Transport Affordability Index

Final Report – Summary

Australian Automobile Association, August 2016

SGS Economics & Planning

1991–2016 25 years of Independent insight.

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EXECUTIVE SUMMARY

The Transport Affordability Index has been designed by SGS Economics and Planning (SGS) and commissioned by the Australian Automobile Association (AAA) to provide a snapshot of the costs of transport for a typical household in Australia's capital cities, including public transport costs and costs associated with car use. This Index is expected to be updated every 3 or 6 months to show how transport costs move over time relative to incomes.

Hypothetical household

The Index is based on the incomes and transport costs of a hypothetical household in each capital city. SGS has aimed for this household to be a typical but car dependent household. The characteristics of the household are based on the most common or average characteristics. In some cases, household characteristics are chosen to ensure some typical transport costs are well illustrated, while still being representative. The household is identical across cities to allow for ready comparison.

The hypothetical household in each capital city is a heterosexual couple with children – the most common type of household in Australia. The couple consists of a 38 year old woman and a 36 year old man – the average ages for a man and a woman. They live in a detached house and have two cars. Both are employed.

The Australian Motor Vehicle Census finds that a typical passenger vehicle is driven 13,800 kilometres per year, and the average passenger vehicle is 9.8 years old. Based on this, we have assumed that the two motor vehicles will be driven 15,000 kilometres per year and 10,000 kilometres per year. The car that does 10,000 kilometres per year is assumed to be ten years old and owned outright. To ensure that costs associated with new vehicles are incorporated into the index, the car that drives 15,000 kilometres per year is assumed to be a near-new vehicle (less than three years old) purchased new and paid for with a car loan. In addition to this, each household is assumed to take public transport into the CBD and home again, five days per week.

Suburbs of residence for hypothetical households were assumed to be as follows. These were chosen as they were middle to outer ring suburbs, had a relatively high population density at the SA2 level, have access to public transport, and in Sydney, Melbourne and Brisbane, would require driving through toll roads to access the CBD.

SUBURBS USED FOR COST CALCULATIONS IN INDEX

City	Residential suburb	Postcode
Sydney	Penrith	2750
Melbourne	Glenroy	3046
Brisbane	Beenleigh	4207
Perth	Armadale	6112
Adelaide	Woodville	5011
Hobart	Glenorchy	7010
Darwin	Wagaman	0810
Canberra	Franklin	2913

Estimation of private vehicle costs

The Index is based on the total weekly cost of all transportation expenses in a hypothetical household, as a share of income. Indexes are calculated for capital cities in each State and Territory. Estimates of transport costs are gathered from a number of publicly available sources. The Index is designed so that the hypothetical household's transport costs can change not only due to a change in the prices of transport, but a change in transport patterns.

Upfront costs

These are the costs required to put a motor vehicle into the garage so it can be driven. These include purchase costs for a new vehicle, registration, compulsory third party (CTP) insurance, driver's licences and comprehensive car insurance.

The purchase price of a new vehicle was based on the weighted average price of the base model of the top ten bestselling cars in Australia. Driveaway prices for each vehicle based on manufacturer websites were used. It was assumed that the car would be purchased with five year loan of 100% of the purchase price, taking an average of the five cheapest interest rates from Canstar to estimate interest costs.

Registration and CTP costs for new vehicles were calculated as a weighted average of the registration costs for the top ten vehicles sold, by State and Territory. Registration and CTP for the ten year old vehicle was based on the State by State costs of registering a ten year old Toyota Corolla. Driver's licence costs were calculated for each State and Territory based on the cheapest non-concessional payment rate, and converted to an annual cost.

Comprehensive car insurance costs were based on quotes from AAA member organisation websites, on the cost of insuring new Toyota Corolla and a ten year old Toyota Corolla. Many factors affect the price a person will pay for motor vehicle insurance, so to ensure that the quotes were based on uniform circumstances, it was assumed that both cars would be kept garaged and that both drivers had a clear driving history.

Ongoing costs

These are the costs that increase as the vehicle is driven more, namely fuel costs and car maintenance.

Fuel consumption by motor vehicles was estimated as ten litres per 100 kilometres for the new vehicle, and 10.8 litres per 100 kilometres for the second vehicle, based on average passenger fuel consumption figures from the ABS Motor Vehicle Survey. Fuel prices were based on 86% petrol prices and 14% diesel prices, based on fuel consumption patterns across Australia. Other fuels, such as electric and LPG, represented a very small percentage of fuel use and so were not considered.

Car maintenance costs were classified as regular servicing costs plus the cost of tyres. New car servicing was drawn from a weighted average of manufacturer's fixed price annual servicing costs for the top ten selling motor vehicles. Used car servicing costs were drawn from the 2009-10 Household Expenditure Survey, inflated by the appropriate CPI measure to 2016 dollars. Cost of tyres for each vehicle were drawn from the 2009-10 Household Expenditure Survey.

Estimates of other transport costs

Public transport costs

Public transport fares were based on one adult return ticket from the suburb of residence to the CBD, five days per week, incorporating any discounts such as capped pricing schemes or discounts for using an electronic fare card (e.g. Opal, myki, MyWay). Weekly public transport costs ranged from as low as $20 per week in Darwin to $65 per week in Brisbane.

CALCULATION OF WEEKLY PUBLIC TRANSPORT COST

City	Mode/distance & travel card	Cost of return trip	Capped pricing	Weekly cost
Sydney	Train, 35-65km, Opal	$12.92	Max. 8 trips	$51.68
Melbourne	Train, Zone1+2, Myki	$7.80	N/A	$39.00
Brisbane	7 zones, go card	$14.54	Max. 9 trips	$65.43
Perth	4 zones, Smartrider	$10.88	N/A	$54.40
Adelaide	Standard trips, Metrocard	$6.96	N/A	$34.80
Hobart	1-4 sections, Greencard	$5.12	N/A	$25.60
Darwin	Flexi-trip fare for 10 trips, Tap and Ride card	$4.00	N/A	$20.00
Canberra	Standard trips, MyWay	$5.96	N/A	$29.80

Toll roads

Only Sydney, Brisbane and Melbourne have toll roads. Whether a resident of that city pays tolls or not will depend heavily on where they live, where they work, shop and socialise. While some residents may drive regularly and pay no tolls, some pay over a hundred dollars per week, however there is little reliable publicly available information that could be used to estimate a typical household's toll use.

The weekly toll costs for affected cities were calculated as the toll paid for five return trips to the CBD each week from the hypothetical household's suburb (for Melbourne and Brisbane), and two return trips to the CBD in Sydney.

WEEKLY COST OF TOLL ROADS

City	Cost of return trip	Weekly household cost
Sydney	$43.02	$86.04
Melbourne	$9.20	$46.00
Brisbane	$9.70	$48.50

Parking

Costs of parking, like tolls, vary widely based on city of residence and place of work. Like tolls, there is little publicly available information available on the typical parking costs faced by households. For this reason, parking can be included or left out of the Index at will.

Roadside assistance

It is assumed that the driver of the secondhand vehicle holds a roadside assistance policy with their State or Territory AAA member. These costs have been provided by AAA.

Weekly household income

The **ABS' Household Income and Wealth (HIW) series has been used as the source of the median weekly income estimates for each city**, the most recent release of which is from 2013-2014. The HIW series provides data for households at the capital city and 'rest of state' level, meaning that data at the metropolitan level can be distinguished from regional areas. Within the HIW series, the breakdown of family income by State/Territory is limited to the *mean* weekly gross household income. To approximate the *median* for each State/Territory, the ratio of the mean and median income of couple families with dependent children has been used. Median incomes are increased each year in line with ABS Average Weekly Earnings which are released in August and February each year.

1 JUSTIFICATION FOR THE INDEX

1.1 Purpose of the Index

The Australian Automobile Association (AAA) is the peak body representing motoring clubs/insurers from around Australia, including RAC State clubs, NRMA and so forth. Its purpose is to represent and advance the interests of these motoring clubs and their members to the Australian Government and other stakeholders. In part, it achieves this through preparing analysis of interest to motorists and motoring policymakers.

The AAA wished to create the Transport Affordability Index, to serve as an indicator of movements in the total price of personal transport, and as such, measures both the upfront and ongoing costs of owning and using a car and public transport. The Index is intended to reflect changes to costs associated with car transport and public transport relative to movements in the CPI and incomes.

The Index is expected to be released and updated with new data on a quarterly basis, and is likely to be of particular interest to motorists and AAA members.

The importance of transport costs

For many families, transport costs can make up a substantial share of the weekly budget, representing the third greatest share of the household budget after housing costs (rent/mortgage) and food. It is particularly important for lower income households – these households are less likely to live close to work, shops and social activities so must travel further, and are less likely to live close to public transport routes. Lower income households are also likely to spend a greater share of their incomes on petrol.

Transport costs interact with housing costs. Often lower income households cannot afford high rent or home purchase costs close to where they work, particularly if they have children to house as well. Although a household might save money on rent or a mortgage by living in an outer suburb compared to living closer into town, they will usually face a trade-off of higher transport costs, such as more petrol, more servicing and the need to have two cars rather than one.

Transport costs are also more likely to be volatile. Petrol prices have trended upwards, but with some sharp fluctuations over the years. In 2011 for example, petrol prices experienced a sharp increase, however since average wages did not increase proportionally, this represented a significant increase in the burden of transport costs relative to incomes.

In 2009-10, ABS data found that the average weekly household expenditure on motor fuel (petrol, diesel, LPG and other fuels) amounted to $41.30 per week, or 11.9% of the mean income of the poorest fifth of the population, and 7.1% of the mean income of the second poorest fifth of the population. Car loan repayments, repair bills and public transport fares can all combine to take up a significant chunk of the household budget. Significant changes in these costs, such as substantial increases in petrol prices, car registration, and so forth, can all eat away at household budgets.

Much of a household's transport costs are non-discretionary. Seventy percent of households used a private car to travel to work on Census day – for many of these workers, a car would be the only way to get to work due to distance or lack of public transport options. Certain vital trips, including travel to work, to shop, to study or seek healthcare can't be cut back on; and social and recreational travel is

essential over the long-term to maintain social connections and wellbeing. Transport costs are a significant and essential expense for most households. A measure showing how transport costs affect household budgets will be a useful tool.

This Index is will be able to perform the following:

- Identify the impact of transport costs growing faster than wage costs,
- Compare the impact of transport costs in different capital cities and how this affects household budgets,
- Identify the impact of specific budget measures, e.g. an increase in petrol taxes or registration costs, on affected Australians, and
- Test the impacts of possible economic shocks, such as a fall in the value of the Australian dollar increasing new car costs, or an increase in the price of petrol.

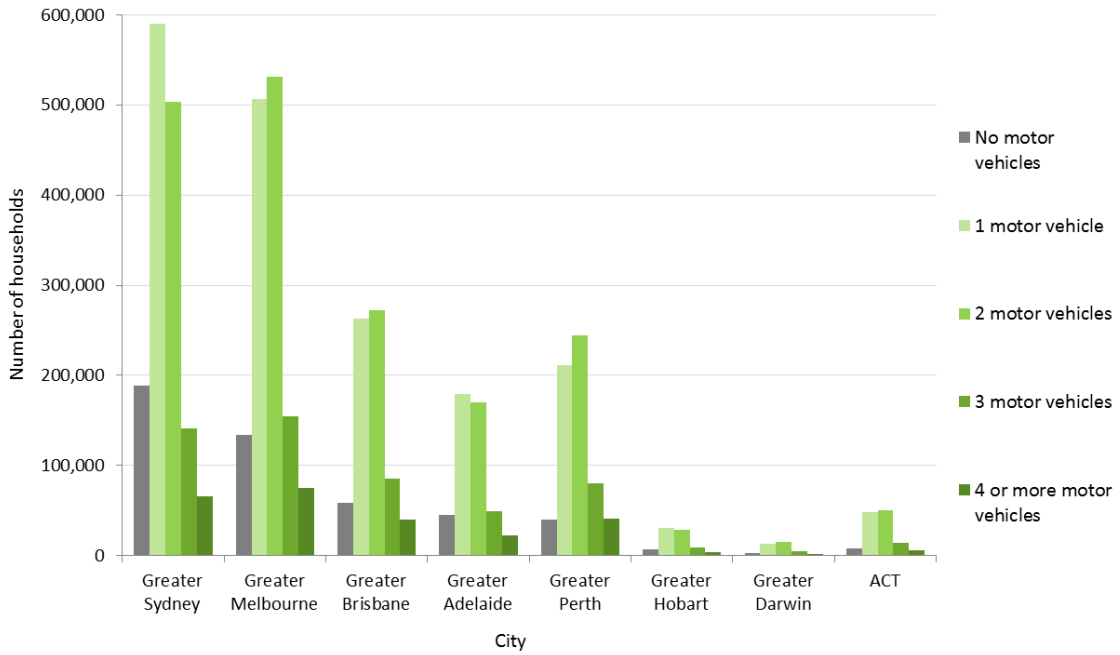
1.2 Transport patterns in Australia

Car ownership and use in Australia

Across Australia, there are approximately 764 vehicles per 1,000 people, of which 575 are passenger vehicles, 123 are light commercial vehicles (for example, utes, vans), and 34 are motorcycles.[1] With the average Australian household consisting of 2.6 people, this means a typical household has an average of two cars.

The figure below illustrates the number of cars owned by households in each capital city in 2011, which is predominantly two per household in most cities.

NUMBER OF MOTOR VEHICLES OWNED IN HOUSEHOLD BY CAPITAL CITY, 2011



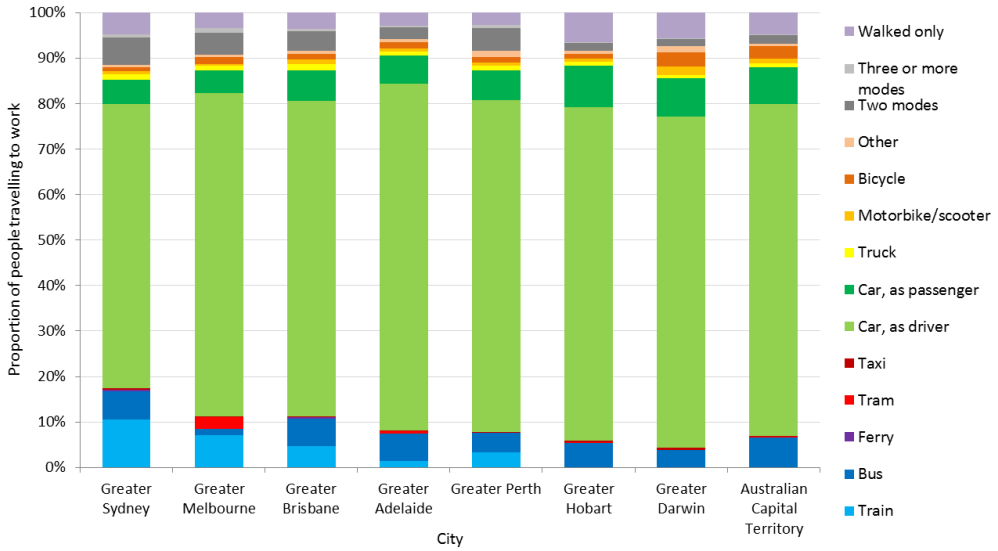
Source: ABS 2011 Census.

The average age of motor vehicles across Australia is 10.1 years, with passenger vehicles tending to be slightly younger with an average age of 9.8 years. The average registered motor vehicle in Australia travels 13,800 kilometres per year.

[1] ABS 2015, *Motor Vehicle Census, Australia, 31 Jan 2015*, Cat. No. 9309.0, released 23/07/2015, http://www.abs.gov.au/ausstats/abs@.nsf/mf/9309.0

The 2011 Census showed that more than two thirds of the Australian population travels to work by car, with this rate consistent over the past 30 to 40 years.[2] The figure below illustrates this predominance in the breakdown of travel mode to work by city. There is a higher rate of use of public transport and other modes in the larger cities, but the majority of travel to work across the capitals is still by private car.

TRAVEL TO WORK BY CITY, 2011



Source: ABS 2011 Census.

Transport costs and affordability

Transport costs are a significant expense for most Australian households and families. The most recent data from the ABS' 2009 Household Expenditure Survey (HES) provides estimates of average weekly household expenditure on transport in each capital city, including for motor vehicle purchases, fuels, registration, insurance, parts and accessories, vehicle charges, and public transport. These are shown in the table below.

AVERAGE WEEKLY HOUSEHOLD EXPENDITURE ON TRANSPORT – 2009-10

City	Average weekly expenditure on transport
Sydney	$193.01
Melbourne	$200.42
Brisbane	$201.45
Perth	$165.28
Adelaide	$192.62
Hobart	$156.86
Darwin	$233.78
Canberra	$232.23

Source: ABS Household Expenditure Survey, Australia, 2009-10.[3]

[2] ABS 2013, *Australian Social Trends*, Cat. No. 4102.0, Released 10/04/2013, http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/4102.0Main+Features30April+2013

[3] See *Table 23A States and Territories, Capital City – Household expenditure on goods and services*, http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/6530.02009-10?OpenDocument

Other previous research has also identified the significant yearly and weekly costs associated with daily commuting to and from CBD areas in Australian cities by car, and that there can be large differences in costs generated from different transport patterns and modes.[4]

It is also well established that car dependency and typically fewer public transport options in outer-suburban areas of cities can result in higher rates of transport disadvantage than inner and middle-ring suburbs, and that this can also disproportionally affect socio-economically disadvantaged households.[5] Transport costs are therefore also an important, though sometimes neglected, element of addressing housing affordability,[6] and in the overall costs of living in Australian cities.

[4] Wang, 2013, 'Commuter costs and potential savings: Public transport versus car commuting in Australia,' Prepared for the Australasian Railway Association, Southern Cross University, November 2013, http://transportreform.org/file.php?fileID=143

[5] Rosier & McDonald, 2011, 'The relationship between transport and disadvantage in Australia,' CAFCA Resource Sheet, August 2011, https://aifs.gov.au/cfca/sites/default/files/publication-documents/rs4.pdf

[6] See Vidyattama, Tanton & Nepal, 2011, 'Housing Stress of Transport Stress? Issues in Australian Housing Affordability,' NATSEM Working Paper 11/06, June 2011, http://www.natsem.canberra.edu.au/storage/Housing%20Stress%20or%20Transport%20Stress%20Issues%20in%20Australian%20Housing%20Affordability_final.pdf

2 HYPOTHETICAL HOUSEHOLD

Transport costs vary significantly from household to household. Factors which affect these costs include the number of people in the household, age and type of cars driven, work and social patterns, proximity to work, shops, social and other activities, and proximity to public transport.

For these reasons, and the previously discussed need for more dynamic variables to reflect particular household characteristics, a 'hypothetical household' will be used as the basis for the development of the Index.

2.1 Approach

In the initial stages of the development of the Index, several approaches were identified as options for the method of constructing the Index and sourcing the relevant transport cost variables. It was decided that a **hypothetical household** method would be used, where the transport costs borne by a household with particular characteristics would be measured and form the basis for the Index.

The Index therefore reflects the financial costs for a particular subset of the Australian population, rather than the costs across the averaged population. It was felt that this would be more representative of the reality of the costs to households with cars and the other characteristics chosen, which are of particular interest to the AAA and its members. This method also allows for the exclusion of other modes of transport with fewer associated costs (such as walking and cycling), which tend to bring down the average cost estimates for transport amongst the wider population, and therefore underestimate the actual amount of weekly expenditure on transport made by a typical household.

A simplified method for the calculation of the Index would have been to update established weekly household transport costs, such as those found in the HES, to the Consumer Price Index (CPI) or other measures of inflation. However, the hypothetical household method, where data is sourced for each variable individually, is likely to provide a more robust estimate of transport costs.

While this method is a more time-consuming and complicated process, it will more accurately reflect the reality of the transport costs faced by Australian households. It is also less dependent on the timing of the release of ABS data.

2.2 Characteristics of the hypothetical household

Household structure

The characteristics of the hypothetical household in the Index are based on those of the 'average' Australian as identified by ABS Census data from 2011.[7] These elements are used as inputs to calculate the costs associated with different variables of the Index where required.

[7] See ABS 2013, *Australian Social Trends*, Cat. No. 4102.0, http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/4102.0Main+Features30April+2013

Age
The average family in Australia in 2011 lived as a heterosexual couple with children. The ages of the two adults in the hypothetical household are based on the Australian median age, of 36 years for males, and 38 years for females.

Employment
It has been assumed for the purpose of the Index that both adults in the household are employed and must regularly travel to and from work, and that both work in a CBD or central location in each city.

Geographic location
It has been assumed that the hypothetical household resides in a suburban area within the wider metropolitan region of each city. A suburb for each has been chosen as a proxy for these locations, in order to calculate some of the relevant variables of the Index. The suburbs chosen for each city are shown in the table below.

SUBURBS USED FOR COST CALCULATIONS IN INDEX

City	Residential suburb	Postcode
Sydney	Penrith	2750
Melbourne	Glenroy	3046
Brisbane	Beenleigh	4207
Perth	Armadale	6112
Adelaide	Woodville	5011
Hobart	Glenorchy	7010
Darwin	Wagaman	0810
Canberra	Franklin	2913

The selection of these suburbs has been based on several factors, including:
- The suburb being a middle to outer-ring suburb in each city's wider metropolis
- That the suburb has a relatively high population density at the SA2 level (as determined by the ABS)
- That households living is these suburbs have access to and would need to utilise both public transport and private vehicles, and
- That in Sydney, Melbourne and Brisbane, driving from the location to the central city would likely require the use of toll roads.

The choice of suburb for each city is likely to affect the relative costs of some variables in the Index, particularly in elements such as car insurance, and may produce significantly higher cost estimates than the city's average or what would be the case in alternative suburbs. It is consequently important to stress that the costs in the Index are representative of a particular subset of the population with these characteristics, and are not intended to be an average of the costs incurred by the whole population.

Mix of transport use and car ownership

Travel patterns
It remains difficult to develop a robust estimate of how the typical Australian household travels and how much they use their private vehicles. Based on established patterns of vehicle ownership and use, such as journey to work data available through the Census and average car ownership rates, SGS believes that the following provides a reasonable representation of household travel habits, and is illustrative of most of the transport costs that households with the characteristics of the hypothetical household would face in their regular weekly travel.

The hypothetical household in each city has been assumed to have:
- One late model car (no more than 3 years old), which drives 15,000 kilometres per year,
- One ten year old car, which drives 10,000 kilometres per year, and

– Use the equivalent of 5 adult daily public transport tickets.

It has been assumed that one of the two adults in the household will drive to work using the late model car, and that the other will use public transport to travel to work, using the older car for other trips. Given that both adults in the hypothetical household are assumed to be employed, they are generally assumed to each make 10 trips in the course of a week (i.e. trips to and from work in the 5 day working week) using their respective modes, from their home to the general vicinity of the city centre, plus social travel. The exception to this is Sydney – its large size means that a person who lives in the middle to outer suburbs and drives to work daily would drive more like 20,000 km per year. To keep car usage comparable between cities, we limit car use to 15,000 km per year and assume a Sydney resident might work from home one or two days per week.

Characteristics of household vehicles

It has been necessary to identify the characteristics of the two household vehicles in order to calculate some elements of the Index. To reflect the variation in car types in the new car market, a weighted average price of the top 10 selling cars according to FCAI and VFACTS data has been used in the car purchase, registration, and maintenance variables for the newer of the two cars. This will also allow changes in preferences in the market for new cars to be reflected in the Index over time. A new Toyota Corolla has been used in the calculation of the comprehensive insurance costs variable for the new car, due to the way that the insurance estimates are generated.

A ten year old car has been used as the proxy for the hypothetical household's used car to calculate variables such as car registration and insurance. This is based on the average age of passenger vehicles in Australia, at 9.8 years, as identified in the 2015 Motor Vehicle Census.[8] As there is little available data identifying the makeup of the used car fleet in Australia by make or model, assumptions have also had to be made regarding the type of vehicle used to estimate the used car's operational costs. A likely suitable model to use as a representative for a ten year old car is a 2006 Toyota Corolla.

This assumption is based on several indicators. These include that Toyota had the highest number of vehicles on register in Australia in 2015 at 2,731,222 cars, more than 600,000 more than the next highest (Holden), and Toyota vehicles being the most common vehicle brand by this measure since at least 2010.[9] Toyota was also the highest selling vehicle brand in 2006.[10] The choice of the Corolla model is consistent with the popularity of passenger cars, which remains the largest segment of car sales in Australia, though SUVs are growing in popularity.[11] The Corolla has also been on the market in Australia for around 50 years in various forms, and has consistently featured among the best-selling models in Australia.

Updating these characteristics over time

It is expected that the characteristics of a typical household and their transport habits will remain fairly similar for some time. Ideally, to ensure the continuity of the Index and that it reflects changes to prices over time, the household structure should be kept the same where possible.

However, as changes occur over time in travel patterns, the types of vehicles being purchased in Australia, and in household composition, these can be factored into the Index as well. As new modes of transport become more common (for example ride-sharing programs or self-driving cars), and if these prove to make up significant proportion of a household's budget, then it may also be worth reconfiguring the characteristics of the hypothetical household to account for the associated costs in the Index.

[8] See http://www.abs.gov.au/ausstats/abs@.nsf/mf/9309.0

[9] ABS 2015, *Motor Vehicle Census, Australia, 31 Jan 2015*, Cat. No. 9309.0.

[10] FCAI 2007, 'Motor Vehicle Sales Second Highest on Record,' 4th January 2007, http://www.fcai.com.au/news/index/index/year/2007/month/all/article/123

[11] FCAI 2015, '2015 new car market,' http://www.fcai.com.au/Sales/2015-new-car-market

3 UPFRONT CAR COSTS

Estimates of transport costs are gathered from a number of publicly available sources. The Index is designed so that the hypothetical household's transport costs can change not only due to a change in the prices of transport, but a change in transport patterns.

Upfront car costs can be broadly described as the costs required just to put a car in the garage. These include car purchase costs, registration, compulsory third party insurance (CTP), and driver's licences and comprehensive car insurance.

3.1 Purchase of car

Assumptions

For this variable of the Index, the cost of the purchase of the hypothetical household's new car has been included. Given the wide variety in car models available on the new car market, **a weighted average price of the top 10 selling vehicles in Australia in 2015 according to VFACTS data has been used to estimate the average cost in each city**. This will be updated each year. The most basic base model for each of the top 10 cars has also been used in the calculations for consistency, and the prices used included on-roads costs.

The assumption has also been made that the new car in the hypothetical household would be purchased through a car loan, for 100% of the purchase price. The cost of the loan using the weighted average prices has been annualised and incorporated into the Index.

It is assumed that the household's used car would be owned outright with no residual purchase costs. The wide variation in prices and models on the used car market would make a robust estimate of this difficult to gather in any case, and households are also less likely to take out finance for the purchase of a used car.

Data sources

The top 10 selling models each year are available through the VFACTS data published by the FCAI. **Vehicle manufacturers' websites have been the primary source of data for the drive-away price of new cars** on this list, with the relevant postcode for each city used to estimate the price in each context. The base model used in the price estimate, and link to the relevant manufacturer's website for each vehicle is provided in the table below.

DATA SOURCES FOR CAR PURCHASE VARIABLE

Vehicle	Model & characteristics	Link to pricing/specifications
Toyota Corolla	Ascent, Hatch 1.8 L Petrol, Automatic	http://www3.toyota.com.au/corolla/prices
Mazda 3	NEO, Sedan 2L Petrol, Automatic	http://www.mazda.com.au/cars/mazda3-sedan/price-and-specification/
Toyota Hi-Lux	4x2, Single cab 2.7L Petrol, Automatic	http://www3.toyota.com.au/hilux/prices http://www.caradvice.com.au/385576/2016-toyota-hilux-pricing-and-specifications/
Hyundai i30	Active, Hatch 1.8L Petrol, Automatic	http://www.hyundai.com.au/shop/calculator
Ford Ranger	Singe cab chassis, 4x2 XL 2.2L Diesel, Manual	http://www.ford.com.au/commercial/ranger/compare-models#step=1
Holden Commodore	Evoke, Sedan 3.0L Petrol, Automatic	http://www.holden.com.au/cars/commodore/sedan-range/evoke
Toyota Camry	Altise, 2.5L Petrol Automatic	http://www3.toyota.com.au/camry/prices
Mitsubishi Triton	Single cab, 4x2 GLX 2WD 2.4L Petrol, Manual	http://www.mitsubishi-motors.com.au/vehicles/triton/range
Mazda CX-5	MAXX, SUV 2.0L Petrol, Automatic	http://www.mazda.com.au/cars/mazda-cx-5/price-and-specification/
Volkswagen Golf	92TSI 1.4L Petrol, Automatic	http://volkswagenaustralia.com.au/PassengerVehicleVariants/vehicle/golf

The **Canstar car loans comparison website** has been used as the source for estimates on the comparison rates for car loans (see http://www.canstar.com.au/compare/car-loans/).

Method and calculations

Calculation of car price

A weighted average cost in each city for the top 10 selling cars has been used in the Index, and is based on the number of each model sold in 2015 (noting that these are total sales figures and include versions other than the base model), and the prices identified through the manufacturer websites using each city's proxy postcode.

The number of each model sold is multiplied by the price identified for each city. The sum of these figures for each city is then divided by the total number of cars sold, which gives the weighted average. The weighted average price in each city has then been used to calculation of the weekly repayments for a new car loan.

Calculation of comparison rates

The Canstar website was used to calculate an average comparison rate for each State/Territory, using the following search criteria:

- New car loan,
- Variable interest rate,
- Providers being banks, credit unions and building societies,
- Loan amount being equal to the weighted average in each city,
- Loan duration of 5 years, and
- Selection of state/territory.

An average of the five cheapest options generated using these search criteria on the website was taken and rounded to the nearest 0.25%. This rate was then used in the formula to calculate the weekly repayment cost over the 5 year period, using the 'PMT' function in Excel.

Updates to the Index

The components of this variable of the Index can be updated using the same websites and sources as the initial costs. While the interest rates on the hypothetical car loan could be updated using changes in the RBA's official interest rate, updating the figures using the online rate calculator will ensure consistency and is likely to better reflect changes in the market for car loans.

The top 10 selling vehicles each year are also likely to change over time, along with sales volumes, which will necessitate a recalculation of the weighted average cost in each city. The figures can be updated from the information on the relevant manufacturers' websites, based on the top 10 selling cars each year, using the same calculations as detailed above. The weighted average can also be updated each quarter to reflect any changes in pricing of the top 10 models, also using the identified relevant websites.

3.2 Car registration, CTPI and driver licences

Assumptions

This variable of the Index factors in costs relating to the registration of the hypothetical household's new and used car, including comprehensive third party insurance (CTP), and cost of maintaining driver licences for the two adults, as these are important elements of the overall costs of owning and operating a car over the course of a year.

The costs associated with the new and used cars in the hypothetical household have been calculated separately, due to the variation in pricing for different cars, and in order to obtain the more accurate estimate of costs.

Data sources

Registration and CTP insurance

Many jurisdictions in Australia include CTP insurance in the total fee for registration of a vehicle. The **costs of car registration in each city are available through the relevant government websites**, as shown in the table below. Some of the government websites have registration cost calculators, while others simply present tables from which the price can be calculated.

REGISTRATION AND CPTI COST SOURCE WEBSITES

City	Link to website
Sydney	https://myrta.com/myRego/pages/content/rc/RegistrationCalculator.page
Melbourne	https://www.vicroads.vic.gov.au/registration/registration-fees/vehicle-registration-fees
Brisbane	https://www.service.transport.qld.gov.au/quoteforregistration/
Perth	http://www.transport.wa.gov.au/licensing/vehicle-licence-fees-and-payments.asp
Adelaide	https://www.ecom.transport.sa.gov.au/et/generalFeesEnquiry.do
Hobart	http://www.transport.tas.gov.au/fees_forms/registration_licensing/calculation_of_fees_-_class_a_vehicles
Darwin	https://nt.gov.au/driving/fees/registration-fees
Canberra	https://www.accesscanberra.act.gov.au/app/answers/detail/a_id/694/#!tabs-8

Sourcing these costs direct from the relevant state governments has been chosen over updating the weekly costs identified in the HES to the CPI, as this provides a more accurate estimate of the costs in

each capital city. It is assumed the vehicle is used entirely for private use and the household is not entitled to any concessions.

Cost of driver licences

The cost of driver licences differs between the Australian jurisdictions, and **the best source of information on fees is the relevant state government authority websites**. Each jurisdiction also offers different options for the length of licence renewal. The cheapest annualised cost of driver licences without any concessions has been chosen for inclusion in the Index (as it is assumed that drivers would select the most affordable option), with these costs and links to relevant government websites shown below.

DRIVER LICENCE COST SOURCE WEBSITES

City	Length of renewal	Total/annual cost	Link to website
Sydney	5 years	$174.00/$34.80	http://www.rms.nsw.gov.au/roads/licence/fees.html
Melbourne	3 years	$76.00/$25.33	https://www.vicroads.vic.gov.au/licences/licence-fees/driver-licence-and-learner-permit-fees
Brisbane	5 years	$159.40/$31.88	https://www.qld.gov.au/transport/licensing/driver-licensing/fees/
Perth	5 years	$132.00/$26.40	https://www.sa.gov.au/topics/transport-travel-and-motoring/transport-fees/motoring-fees/driver-s-licence-and-permit-fees
Adelaide	1-10 years	$41.00/$41.00	http://www.transport.wa.gov.au/licensing/driver-licence-fees-and-payments.asp
Hobart	5 years	$108.35/$21.67	http://www.transport.tas.gov.au/fees_forms/registration_licensing/driver_licence_fees
Darwin	10 years	$150.00/$15.00	https://nt.gov.au/driving/fees/driver-and-rider-licence-fees
Canberra	5 years	$171.60/$34.32	http://www.rego.act.gov.au/__data/assets/pdf_file/0006/568500/Licence-Fees.pdf

Method and calculations

The costs of registration and CTP have been obtained for a 12 month period, as is typical in most Australian jurisdictions. As discussed above, the calculation of the cost of driver licences in based on the cheapest term of renewal in each State/Territory.

The variables used to calculate registration costs also vary between jurisdictions, with some based on the weight of the vehicle, some on the size of the engine, and other factors. **For the new car in the hypothetical household, the weighted average of the characteristics of the top 10 sellers** have been used as inputs to the cost calculators where required, however, this was only necessary for Sydney's costs. A **ten year old Toyota Corolla (base model, 2006 at time of writing) has been used to estimate the cost for the used car**.

It should be noted that changes to the variables selected, particularly the postcode, can change the cost of registration and CTP significantly. The cost of registration and CTP insurance for each car, and the cost of two driver licences have then been added together to estimate the overall cost of insurance for the hypothetical household in the Index.

Updates to the Index

The car registration and licence cost variables in the Index can be updated as needed using the information at the websites identified previously. These variables may however only need to be updated annually rather than with each quarterly update to the Index, as the costs for registration and licencing

are typically updated on a yearly basis. The cheapest annual option should be chosen if licence renewal or costs change over time. The annualised cost should be used as the input to the Index, by dividing the total price by the number of years of renewal.

Registration and licence costs could feasibly be updated relative to the CPI, however, sourcing the costs directly from the government agencies will provide a more accurate figure, and maintain the consistency of the Index over time.

The weighted average of the top 10 selling cars should also be updated when the figures for these are released each year, to reflect changes in new car preferences in the market.

3.3 Comprehensive car insurance

Assumptions

The cost of comprehensive car insurance is an important variable to include in the Index, and is a cost that is often not thought about by drivers in the day-to-day operation of their vehicles.

Insurance costs are dependent on a number of different factors relating to both the vehicle and those who drive it, meaning that costs from different providers and between States/Territories can vary considerably. Because of this, some assumptions need to be made to generate cost estimates, such as the model of car, where it is kept, and details of the drivers and their driving history.

Where possible, these elements have been kept consistent with the characteristics of the hypothetical household in Section 2 (such as the drivers' ages), and the suburbs and postcodes used previously have been used for each city. As most insurance estimates are based on a particular make and model of car (meaning a weighted average of the top 10 sellers cannot be used), a **new Toyota Corolla has been used as a proxy for the** new car in the hypothetical household, as it is the highest selling car, and has been amongst the top selling cars for a long period of time. Similarly, a **2006 Toyota Corolla (base model with estimated current value of $7,000) has been used to estimate the cost for the used car** in the hypothetical household.

Data sources

The cost estimates included in the Index for comprehensive car insurance for both the new and used car in the hypothetical household have been sourced from **AAA member organisation websites**, with the exception of the AANT, which does not currently provide car insurance (Suncorp has been used for Darwin instead, as it is one of the largest providers in the market). These providers have been chosen as they tend to be dominant in the car insurance market and have a significant market share in each State/Territory. The source websites for the estimates used for each capital city are provided in below.

SOURCES FOR COMPREHENSIVE CAR INSURANCE ESTIMATES

City	Provider	Link to website
Sydney	NRMA	https://www.insuranceonline.nrma.com.au/oss/GTConnect/UnifiedAcceptor/Portal.Quote/RW1461193950751?brandId=nrma&product=Comprehensive
Melbourne	RACV	https://mymembership.racv.com.au/wps/portal/r3_um_quote?riskType=CRCP
Brisbane	RACQ	https://www.racq.com.au/insurance/quote/car?covertype=MC
Perth	RAC	http://rac.com.au/insurance/car-insurance/comprehensive
Adelaide	RAA	https://quote.raa.com.au/motor/quote
Hobart	RACT	https://insurance.ract.com.au/
Darwin	Suncorp	http://www.suncorp.com.au/insurance/car/comprehensive

Canberra	NRMA	https://www.insuranceonline.nrma.com.au/oss/GTConnect/UnifiedAcceptor/Portal.Quote/RW1461194120566?brandId=nrmaact&product=Comprehensive

Weekly costs identified in the HES do not distinguish between different types of insurance, and as such are not able to be used accurately for the purposes of the Index.

Method and calculations

As mentioned previously, there are many different variables which factor into car insurance costs, and the process of accessing online estimates of prices from each of the providers is different. As much as possible, the assumptions used have been kept consistent across the different jurisdictions, particularly the age of the drivers, that they have good driving records, that the vehicle is garaged, and the amount of excess included in the policy. Where required, the agreed price of a new Toyota Corolla in each jurisdiction has been used as an input.

For some of the capital cities, specific addresses in the proxy suburbs have had to be identified and used in the cost calculators. These have been chosen on the basis of their suburban location and because they contain predominantly detached housing types, as is consistent with the hypothetical household and Australian average. It should also be noted that there can be significant variations in pricing for different suburbs within the metropolitan area of each capital city, and is dependent on the assumptions made by each of the insurers. Many factors are likely to influence this, such as crime rates, the age profile of an area, regularity of accidents, and perceived safety.

The price estimates generated using these assumptions are inclusive of GST and other government charges, and in several cases also incorporate a discount for purchasing the policy online rather than at a shopfront. The weekly costs for the new and used car are then added together to get the total comprehensive insurance cost variable used in the Index.

Updates to the Index

The costs in this variable of the Index should be updated using the same insurance cost calculators on the AAA member organisation websites. Because this information is available online, it can be updated each quarter in line with the Index, or as regularly as the AAA sees fit.

While this process can be somewhat time-consuming, using the same inputs to the cost calculators will give a more accurate and robust indication of changes to comprehensive insurance costs between Index updates, and better reflect changes in this market than updating the figures using the overall CPI. This is particularly important as the Index aims to identify changes to household transport expenses over time.

As the popularity of different car models is also likely to change over time, it may also be necessary to alter which model of car is used in the Index as the substitute for the hypothetical household's new car, and update the used car model annually to the most popular model 10 years prior.

3.4 Depreciation costs are not included in the Index

Depreciation, the fall in value of a vehicle over time and with use, can be a significant cost of owning a car, particularly new cars. It is a cost incurred even if the car is never driven, although cars driven long distances depreciate faster than cars that are driven less. It is a cost included in Cost Calculators for new cars provided online by AAA member organisations. However, it is often not noticed by car owners as it doesn't represent cash coming out of owners' pockets on a weekly, monthly or annual basis – it is often only noticed when the owner sells the car.

SGS have decided not to include depreciation costs in the Index for two reasons. First, the Index is intended to show the impact on a household's weekly budget of transport costs – households need not

set money aside out of their weekly budgets for depreciation. Second, the Index includes principal and interest car loan repayment costs. Principal repayments and depreciation are two halves of the same coin – repayment of principal increases household net wealth at the same time as depreciation reduces it – so counting both principal repayments and depreciation would be double-counting. Since our primary concern is household cashflow, principal and interest loan repayments are used instead of depreciation.

4 ONGOING CAR COSTS

4.1 Fuel costs

Assumptions

There are a number of sources and methods that could be used to determine the fuel costs of the hypothetical household. In the Index, the weekly fuel costs have been calculated using published fuel prices in each capital city, and estimate of the kilometres travelled by each car over the course of a year, an estimated rate of fuel consumption for each of the household's vehicles, and an estimate of the proportion of the use of petrol and diesel fuels across the Australian fleet.

In order to reflect the use of petrol fuel and diesel fuel, the Index uses the proportions of the use of each type of fuel identified in the ABS' Survey of Motor Vehicle Use of 2014 (see http://www.abs.gov.au/ausstats/abs@.nsf/mf/9208.0/). The use of other types of fuel have been excluded at this stage, as they make up a small percentage of overall use, and particularly in the case of hybrid electric cars, have other associated costs which are difficult to estimate and include in the Index at this point. **The proportion of fuel type used has therefore been set at 86% petrol and 14% diesel**.

As identified in Section 2, **it is assumed for the purposes of the Index that the hypothetical household's new car will travel around 15,000 kilometres per year, and that the used car will travel around 10,000 kilometres per year**. These estimates are based on typical vehicle use patterns, which suggest that the average passenger vehicle travels 13,800 kilometres annually.

Data sources

Fuel prices

FUELTrac provides weekly and monthly data on average fuel prices by capital city. Since petrol prices can fluctuate significantly on a weekly basis, it was decided that average capital city fuel prices for each quarter would be used as inputs. Petrol and diesel prices can be obtained from FUELTrac and averaged.

Fuel consumption

Table 14 Average rate of fuel consumption, by year of manufacture – by type of vehicle by type of fuel in the **ABS' Survey of Motor Vehicle Use** provides estimates of the typical fuel consumption of vehicles by age. The most recent data is available for 2014, with the series released every two to three years. The ABS figures have been used rather than estimates made by vehicle manufacturers, as these typically underestimate the fuel use of an average driver.

For the new car, the fuel consumption figure for cars manufactured after 2009 has been used, while for the used car, the figure for those manufactured between 1999 and 2008 has been used.

Method

Monthly State and Territory data on fuel prices from FUELTrac were converted to quarterly figures for each capital city in the Index. The prices for the March 2016 quarter are shown below.

FUELTRAC CAPITAL CITY FUEL PRICES, FIRST QUARTER 2016

City	Petrol prices (cents)	Diesel prices (cents)
Sydney	112.0	115.6
Melbourne	110.4	111.7
Brisbane	115.5	117.8
Perth	114.1	117.0
Adelaide	108.3	107.3
Hobart	122.2	122.4
Darwin	120.7	123.0
Canberra	119.7	117.5

The fuel costs paid by the hypothetical household have then been calculated using the figures for fuel consumption for the two vehicles, the assumptions of how many kilometres each travels annually, the proportion of each type of fuel used, and the prices in each city.

Updates to the Index

Future updates to the fuel price variable of the Index should use the figures available from FUELTrac for petrol and diesel respectively. Any observed changes in the proportion of vehicles using petrol, diesel or other fuel types in future releases of the Survey of Motor Vehicle Use should also be incorporated into the Index.

If alternative fuel sources become more prominent in the market in future, such as electric cars or biofuels, these could also be represented in the Index, however, this will depend on accurate information of the costs associated with these types of vehicles being available.

4.2 Car maintenance

Assumptions

The car maintenance variable of the Index is made up of the costs of servicing the hypothetical household's new car, used car, and the cost of tyres for both. The costs associated with these aspects of owning and operating a car can vary substantially, and will often be dependent on the make and model of the vehicle, the service provider, and car owner preferences.

While most new cars come with fixed-price servicing arrangements, used cars are likely to be serviced at less regular intervals, and some drivers may choose not to maintain their vehicles as well as recommended by manufacturers. The costs of tyres and other spare parts also vary substantially by brand, type and quality. These variables make it difficult to obtain accurate estimates of maintenance costs, and as such different sources and methods have been used in the calculation of these in the Index.

The amount that car owners should spend on new tyres and servicing their vehicles may not line up with actual expenses. Car owners who do a lot of stop-start driving may opt for more regular servicing, or used car owners may face higher maintenance costs as their cars get older. Alternatively some car owners may drive on balding tyres, not get around to servicing their vehicles regularly or save money by performing some maintenance at home. For this analysis we have assumed that new car owners will get their vehicle serviced according to manufacturer recommendations to keep their warranty, while used car maintenance costs will be based on estimates of what people actually spend.

Data sources

As most new cars come with fixed price servicing, the **published costs from the relevant manufacturer's website for new car servicing** have been used as an estimate for maintenance costs in the Index. Links to the relevant websites for this information are provided below.

SOURCES FOR FIXED PRICE SERVICING ESTIMATES

Vehicle	Link to fixed-price servicing information
Toyota Corolla	http://www3.toyota.com.au/owners/service/~/media/toyota/main-site/images/genuine-service/files/toyota-service-advantage-pricing.pdf?la=en
Mazda 3	http://www.mazda.com.au/cars/mazda3-sedan/servicing/
Toyota Hi-Lux	http://www3.toyota.com.au/owners/service/~/media/toyota/main-site/images/genuine-service/files/toyota-service-advantage-pricing.pdf?la=en
Hyundai i30	http://www.hyundai.com.au/owning/get-a-service-quote
Ford Ranger	http://www.ford.com.au/service/calculator
Holden Commodore	http://www.holden.com.au/ownership-and-servicing/servicing/lifetime-capped-price-servicing
Toyota Camry	http://www3.toyota.com.au/owners/service/~/media/toyota/main-site/images/genuine-service/files/toyota-service-advantage-pricing.pdf?la=en
Mitsubishi Triton	http://www.mitsubishi-motors.com.au/uploads/pdf/CPS-Pricing-Summary-Mar16.pdf
Mazda CX-5	http://www.mazda.com.au/cars/mazda-cx-5/servicing/
Volkswagen Golf	http://volkswagenaustralia.com.au/CappedPriceServicing/?Model=Golf&EngineType=1.4L+Petrol+90kW&Transmission=DSG+7sp&Year=2015

Due to the wide variation in car types in the used car fleet and the multitude of options for servicing and maintenance, **the estimates of costs for the used car in the hypothetical household are made using figures in the HES updated to 2016 dollars using the CPI**. Similarly, as there is huge range and complexity of retail prices for a set of tyres (which are dependent on brand, quality etc.), the **figures for household spending on tyres in the HES have been updated using the CPI**.

Sourcing online estimates of used car servicing and tyres remains difficult because of the variation in pricing and options, and using the CPI method will ensure a level of consistency in the cost estimates for these variables. The HES is also more likely to reflect how much households actually spend on tyres and other maintenance, rather than what is recommended by manufacturers which is not always adhered to by car owners when car warranties expire.

Links to these sources via the ABS website are as follows:

- CPI: http://www.abs.gov.au/ausstats/abs@.nsf/mf/6401.0
- HES: http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/6530.0Main+Features12009-10?OpenDocument

Method and calculations

New Car

Estimates of the fixed price servicing from manufacturer websites have been based on the costs for the base model of each of the top 10 best sellers in 2015, with a **weighted average of these used in the Index**. Because the manufacturer's published fixed-price servicing costs do not distinguish between cities or States, the same average cost has been used for each.

To calculate the weighted average cost of servicing of the top 10 best sellers, the cost of each service required over a 5 year period has been identified. The average of these was then taken, and then the weighted average was calculated. This gives a weighted average cost per year, of $329.73, which has then been divided by 52 to give the weekly cost of $6.34.

Used Car

The calculation of the weekly cost of used car maintenance is relatively straightforward, where the weekly cost of vehicle maintenance in each city identified in the HES has been multiplied by the ratio of

the current quarter's CPI to the CPI of the quarter when the HES was taken. As the most recent HES data is from 2009, the December 2009 quarter figure has been used as the base level.

In future updates, the ratio used in the calculation will reflect the change in the CPI between quarters rather than to the 2009 HES figure.

Cost of tyres
The method and calculation for updating the used car maintenance costs to the CPI has been used for the cost of tyres.

Because the HES figures are less recent than other data sources used in the Index, SGS investigated the cost of a set of tyres from online retailers to 'sense check' the calculated weekly costs.[12] This involved using the specifications for the top 10 selling vehicles in 2015, taking the average of the highest and lowest cost brands and options available for these specifications, and the standard assumption that a set of tyres will last approximately 3 years. The weekly average cost from the selected online sources using these assumptions ranged from $3.46 to $6.06, which is roughly consistent with the results found.

Total maintenance cost variable
The total household weekly car maintenance variable for the Index is calculated by adding the weekly cost of maintenance for the new car, cost of maintenance for the used car, and the household weekly cost of tyres together.

Updates to the Index

As with the other variables in the Index, changes in the list of top 10 selling models should be accounted for in the calculation of the weighted cost of fixed price servicing, as the list is annually released. This will ensure that any changes to the popularity of different types of cars and their associated servicing costs are reflected in the Index. For consistency, the fixed price servicing costs should continue to be sourced from the relevant manufacturer's websites.

Updates to the estimates for used cars and tyres can be made through the CPI. As new editions of the HES are released, these figures can also be used to update the Index. However, due to the methodology and the time interval between these releases, it will be important to identify if there is a substantive difference between HES estimates and estimates using the CPI for the same quarterly interval before incorporating the new HES figures into the Index. Substituting any new figures straight in to the Index could substantially alter and skew its results, and spreading the difference between the two estimates over time may be required to maintain the Index's consistency.

[12] These sources were primarily Jax Tyres and Tyresales.com.au

5 PUBLIC TRANSPORT COSTS

5.1 Daily travel on public transport

Assumptions

As detailed in Section 2, the adult who uses the older of the hypothetical household's two cars has been assumed to catch public transport for their daily travel to work in each city's CBD. Therefore, two trips per working day using public transport need to be accounted for in the Index.

For consistency, a number of other assumptions have also been made concerning the charges used for the public transport cost calculation:

- Fares charged are the standard price for an adult, with no extra concessions,
- Capped pricing schemes are included where applicable – limited to Sydney and Brisbane currently,
- Where pricing is dependent on the time of day of travel, the cost for travelling at peak commuting times has been used,
- As regular commuters would be likely to own and use the relevant electronic travel card in each city, the prices charged for these have been used rather than the amounts charged for cash fares,
- Where pricing differs by the mode of public transport used, the cost of the most direct of these has been included in the Index, as the traveller would likely want to minimise their travel time.

Data sources

As each capital city operates its own public transport network, **details on fares need to be sourced from the individual websites of the relevant public transport providers**. Each has a different method of pricing and charges, with some trips charged as flat rates, and others dependent on the distance travelled or mode used. Links to the relevant transport authority websites in each capital city are provided below.

PUBLIC TRANSPORT COST SOURCES

City	Relevant public transport website
Sydney	https://www.opal.com.au/en/opal-fares/calculating_opal_fares/
Melbourne	http://ptv.vic.gov.au/tickets/metropolitan-myki-fares-2016/
Brisbane	http://translink.com.au/tickets-and-fares/fares-and-zones/current-fares
Perth	http://www.transperth.wa.gov.au/tickets-fares/fares
Adelaide	https://www.adelaidemetro.com.au/Tickets/Fares
Hobart	http://www.metrotas.com.au/fares/urban-fares/
Darwin	https://nt.gov.au/driving/public-transport-cycling/public-bus-tickets/bus-fares-and-concessions
Canberra	https://www.transport.act.gov.au/catch_a_bus/myway/fares

Method and calculations

The weekly costs for public transport have been derived from the information in the above websites. For the public transport systems which charge based on distance, the fares for a typical daily commute to work have been estimated using the suburbs identified previously as the proxies for each city. For the cities which charge flat rates, the cost of two trips per day has been used.

The fares and the type of trip or ticket used for each capital city are identified below. The cost of two trips per day has been multiplied by five in each case to account for the weekly cost of commuting by public transport, with the current capped pricing schemes in Sydney and Brisbane factored in.

CALCULATION OF WEEKLY PUBLIC TRANSPORT COST

City	Mode/distance & travel card	Cost of return trip	Capped pricing	Weekly cost
Sydney	Train, 35-65km, Opal	$12.92	Max. 8 trips	$51.68
Melbourne	Train, Zone1+2, Myki	$7.80	N/A	$39.00
Brisbane	7 zones, go card	$14.54	Max. 9 trips	$65.43
Perth	4 zones, Smartrider (no autoload)	$10.88	N/A	$54.40
Adelaide	Standard trips, Metrocard	$6.96	N/A	$34.80
Hobart	1-4 sections, Greencard	$5.12	N/A	$25.60
Darwin	Flexi-trip fare for 10 trips, Tap and Ride card	$4.00	N/A	$20.00
Canberra	Standard trips, MyWay	$5.96	N/A	$29.80

Updates to the Index

Updates to public transport costs in the Index will be relatively straightforward, as the prices charged in each city are readily available at the websites previously. However, changes to fares are likely to vary across the cities and may not be introduced on a regular basis, and as such may not need to be updated are regularly as other Index components.

If methods of calculating public transport fares change, for example, with an alteration to transport zones or the pricing for fares, then the costs used in the Index should be those paid by a commuter travelling from the suburbs identified into the city and home again, for five days per week.

6 OTHER TRANSPORT COSTS

6.1 Toll roads

Assumptions

Toll roads are an important element to include in the Index, as they can be expensive and make up a significant proportion of weekly travel costs if drivers use them every day to get to work. As toll roads currently operate in Sydney, Melbourne and Brisbane, but not in the other capital cities, these present significant comparative costs for residents living in the larger Australian cities, and this is also an important element which should be reflected in the Index.

As the Index assumes that the adults in the hypothetical household work in central city areas, the toll road charges have been based on the most convenient route from the hypothetical addresses and postcodes used previously for other Index variables to the CBD.

Data sources

The figures for toll roads costs have been sources using online cost calculators provided by the relevant government authorities or private providers, via the websites below.

TOLL ROAD PRICING SOURCE WEBSITES

City	Toll road pricing and information
Sydney	http://www.rms.nsw.gov.au/sydney-motorways/toll-calculator/#
Melbourne	https://www.citylink.com.au/tollcalculator.asp
Brisbane	https://www.govia.com.au/web/ssp/toll-costs-by-tolling-point

Method and calculations

The addresses and postcodes used as proxies for each city and as input into other variables in the Index (such as for insurance) have been used to calculate the likely toll road charges for daily travel to the CBD in the 3 cities. In cases where there are multiple options, the most convenient route has been used for the estimate.

Sydney

There are a number of ways the driver in the hypothetical household could travel from Penrith to the CBD. The most direct route using toll roads consists of travel on the M7 ($7.65), the M2 ($6.68), the Lane Cove Tunnel ($3.18), and the Sydney Harbour Bridge ($4.00), with a total one-way cost of $21.51 in peak hours. This is based on the hypothetical address chosen for Penrith, and assumes that the driver would enter the toll road at the M4/M7 intersection, and exit at Bridge Street in the CBD.

However, the hypothetical household could also travel to the CBD via the M4 motorway, which is not a toll road. While it is likely that the household would elect to travel via the free option most days, they may also alternate between the two routes to avoid things like traffic congestion, accidents, or road works, and to reduce their trip time. It is also important that the Index include a measure of toll road costs for Sydney, as these are significant costs for drivers, and many households are likely to be paying these charges on a daily basis.

Given the significant cost of a one-way toll road trip (particularly in comparison to Melbourne and Brisbane), and the fact that there is a toll-free alternative which ordinarily takes a similar amount of time, it has been assumed that the driver in the hypothetical household takes the toll-road route 2 days per week, and on other days either works from home or takes the non-toll road (M4) route 3 days per week.

The toll road costs for Sydney is particularly high compared to the other Australian cities which have them, and this is largely due to the choice of Penrith as the location for the hypothetical household. While using Penrith is likely to generate higher toll road costs than other suburbs, it is more likely to reflect the travel patterns of people living in Western Sydney and areas far from the CBD.

The choice of Penrith is also likely to reflect the longer average commuting trip times seen in Sydney compared to other cities, and the higher proportion of employed people undertaking lengthy commutes. Research conducted in 2011 identified that Sydney had the longest average commuting trip duration of Australia's cities, and the largest proportion people with lengthy commutes (over 45 minutes duration), at 39.2%, as shown below.

AVERAGE COMMUTING TRIP DURATION AND PROPORTION OF LENGTHY COMMUTES, 2011

City	Average commuting trip duration (minutes)	Proportion of people with lengthy commutes (%)
Sydney	39.2	39.2
Melbourne	35.3	32.0
Brisbane	37.1	34.1
Perth	30.0	23.6
Adelaide	27.7	17.7
Hobart	25.0	12.2
Darwin	20.6	5.6
Canberra-Queanbeyan	24.7	10.7

Source: Productivity Commission, 2011.[13]

Melbourne

From the hypothetical Melbourne household location in Glenroy, the most convenient route to the city by car is via the CityLink toll road. As it is assumed that the most direct and convenient route will be taken, the driver would likely enter the toll road at Bell Street and exit at Dynon Road, resulting in a one way fare of $4.60.

Brisbane

Travel from Beenleigh to the centre of Brisbane can involve both toll and non-toll roads, as most of Brisbane's toll roads cover travel which circumvents the CBD, and applies to roads which link to the airport and between areas to the north and south of the City.

In order for the Index to capture the fact that many Brisbane residents do pay tolls in daily travel, and the associated cost of this, it has been assumed that the work location of the hypothetical household member is located on the northern side of the river, and as such would likely travel via the Clem 7 toll road to get there, and thus pay a toll of $4.85 each way.

[13] See BITRE 2016, 'Lengthy Commutes in Australia,' Research Report 144, p.74 *Table 5.3 Average commuting trip duration and prevalence of lengthy commutes for selected metropolitan and regional cities, Productivity Commission Community Survey 2011*, https://bitre.gov.au/publications/2016/files/rr_144.pdf

Weekly costs in each city

The cost of a return trip in Melbourne and Brisbane has been multiplied by 5 to generate the weekly household cost. For Sydney, as discussed above, the driver in the hypothetical household will use the toll road 2 days a week, so the figure has been multiplied by 2. The weekly costs are shown in below.

CALCULATION OF WEEKLY COST OF TOLL ROADS

City	Cost of return trip	Weekly household cost
Sydney	$43.02	$86.04
Melbourne	$9.20	$46.00
Brisbane	$9.70	$48.50

Updates to the Index

Updates to the toll road variable can be made with reference to the costs available at the relevant websites, and using the same hypothetical household addresses and travel routes. Any change in charges on these toll roads will then be reflected over time. If toll roads are established in the other capital cities, these costs can also be included in the Index to reflect this change and the additional costs to the hypothetical household.

If new toll roads are introduced in future in Sydney, Melbourne, or Brisbane, the impact of these on the hypothetical household may need to be considered. For example, if a new toll road results in a faster or more convenient journey to the city for the hypothetical households, the cost of this could be substituted for the cost of the previously assumed route.

If new or more detailed information about the amounts households in these cities spends on toll roads become available, this could also be factored into the Index. At the same time, if toll road charges become a less significant proportion of household spending, they could be excluded from the Index.

6.2 Parking

Assumptions

As the hypothetical household scenario assumes that the one of the adults drives to work each day or most days, an estimate for the costs associated with parking should ideally be included as part of the Index. However, determining an accurate estimate of what an average household is likely to spend on parking each week is difficult, given the variation in pricing as a result of factors including the range of providers, the time period paid for, whether it is an on-street or secured parking space. Some employers are also likely to provide free or subsidised parking to employees in city centres as well, and this is also difficult to factor in to an accurate estimate of cost.

It would also be difficult to use the figures available in the HES updated to CPI, as the CPI does not include a specific measure for parking, and it would be difficult to update the figures accurately using other measures of inflation.

Method and calculations

Because of the variation in pricing for parking within Australia's capital cities, the default setting for the Transport Affordability Index is zero dollars for parking, but it can be easily added in to see what the costs would be for households who have to pay for parking.

Updates to the Index

Because of the inexact nature of the assumptions used for the parking variable, the estimated costs could be excluded from the Index if the AAA sees fit.

If more detailed or accurate data concerning the parking charges paid by households in the different cities is made available, this can also then be substituted into the Index. Similarly, if parking charges

become a less significant part of household spending patterns, or these become less relevant to the purposes of the Index over time, they can be excluded from the total cost calculation.

6.3 Roadside assistance

The AAA member organisations in each State and Territory offer roadside assistance policies to motorists. These offer a fixed annual fee to send a repair vehicle out to a motorist's location if they lock themselves out of their car, run out of petrol, flatten their battery or their car won't start for some other reason.

SGS is unaware of any data on the prevalence of these policies, however the number of policies held by AAA members suggests that these are very common. It is assumed that each hypothetical household will hold a single vehicle policy over one car, most likely the secondhand car. A new car driver might feel less of a need for a roadside assistance policy as newer cars are less likely to break down, and with modern features the driver is less likely to lock their keys in their car or run out of petrol.

Costs of annual roadside assistance were provided by AAA and are shown below.

ANNUAL ROADSIDE ASSISTANCE MEMBERSHIP

City	Annual cost of roadside assistance
Sydney	$110.00
Melbourne	$100.00
Brisbane	$89.00
Perth	$104.00
Adelaide	$97.00
Hobart	$105.00
Darwin	$99.00
Canberra	$110.00

6.4 Other transport modes

In the current Index, no costs have been assigned for taxis, ridesharing or cycling modes. However, these costs are able to be factored in through the 'household' spreadsheet in the model. This will allow the AAA to modify the Index in future to account for changes to travel modes and patterns, particularly if these modes become more common, or more detailed data of their usage becomes available.

7 WEEKLY HOUSEHOLD INCOME

7.1 Figures used in Index

Assumptions

An estimate of the median weekly income of the hypothetical household in each capital city has been used in the Index to illustrate the proportion of income spent on transport related costs in the course of a week. In line with the characteristics of the hypothetical household detailed in Section 2, **weekly income estimates have been sought for households containing two adults with dependent children only**.

The median figure has been used as this is likely to provide a more robust estimate of an average household's weekly income than the mean. Mean measures tend to overestimate average earnings, as a small number of households on very large incomes skew the average upwards.

Data sources

The **ABS' Household Income and Wealth (HIW) series has been used as the source of the median weekly income estimates for each city**, the most recent release of which is from 2013-2014 (see Cat. No. 6523.0 http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/6523.02013-14?OpenDocument). The HIW series provides data for households at the capital city and 'rest of state' level, meaning that data at the metropolitan level can be distinguished from regional areas.

Two tables within the series have been used to generate the values in the Index:

- *Table 11.1 INCOME DISTRIBUTION, Household Composition*, and
- *Table 11.4 GROSS AND EQUIVALISED DISPOSABLE HOUSEHOLD INCOME, Household composition*.

There are a number of other available sources from the ABS which provide estimates of household incomes, such as Average Weekly Earnings (AWE) and the Census. However, AWE figures are published at the State and Territory level only, and the Census is now five years old, and given this, the HIW figures are likely to give a more up to date and robust estimate of average household incomes.

Method and calculations

Within the HIW series, the breakdown of family income by State/Territory is limited to the *mean* weekly gross household income. To approximate the *median* for each State/Territory, the ratio between the mean and median income of couple families with dependent children has been used.

Using Table 11.1 of the HIW series, the *weekly value for the **median** private income for couple families with dependent children* has been divided by the *weekly value for the **mean** private income for couple families with dependent children*. This gives a ratio of 0.84.

The 0.84 ratio has then been applied to the *mean weekly gross household income values for couple families with dependent children in each State/Territory* contained in Table 11.4 of the HIW series. This gives the median weekly household earnings values included in the Index.

Updates to the Index

As new HIW data is released every few years, the new figures for incomes can be substituted into the Index calculation, and the ratio of mean to median incomes can also be updated using the same calculation.

In the interim, updates to the income figures used in the Index can be made using the growth rates in average household income identified in the ABS' AWE releases. The AWE series is released every 6 months, in August and February of each year.

8 CONCLUSION

This report has aimed to summarise the reason and purpose behind the development of a Transport Affordability Index – to develop an estimate of transport costs as a share of income across Australia, and to track movements in costs over time. It has aimed to represent the transport patterns of a typical Australian family – a two car household in the middle to outer suburbs with two adults and children. Some compromises were made to ensure costs were comparable across cities and across time; for example, cars were assumed to drive the same number of kilometres per year regardless of the size of the city, and all drivers were assumed to have similarly unblemished records.

The index takes into account the costs of purchasing a new car, and the costs of fuel, registration, insurance, driver's licences, maintenance, parking and tolls for both new and used cars, and takes into account public transport costs. These costs were selected as they were the major cost areas of car ownership and transport for people living in Australian capital cities.

This index has the capacity to be adapted in the future. It has the facility to add in other costs in the future such as taxis, Ubers or bikeshares, if these become a larger part of household transport expenditure. It can also be adapted to other household types, for example retiree households with one car who drive less, young households who might be more reliant on public transport and regional households which might not have access to public transport, will pay no parking or tolls but may face higher petrol and maintenance costs.

In describing each element of the index, this report aims to justify the use of particular data sources or methods. If necessary, these can be changed over time as Australian transport patterns change or new data sources become available.

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