

ADVISORY PANEL ON CONSUMER PRICES – STAKEHOLDER

Reviewing the methodology of the used car price index**Purpose**

1. There has recently been an increased user interest in used car prices given Eurostat’s review and the advisory panel met in February to discuss this and raised concerns over the current methodology used for the UK index. Annex A elaborates on these issues with evidence and explains work that is being conducted to address these issues.

Actions

2. Members of the panel are invited to:
 - a. Comment on the research and analysis in Annex A
 - b. Advise on potential solutions to the methodological issues highlighted in Annex A

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List of Annexes

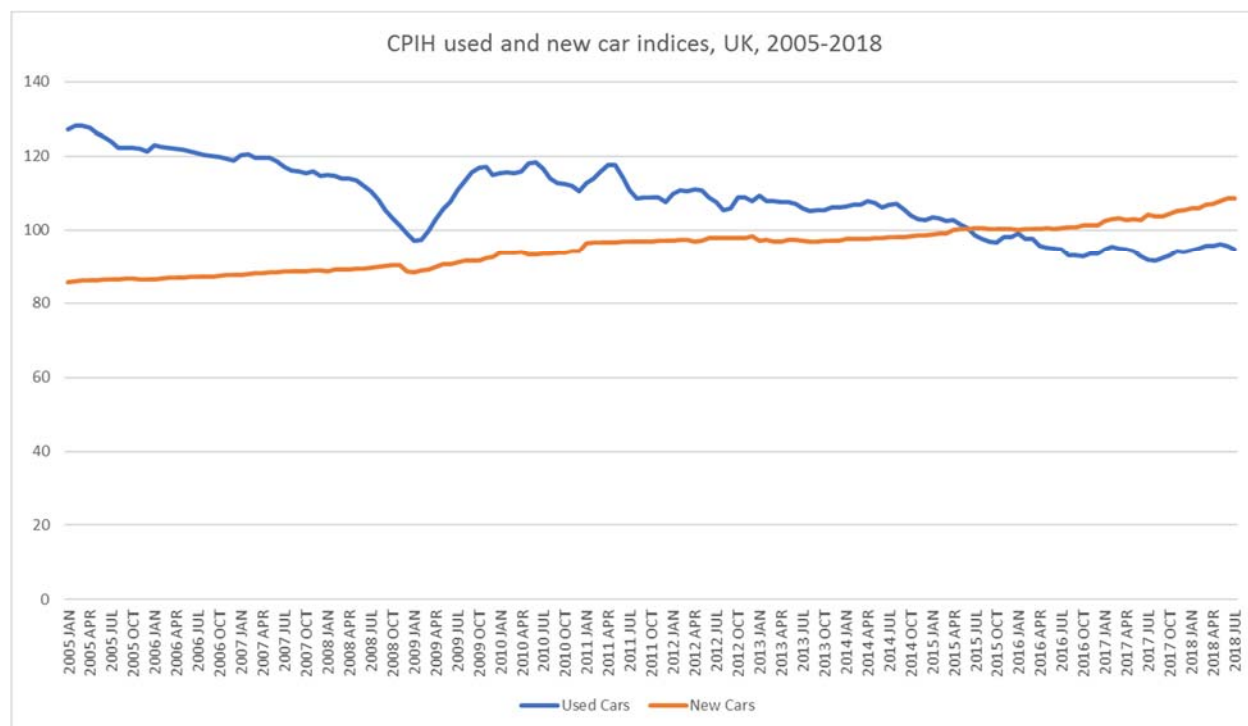
Annex A	Reviewing the methodology of the used car price index
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Annex A – Reviewing the methodology of the used car price index

1. Introduction

A review of the UK used car index is in progress following Eurostat's review of the approaches undertaken in EU countries, which highlighted a downward trend in used car prices.

Figure 1: CPIH used and new car indices, UK, 2005-2018



The [APCP-S\(18\)02](#) suggested explanations for such a trend, highlighting a number of areas for potential development of the UK used car price index, including:

- Age of cars in the sample
- Personal Contract Purchase plan (PCP) market
- Quality adjustment
- Price source

The advisory panel had also requested:

- an investigation into the use of alternative data sources
- contacting industry experts to get further insight into trends of the market

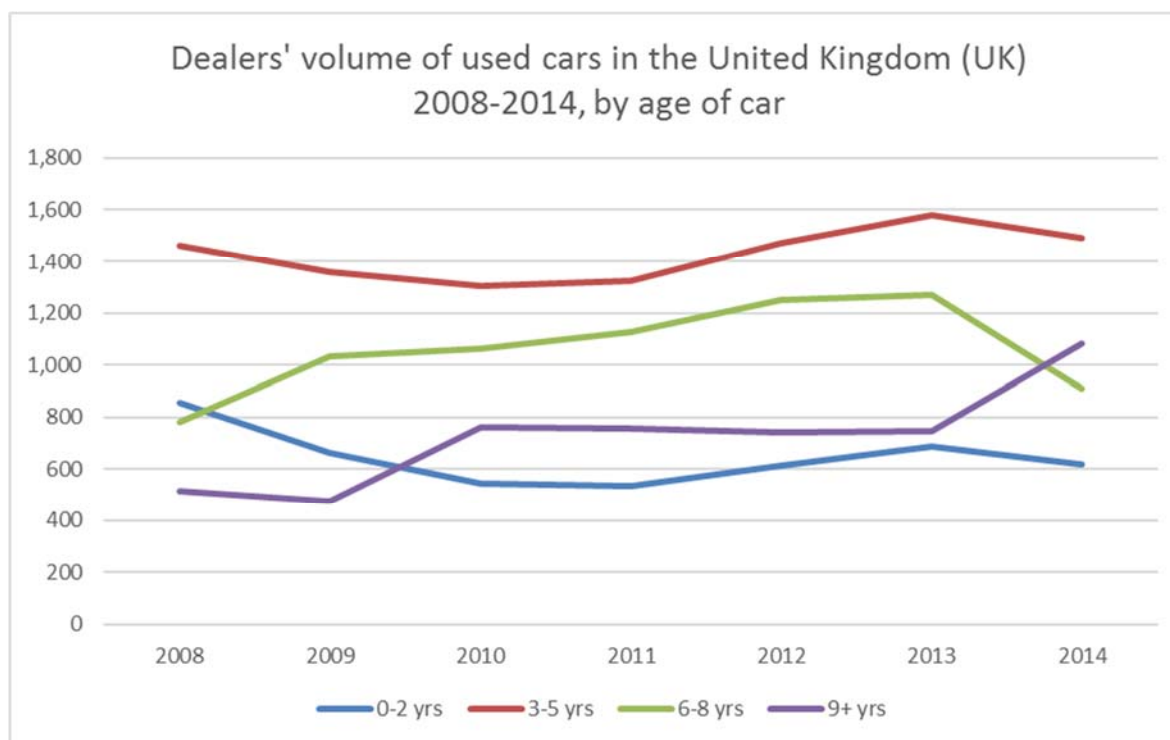
2. Age of cars

ONS uses a sample of 35 models of two-year and three-year old cars, making the assumption that dealers only sell cars at a maximum age of three years. Table 1 displays the volume of used cars sold by UK dealers from 2008 to 2014, broken down by the age of the cars.

Table 1: Dealers' volume of used cars in the United Kingdom 2008-2014, by age of car (000s)

	0-2 yrs	3-5 yrs	6-8 yrs	9+ yrs
2008	856	1,462	780	513
2009	663	1,358	1,034	473
2010	543	1,302	1,063	759
2011	535	1,325	1,126	755
2012	611	1,470	1,250	741
2013	685	1,581	1,269	745
2014	620	1,490	907	1,083

Figure 2: Dealers' volume of used cars in the United Kingdom 2008-2014, by age of car (000s)



The data shows that the volume of used cars sold by dealers beyond the age of three years has been consistently high over the years 2008 to 2014. Data beyond 2014 was not readily available, however the

analysis provided is sufficient to support the argument that limiting the index to only three-year old cars is based on a weak assumption.

We constructed indices that use prices of 4-year and 5-year old cars, using the current methodology. Due to limited availability of data, the sample was restricted to 5 models of car. To test how robust the 5 model sample was compared to the 35 model sample, the two-year (Figure 3) and three-year (Figure 4) old car index was constructed based on each sample and compared.

Figure 3: Comparison of two-year used car index based on 35 model (full) sample and 5 model sample

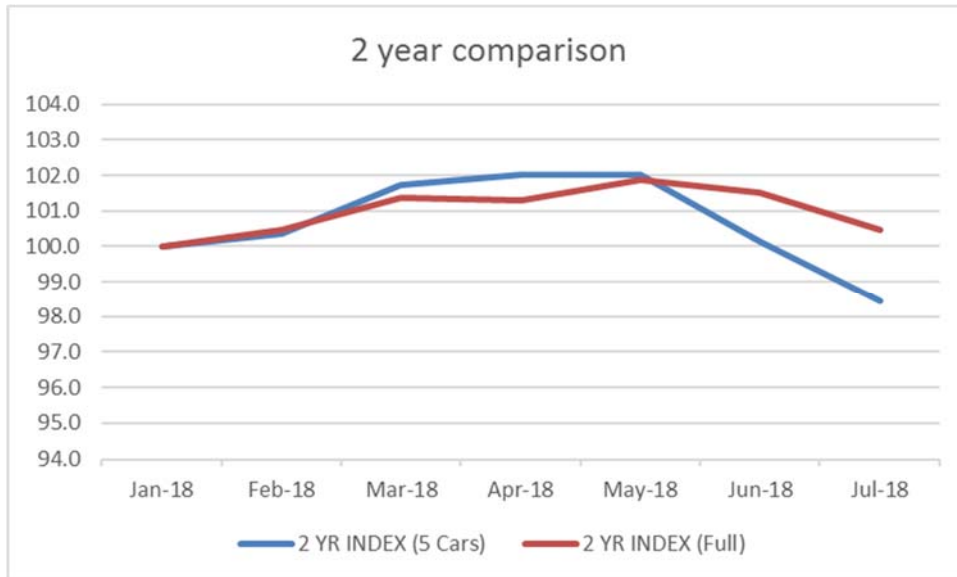
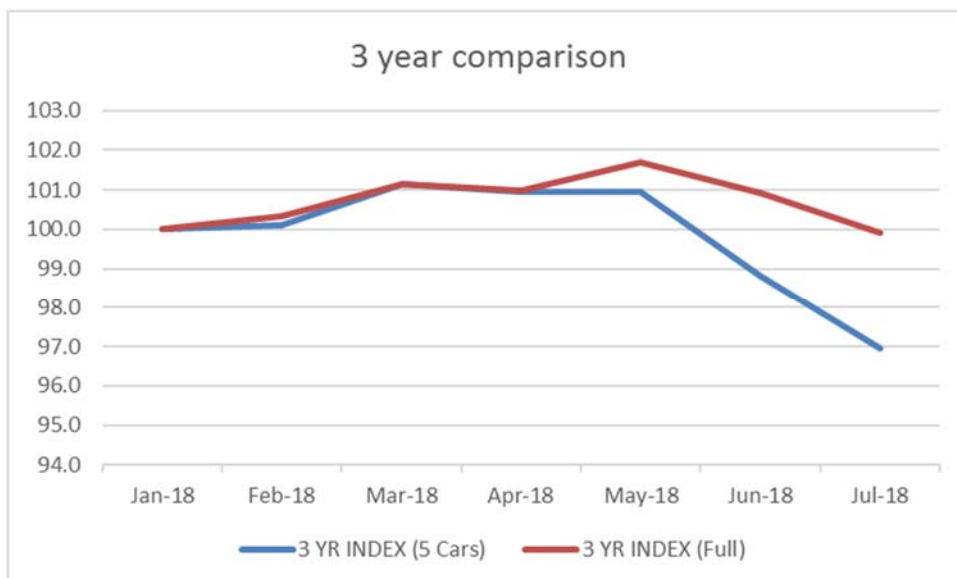
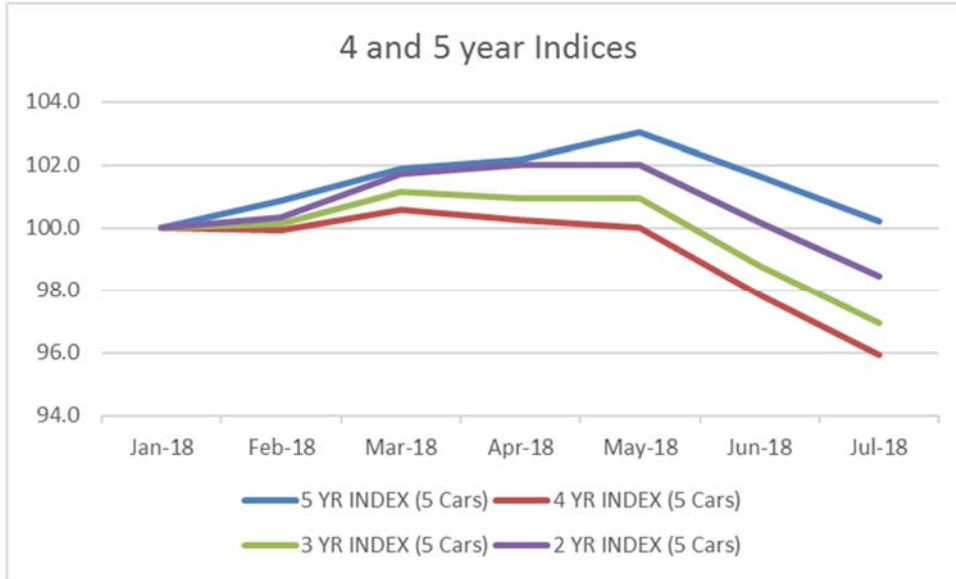


Figure 4: Comparison of three-year used car index based on 35 model (full) sample and 5 model sample



The results of the analysis show that, for both the two-year and three-year old car index, the index based on the 5 model sample tracks the index based on the 35 model sample reasonably well until May 2018, after which point the series diverge.

Figure 5: Comparison of two-year, three-year, four-year and five-year used car indices based on 5 model sample



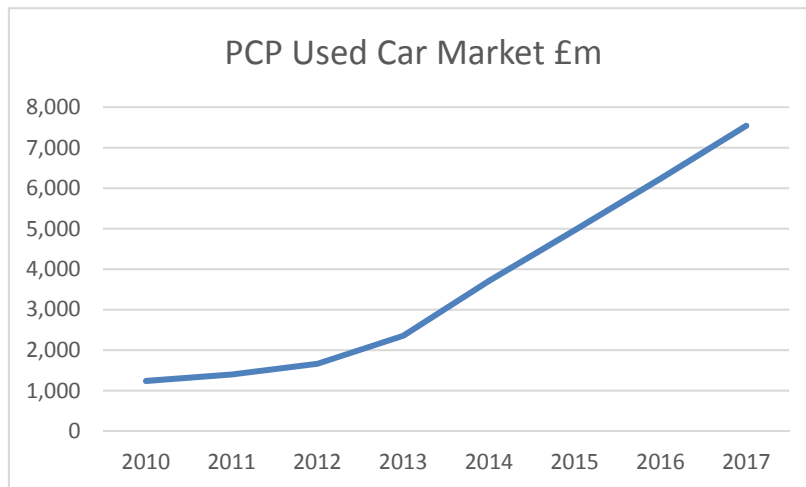
The four-year and five-year old car indices (Figure 5) exhibit similar price movements to the two-year and three-year old car indices which indicates a certain level of consistency across the years.

3. Personal Contract Purchase (PCP)

In recent years the number of used cars purchased on PCP has increased, however there is currently no method in place to account for these within the Index. Table 2 provided by the FLA (Finance and Leasing Association), shows that the PCP Market in the UK for used cars has not only significantly increased in recent years but that it is also extremely large and therefore something which could have a significant impact on price changes.

Table 2: PCP used car market, UK, 2010-2017

	£m
2010	1,240
2011	1,402
2012	1,666
2013	2,356
2014	3,712
2015	4,962
2016	6,238
2017	7,540

Figure 6: PCP used car market, UK, 2010-2017

Further research is required to decide how PCP price changes can be incorporated into the index, or whether it should have its own index, given that they operate on rental prices whereas the current used car index is based upon acquisition prices.

4. Price source

The current source for price valuation of cars is an online guide called Glass' Guide. This is an industry leading tool for car valuations using detailed information about the model and specification of cars as well as elements such as age and mileage. When it was originally introduced it was considered the best data source available, after many alternatives were tested.

As prices are collected manually from the online guide the sample is restricted to just 35 models of car. This comes with problems, as the sample is potentially unrepresentative given the large range of models of used cars sold in the UK.

One of the main concerns with the guide is that the prices can be volatile at times. This has been an ongoing concern since the ONS started using it which have led to the recommendation to improve the sample.

There is also a time lag due to Glass' price collection methodology. Data is collated for cars sold in May and an average price is created for each model which takes a considerable amount of time.

The final concern with the guide are the gaps in the data. Occasionally Glass' will stop producing a price for a car at some point during the year. In such circumstances a replacement model must be found.

5. Alternative data sources

As displayed in Table 3, the German consumer price index for used cars has an annual average price movement close to that for new cars. The German Federal Statistical Office (along with Stats New Zealand) uses the hedonic technique for calculating the consumer price index for used cars. A used car is seen as comprising a set of characteristics. Once these characteristics are identified, the hedonic function can be interpreted as breaking down the car's price into the estimated prices and quantities of the characteristics. Such a method would allow for far more robust quality adjustment compared to the existing age adjustment method used for the UK used cars index.

Table 3: Annual average price changes for new and used cars in 25 countries

	New Cars	Used Cars
UK	1.7	-3.0
France	2.2	-0.3
Switzerland	-1.0	-2.5
Portugal	0.6	-1.9
Netherlands	1.4	-1.8
Germany	0.7	1.1
Finland	-0.3	-2.4
Cyprus	-1.9	-4.0
Malta	-0.3	0.7
Estonia	0.6	-15.9
Hungary	2.5	-3.3
Bulgaria	-0.9	-15.9
Poland	2.3	-23.8
Croatia	3.3	-17.0
Czech Republic	-2.5	-5.2
Slovakia	-1.5	-13.2
Sweden	-0.5	-0.1
Luxembourg	1.4	-1.4
Slovenia	-0.4	-8.0
Latvia	-1.3	-2.4
Lithuania	0.5	-4.0
Belgium	0.8	.
Italy	1.7	.
Norway	0.9	.
Denmark	-0.6	.
Mean	0.3	-6.0
Std. dev.	1.4	6.7

Auto Trader is the UK's largest online marketplace that specialises in used car sales, including cars sold by private sellers and trade dealers. It enables the user to search for cars through many categories.

As per the panel's advice to approach industry experts and to investigate use of alternative data sources, we contacted Auto Trader with a view to acquiring data to research hedonics for used cars, asking whether we could:

- 1) web scrape their website; or
- 2) obtain a back series of their used car data

We are still at the very early stages of working with Auto Trader, however they are very keen to assist ONS. They have highlighted the need to protect their data but have agreed to:

- 1) share the results of the pricing models they have implemented
- 2) supply ONS with test data so that we can conduct our own research
- 3) run our specified models on Auto Trader big data

6. Conclusion

The current methodology of the used car index can be improved. Restricting the index to only two-year and three-year old cars appears to have no justification with the evidence pointing towards extending the age of cars used in the index.

The car finance market is a significant market which deserves serious consideration as to whether it can be incorporated within the index or whether it's best placed outside.

The current data source, Glass' guide, although being considered the best online guide available has some issues. This, along with the apparent success of the hedonic approach, utilised by the German Federal Statistical Office, leads us to the proposal that an alternative data source containing the set of characteristics required to produce a hedonic model would allow for major improvements to the quality of the index. An effective partnership with Auto Trader would play a pivotal role in achieving this.