

Report on the effects of the container deposit scheme on beverage prices in Western Australia

Draft report

21 July 2021

Economic Regulation Authority

WESTERN AUSTRALIA

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Invitation to make submissions

Submissions are due by 4:00 pm WST, Monday, 23 August 2021

The ERA invites comment on this paper and encourages all interested parties to provide comment on the matters discussed in this paper and any other issues or concerns not already raised in this paper.

We would prefer to receive your comments via our online submission form <https://www.erawa.com.au/consultation>

You can also send comments through:

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Please note that submissions provided electronically do not need to be provided separately in hard copy.

All submissions will be made available on our website unless arrangements are made in advance between the author and the ERA. This is because it is preferable that all submissions be publicly available to facilitate an informed and transparent consultative process. Parties wishing to submit confidential information are requested to contact us at info@erawa.com.au.

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Executive summary

Containers for Change, Western Australia's container deposit scheme, commenced on 1 October 2020.

The State Government introduced the scheme to increase the rate of recycling and reduce littering in Western Australia.

Through the scheme, consumers can return eligible beverage containers to refund points to receive a refund of 10 cents per container.

The scheme mostly targets single-serve beverages – such as bottled water, soft drinks, beer and cider – which are most likely to be consumed outside the home and become litter.

Western Australia Return Recycle Renew Ltd (WARRRL) is the not-for-profit organisation appointed to be the scheme coordinator for Containers for Change.

Beverage suppliers pay a fee to WARRRL to fund the cost of administering and operating Containers for Change. The fee is based on the number of containers recycled and the material the containers are made of. The average scheme fee is 12.82 cents per container.

In May 2019, the Treasurer asked the Economic Regulation Authority to monitor beverage prices in Western Australia, to see whether prices increased by more than the amount suppliers are charged by the scheme coordinator. The ERA is to report on the effect on beverage prices over the first six months of the scheme – in this draft report – and on the first 12 months of the scheme. It must also make recommendations on whether price monitoring should continue after the scheme has operated for 12 months.

The ERA's analysis of prices in the first 6 months of the scheme finds that prices have typically increased by less than the cost of running the scheme. The ERA's final report, to be published in early 2022, will consider the full year's data before making a formal recommendation to government on whether price monitoring should continue. If price increases remain at or below the cost of operating the scheme, the ERA is likely to recommend that further price monitoring is not necessary.

Draft findings

Based on the first six months of the scheme, the estimated average retail price increases due to Containers for Scheme are:

- For non-alcoholic beverages, 10.5 cents per container in metropolitan markets.
- For alcoholic beverages, 7.6 cents per container in metropolitan markets.

Overall, regional retail prices also increased by amounts similar to those in Perth, though due to the smaller data set the results were more variable.

These average price increases are all below the cost of administering and operating the scheme.

Both the cost of running the scheme and the average price increases are very similar to those seen in other states with container deposit schemes.

Submissions

The ERA invites comments on the effect on beverage prices of the introduction of the Containers for Change scheme and any other relevant issues or concerns not already raised in this paper. Submissions are due by 23 August 2021.

The ERA will consider all submissions in the final report, which will be released in early 2022.

1. Western Australia's container deposit scheme

Main points

- Western Australia's container deposit scheme, Containers for Change, commenced operation on 1 October 2020.
- Western Australia Return Recycle Renew Ltd (WARRRL) is the not-for-profit organisation that coordinates the scheme.
- WARRRL charges beverage suppliers to recover the difference between the costs of operating and administering the scheme and the revenue that it receives from selling containers to recyclers.

On 1 October 2020, the Western Australian Government commenced its container deposit scheme called Containers for Change. The scheme was originally planned to commence on 2 June 2020, but was delayed as a result of the COVID-19 pandemic.

Containers for Change is established under Part 5A of the *Waste Avoidance and Resource Recovery Act 2007* and the *Waste Avoidance and Resource Recovery (Container Deposit Scheme) Regulations 2019*.

Under the scheme, consumers are encouraged to collect eligible beverage containers for recycling and exchange them for a refund of 10 cents per container.

In Western Australia, before the commencement of the scheme, beverage containers made up 44 per cent of all litter, according to the 2017 to 2018 National Litter Index.¹

The Department of Water and Environmental Regulation is the government policy agency responsible for the introduction of the scheme and its legislation. The Department of Water and Environmental Regulation has a broad oversight role over the scheme. The ERA's focus, under its terms of reference, is on price monitoring.

In July 2019, Western Australia Return Recycle Renew Ltd (WARRRL) was appointed as the scheme coordinator. WARRRL is a not-for-profit organisation created to set up and administer Containers for Change. As the scheme coordinator, WARRRL is responsible for establishing container refund points; recycling refunded containers; ensuring beverage manufacturers fund the scheme; receiving and dealing with scheme complaints; and reporting on the performance of the scheme.

WARRRL charges beverage manufacturers and beverage importers (together called suppliers in this report) for the costs it incurs. As well as the cost of the 10 cent refund per container, costs also include costs for the scheme's operation and administration.

Beverage suppliers can pass some of all of these costs of the scheme through the supply chain to customers.

¹ WARRRL, About us, available [online](#).

1.1 Eligible containers

The scheme targets beverages that are most likely to be consumed outside of the home, and whose containers are therefore most likely to become litter.

Most aluminium, glass, plastic, steel and liquid paperboard drink containers between 150 millilitres and 3 litres are eligible for a refund. Eligible containers must:

- Be included on the scheme's list of products (for example, soft drink, water and beer).²
- Display the refund market on their packaging (for example, "10c refund at collection depots/points in participating State/Territory of purchase").

Some drink containers are not eligible for a refund, generally those that are less than 150ml or greater than 3L in size. The following beverage containers are also not included in the scheme:

- Any plain milk containers.
- Any glass containers that have contained wine or pure spirits.
- Containers 1L or larger that have contained flavoured milk, or pure fruit or vegetable juice.
- All cordial and syrup containers.
- Registered health tonics.

In Western Australia, 753.6 million eligible containers were sold over the period between October 2020 and March 2021.³

1.2 Refund points

Containers for Change has 219 active refund points.⁴

There are four types of refund points where the public can return eligible containers. These are:

- Depots – walk in or drive through to get containers counted and refunded.
- Bag drops – a contact-free way to recycle and receive refunds.
- Reverse vending machines – insert uncrushed containers for the machine to count your containers by scanning their barcodes.
- Pop-up refund points – organised by local operators, appearing at set times and locations.

Containers are also collected through local government kerbside recycling. Local governments commonly contract materials recovery facilities to collect their kerbside recycling. The refund for eligible containers from kerbside recycling is a lower amount of 9.1 cents per container.

² Eligibility of the container can be checked [online](#).

³ Provided by the Department of Water and Environmental Regulation.

⁴ Containers for Change WA, accessed [online](#) on 26 May 2021.

Refunds for 376.7 million containers have been paid through refund points and material recovery facilities between October 2020 and March 2021.⁵

1.3 Container deposit scheme participants and process flow

Major participants in Containers for Change are listed in Table 1.

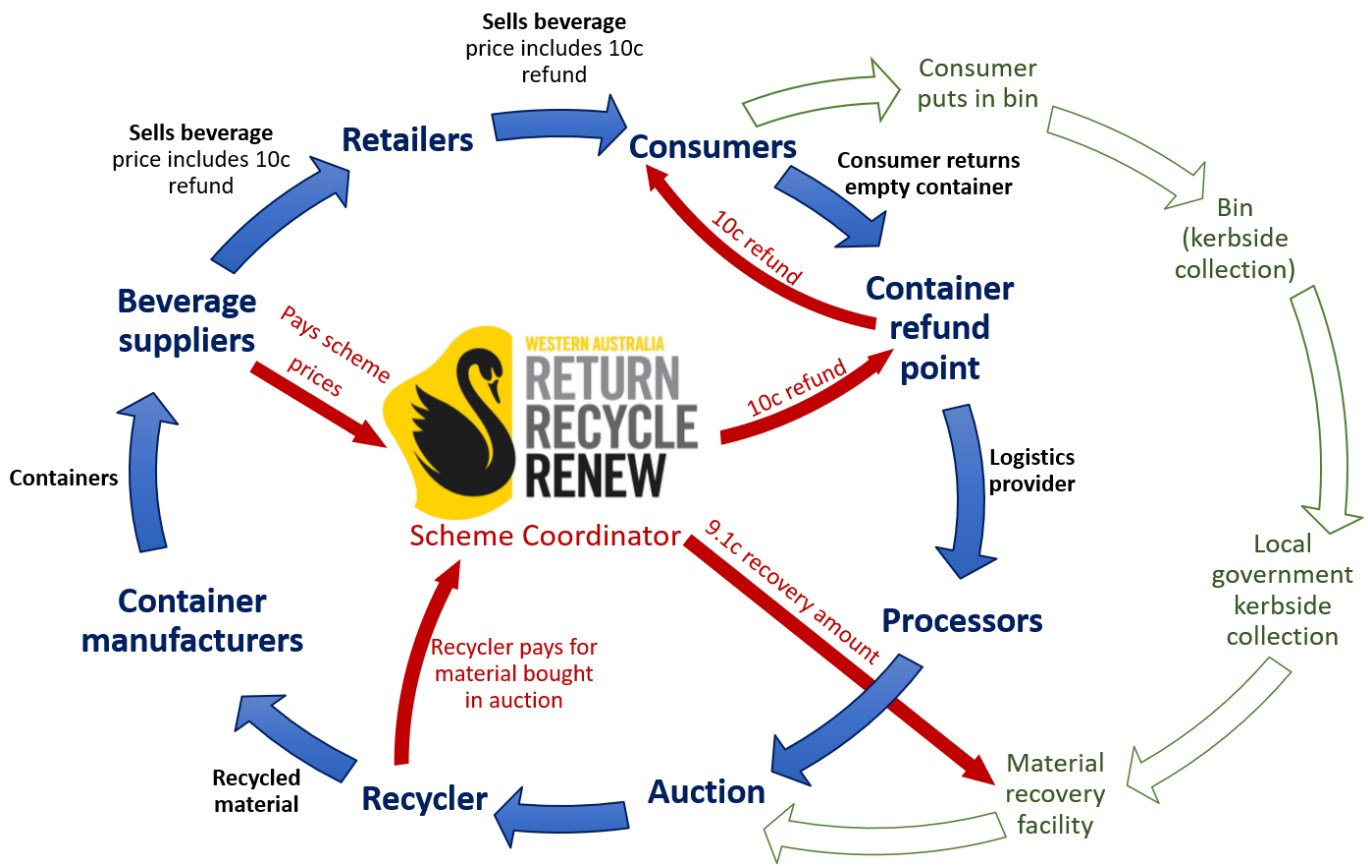
Table 1: Major stakeholders of the Containers for Change scheme

Stakeholder	Function
Department of Water and Environmental Regulation	The Department of Water and Environmental Regulation is the government agency responsible for the scheme. It regulates the scheme under the <i>Waste Avoidance and Resource Recovery Act 2007</i> .
Scheme coordinator	WARRRL is the scheme coordinator. It is responsible for establishing container refund points, recycling refunded containers, ensuring that beverage manufacturers fund the scheme, receiving and dealing with complaints relating to the scheme and reporting on the performance of the scheme.
Network operators	WARRRL appoints network operators, which are responsible for container handling and container refund points. Network operators are paid by WARRRL to carry out these roles.
Materials recovery facilities	Materials recovery facilities sort and prepare kerbside waste for recycling. A facility can receive a refund for eligible containers returned via kerbside collections, subject to reaching a refund sharing agreement with the relevant local government authority.
Local governments	Local governments collect beverage containers through kerbside recycling. Eligible containers recovered through the kerbside are still eligible for the refund per container. Local governments may outsource this process and enter into refund sharing agreements with materials recovery facilities.
Recycler	A recycler recovers resources to be used again or transformed into materials that can be used in new products.
Suppliers	Suppliers make or import beverage products or arrange for the distribution of a beverage product. These suppliers pay the scheme costs on a per container basis, as determined by WARRRL, and may recover these costs from consumers.
Consumers	Consumers pay for beverages and can return eligible containers to a container refund point in exchange for a 10 cent refund per container.

The interactions between participants and the flow of materials and funds through a beverage's lifecycle is detailed in Figure 1.

⁵ Provided by the Department of Water and Environmental Regulation.

Figure 1: Container deposit scheme flow of materials and funds



The arrows shown in Figure 1 illustrate flows of containers and funds under the scheme.

- **Containers** (blue). Eligible containers are purchased by consumers who can then choose to divert the container from landfill to recycling facilities using the scheme.
- **Kerbside collection** (green). Eligible containers placed into kerbside recycling are recovered and redirected to recycling facilities.
- **Funds and refunds** (red). The scheme coordinator collects and distributes funds. Container refund points provide refunds to consumers.

1.4 Scheme costs and funding

WARRRL's costs are the costs of operating and administering the scheme, and the refund costs of paying a 10 cent refund to consumers or 9.1 cent refund to materials recovery facilities for eligible containers.

WARRRL levies charges on suppliers to recover the difference between the costs of operating and administering the scheme (including paying refunds) and the revenue that it receives from the sale of collected containers to recyclers. The price is charged per container sold and varies according to the material the beverage container is made of, because different materials have different values when sold in the recycling market.

At the end of each month, WARRRL invoices suppliers based on the volume of eligible containers sold in that month multiplied by the relevant scheme price for the material type of the containers.

Most beverage suppliers are required to pay monthly. Small suppliers – with fewer than 300,000 units of product sold each year – are required to pay quarterly, although they may elect to pay at shorter intervals.

To recover the scheme price charged by WARRRL, suppliers are likely to increase the price of eligible beverages. Suppliers may pass on all or some of the scheme costs to their customers.

Beverage retailers are subject to the Australian Consumer Law, which aims to protect consumers and ensure fair trading. The Australian Competition and Consumer Commission and the Consumer Protection division of the Department of Mines, Industry Regulation and Safety regulate businesses' compliance with the Australian Consumer Law. This could include considering claims that misrepresent price increases resulting from the scheme.

1.5 Container deposit schemes across Australia

Six states and territories have container refund or deposit schemes. Tasmania and Victoria do not have schemes, but both have announced plans to introduce a scheme.

A summary of the Australian schemes is provided in Table 2.

Table 2: Summary of container deposit schemes across Australia^{6,7}

State/Territory	Start date	Description	Return rate ⁸
South Australia	1977	South Australia was the first state to implement a scheme in 1977.	The scheme had a return rate of around 76 per cent in 2018/19.
Northern Territory	January 2012	The Northern Territory's scheme was modelled on the South Australian scheme.	The scheme had a return rate of around 75 per cent in 2017/18.
New South Wales	December 2017	New South Wales developed its own scheme.	The return rate was 53 per cent over the initial 12 months and reached 60 per cent in March 2019.
Australian Capital Territory	June 2018	The Australian Capital Territory's scheme was designed to be consistent with New South Wales.	The container return rate was 35 per cent for the period July 2018 to March 2019, and 53 per cent in the month of March 2019.
Queensland	November 2018	Queensland's scheme was designed to be similar to existing schemes.	The container return rate was 50 per cent for the period November 2018 to October 2019.
Western Australia	October 2020	Western Australia's scheme was based on other schemes. It was refined to account for the lessons learnt from the operation of those	The total container return rate (refund points and materials recovery facilities) was 58 per cent

⁶ Independent Competition and Regulatory Commission, *Container Deposit Scheme Price Monitoring – Final Report*, July 2019, pp. 9-10.

⁷ Queensland Productivity Commission, *Final Report Container Refund Scheme Price monitoring review, January 2020*, pp. 35-36.

⁸ The return rate is the proportion of the total number of eligible containers that make their way back to the scheme coordinator.

State/ Territory	Start date	Description	Return rate ⁸
		schemes and for the State's requirements.	for the latest available quarter of January 2021 to March 2021. WARRRL has an average return rate target of 65 per cent for 2021/22.

2. The ERA's price monitoring role

In May 2019, the Treasurer asked the ERA to monitor prices of beverages in containers included in the container deposit scheme.

Under its terms of reference, the ERA is required to monitor prices across Western Australia before the commencement of the scheme and for the following year.

To conduct its price monitoring, the ERA should consider:

1. Changes in the prices of beverages during the monitoring period and, in particular, whether the prices of beverages increase by more than the amount suppliers are charged by the Scheme Coordinator.
2. Information provided by scheme participants, retailers and consumers through consultation.

The ERA is to report to the Treasurer on:

1. The effect of the scheme on prices of beverages during the monitoring period.
2. The method applied by the ERA to assess the effects on prices arising from the scheme and on the need to continue price monitoring.

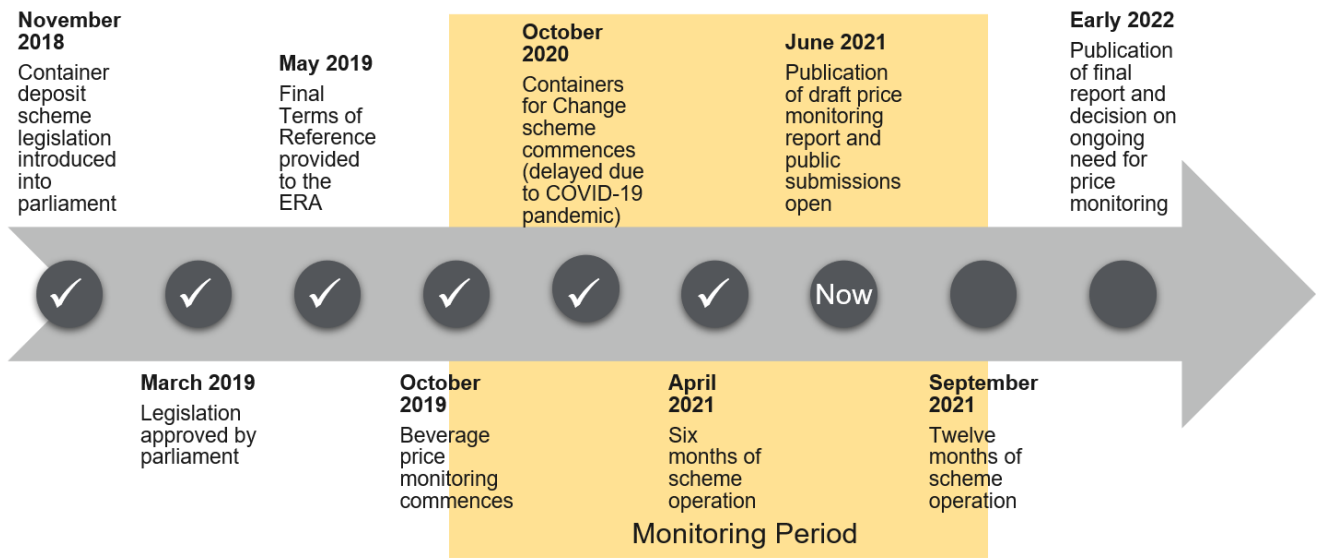
The terms of reference for this review require the ERA to publish:

- a draft report on analysis of the first six months of the scheme (this report)
- a final report on analysis of a year of the scheme.

The ERA's focus is on monitoring beverage prices and it was not asked to undertake a broader review of the Containers for Change scheme.

A timeline of Container for Change's introduction and the ERA's price monitoring is provided in Figure 2.

Figure 2: Timeline of Containers for Change introduction and price monitoring



3. The ERA's monitoring approach

The ERA has designed its price monitoring approach to identify any systemic, ongoing effects arising from the operation of the scheme.

The ERA has built on – to the extent it is appropriate for Western Australia – the price monitoring frameworks developed to conduct price monitoring for container deposit schemes in other states. This includes frameworks developed by the Independent Pricing and Regulatory Tribunal (IPART) in New South Wales, the Independent Competition and Regulatory Commission (ICRC) in the Australian Capital Territory, and the Queensland Productivity Commission (QPC).^{9, 10, 11}

The steps in the ERA's approach and the structure of this draft report are summarised in Table 3.

Table 3: The ERA's approach to the review

Step	Method	Where discussed in this report
Step 1 – Estimate the cost of administering the scheme	This is based on information from WARRRL on the scheme price per container.	Chapter 5
Step 2 – Estimate changes in retail prices of beverages that can be attributed to the scheme	This involves analysing prices using econometric methods and available data sources for urban and regional areas. As a cross check, the data is compared with Consumer Price Index data and stakeholder feedback.	Chapter 6
Step 3 – Assess whether changes in beverage prices are more than the costs incurred under the scheme	This involves assessing whether the changes in container beverage prices are less than, equal to or more than the scheme costs levied on suppliers.	Chapter 7
Step 4 – Assess the need for ongoing price monitoring	The ERA has considered the initial findings of the steps above to assess the need for ongoing price monitoring.	Chapter 8

The remainder of this report is structured according to the steps in Table 3.

⁹ IPART, *NSW Container Deposit Scheme: Monitoring the impacts on container beverage prices and competition – Final Report*, December 2018.

¹⁰ Independent Competition and Regulatory Commission, *Container Deposit Scheme Price Monitoring – Final Report*, July 2019.

¹¹ Queensland Productivity Commission, *Final Report - Container Refund Scheme: Price monitoring*, January 2020

4. Estimate of scheme costs

Main points

- WARRRL's weighted average scheme price was 12.82 cents per container (including GST) over the first six months of the scheme. This is similar to scheme prices in other states.
- Suppliers may have other costs, above the scheme price, to take part in Containers for Change, for example new labels or staff training. These costs are hard to quantify and are likely to be small.
- As six other states and territories already have container deposit schemes, most large beverage suppliers would already be set up to participate in the Western Australian scheme.

The first step in the ERA price monitoring approach is to estimate the costs of the Containers for Change scheme per container.

4.1 Direct scheme costs

WARRRL recovers the direct costs of the scheme from suppliers through scheme fees, which are based on the scheme price.

The scheme price is calculated based on the operating costs plus refund costs minus revenue WARRRL receives from recyclers.

- **Operating costs:**
 - Scheme coordinator costs: The cost for WARRRL to administer the scheme.
 - Network costs: The costs for administering collection points and handling containers and the costs associated with transport and processing containers for sale to recycling markets.
- **Refund costs:**
 - 10 cent per container at container refund points.
 - 9.1 cents per container at material recovery facilities.
- **Recycler revenue:**
 - WARRRL receives revenue from recyclers for the sale of recyclable material. This revenue helps to partially offset the costs of the scheme.

The scheme price is charged per container sold and varies according to the material the beverage container is made of. The scheme's prices are shown in Table 4.

Table 4: Western Australia's Containers for Change scheme pricing (cents)

Material type	Cost per container supplied (ex GST)	GST	Cost per container supplied (Inc GST)
Aluminium	11.39	1.14	12.53
Glass	11.84	1.18	13.02
Plastic high-density polyethylene	11.85	1.19	13.04
Plastic polyethylene terephthalate	11.76	1.18	12.94
Liquid paper board	12.17	1.22	13.39
Other materials	12.17	1.22	13.39
Weighted average cost	11.65	1.17	12.82

Source: WARRRL¹²

The scheme price per container ranges between 12.53 cents and 13.39 cents (including GST), depending on the type of material in the containers (as different materials have different values when sold in the recycling market). The material with the most value to recyclers, aluminium, has the lowest scheme price.

WARRRL's scheme prices have remained unchanged since the introduction of the scheme in October 2020.

Not all consumers will return their containers and seek a refund, so refund costs depend on the proportion of containers that is returned. As more containers are returned, WARRRL distributes more refunds to container refund points and materials recovery facilities. Therefore, the higher the return rate, the higher WARRRL's refund cost and the higher the scheme price charged to suppliers.

WARRRL sets a long-term scheme price based on a forecast return rate averaging 65 per cent over the 2021/22 financial year. This price was developed using an increasing return rate over the year.

WARRRL's weighted average scheme price of 12.82 cents (including GST) is charged on all eligible containers, whether or not they are recycled. As an approximation, based on an assumed 65 per cent return rate and 10 cent refund, the scheme price is made up of:

- Net operating costs (after revenue from the sale of recyclable materials) of approximately 6.3 cents per container.
- Refund costs of approximately 6.5 cents per container (that is, WARRRL pays 10 cents on 65 per cent of all eligible containers).

WARRRL's scheme prices are similar to those charged in other states:

- Queensland has a weighted average scheme price of 12.76 cents (including GST).¹³

¹² WARRRL, *First Responsible Suppliers*, available [online](#).

¹³ Queensland Productivity Commission, *Final Report Container Refund Scheme Price monitoring review*, January 2020, p. 19.

- New South Wales has a weighted average scheme price of 12.62 cents (including GST).¹⁴
- The Australian Capital Territory has a weighted average scheme price of around 13 cents (including GST).¹⁵

Other Australian schemes have used more complex methods to determine monthly scheme prices, including what are known as “true-up” mechanisms, which use actual monthly container and return volumes to determine the scheme price. Given the initial uncertainty and volatility of return rates at the introduction of a scheme, these more complex approaches have led to variations in monthly scheme prices. Some jurisdictions, such as the Australian Capital Territory, are now simplifying the process of setting scheme prices and moving to long-term fixed price per material type.¹⁶

4.2 Indirect costs

Suppliers and other supply chain participants incur indirect costs when participating in and complying with the Containers for Change scheme. Businesses that incur these costs may seek to increase prices to recover these costs.

The ICRC in the Australian Capital Territory noted the following additional administrative tasks for suppliers participating in a scheme:¹⁷

- Ensuring eligible containers are registered with the scheme before they are sold.
- Labelling containers correctly to meet the scheme requirements.
- Communicating with customers about the scheme.
- Training employees to understand how to use the reporting systems and monthly reporting of container volumes to the scheme operator.
- Updating prices for changes in the scheme costs.

In addition to these administrative costs, the supplier may also incur one-off costs such as changing information technology and systems to comply with reporting requirements.

Indirect costs are not easy to quantify as they vary from business to business. Indirect costs are likely to be higher at the commencement of the scheme but lower once it is established.

IPART considered indirect costs in its review of the New South Wales scheme. IPART was not able to estimate the indirect costs of the scheme but considered that it was reasonable that indirect costs may be between 1.5 cents and 2.3 cents per container (including GST) over the first 12 months of the scheme’s operation.¹⁸

¹⁴ Exchange for Change, *Media Release New pricing announced for NSW Container Deposit Scheme supplier contributions*, 31 March 2021.

¹⁵ Exchange for Change, *Webinar ACT CDS – Performance and Pricing*, 30 April 2021. The ACT currently operates a monthly pricing model, which includes a true up adjustment that does produce some variability of scheme charges. The ACT is now transitioning to simpler long-term fixed scheme charges.

¹⁶ Exchange for Change, *Summary of pricing and contribution approach changes*, available [online](#).

¹⁷ Independent Competition and Regulatory Commission, *Container Deposit Scheme Price Monitoring – Final Report*, July 2019, p. 40.

¹⁸ IPART, *NSW Container Deposit Scheme: Monitoring the impacts on container beverage prices and competition – Final Report*, December 2018, p 58.

The Western Australian scheme commenced after those in most other States, so the systems and processes needed to participate may have already been in place for the large multi-state suppliers that supply a large proportion of beverages sold in the Western Australian market. As these suppliers can spread systems costs across several jurisdictions, average indirect costs arising from Western Australia's scheme could be small, and lower than IPART's estimate.

Smaller Western Australian suppliers that have not participated in schemes in other states may have incurred higher indirect costs.

Beverage suppliers may increase prices above the direct costs of the scheme to meet the indirect costs incurred as a result of participation in the scheme. However, given that indirect costs are likely to be small for Western Australia, and vary between businesses and over time, the ERA has not at this stage included indirect costs in its estimate of costs of the Containers for Change scheme.

To assess whether price increases arising from the scheme are greater than direct scheme costs, the ERA will further consider indirect costs in its final report if price increases are found to be materially higher than direct scheme costs, or if stakeholders indicate that indirect costs are significant.

The ERA invites stakeholder comment on the likely size of indirect costs for suppliers.

Draft findings

The ERA finds that:

- WARRRL has fixed scheme prices since the introduction of the scheme in October 2020.
- WARRRL's weighted average scheme price has been 12.82 cents per container (including GST) over the first six months of the scheme.
- The scheme price in Western Australia is similar to other states.
- Suppliers face other costs of participating in the scheme. However, these indirect costs are hard to quantify, vary between businesses and over time, and are likely to be small.
- Beverage suppliers may increase prices above the direct costs of the scheme to meet the indirect costs incurred as a result of participation in the scheme. However, in Western Australia the size of any increase above direct costs is likely to be small and to reduce over time.

5. Price changes attributable to the scheme

Main points

- The ERA monitored beverage prices before and after the introduction of Containers for Change.
- The ERA broke the data down into alcoholic and non-alcoholic beverage categories, and metropolitan and regional areas.
- For the first six months of the scheme, the ERA has found that:
 - For non-alcoholic beverages, prices went up by an average of 10.5 cents per container in the metropolitan area.
 - For alcoholic beverages, prices went up by 7.6 cents per container in the metropolitan area.
- Price increases by category were similar in regional areas to the increases in Perth, but were more varied due to a smaller set of data.

5.1 Analysing beverage price changes

The second step of the ERA's price monitoring approach is to examine changes in retail prices of beverages that can be attributed to the Containers for Change scheme.

Beverage retailers are free to price products as and when they choose, within the constraints provided by competitive pressures, and competition and retail laws. The market is composed of many participants – manufacturers, importers, wholesalers and retailers – whose behaviour may affect retail prices. Pricing decisions are relatively opaque. Retailers may practice “lumpy pricing”, that is, they may change prices in particular increments than by the exact amount of a cost increase. Furthermore, price changes may be affected by non-promotional and promotional price cycles, which affect rates of cost recovery.

The many factors that affect beverage prices make it difficult to determine which price changes are due to the scheme.

To estimate the changes in beverage container prices that are attributable to the Containers for Change scheme, the ERA has analysed how retail prices changed in periods before and after the introduction of the scheme, through:

- Estimating price changes that are attributable to the scheme using a difference-in-differences approach.¹⁹
- Considering changes in price indices for beverages published by the Australian Bureau of Statistics.
- Considering stakeholder feedback.

¹⁹ The method used in difference-in-difference analysis is that the market of interest (the “treatment group”) is studied alongside a control market (the control group) that is not subjected to a policy “treatment” (a measure such as the Containers for Change scheme). The control and treatment groups are monitored both before and after a treatment is introduced so that price changes due to the treatment can be quantified.

5.2 Defining beverage markets

To assess the effect of the scheme on beverage prices it is important to recognise that different beverage markets have different characteristics that may affect retail prices.

The ERA considers that alcoholic and non-alcoholic beverage markets are separate markets. This finding is consistent with the assessments of regulators in other States. The distinctions between alcoholic and non-alcoholic beverage markets are established when viewed across the supply chain.

- Businesses that manufacture alcoholic drinks require different equipment to businesses that manufacture non-alcoholic drinks.
- Businesses that sell alcoholic beverages require a licence, while those whose retail non-alcoholic drinks do not.

Markets can further be segmented into geographical markets, where those in the metropolitan areas and those in the regions may have different dynamics.

To reflect these differences, the ERA has defined the relevant markets for this analysis as:

- Two separate markets for alcoholic beverages and non-alcoholic beverages.
- Sub-categories of beverages within those two markets, for example beer, soft drinks and water.
- Separate geographical markets for metropolitan Western Australia and regional Western Australia.

Table 5: Beverage categories

Beverage market					
Non-alcoholic			Alcoholic		
Soft drinks	Water	Fruit juice	Beer	Cider	Ready-to-drink

5.3 Data sources

The ERA engaged price data providers to provide retail price data for analysis.

The data comprises the retail prices of beverages sold in Western Australia and other Australian states over the monitoring period of October 2019 to September 2021. This draft report covers the first six months of the scheme to March 2021. A final report will cover the first year of the scheme to September 2021.

Datasets for the analysis of the Containers for Change scheme's effect on beverage prices are:

- Non-alcoholic beverages: Transactional prices from NielsenIQ Homescan, which consists of a nationally representative panel of over 10,000 households that are geographically and demographically representative of all Australian households.
- Alcoholic beverages: Invigor Group's Pricing Insights platform, which includes state-based, stock keeping unit level pricing for beer, cider, ready-to-drink beverages, spirits and wine from over 60 retailer websites and 20 catalogues on a daily basis.

These large commercial datasets consist of data from the metropolitan area and some larger regional centres. The ERA recognised that beverage markets may have different characteristics in regional areas of Western Australia, which could result in different effects from the introduction of the scheme.

Therefore, the ERA engaged the Goomalling Community Resource Centre to collect regional and remote container price data over the monitoring period. The Goomalling Community Resources Centre had previous experience in surveying regional consumer prices and has a network of data collectors in regional Western Australia.

The three datasets categorise products by:

- manufacturer (or brand)
- pack type (multi pack or single pack)
- size (for example, 350ml, 600ml)
- price type (promotional or non-promotional price)
- retailer
- retailer location.

5.4 Analytical approach

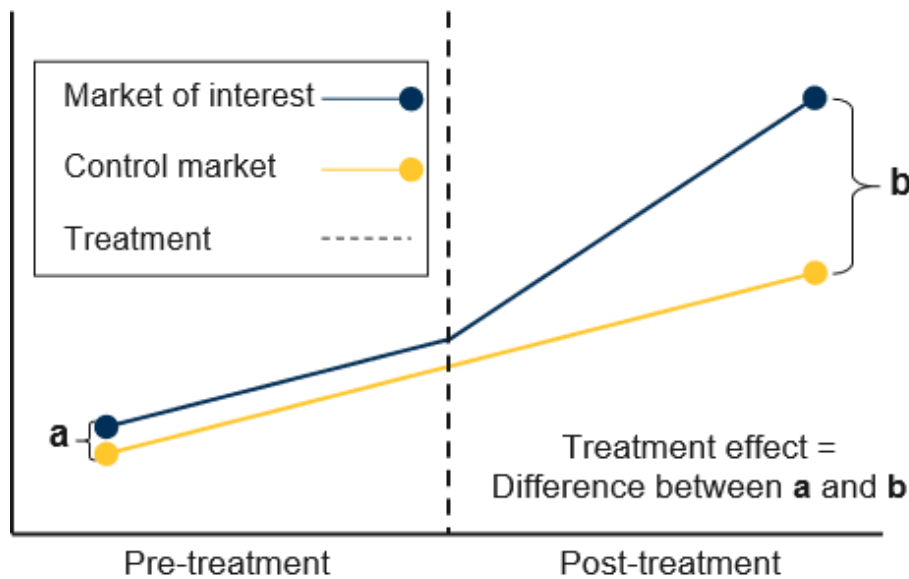
The ERA's approach uses econometric analysis (the difference-in-differences approach) to quantify the extent to which the costs of the scheme are being passed through to retail beverage prices.

Difference-in-differences is a statistical technique commonly used to evaluate a policy effect. For this approach outcomes are observed for two groups over two time periods – a 'control group' that is not exposed to any 'treatment' (a policy measure or similar change) in either time period and a 'treatment group' that is exposed to a specific treatment in the second time period.

The basic premise of difference-in-differences is that the market of interest (the treatment group) is studied alongside a control market (the control group). The treatment group is subject to a policy treatment, in this case the Containers for Change scheme, whereas the control group is not subject to the policy treatment. The control and treatment groups are monitored both before and after a treatment is introduced so that price changes associated with the treatment can be quantified. The price difference between the control and treatment groups before and after the treatment are examined. The difference-in-differences approach provides a stronger indicator of price changes resulting from a policy treatment than other analysis techniques such as strict time series analysis of the intervention market, or a cross-sectional analysis of the two markets post-intervention.

A simple illustration of the approach is provided in Figure 3.

Figure 3: Illustration of the difference-in-differences approach



In the context of this review, the treatment is the introduction of Containers for Change, and the differences-in-differences method identifies changes in beverage prices in Western Australia that are due to the scheme by:

- Calculating the change in beverage prices in Western Australia before and after the scheme's introduction (movements in the blue line).
- Calculating the change in beverage prices in a comparison group (other Australian states) over the same period (movements in the yellow line).
- Calculating the difference between the above two points (the difference after treatment b minus the difference before the treatment a).

The comparison group can have a container deposit scheme in place, as long as it has been in place for a sufficient period of time to enable stable prices.

When applying the difference-in-differences approach, the ERA used the beverage categories defined in Table 5. For each beverage category, a regression model was run to look at how retail prices changed during the review period.

Separate analyses for each beverage category allow the ERA to account for differences in the price elasticity of demand across beverage types, and differences in the underlying production costs of different beverage types. Performing an analysis for each beverage category helps to minimise information unrelated to the introduction of scheme. In the analysis, non-eligible containers are also excluded.

The ERA considers that its analytical approach is robust enough to deal with any effect on prices due to COVID-19 and this effect, if any, will not distort the model's estimate of the scheme's effect on prices. The scheme was introduced six months after the effects of the pandemic were first felt in Western Australia. Any effect of COVID-19 on beverage prices would probably affect broader national trends as well as prices in Western Australia, and so would be reflected in the control group data.

More detail of the empirical approach can be found in Appendix 1 and the Pink Lake Analytical Report.²⁰

As a cross check on the results of the difference-in-differences analysis, the ERA has also analysed overall price changes using general price indices for beverages published by the Australian Bureau of Statistics.

The ERA has also considered stakeholder feedback on the scheme made to other Western Australian regulators.

²⁰ Pink Lake Analytics, *CDS Pricing Monitoring – 6 Month Report*, June 2021.

5.5 Metropolitan regression results

The ERA has engaged Pink Lake Analytics to assist with the analysis of beverage prices. Pink Lake has produced a detailed analytical report for this draft report.²¹

The estimated metropolitan retail price increases due to the Containers for Change scheme are provided in Table 6.

Table 6: Estimated metropolitan retail price increases due to the Containers for Change scheme (cents per container)²²

Beverage market	Beverage type	Draft report (for first 6 months of the scheme)
All		
Non-alcoholic		10.5* (5.5 – 15.5)
	Water	10.8 (-2.3 – 23.9)
	Soft drink	10.4* (4.7 – 16.2)
	Fruit juice	11.9* (3.5 – 20.4)
Alcoholic		7.6* (-)
	Beer	8.3* (5.6 – 10.9)
	Cider	9.7* (5.0 – 14.3)
	Ready-to-drink	0.7 (-4 – 5.4)

Source: Pink Lake estimates based on NielsenIQ data for non-alcoholic beverages and Invigor Group for alcoholic beverages. Linear model. Data is from WA, NSW, QLD and VIC. Pink Lake has also used an alternative model (a linear mixed effects model), which produces similar estimates of the price effect.

The range in brackets is the confidence interval at 95 per cent. A confidence interval is a range of values so defined that there is a specified probability that the value of a parameter lies within it. There is a 95 per cent probability that the calculated confidence interval value encompasses the true value of the parameter.

* Means estimate is significantly different to zero at 99 per cent confidence.

²¹ Pink Lake Analytics, *CDS Pricing Monitoring – 6 Month Report*, June 2021.

²² The robustness of results (that is, their statistical significance) in the Draft Report may be affected by the short six month data period after the commencement of the scheme. For the Final Report, using the longer 12-month data period is expected to improve the reliability of results.

Table 6 includes the 95 per cent confidence intervals in brackets under the estimate of the price increase. With these confidence intervals there is a 95 per cent probability that the estimated interval encompasses the true value of the parameter. The estimated confidence intervals in the table are wide. The wider the confidence interval, the less likely it is that the estimate is accurate. If an estimated confidence interval includes zero, we cannot say that the estimated price increase is statistically different from zero.

These estimates are gross increases that do not factor in any offsetting effect of consumers receiving a 10 cent refund. Consumers can offset some of the increase in the price of eligible beverages through the 10 cent refund.

5.5.1 Non-alcoholic beverages

During the first six months of the scheme's operation, the ERA estimates that retail prices have increased for non-alcoholic beverages by 10.5 cents per container in metropolitan markets. This estimated increase was statistically significant.

For non-alcoholic drinks the estimated price effects were similar across the three beverage types.

The large sample size of soft drinks reduces its standard error when compared to water and fruit juice, so the estimate for soft drinks is more accurate than water and fruit juice.

The introduction of the scheme has resulted in a statistically significant estimated price increase for soft drink of 10.4 cents, and for fruit juice of 11.9 cents.

The estimated price increase for water was not statistically significant. While the non-alcoholic beverage categories' estimated price increases were statistically significant at 99 per cent, water was not statistically significant even at the lower confidence level of 90 per cent. This means that water had no discernible price increase as a result of the scheme. This may change when the full 12 months of data is available.

5.5.2 Alcoholic beverages

During the first six months of the scheme's operation, the estimated price increase for alcoholic beverages was 7.6 cents per container in metropolitan markets. This estimated increase was statistically significant.

For alcoholic drinks, the estimated price effects were similar for beer and cider. The introduction of the scheme has resulted in a statistically significant price estimated increase for beer of 8.3 cents, and for cider of 9.7 cents.

The price increase for ready-to-drink beverages was not statistically significant, and this was true even at the lower confidence level of 90 per cent. This means that ready-to-drink beverages had no discernible price increase as a result of the scheme. This may change when the full 12 months of data is available.

5.6 Regional regression results

5.6.1 *Regional approach*

Beverage markets may have different characteristics in regional areas of Western Australia compared to the metropolitan areas, given differing supply chains and consumer demand. Suppliers in small and/or isolated markets may not face much competition.

These differences between regional and metropolitan markets may result in different price effects from the Containers for Change scheme and it cannot be assumed that effects in the metropolitan areas will be the same as in regional Western Australia.

To understand the effect of the Containers for Change scheme on regional markets, the ERA has undertaken analysis of price data from regional areas.

As the available commercial datasets largely cover metropolitan areas, the ERA engaged the Goomalling Community Resource Centre to collect regional and remote container price data over the review period. This regional data collection was briefly suspended in March and April 2020 due to the COVID-19 pandemic.

The ERA used econometric analysis to analyse the regional dataset to quantify changes in regional retail beverage prices.

5.6.2 *Regional results*

The ERA engaged Pink Lake Analytics to assist with the analysis of regional beverage prices. Pink Lake Analytics produced a detailed analytical report for the draft report.²³

The estimated regional retail price increases due to the Containers for Change scheme are provided in Table 7.

²³ Pink Lake Analytics, *CDS Pricing Monitoring – 6 Month Report*, June 2021.

Table 7: Estimated regional retail price increase due to the Containers for Change scheme (cents per container)

Beverage market	Beverage type	Draft report (for first 6 months of the scheme)
All		
Non-alcoholic		7.3* (3.0 – 11.5)
	Water	3.1 (-7 – 13.2)
	Soft drink	8.1* (3.1 – 13.1)
	Fruit juice	13.7* (7.8 – 19.6)
Alcoholic		8.2* (5.7 – 10.7)
	Beer	8.1* (3.0 – 13.2)
	Cider	23.1* (10.6 – 35.5)
	Ready-to-drink	(1.9) (-10.8 – 7.1)

Source: Pink Lake estimates based on NielsenIQ data for non-alcoholic beverages and Invigor Group for alcoholic beverages. Linear model. Data is from WA, NSW, QLD and VIC. Pink Lake has also used an alternative model (a linear mixed effects model), which produces similar estimates of the price effect.

Range in brackets is the confidence intervals at 95 per cent. A confidence interval is a range of values so defined that there is a specified probability that the value of a parameter lies within it. There is a 95 per cent probability that the calculated confidence interval value encompasses the true value of the parameter.

* Means estimate is significantly different to zero at 99 per cent confidence.

These estimates are gross increases that do not factor in any offsetting effect of consumers receiving a 10 cent refund. Consumers can offset some of the increase in the price of eligible beverages through the 10 cent refund.

In aggregate, estimated regional retail prices increased due to the scheme by a similar amount as the metropolitan area across non-alcoholic and alcoholic beverages, though due to the smaller data set the regional results were more variable.

5.6.3 Non-alcoholic beverages

During the first six months of the scheme's operation, the price of non-alcoholic beverages increased by an estimated 7.3 cents per container in regional markets. This estimated increase was statistically significant.

Regional data produced similar estimated price effects to metropolitan data for soft drinks and fruit juice.

The introduction of the scheme has resulted in a statistically significant estimated price increase for soft drink of 8.1 cents, and for fruit juice of 13.7 cents.

The price increase for water was not statistically significant, even at the lower confidence level of 90 per cent. As a result, water in regional areas had no discernible price increase as a result of the scheme. This may change when the full 12 months of data is available.

5.6.4 Alcoholic beverages

During the first six months of the scheme's operation, the price of alcoholic beverages increased by an estimated 8.2 cents per container in regional markets. This estimated increase was statistically significant.

Regional data produced similar estimated price effects to metropolitan data for beer. The introduction of the scheme has resulted in a statistically significant estimated price increase for beer of 8.1 cents, and for cider of 23.1 cents.

The regional results for cider suggest its price increased considerably more than the average. While this result was statistically significant, it should be treated with caution due to the small sample size and the volatility of underlying cider prices. A further six months of data is likely to improve the reliability of this estimate.

As was the case in the metropolitan market, there was no statistically significant scheme effect observed for the price of ready-to-drink beverages in the regional data.

5.7 Consumer Price Index cross check

To cross-check the findings of the regression analysis, the ERA has also considered the changes in price indices for beverages published by the Australian Bureau of Statistics.

The Consumer Price Index (CPI) provides data on beverage prices for the eight capital cities and is released quarterly by the Australian Bureau of Statistics.²⁴ CPI data can provide some high-level trends of what happened to prices after the introduction of the Containers for Change scheme. However, the usefulness of CPI data in measuring the effect of the scheme is limited by its quarterly calculation and its use of broad expenditure categories that include both eligible and ineligible containers.

When considering CPI data the ERA has:

- Analysed how beverage prices have changed since the introduction of the scheme to indicate whether Western Australia has experienced price increases.
- Analysed data on expenditure categories in Perth compared to other capitals to provide a simple high-level estimate of the scheme's price effect in Perth.

The CPI follows 87 expenditure classes that are priced over time in each of the eight capital cities. Of these, the following have been analysed:

1. Alcoholic beverages – a broad expenditure group that includes some eligible beverages.
2. Beer – a category mostly made up of beverages eligible for the Containers for Change scheme.

²⁴ Australian Bureau of Statistics, *Consumer Price Index, Australia – March 2021*, available [online](#).

3. Milk – a broad expenditure group that includes some eligible beverages for smaller flavoured milk products.
4. Non-alcoholic (waters, soft drinks and juices) – a category mostly made up of beverage containers eligible for the Containers for Change scheme.
5. Spirits – a broad expenditure group that includes some eligible containers for ready-to-drink beverages.
6. Wine – a category not eligible for the Containers for Change scheme.

For these CPI categories, Pink Lake analysed how beverage prices changed after the introduction of the scheme in Western Australia, and compared this to the change in other capital cities. This analysis found that:

- Beer and non-alcoholic beverages increased after the September 2020 quarter.
- For milk, alcoholic and spirits there was a less noticeable change in prices (eligible containers make up a only small part of these categories).
- Wine prices slightly reduced (wine is not eligible for the scheme).
- Since September 2020, Perth beverage prices have increased by more than prices in other capitals, except for wine.

Pink Lake compared the CPI change for these expenditure categories in Perth to that of a composite index compiled from these categories in other capitals to provide simple estimates of the scheme's price effects in Perth, detailed in Table 8.

Table 8: Simple estimate of the scheme's effect on price from CPI beverage data.

ABS expenditure category	CPI change Perth (%) (A)	CPI change other capitals (%) (B)	Scheme effect (%) (C = A – B)	Container price (\$) (D)*	Scheme effect (cents) (E = C x D)#
Alcoholic	2.4	1.1	1.3	3.43	4.3
Beer	3.5	0.7	2.8	2.82	7.8
Milk	1.6	0.8	0.8	-	-
Non-alcoholic	11.4	0.6	10.7	1.22	13.1
Spirits	2.6	1.2	1.3	-	-

Source: Pink Lake analysis based ABS CPI data and Invigor and Nielsen price data.

* Median beverage container prices observed before the scheme's introduction based on NielsenIQ data for non-alcoholic beverages and Invigor Group data for alcoholic beverages.

Numbers may vary due to rounding.

The analysis in Table 8 is structured as follows.

- Columns A and B show the price increases for each category in Perth and the other capitals following the scheme's introduction, and Column C shows the difference between these increases.
- Column D contains estimates in dollars of the Perth price of each type of container before the scheme's introduction.
- Column E multiplies that individual container price by the difference in price increases between Perth and the other capitals (Column C) to estimate the increase in prices caused by the scheme, measured in cents.

The CPI comparison shows that the largest effects are in the expenditure classes of beer and non-alcoholic beverages. This is to be expected, as eligible containers make up a large part of these categories. The scheme's effects measured in cents per container are similar to the effect estimated in the Invigor and Nielsen retail price data.

- For beer, the CPI estimate is 7.8 cents per container compared to an estimate of 8.3 cents from the analysis of Invigor's retail price data.
- For non-alcoholic beverages, the CPI estimate is 13.1 cents compared to an estimate of 10.4 cents from the analysis of Nielsen's retail price data.

CPI data, where available, indicate that the Containers for Change scheme has increased retail prices in Western Australia and that price estimates are a similar magnitude compared to the difference-in-differences estimates.

5.8 Customer complaints

As a further cross-check of the findings of the regression analysis, the ERA has also considered customer complaints received related to price increases from the scheme.

The ERA has liaised with the Department of Water and Environmental Regulation and WARRRL to understand customer complaints received over the first six months of the scheme's operation.

Eight complaints were received about retail beverage prices. These complaints were received around the time of the introduction of the scheme.

From the feedback from the Department of Water and Environmental Regulation and WARRRL, and the ERA's interactions with the public, it appears that some consumers expected prices to rise by no more than 10 cents per container, as this is the value of the refund they can claim. However, WARRRL also charges suppliers for its operating and administrative costs, in addition to the 10 cent refund cost. Suppliers and retailers may also incur their own internal costs in adopting to and implementing the scheme. Some consumers were also not aware of the different scheme prices that WARRRL charges suppliers, which vary by material. On a weighted average basis, WARRRL's costs were 12.82 cents per container (including GST) during the first 6 months of the scheme's operation.

The ERA considers that the small number of complaints indicates that, in most cases, price increases following the introduction of the scheme were likely to have been less than or in line with consumers' expectations.

Draft findings

The ERA finds that:

- Based on the first six months of the scheme, the estimated retail price increases due to the Containers for Change scheme were:
 - For non-alcoholic beverages, 10.5 cents per container in metropolitan markets (95 per cent confidence interval of 5.5 to 15.5).
 - For alcoholic beverages, 7.6 cents per container in metropolitan markets (95 per cent confidence interval of 5.5 to 9.6).
- In aggregate, regional retail prices also increased due to the scheme by a similar amount as the metropolitan price increases for non-alcoholic and alcoholic beverages, though due to the smaller data set the regional results were more variable.
- Consumer Price Index data indicate that the introduction of Containers for Change did increase the retail prices of beverages covered by scheme.
- There were few complaints about retail beverage price changes resulting from the scheme.

6. Consistency of changes in prices with costs incurred by suppliers

Main points

- The ERA examined whether increases in beverage prices were more than the costs of running the scheme.
- On average, beverage prices rose by less than the weighted average scheme cost of 12.82 cents.
- The average beverage price increases in Western Australia were very similar to those seen in other states when container deposit schemes were introduced.

6.1 Comparison of price changes and the cost to suppliers

Following the analysis of beverage price data, the ERA examined whether changes in beverage prices were more than the costs incurred under the scheme.

The scheme imposes a direct cost on businesses that supply beverages in eligible containers in Western Australia. It is to be expected that suppliers will pass through at least some of this cost to consumers. Price monitoring can detect whether the increase in consumer prices following the scheme's introduction has been less than, roughly equal to, or more than is needed for businesses to recover their extra costs. In practice, the proportion of the scheme cost that suppliers are able to pass through to consumers will depend on a range of factors, particularly on how responsive both the supply of, and demand for, beverages are to price changes.

Beverage price monitoring reviews following the introduction of similar schemes in the Australian Capital Territory, Queensland and New South Wales found that the beverage markets under review were “workably competitive”.²⁵ In such markets, prices typically reflect underlying costs due to rivalry between companies.

The ERA has compared the retail price increases due to the introduction of Containers for Change with the weighted average scheme price of 12.8 cents per container, to assess whether average retail price increases due to the scheme were statistically higher than the scheme price.

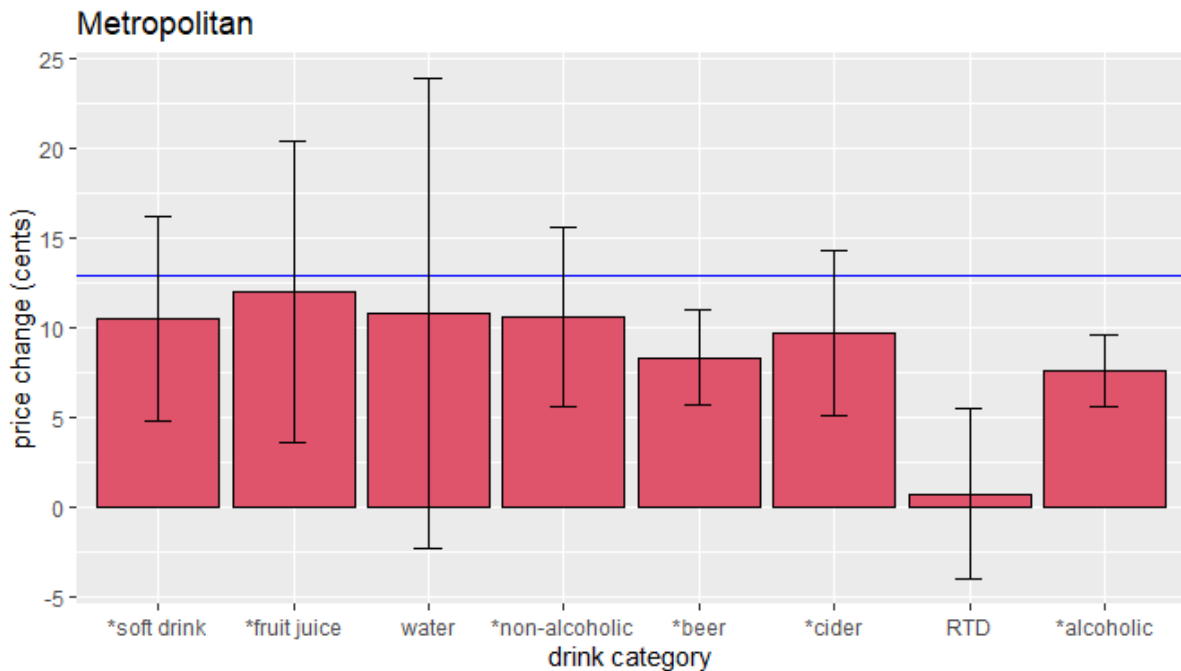
It is possible for average retail price increases for some beverage categories to exceed the overall scheme price. This may be due to the price change not being statistically greater than the scheme cost and/or suppliers incurring some level of indirect costs above the direct costs charged by WARRRL.

The estimates of the retail price change attributable to the introduction of the scheme are shown in Figure 4 and Figure 5. The blue line is the weight average scheme price of 12.82 cents per container (including GST).

²⁵ A workably competitive market is a market where, even if some market power exists, there is enough competition which protects consumers from being abused due to the existence of monopoly power. This is a workable alternative to the theory of perfect competition.

The bars in the figures below represent 95 per cent confidence intervals of the estimates. A confidence interval is a range of values so defined that there is a specified probability that the value of a parameter lies within it. That is, there is a 95 per cent probability that the calculated confidence interval value encompasses the true value of the parameter. The estimated confidence intervals in Figure 4 and Figure 5 are wide. The wider the confidence interval, the less likely it is that the estimate is accurate. For example, in Figure 5 the price change for water has a very wide confidence interval and it is not statistically significant.

Figure 4: Estimated metropolitan price changes from the scheme with error bars representing 95% confidence intervals.

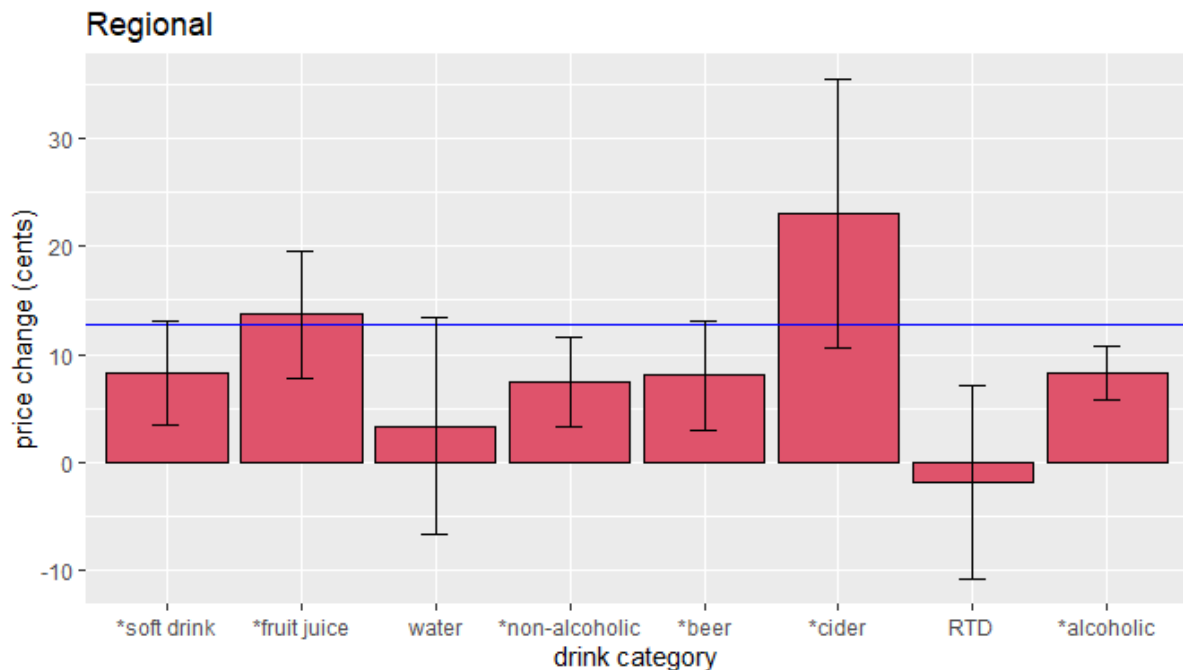


Source: Pink Lake analysis based on NielsenIQ data for non-alcoholic beverages and Invigor Group for alcoholic beverages.

A confidence interval is a range of values so defined that there is a specified probability that the value of a parameter lies within it. There is a 95 per cent probability that the calculated confidence interval value encompasses the true value of the parameter.

* Means estimate is significantly different to zero at 99 per cent confidence.

Figure 5: Estimated regional price changes from the scheme with error bars representing 95% confidence intervals.



Source: Pink Lake analysis based on regional data.

A confidence interval is a range of values so defined that there is a specified probability that the value of a parameter lies within it. There is a 95 per cent probability that the calculated confidence interval value encompasses the true value of the parameter.

* Means estimate is significantly different to zero at 99 per cent confidence.

The figures above illustrate that:

- No estimate is significantly higher than 12.82 cents at a 95 per cent level (that is, with a confidence interval completely above the blue line).
- There are categories of beverages where price changes are significantly lower than the 12.82 cent level (that is, with a confidence interval completely below the blue line).

The estimated overall retail price increase across most beverage categories is equal to or less than the scheme price, whether measured by the estimated actual average price increase, or by the plausible range of price increases indicated by category's confidence interval. There are two exceptions, for the estimated price increases for regional fruit juice and regional cider. These beverage categories have estimated price increases that are above 12.82 cents, although in both cases the 12.82 cents benchmark falls within the confidence interval of the category's price estimate.

Overall, estimated beverage prices have not risen by more than the weighted average scheme cost and in most cases by less than this amount.

6.2 Comparison with other regulators' findings on price effects

The ERA's findings are broadly similar to outcomes of reviews on container deposit schemes in other jurisdictions.

- IPART estimated that for the first year of the operation of New South Wales' scheme average retail beverage prices increased by 7.7 cents per container. This was less than the average direct cost of the scheme, which was 9.3 cents per container (including GST). The average price increase varied across beverage markets and categories, with non-alcoholic beverage prices increasing by 10.1 cents per container and alcoholic beverage prices increasing by 5.1 cents per container.²⁶
- The ICRC estimated that for the first year of the operation of the Australian Capital Territory's scheme average retail beverage prices of non-alcoholic beverages increased by 10 cents and promotional alcoholic beverage prices increased by 11 cents. While this was more than the average direct cost of the scheme, which was 7.5 cents per container (including GST), the ICRC estimated that changes in beverage prices appeared consistent with what would be expected in a workably competitive market.^{27, 28}
- The QPC estimated that for the first year of the operation of Queensland's scheme average retail prices of non-alcoholic beverages increased by 9 cents and alcoholic beverages increased by 9.9 cents per container. This was less than the average direct cost of the scheme, which over the period was 11.2 cents per container (including GST).²⁹

From the experience of schemes in other states, some monthly variability of direct costs arises from changes in the number and type of containers collected and returned. This variability generally is higher in the early months of the scheme, and then reduces as consumer behaviour adapts to the scheme.

Regulators in New South Wales and the Australian Capital Territory also found that the price increases attributable to their schemes were consistent with a workably competitive market.^{30 31} Price increases were broadly in line with scheme costs and did not suggest cost over-recoveries.

²⁶ IPART, *NSW Container Deposit Scheme: Monitoring the impacts on container beverage prices and competition – Final Report*, December 2018, p 2.

²⁷ Independent Competition and Regulatory Commission, *Final Report - Container Deposit Scheme Price Monitoring*, July 2019, p. xviii.

²⁸ In terms of the price impact of the scheme, the ERA's final findings are less comparable between the ERA and Commission because of differences in the type of prices, data used and analytical approach.

²⁹ Queensland Productivity Commission, *Final Report - Container Refund Scheme: Price monitoring review*, August 2019, pp. vi-vii.

³⁰ IPART, *NSW Container Deposit Scheme: Monitoring the impacts on container beverage prices and competition – Final Report*, December 2018, pp 94-95.

³¹ Independent Competition and Regulatory Commission, *Final Report - Container Deposit Scheme Price Monitoring*, July 2019, p. 65.

Draft findings

The ERA finds that:

- Beverage prices have not risen by more than the weighted average scheme cost, and in most cases have risen by less than this amount.
- There is variability between beverage categories in the price effect of the scheme, with some categories having a statistically smaller increase than the scheme price.
- The ERA's findings are broadly consistent with evaluations of container deposit schemes in other jurisdictions.

7. Need for ongoing price monitoring

The Treasurer asked the ERA to assess whether ongoing price monitoring was needed beyond the first year of the scheme.

This step involves the ERA considering the findings of its analysis. If the ERA finds that prices have been increasing by more than the additional cost incurred by suppliers as a result of the scheme, then the ERA will recommend further monitoring to ascertain the reasons for this.

Draft findings

The ERA finds that:

- Data collected to date indicate that beverage prices have not risen by more than the weighted average scheme cost.
- There is no need for ongoing price monitoring.

Appendix 1 Terms of reference

REPORT ON THE EFFECTS OF THE CONTAINER DEPOSIT SCHEME ON BEVERAGE PRICES IN WESTERN AUSTRALIA

28 May 2019

I, BEN WYATT, Treasurer, pursuant to section 38 (1)(b) of the Economic Regulation Authority Act 2003, request that the Economic Regulation Authority (ERA) monitor prices of beverages in containers affected by the Container Deposit Scheme (the Scheme) in accordance with these terms of reference.

The ERA is to monitor prices across Western Australia before commencement of the Scheme and for the following year (the monitoring period). In conducting price monitoring, the ERA should consider:

1. changes in the prices of beverages during the monitoring period and, in particular, whether the prices of beverages increase by more than the amount suppliers are charged by the Scheme Coordinator; and
2. information provided by Scheme participants, retailers, and consumers through consultation.

The ERA is to report to the Treasurer on:

1. the effect of the Scheme on prices of beverages during the monitoring period;
2. the method applied by the ERA to assess the effect of the Scheme on prices of beverages during the monitoring period; and
3. recommendations to address any adverse effects on prices arising from the Scheme and on the need to continue price monitoring.

The ERA will release a draft report about the above matters based on analysis of the first six months of operation of the Scheme, for public consultation. The ERA will provide a final report, including recommendations, no later than six months after the monitoring period has concluded.

Appendix 2 Empirical approach

Quantifying a policy effect through the difference-in-differences approach requires regression modelling.

The difference-in-differences method is the most robust method available to quantify the price impact of a market intervention such as a container deposit scheme. The difference-in-differences approach has been applied in rigorous ways by other regulators, with the same proposed datasets.

The approach performs regression analysis on beverage container prices for each container category (that is, each market segment) to isolate the impact of the container deposit scheme.

For each beverage category, price changes due to the scheme are quantified using the following regression model.

$$P_{it} = \beta_0 + \beta_1 WA + \beta_2 CDSWA + \beta_3 WA \times CDSWA + y_{i,t,r} X_{i,t,r} + \beta_3 Time_t + \epsilon_{i,t}$$

where:

P_{it} is the price of product i at time t , expressed in \$ per container

WA is an indicator variable, equalling 1 if product i is sold in WA, and 0 otherwise

$CDSWA$ 1 if time t is after the introduction of the scheme in WA and 0 otherwise.

$WA \times CDSWA$ denotes the interaction between the WA and $CDSWA$ indicator variables, and equals 1 if $WA = 1$ and $CDSWA = 1$

X_{it} is a set of confounding attributes associated with product i in month t . These factors are included as control variables to isolate the impacts of these confounding variables on beverage prices. Confounding attributes may include: product sizes, package types and manufacturers.

$Time_t$ is a time variable.

ϵ_{it} the error term.

Of note:

- The dependent variable in the regression is the price of a product.
- B_0 is an intercept term that represents a starting price for an 'average product' at the start of the period.
- B_1 captures possible differences in beverage prices between Western Australia and the other control states.
- B_2 captures general price escalation for both Western Australia and the control state after treatment.
- B_3 is the main coefficient of interest which captures the average change in beverage prices in Western Australia that is due to the scheme. This is the difference-in-differences estimates, which captures the price impact of the scheme attributable to the scheme itself in each of the relevant months.

- y represents a list of other factors that may affect beverage prices. Beverage price per container may vary across different dimensions such as size, package type, price type, retailer, etc. To isolate the impacts of these confounding factors on beverage prices, we control for several product characteristics, which are captured in the coefficient(s) y . The exact classification of product characteristics may vary between product types (e.g. fruit juice packages are generally a smaller size than soft drink sizes).
 - Adding many beverage and retailer attributes will increase the complexity of the model, more so if interactions between these attributes and the price response over time are also considered.
 - B_{size} , captures the price impact of package size. For example, products can be categorised into three size groups:
 - Small, less than or equal to 600 ml
 - Medium, between 600 ml and 1 litre (inclusive)
 - Large, greater than 1 litre.

The coefficients for size would be B_{small} (with variable X_{small} equal to 1 is a small size) and B_{medium} (with variable X_{medium} equal to 1 is a medium size). If variables X_{small} and X_{medium} are both zero, then the pack size represents a large pack (which is built into the intercept).
 - B_{brand} , captures the price impact of product brand. For example, brand category will indicate whether a product is a major, private label or any other brand.
 - The coefficients for size would be B_{private} (with variable X_{private} equal to 1 is a private label) and $B_{\text{otherbrand}}$ (with variable $X_{\text{otherbrand}}$ equal to 1 is a other brand). If variables X_{private} and $X_{\text{otherbrand}}$ are both zero, then the brand represents a major brand (which is built into the intercept).
 - B_{retailer} , captures the price impact of retailer type. For example, retailer category will indicate whether a product is sold at a major retailer or a non-major, second-tier or other retailer.

The coefficients for size would be $B_{\text{secondtier}}$ (with variable $X_{\text{secondtier}}$ equal to 1 is a second tier retailer) and $B_{\text{otherretailer}}$ (with variable $X_{\text{otherretailer}}$ equal to 1 is a other retailer). If variables $X_{\text{secondtier}}$ and $X_{\text{otherretailer}}$ are both zero, then the retailer is a major retailer (which is built into the intercept).
 - B_{packtype} , captures the price impact of package type (that is, multi pack). Multi pack is a binary variable X_{multi} that is equal to 1 if a product is a multi-pack and zero, otherwise.
- δ captures the general monthly escalation factor for the product.

The above model assesses the overall scheme effect as a whole across the period.