NERA
ECONOMIC CONSULTING

Grocery price benchmarking

Woolworths New Zealand Limited

4 February 2021

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Contents

1. Introduction

1. We have been asked by Woolworths New Zealand Limited ("WWNZ") to compare grocery prices in New Zealand to those in comparator countries.
2. This type of international benchmarking is difficult for a variety of reasons, including:
   A. The prices are surveyed in different currencies;
   B. Consumers have different incomes, buying habits and preferences in different countries;
   C. Product "quality" and other product characteristics may vary across countries; and
   D. Taxes and other government interventions might affect prices differentially across countries.
3. However, there are sources of data and techniques that can be used to benchmark prices, if implemented and interpreted carefully (although multiple different factors, such as those outlined above, mean that benchmarking of prices does not necessarily enable any comparisons or conclusions to be drawn in relation to the extent of competition).
4. Sections 2 through 4 describe our methodology for this analysis, while Section 5 sets out our results. More technical details on methodology are included in footnotes.

2. Data source

5. The Economist Intelligence Unit ("EIU") surveys the price of certain grocery products twice per year across numerous cities for its CityData tool. NERA has subscribed to the EIU's CityData database. A condition of this subscription is inclusion of the following EIU disclaimer:

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6. The EIU data covers grocery products in 140 cities. For our analysis, we have excluded cities in non-OECD countries, which leaves us with 67 cities.[1]
7. The EIU data covers 89 products from what it categorises as "supermarkets" (being "supermarkets or equivalent high-volume outlets") and "mid-priced stores" (being "mid-priced stores or equivalent middle-market retail outlets"). However, not all of these products are common across all OECD city-years. We limit our analysis to products common across the cities we analyse in the year we analyse them, as we describe in more detail below.
8. We initially focussed our analysis on the "supermarket" category. However, in response to a set of clarifying questions, we were informed by the EIU representative on 3 February 2021 that:
   A. PAK'nSAVE stores were surveyed under the supermarket category; and
   B. Countdown, New World and Farro Fresh stores were surveyed under the mid-priced store category.
9. Accordingly, we have now also applied our methodology to the mid-priced store category and to a blend ("average") of both categories, as we explain further below.
10. To date we have analysed the EIU data for 2019 and 2020, although we do have access to more historic data.

[1] We note that the Commission has also used OECD countries as comparators for benchmarking exercises in the past. See, for example, NZCC, *International Price Comparison for Retail Mobile Telecommunications Services 2013*, March 2014, p 4.

3. Conversion to a common currency

11. When carrying out international price benchmarking, the Commerce Commission ("NZCC") has converted local currency prices into a common currency using:
    A. "Purchasing power parity" ("PPP") for "non-tradable" products; and
    B. A 10-year average market exchange rate for "tradable products".[2]
12. We note that Statistics NZ defines the "supermarket and grocery stores" industry as non-tradable.[3] Accordingly, we use PPP to convert all prices into international dollars. These are sourced from the OECD.[4]

4. Comparability

13. Typically for international benchmarking a specific product or basket of products is identified and priced in each country (for example, fixed broadband or a bundle of broadband and a mobile phone plan).
14. Because of different preferences and income, the typical consumer grocery basket is likely to vary across countries. Even within a country, consumer heterogeneity may make it difficult to define what is "typical". We do not know what these typical (or other) baskets are. This raises a material risk of the price comparison results being skewed by irrelevant prices.
15. To manage this risk, we use a ranking mechanism.[5]
    A. For each product, prices are ranked by city from lowest to highest, with the median rank normalised to zero (for example, if there are 29 cities in the dataset, they would be ranked for the relevant product from -14 for the lowest price to 14 for the highest price).[6]
        i. We do this for the supermarket and mid-price store category datasets separately. For the "average" analysis, we use an unweighted average price for each city-item between the supermarket and mid-priced store price data.
    B. We then plot the distribution of rankings across all products for each city in "box and whisker" diagrams.[7] For example, a city that has the lowest price for every product would always have a rank of -14, therefore resulting in a distribution of a single point at -14 on the y-axis.

[2] See, for example, NZCC, *Final pricing review determination for Chorus' unbundled copper local loop service*, [2015] NZCC 37, p 417. The NZCC has also used a blend of these rates when the relevant products consist of non-tradable and tradable components.

[3] Statistics NZ, *The tradable sector and its relevance to New Zealand's GDP*, 3 July 2013, p 28.

[4] We have used the most recent rate calculation available, which is for 2019. We note that the NZCC has used PPP exchange rates from the OECD in past exercises. See, for example, NZCC, *International Price Comparison for Retail Mobile Telecommunications Services 2013*, March 2014, p 3. We have applied the OECD "PPP rates for GDP" in our figures, but note that we have also applied the "PPP for private consumption" rates as a sensitivity check and find very similar results. Available at https://stats.oecd.org/Index.aspx?datasetcode=SNA_TABLE4, accessed 29 January 2021.

[5] Our analysis was undertaken in Stata and then cross-checked in R.

[6] In some instances (less than one percent of city-products in the "metro" figures only), two cities in the same country resulted in the same product price (and therefore would tie for a rank for a given product). In these cases, we sorted the results alphabetically such that City A would receive a rank deeming the price "lower" than City B for that product.

[7] A box and whisker plot is a statistical tool that shows the distribution of data, meaning the minimum represented by the end of one whisker (line protruding from box), 25th percentile at one end of the box, median (i.e. 50th percentile) represented by a line in the centre, 75th percentile at the other end of the box, and maximum of the distribution at the end of the opposite whisker. Outliers are excluded from the plot itself (determined as more than 1.5x the interquartile range, or in other words the space between the box edges, in either direction) but instead represented by dots outside the plot.

C. This ranking approach smooths extreme results stemming from large variations in prices, therefore mitigating our inability to control for specific consumer preferences/baskets.

D. The rankings are not weighted in any way.

E. From an interpretative point of view, the boxes should be seen as the central range of prices within the set of products for the different cities. The "boxes" are bounded by the 25th and 75th percentiles, with the median being marked by the line within each box.

5. Results

5.1. Base case

16. The EIU data is divided between:

    A. Cities in respect of which the sampled prices were from a "metro" area; and

    B. Cities in respect of which the sampled prices were from a "non-metro" area.

17. Even though we have sought clarification from the EIU, the precise metro/non-metro delineation remains unclear to us.

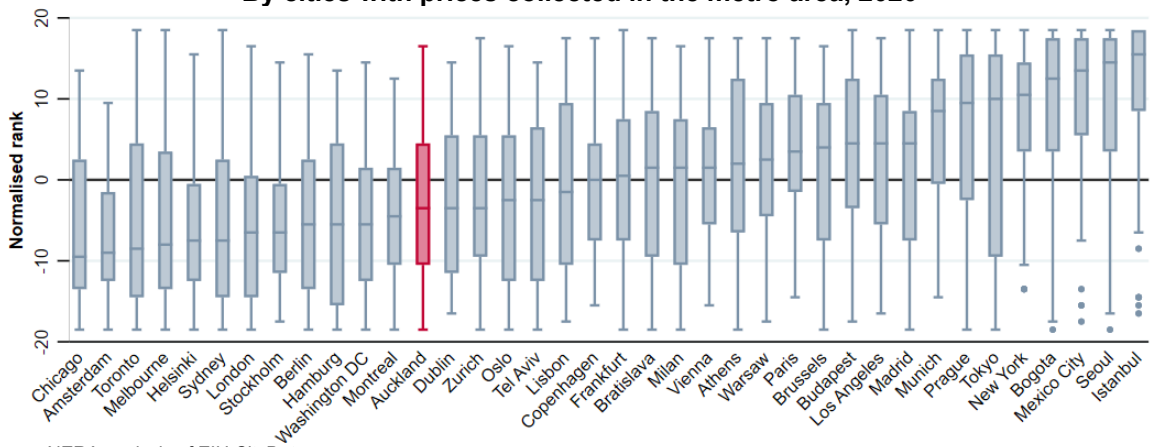
18. Accordingly, we have analysed the metro and non-metro datasets separately. The number of products common across all cities within each segment are:

    A. 62 products for the 38 metro cities; and

    B. 69 products for the 29 non-metro cities.

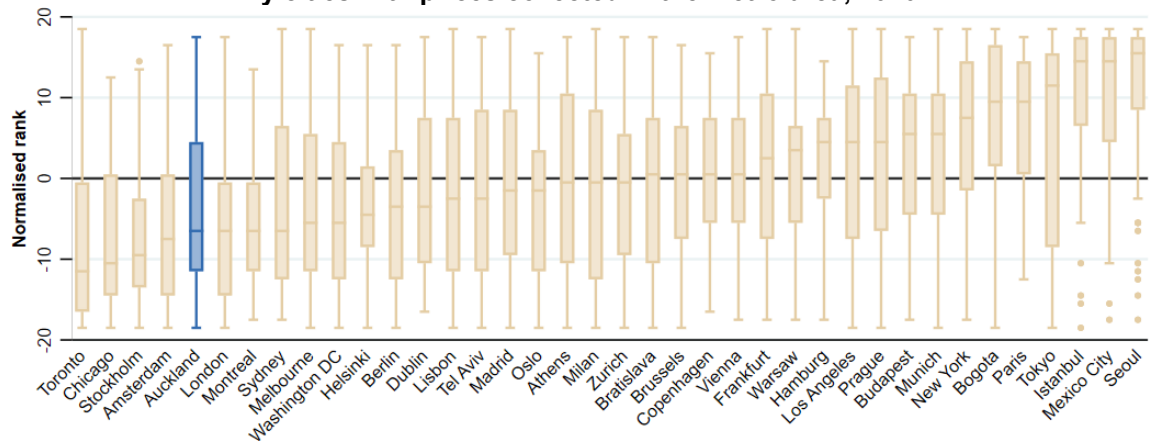
19. We list these products in the appendix to this report and the results in the following box and whisker figures.

Figure 5.1
Distribution of supermarket product price ranks in PPP for available OECD cities[8]
By cities with prices collected in the metro area, 2020



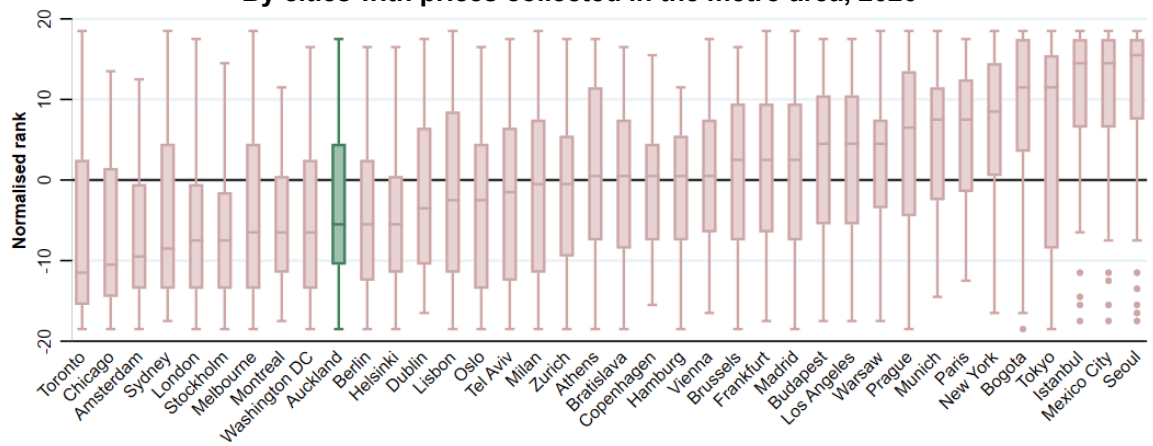
Source: NERA analysis of EIU CityData.

Figure 5.2
Distribution of mid-price store product price ranks in PPP for available OECD cities[8]
By cities with prices collected in the metro area, 2020



Source: NERA analysis of EIU CityData.

Figure 5.3
Distribution of average product price ranks in PPP for available OECD cities[8]
By cities with prices collected in the metro area, 2020



Source: NERA analysis of EIU CityData.

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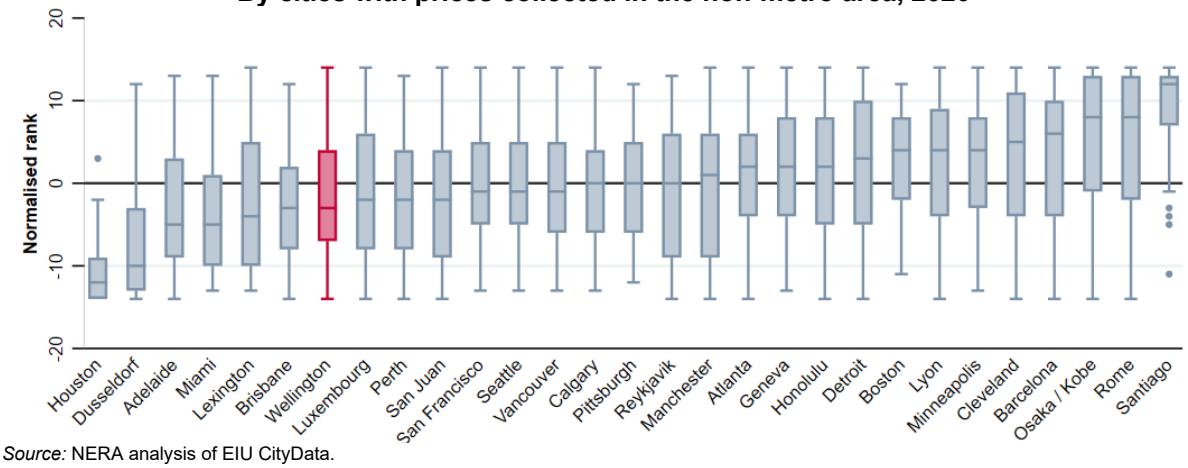
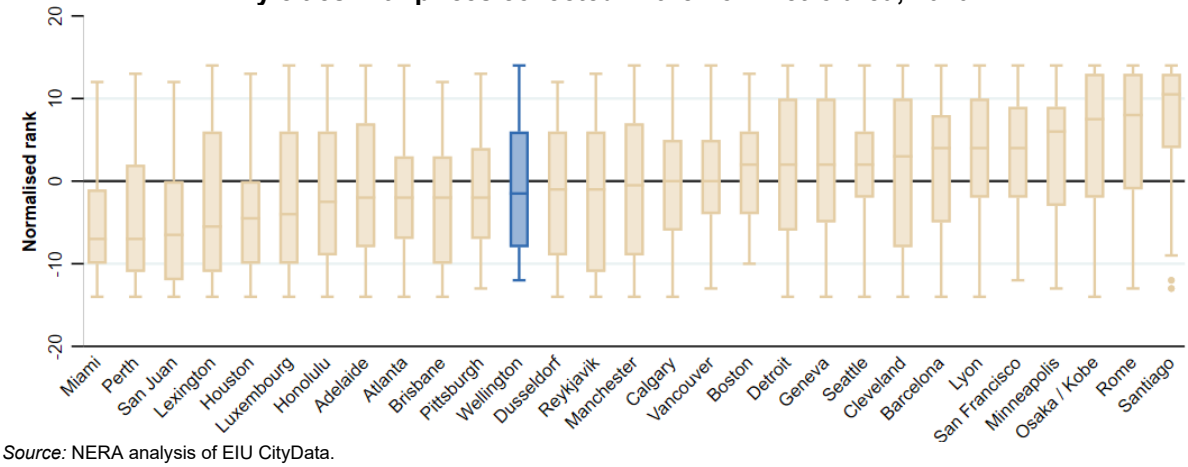
Figure 5.4
Distribution of supermarket product price ranks in PPP for available OECD cities[9]
By cities with prices collected in the non-metro area, 2020



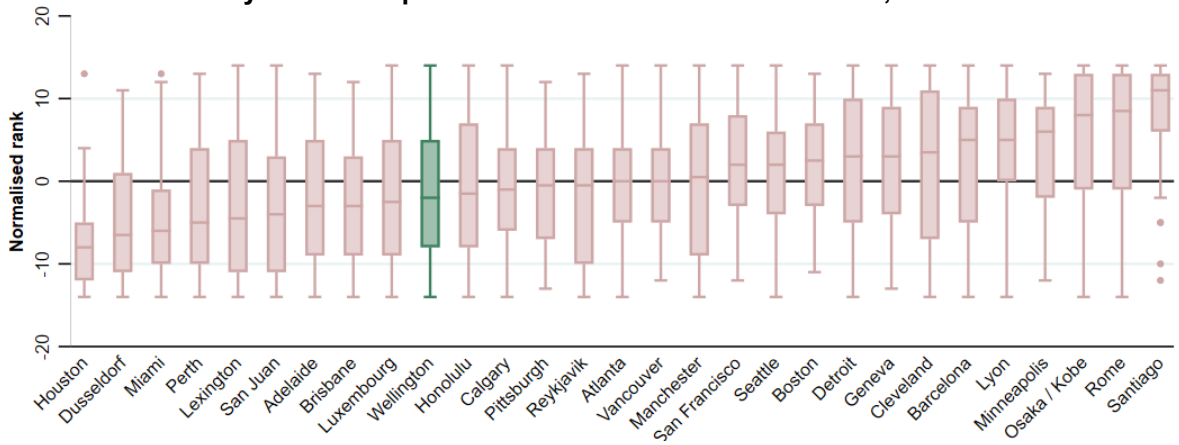
Source: NERA analysis of EIU CityData.

Figure 5.5
Distribution of mid-price store product price ranks in PPP for available OECD cities[9]
By cities with prices collected in the non-metro area, 2020



Source: NERA analysis of EIU CityData.

Figure 5.6
Distribution of average product price ranks in PPP for available OECD cities[9]
By cities with prices collected in the non-metro area, 2020



Source: NERA analysis of EIU CityData.

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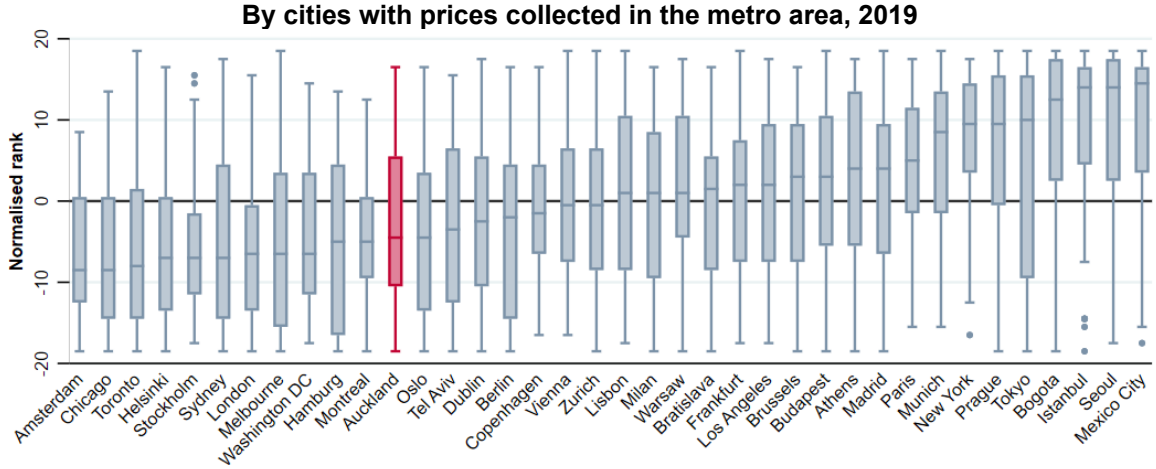
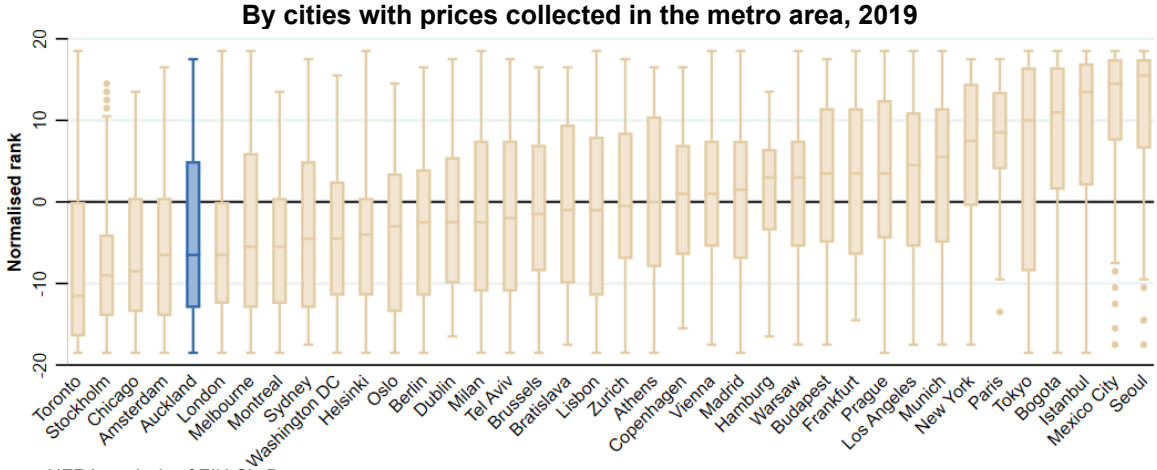
Figure 5.7
Distribution of supermarket product price ranks in PPP for available OECD cities[10]
By cities with prices collected in the metro area, 2019



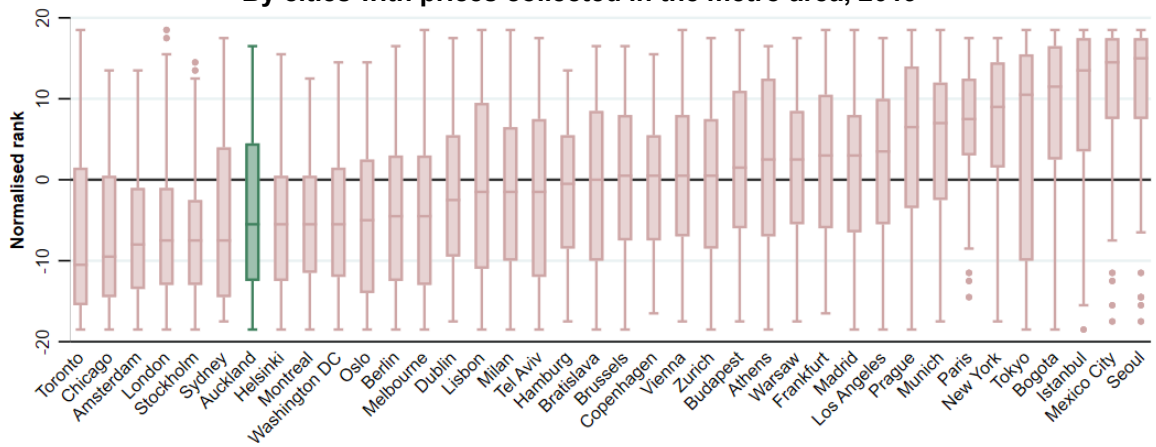
Source: NERA analysis of EIU CityData.

Figure 5.8
Distribution of mid-price store product price ranks in PPP for available OECD cities[10]
By cities with prices collected in the metro area, 2019



Source: NERA analysis of EIU CityData.

Figure 5.9
Distribution of average product price ranks in PPP for available OECD cities[10]
By cities with prices collected in the metro area, 2019



Source: NERA analysis of EIU CityData.

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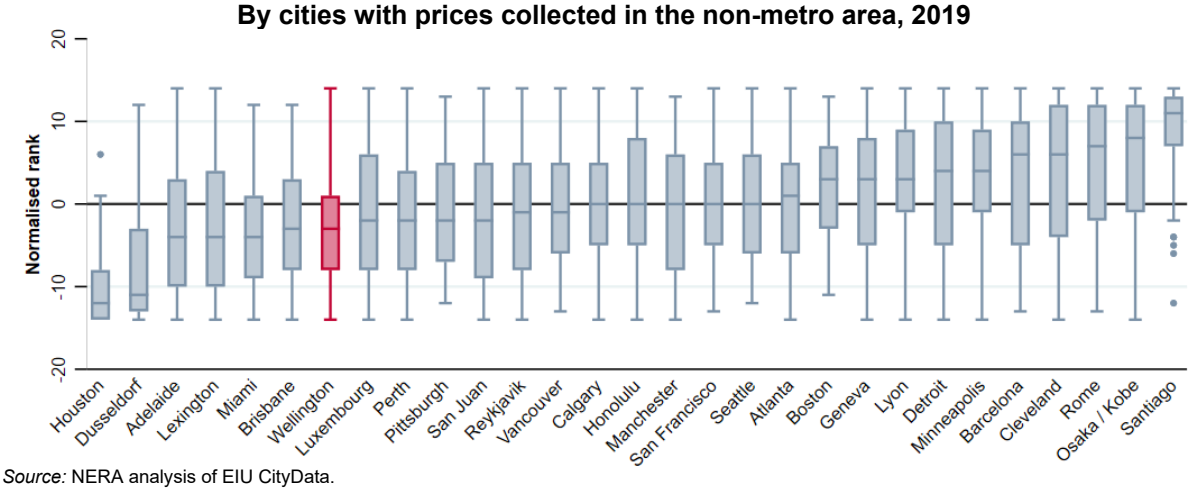
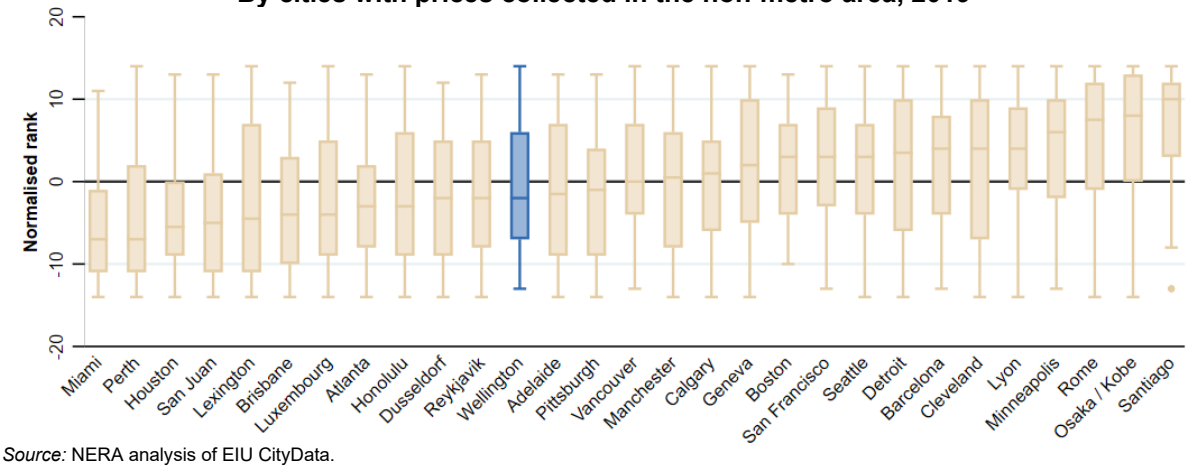
Figure 5.10
Distribution of supermarket product price ranks in PPP for available OECD cities[11]
By cities with prices collected in the non-metro area, 2019



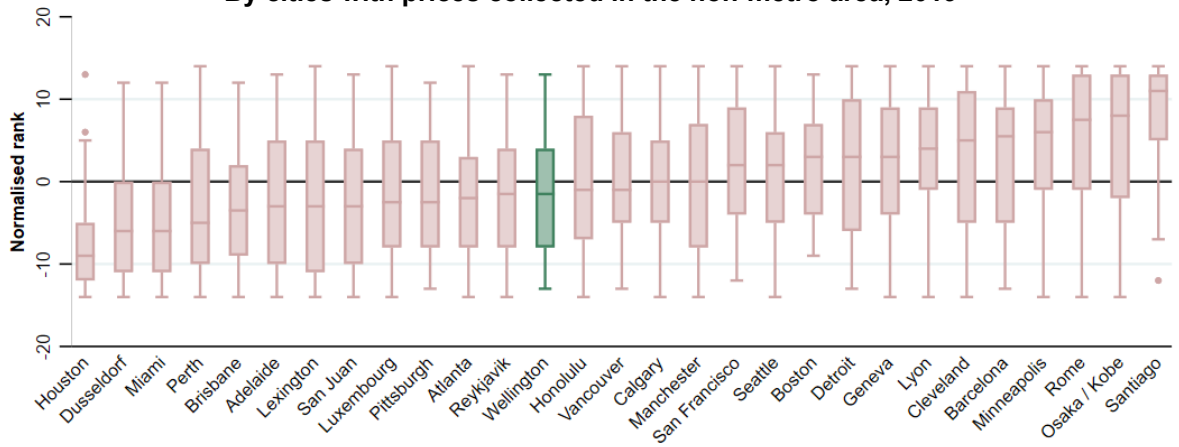
Source: NERA analysis of EIU CityData.

Figure 5.11
Distribution of mid-price store product price ranks in PPP for available OECD cities[11]
By cities with prices collected in the non-metro area, 2019



Source: NERA analysis of EIU CityData.

Figure 5.12
Distribution of average product price ranks in PPP for available OECD cities[11]
By cities with prices collected in the non-metro area, 2019



Source: NERA analysis of EIU CityData.

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5.2. Sensitivity testing

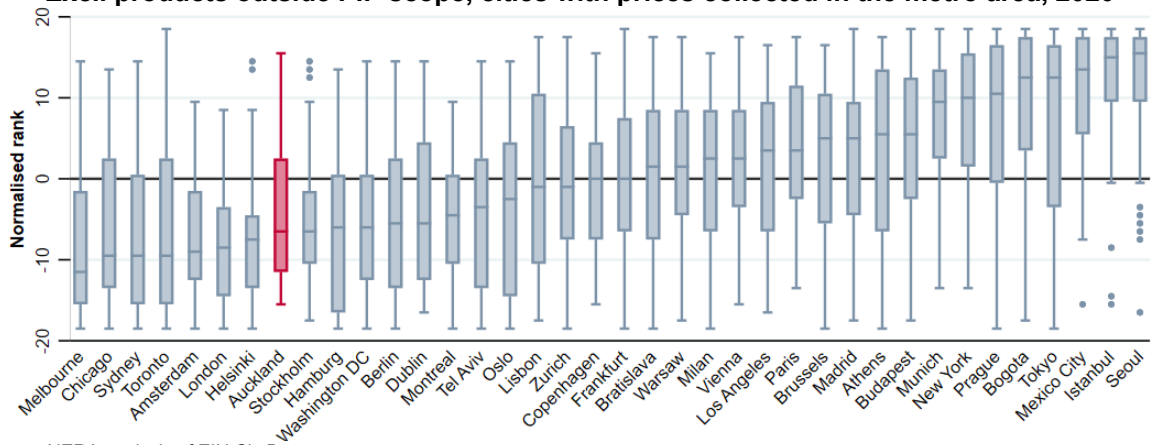
20. The dataset analysed above includes alcohol and tobacco. Because these products are often especially taxed, there is a risk their inclusion would distort the results. Furthermore, the NZCC's Preliminary Issues Paper ("PIP") proposes to exclude these categories from the market study.[12]

21. Accordingly, we also analyse a dataset that excludes alcohol and tobacco products. We have also excluded electric toasters, frying pans, batteries, light bulbs, aspirin and cough medicine on the basis the NZCC proposes to exclude these from the scope of the market study.[13] The 2020 results are set out in the following figures.

[12] NZCC, *Market study into the retail grocery sector: Preliminary issues paper*, 10 December 2020, p 9.

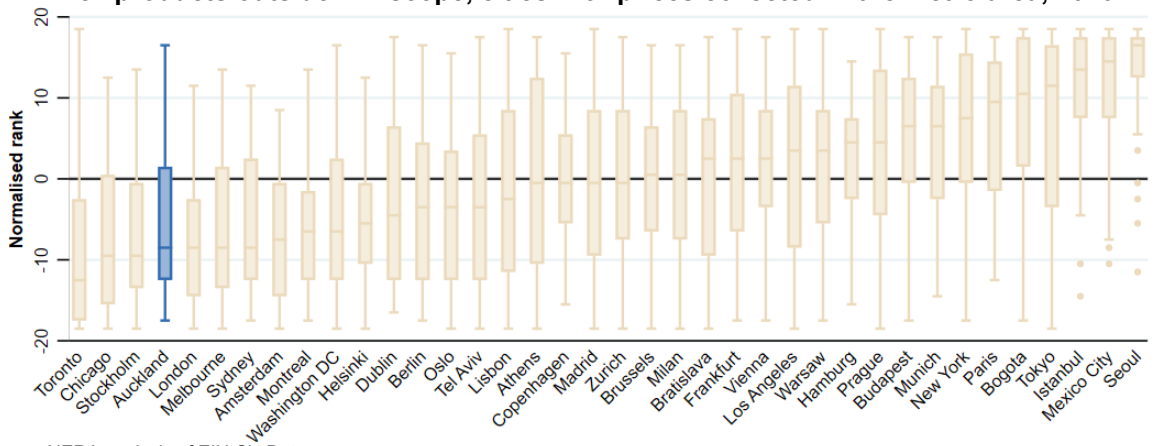
[13] NZCC, *Market study into the retail grocery sector: Preliminary issues paper*, 10 December 2020, p 9. See also, Stats NZ, "Consumers price index review: 2020 – basket item list" at https://www.stats.govt.nz/methods/consumers-price-index-review-2020.

Figure 5.13
Distribution of supermarket product price ranks in PPP for available OECD cities[14]
Excl. products outside PIP scope, cities with prices collected in the metro area, 2020



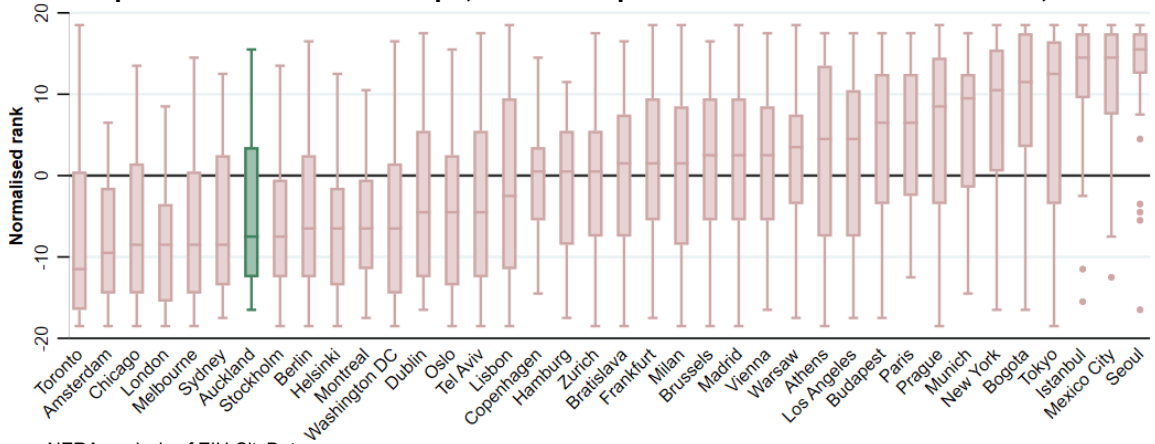
Source: NERA analysis of EIU CityData.

Figure 5.14
Distribution of mid-price store product price ranks in PPP for available OECD cities[14]
Excl. products outside PIP scope, cities with prices collected in the metro area, 2020



Source: NERA analysis of EIU CityData.

Figure 5.15
Distribution of average product price ranks in PPP for available OECD cities[14]
Excl. products outside PIP scope, cities with prices collected in the metro area, 2020



Source: NERA analysis of EIU CityData.

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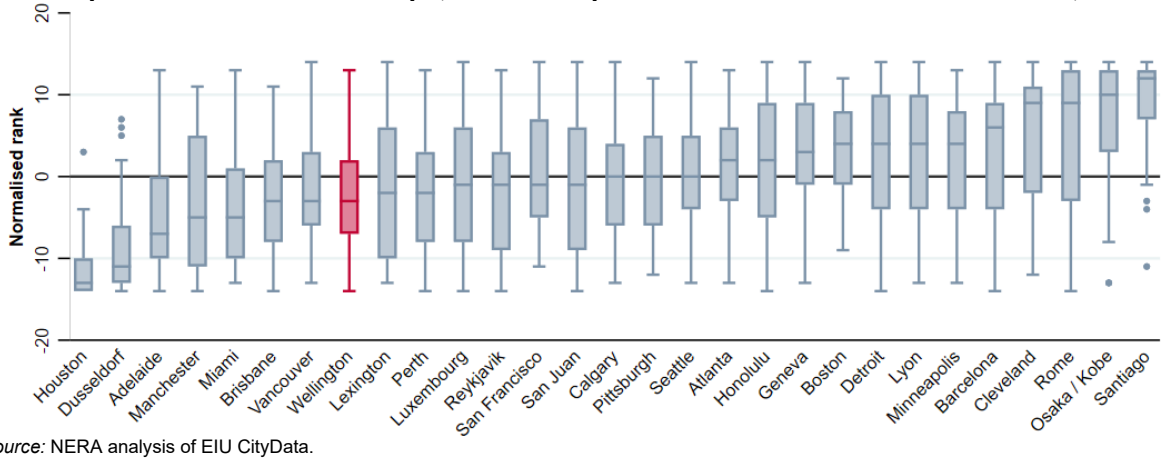
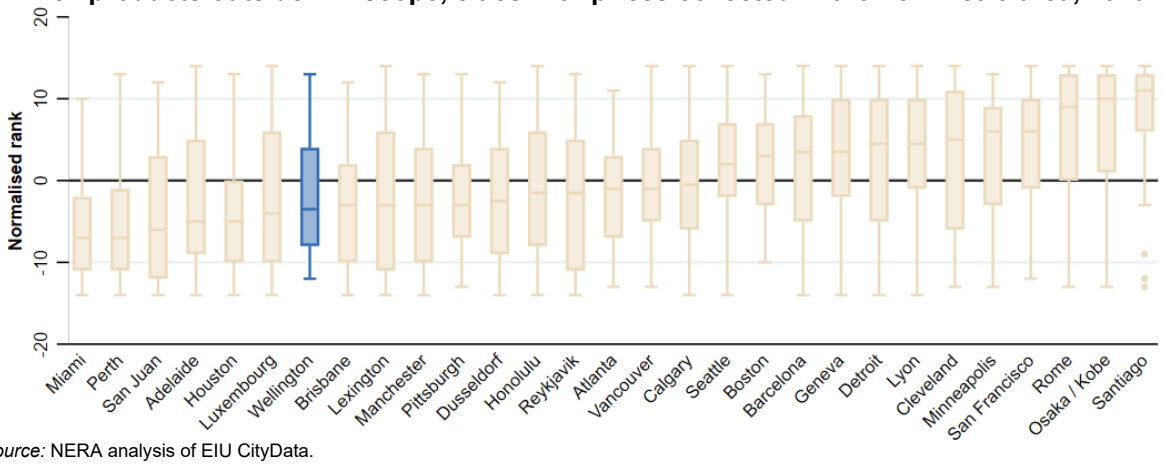
Figure 5.16
Distribution of supermarket product price ranks in PPP for available OECD cities[15]
Excl. products outside PIP scope, cities with prices collected in the non-metro area, 2020



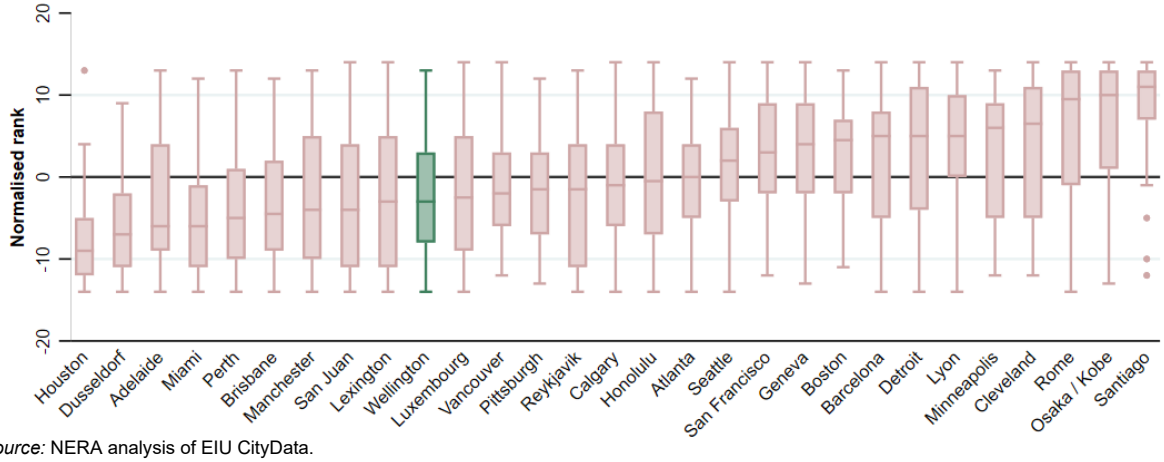
Source: NERA analysis of EIU CityData.

Figure 5.17
Distribution of mid-price store product price ranks in PPP for available OECD cities[15]
Excl. products outside PIP scope, cities with prices collected in the non-metro area, 2020



Source: NERA analysis of EIU CityData.

Figure 5.18
Distribution of average product price ranks in PPP for available OECD cities[15]
Excl. products outside PIP scope, cities with prices collected in the non-metro area, 2020



Source: NERA analysis of EIU CityData.

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Appendix A. Products included in analyses

The products for which there is a price available for each OECD city are listed in Table A.1 below. All unshaded items are available for both metro and non-metro cities, while items shaded in **blue** are only included in the non-metro analyses (meaning that these products are unavailable for some metro cities).

Items shaded in **orange** are excluded in Figure 5.13 through Figure 5.18, as these are considered outside the scope of the PIP.

Table A.1
List of products in analyses

Apples (1 kg)	Eggs (12)	Peaches, canned (500 g)
Aspirins (100 tablets)	Electric toaster (for two slices)	Peanut or corn oil (1 l)
Bacon (1 kg)	Facial tissues (box of 100)	Peas, canned (250 g)
Bananas (1 kg)	Flour, white (1 kg)	Pork: chops (1 kg)
Batteries (two, size D/LR20)	Fresh fish (1 kg)	Potatoes (2 kg)
Beef: filet mignon (1 kg)	Frying pan (Teflon or good equivalent)	Razor blades (five pieces)
Beef: ground or minced (1 kg)	Ground coffee (500 g)	Shampoo & conditioner in one (400 ml)
Beef: roast (1 kg)	Ham: whole (1 kg)	Sliced pineapples, canned (500 g)
Beef: steak, entrecote (1 kg)	Hand lotion (125 ml)	Soap (100 g)
Beef: stewing, shoulder (1 kg)	Insect-killer spray (330 g)	Spaghetti (1 kg)
Beer, local brand (1 l)	Instant coffee (125 g)	Sugar, white (1 kg)
Beer, top quality (330 ml)	Laundry detergent (3 l)	Tea bags (25 bags)
Butter, 500 g	Lemons (1 kg)	Toilet tissue (two rolls)
Carrots (1 kg)	Lettuce (one)	Tomatoes (1 kg)
Cheese, imported (500 g)	Light bulbs - LED (two, 8-10 watts)	Tomatoes, canned (250 g)
Chicken: fresh (1 kg)	Margarine, 500g	Tonic water (200 ml)
Cigarettes, Marlboro (pack of 20)	Milk, pasteurised (1 l)	Toothpaste with fluoride (120 g)
Cigarettes, local brand (pack of 20)	Mineral water (1 l)	White bread, 1 kg
Coca-Cola (1 l)	Mushrooms (1 kg)	White rice, 1 kg
Cocoa (250 g)	Olive oil (1 l)	Wine, common table (750 ml)
Cornflakes (375 g)	Onions (1 kg)	Wine, fine quality (750 ml)
Dishwashing liquid (750 ml)	Oranges (1 kg)	Wine, superior quality (750 ml)
Drinking chocolate (500 g)	Packaged juice (1 l)	Yoghurt, natural (150 g)

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