

Household transport cost indexes methodological document

August 2018

Executive summary

Stats NZ has developed six household transport price indexes at the request of the New Zealand Automobile Association (AA):

1. General driving costs (North Island)
2. General driving costs (South Island)
3. Metro commuter (Auckland and Wellington)
4. Urban Public transport commuter (Auckland and Wellington)
5. Non-urban Public transport commuter (Not Auckland and Wellington)
6. Cycling

The indexes were developed with input from the AA to represent 6 different transport profiles. Stats NZ has used data from the Household Economic Survey - expenditure (HES), Census (2013), and the Consumers Price Index (CPI) to work out the weights (proportion) and associated transport costs for each index.

A back series has been calculated, going back to the June 2008 quarter. Weights for the back series were derived from a mixture of HES and CPI data.

The indexes and their inputs

Below are the price indexes and the transport costs used as inputs. In the appendix there is a more detailed breakdown of each of the transport costs and the items/services they cover.

General driving costs (North Island)

- Vehicle purchasing costs
- Vehicle interest costs
- Vehicle parts and maintenance
- Fuels and lubricants
- Other private transport services
- Vehicle insurance

General driving costs (South Island)

- Vehicle purchasing costs
- Vehicle interest costs
- Vehicle parts and maintenance
- Fuels and lubricants
- Other private transport services
- Vehicle insurance

Metro commuter (Auckland and Wellington)

- Vehicle purchasing costs
- Vehicle interest costs
- Vehicle parts and maintenance
- Fuels and lubricants
- Other private transport services
- Vehicle insurance

Urban Public transport commuter (Auckland and Wellington)

- Urban train fares
- Short distance bus fares
- Urban ferry fares¹

Non-urban Public transport commuter (Not Auckland or Wellington)

- Short distance bus fares

Cycling

- Bicycle purchasing costs
- Bicycle accessories purchasing costs²
- Household contents insurance

¹ Only available in the CPI from 2014. Prior to this the index used train and bus fares.

² Only available in the CPI from 2017. Prior to this the index used bicycle purchasing costs and household contents insurance.

Data sources and methods applied

The main data sources used are the HES 2006/07, 2009/10, 2012/13, and 2015/16; 2013 Census; and CPI data.

All indexes had reweights (updating the relative importance of the transport costs) applied in 2008, 2011, 2014, and 2017 (in accordance with the 3 yearly review of the CPI) using either HES data and/or CPI data. The reweights were applied a year later than the HES survey data due to timing around the availability of HES data and consistency with the CPI.

General driving costs (North Island and South Island)

Weights were derived from the HES years listed above. Stats NZ identified households that have expenditure on petrol or diesel that are located in the North/South Island. For these households Stats NZ worked out the weights of household expenditure spent on transport costs.

Pro-rated items

For every reweight, items/services recorded in HES that are not part of the CPI basket are pro-rated to their closest priced CPI item(s), for example, LPG was pro-rated to all other items priced in the fuels and lubricant transport cost category. This was consistent with how these items/services are treated in the CPI.

Other data sources

As part of the 3 yearly CPI reviews, other data sources are sometimes used in place of HES data, where HES does not provide accurate expenditure estimates. For the reweights of these transport indexes, we used the same alternative data sources as used for the CPI reviews.

Price updating weights

Each CPI review is implemented approximately one year after the end of the HES data collection, so Stats NZ price updates the weights to the CPI review period. The effect of price updating is to calculate how much households would have to spend in the period that the weights were applied (eg September 2017 quarter) to purchase the same quantity (volume) of goods and services purchased in the weight reference period (eg HES data for the year to June 2016). The transport indexes have been price updated at every reweight except for the first set of weights (in 2008) due to data constraints.

Second hand cars treatment

The weight for the purchase of second-hand cars, derived from HES, represents net purchases of second-hand cars (ie purchases of second-hand cars minus sales and trade-ins of second-hand cars, including trade-ins on purchases of new cars).

Metro commuter (Auckland and Wellington)

Weights have been derived from the HES and Census data. Stats NZ's Integrated Data Infrastructure (IDI) includes linked HES/Census data which results in 400-450 households that were in the 2012/13³ HES that also had at least one person reporting that they drove to work on Census day 2013. For these households we worked out the weights of household expenditure spent on transport costs⁴:

New and second hand cars split

The weight used to split new and second-hand cars was not available due to confidentiality, so the split from the general driving costs (North Island) for new and second-hand cars was used.

Reweighting

The weights from the 2012/13 HES and 2013 Census data were applied in 2014. For the reweights in 2008, 2011, and 2017, the weight changes between 2014 and each other reweight period from the general driving costs (North Island) were applied. For example, the weight of new cars purchased in the general driving costs (North Island) index was 11.7% in 2014 and it increased to 14.8% in 2017 (~26% increase). That same percentage increase of ~26% was applied to the weight of new cars in the metro commuter index for 2014, making it increase from 10.2% to 12.9%.

Auckland/Wellington split

Auckland and Wellington prices used in this index were split using the CPI split between these two locations.

Other assumptions

All other methods mentioned in the general driving costs above were also applied (ie pro-rated items, other data sources, price updating of weights, and second hand cars treatment).

Urban and non-urban public transport commuter, cycling

The weights used for the reweights came from the CPI. Because these weights already existed in the CPI, they already had the pro-rated items, other data sources, and price updating of weights applied to them before being applied in the CPI.

For the cycling index, the household contents weight was derived from the percentage of claims related to bicycles in contents insurance⁵.

³ 2012/13 HES is the latest HES expenditure dataset that is linked to the 2013 Census.

⁴ The weights used are not official statistics. They have been created for research purposes from the Integrated Data Infrastructure (IDI), managed by Statistics New Zealand.

Access to the anonymised data used in this study was provided by Statistics NZ under the security and confidentiality provisions of the Statistics Act 1975. Only people authorised by the Statistics Act 1975 are allowed to see data about a particular person, household, business, or organisation, and the results in this application have been confidentialised to protect these groups from identification and to keep their data safe. Careful consideration has been given to the privacy, security, and confidentiality issues associated with using administrative and survey data in the IDI. Further detail can be found in the Privacy impact assessment for the Integrated Data Infrastructure available from www.stats.govt.nz.

⁵ This data was obtained from AA insurance.

Appendix

Weights used in indexes over time⁶

| Index | General driving costs - North island | | | | General driving costs - South island | | | | Metro commuter (Auckland and Wellington) | | | |
|---|--------------------------------------|-------|-------|-------|--------------------------------------|-------|-------|-------|--|-------|-------|-------|
| | 2008 | 2011 | 2014 | 2017 | 2008 | 2011 | 2014 | 2017 | 2008 | 2011 | 2014 | 2017 |
| Vehicle purchasing costs | 30.0% | 24.2% | 25.7% | 34.5% | 37.8% | 25.1% | 25.6% | 38.8% | 26.8% | 21.3% | 22.4% | 30.1% |
| Purchase of second-hand motor cars | 18.4% | 15.9% | 14.0% | 19.7% | 23.9% | 14.7% | 14.4% | 25.4% | 16.4% | 14.0% | 12.2% | 17.2% |
| Purchase of new motor cars | 11.6% | 8.3% | 11.7% | 14.8% | 13.9% | 10.3% | 11.1% | 13.3% | 10.4% | 7.3% | 10.2% | 12.9% |
| Fuels and lubricants | 39.7% | 48.2% | 44.5% | 42.2% | 35.0% | 45.2% | 45.4% | 39.0% | 42.0% | 50.1% | 46.3% | 44.3% |
| Petrol | 36.8% | 44.4% | 41.9% | 40.0% | 31.2% | 41.1% | 40.9% | 36.3% | 40.3% | 48.0% | 44.8% | 42.9% |
| Diesel | 2.6% | 3.4% | 2.3% | 1.8% | 3.5% | 3.6% | 3.8% | 2.3% | 1.4% | 1.8% | 1.2% | 0.9% |
| Oil, grease, lubricants for vehicles | 0.3% | 0.3% | 0.3% | 0.4% | 0.3% | 0.5% | 0.6% | 0.4% | 0.3% | 0.4% | 0.3% | 0.5% |
| Registration, WOF, RUC, parking, licence fees etc | 8.9% | 10.4% | 10.7% | 6.7% | 9.2% | 11.8% | 11.9% | 5.5% | 10.4% | 11.4% | 12.2% | 8.7% |
| Vehicle relicensing fees | 4.6% | 6.2% | 6.3% | 2.3% | 5.0% | 7.1% | 6.4% | 2.3% | 4.8% | 6.4% | 6.4% | 2.4% |
| Parking fees | 0.9% | 0.9% | 1.6% | 2.0% | 0.6% | 0.9% | 0.7% | 0.7% | 1.8% | 1.8% | 3.1% | 3.9% |
| Warrant-of-fitness fees | 1.6% | 1.6% | 1.4% | 1.0% | 1.6% | 1.7% | 2.1% | 0.8% | 1.8% | 1.8% | 1.6% | 1.2% |
| Road user charges | 0.8% | 0.9% | 0.8% | 0.7% | 1.1% | 0.9% | 1.4% | 1.0% | 0.3% | 0.4% | 0.3% | 0.3% |
| Motoring organisation subscriptions | 0.5% | 0.3% | 0.2% | 0.4% | 0.3% | 0.5% | 0.5% | 0.1% | 1.0% | 0.6% | 0.5% | 0.7% |
| Driver licensing fees | 0.5% | 0.4% | 0.3% | 0.2% | 0.3% | 0.6% | 0.7% | 0.3% | 0.5% | 0.4% | 0.3% | 0.2% |
| Driving tuition | 0.1% | 0.1% | 0.1% | 0.1% | 0.2% | 0.1% | 0.0% | 0.2% | 0.1% | 0.1% | 0.1% | 0.0% |
| Vehicle parts and maintenance | 12.9% | 10.1% | 11.8% | 7.7% | 11.2% | 11.3% | 10.8% | 9.5% | 11.6% | 9.5% | 11.3% | 7.5% |
| Tyres | 3.6% | 3.6% | 4.4% | 3.2% | 3.7% | 3.4% | 3.6% | 3.2% | 4.1% | 4.0% | 4.9% | 3.5% |
| Vehicle servicing | 2.2% | 2.2% | 3.0% | 1.9% | 1.8% | 2.5% | 2.5% | 2.3% | 2.5% | 2.5% | 3.4% | 2.1% |
| Cambelt repairs | 3.3% | 1.8% | 2.0% | 1.1% | 2.2% | 2.1% | 2.5% | 2.1% | 2.7% | 1.5% | 1.6% | 0.9% |
| Transmission repairs | 1.0% | 0.8% | 0.4% | 0.7% | 0.7% | 0.8% | 0.4% | 0.7% | 0.6% | 0.5% | 0.3% | 0.4% |
| Panelbeating, painting | 1.1% | 0.7% | 0.5% | 0.3% | 0.8% | 1.0% | 0.1% | 0.4% | 0.6% | 0.4% | 0.2% | 0.1% |
| Other electrical parts (eg spark plugs) | 0.5% | 0.2% | 0.4% | 0.3% | 0.6% | 0.5% | 0.4% | 0.3% | 0.6% | 0.2% | 0.4% | 0.3% |
| Automotive batteries | 0.8% | 0.4% | 0.6% | 0.2% | 0.6% | 0.7% | 0.8% | 0.2% | 0.0% | 0.0% | 0.0% | 0.0% |
| Brake repairs | 0.5% | 0.3% | 0.6% | 0.2% | 0.8% | 0.5% | 0.6% | 0.2% | 0.5% | 0.3% | 0.6% | 0.1% |
| Vehicle insurance | 7.5% | 6.2% | 6.5% | 7.5% | 5.6% | 5.9% | 5.8% | 6.0% | 8.7% | 7.0% | 7.3% | 8.5% |
| Vehicle interest | 0.9% | 0.9% | 0.7% | 1.3% | 1.2% | 0.7% | 0.5% | 1.2% | 0.6% | 0.6% | 0.5% | 0.9% |

| | Urban public transport commuter (Auckland and Wellington) | | | |
|---|--|-------|-------|-------|
| | 2008 | 2011 | 2014 | 2017 |
| Urban train fares | 38.3% | 44.7% | 37.0% | 36.6% |
| Short distance bus fares | 61.7% | 55.3% | 51.5% | 50.7% |
| Urban ferry fares | NA | NA | 11.5% | 12.7% |
| | Cycling | | | |
| | 2008 | 2011 | 2014 | 2017 |
| New bicycles, BMX bikes, mountain bikes | 91.3% | 91.8% | 82.2% | 41.6% |
| Bicycle accessories | NA | NA | NA | 51.9% |
| Contents insurance | 8.7% | 8.2% | 17.8% | 6.5% |

More information about the data sources used

Household Economic Survey

The Household Economic Survey (HES) collects information on household income, savings, and expenditure, as well as demographic information on individuals and households. The survey asks for detail on where households get their money from – for example, wages and salaries, self-

⁶ Weights may not sum due to rounding. Non-urban public transport commuter weights are not shown due to only having one transport cost input (short distance bus fares).

employment, investments, or benefits. In HES (Expenditure) years, which occur every 3 years, purchases are recorded by households and include such things as fruit and vegetables, footwear, and cars, as well as spending on services such as electricity, telecommunications, and health.

Census

The New Zealand Census of Population and Dwellings is the official count of how many people and dwellings there are in New Zealand. It takes a snapshot of the people in New Zealand and the place where we live.

Consumers Price Index

The Consumers Price Index (CPI) is the measure of inflation for all New Zealand households. It records the change over time in the price of a fixed basket of goods and services. The basket contains everything from food and household utilities to transport and health expenditure. The basket needs to be representative of the spending habits of New Zealand households, and remain at a fixed quality so that changes in the CPI represent only price change. More information about quality can be found in the following links:

[Accounting for quality change in the CPI](#)

[Dealing with size changes in the CPI](#)