INFOCUS

MACRO COMMENT

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Diesel shortage and inflation persistence

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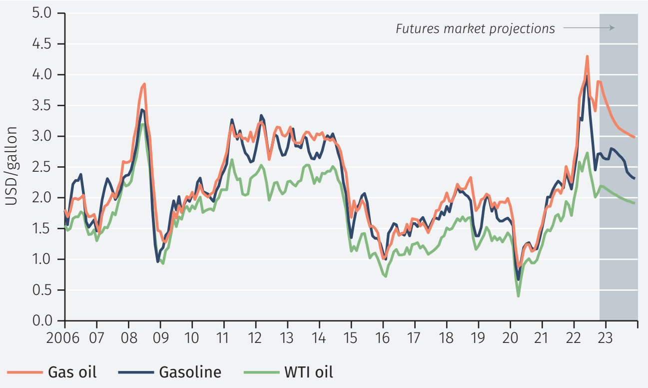
The price of diesel has soared since the invasion of Ukraine, diverging from other petroleum products. While the markets are confident that the recent drop in oil prices will help lower inflation, the high price of diesel is slowing this process. In this edition of *Infocus*, GianLuigi Mandruzzato looks at the price drivers of diesel and its impact on the prices of other goods and services.

Many commentators predict a rapid decline in inflation because of the drop in oil and gasoline prices. However, the crisis in the diesel market makes this scenario more uncertain.[1] Since the start of the war in Ukraine, the price of diesel has risen to an all-time high of over USD 4 per gallon in the US (see Figure 1).[2]

1. Petroleum products' futures prices

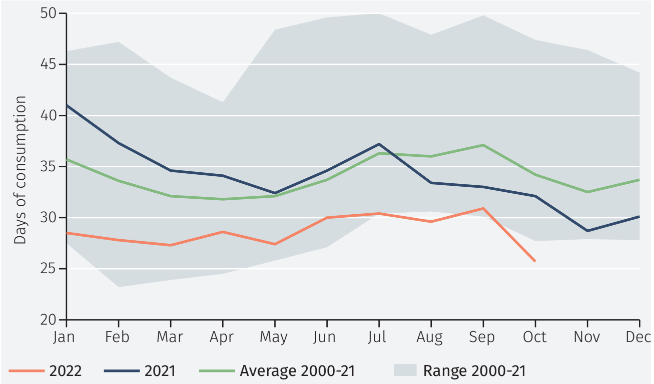


Sources: Refinitiv and EFGAM calculations. Data as at 4 November 2022.

In the first months after the invasion of Ukraine, the prices of petroleum products, including gasoline and diesel, rose much more than the crude oil from which they are refined. Since June, gasoline prices have fallen rapidly, but diesel prices remain close to all-time highs. This reflects the collapse of US and European diesel inventories. Coverage (the number of days of consumption covered by inventories) is at historic lows for this period of the year (see Figure 2). Stocks of diesel had already started to run low in the second half of 2021, before the war in Ukraine affected an already tense market.

The shortage of diesel reflects multiple factors. From 2020, the International Maritime Organization (IMO) required the use of a less-polluting (lower sulphur) diesel fuel for long-distance sea haulage, similar to the diesel used in industry and other transportation.[3] This increased global demand for diesel by about 3 million barrels per day (mbd).

2. US diesel inventories seasonal coverage



Sources: Refinitiv and EFGAM calculations. Data as at 4 November 2022.

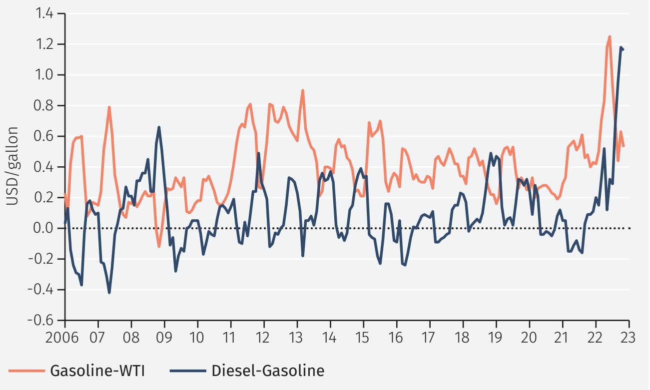
The slump in demand following the outbreak of the pandemic masked the impact of this shock, but the rebound in international trade since late 2020 quickly eroded diesel inventories. In addition, oil companies reduced refining capacity in Western countries by around 1.5mbd during the pandemic. However, global refining capacity will rise in 2023 when new refineries will be completed in Gulf countries and Africa.[4] Notwithstanding that, petroleum products futures contracts point to diesel prices staying high, perhaps reflecting fears that the possible end of anti-Covid restrictions in China will boost demand.

The invasion of Ukraine and the ensuing sanctions against Russia affected the diesel market balance. Beyond crude oil, Russia exported nearly 2.5mbd equivalent of refined petroleum products, including 0.6mbd of diesel to Europe. Furthermore, the surge in natural gas prices has increased the demand for diesel for heating and for electricity generation. The ban from next February of EU imports of Russian petroleum products risks further tightening the diesel market.

Unsurprisingly, refining margins have also increased, and particularly so for diesel (see Figure 3). The spread between the futures contract prices of diesel and gasoline has risen to USD

[1] Diesel is one of a range of products referred to as middle distillates that are used in a variety of industrial processed, transportation and heating. In fact, the Nymex futures contracts refer to heating oil. Gasoline and diesel are obtained by refining crude oil which is broken down into a range of components which are then selectively reconfigured into final products. Petroleum refineries are complex industrial facilities whose operating costs are added to that of crude oil to determine the price of final refined products. See https://tinyurl.com/3atw7wfd
[2] One barrel of oil contains 42 gallons. WTI oil is priced to the barrel and refined products are priced to the gallon, which is the metric used in the chart for comparability.
[3] See https://www.cnbc.com/2019/03/01/biggest-change-in-fuel-since-leaded-gas-went-away-could-raise-prices.html
[4] See https://www.cnbc.com/2022/03/30/everyone-is-worried-about-gas-prices-but-diesel-is-driving-inflation-more-than-you-think.html

3. US diesel inventories seasonal coverage

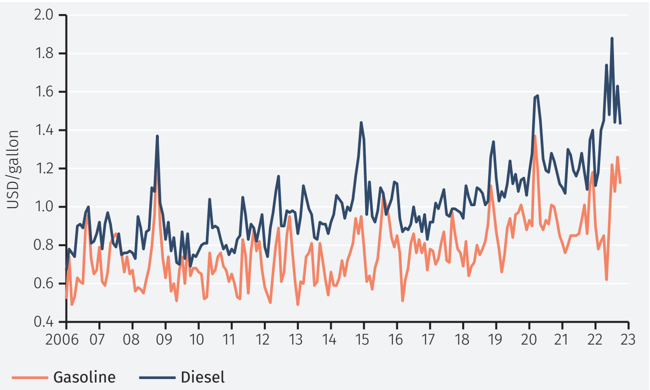


Sources: Refinitiv and EFGAM calculations. Data as at 4 November 2022.

1.2 per gallon, far above the 2006-21 average of less than USD 0.1, making diesel a record 40% more expensive than gasoline.

Finally, the spread between retail and futures contract prices of petroleum products has also surged, more so for diesel than gasoline (see Figure 4). As a result, the retail prices of fuels have risen much more than that of the crude oil from which they are refined. For households and corporates, gasoline prices are equivalent to a WTI oil price of USD 110 per barrel (pb), which rises to USD 145pb for diesel, much higher than the official WTI price of about USD 90pb.

4. Retail - futures price spreads



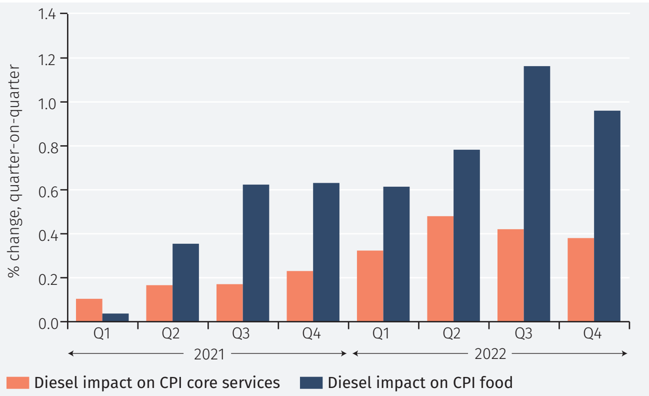
Sources: Refinitiv and EFGAM calculations. Data as at 4 November 2022.

While many commentators, especially in the US, focus on the price of gasoline, diesel is also important to the economy. Diesel is used to power industrial and agricultural machinery as well as ships, airplanes and trucks needed to deliver manufactured goods and food to retailers. In addition, an increasing number of carriers and online retailers apply a surcharge linked to the fuel cost, increasing the final price paid by consumers. Finally, diesel is used by services sector companies for heating and electricity generation.

To investigate the impact of the rise in petroleum products prices on US inflation, a model is used to show how prices of services and non-energy goods, including food and beverages, respond.[5] The model shows that a standard shock to diesel prices strongly influences the CPI of services less energy and of food several quarters after the shock.[6]

Based on the model estimates, it is possible to quantify the impact of diesel price increases since early 2021 on the quarterly changes in CPI of the other expenditure items. The impact on the CPI services less energy peaked at almost 0.5% quarter-on-quarter in Q2 2022 and, despite the recent moderation of diesel prices, should remain at almost 0.4% quarter-on-quarter also in Q4 2022 (see Figure 5). The impact on CPI food prices is stronger and is estimated to have peaked at almost 1.2% quarter-on-quarter in Q3 2022, making diesel responsible for over 40% of the total quarterly increase in food prices.

5. Estimated impact of diesel price shock on food and services' CPI



Sources: Refinitiv and EFGAM calculations. Data as at 4 November 2022.

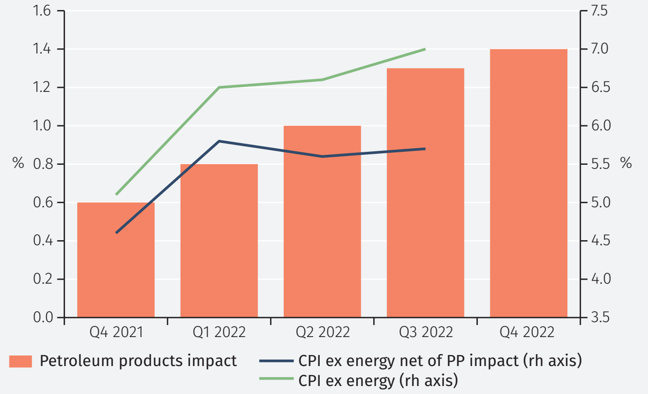
Aggregating the impact across sectors, the price increase of petroleum products is estimated to have added 1.3 percentage points to the annual inflation of CPI ex energy in Q3 2022. In the absence of these shocks, not only would inflation net of energy be lower than reported but it would have stopped rising in Q1 2022 onwards according to the model (see Figure 6). The estimate of the impact of the shock to petroleum products prices increases by another 0.16 percentage points in Q4 2022.

[5] A VAR(2) model is estimated on retail diesel and gasoline prices, and the CPI of services less energy, goods less food and energy, and food and beverage. All variables are quarterly averages and the sample spans from 2001Q1 to 2022Q3. The correlation matrix of the model variables suggests that shocks to diesel price come first, followed by that to gasoline, services less energy, goods less food and energy, and food and beverage.

[6] The model shows that the cumulative transmission of a standard shock to diesel prices to the CPI of services less energy and of food is statistically significant and it takes about two years to be complete. Surprisingly, a shock to gasoline prices is statistically significant only for food CPI, but with a negative sign. See *Appendix* for impulse response charts.

While this may moderate the expected fall in inflation in the short term, it also means that inflation will drop faster in 2023 when refining margins fall back closer to historical values.

6. Estimated impact of petroleum products shock on CPI ex energy, year-on-year



Sources: Refinitiv and EFGAM calculations. Data as at 4 November 2022.

In conclusion, the shortage of diesel and the consequent upward pressure on prices has had a considerable impact on inflation, well above what the weight of only 0.24% in the US CPI basket would suggest. In fact, diesel is an input for manufacturing, agriculture and shipping industries. Diesel is a more important determinant of the final prices of goods and services than gasoline, which is mainly used to power private vehicles. The record low level of diesel stocks is therefore a risk for the economy and markets.

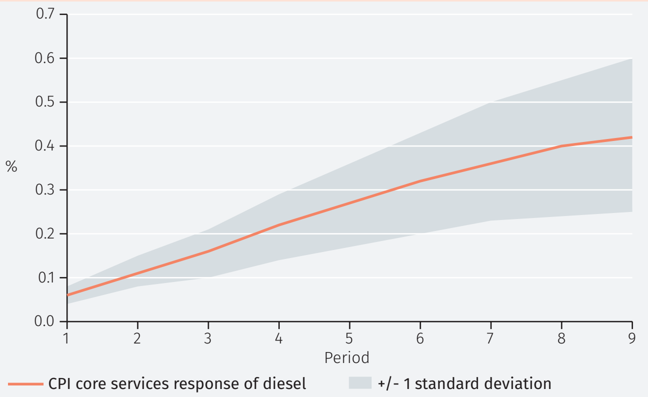
Statistical analysis shows that the past increases in the price of diesel added more than one percentage point to CPI ex-energy inflation in Q3 2022. Furthermore, while estimates indicate that the impact of the past shocks will grow again in the last months of 2022, this would mean that the expected fall in inflation would be more moderate in the short-term but would then accelerate in 2023. of inflation 2023. Should this be the case, the Federal Reserve's upcoming interest rate decisions would be affected, with high chances that the Fed will soon pivot to a softer guidance on interest rates.

APPENDIX

Impulse responses of core CPI items to a standard shock to diesel and gasoline retail prices:

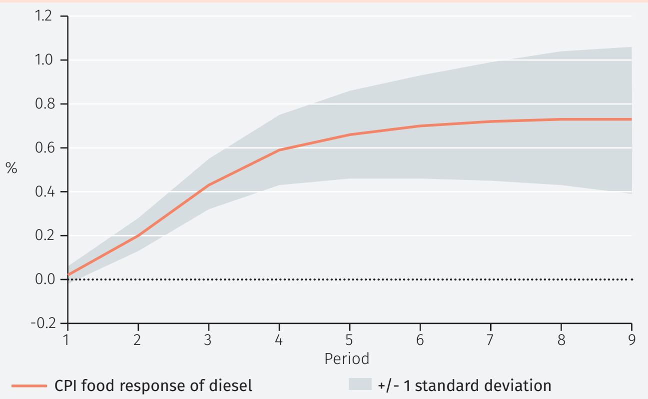
Responses to diesel prices

A1. Cumulated response of CPI core services



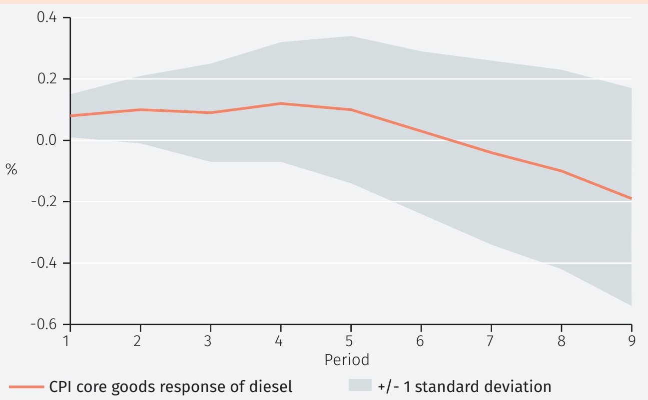
Source: EFGAM calculations. For illustrative purposes only.

A2. Cumulated response of CPI food



Source: EFGAM calculations. For illustrative purposes only.

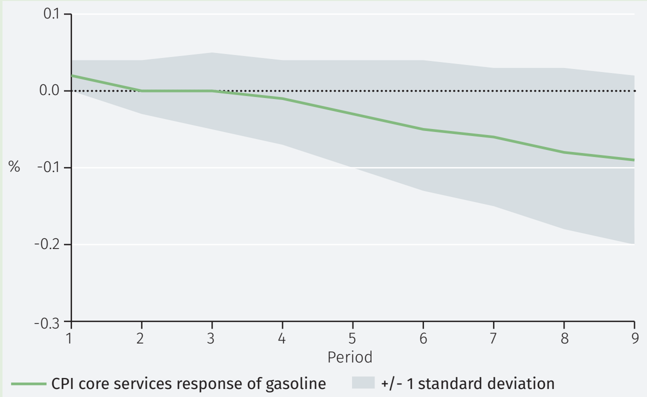
A3. Cumulated response of CPI core goods



Source: EFGAM calculations. For illustrative purposes only.

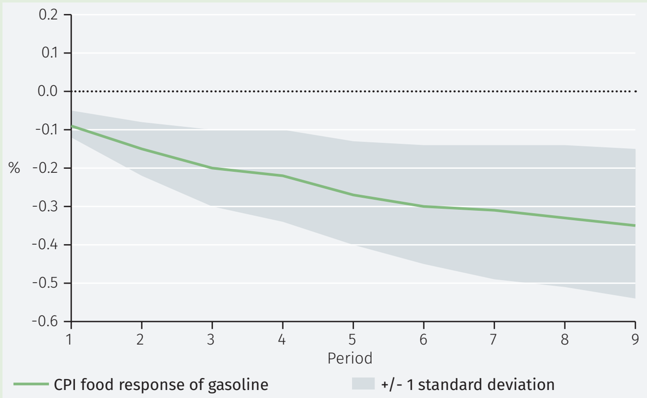
Responses to gasoline prices

A4. Cumulated response of CPI core services



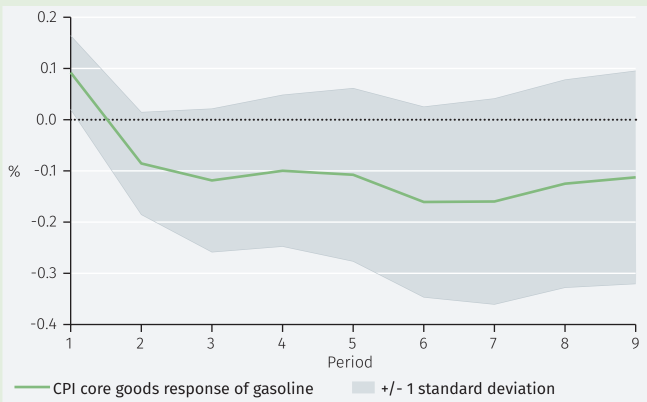
Source: EFGAM calculations. For illustrative purposes only.

A5. Cumulated response of CPI food



Source: EFGAM calculations. For illustrative purposes only.

A6. Cumulated response of CPI core goods



Source: EFGAM calculations. For illustrative purposes only.

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