Staff memo

Effect of Energy Costs on Swedish Consumption Patterns

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Contents

Staff Memo

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Summary

This analysis examines the impact of energy price shocks on Sweden's consumption patterns using Bayesian estimated structural models. It highlights the significant disruption caused by cuts in Russia's energy export to Europe in 2022, which according to this analysis deeply affected Swedish consumption, especially for durable goods. Although consumption showed tentative signs of recovery in 2024, the study underscores the persistent negative influence of energy price shocks on total consumption and its various components in the last quarter of 2024.

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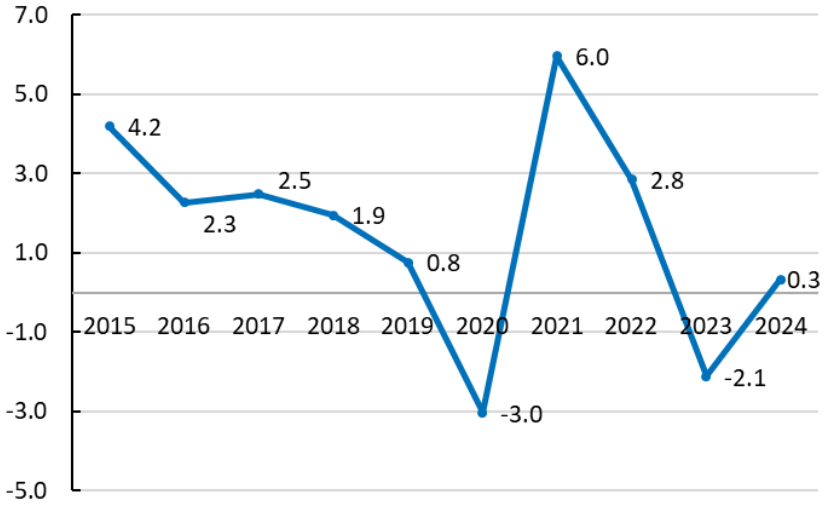
1 Introduction

Over the past five years, Swedish consumption has shown significant volatility.[1] After growing consistently between 2015 to 2019 at an average annual rate of 2.3% in real terms, total private expenditure contracted sharply in 2020 (-3%) following the onset of the COVID-19 pandemic. The following year, spending rebounded strongly (+6%) driven by a broad relaxation globally of pandemic-related restrictions, the gradual alleviation of global supply chain issues, the subsiding of economic uncertainty, and a rapid decline in the real cost of borrowing due to rising inflation coupled with low interest rates. But, much like in the rest of Europe, consumption decelerated again in 2022 and declined rapidly during 2023, as disruptions to energy supplies from Russia in the aftermath of the Ukraine war generated large increases in energy prices that impacted households' purchasing power (Adolfsen, 2022). Averaged over 2022–2023, yearly spending growth was almost flat (+0.4%), much like in 2024 (+0.3%) (see Figure 1).

Figure 1. Total private consumption at constant prices—2015-2024

Annual percentage change



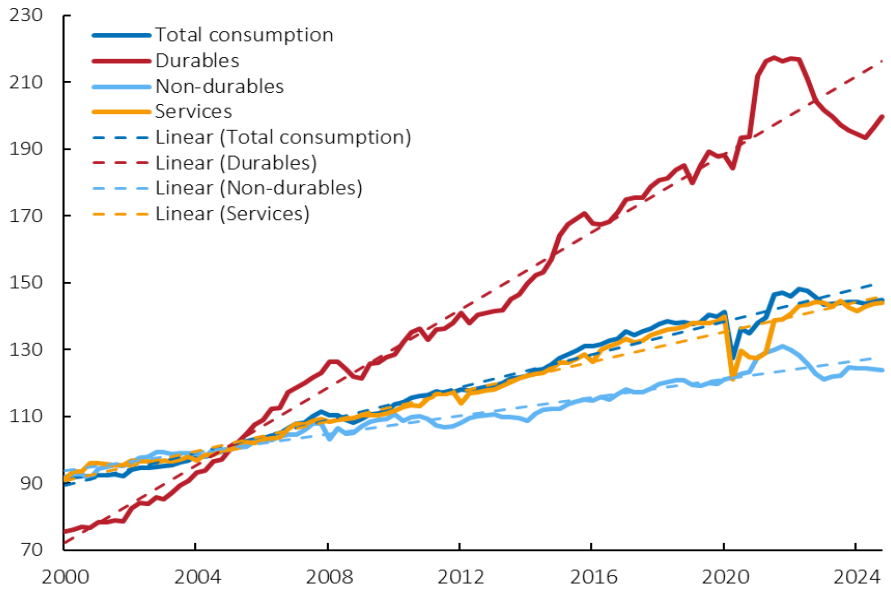
Source: Statistics Sweden and own calculations. Data are seasonally adjusted using the X11 method, starting from the unadjusted series "Sweden, Expenditure Approach, Final Consumption Expenditure, Households & NPISH, Total, Constant Prices, SA, SEK."

[1] The expenditure data used in this memo are raw data from Swedish Statistics, adjusted for seasonality using the X11 method.

These recent developments in total private consumption mask significant heterogeneity in individual spending components. Broadly, Sweden's consumption patterns have evolved through three distinct phases since 2020. During the pandemic year of 2020, total private consumption dropped in the first three quarters, mainly due to a decline in services, while durables[2] and non-durables[3] remained relatively stable (see Figure 2). In 2021, consumption of durables and non-durable goods rose sharply producing the strong recovery in overall spending, despite enduring weakness in spending on services.

Figure 2. Total private consumption and components at constant prices -- 2000Q1-2024Q4,

Levels, 2005Q1=100



Source: Sweden Statistics and own calculations. Data are seasonally adjusted using the X11 method, starting from the unadjusted series “Sweden, Expenditure Approach, Final Consumption Expenditure, Households & NPISH, Total, Constant Prices, SA, SEK.” Notes: The dashed lines show linear trendlines fit to the actual data. They are color-coded to match the correlative consumption data categories.

[2] Durable goods, or durables, are long-lasting items typically expected to last three years or more, and they are not purchased frequently. They include appliances such as refrigerators, washing machines, and microwaves, as well as furniture like sofas, beds, and dining tables. Electronics such as televisions, computers, and smartphones also fall into this category, along with vehicles like cars, motorcycles, and bicycles. These goods are generally considered significant investments due to their longevity and utility.

[3] Non-durable goods are items that are consumed quickly or have a short lifespan, usually less than three years. Along with food and beverages, this category also often includes items like clothing, fuel, and household supplies.

From 2022 to 2024, in conjunction with several energy price shocks from physical and sanctions-related disruptions to the supply of Russian energy to Europe, consumption of durable and non-durable goods dropped considerably and remained below long-run trends, despite a subsequent downward correction in energy prices, depressing total consumption, which stagnated around its 2019 Q4 level.

The variation in spending persisted in the first three quarters of 2024, with household spending on services recovering modestly, driven by a resurgence in travel and leisure activities. On the other hand, durable goods consumption experienced volatility, with declines in early 2024 reflecting economic uncertainties, followed by a slight pick-up in the second half of the year (see Figure 2). Spending on non-durables also remained muted, although food and non-alcoholic beverages maintained steady growth, underscoring their essential nature (see Figure 2). In Q4, durables continued to pick up, pushing total expenditure growth higher. According to Swedish Statistics' own seasonally and working-day adjusted series, this growth was 0.7% quarter-on-quarter—a figure that looks more modest using our X11 seasonal adjustment method (+0.3%, see Figure 2).

This memo aims to assess the impact of the fluctuations in energy prices on real consumer spending in Sweden over the past five years. The findings indicate that the weakness in private consumption, particularly in the demand of durable goods, is linked to the significant energy supply shock in 2022, which was unprecedented. Results indicate that, while private consumption in Sweden is exhibiting a modest recovery in 2024, the impact of energy price shocks turned negative again in the latter part of the year.

2 How do changes in energy prices affect private consumption?

2.1 Theoretical background

Energy price fluctuations can exert important impacts on consumer spending and inflation, prompting monetary policy responses. When fluctuations originate in a shock to the supply of energy, there are at least three key mechanisms through which this happens.

First, when energy prices rise, the cost of energy products like electricity, gas, petrol, and heating oil increases, implying higher production costs in energy sectors and higher transportation costs. This erodes consumers' disposable income, reducing their spending on non-essential items (Taylor and Uhlig, 2016; ECB, 2019). The opposite usually happens when energy prices fall. In Sweden, approximately 25-30% of all energy consumption is attributed to final consumption by households (Swedish Energy Agency, 2024). So this effect can be large. The rest of energy consumption goes in the production of non-energy goods and services, known as intermediate consumption.

Second, higher energy prices raise the production costs also for non-energy sectors.[4] If producers of these goods and services pass on the higher costs to consumers, it results in a further direct reduction in households' purchasing power. Conversely, if these costs are not passed on, there is an indirect impact on households' purchasing power, as producers may reduce wages or experience lower profits (Blanchard and Galí, 2009; Kilian, 2018). Moreover, in advanced economies that are large producers of energy (e.g. Canada, Norway, the United Kingdom and the United States), indirect effects through the wages and profits of energy producers are also important. Like with the first mechanism, this mechanism works in reverse when energy prices fall, with the final effect on goods and services from non-energy sector producers equivalently depending on the degree of energy price pass-through.

Third, increases in headline inflation from soaring costs can lead to higher interest rates, as the central bank tries to restore price stability. This can dampen consumer spending further by increasing borrowing costs, while lower rates aim to stimulate spending and investment (ECB, 2010; Federal Reserve Bank of San Francisco, 2014; Galí and Gambetti, 2015).

2.2 Measuring the impact

The strength of the relationship between energy prices and private consumption can be evaluated through the lens of the terms of trade, which is an indicator of the relative price changes of a country's exports compared to its imports. Globally, the terms of trade and energy prices tend to move inversely in countries which are net energy importers, while they move together with energy prices in countries that are net energy exporters (Backus and Crucini, 2000; Gunnella and Schuler, 2022). This is because, for countries which are net importers of energy, such as Sweden,[5] when energy prices rise, the terms of trade deteriorate and household purchasing power falls, and vice versa.

A key proxy of the terms of trade used in the literature studying the impact of energy prices on consumption is the ratio between the GDP deflator and the private consumption deflator (the ratio of the income to spending deflator) (ECB, 2018; Battistini et al., 2022).[6] This measure captures both direct channels (e.g., consumer prices) and indirect channels (e.g., wages) through which energy prices affect households' purchasing power (Battistini et al., 2022; World Bank, 2024). When energy prices increase, this measure parallels the decline observed in the terms of trade. This is because, although both the consumption deflator and the GDP deflator tend to rise after positive shocks to energy prices, the former typically rises by more than the latter since it reflects energy price shocks more directly and swiftly than the GDP deflator does. In Sweden, a net energy importer, this indicator—which has been declining since energy prices started rising in 2022—is positively and significantly correlated with the terms of trade (with a correlation of around 0.7 over the past 15 years); and is also negatively correlated with real energy prices (Figure 3). In Swedish data the correlation between real energy prices and this indicator is less pronounced than in the euro area,

[4] By showing deviations of CPI subcomponents from their historical averages, the heatmap in Figure 14 of the Riksbank's March 2025 Monetary Policy Report serves as a compelling illustration of the transmission channels through which energy price shocks affect non-energy sectors.

[5] According to the Swedish Energy Agency's report "Energy in Sweden 2023," Sweden is a net importer of energy overall, but it is a net exporter of electricity. The report highlights that while Sweden imports significant amounts of oil and gas, it exports a substantial amount of electricity, primarily due to its robust renewable energy sector. See Swedish Energy Agency (2023).

[6] The consumption deflator tends to rise when the terms of trade deteriorate and vice versa. Similarly, when the terms of trade deteriorate (i.e., export prices fall relative to import prices), the cost of imports rises, which can increase the overall price level and raise the GDP deflator. This deterioration reduces the purchasing power of the country's income, due to higher costs for imported goods and services and potentially increasing domestic inflation pressures. See Blanchard and Galí (2010) for a theoretical discussion of the relationship between the terms of trade expressed as the ratio of export and import prices and the spending and income deflators.

however, as Sweden is less energy-dependent largely due to its diverse energy mix, which includes a significant proportion of low-carbon sources such as hydro, nuclear, and wind power (Swedish Energy Agency, 2024).

As shown in Bobasu and Gareis (2022), this proxy of the terms of trade (hereafter called 'terms of trade') can be used together with other variables within a structural vector autoregression (SVAR) model to evaluate in practice the impact of energy supply shocks on consumer spending. A SVAR is a statistical model, estimated over multiple time series data, that helps identify how different variables influence each other over time by incorporating economic theories or structural information into the analysis. Following Bobasu and Gareis (2022) estimation on data for the euro area, we set up four such similar SVAR models using Swedish data. The models include the terms of trade,[7] the CPIF (Consumer Price Index with a fixed interest rate),[8] real GDP, the three-month STIBOR (Stockholm Interbank Offered Rate), and either total private consumption or consumption of durable goods, non-durable goods, or services (meaning there are four final SVAR model configurations).[9]

To identify structural economic drivers, sign restrictions are applied to the impact responses of the model variables. These sign restrictions are constraints based on economic theory that specify the expected direction (positive or negative) of the response of certain variables to shocks, helping to distinguish between different types of economic shocks. Specifically, following Bobasu and Gareis (2022), in modelling an energy supply shock, an unexpected decline in energy supply is depicted by a sudden worsening in the terms of trade, which means an increase in real energy prices. This scenario results in an immediate rise in inflation and a simultaneous negative impact on real economic activity and consumer spending.

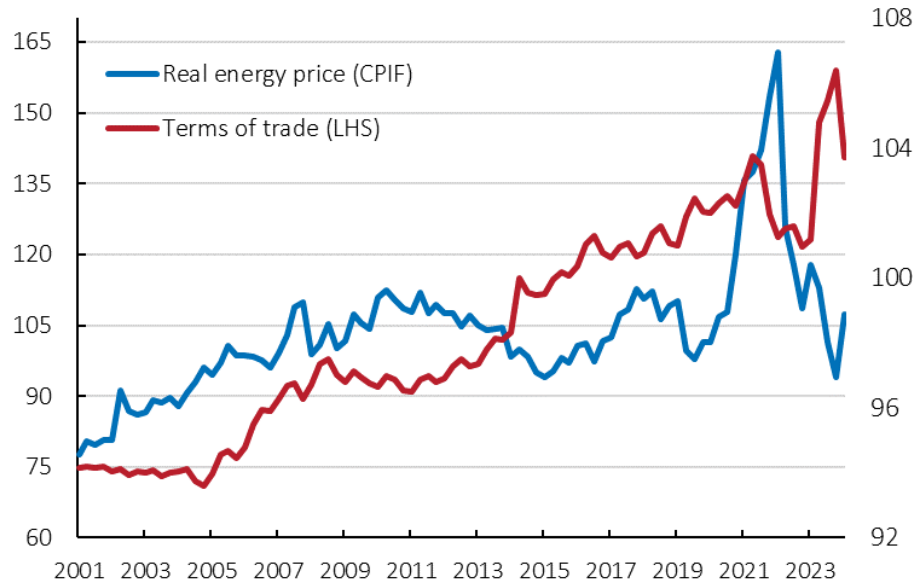
[7] The terms of trade series is smoothed using a backward-looking 3-quarter moving average to avoid excessive series volatility.

[8] The CPIF is a measure of inflation in Sweden. It is similar to the Consumer Price Index (CPI), but it excludes the direct effects of changes in mortgage interest rates. This means that the CPIF reflects the price changes of goods and services without being influenced by fluctuations in interest rates on household mortgages. The CPIF is used by the Riksbank, Sweden's central bank, as the target variable for its inflation target, aiming for an annual inflation rate of around 2%.

[9] Like in Bobasu and Gareis, (2022), no control is used in estimation to capture the support of electricity spending by the government in Sweden because this was relatively small compared to other Euro area countries. Without this support, the impact of the 2022-2023 energy price swing on consumption would have been even larger in Sweden. It follows that the estimates in this paper providing a conservative view of the significant impact of terms of trade on consumption.

Figure 3. Real energy prices and the terms of trade—2001Q4-2024Q4.

Levels, 2015Q1=100



Source: Statistics Sweden and own calculations. Notes: The "real energy price" indicates the ratio between the energy component of the CPIF and the overall CPIF index. The terms of trade are proxied by the ratio between the GDP deflator and the private consumption deflator.

Other restrictions also follow the literature on distinguishing energy price shocks from other structural shocks, as explored by Conti et al. (2017). In particular, an aggregate demand shock positively impacts both inflation and real economic activity, while a (non-energy) aggregate supply shock leads to a decrease in inflation and an increase in real economic activity. A monetary policy shock results in higher interest rates, negatively affecting both inflation and real economic activity. Lastly, a residual shock captures any other shocks that do not fit into these categories, ensuring they do not mimic the energy price shock.[10]

The models are estimated using Bayesian methods, specifically employing the BEAR Toolbox (Bayesian Estimation, Analysis, and Regression toolbox)—a comprehensive tool developed by the European Central Bank (ECB) for forecasting and policy analysis (Dieppe and van Roye, 2021; ECB, 2021). The data are quarterly series (expressed as percentage changes against the previous quarter, except for the three-month STIBOR). The sample spans from the first quarter of 2000 to the fourth quarter of 2024. Non-durable goods include semi-durable goods. The models do not incorporate structural

[10] In turn, this approach builds on the sign restrictions methodology initially developed by Canova and De Nicolò (2002) and Uhlig (2005), and further refined by Rubio-Ramírez, Waggoner, and Zha (2010).

breaks, as the economic fluctuations in Sweden during the COVID-19 pandemic were not unprecedented from a historical perspective. This is attributed to Sweden's strategy, which facilitated greater normalcy and minimized economic disruption compared to other countries.

All in all, the models seem to fit the data well and are well-behaved, as evidenced by their fit to the data and the impulse response functions (IRFs). For example, a negative shock to the terms of trade (from a rise in energy prices) has a negative effect on GDP while pushing up CPIF inflation, and consequently, the interest rate. The variables respond in the expected directions to shocks, and the magnitudes of these responses are plausible.

3 Results

Using estimated historical decompositions from the models, it is possible to derive the contribution of energy supply shocks to the cumulative changes in the various private consumption components. Three key findings emerge.

First, the substantial increase in energy prices in 2022 seems to have been a key driver in the decline of real consumer spending in Sweden (Figure 4). Strains on energy supplies affected Sweden both via the effect on EU energy markets, on world market prices and via direct supplies.[11] While individual consumption components were affected to varying degrees, higher energy prices have significantly dragged down all components. The relatively strong reaction of durable goods consumption to the increase in energy prices is likely because households could use their existing stock of durable goods without an immediate impact on their welfare. Additionally, given the heightened uncertainty due to energy price fluctuations, households may have decided to postpone irreversible purchases of durable goods. The large estimated impact of higher energy prices on services is less straightforward

[11] Before the war in Ukraine in 2022, Russia was a significant exporter of energy to Europe, including Sweden. In 2021, about 30% of Sweden's liquefied natural gas imports came from Russia. Additionally, around 8% of Sweden's crude oil imports originated from Russia (Sveriges Riksdag, 2022). Similarly, prior to 2022 Sweden imported biomass from Russia, primarily waste and residues from the forest industry, for use primarily in district heating plants, in the residential sector and for electricity production (around 60% of all Sweden's renewable energy comes from biomass and more than 50% of the heat comes from biomass. See IEA Bioenergy, 2024). However, following the war, Sweden, like many other European countries, took measures to reduce its dependence on Russian energy. The Swedish parliament directed the government to investigate and eliminate imports of energy from Russia in the shortest possible time (Sveriges Riksdag, 2022).

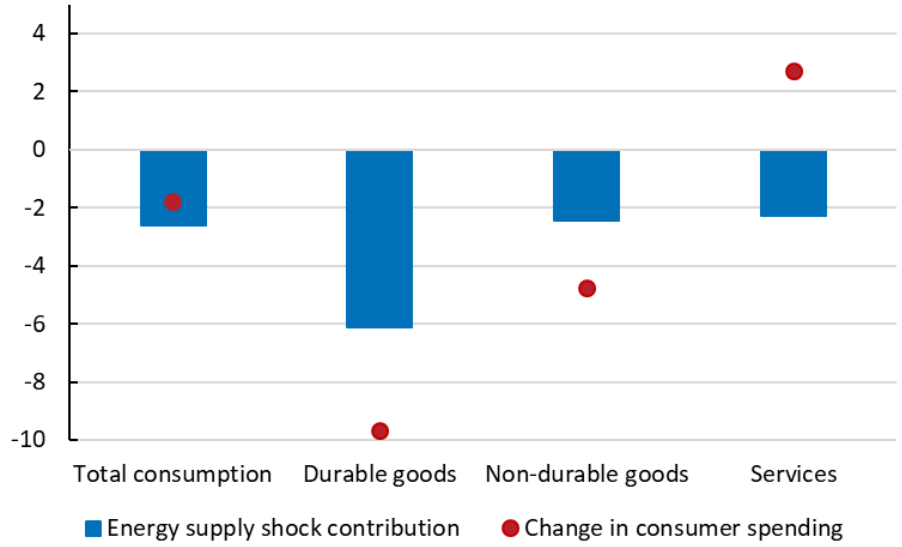
to explain. However, a portion of service consumption is obviously associated with transactions in goods, so when the latter are depressed, the former tend to be depressed as well.

However, these shocks had a clear, larger negative effect on the consumption of non-durable goods. This can be explained by the strong links between energy prices and food prices, a significant component of non-durable goods. Higher energy costs lead to increased expenses in agricultural production, particularly through the rising prices of fertilizers, which are energy-intensive to produce. Additionally, elevated transportation costs due to surging fuel prices further exacerbate food price inflation, making essential goods more expensive for consumers. These connections mean that energy price shocks can significantly amplify the cost of non-durable goods, resulting in a larger negative effect on their consumption compared to other categories.

Second, when comparing the impact of energy supply shocks on consumption components between 2020 and the period after 2022, it is clear that the contributions during the pandemic were relatively minor (Figure 5).

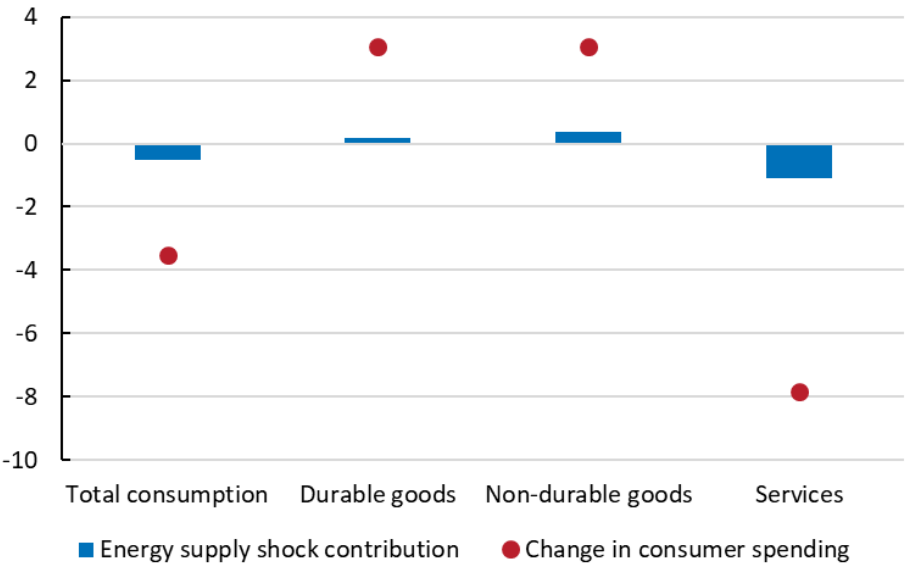
Third, in 2024, the substantial energy price shock that began in 2022 has largely dissipated, and its impact on consumption growth has diminished. However, although in 2024 energy prices initially had a positive effect on total private consumption, leading to an overall positive contribution when averaged across quarters (Figure 6), this support for consumption growth was not consistent throughout the year. The historical decomposition based on the SVAR model estimates suggest that by the final quarter of 2024, the influence of energy price shocks on total private consumption growth had once again turned negative (Figure 7). This may be explained by the fact that our measure of the terms of trade (TOT)—which is smooth and thus captures the persistence in changes—fell considerably in Q4 2024 (-2.5%). Ultimately, this decline weighed on consumption, although much less than during the period of continuously accelerating energy prices in 2022.This late-year reversal, combined with other factors such as aggregate demand and non-energy supply shocks weighed on consumption growth throughout the year.

Figure 4. Impact of energy supply shocks on real consumer spending—2022Q1-2023Q4



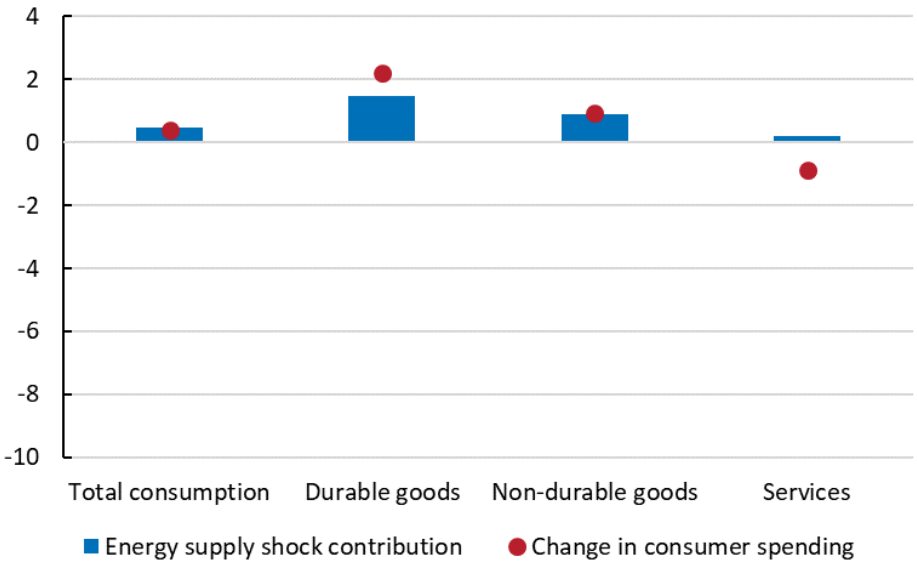
Source: Sweden Statistics and own calculations. Notes: The chart shows energy supply shock contributions to consumption changes in percentage points—blue bars—and percentage changes in the various real, private consumption categories (2023Q4 relative to 2021Q4)—red dots.

Figure 5. Impact of energy supply shocks on real consumer spending—2020Q1-Q4



Source: Sweden Statistics and own calculations. Notes: The chart shows energy supply shock contributions to consumption changes in percentage points—blue bars—and percentage changes in the various real, private consumption categories (2020Q4 relative to 2019Q4)—red dots.

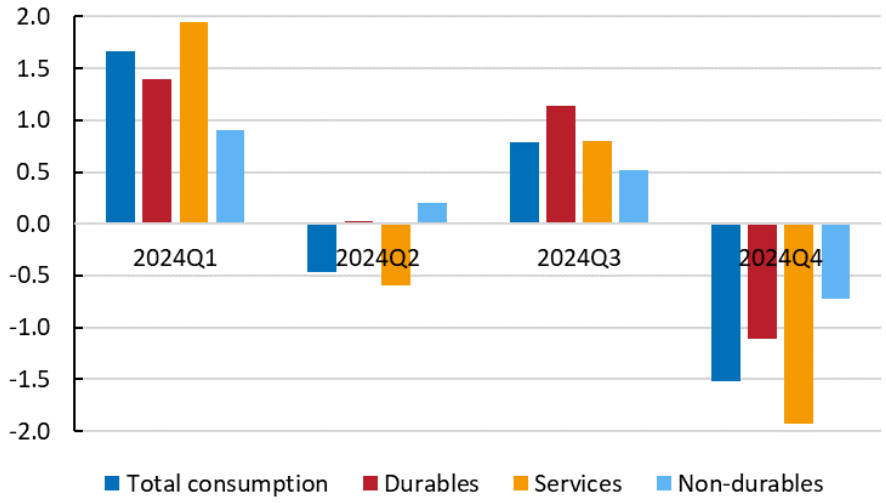
Figure 6. Impact of energy supply shocks on real consumer spending—2024Q1-Q4



Source: Sweden Statistics and own calculations. Notes: The chart shows energy supply shock contributions to consumption changes in percentage points—blue bars—and percentage changes in the various real, private consumption categories (2024Q4 relative to 2023Q4)—red dots.

Figure 7. Impact of energy supply shocks on real consumer spending—2024Q1-Q4

Percentage points



Source: Own calculations. Notes: The chart shows energy supply shock contributions to consumption changes to changes in in the various real, private consumption categories during each quarter of 2024, in percentage points.

4 Conclusions

Sweden's consumption patterns have experienced significant volatility in recent years due to unprecedented energy price shocks. This memo has specifically examined the impact of energy price shocks on consumption.

The findings indicate that the large increases in energy prices in 2022 had a profound effect on Swedish consumption, particularly on durable goods, but also on other components. Although consumption has shown some tentative signs of recovery in 2024, the contribution of energy price shocks to consumption growth has turned negative again at the end of the year.

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