



**Economic Regulation Authority**

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

Final report

11 February 2022

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## Executive summary

In May 2019 the State Government asked the Economic Regulation Authority to monitor any effect that the new container deposit scheme, Containers for Change, had on drink prices. The Government asked the ERA to do this to help ease any community concerns that the introduction of the scheme might be used to unfairly increase drink prices.

Containers for Change commenced on 1 October 2020. Through the scheme, consumers can return eligible drink containers to receive a refund of 10 cents each.

The State Government introduced the scheme to increase the rate of recycling and reduce littering in Western Australia. The scheme mostly targets single-serve drinks – such as bottled water, soft drinks, beer and cider – that are most likely to be consumed outside the home and become litter.

Drink suppliers pay a fee to fund the cost of Containers for Change. This fee is charged on each container and includes both the costs of paying refunds and operating the scheme.

The ERA monitored drink prices before and after the scheme's introduction to determine whether suppliers and retailers increased prices by more than the amount they were being charged to take part in the scheme.

In July 2021 the ERA released a draft report on the scheme's first six months, which found that average price increases were below the cost of operating the scheme.

This final report covers the scheme's first year of the operation.

### Findings

Over the first year of the scheme, fees have remained unchanged. The average scheme fee was 12.82 cents per container.

The ERA finds that, on average, the drink price increases over the first year of the scheme are less than, or very close to, the average scheme fee.

### Effect on drink prices – Metropolitan region

<b>Non-alcoholic beverages</b>			
Average increase from Containers for Change: <b>13.2 cents</b>	Soft drinks 13.5 cents	Water 12.0 cents	Fruit juice 12.3 cents
<b>Alcoholic beverages</b>			
Average increase from Containers for Change: <b>3.9 cents</b>	Beer 3.3 cents	Ready-to-drink 7.5 cents	Cider 5.7 cents

Regional price changes were similar to those in the metropolitan area, but more variable due to the smaller data set and more volatile regional prices.

Both the cost of running Containers for Change and the average drink price increases are similar to those in other Australian states with container deposit schemes.

### **Recommendation**

The ERA finds that there is no evidence to suggest that drink suppliers and retailers have exploited the introduction of the container deposit scheme to increase drink prices by an amount in excess of the additional costs incurred as a result of the scheme. Therefore, the ERA recommends not continuing with further price monitoring.

# 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's container deposit scheme, called Containers for Change, commenced operation.

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 can 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.<sup>1</sup>

The Department of Water and Environmental Regulation (DWER) is the government policy agency responsible for the introduction of the scheme and its legislation and has broad oversight of 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. This cost compromises the 10-cent refund per container and costs for the scheme's operation and administration.

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

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<sup>1</sup> WARRRL, About us, available [online](#).

## 1.1 Eligible containers

The scheme targets beverages that are most likely to be consumed outside of the home, the containers of which are 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).
- 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, 1.420 billion eligible containers were sold over the first year of the scheme's operation.<sup>2</sup>

## 1.2 Refund points

Containers for Change has 213 refund points as at 30 June 2021.

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.

Refunds for 766 million containers have been paid through refund points and material recovery facilities over the first year of the scheme, or 54 per cent of eligible containers.<sup>3</sup>

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<sup>2</sup> Provided by DWER.

<sup>3</sup> Provided by DWER.

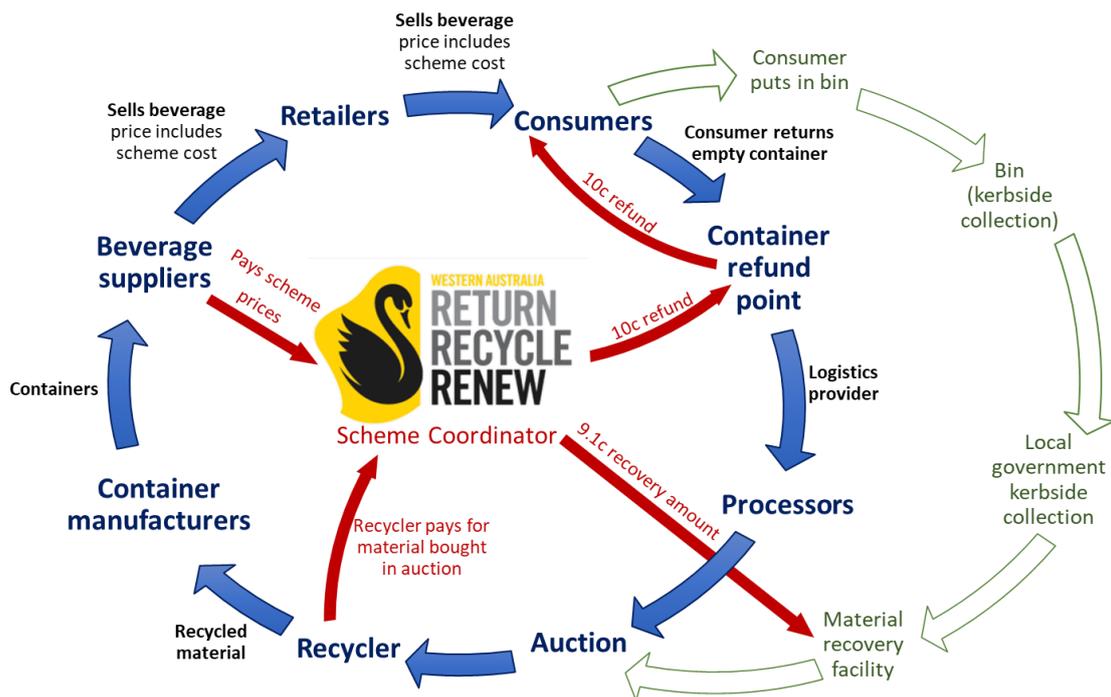
## 1.3 Container deposit scheme participants and process flow

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	DWER 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.

**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 include operating and administering the scheme, and the costs of paying a 10-cent refund to consumers or 9.1-cent refund to materials recovery facilities.

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 may increase the price of eligible beverages. Suppliers can 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<sup>4,5</sup>**

State/Territory	Start date	Description	Return rate <sup>6</sup>
South Australia	1977	South Australia was the first state to implement a scheme.	The scheme had a return rate of 76 per cent in 2020/21.
Northern Territory	January 2012	The Northern Territory's scheme was modelled on the South Australian scheme.	The scheme had a return rate of around 72 per cent in 2020/21.
New South Wales	December 2017	New South Wales developed its own scheme.	The scheme had a return rate of around 53 per cent over the first 12 months of operation and 67 per cent in 2019/20.
Australian Capital Territory	June 2018	The Australian Capital Territory's scheme was designed to be consistent with the New South Wales scheme.	The scheme had a return rate of around 35 per cent over the first 12 months of operation and 50 per cent in 2019/20.
Queensland	November 2018	Queensland's scheme was designed to be similar to existing schemes.	The scheme had a return rate of 50 per cent over the first 12 months of operation and 62 per cent in 2020/21.
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 schemes and for the State's requirements.	The scheme had a return rate of 54 per cent over the first 12 months of operation. WARRRL has a target return rate of 65 per cent for 2021/22.

<sup>4</sup> Independent Competition and Regulatory Commission, *Container Deposit Scheme Price Monitoring – Final Report*, July 2019, pp. 9-10.

<sup>5</sup> Queensland Productivity Commission, *Final Report Container Refund Scheme Price monitoring review*, January 2020, pp. 35-36.

<sup>6</sup> The return rate is the proportion of the total number of eligible containers that make their way back to the scheme coordinator. Return rates sourced from scheme coordinator annual reports.

## 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
- a final report on analysis of a year of the scheme (this report).

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 that 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).<sup>7, 8, 9</sup>

The steps in the ERA's approach and the structure of this final 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 4
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 metropolitan and regional areas. As a cross check, the data is compared with Consumer Price Index data and stakeholder feedback.	Chapter 5
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 6
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 7

<sup>7</sup> IPART, *NSW Container Deposit Scheme: Monitoring the impacts on container beverage prices and competition – Final Report*, December 2018.

<sup>8</sup> Independent Competition and Regulatory Commission, *Container Deposit Scheme Price Monitoring – Final Report*, July 2019.

<sup>9</sup> 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 12 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 but are likely to be small.
- As six other states and territories already have container deposit schemes, most large beverage suppliers were already 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 by WARRRL 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
<b>Weighted average cost</b>	<b>11.65</b>	<b>1.17</b>	<b>12.82</b>

Source: WARRRL<sup>10</sup>

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).

<sup>10</sup> WARRRL, *First Responsible Suppliers*, available [online](#).

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

- Queensland had a weighted average scheme price of 12.76 cents (including GST).<sup>11</sup> Queensland as part of its annual scheme price review reduced its scheme prices from 1 August 2021 to equal a weighted average of 12.0 cents.<sup>12</sup>
- New South Wales had a weighted average scheme price of 12.62 cents (including GST).<sup>13</sup> As part of its annual scheme price review, the scheme changed its prices from August 2021 to equal a weighted average of 13.68 cents (including GST).<sup>14</sup>
- The Australian Capital Territory has a weighted average scheme price of around 13 cents (including GST).<sup>15</sup> The scheme announced a move to longer-term fixed pricing, and will change pricing effective from February 2022. The new weighted average price will be 13.45 cents (including GST).<sup>16</sup>

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.<sup>17</sup>

## 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:<sup>18</sup>

- 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.

<sup>11</sup> Queensland Productivity Commission, *Final Report Container Refund Scheme Price monitoring review*, January 2020, p. 19.

<sup>12</sup> COEX Container Exchange, *Beverage manufacturers*, available [online](#).

<sup>13</sup> Exchange for Change, *Media Release New pricing announced for NSW Container Deposit Scheme supplier contributions*, 31 March 2021.

<sup>14</sup> Exchange for Change, *NSW supplier obligations*, available [online](#).

<sup>15</sup> 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.

<sup>16</sup> Exchange for Change, *Fact Sheet: ACT container deposit scheme supplier contribution pricing*, 1 October 2021, available [online](#).

<sup>17</sup> Exchange for Change, *Summary of pricing and contribution approach changes*, available [online](#).

<sup>18</sup> Independent Competition and Regulatory Commission, *Container Deposit Scheme Price Monitoring – Final Report*, July 2019, p. 40.

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 high at the commencement of the scheme but low 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 to conclude 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.<sup>19</sup>

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.

## 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 12 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.

<sup>19</sup> IPART, NSW Container Deposit Scheme: Monitoring the impacts on container beverage prices and competition – Final Report, December 2018, p 58.

## 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 segregated the data into non-alcoholic and alcoholic beverage categories, and metropolitan and regional areas.
- For the first 12 months of the scheme, the ERA has found that:
  - For non-alcoholic beverages, prices went up by an average of 13.2 cents per container in the metropolitan area.
  - For alcoholic beverages, prices went up by 3.9 cents per container in the metropolitan area.
- Regional price increases were similar on average but more variable compared to the increases in Perth.
- With the exception of regional cider (which has more volatile underlying prices), the average price increases were consistent with the cost of administering and operating the scheme, with some beverage categories increasing by less than that cost.

### 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 opaque. Retailers may practice “lumpy pricing”, that is, they may change prices in particular increments rather 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.<sup>20</sup>

<sup>20</sup> 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.

- Considering changes in price indices for beverages published by the Australian Bureau of Statistics (ABS).
- Considering stakeholder feedback.

## 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 non-alcoholic and alcoholic beverage markets are separate markets. This finding is consistent with the assessments of regulators in other States. The distinctions between non-alcoholic and alcoholic beverage markets are evident 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 price dynamics.

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

- Two separate markets for non-alcoholic and 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 and territories over the monitoring period of October 2019 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 Resource 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.

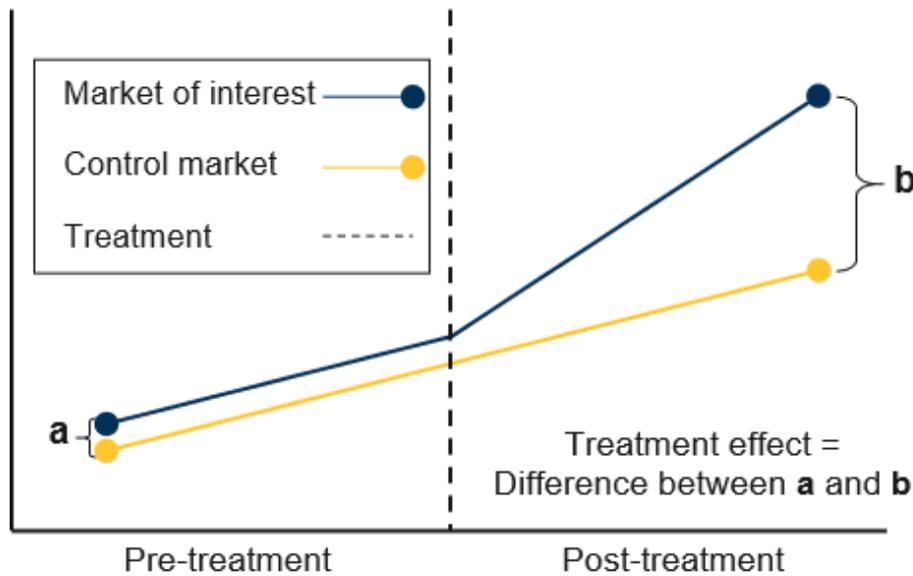
Difference-in-differences is a statistical technique commonly used to evaluate a policy effect. For this approach outcomes are observed for two groups over two time periods – a control group that is not exposed to any treatment (a policy measure or similar change) in either time period and a treatment 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. Due to its use of a control, the difference-in-differences approach provides a stronger indicator of price changes resulting from a policy treatment than other analytical techniques such as strict time series analysis of the intervention market, or a cross-sectional analysis of the two markets post-intervention.<sup>21</sup>

<sup>21</sup> Time series analysis looks at a sequence of data points collected over an interval of time. A time series analysis compares a product's price before and after the policy intervention. This before and after analysis does not consider what the price path for the product would be in the absence of the intervention, which the difference-in-differences approach does through using a control as a counterfactual. Cross-sectional analysis looks at data from a population collected at a single point in time, rather than over a period of time. A cross-sectional analysis post intervention utilises a control for comparison purposes but does not adjust for how prices behave over time.

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 estimated to examine 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 that product and to focus on the introduction of the scheme. In the analysis, non-eligible containers are also excluded.

The ERA used the same method in the draft report.

The ERA considers that its analytical approach is robust enough to deal with any effect on prices due to the COVID-19 pandemic and that 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 report by consultants Pink Lake Analytics, which is available on the ERA website.<sup>22</sup>

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 ABS.

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

## 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 final report.<sup>23</sup>

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)**

Beverage market	Beverage type	Final report (for first 12 months of the scheme)
<b>Non-alcoholic</b>		13.2*
	Water	12.0*
	Soft drink	13.5*
	Fruit juice	12.3*
<b>Alcoholic</b>		3.9*
	Beer	3.3*
	Cider	5.7*
	Ready-to-drink	7.5*

Source: Pink Lake Analytics 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.

\* Means estimate is significantly different to zero at 99 per cent confidence and there is a very high likelihood the estimate is different to zero. A 99 per cent confidence level means that there is a 99 per cent probability that the true value of the estimated parameter is not 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.

Given 12 months of data and the larger sample size, the ERA has greater confidence in these estimates compared to the draft report.

<sup>22</sup> Pink Lake Analytics, *Container Deposit Scheme Pricing Monitoring – 12 Month Report*, January 2022.

<sup>23</sup> Pink Lake Analytics, *Container Deposit Scheme Pricing Monitoring – 12 Month Report*, January 2022.

### **5.5.1 Non-alcoholic beverages**

During the first 12 months of the scheme's operation, the ERA estimates that retail prices have increased for non-alcoholic beverages by 13.2 cents per container in metropolitan markets. This estimated increase was significantly different to zero, but in line with the scheme cost of 12.82 cents. This means that we can say with confidence that the true increase from the scheme for non-alcoholic beverages was greater than zero, but not greater than the scheme cost.

The estimated effect of 13.2 cents per container is higher than that reported in the draft report of 10.5 cents per container, which was calculated using data that covers the first six months of the scheme to March 2021.

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

The introduction of the scheme has resulted in a statistically significant estimated price increase for soft drink of 13.5 cents, for water of 12.0 cents and for fruit juice of 12.3 cents. This means that we can say with confidence the true increase from the scheme for these categories was greater than zero.

The estimates for soft drinks and fruit juice were more precise than those of water, as water had higher estimation errors.

While the estimated 13.5 cent increase of soft drink in the metropolitan market was greater than 12.82 cents, this estimated increase was not found to be statistically higher than the scheme cost of 12.82 cents.

### **5.5.2 Alcoholic beverages**

During the first 12 months of the scheme's operation, the estimated price increase for alcoholic beverages was 3.9 cents per container in metropolitan markets. This estimated increase was statistically different to zero and statistically lower than the scheme cost of 12.82 cents. Therefore, the ERA can say with confidence that the true increase from the scheme for alcoholic beverages was less than the scheme cost.

The estimated impact of 3.9 cents per container is lower than that reported in the draft report of 7.6 cents per container, which was calculated using data that covered the first six months of the scheme.

For alcoholic drinks the final estimated price effects did show some variance across the three beverage types.

The introduction of the scheme has resulted in a statistically significant estimated price increase for beer of 3.3 cents, for cider of 5.7 cents and for ready-to-drink of 7.5 cents.

## **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.

The ERA used econometric analysis to analyse the regional dataset to quantify changes in regional retail beverage prices attributable to the Containers for Change scheme.

## 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 final report.<sup>24</sup>

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

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

Beverage market	Beverage type	Final report (for first 12 months of the scheme)
<b>Non-alcoholic</b>		7.2*
	Water	(0.9)
	Soft drink	8.9*
	Fruit juice	11.6*
<b>Alcoholic</b>		14.4*
	Beer	13.6*
	Cider	32.8*
	Ready-to-drink	7.6

Source: Pink Lake Analytics 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.

\* Means estimate is significantly different to zero at 99 per cent confidence and there is a very high likelihood the estimate is different to zero. A 99 per cent confidence level means that there is a 99 per cent probability that the true value of the estimated parameter is not 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.

<sup>24</sup> Pink Lake Analytics, *Container Deposit Scheme Pricing Monitoring – 12 Month Report*, January 2022.

### **5.6.3 Non-alcoholic beverages**

During the first 12 months of the scheme's operation, the ERA estimates that retail prices have increased for non-alcoholic beverages by 7.2 cents per container in regional markets. This estimated increase was significantly different to zero, and statistically lower than the scheme cost of 12.82 cents. Therefore, the ERA can say with confidence that the true increase from the scheme for regional non-alcoholic beverages was less than the scheme cost.

The estimated impact of 7.2 cents per container was similar to that reported in the draft report of 7.3 cents per container, which was calculated using data that covered the first six months of the scheme. Like the draft report, the small regional sample meant some results were not significantly different to zero.

For non-alcoholic drinks the final estimated price effect did show an increase for soft drinks and fruit juice. The introduction of the scheme has resulted in statistically significant estimated price increases for soft drink of 8.9 cents, and for fruit juice of 11.6 cents. The regional data produced similar estimated price effects to metropolitan data for fruit juice.

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.

### **5.6.4 Alcoholic beverages**

During the first 12 months of the scheme's operation, the price of alcoholic beverages increased by an estimated 14.4 cents per container in regional markets. This estimated increase was significantly different to zero, and is only statistically greater than the scheme cost of 12.82 cents at the lower confidence level of 90 per cent. This means that the ERA can say with confidence that the true increase from the scheme for regional alcoholic beverages was greater than zero, but may not be greater than the scheme cost.

The estimated impact of 14.4 cents per container is higher than that reported in the draft report of 8.2 cents per container, which was calculated using data that covers the first six months of the scheme to March 2021. Compared to the draft report, the increased regional sample size has resulted in all estimates being statistically significant at the 90 per cent level.

The final estimated price effect for alcoholic drinks in regional areas are characterised by large variances across the three beverage types. Regional data also produced differing estimated price effects to metropolitan data for beer and cider.

The introduction of the scheme has resulted in a statistically significant estimated price increase for beer of 13.6 cents, and for cider of 32.8 cents. The regional increase in beer was not found to be statistically higher than the scheme cost of 12.82 cents.

There was a weak statistically significant scheme effect observed for the price of ready-to-drink beverages in the regional data of 7.6 cents.

The regional results for cider suggest its price increased considerably more than the average alcoholic drink. While this result was statistically significant, it should be treated with caution due to the regional cider market being highly segmented. This segmentation includes a range of highly priced boutique ciders, and differently priced cider products that have unique price movements over time. The resulting volatility of underlying cider prices means that the model has some difficulty producing reliable results.

Recognising that the large price effect for cider needs to be interpreted with caution, the ERA estimates the average regional alcoholic beverage price effect excluding cider, which produces an estimated price increase of 13.1 cents per container, which is not statistically greater than 12.82 cents. This means that the ERA can say with confidence that the true increase from the scheme for regional alcoholic beverages excluding cider was greater than zero, but not greater than the scheme cost.

## 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 ABS.

The Consumer Price Index (CPI) provides data on beverage prices for the eight capital cities and is released quarterly by the ABS.<sup>25</sup> 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 ERA has analysed the following:

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.
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 Analytics analysed how beverage prices changed after the introduction of the scheme in Western Australia and compared this to the change in other capital cities. Pink Lake found that:

- Beer and non-alcoholic beverages increased after the September 2020 quarter.

<sup>25</sup> Australian Bureau of Statistics, *Consumer Price Index, Australia – September 2021*, available [online](#).

- For milk, alcoholic and spirits there were smaller price increases over the year (eligible containers make up only a small part of these categories).
- Wine prices slightly decreased (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 Analytics 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	2.8	1.4	1.3	4.0	5.4
Beer	3.6	1.2	2.3	3.8	8.8
Milk	1.7	0.7	1.0	-	-
Non-alcoholic	12.4	1.7	10.5	1.2	12.9
Spirits	3.4	1.7	1.6	-	-
Wine	1.3	1.4	-0.1	-	-

Source: Pink Lake Analytics 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 varied from the effect estimated in the Invigor and Nielsen retail price data:

- For beer, the CPI estimate is 8.8 cents per container compared to an estimate of 3.3 cents from the analysis of Invigor's retail price data.
- For non-alcoholic beverages, the CPI estimate is 12.9 cents compared to an estimate of 13.2 cents from the analysis of Nielsen's retail price data.

CPI data, where available, indicates that beverage prices Western Australia have been increasing.

The granular data that underlies the difference-in-differences analysis, along with controls for other variables that have explanatory power with price, are likely to provide a more accurate estimate of the scheme price change. The CPI cross-check indicates that prices did increase in Perth for beverages, with the same relativity observed for scheme price effects between non-alcoholic and alcoholic drinks. The CPI analysis provides some confirmation of the difference-in-differences estimates produced for the metropolitan areas.

## **5.8 Customer complaints**

The ERA considered customer complaints received about price increases from the scheme.

The ERA has liaised with DWER and WARRRL to understand customer complaints received over the first 12 months of the scheme's operation.

Eight complaints were received about retail beverage prices, mostly when the scheme first started.

In response to the ERA's draft report, the ERA received two general submissions. One submission noted price effects and commented that the price impacts were in line with other state experiences. The other provided general comment on the scheme.

From the feedback from DWER 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 adopting and implementing the scheme. Some consumers were also not aware of the different scheme prices that WARRRL charges suppliers, which vary by material.

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.

## Findings

The ERA finds that:

- Based on the first 12 months of the scheme, the estimated retail price increases due to the Containers for Change scheme were:
  - For non-alcoholic beverages, 13.2 cents per container in metropolitan markets.
  - For alcoholic beverages, 3.9 cents per container in metropolitan markets.
- Overall, regional retail price changes were more variable than the metropolitan area due to the smaller regional data set.
- With the exception of regional cider (which has a small sample size), the average price increases were consistent with the cost of administering and operating the scheme, with some beverage categories increasing by less than that cost.
- CPI data indicates that the introduction of Containers for Change did increase the retail prices of beverages covered by scheme.
- There were very 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". 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 12.82 cents per container, to assess whether average retail price increases due to the scheme were statistically higher than the scheme price.

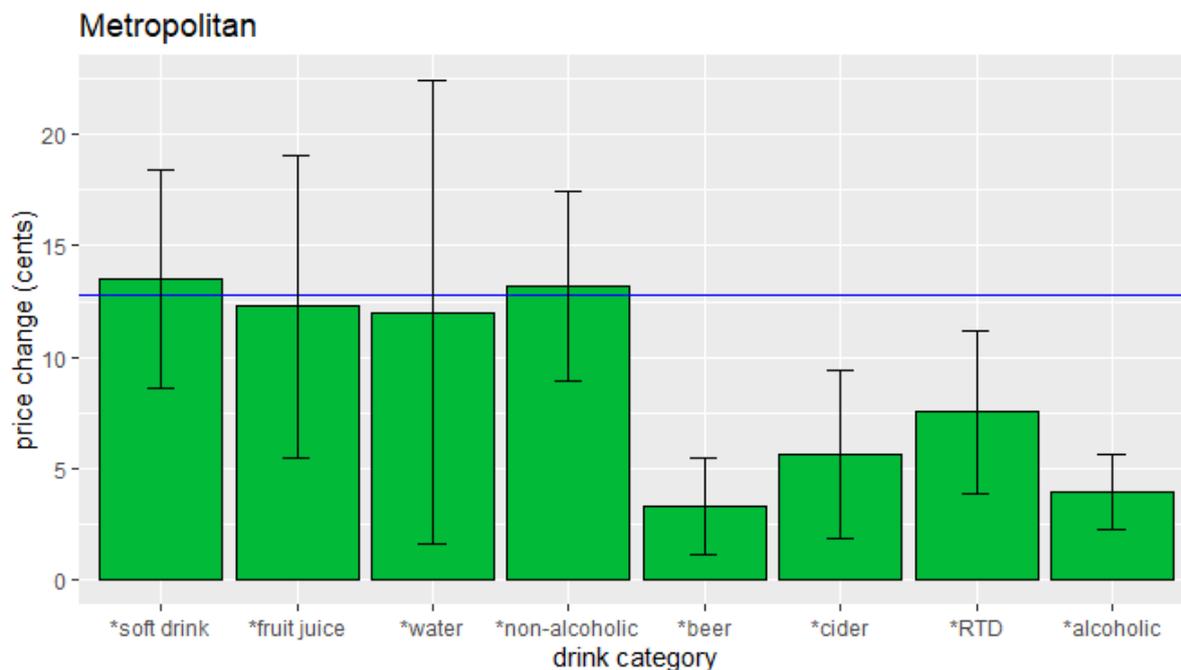
It is possible for the average estimated retail price increases for some beverage categories to exceed the overall scheme price. A price estimate greater than 12.82 cents may be due to:

- The estimate's natural estimation error. This means that the estimated price effect of the scheme may be higher or lower than the true effect of the scheme.
- Other factors unrelated to the container deposit scheme. Whilst the model attempts to estimate/isolate the scheme effect on prices through controlling for product characteristics, there may be omitted variables given the inability to observe and incorporate all price factors into the difference-in-difference model.
- Suppliers may incur some level of indirect costs above the direct costs charged by WARRRL. These indirect costs could be passed through to beverage prices, which are captured by the model, but not included within the scheme price.

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 weighted average scheme price of 12.82 cents per container (including GST).

As the model estimates have some degree of uncertainty, confidence intervals are presented to indicate the precision of such estimates. A confidence interval presents a range of values that the true estimate is likely to be at a specified probability. The bars in the figures below represent 95 per cent confidence intervals of the estimates. That is, there is a 95 per cent probability that the calculated confidence interval encompasses the true value of the parameter.

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

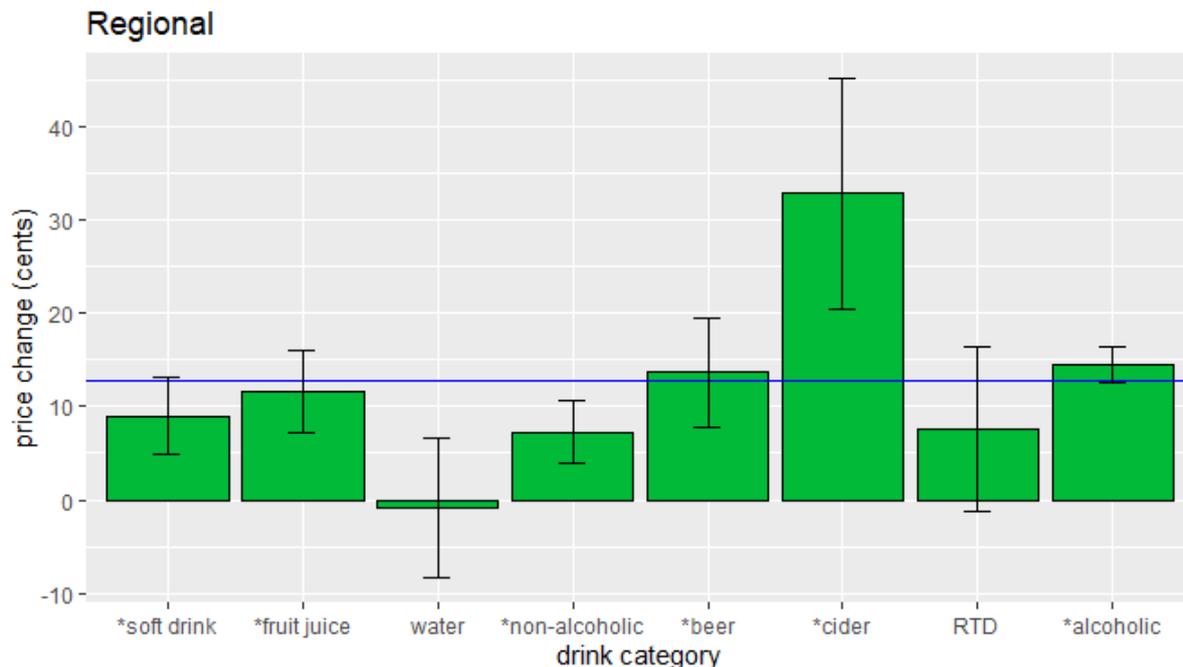


Source: Pink Lake Analytics analysis based on NielsenIQ data for non-alcoholic beverages and Invigor Group for alcoholic beverages.

A confidence interval is a range of values that there is a specified probability that the true value of a parameter lies within it. There is a 95 per cent probability that the calculated confidence interval encompasses the true value of the parameter. The narrower the confidence interval the more confidence we have that the estimate reflects the actual effect. The wider the confidence interval the less confidence we have that the estimate reflects the actual effect.

\* Means estimate is significantly different to zero at 99 per cent confidence and there is a very high likelihood the estimate is different to zero. A 99 per cent confidence level means that there is a 99 per cent probability that the true value of the estimated parameter is not zero.

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



Source: Pink Lake Analytics analysis based on regional data.

A confidence interval is a range of values that there is a specified probability that the true value of a parameter lies within it. There is a 95 per cent probability that the calculated confidence interval encompasses the true value of the parameter. The narrower the confidence interval the more confidence we have that the estimate reflects the actual effect. The wider the confidence interval the less confidence we have that the estimate reflects the actual effect.

\* Means estimate is significantly different to zero at 99 per cent confidence and there is a very high likelihood the estimate is different to zero. A 99 per cent confidence level means that there is a 99 per cent probability that the true value of the estimated parameter is not zero.

The figures above illustrate that:

- There is a high likelihood that beverage prices did not increase by amounts greater than the scheme cost. The majority of estimates were not significantly higher than 12.82 cents at a 95 per cent level (that is, with a confidence interval completely above the blue line).
- There is a high likelihood that multiple beverage categories experienced a price increase from the scheme which are less than the scheme cost. 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 regional cider price effects was large and needs to be interpreted with caution. Based on the observed price data, there is a high likelihood that the scheme's price effect for regional cider increased by more than the scheme cost.

The estimated overall retail price increase across most beverage categories is equal to or less than the scheme price. The exceptions to this are:

- For soft drinks in the metropolitan area and beer in the regional areas. While both the estimated price increases are above 12.82 cents, the 12.82 cents benchmark falls within the confidence interval of the category's price estimate and therefore the price increases are not statistically greater than the scheme price. Furthermore, the estimated effects for both beverage categories are reasonably close to the scheme price.

- For cider in the regional areas. Regional cider has a large increase above the 12.82 cent benchmark. This result has been further investigated and the underlying price data reviewed. While this result was statistically significant, it should be treated with caution. Regional cider products appear to be highly segmented with prices displaying a lot of volatility, both in terms of large price differences between cider products but also high changes in price over time.

Overall, estimated beverage prices have not risen by more than the weighted average scheme cost and in many 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 the 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.<sup>26</sup>
- 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.<sup>27, 28</sup>
- 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).<sup>29</sup>

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.

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

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

<sup>28</sup> 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.

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

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.<sup>30,31</sup> Price increases were broadly in line with scheme costs and did not suggest cost over-recoveries.

## Findings

The ERA finds that:

- Overall beverage prices have not risen by more than the weighted average scheme cost, and in most cases have risen by less than this amount.
- The size of the estimated beverage price increase from the scheme does vary by beverage category. Prices in some beverage categories increased by less than the scheme cost.
- The ERA's findings are broadly consistent with evaluations of container deposit schemes in other jurisdictions.

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

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

## 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.

The ERA finds that overall prices have not been increasing by more than the additional cost incurred by suppliers as a result of the scheme, and consumer complaints about the scheme's effects on prices have been very few. Therefore, the ERA does not recommend further monitoring. The experience in other states also supports the ERA recommendation not to continue to monitor prices.

### Findings

The ERA finds that:

- Data collected to date indicate that overall beverage prices have not risen by more than the weighted average scheme cost.
- There is no evidence to suggest that suppliers and retailers of beverages have exploited the introduction of the container deposit scheme to increase beverage prices by an amount in excess of the additional costs incurred as a result of the scheme.
- There is no justification 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.

$$P_{it} = \beta_0 + \beta_1 WA + \beta_2 CDSWA + \beta_3 WA \times CDSWA + y_{i,t,r} X_{i,t,r} + \beta_4 Time_t + \epsilon_{i,t}$$

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.

$\epsilon_{it}$  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.

- $\gamma$  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)  $\gamma$ . The exact classification of product characteristics may vary between product types (e.g. fruit juice packages are a 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.
  - $B_{\text{size}}$ , 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  $B_{\text{small}}$  (with variable  $X_{\text{small}}$  equal to 1 is a small size) and  $B_{\text{medium}}$  (with variable  $X_{\text{medium}}$  equal to 1 is a medium size). If variables  $X_{\text{small}}$  and  $X_{\text{medium}}$  are both zero, then the pack size represents a large pack (which is built into the intercept).
  - $B_{\text{brand}}$ , 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  $B_{\text{private}}$  (with variable  $X_{\text{private}}$  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  $X_{\text{private}}$  and  $X_{\text{otherbrand}}$  are both zero, then the brand represents a major brand (which is built into the intercept).
  - $B_{\text{retailer}}$ , 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).
  - $B_{\text{packtype}}$ , captures the price impact of package type (that is, multi pack). Multi pack is a binary variable  $X_{\text{multi}}$  that is equal to 1 if a product is a multi-pack and zero, otherwise.
- $B_4$  captures the general monthly escalation factor for the product.

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