Behavioural impact of rising automotive fuel prices on UK consumers QMI

Quality and methodology information for estimated quantity demanded (of fuel) per transaction, detailing the strengths and limitations of the data, methods used, and data uses and users.

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1 . Output information

- National Statistic: No

- Frequency: Weekly

- How compiled: Based on Office for National Statistics and third-party data

- Geographic coverage: UK

2 . About this Quality and Methodology Information report

This Quality and Methodology Information report contains information on the quality characteristics of the data as well as the methods used to create it.

The information in this report will help you to:

- understand the strengths and limitations of the data

- learn about existing uses and users of the data

- understand the methods used to create the data

- help you to decide suitable uses for the data

- reduce the risk of misusing data

3 . Important points

- Estimated quantity of automotive fuel demanded per transaction is an experimental indicator used to isolate real demand after adjusting nominal growth for inflation in fuel prices.

- Anonymised and aggregated card spending data are adjusted for inflation by using weekly fuel price data from the Department for Business, Energy and Industrial Strategy (BEIS).

- Average road sales (from BEIS) are included in this publication to provide a UK-representative overview of automotive fuel trends.

- The analysis is carried out in year-on-year format, primarily to mitigate the impacts of seasonality within card spending data.

4 . Quality summary

Overview

As Experimental Statistics, these data are subject to revisions as our methodology and systems are refined.

We have developed an experimental high-frequency indicator of automotive fuel consumer demand within the UK. We are using a combination of the publicly accessible fuel price and sales data, provided by the Department for Business, Energy and Industrial Strategy (BEIS), with anonymised and aggregated card spending data. This QMI sets out the methodology used to derive this indicator, and outlines strengths and limitations that users should consider when interpreting this experimental indicator.

Given the sustained high automotive fuel price affecting the UK and global economy in 2022, we seek to provide a timely indicator on fuel consumer spending behaviour. We will do this by estimating the growth in quantity demanded of fuel per transaction. This experimental indicator may be an occasional feature in our Economic activity and social change in the UK, real-time indicators bulletin.

The resulting indicator reflects the Office for National Statistics' (ONS') estimates as year-on-year growth rates of estimated quantity of automotive fuel demanded in litres per transaction, adjusted for inflation in automotive fuel prices. This is achieved through using aggregated card spending data to derive an average transaction series, which is calculated by dividing the value and volume series and applying BEIS price data to strip out nominal price effects. This indicator reflects ONS estimates extrapolated from multiple sources, including aggregated anonymised Visa transaction data. For contextual information, the BEIS total average road fuel sales published monthly are also included alongside this indicator.

As Experimental Statistics, these data are subject to revisions as our methodology and systems are refined.

Strengths and limitations

Strengths

- This experimental analysis is intended to be highly representative of UK consumer fuel demand.

- The category for fuel is largely homogenous and is mainly comprised of automotive-type spending, facilitating the process of stripping out price effects uniformly.

- This experimental analysis uses year-on-year growth rates, which helps to mitigate the impacts of seasonality which is present in card spending data cyclicality.

Limitations

- The year-on-year figures can be sensitive to baseline impacts and pandemic effects, which may sometimes distort real consumer trends.

- The year-on-year figures are calculated based off the same calendar days a year ago, as opposed to the corresponding week number. This differs from the BEIS estimates as they are based on weekly fuel price figures.

- The calculation used to derive the average fuel prices are highly experimental, and so should be interpreted with caution.

- This experimental analysis does not account for cash transactions and cash to card conversions.

5 . Methods used to produce behavioural impact of rising automotive fuel prices on UK consumers data

How we collect the data and our main data sources

The experimental indicator of fuel demand is compiled from multiple sources including aggregated and anonymised Visa transaction data.

Visa card data

Visa is a financial services corporation and a card scheme within the financial payment ecosystem. Card schemes are organisations that are a part of the financial payment ecosystem that process debit and credit card payment transactions.

Department for Business, Energy and Industrial Strategy (BEIS)

BEIS conduct a weekly fuel price survey, consisting of six companies (four oil companies and two supermarkets). These companies provide data on unleaded petrol (ULSP), diesel (ULSD), and super unleaded fuel prices, which cover around 65% of the market. Gas oil and kerosene prices are also provided by three oil companies. Further details can be found in Road Fuel Price Statistics - data sources and methodologies (PDF, 669KB).

Alongside the weekly fuel price survey, BEIS publish an experimental dataset on average road fuel sales. Data are sampled from approximately 4,900 filling stations across the UK, with the sample estimated to cover over 80% of typical fuel sales. The fuel types measured are petrol and diesel, but are aggregated at a total level by day and region, with the data being measured in volume in litres. Further details can be found in Experimental statistics on average road fuel sales and stock levels (monthly data).

Note: The experimental dataset on average road fuel sales is published monthly.

Opinions and Lifestyle Survey (OPN) data

We have also used the Opinions and Lifestyle Survey data to supplement the insights from our experimental estimates. These data focus on social insights on daily lifestyle and events, including cost-of-living sentiments. Further details can be found in Public opinions and social trends, Great Britain: personal experiences of shortages of goods.

From 30 March to 10 April 2022, we made changes to the OPN to provide ongoing indicators on a wide range of public opinion and societal issues.

We made changes to the OPN survey design, for example, sample size, the questionnaire, and financial incentives to participate. These changes may result in small changes to the responding sample. We therefore advise caution when comparing estimates from this period onwards with those published prior to this period.

For a more comprehensive overview, please see Section 2 of our Public opinions and social trends, Great Britain: 6 to 17 July 2022 bulletin.

How we analyse the data

Methodology to derive estimated quantity demanded of fuel (per transaction)

Estimated quantity demanded (of fuel) per transaction is a metric which is derived from several prior calculations:

$$\text{Average transaction value (growth)} = \frac{1 + \text{Total Value}_{\text{growth}}}{1 + \text{Number of Transactions}_{\text{growth}}} - 1$$

This calculation is a division of the card spend value fuel growth series by the number of transactions fuel growth series. The resulting metric is an average value of a transaction per person, which can be used to derive an estimated quantity demanded per transaction series.

$$\text{Weighted average fuel (pp litre)} = (Petrol_{price} \times \frac{2}{3}) \times (Diesel_{price} \times \frac{1}{3})$$

This calculation takes the respective prices of petrol and diesel from BEIS data, and weights them according to the fractional proportion of the vehicle types within the population. The Department for Transport provide the vehicle type data (ODS, 12,532KB).

$$\text{Average fuel price (yoy growth)} = \frac{\text{Average fuel price per litre}_{t}}{\text{Average fuel price per litre}_{t-1 \text{ year}}} - 1$$

This calculation uses the pre-calculated average fuel price series to estimate year-on-year growth rates.

$$\text{Estimated quantity demanded per transaction (growth)} = \frac{1 + \text{Average transaction value}_{\text{growth}}}{1 + \text{Average fuel price}_{\text{growth}}} - 1$$

This calculation uses both the average transaction value and the average fuel price series to estimate consumer demand growth rates per transaction (of fuel), by stripping out the price component and isolating consumer behaviour.

6 . Cite this QMI