

Box 5

A PRELIMINARY ANALYSIS OF THE SENSITIVITY OF ENERGY CONSUMPTION IN SPAIN TO ENERGY PRICE RISES

Aitor Lacuesta, David López Rodríguez and María de los Llanos Matea

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The academic literature suggests that, compared with demand for other goods and services, energy demand is largely insensitive to short-term price changes. Thus, for example, Labandeira *et al* (2016)¹ signal that in Spain, the price elasticity of demand for diesel fuel and petrol on a short-term horizon is between -0.20 and -0.25, while over a longer time frame – more than 12 months – it is between -0.7 and -0.9. They also show that the price elasticity of

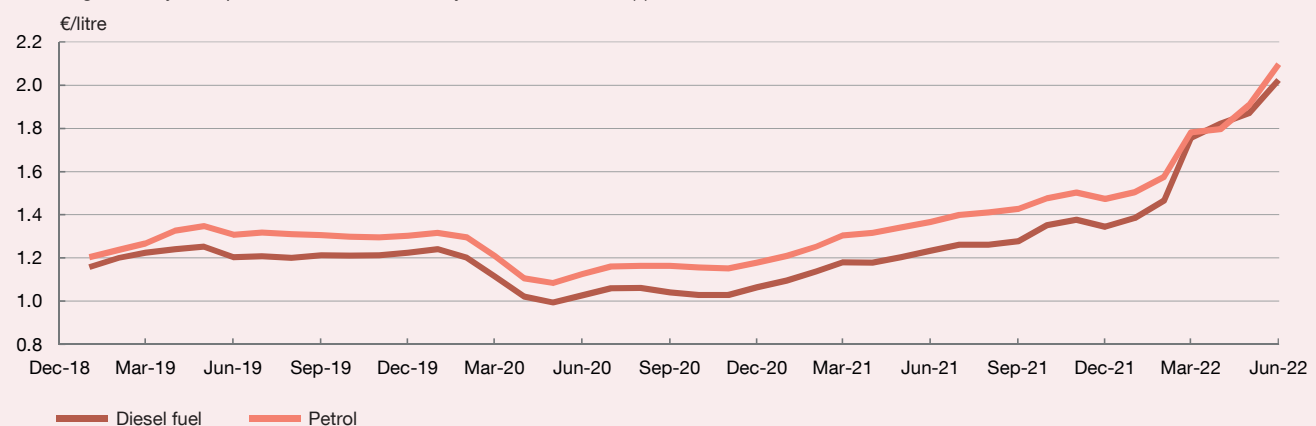
total electricity demand is around -0.2 in the short term and -0.7 on a 12- to 24-month horizon.

In view of the steep rise in energy prices observed since early 2021, this box analyses to what extent the recent behaviour of vehicle fuel (petrol and diesel) and electricity consumption in Spain compares with the patterns to be expected from the historical elasticities estimated in the literature.

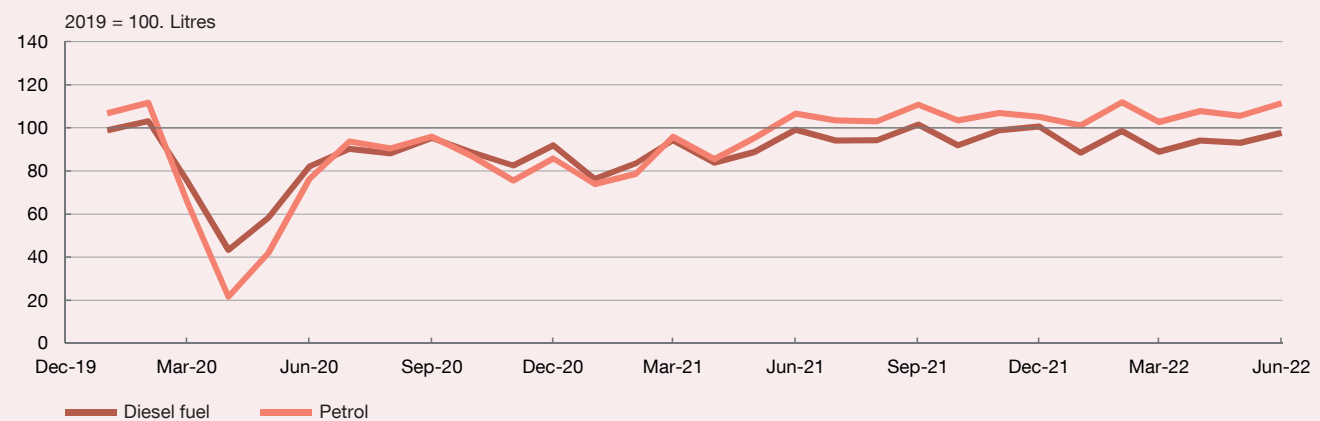
Chart 1

Vehicle fuel price rises have not led to lower consumption, especially in the case of petrol

1 Average monthly retail price of vehicle fuel, January 2019 to June 2022 (a)



2 Changes in monthly consumption of vehicle fuel compared with 2019 (b)



SOURCES: Comisión Nacional de los Mercados y la Competencia (CNMC) and Agencia Tributaria.

a Prices previous to the €0.20/litre discount applied since 1 April 2022.

b Year-on-year change in consumption compared with corresponding month of base year 2019.

1 See the estimated price elasticity of demand for different energy goods in Spain in X. Labandeira, J. M. Labeaga and X. López (2016), "Un metaanálisis sobre la elasticidad precio de la demanda de energía en España y la Unión Europea", *Papeles de Energía*, N.º 2 (December), Funcas, pp. 65-93.

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Taking vehicle fuel prices first, Chart 1.1 depicts the extraordinary surge in petrol and diesel prices observed since early 2021. Yet despite this marked increase, not only has consumption of these products not decreased in recent quarters, but it has in fact increased, especially in

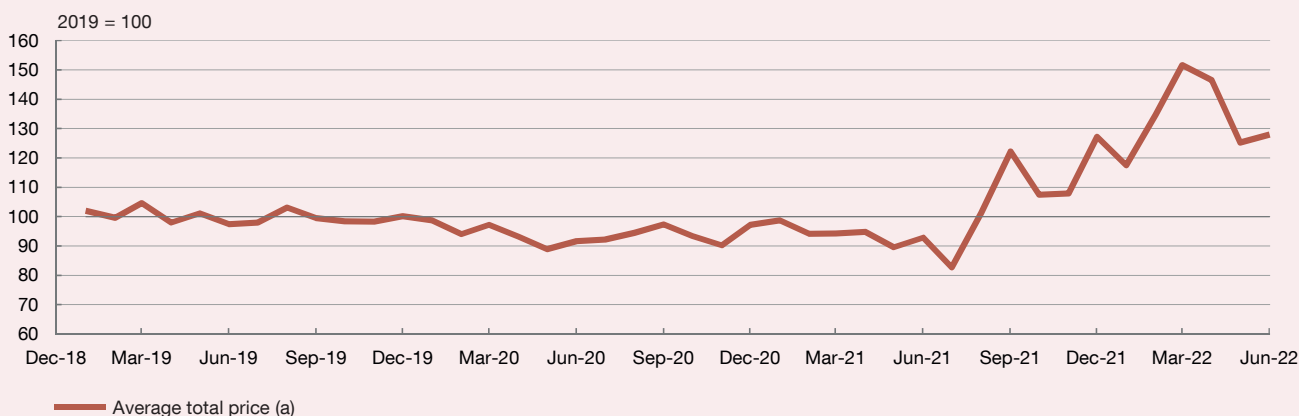
the case of petrol (see Chart 1.2), the segment in which household consumption is concentrated.²

This recent dynamic may be heavily influenced by the impact of the pandemic on mobility, which fell very sharply

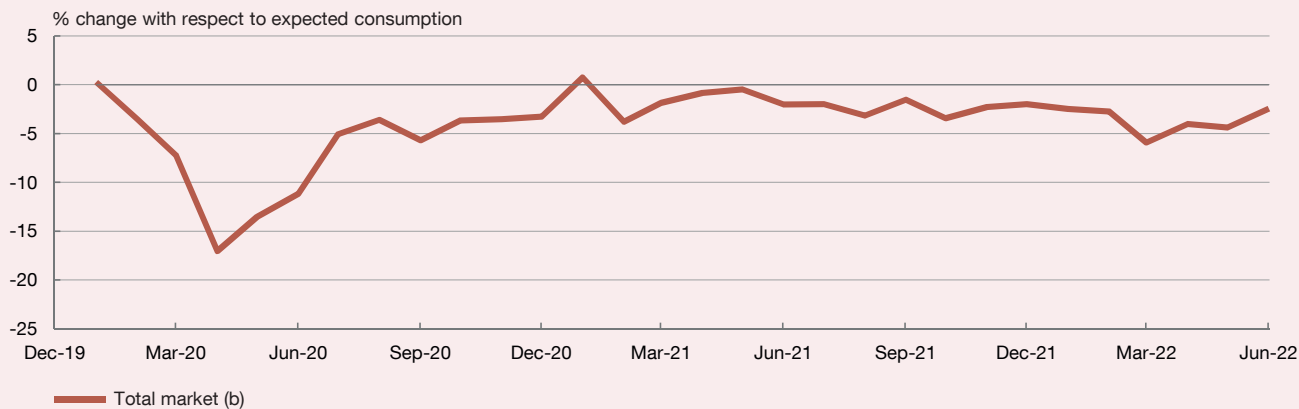
Chart 2

Electricity price rises have led to a moderate fall in consumption

1 Changes in average electricity prices for firms and households, January 2019 to June 2022



2 Changes in firm and household electricity consumption



SOURCE: Banco de España, drawing on information from Agencia Tributaria and Red Eléctrica Española.

a The average price for all consumers (household and non-household) is estimated based on Tax Revenue Service data relating to the tax base of the electricity tax paid by all consumers and on the figures on changes in total electricity consumption. The ratio between the two series proxies an average total electricity price before tax. The average final price charged on consumption is calculated based on this average pre-tax price, before applying to each month the relevant amount for the excise duty on electricity and VAT. The chart depicts the price in a month with respect to the average of the prices between January 2019 and December 2019 normalised to 100.

b Red Eléctrica Española publishes data on the results of the P48 hourly consumption (I3DIA02) for regulated rate retailers, free market retailers and those who purchase directly in the wholesale market. Total consumption is the sum of all three.

² The vehicle fuel consumption data are drawn from the series published by the *Agencia Tributaria* (Tax Revenue Service), with information up to June 2022 for the provinces subject to the standard tax regime (which excludes the provinces with specific tax status, the Canary Islands and the city enclaves of Ceuta and Melilla).

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in 2020 and has been gradually recovering since then. Accordingly, it seems more appropriate to compare monthly consumption levels in 2022 H1 with those observed in 2019 H1. This comparison suggests that, in the case of vehicle fuel, price elasticity to demand in Spain – taking no account of other aspects that could also affect consumption of these products – has recently been lower than the historical elasticities estimated in the academic literature. Thus, while in 2022 H1 average petrol and diesel prices were 30.9% and 33.5% higher, respectively, than in 2019 H1, in the same period petrol consumption was 6.7% higher while diesel consumption was 6.5% lower. Nonetheless, taking a short-term elasticity of -0.25, the consumption of these products ought to have declined by around 8% as a result of rising prices.³

In the case of electricity, price and consumption dynamics since last year also suggest that demand is less price sensitive than has traditionally been estimated. Thus, while the average cost of electricity for firms and households – estimated drawing on Tax Revenue Service data – has risen notably since early 2021, even factoring in the various measures rolled out by the authorities (see Chart 2.1), electricity consumption has barely fallen (see Chart 2.2).

In particular, during 2022 H1, when compared with the same period in 2019, electricity consumption appears to have been only 3.7% lower than would be suggested by a

model that estimates the consumption of this input based on a broad range of factors (other than price) that are essential to understand how electricity demand behaves. These include, inter alia, temperature, public holidays and the seasonality generally associated with each month, week and day.⁴

The fact that electricity consumption, much like vehicle fuel consumption, fell less during the period under analysis than would be suggested by the price elasticities estimated in the literature – for instance, with an elasticity of -0.2, electricity consumption ought to have declined by 6.7% in the short term – could be down to a range of factors. These include the possible expectation on the part of agents (households and firms) that the price changes observed would be short-lived, the fact that certain means-tested compensatory measures have been rolled out for the most vulnerable groups, and the sizeable savings built up when the pandemic was at its height. In the case of electricity, better cost optimisation thanks to hourly rate-setting or higher household demand for electricity as a result of the increase in teleworking may also have helped to maintain consumption levels. In any event, it is important to note that it is still too soon to accurately assess the quantitative importance of any of these factors, or even to conclude that there has in fact been a structural shift in terms of the price sensitivity of energy demand in Spain. With this in mind, the evidence presented in this box should be assessed with due caution.

3 The reasons behind the differences in the behaviour of aggregate petrol and diesel consumption observed from 2021 Q2 onwards are manifold and hard to pin down in quantitative terms. For instance, one contributing factor could be certain changes in the make-up of the Spanish vehicle fleet, with petrol vehicles now accounting for a larger share.

4 See O. Bover, N. Fabra, S. García-Urbe, A. Lacuesta and R. Ramos (2020) for further details on this model: “Firms and households during the pandemic: what do we learn from their electricity consumption?”, Occasional Paper No 2031, Banco de España.