# From field collection to alternative prices data at Stats NZ

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# Introduction

- Stats NZ has been moving from prices survey data to ‘alternative data’ and the methods associated with those since 2001 for inflation measurement:

- used cars - introduced a ‘multilateral method’ (hedonics) from 2001 (on large-scale survey data) then incorporated admin data in 2017
- Scanner data – consumer electronics (2014), supermarkets (2019)
- Rent price index from tenancy bonds data (2019)
- Overseas trade index (import data for TVs and phones: 2013, customs data all imports: 2020)

- Time saved and quality improved **but** risks from bespoke systems becoming ‘black boxes’ over time
- So, after 20 years, Stats NZ is building MAP (Multilateral Application Pipeline) to generalise our production processes

# Multilateral price indexes

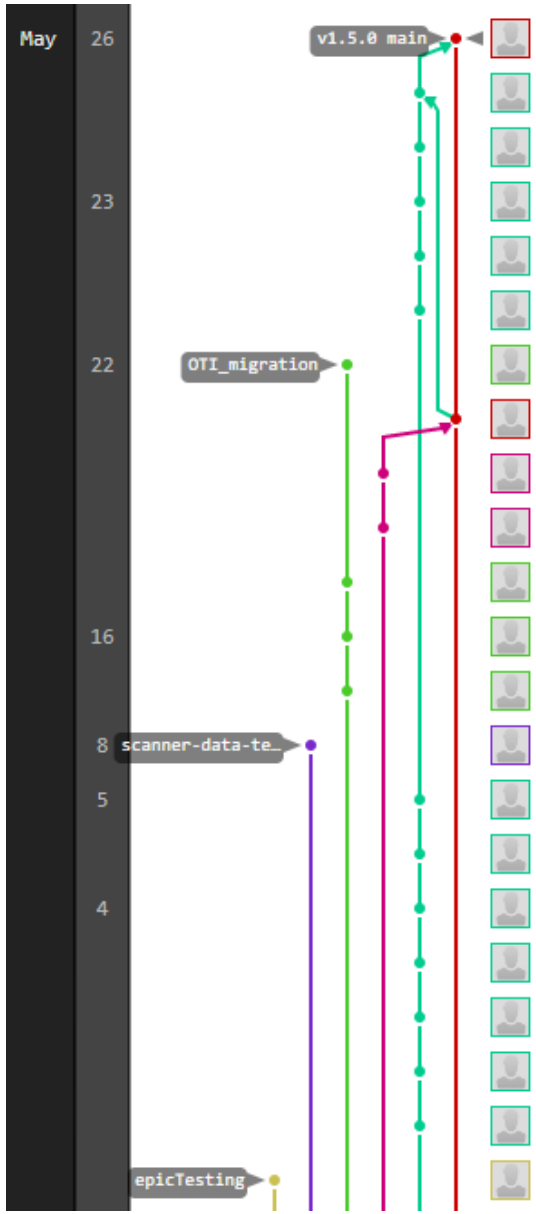
- Traditional methods don’t work well with alternative data
  - chain drift (asymmetrical price/quantities due to sales)
  - implicit price movements associated with new products
- Over the last 20 years, significant research on multilateral methods
  - TDH, GEKS, TPD, GK, ITRYGEKS
- Stats NZ has adopted multilateral methods in production since 2001
  - used cars (2001, TDH), consumer electronics (2014, ITRYGEKS), rents (2019, TPD), overseas trade index (2013, 2020, TPD)
- 2019 internal review recommended consolidation of processes for both production and R&D

# Production processes

Production processes are needed in addition to the index estimation itself:

- **input diagnostics** to explore and validate source data
- **output diagnostics** to validate indexes, and compare them to previous production runs, effect of splicing on most recent movement
- **analytical measures** such as decomposition (i.e. what drives change)
- processes to identify and **deal with changes** – e.g. to coding of characteristics

# Version control




## Version 1.5 release

Assets 4

Active branches

main default protected
c32cafbc

OTI_migration
cec26646

scanner-data-testing
704cead4

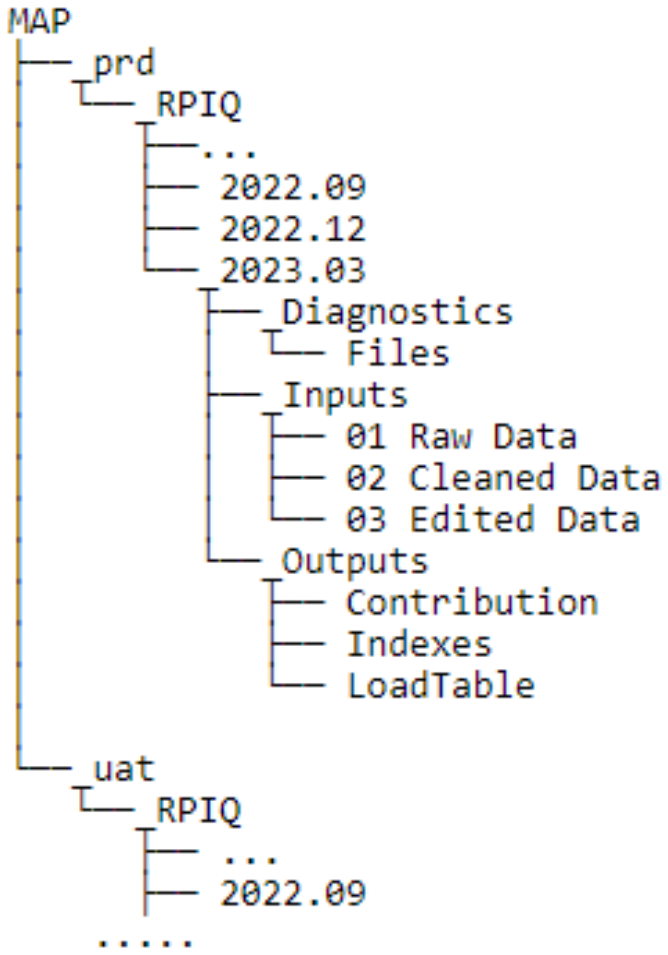
epicTesting
91960db1

- Significant quantity of ad-hoc analysis code, and bug/error investigations

c32cafbc v1.5.0 Created 2 hours ago by

## Version 1.4 release

# Data Storage




MAP › prd › RPIM › 2023.04 › Outputs › Indexes

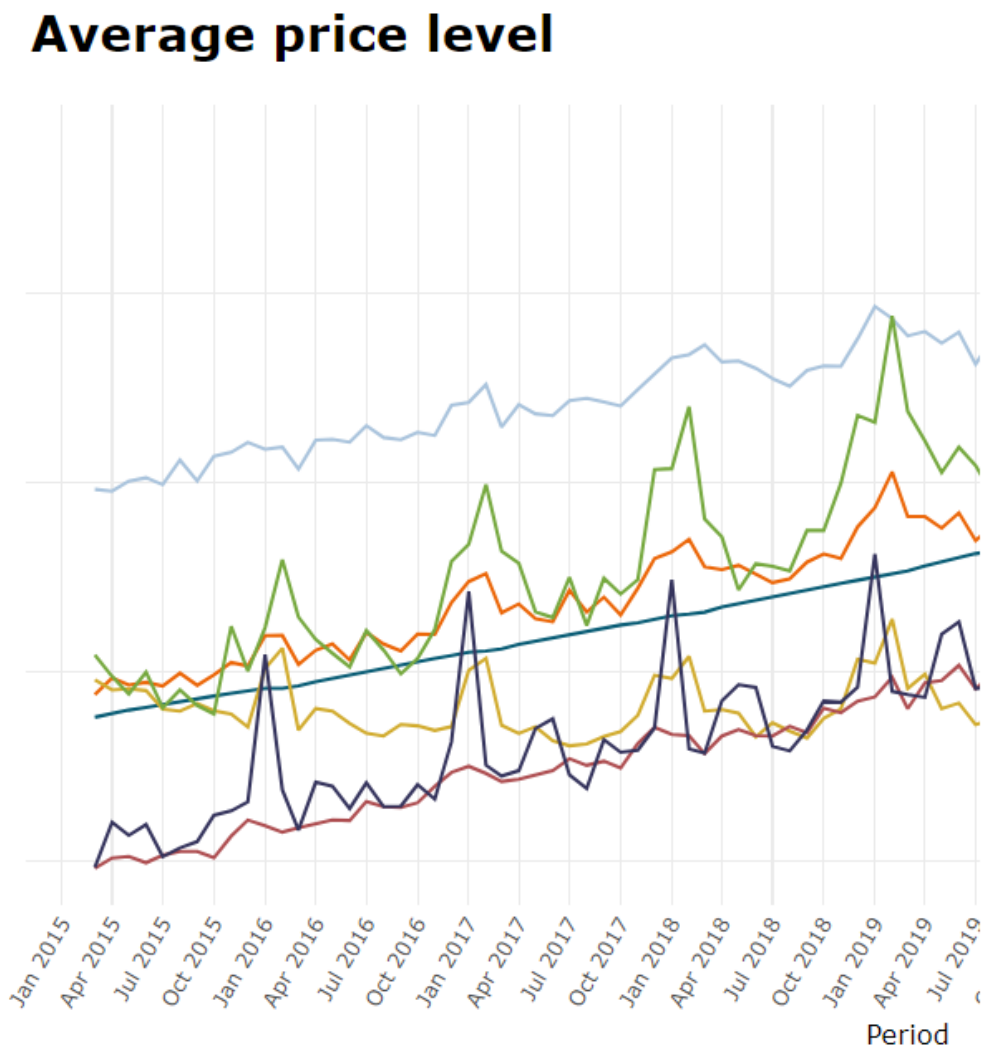
| Name | Date modified | Type | Size |
|---|---|---|---|
| calc_results 2023-05-02.rds | 2/05/2023 4:26 pm | RDS File | 12 KB |
| calc_results 2023-05-03.rds | 3/05/2023 11:03 am | RDS File | 12 KB |
| calc_results 2023-05-04.rds | 4/05/2023 6:12 pm | RDS File | 12 KB |

MAP › prd › RPIM › 2023.04 › Diagnostics › Files

| Name | Date modified | Type | Size |
|---|---|---|---|
| countPriceNA_diagnostic 2023-05-02.csv | 2/05/2023 4:22 pm | Microsoft Excel C... | 1 KB |
| countPriceNA_diagnostic 2023-05-03.csv | 3/05/2023 10:59 am | Microsoft Excel C... | 1 KB |
| countPriceNA_diagnostic 2023-05-04.csv | 4/05/2023 6:08 pm | Microsoft Excel C... | 1 KB |
| countPriceNull_diagnostic 2023-05-02.csv | 2/05/2023 4:22 pm | Microsoft Excel C... | 1 KB |
| countPriceNull_diagnostic 2023-05-03.csv | 3/05/2023 10:59 am | Microsoft Excel C... | 1 KB |
| countPriceNull_diagnostic 2023-05-04.csv | 4/05/2023 6:08 pm | Microsoft Excel C... | 1 KB |

- Input Diagnostics
  - Error details
  - Number of Rows
  - Number of Columns
  - Number of IDs
  - Average Price Level
  - Average Price Change
- Output Diagnostics
  - Latest period indexes
  - Latest index
  - Contribution to latest movement

# Average Price Level



# Thank you!

…and we welcome any questions or feedback:

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# Performance time

The ***multilateral*** R package is the index-estimating R package that sits within the wider Multilateral Application Pipeline (MAP) R-based system.

Relative processing times (in minutes) using *multilateral* within the Stats NZ environment using parallel processing (with four CPU cores) compared to standard runs (one CPU core) on two years of supermarket scanner data - approximately 50 million observations.
(Note – in this example both the GEKS-Tornqvist and TPD (time-product dummy) methods use geomean splicing and an estimation window length of 13 months).


***GEKS-T*** *45 min (1 core), 23 min (4 cores)* ***TPD*** *105 min (1 core), 36 min (4 cores)*

# References


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de Haan, J and Krsinich, F (2014) *Scanner data and the treatment of quality change in nonrevisable price indexes* Journal of Business and Economic Statistics, 32(3)

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Stats NZ (2014) *Measuring price change for consumer electronics using scanner data*

Stats NZ (2019a) *New methodology for rental prices in the CPI*

Stats NZ (2019b) *Overseas trade price indexes through a multilateral method*