as the specific objectives of the schemes are not clear. Alternative policy levers may provide a better benefit-cost trade-off in achieving the desired objectives. However, no change should be made before the objectives of the CDS are clarified, the implemented and soon-to-be introduced CDS in Australia have had a chance to mature, and data has been collected to properly understand both the extent of the unavoidable costs under existing settings and if goals can be achieved with smaller costs using alternative policy levers.

Report Scope

In the subsequent sections of this report we consider evidence relating to the behavioural responses to the CDS to help assess the effectiveness of scheme mechanisms in achieving their objectives and to consider how changes in various elements of CDS, including the refund amount, might impact behaviour and, consequently the economy. Before turning to this analysis, it is important to establish that it is beyond the scope of this report to consider whether CDS are the best mechanism available to policymakers for achieving the objectives of the scheme relating to container recovery. In addition, while our focus is very much on the CDS, it is important to recognise that it is only one component of a wider package of policies relating to the recovery and recycling of containers.

In this report, **Section 2** presents the objectives and mechanisms of the CDS. As the CDS work by targeting key decisions in order to change behaviours, **Section 3** presents the economic consequences as a result of the scheme, both intended and unavoidable. **Section 4** makes the point that the refund amount should not be the only consideration to achieve a high redemption rate as it increases the costs/distortions that are already present with the introduction of the CDS. **Section 5** provides an overview of pathways forward for the CDS to continue making a positive contribution to society.

[1] See Australian Food and Grocery Council State of the Industry report at https://www.afgc.org.au/industry-resources/state-of-the-industry

[2] See for example Coca-Cola:https://www.coca-colacompany.com/au/faqs/does-coca-cola-support-container-deposit-schemes-ABCL https://www.australianbeverages.org/initiatives-advocacy-information/container-deposit-schemes/

02

Container Deposit Schemes (CDS)

2. Container Deposit Schemes (CDS)

Container Deposit Schemes (CDS), also known as Container Refund Schemes (CRS), are designed to encourage the return of eligible containers to designated collection points, through a price signal. A monetary reward (refund amount) is provided to the person or entity that returns an eligible container to a designated collection point. To fund the reward, a liability is imposed on the supplier that uses the eligible container as a receptacle for the product (e.g. soft drink manufacturer using a bottle). To cover the cost of operating the collection program, the liability imposed on the supplier is usually larger than the reward provided for returning the container.

2.1 Objectives

The objectives of the CDS that have been implemented in Australia have focused on **reducing litter** and **increasing recycling** to reduce landfill waste and/or increase resource recovery. These objectives are similar across all the schemes operating in Australia. Partly as a result of the litter reduction objective, only containers deemed to contribute to litter are captured under the scheme. Please refer to Appendix A for the list of CDS objectives in the respective jurisdictions and a detailed list of eligible CDS containers.

In the more recent schemes proposed, such as in WA and Vic,[3] these objectives have become more sophisticated and have expanded to include greater **product stewardship** and creating a **circular economy**. The beverage industry has a role to play, as consumers want their goods to have a lower environmental impact.[4] Greater supply of recycled material, such as rPET, should also mean lower production costs for containers, and subsequently, beverage manufacturers.

A secondary objective that some schemes focus on is **job creation** in the recycling and charity sector, particularly in the WA and QLD schemes. It is estimated that the Western Australian scheme will generate 500 local jobs on scheme commencement. In comparison, it is estimated that the Queensland scheme directly employed 700 people after 1 year of operation.[5] The employment aspect of the CDS objectives in WA is quite specific, as it aims to create jobs for individuals with disabilities and those who are long-term unemployed.[7] The scheme is also seen as complementary rather than a replacement for the existing collection and recycling activities.[8]

[3] https://dwer.wa.gov.au/cds and https://www.vic.gov.au/container-deposit-scheme

[4] https://www.bloomberg.com/opinion/articles/2019-10-06/america-s-shale-boom-is-a-threat-to-recycled-plastic-bottles

[5] https://statements.qld.gov.au/statements/88782

[6] Alex Young, NSW Government, in a presentation given to the Waste Industry Association of Victoria in September 2019

[7] https://www.mediastatements.wa.gov.au/Pages/McGowan/2019/12/Regulations-pave-way-for-Container-Deposit-Scheme-in-June-2020.aspx

[8] https://dwer.wa.gov.au/cds

Relative to kerbside recycling, the CDS are a more expensive way of recovering containers to be recycled. In general, however, there is currently some benefit of using this channel rather than kerbside collection. This is because the CDS produce some cleaner and more valuable recyclate, particularly in materials such as glass and plastics. Most kerbside recycling systems using the same mixed recycling bin which leads to contamination i.e. broken glass and mixed plastics. In contrast, the collection centres separate materials at the point of deposit. To narrow the gap in quality between the two collection channels and, thus, ensure that the containers that are returned can best contribute to the broader recycling/circular economy goals, investment in increased and better sortation solutions for MRF operators that run kerbside recycling could be put in place.

The table below presents the latest statistics available on the container redemption rate and beverage litter reduction for each of the jurisdictions. Return and Earn in NSW set a target of reducing litter 40% by 2020, which was successfully achieved in 2018-19. The Return and Earn report states that further targets including an additional 12.6 billion beverage containers to be recycled by 2037, although it is unclear what redemption rate would be required to achieve this. Currently, only Queensland and Western Australia have set a legislated redemption rate target of 85% by 2022.

Table 1: Latest redemption rates and litter reduction estimates across CDS

		Redemption rate		Beverage litter reduction	
	Year	Latest actual	Target	Latest actual	Targets
SA[9]	2019-20	76.7%	None stated	N/A	No measurable target
NT[10]	2018-19	84%	None stated	N/A	No measurable target
NSW[11, 12]	2018-19	61%	None stated	40%	1.6bn fewer containers littered by 2037 12.6 bn more containers recycled by 2037 11bn fewer containers in landfill by 2037
ACT[13]	2018-19	50.4%	None stated	40%	No measurable target
QLD[14]	2019-20	60%	85%	54%	No measurable target
WA[15]	-	-	85%		No measurable target

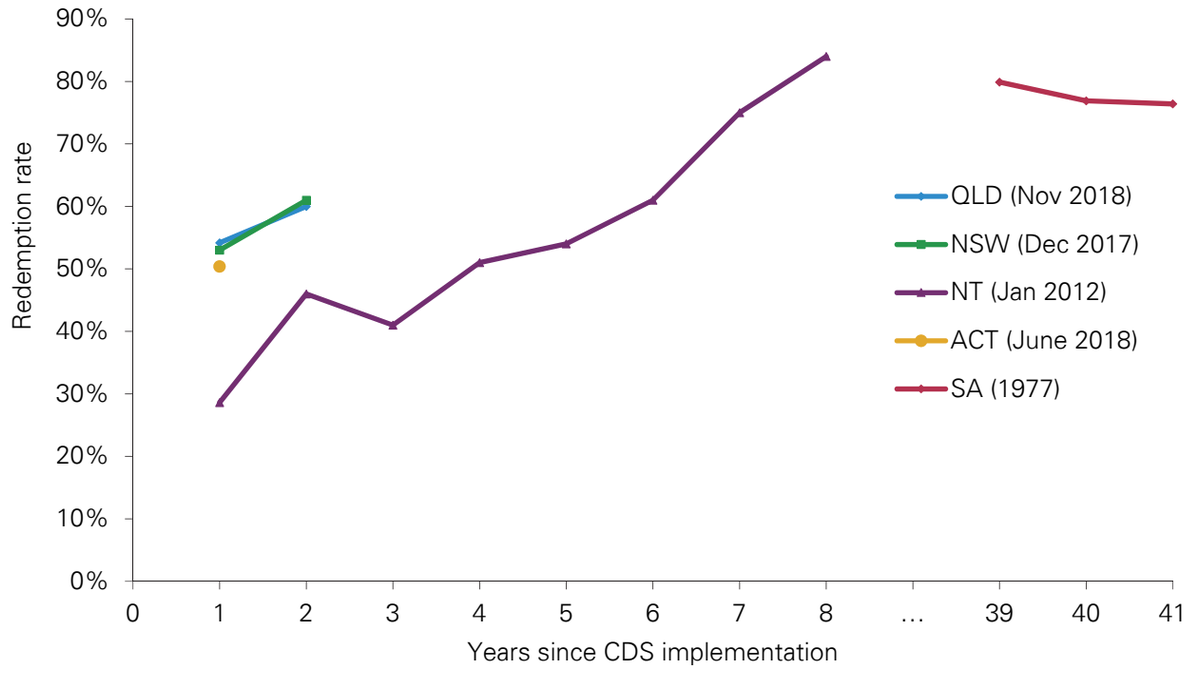
Sources: Return and Earn Annual report (2018-19), South Australia's Recycling Activity Survey Report 2017-18, QLD COEX Annual Report 2019-20, Northern Territory EPA Environmental Protection Act annual report 2018-19, ACT Container Deposit Scheme annual report 2018-19.

Note: These redemption rates are overall rates for all materials covered under the scheme. Redemption rates for aluminium and glass tend to be higher, while redemption rates for polyethylene terephthalate (PET), liquid paperboard (LPB/cartons) and high-density polyethylene (HDPE) are much lower, based on published redemption rates in SA.[16]

The current CDS settings appear to be effective in terms of redemption rates, as reported in Figure 1. This figure shows that the early trajectories for the NSW and QLD schemes are growing, and the NT scheme has reached a redemption rate of 84% after eight years of operation. Redemption rates in South Australia are reported to be around 77%, however these figures are not comparable as they do not include kerbside collection. If included, this rate would be higher.

[9] https://www.epa.sa.gov.au/environmental_info/waste_management/container_deposit
[10] https://ntepa.nt.gov.au/__data/assets/pdf_file/0010/746083/2018_2019_CDS_annual_report.pdf
[11] https://www.epa.nsw.gov.au/news/media-releases/2019/epamedia191204-two-year-old-return-and-earn-keeps-delivering#:~:text=%E2%80%9CReturn%20and%20Earn%20now%20has,anniversary%20of%20Return%20and%20Earn.
[12] 2018-19 Return and Earn Annual Report, accessed at https://www.parliament.nsw.gov.au/tp/files/77987/Return%20and%20Earn%20Annual%20Statutory%20Report%202018-19.pdf
[13] ACT Container Deposit Scheme 2018-19
[14] 2019-20 COEX Annual Report, accessed at https://containerexchange.com.au/wp-content/uploads/2020/10/Container-Exchange-Annual-Report-2019-2020.pdf
[15] See page 10 of WA CDS legislation at https://www.legislation.wa.gov.au/legislation/prod/filestore.nsf/FileURL/mrdoc_41872.pdf/$FILE/Waste%20Avoidance%20and%20Resource%20Recovery%20(Container%20Deposit%20Scheme)%20Regulations%202019%20-%20%5B00-00-00%5D.pdf?OpenElement
[16] https://www.epa.sa.gov.au/environmental_info/waste_recycling/container_deposit

Figure 1: Redemption rates since implementation across states



Sources: Return and Earn Annual report (2018-19), South Australia's Recycling Activity Survey Report 2017-18, QLD Container Exchange monthly dashboard July 2020, Northern Territory EPA Environmental Protection Act annual report 2018-19, ACT Container Deposit Scheme annual report 2018-19.

Note: Northern Territory experienced a legislative change in their CDS in 2014 which explains part of the reduction in the third operating year. Data for the complete second year of the Queensland scheme is not available, so the second year's redemption rate is based on six months only. Data on initial years of the SA scheme is unavailable. Only the first year of data is available for ACT to date.

This positive trajectory is expected to continue, particularly in the newer schemes, as consumers adjust their behaviour. Container Exchange (COEX) in Queensland has established a target of 80% public awareness by 2022, which will continue to encourage participation as consumers become more aware of the scheme. Exchange for Change in NSW reported that 42% of NSW residents had participated at least once in the scheme, and that 78% of those who had not participated yet, intend to do so.[17]

Without all states and territories having clear published targets however, it is hard to determine the exact nature of "success" for the schemes. For example, if states and territories are committed to achieving an 80% average resource recovery rate from all waste streams by 2030, as stated in the National Waste Policy Action Plan,[18] they should have a strategy on the role that CDS, amongst other policies, may play in this. Interactions between the CDS and other environmental policies should also be considered.

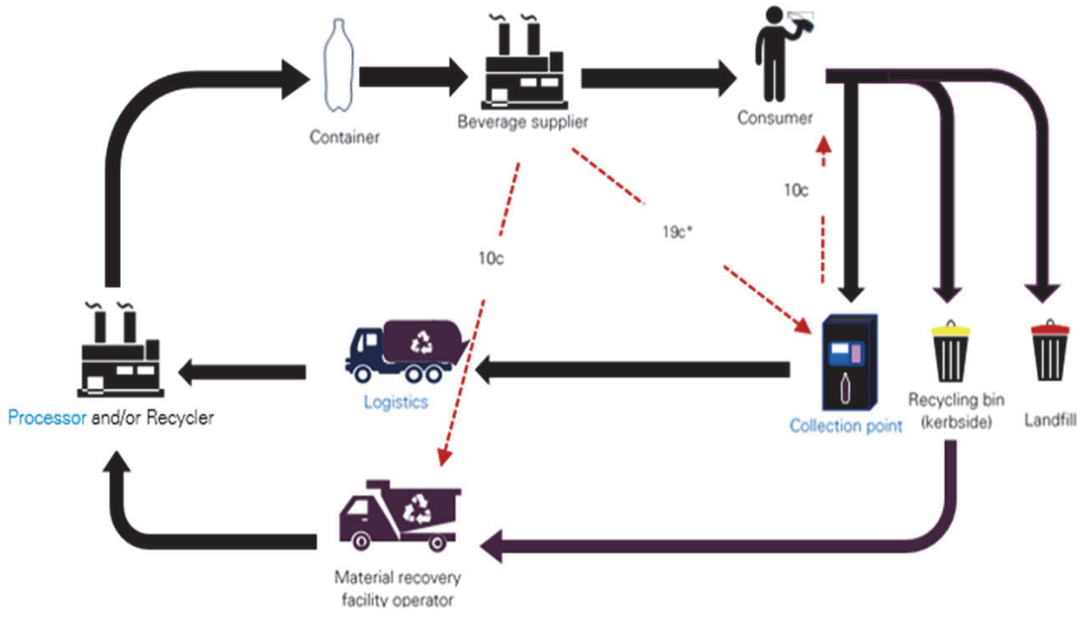
[17] See page 25 of the Containers for Change 2017-18 Annual Report accessible at https://www.parliament.nsw.gov.au/tp/files/77263/2017-18%20Return%20and%20Earn%20Annual%20Report.pdf

[18] National Waste Policy Action (2019) https://www.environment.gov.au/system/files/resources/5b86c9f8-074e-4d66-ab11-08bbc69da240/files/national-waste-policy-action-plan-2019.pdf

2.2. Mechanisms

The total cost of the CDS lies not in the refund amount alone. There are also costs associated with running the scheme, such as the costs associated with the collection, logistics and processing of returned containers. Figure 2 illustrates the flow of costs related to the scheme.

Figure 2: Illustration of CDS cost flows



** the actual cost of running the schemes vary across jurisdictions. The 9c amount is indicative only. The CDS roles in blue are part of the CDS collection network paid for using the 9c amount*

In terms of recovering eligible beverage containers post-consumption to recyclers, the CDS channel is more costly relative to the material recovery facility (MRF) collection (kerbside recycling).

The per container contribution by the beverage supplier to the CDS collection network includes the 10-cent refund amount. If the eligible container is returned via a collection point for processing through the scheme, the beverage suppliers are required to pay an estimated additional 9 cents on average to cover the scheme costs.[19] In contrast, the beverage supplier would be liable for only the refund amount if returned via the MRF operators.[20] Therefore, the cost to beverage suppliers (and ultimately the consumer) to recover eligible containers via the scheme is almost double than if the recovery occurs through kerbside recycling via MRF operators. An unavoidable result from the introduction of the CDS are a diversion from kerbside recycling (via MRF operators) into the more costly CDS stream. This diversion is from individuals who would already be recycling (through the kerbside bin) for environmental or societal reasons.

[19] The 9 cent cost varies depending on the efficiency of the scheme. For example in QLD it was 8.6 cents (2019-20) and in NSW it was 9.3 cents (2018-19).
[20] Some jurisdictions allow for MRF operators to claim processing refunds by weight to container factors.

How the CDS works

- Suppliers are liable for the cost of operating the scheme. While the exact mechanics differ between the Australian CDS schemes, suppliers in principle contribute a fee to a scheme based on the expected redemption rate (amount of containers expected to be sold vs the number of containers expected to be recovered by the scheme), where the container is redeemed (e.g. collection point versus MRF) and scheme running costs.[21] The costs would increase as the expected redemption rate increases. Please see Table 3 in Appendix C – Scheme costs for the range of estimates in NSW.
- This fee covers the 10-cent refund amount and the scheme running cost of handling containers as part of the recovery process.
- The estimated contributions required vary by type of material and jurisdiction. The following contributions are examples of contributions required to be made by beverage manufacturers in NSW, QLD and WA. They are based on expected redemption rates and scheme costs rather than actual costs.

Contributions required by suppliers (excl GST)			
	NSW (from Feb 2020 – Jan 2021)	**QLD (from Nov 2018 to Jan 2021)**	**WA (from Oct 2020)**
Glass	14.80	11.9	11.84
PET	11.82	11.8	11.76
HDPE	7.40	11.9	11.85
Aluminium	13.25	11.2	11.39
Liquid paperboard	5.08	12.1	12.17
Steel	4.12		
Other plastics	5.57		
Other materials	10.44		12.17
Weighted average	*12.70*	*11.6*	*11.65*

Source: Container Exchange [21], Exchange for Change[22] and WA Return Recycle Renew Ltd [23]

- Upon consumption, a consumer may return the empty container to a collection point to receive their 10-cent refund amount.
- If kerbside recycling is available and a consumer chooses to dispose of the container that way, the MRF operators may collect a refund amount for the container if the container is appropriately recycled (in some jurisdictions). These amounts are often required to be shared with the local council where the containers are collected.[22]
- MRF operators can return the eligible containers through the scheme for a refund amount based on the exact number of individual containers collected and recycled, or by using the state determined factor to convert weight to number of containers, by material in some jurisdictions.[24] In SA and NT, MRF operators are limited to returning individual containers at collection points.
- The recyclable waste is baled or crushed by processors and sold to eligible recyclers. The not-for-profit scheme coordinators (in QLD and WA) reinvest the proceeds from such sales back into the scheme to offset future costs.[21]

[21] https://www.containerexchange.com.au/partners/
[22] https://www.exchangeforchange.com.au/suppliers/supplier-obligations.html
[23] https://warrrl.com.au/faqs/
[24] https://www.epa.nsw.gov.au/your-environment/recycling-and-reuse/return-and-earn/material-recovery-facility-operator

03

Economic impacts

3. Economic impacts

Container Deposit Schemes (CDS) are designed to change behaviour to meet objectives related to reducing the volume of beverage containers that end up in landfill or that are discarded in the environment. Together with other policies, this change in behaviour facilitates recycling.

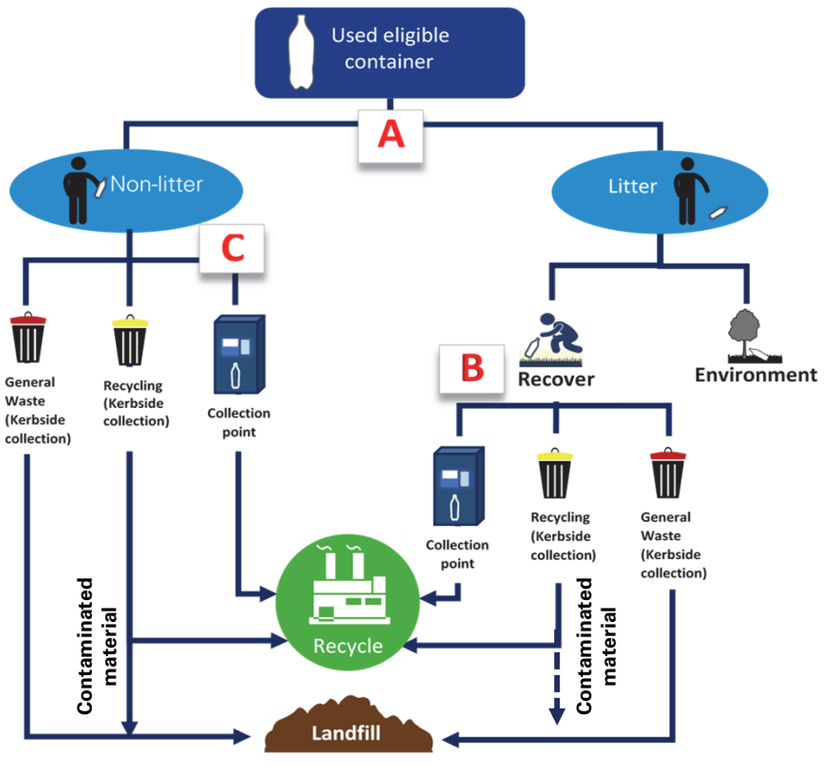
The refund amount provides a price signal to encourage behaviours that result in the return of more eligible containers to a designated collection point. In the first instance, this price signal operates to change the behaviour of the consumer who purchases the product in the eligible container and, if this fails, to change the behaviour of other persons/entities by encouraging them to collect discarded containers and return them to a designated collection point.

This section describes the decision-making points for individuals that are targeted by the CDS and the supply and demand framework from which it works. As a result of the costs associated with the goal of changing behaviour, trade-offs in the form of unavoidable market distortions are described. Whether these costs are worthwhile is still unclear even for the existing CDS, owing to a lack of relevant and robust data.

3.1. Price signals and decision points

The CDS work to reduce litter and increase recovery by **influencing behaviour** at key decision-making points. From Figure 4, the first decision point (**point A**) that is targeted occurs at the cross-roads of whether an individual chooses to litter or not. An individual would lean towards not discarding the empty beverage container on the ground, having pre-paid for the refund entitlement upon purchase of the beverage.

Figure 4: Decision points targeted by the CDS



In the second instance (point **B**), where litter is already present, the CDS influences behaviours of individuals who encounter the litter. Instead of leaving it, the refund entitlement on the empty beverage container incentivises individuals to return the littered eligible container for a refund amount.

With the empty container in hand, the choice (point **C**) of what to do with the container depends on the refund entitlement less the time and energy costs to return it to the nearest collection point. A net positive outcome would encourage the individual to return the container to the nearest collection point. With a financial incentive provided through the scheme, individuals and households that would normally recycle through kerbside recycling for environmental or societal reasons may be incentivised to divert eligible containers away from kerbside recycling into the CDS stream. As such, the introduction of the CDS will see some diversion of recycling from the usual kerbside recycling collection (or yellow bins) into the CDS stream. This could support product stewardship and circular economy goals, as the recycled materials are less contaminated relative to kerbside recycling and are able to be recycled into higher quality containers again. However, this benefit may not yet be reflected in the CDS objectives for that jurisdiction.

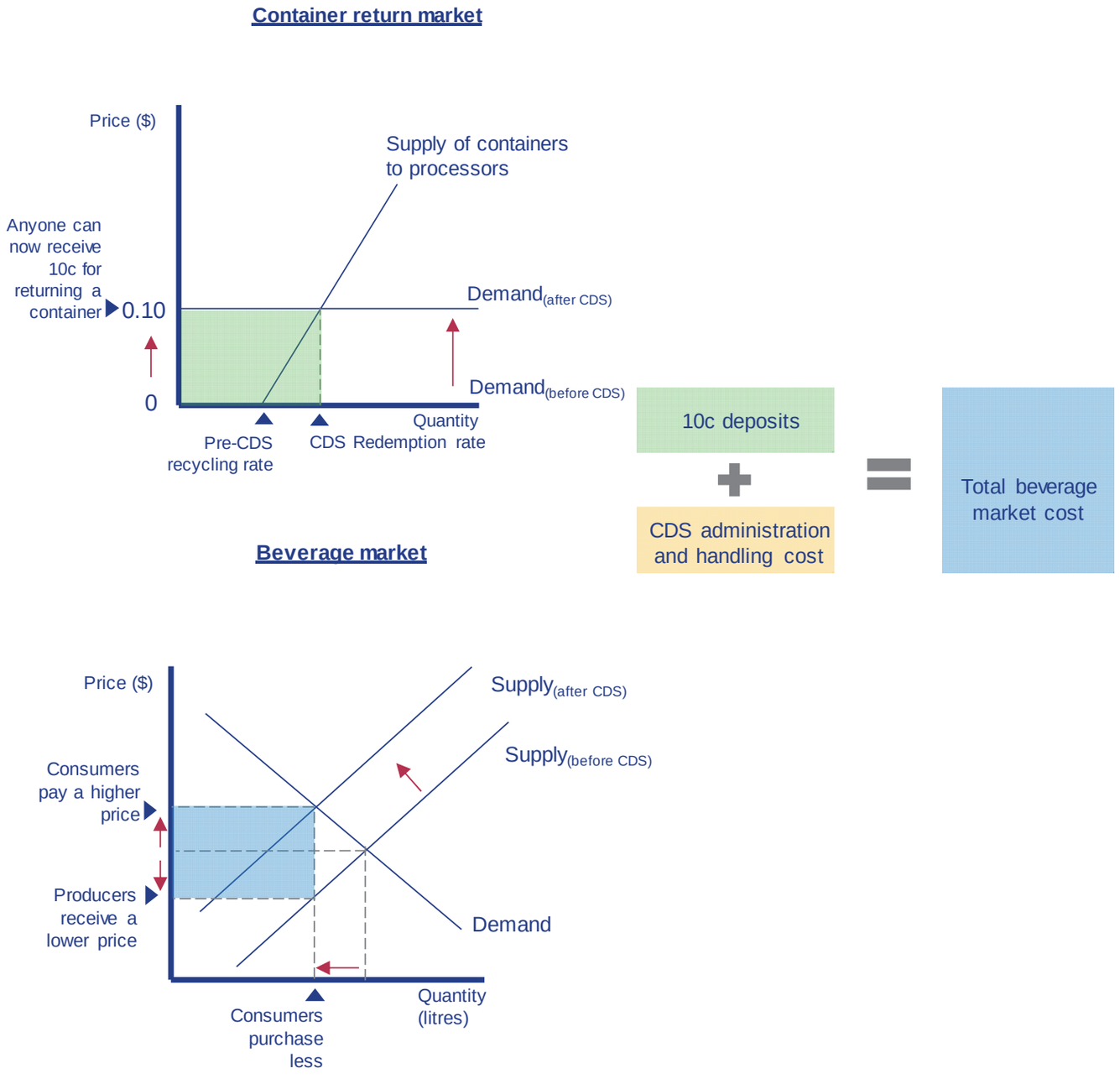
3.2. Supply and demand

To achieve the intended change in behaviour (that is central to the objectives of the CDS), a chain of other behavioural changes is necessary and/or inevitable. The costs of operating CDS (refund amount plus costs of collecting and delivering containers to recycling plants) could be met by a range of mechanisms that would have different behavioural consequences. Here we focus on the mechanism whereby the scheme costs are met by the producers of the products in the eligible containers. For these producers, the CDS impose an additional cost. The behavioural response of producers depends on market conditions.

The behaviour changing incentive utilises a combination of a "tax" and "subsidy" in two different markets, which will be described in this section. The introduction of the CDS affects both the beverage market and the container return market. It influences the number of beverages (and beverage containers) sold, as well as the number of beverage containers returned for recycling. This link is present because beverage manufacturers require a container in order to provide consumers with their product as part of the sale. Figure 5 illustrates the impact of the CDS on the beverage market and on the container return market.

CDS aim to influence behaviour through the use of price signals in the **container return market**. The refund amount that is applied to each eligible CDS beverage container at the point of beverage purchase effectively works as a subsidy. Beverage consumers fund this subsidy (see green box in Figure 5) whenever they purchase a beverage that is captured within the scope of CDS containers. The subsidy is withheld and only provided upon the return of the used container to collection points. If the container is not returned, the beverage consumer forfeits the right to this subsidy with the entitlement automatically transferred to any individual who returns that container to the collection points. The individual returning the container receives a payment of 10 cents for depositing each container while the recycling processor does not need to pay anything as the 10 cents is funded by the subsidy. The resulting redemption rate is determined by the intersection of the supply of beverage containers and the demand curve.

Figure 5: Impacts of the CDS on the beverage and container markets



The refund amount is not the only cost present in the scheme. Supplier (or, ultimately, the beverage manufacturer) contributions fund the cost of running the CDS which increases the supply price and reduces the quantity purchased and sold in the **beverage market**. The refund amount and cost of running the scheme works like a tax (blue box in Figure 5). The extent to which this burden is shared between the consumer and the beverage manufacturer depends on the relative responsiveness of the supply and demand to price changes. If demand is more sensitive (elastic) relative to supply, the greater the burden of the increased cost will fall on the supplier and vice versa. If suppliers are unable to pass on the cost to consumers, profit margins will be compressed, and the size of the beverage manufacturing industry will shrink as investment and operations contract to restore rates of return to levels dictated by global capital markets. This will induce job losses as well.

There are two links connecting the beverage market to the container return market. The first link is through the refund amount and cost of running the scheme. This amount is the total beverage market cost represented by the blue box in Figure 5 and increases the sale price for beverages captured within the scope of the CDS. The subsidy in the container return market is funded by the higher prices. The higher the refund/subsidy amount is, the higher the gap between consumer price and producer price will be.

The second connection between these two markets lies in the redemption rate because the container is used by the producer to provide their product, e.g. soft drink, juice, water or beer. The higher the redemption rate, the greater the cost per container to operate the scheme. For example, NSW estimated that a 50% redemption rate would cost 9.53 cents per container, while an 80% redemption rate would increase this to 14.92 cents (assuming no MRF collection, see Table 3 in Appendix). To the extent that suppliers (beverage manufacturers and wholesalers/retailers) are able to pass this cost on to the consumer, this increases the retail price for beverages through the tax and reduces the number of beverages in CDS eligible containers demanded.

3.3 Unavoidable market distortions

Achieving the desired change in behaviour comes at a cost. While the refund amount is set at 10 cents, the actual cost to beverage businesses can be significantly higher and will depend on scheme running costs and on redemption rates. The final cost burden of the CDS falls on consumers that purchase beverages (particularly those that have a large share of these in their consumption basket) and on businesses that manufacture and sell beverages.

Cost to producers

In considering the distortion to consumption behaviour, it is important to consider the extent to which any price increase induced by the CDS are seen by the consumer as a deposit that they pay at the point of sale and then collect at the point of disposal. For example, if the CDS resulted in the price of the beverage increasing by 10 cents and the consumer expects to receive 10 cents when they dispose of the container, then there may be no distortion to consumer behaviour. In reality, this is very unlikely to be the outcome for two important reasons.

- Firstly, it is not costless for the consumer to dispose of the container at a designated collection point. The ease and convenience with which a container can be returned to a designated collection point is likely to be very important to the decision that a consumer makes with regard to how they dispose of the container.
- Secondly, the expected cost to the producer of the CDS is higher than the 10-cent refund, so the price increase that the consumer confronts may be greater than the refund amount that they are eligible to receive (see next section for the average price increase found by IPART NSW and the Queensland Productivity Commission review as a result of the introduction of CDS in NSW and QLD).

> Except in special market conditions (which are unlikely to be prevalent in the beverages market), the costs of a CDS incurred by producers cannot be fully passed on to consumers. This means that producers operating in competitive markets will need to reduce the size of their operations to restore margins to rates dictated by global capital markets. This will invariably result in reducing workforce size and reducing investment in fixed assets. This industry contraction will also reduce the level of business taxes (such as corporate taxes and payroll taxes) that currently contribute to the Australian economy, and a decrease in the quantity of alcoholic beverages sold will also adversely affect excise tax revenue.

Cost to consumers

Under conventional economic assumptions, a business that is confronted with higher costs will attempt to pass these on to consumers to preserve their margin. This increases the price of the product to consumers. In response to the higher price, the behaviour of consumers is distorted by two effects that economists label the substitution and income effects.

- The substitution effect captures the distortion introduced by the increase in the price of the product (say beverages) relative to the price of all other goods and services in the consumer's basket. This relative price increase will tend to skew the consumption basket away from beverages and towards other products, including those using containers not covered by the CDS. At first blush, this distortion in the consumption basket might be seen as reasonable on environmental grounds but in reality, a perverse environmental outcome is likely.
- The income effect captures the impact that any price increase has on the household budget. Under conventional economic assumptions, an increase in the price of any product in the consumption basket results in a decrease in real income, with consumers tending to respond by reducing their consumption of all goods and services (that is, reducing the size of their "basket of goods").

> Thus, an increase in the price of beverages is expected to distort the behaviour of consumers by reducing their demand for beverages relative to other goods and services and by reducing their demand for all goods and services in their consumption basket.

Recovery of containers

In the preceding analysis, we have not considered in any detail the behaviours directly relevant to the number of eligible containers that end up in landfill or in the environment in the absence of a CDS. This is an important issue. In the absence of a CDS, not all containers end up being discarded in landfill or in the environment. This confirms that there are other important mechanisms, other than price, that drive decisions relating to how containers are discarded. Education campaigns and increased consciousness about the environmental consequences of different disposal methods, together with practical and convenient disposal options, such as yellow/kerbside recycling bins, have resulted in recovery and recycling of containers. An important question for policymakers to consider is how effective non-price drivers of container recovery can be and how these may be blunted by price signals. For example, people that previously discarded containers via yellow bins may be incentivised by a CDS to change behaviour and receive a payment for returning containers to designated collection points. This economic inefficiency is an inevitable by-product of a CDS.

> The higher the refund amount, the greater is the incentive to return containers through the CDS mechanism rather than the less costly kerbside recycling bin option. If community members cease using the recycling bin and transition to CDS collection points, the scheme costs will increase due to increased handling fees, yet there is no proof that total redemption rates will be significantly increased. Other options should therefore be explored, such as (the potentially more cost effective) improvement to optical sortation in MRF's.

These costs are a trade-off that cannot be avoided under the existing set up of the CDS to achieve its objectives.

3.4. Quantifying the market impacts

The discussion so far has determined that beverage prices will be higher for consumers as a result of the CDS. The magnitude of this price increase depends on market conditions. The extent to which beverage suppliers are able to pass on the costs to consumers depends on how responsive consumers are to price changes.

It is estimated that in Australia,[25] when prices increase by 1%, quantity demanded falls by:

- 0.9% overall for sugar-sweetened beverages;
- 0.6% for regular soft drinks;[26]
- 1.01% for low and no-sugar drinks;
- 1.2% for fruit juices; and
- 1.84% for bottled water.

Similarly, for alcohol[27] it is estimated that in developed economies such as Australia, when prices increase by 1%, quantity demanded falls by:

- approximately 0.6% for beer; and
- 0.9% for ready-to-drink alcoholic beverages.

The rest of this section presents some empirical figures to identify the costs passed on to consumers from the CDS and the resulting quantity and expenditure impacts. It also highlights that there is currently a distinct lack of data to provide a clear understanding of the trade-offs associated with the CDS at the current refund amount of 10 cents.

Price impacts

The NSW Independent Pricing and Regulatory Tribunal (IPART NSW)[27] and the Queensland Productivity Commission (QPC)[29] have conducted reviews of the impacts on price as a result of the introduction of the NSW and QLD CDS, respectively. Table 2 summarises some of the findings. It is important to note that these price impacts are captured following implementation of the scheme, and are expected to increase as schemes mature and redemption increases.

The price impacts on alcoholic versus non-alcoholic beverages are very different across the two states. On the one hand, non-alcoholic beverages saw twice the price increase as alcoholic beverages in NSW. On the other hand, there was a relatively similar increase in price across the two beverage categories in QLD. Although it should be noted that QPC caveat that there was a lack of data on alcoholic beverages to make robust conclusions in this sector.[30]

Table 2: Summary of estimated average retail price impacts of 10 cent CDS implementation in NSW and QLD

	Non-alcoholic beverages	Alcoholic beverages
NSW (Dec. 2017 to Nov. 2018)	10.1 cents	5.1 cents
QLD (Nov. 2018 to Oct. 2019)	9.0 cents	9.9 cents

Source: NSW independent regulatory and pricing tribunal (2018) and QPC Container Refund Scheme Price monitoring review (2020)

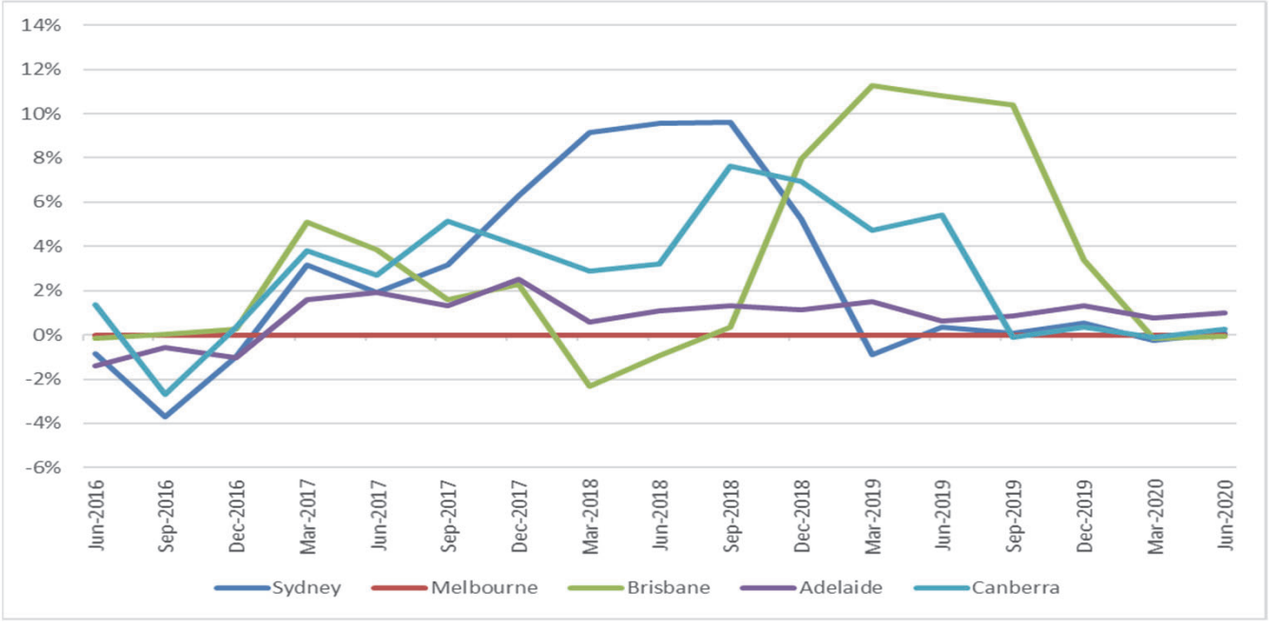
Note: These impacts are faced by consumers and differ from those charged to beverage suppliers.

The price increases are also captured to some extent in the CPI measures on non-alcoholic beverages for NSW and QLD. Figure 6 charts the change in the quarterly consumer price indices (CPI) related to the water, soft drink and juices segment for Sydney, Brisbane and Canberra anchored against the changes in Melbourne prices (which have no direct CDS impacts). This figure shows that the price of these beverages increased by an additional 8% to 10% (compared to the change in Melbourne prices) in the quarter following the introduction of their schemes. For reference, the CDS commenced in NSW on 1 December 2017,[30] in the ACT on 1 July 2018 and in QLD on 1 November 2018.[32]

[25] Sharma, A., Hauck, K., Hollingsworth, B. and Siciliani, L. "The effects of taxing sugar-sweetened beverages across different income groups". Health Economics 23.9, pp. 1159–1184.
[26] This includes standard soft drinks, mixers, sports drinks, energy drinks, still drinks and flavoured bottled water.
[27] https://blog.euromonitor.com/price-elasticities-in-alcoholic-drinks/
[28] Table 5.1 on page 32 of NSW independent regulatory and pricing tribunal (2018) NSW Container Deposit Scheme https://www.ipart.nsw.gov.au/files/sharedassets/website/shared-files/investigation-section-12-publications-container-deposit-scheme/final-report-nsw-container-deposit-scheme-monitoring-the-impacts-on-container-beverage-prices-and-competition-december-2018.pdf
[29] QPC Container Refund Scheme Price monitoring review (2020)
[30] Queensland Productivity Commission (QPC) Jan 2020, "Container Refund Scheme - Price monitoring review", page vii https://qpc.blob.core.windows.net/wordpress/2019/02/Container-Refund-Scheme-final-report.pdf
[31] https://returnandearn.org.au/about-return-and-earn/
[32] https://www.containerexchange.com.au/containers-for-change/

The impacts of the introduction of the CDS on the price of alcoholic beverages are not as clear in the equivalent CPI measures. The impact on CPI for beer in Sydney did increase after the introduction of the CDS in NSW relative to Melbourne, however this price impact is not observed in Brisbane after the introduction of the CDS in QLD. It is possible that there are other policies, such as excise tax policies at work that have confounded any price changes on alcoholic beverages as a result of the introduction of the CDS.

Figure 6: Consumer price index for waters, soft drinks and juices in Sydney, Brisbane, Adelaide and Canberra (year-over-year growth%) – anchored against Melbourne price changes



Source: Estimates based on ABS Cat No. 6401.0

Note: This price measure includes items that not eligible under the CDS such as juices above 1 litre, sports drinks that are registered health products and cordials

Quantity

The review by IPART NSW focused mainly on price changes as a result of the CDS and did not present any impacts on quantity. QPC estimated that non-alcoholic beverage sales were approximately 6.5% lower as a result of a 6.7% price increase after the introduction of the QLD CDS.

In other sources, Coca-Cola Amatil's (CCA) 2018 annual report states that there was a 3.4% volume decline in NSW after the introduction of the CDS compared to a 0.4% volume decline in other states for the year. In comparison, their 2019 annual report finds that the impact on volumes in QLD from the introduction of the CDS was relatively more muted; national volumes (including QLD) increased by 0.9% whereas national volumes (excluding QLD) increased by 1.5%, indicating QLD accounted for the shortfall of 0.6 percentage points in the growth rate as a result of the CDS introduction.

Expenditure

Based on the empirical estimates in preceding sections, the price of non-alcoholic beverages increased but the quantity consumed decreased. The QPC report finds that the fall in consumption was offset by the increase in price with a resulting increase in total expenditure on non-alcoholic beverages. An increase in total expenditure on beverages due to the CDS means that there is less household income to spend on other goods and services. Therefore, households are faced with both a decrease in beverage consumption and a decrease in consumption of other goods. QPC estimates that households spent 4.3% more on non-alcoholic beverages, with the impact on alcoholic beverages being unclear.

Overall, a significant limitation to assessing the extent to which the CDS has impacted the beverages market is the lack of relevant and robust data. This was also a challenge found by QPC. Their report cites that data limitations prevented the Commission from making any robust conclusions about the pricing of alcoholic beverages. The lack of data on decreases in quantity consumed of alcoholic beverages also poses a challenge to estimating the flow-through impact of the CDS on excise tax revenue.

04

Potential economic impacts of an increase in the refund amount

4. Potential economic impacts of an increase in the refund amount

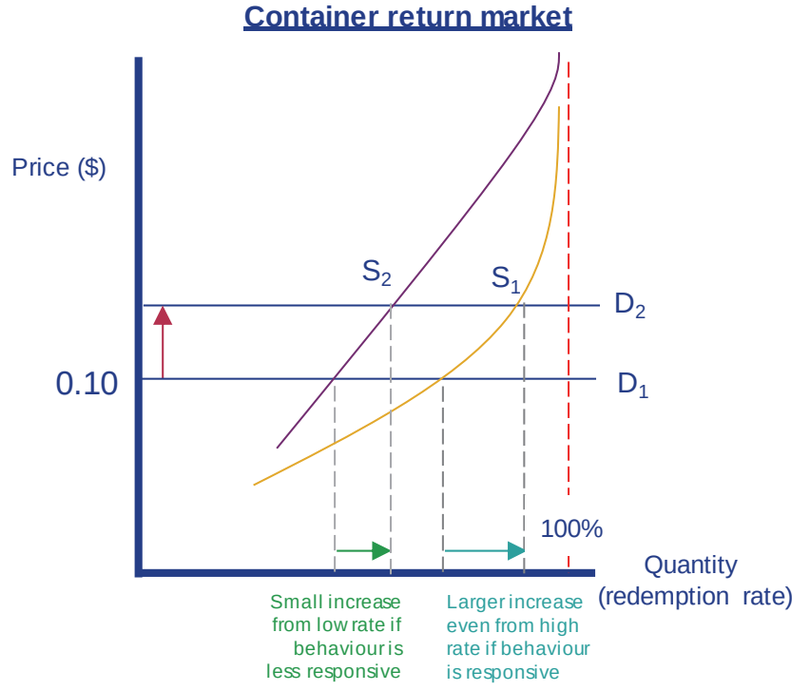
This section assesses the potential impacts of increasing the refund amount above 10 cents. The two key areas of impact are:

- The existing market distortions will be **exacerbated**; and
- It is **unclear** whether redemption and recycling rates will increase significantly.

The current market distortions created by the existing scheme would likely be **exacerbated if the refund amount were to be increased**. Unavoidable market distortions including higher prices for consumers, lower real incomes for households, and lower competitiveness and returns on investment for beverage industries (outlined in Section 3) will be further enhanced. Given the exact magnitude of these impacts under the 10-cent refund amount is not clearly understood, it is not possible to estimate the magnitude of the impact under a higher refund amount. However, it is clear that these distortions, or costs to the economy, would be larger.

The CDS redemption rate, if that was the objective, **is not guaranteed to increase significantly** as a result of increasing the refund amount. Figure 7 illustrates this point. With more responsive behaviour (Supply1), an increase in the refund amount raises container redemption rates significantly. However, if behaviour was less responsive (Supply2) then the increase would be marginal or even negligible.

Figure 7: Impact of increasing refund amount under different supply responses (consumer behaviour)

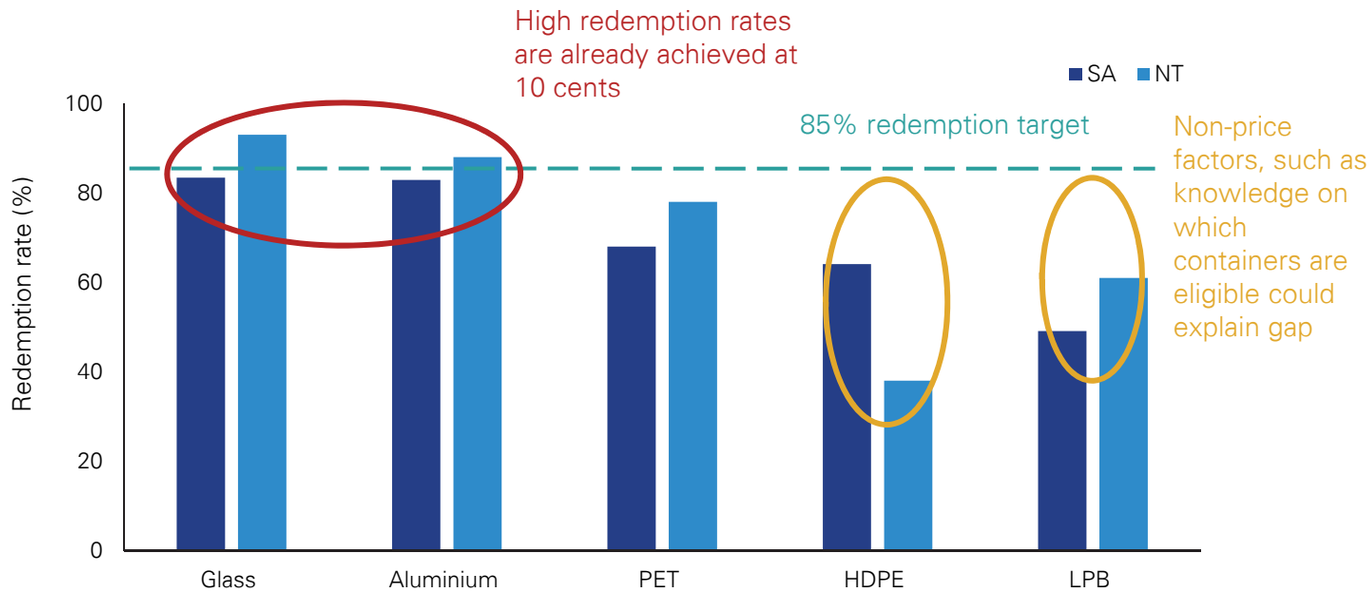


As it is not possible to get a full picture of how the existing schemes have impacted markets, it is unclear how a higher refund would increase redemption. Behaviour would be less responsive (as illustrated in S2) under the following scenarios.

- High redemption rates are achieved with the 10-cent refund (once schemes have matured). This is likely the case based on the initial redemption rates seen in Figure 1, coupled with surveyed households who responded that a 20-cent refund amount (as compared to the current 10-cent refund amount) would only increase participation by 2%.[33]
- There are barriers beyond price, such as collection points not conveniently located or insufficient awareness of the CDS.[34]
- Beverage containers were simply transferred from kerbside collection to container collection points, this would not change the overall redemption rate but would exponentially increase the cost to community.[35]
- There are barriers related to specific container types, such as consumers not being aware of which liquid paperboard containers are eligible.[36]

South Australia and Northern Territory, where the schemes have matured, demonstrate the barriers between container types. Glass and aluminium containers both have high redemption rates at around 85% (see Figure 8 below). For these containers, the 10-cent refund is adequate to achieve high recovery of containers. Containers such as liquid paperboard (LPB) and HDPE have lower redemption rates, and this is likely to be due to factors such as insufficient knowledge of which containers are eligible under legislation. For example, a 600ml iced coffee LPB container is acceptable, while a 1 litre LPB container of the same beverage is not.[37] Better education on these differences could be a more cost effective option to achieve higher overall redemption.

Figure 8: 2018-19 Container redemption rates by material in SA and NT



Sources: South Australia's Recycling Activity Survey Report 2017-18, Northern Territory EPA Environmental Protection Act annual report 2018-19.

Note: Redemption target of 85% has not been set by either NT or SA but is an indicative target based on QLD and WA. SA redemption rates exclude containers collected by MRFs and so potentially underestimate total redemption.

[33] A national survey of 3,432 households commissioned by the Australian Environment Protection and Heritage Council (EPHC) found that 84%of households would be willing to take containers to a recycling depot if a 10c refund was granted and that higher refund amounts of 20 cents and 50 cents would only increase redemption to 86% and 88% respectively. See page 42 of the EPHC report at http://www.nepc.gov.au/system/files/resources/0c513e54-d968-ac04-758b-3b7613af0d07/files/bevcon-rpt-pwc-wtp-packaging-final-report-201007-0.pdf

[34] https://s3-ap-southeast-2.amazonaws.com/assets.yoursay.sa.gov.au/production/2019/12/12/00/04/12/9b4d0781-1480-4653-9755-f34e4237a136/EPA%20Consultation%20Summary%20Report%20Final.pdf

[35] With the exception of South Australia as redemption rates exclude kerbside pickup.

[36] Liquid paperboard has consistently lower redemption rates than aluminium or glass across schemes.

[37] See page 12 of the South Australia EPA CDS 2019 review, accessible at https://www.epa.sa.gov.au/files/14132_cds_reference_group_powerpoint_presentation_15_february_2019.pdf

International CDS experience highlights that **redemption rates are influenced by other factors beyond refund value, such as cultural attitudes and other environmental policies on recycling**. While these comparisons are helpful in understanding the issues, it should be noted that the schemes and the measures quoted are not directly comparable with Australia.

Countries such Germany, Norway, Finland and the Netherlands have high container refund amounts (above 0.20 USD) and high reported redemption rates (see Figure 15 in the Appendix D), but this only offers a partial perspective on CDS operating in these jurisdictions. Other factors such as a strong set of environmental policies and established culture of recycling can drive higher redemption rates. Biases in the way that data is collected can also mean the redemption rates are not directly comparable to those in Australia.

05

Future pathways

5. Future pathways

The various CDS in Australia will evolve over time, along with other policies targeting environmental outcomes. A robust evidence base should be developed as the various CDS are rolled out across the country, so that any proposed changes to the schemes can be based on a better understanding of the costs and the benefits of the schemes. This evidence base will also be important when considering the benefits of increasing the consistency of the schemes across jurisdictions and adopting a national approach to the recovery and recycling of containers. Implicit in this consideration is the benefit of having objectives for the schemes that are clear and well-understood and consistent with the objectives of other related policies, such as recycling. This type of clarity and consistency of objectives is necessary if the costs of achieving environmental objectives are to be minimised.

The figure below outlines a framework that can guide how the CDS can evolve to align with other environmental policies and meet objectives without imposing unnecessary costs on businesses and consumers.

Figure 9: Framework for evolving the CDS

Allow the current CDS to mature

Most CDS in Australia are less than 3 years old or yet to begin. Before any further changes are proposed, the schemes need to be allowed to mature. As consumers learn about the scheme and have time to adjust their behaviour, and the scheme operators address emerging gaps or issues, we could expect to see redemption rates increase (as shown earlier in Figure 1).

Establish clear, nationally consistent, measurable goals for CDS

The CDS have already indicated a level of success, albeit unmeasurable in the absence of any existing scheme indicators. Clear and measurable goals need to be established and aligned to wider waste management targets. For example, states and territories should know the scheme redemption rate required, amongst other waste policies, to meet the national target of an 80% average resource recovery rate from all waste streams by 2030.

This coordination of CDS goals and alignment to wider strategies is demonstrated in the EU, where a common target of 65% recycling of municipal waste by 2035 has been set, along with common supporting targets, for example on plastic bottles. Member states are designing their CDS with clear objectives in mind and a clear understanding of their role in meeting wider environmental goals.[38]

Scheme goals may also need to evolve beyond litter reduction and become more aligned with broader waste strategies and targets. For example, the Australian Government has endorsed the APCO led voluntary industry targets for packaging to contain an average of 50% recycled content by 2025.[39] Schemes should be designed with these targets in mind to meet more sophisticated objectives of greater product stewardship and creating a circular economy. To achieve such objectives, local reprocessing capacity bottlenecks, as reported in the 2018 review of Australia's municipal recycling infrastructure capacity, need to be addressed to increase the amount of PET, HDPE and glass that can be recycled into new bottles to support a circular economy.[40] Co-ordination of policies is critical to ensure that schemes such as CDS do not work in isolation but complement other policies and meet changes in societal concerns about the environment.

Data collection and monitoring

Better data collection is needed to both measure performance against goals and to understand the full extent of unavoidable market distortions. This lack of data has been reported by multiple sources,[41] and data that is available is difficult to compare across jurisdictions.[42]

Examples of data required include:

- Redemption rates by container type/material, collection method (deposit site or MRF), on a comparable basis across states.[43] Glass and aluminium are currently achieving high return rates, and collecting better data by product type could help identify the real issue causing other materials to have lower return rates.
- Both the numerator and denominator of redemption rates to know how much is driven by deposit behaviour or whether changes in consumption influence redemption.
- Recycle rates and litter rates for beverage containers that are current and on a comparable basis across states.[44]
- Breakdown of container redemption by collection type (automated, over-the-counter, reverse vending machines) and depositor behaviour (frequency of deposit site visit such as weekly, monthly or longer) on a comparable basis across states.
- Price and quantity data on beverages, on a comparable basis across states and with estimates of cross-border flows, where possible.

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[38] An interim target of 77% by 2025 has also been set, see the EU First Circular Economy Action Plan, accessible at https://ec.europa.eu/environment/circular-economy/first_circular_economy_action_plan.html

[39] See the APCO Sustainable packaging guidelines at https://www.packagingcovenant.org.au/documents/item/1091

[40] See page 26 of The Department of Environment and Energy's Analysis of Australia's municipal recycling infrastructure capacity, accessible at https://www.environment.gov.au/system/files/resources/f0196d2e-9040-4547-8cb6-8b433923b53d/files/waste-stocktake-report.pdf

[41] Queensland Productivity Commission reported being unable to quantify price and volume impacts on the alcoholic beverage market. The ACT independent competition and regulatory commission reported limited options to assess price impacts due to data.

[42] For example, terminology varies between states, and SA does not include MRF collection meaning that state comparisons cannot be made on a like for like basis

[43] For example, South Australia only includes containers deposited at collection points and not those collected via kerbside unless they are then taken to a deposit site. This masks what diversion may have occurred when increasing the refund amount from 5 cents to 10 cents in 2008.

[44] For example Return-It in Canada report this, see page 10 of their annual report at https://www.return-it.ca/ar2019/pdf/Encorp_AR2019_AnnualReport.pdf

Consider the full suite of policy levers

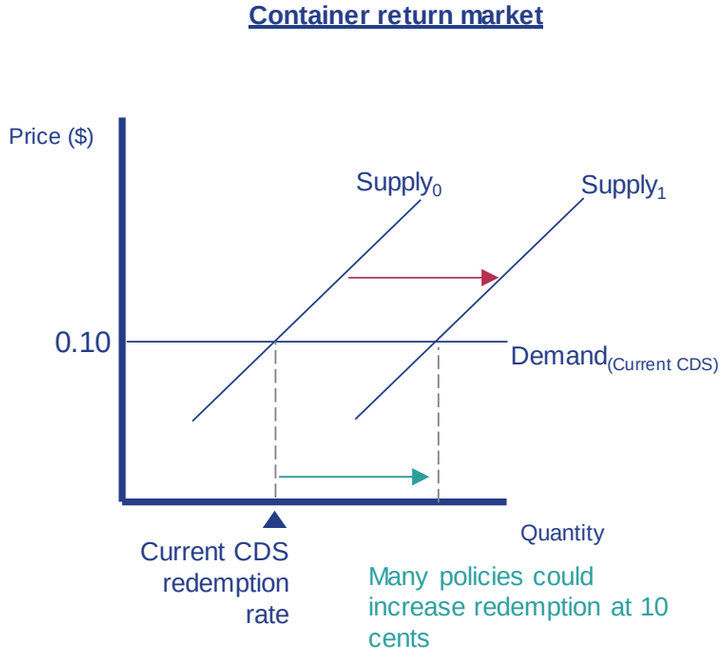
There are many policy levers that could be considered. However, before considering any of these, it is critical to first:

- Have clear, measurable targets to understand what a policy lever is trying to achieve;
- Collect sufficient data to measure both progress against targets and to understand the unavoidable market impacts of the current CDS; and
- Consider all policy levers to identify which ones could best achieve targets while minimising the unavoidable costs.

Of the policy options available, an increase in the refund amount is likely to be the most distortive and costly to the economy in terms of loss of consumer and producer surplus. In gross terms, a 10 cent increase in the refund amount could cost those consumers of products in eligible containers up to $1 billion in higher prices. Excise taxes could also be lower for government and may create an additional distortion if another tax is increased to make up the lost revenue. If a 10 cent increase raises beer prices by 2%, then excise revenue of around $30m would be lost to government. Other policies could achieve similar results at lower cost, for example an awareness campaign could cost around $35 million.[45]

Many policies could increase the redemption rate of CDS. Figure 10 demonstrates how a policy such as improving scheme awareness or increasing the number of deposit sites would increase the current supply of returned containers ($Supply_0$ to $Supply_1$) while maintaining the current refund amount. This could be achieved at a lower economic cost, but this cannot yet be determined with confidence given the limited data available and levels of maturity among CDS in Australia.

Figure 10: Potential impact of improved CDS public awareness or convenience of drop-off sites



[45] Increasing the refund amount by 10 cents would add approximately $1 billion to the cost to consumers based on 11.7 billion beverage containers being sold in Australia in 2018-19 and assuming an 85 redemption rate. Lost beer excise of $30m is based on federal beer excise revenue of $2.5bn in 2018-19, a 2% price increase as reported by IPART on promotion beer prices after CDS and 0.6% drop in consumption as reported in literature. According to the COEX annual report Queensland spent $3.3m on marketing and communications in 2019, so a $35 million national campaign could be considered an effective amount.

06

Conclusion

6. Conclusion

This report has analysed the economic impacts of CDS in Australia. The mechanisms of the CDS, when working as intended, have complex economic impacts.

Some of these impacts are intended and central to the fundamental objectives of the schemes in recovering recyclable containers. Other economic impacts are unavoidable by-products of achieving the central goal.

Despite their immaturity and lack of consistency, the Australian CDS appear capable of achieving high redemption rates. Whether these redemption rates could be achieved at lower cost remains an open question.

This report also suggests that caution is warranted in considering any increase in the refund amount. The broader economic costs of doing this are not well understood and the benefits may be marginal, especially as the specific objectives of the schemes are not clear.

Alternative policy levers may provide a better benefit-cost trade-off in achieving the desired objectives. Changes should not be made to CDS refund amounts until there is more clarity on their objectives and until the implemented and soon-to-be introduced CDS in Australia have had a chance to mature, and data has been collected to properly understand both the extent of the unavoidable costs under existing settings and if goals can be achieved with smaller costs using alternative policy levers.

Appendix

Appendix A - CDS details

This appendix summarises details about CDS across Australian jurisdictions and eligible containers.

CDS objectives

South Australia

Source: https://www.epa.sa.gov.au/environmental_info/waste_management/container_deposit

"South Australia introduced its container deposit legislation (CDL) in 1977, and in 2017 celebrated its 40th anniversary. Our container deposit scheme continues to be a highly successful product stewardship program for litter reduction and resource recovery.

The container deposit scheme is one of the first pieces of environmental legislation to focus on the 'polluter pays' principle, meaning that the person who discards an empty container forfeits the right to the refund, and someone else can benefit by picking it up and collecting that refund.

It is also one of the first pieces of 'product stewardship' legislation in which industry is obliged to take greater responsibility for its packaging after it has been sold. In the case of a CDS, beverage suppliers must ensure that a system is in place for the recovery and recycling of their empty beverage containers."

Northern Territory

Source: https://ntepa.nt.gov.au/__data/assets/pdf_file/0011/590798/cds_review_report_ernst_young.pdf

"The Northern Territory's Container Deposit Scheme (NT CDS, CDS or the scheme) was established under the Environment Protection (Beverage Containers and Plastic Bags) Act (the Act), and commenced 3 January 2012 – with the key objectives as stated in sections 3(a)(i) and (ii) of the Act to minimise environmental pollution by establishing a container deposit scheme to:

- Reduce beverage container waste by providing communities throughout the whole of the Territory, as far as practicable, with access to facilities for the collection of empty containers and the payment of refund amounts, and
- Increase resource recovery, reuse and recycling."

Queensland

Source: https://www.qld.gov.au/environment/pollution/management/waste/recovery/reduction/container-refund/container-refund-about

"The introduction of the state-wide container refund scheme, Containers for Change, gives people an incentive to collect and return containers for recycling, in exchange for a 10 cent refund payment. This will help to:

- reduce the amount of drink containers that are littered and,
- increase Queensland's recycling rate.

The scheme also provides benefits to social enterprises, communities, and regional and remote areas by creating new job, recycling and fundraising opportunities."

NSW

Source: https://www.epa.nsw.gov.au/your-environment/recycling-and-reuse/return-and-earn/why-return-and-earn

"The NSW Government has introduced Return and Earn to reduce drink container litter.

Aspects covered include: environmental impacts, impacts on human health (litter), loss of easily recyclable and valuable resources; and economic impacts of litter"

"In September 2015, the NSW Government committed to reducing the volume of litter in NSW by 40% by 2020."

ACT

Source: https://www.cityservices.act.gov.au/?a=1132601

"The industry-funded Scheme encourages recycling within the Canberra community and aims to reduce litter and waste to landfill."

Western Australia

Source 1: https://dwer.wa.gov.au/cds

"The scheme aims to:

- increase recovery and recycling of empty beverage containers;
- reduce the number of empty beverage containers that are disposed of as litter or to landfill;
- ensure that first responsible suppliers of beverage products take product stewardship responsibility;
- provide opportunities for social enterprise and benefits for community organisations;
- create opportunities for employment; and
- complement existing collection and recycling activities for recyclable waste."

Source 2: https://www.mediastatements.wa.gov.au/Pages/McGowan/2019/12/Regulations-pave-way-for-Container-Deposit-Scheme-in-June-2020.aspx

"The scheme will help create around 500 jobs across the State, and support employment of people with disability and the long-term unemployed." This is likely due to the Minister of Environment also being the Minister for Disability Services."

Tasmania

Source: http://www.premier.tas.gov.au/releases/container_refund_scheme_for_tasmania#:~:text=The%20Tasmanian%20Government%20will%20implement,help%20maintain%20the%20Tasmanian%20brand.

"Drink containers currently account for around 41 per cent of litter by volume in Tasmania, and we know one of the most effective ways to change littering behaviours is to introduce a container refund scheme as has been seen in other Australian jurisdictions."

…

"The Scheme will encourage positive, incentivised recycling and re-use behaviours, that will help reach our target of becoming the tidiest state by 2023.

Another benefit of a CRS is the ability to produce purer streams of recyclable materials, which are then turned into higher value, second life products with reduced levels of contamination - a move strongly supported by local government with enormous opportunities for local businesses."

Victoria

Source: https://www.vic.gov.au/container-deposit-scheme

"By 2022–23 Victoria will have a container deposit scheme that will work alongside the new household waste collection system and make recycling easier outside the home.

The scheme will:

- see more plastic, aluminium and glass containers recycled into new products
- reduce litter – saving councils millions in clean-up costs and protecting the environment – with drink container litter expected to halve in Victoria by 2030
- create new jobs in the recycling sector
- make producers more responsible for the end stage of their products"

Eligible containers

The eligibility criteria of material and size are broadly consistent across jurisdictions. Only polyethylene terephthalate (PET), high-density polyethylene (HDPE), glass, aluminium, steel and liquid paperboard (cartons) drink containers between 150ml and 3L are eligible, except for South Australia, that does not have a stipulated minimum container volume.

As the focus of the CDS was initially on reducing litter, the scope of eligible containers has been on beverages that are typically consumed outside the home. As such, containers excluded from the scheme are largely based on container types that would not normally be found in roadside litter.

Containers that are not included in the CDS and, therefore, do not qualify for a refund are:

- plain milk or milk substitute containers
- flavoured milk containers of 1 litre or more
- pure fruit or vegetable juice containers of 1 litre or more
- glass containers for wine and spirits
- casks (plastic bladders in boxes) for wine and casks for water of 1 litre or more
- sachets for wine of 250 millilitres or more
- containers for cordials, or concentrated fruit and vegetable juices;
- registered health tonics.

Eligible beverage containers are intended to be returned in the jurisdiction that they were purchased.

Appendix B - Waste and Recycling targets

This appendix notes some of the waste and recycling targets across Australia and some supporting data in progress towards these.

The National Waste Action Policy 2019 has a goal of, among others, attaining an 80% resource recovery rate from all waste streams and significantly increasing the use of recycled content by government and industry.[46] For reference, the different waste and recycling targets for each state according to legislation are presented in the table below.[47]

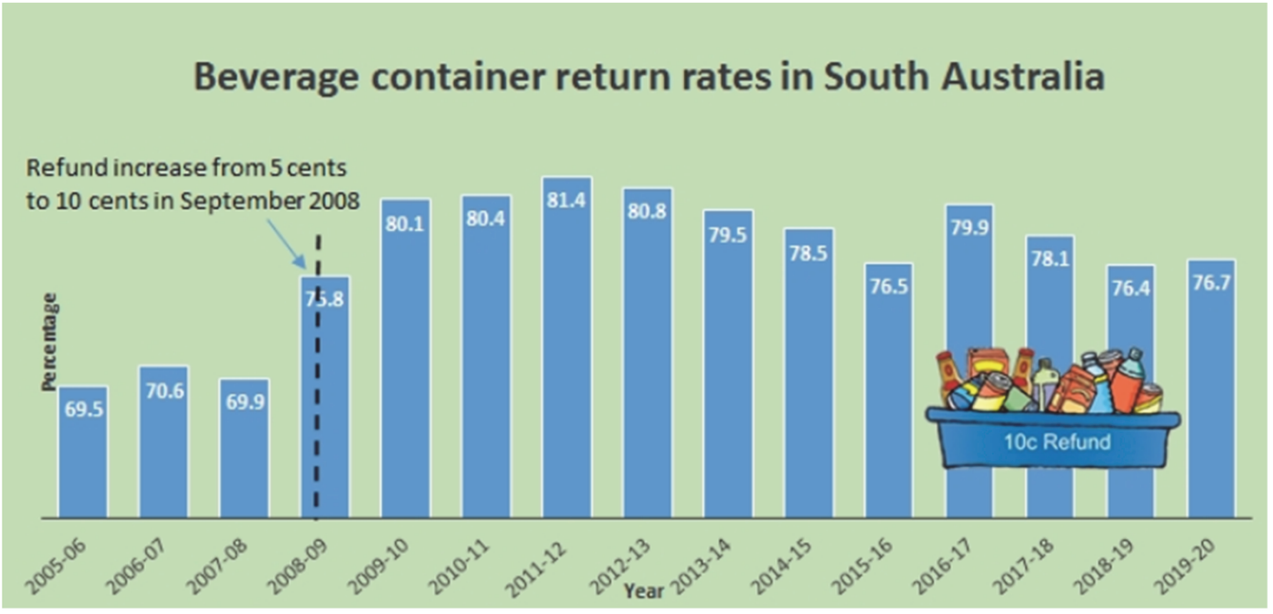
State	Legislation	Details	Redemption rate target specified
ACT	Waste Management Strategy 2011–25	• Cap growth in waste generation at population growth rate • Rate of resource recovery be more than 90% by 2025	None stated
NSW	Waste Avoidance and Resource Recovery Strategy 2014-21	• Increase recycling rates to 70% for municipal solid waste, commercial and industrial waste • Increase recycling rates to 80% for construction and demolition waste • Increase waste diverted from landfill to 75% by 2021-22 • By 2016–17, reduce the number of litter items by 40% and then continue to reduce litter items to 2021–22	None stated
NT	Waste Management Strategy for the Northern territory 2015-22	• No specific targets	None stated
QLD	Waste Management and Resource Recovery Strategy	• 75% recycling rates across all waste types by 2050 • 25% reduction in household waste by 2050 • 90% of waste is recovered and does not go to landfill by 2050	85% by 2022
SA	Waste Strategy 2015-2020	• 35% reduction in landfill disposal by 2020 • 5% reduction in waste generation per capita by 2020 • Maximise diversion to the extent practically and economically achievable in non-metropolitan areas • For metropolitan areas: • 70% landfill diversion for municipal solid waste by 2020 • 80% landfill diversion for commercial and industrial waste by 2020 • 90% landfill diversion for construction and demolition waste by 2020	None stated
WA	Waste Avoidance and Resource Recovery Strategy 2014-21	• 20% reduction in waste generation per capita by 2030 • Increase material recovery to 75% by 2030 • Recover energy only from residual waste from 2020 • No more than 15% of waste generated in Perth and Peel regions in landfill by 2030	85% by 2022

Source: National Waste Policy Action (2019) https://www.environment.gov.au/system/files/resources/5b86c9f8-074e-4d66-ab11-08bbc69da240/files/national-waste-policy-action-plan-2019.pdf

[46] National Waste Policy Action (2019) https://www.environment.gov.au/system/files/resources/5b86c9f8-074e-4d66-ab11-08bbc69da240/files/national-waste-policy-action-plan-2019.pdf

[47] See Appendix B of the National Waste Policy Action (2019) https://www.environment.gov.au/system/files/resources/5b86c9f8-074e-4d66-ab11-08bbc69da240/files/national-waste-policy-action-plan-2019.pdf

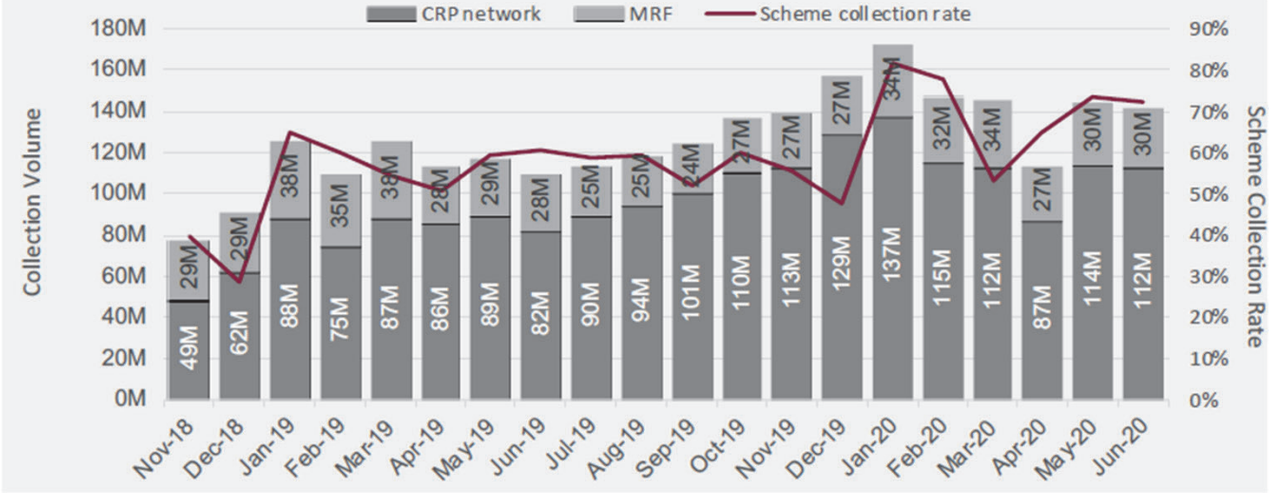
Figure 11: South Australia CDS container redemption rate



Note: These redemption rates are based on the CDS channel only and do not reflect any kerbside collection recycling. SA's scheme differs from CDS in other jurisdictions as they do not have an arrangement with MRFs. If MRF collections were included then redemption could be higher.

Source: https://www.epa.sa.gov.au/environmental_info/waste_management/container_deposit#return

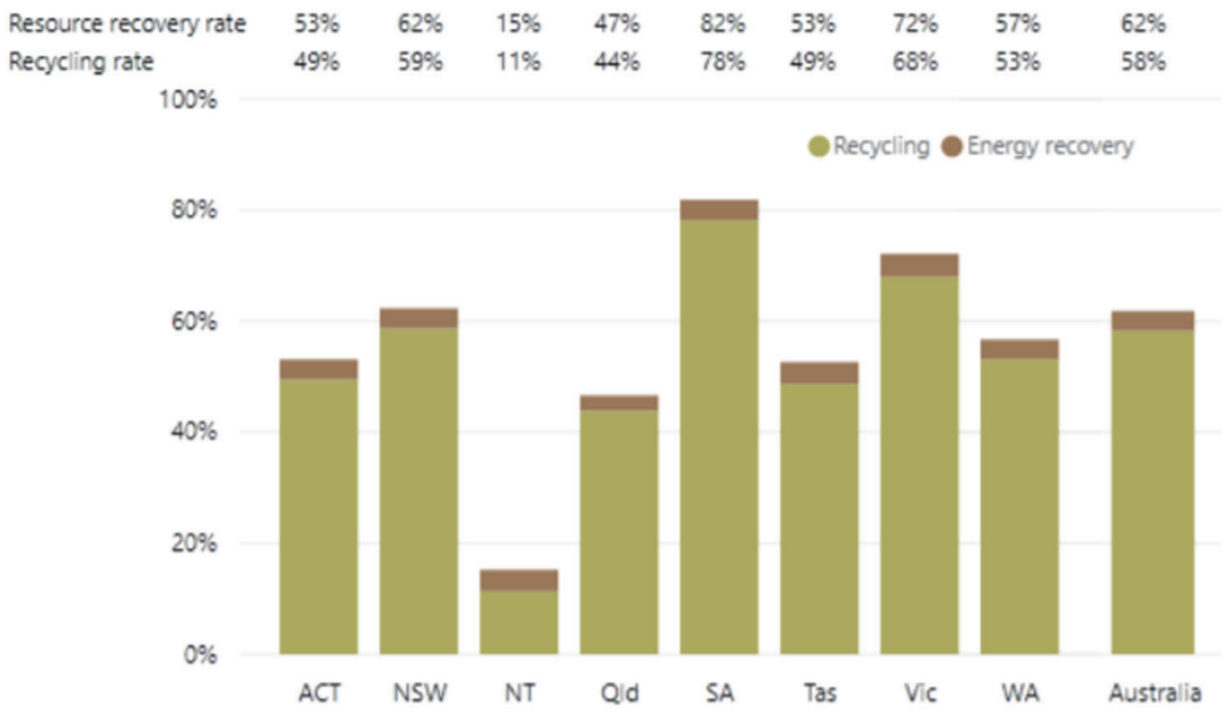
Figure 12: Queensland CDS container redemption rate



Note: Jan 2020 to June 2020 MRF volumes are forecast volumes as MRF audits are done on a quarterly basis in arrears.

Source: https://www.containerexchange.com.au/wp-content/uploads/2020/08/COEX-Website_Monthly-Dashboard_V4.pdf

Figure 13: Recycling and resource recovery rates across Australia in 2016-17



Source: National Waste Report 2018 https://www.environment.gov.au/system/files/resources/7381c1de-31d0-429b-912c-91a6dbc83af7/files/national-waste-report-2018.pdf

Figure 14: Resource recovery rate of core waste by jurisdiction from 2006-07 to 2016-17

Jurisdiction	2007	2009	2010	2011	2014	2015	2016	2017	CAGR
ACT	76%	77%	78%	76%	78%	74%	72%	53%	-3.5%
NSW	62%	60%	65%	65%	63%	66%	64%	62%	0.0%
NT	12%	19%	19%	17%	14%	22%	20%	15%	2.3%
Qld	48%	46%	44%	50%	47%	47%	48%	47%	-0.2%
SA	79%	80%	81%	82%	80%	83%	82%	82%	0.4%
Tas	40%	46%	48%	46%	50%	48%	53%	53%	2.9%
Vic	58%	61%	64%	65%	70%	70%	73%	72%	2.2%
WA	35%	35%	32%	41%	54%	48%	53%	57%	5.0%
Australia	55%	56%	57%	60%	61%	62%	63%	62%	1.2%

Source: National Waste Report 2018 https://www.environment.gov.au/system/files/resources/7381c1de-31d0-429b-912c-91a6dbc83af7/files/national-waste-report-2018.pdf

Appendix C - Scheme costs

Table 4 illustrates how the cost of the NSW scheme per glass container is estimated to change according to redemption rates and the share collected via kerbside or materials recovery facilities (MRFs). For example, if the redemption rate is 70% and 50% of this is collected via kerbside, then the cost per container is 10.01 cents per container sold.

As the redemption rate increases, the cost per container sold increases as these additional container deposits need to be paid. This effectively means that the more "successful" the scheme is (in terms of increased redemption rates), the more costly it is. Further, if an increase in returns is largely through a diversion from kerbside collection, this makes the scheme even more costly.

As the share of kerbside collection decreases, the cost per container sold increases as MRFs only received 10 cents and not the additional handling fee.

Table 4: NSW estimated cost of scheme per glass container by recovery rate and kerbside collection

	Total Redemption rate as a % of all containers supplied										
% of containers recovered via kerbside	**0%**	**10%**	**20%**	**30%**	**40%**	**50%**	**60%**	**70%**	**80%**	**90%**	**100%**
0%	0.53	2.33	4.13	5.93	7.73	9.53	11.33	13.14	14.94	16.74	18.54
10%	0.53	2.24	3.95	5.66	7.37	9.08	10.79	12.50	14.21	15.92	17.63
20%	0.53	2.15	3.77	5.40	7.02	8.64	10.26	11.89	13.51	15.13	16.76
30%	0.53	2.06	3.59	5.13	6.66	8.19	9.73	11.26	12.79	14.33	15.86
40%	0.53	1.97	3.42	4.86	6.30	7.75	9.19	10.64	12.08	13.52	14.97
50%	0.53	1.88	3.24	4.59	5.95	7.30	8.66	10.01	11.37	12.72	14.08
60%	0.53	1.79	3.06	4.33	5.59	6.86	8.12	9.39	10.66	11.92	13.19
70%	0.53	1.71	2.88	4.06	5.24	6.41	7.59	8.77	9.94	11.12	12.30
80%	0.53	1.62	2.70	3.79	4.88	5.97	7.05	8.14	9.23	10.31	11.40
90%	0.53	1.53	2.53	3.52	4.52	5.52	6.52	7.52	8.51	9.51	10.51
100%	0.53	1.44	2.35	3.26	4.17	5.08	5.98	6.89	7.80	8.71	9.62

Source: NSW Return and Earn scheme cost estimates[48]

Note: these costs are estimates created prior to scheme implementation and are subject to change. Data shown is for glass containers; other container types attract similar costs, see source for full list

[48] See page 11 at https://returnandearn.org.au/wp-content/uploads/2018/05/ReturnandEarn_SchemeCosts.pdf

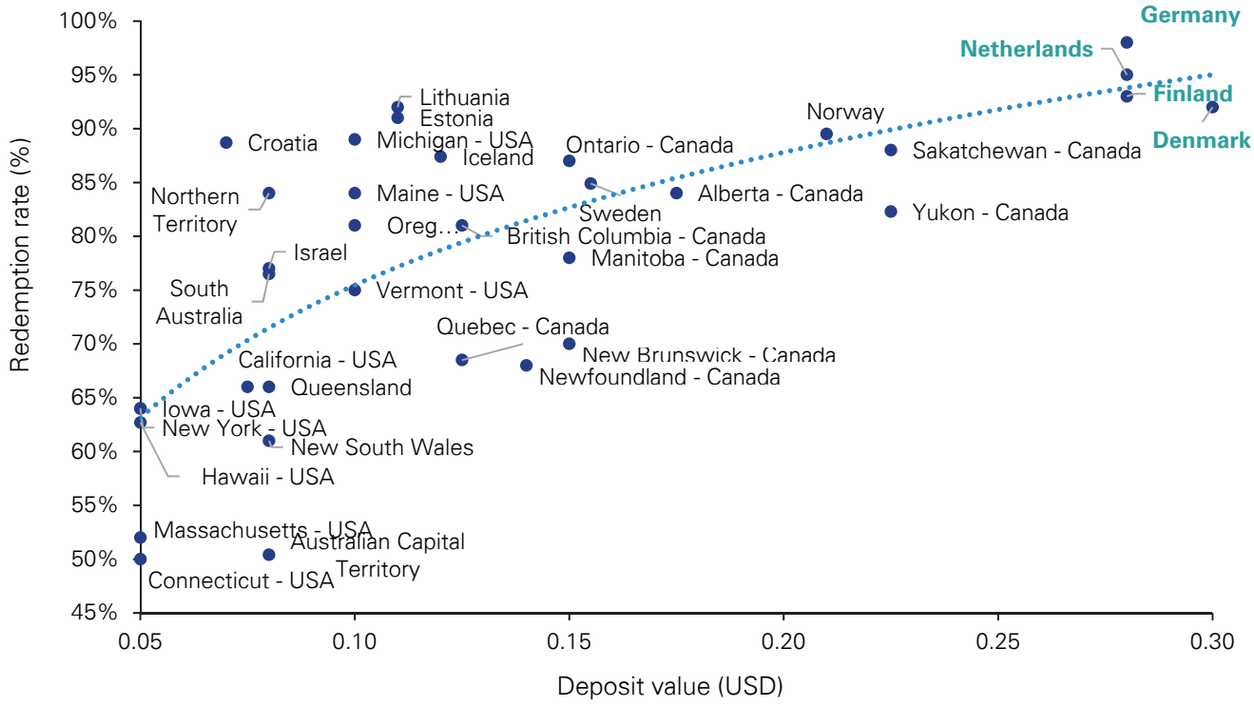
Appendix D – Global Container Deposit Schemes

This appendix reports some of the experience of CDS globally, including redemption rates, refund values, promotion strategies and also broader waste recovery trends.

Countries such as Germany, Finland, Denmark and the Netherlands have high reported redemption rates (see Figure 15 below). However, care has to be taken with comparisons, as reporting standards vary across countries and in some cases statistics may be inflated through cross border flows (where beverages sold in one jurisdiction are redeemed in a different jurisdiction boosting redemption numbers as a share of sales).

As noted in the body of the report, there are a number of key drivers of redemption rates – such as cultural attitudes, refund amounts, access to collection points and other environmental policies on recycling. The importance of all of these drivers is demonstrated in the following pages.

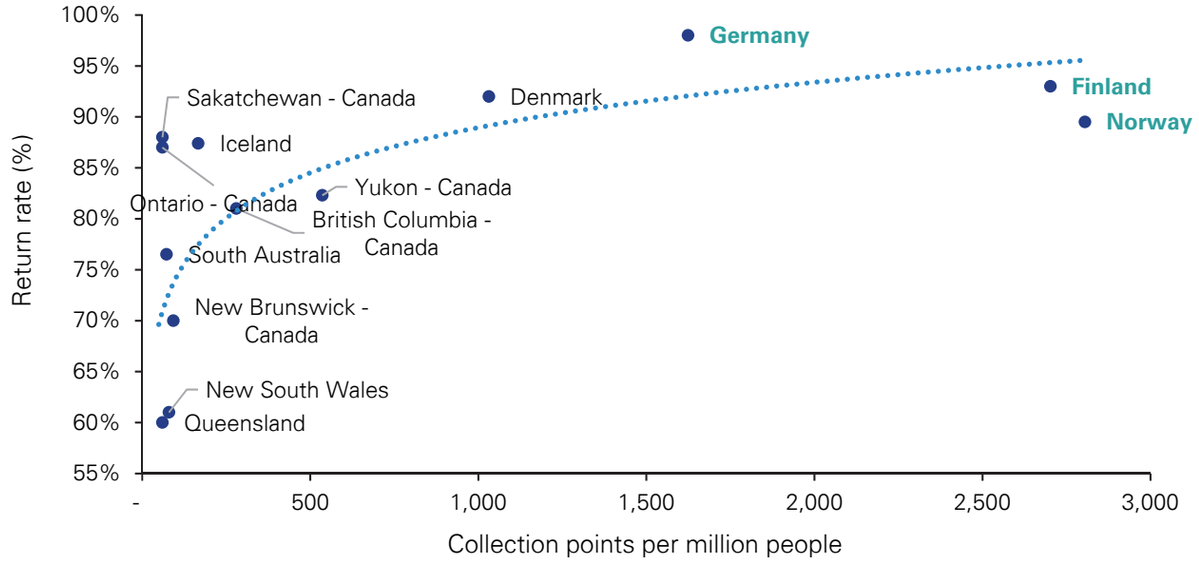
Figure 15: Relationship between deposit value and CDS redemption rate



Source: Zhou et. all (2020), based on various sources.

Note: Data on redemption rates vary across jurisdictions and should be interpreted with caution. For countries with variable deposit rates a simple average between the minimum and maximum value is taken. Note that the relative maturity of schemes is not considered. Industry sources indicate that redemption rates can include containers that pass through conventional waste recovery into waste-for-energy, and not through CDS collection points. Europe is also noted to potentially have cross border flows where beverages sold in other jurisdiction are redeemed, inflating the correct redemption rate.

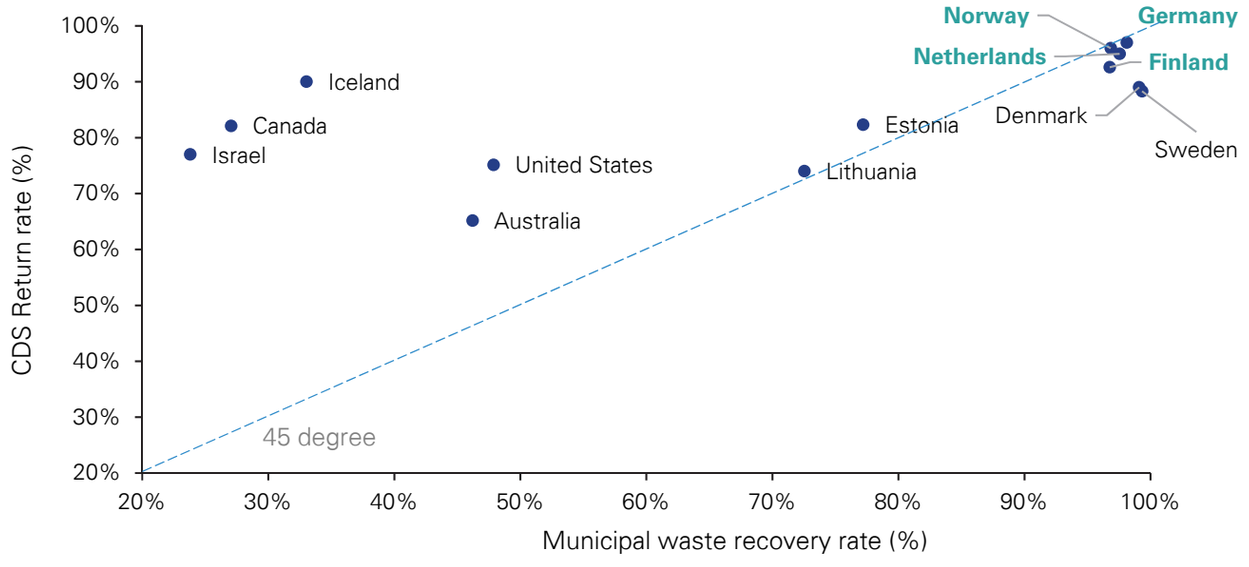
Figure 16: Relationship between CDS collection points per million people and CDS redemption rate



Source: Zhou et. all (2020), supplemented with additional sources.

Note: Data on redemption rates vary across jurisdictions and should be interpreted with caution. Only countries with data on number of collection points have been included.

Figure 17: Relationship between municipal waste recovery rate and CDS redemption rate



Source: CDS redemption rates from Zhou et. all (2020), based on various sources. Municipal waste recovery rates from OECD.stat.

Note: Municipal waste recovery includes wastes from households, small businesses, schools and similar institutions (construction waste is exempt) that have been recovered through either recycling, energy recovery (e.g. as fuel), biological recovery (e.g. composting) and re-use. Australia, United States and Canada CDS redemption rates are a population-weighted average of jurisdictional redemption rates.

CDS are generally more effective when the public are educated about them. Consumers need to know that the scheme exists, where their nearest collection point is, what containers are eligible, and what the benefits of participating are. Table 5 shows some examples of scheme branding used to educate the public. Globally there are some good examples, such as in Sweden where Returnpack who operate the CDS launched a campaign in early 2000s with catchy parodies of famous songs encouraging citizens to "panta mera".[50] Another strong example is in Michigan, USA, where the Recycling Raccoon Squad campaign educates children and the broader public on how to recycle.[51] These campaigns raise public awareness and can appeal to both the monetary incentive of the CDS and the environmental awareness (see table below for more examples).

Table 5: Examples of scheme branding across jurisdictions

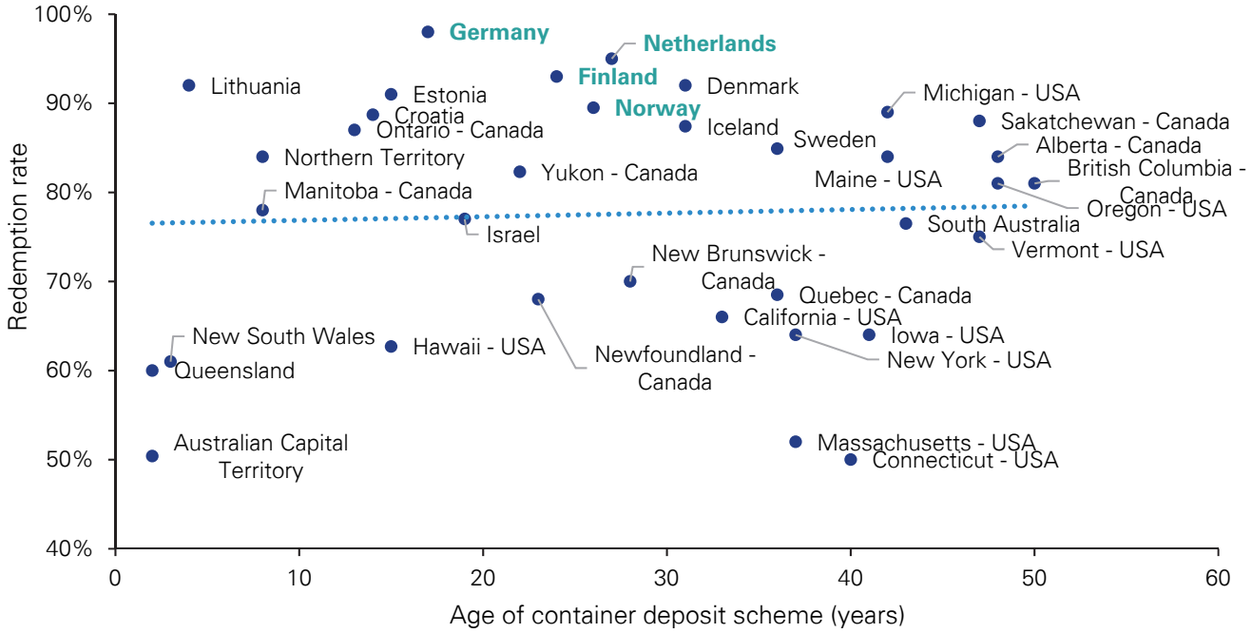
Scheme branding	Jurisdiction	Established	Notes
Containers for Change	QLD, WA	2018	In QLD in 2018-19, 91 per cent of residents are aware of the scheme.
Return & Earn	NSW	2017	In 2018-19, 89 per cent of residents over 18 have heard of the scheme and 55 per cent have participated.
Pantamera ('Recycle More')	Sweden	2003	
Infinitum	Norway	1999 (rebranded from Norsk Resirk) in 2014)	Recruited Norwegian former World Cup alpine ski racer Aksel Lund Svindal as an ambassador
Recycling Racoons	Michigan (USA)	2019	
Return-It	British Columbia (Canada)	1994	99 per cent of residents are reported to know the CDS eligible containers and 91 per cent of residents are aware of Return-It brand.

Source: Scheme websites including containersforchange.com.au; returnandearn.org.au; pantamera.nu; infinitum.no; recyclingraccoons.org; return-it.ca

[49] https://www.thelocal.se/20180328/thats-pant-the-story-behind-swedens-bottle-recycling-system
[50] See the Recycling Raccoons website at https://recyclingraccoons.org/

Relying on the age of a CDS and that knowledge will gradually spread and influence behaviours does not guarantee success. Figure 18 shows the age of schemes across international jurisdictions and that the longest running schemes do not indicate high redemption rates. Particularly in the United States, there are a number of schemes that have been operating for over 30 years, but have lower relative deposit rates.

Figure 18: Age of container deposit scheme and relationship to current redemption rate



Container Deposit/Refund Schemes (CDS) in Australia

The Brewers Association of Australia, the Australian Beverages Council and the Australian Food and Grocery Council represent the food, beverage and grocery industries, which contribute **$127 billion in turnover** per year to the Australian economy and support **274,835 jobs**.

CDS are **product stewardship** schemes, supported by industry, that seek to realise benefits across the country through **reducing litter** and **increasing redemption and recycling.** CDS do this by **influencing behaviour:**

- **refunds** act as a **subsidy** in the container return market to **encourage returns.**
- **refunds** and **costs of running** the schemes **distort** consumption and **reduce production** in the beverage market.

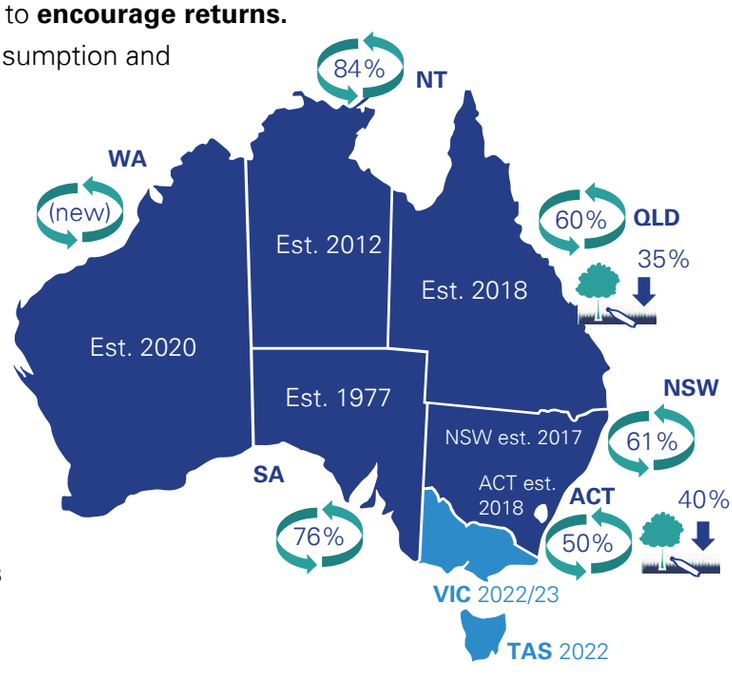
CDS are active in **6 States/Territories,** with **a further two to be implemented by 2023**.

The **current 10c schemes** have led to **litter reduction** and **high redemption rates** – even for new schemes.

Strong incentives for **operators** of CDS and **beverage manufacturers** to **encourage redemption:**

- higher redemption gives better access to recycled products.
- clearer redemption goals give incentives for achievement.

Beverage producers support **product stewardship** and its implementation in a way that is most **cost-effective for their business and consumers** and achieves the **greatest benefits to the broader community.**



CDS impose direct and indirect **costs** on **consumers** and **producers.**

Consumers pay more for their beverages:

- **distorts consumption** away from beverages towards other goods and services.
- **cost pressure** on the **household grocery basket reduces consumption of all goods and services**.

Beverage producers face higher costs and in a competitive market environment cannot fully pass these on to customers. Results in down-sizing of operations:

- **Reduced workforce.**
- **Lower investment.**

The mature CDS in Australia are achieving high redemption rates and the newer schemes are on track to achieve the same with a 10c refund amount. Importantly, international evidence also shows that **redemption and recycling rates** are influenced by **many factors** in addition to the refund amount such as:

- **ease of access**
- **cultural attitudes and awareness**
- **other environmental policies.**

Once the newer schemes are bedded down, opportunities to enhance the CDS can be explored.

A **comprehensive framework** is required to ensure that any proposed **changes** to the **CDS** are **efficient** and **effective:**

- **clear objectives** that are consistent with other environmental policies.
- an **evidence base** that helps inform policy settings so that the scheme achieves its objectives without imposing unnecessary costs on businesses and consumers.

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