

Economic Effects of rising Energy Prices

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Abstract. *Energy is an indispensable resource for everyday activities, both for the population and for economic operators. Being used for heating, cooling, and lighting buildings, driving, and putting into operation various machines, energy is essential for the entire economy. Since energy is a central element of human activity and energy prices are the quasi-permanent component in most costs, its price can be called "the most important price in the economy". The topic of the research is a highly relevant issue for both financial and energy sectors. The research aims to identify and analyse the economic effects of energy price increases. Among the proposed objectives are: to gain in-depth knowledge of the scientific background of the subject under investigation; to determine the role of energy in a country's economy; and to determine the economic and social consequences of energy crises. Using the qualitative research method, this article is the result of an integrative consultation of a large, rich, and recent scientific literature. To achieve the established objectives, official documents of the European Commission and the United Nations, reports of the International Monetary Fund, the European Central Bank, and the National Bank of Romania, academic articles and studies elaborated by various prestigious think tanks were studied. The first part of the paper briefly outlines the importance of energy for a country's economy. The second part reviews the scientific literature, thus illustrating the distinct opinions of various experts in the field. The third part presents the economic effects of energy crises and analyses the impact of rising energy prices on inflation and economic activity from a theoretical perspective.*

Keywords: energy, energy crises, inflation, economic effects, energy resources.

Introduction

Natural resources, especially energy resources, have always had a major impact on social evolution and economic development. Agenda 21, a comprehensive plan of action, adopted at the 1992 Earth Summit in Rio de Janeiro (Brazil) states that "Energy is essential to economic and social development and improved quality of life".

Energy is an indispensable resource for everyday activities, both for the population and for economic operators. Being used for heating, cooling, and lighting buildings, driving and putting into operation various machines, energy is essential for the entire economy, i.e. agriculture, industry, and services.

The price and reliability of the energy supply are key elements of a country's energy security strategy. Electricity prices are of particular importance for international competitiveness, as electricity usually represents a significant proportion of total energy costs for industrial and service-providing businesses (Eurostat, 2017). Being such an important resource for society, energy has a

major impact on a country's economic development and the quality of life and social well-being of its citizens (Sovacool, 2016).

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Literature review

Energy is a vital component of economic development and has generated worldwide concern since the interwar period. The effects of rising gas, fuel, and electricity prices play an important role in inflation studies and monetary policy decisions. In the context of the current energy crisis, this topic has received increased interest from the scientific community. The emergence and maintenance of the inflationary wave stimulated by high energy prices has been at the heart of the greatest interest in recent years.

Khan et al. (2022), Olubusoye et al. (2021), Wang et al. (2022) analysed the impact of fossil fuel prices on energy market efficiency and volatility, Yagi & Managi (2023) - the effects of the armed conflict in Ukraine on rising energy prices, and Neufeld (2022) presents three effects of higher energy prices, namely: higher inflation worldwide, slower global economic growth, and increased food insecurity and social unrest in the least developed and developing countries. Several authors have also studied the macroeconomic effects of rising energy prices on the UK economy. Considering the impact on business costs, Barwell (2007) first investigates how increased energy prices are reflected in the prices of goods and services. At this stage, wages and costs are unaffected and the level of nominal expenditure in the economy remains unchanged. Next, the overall impact of higher energy prices is analysed by examining the adjustment of wages and costs, and the impact on aggregate supply and demand. The monetary policy response and inflation expectations are then presented. Professor Dixon (2022) points out that rising prices for electricity, gas, and fuel affect households both directly and indirectly, as these fuels are key factors in the production of most goods and services. In addition to rising inflation, high energy prices reduce real GDP, wages and productivity. In the current geopolitical context, Dixon also presents a positive effect. Rising fossil fuel prices will accelerate the development of alternative energy sources, especially renewables. The new reality may be a trigger for reducing the dependence on fossil fuels in a shorter time frame than originally planned and accelerating the use of renewable resources. The same topic is also addressed by Ari & Mulas Granados (2023). The authors highlight five effects of higher energy prices in the UK. First, economists point to the idea that the gas and electricity prices paid by end users have risen considerably. In addition, the authors point out that the energy shock, which started in 2021, has negatively influenced the country's terms of trade. Third, they show that in the UK compared to other countries in the region, retail energy prices have seen a greater dependence on wholesale prices. The fourth effect is decreased activity and increased business failure among economic operators. Higher energy prices have led to higher prices for other products and services, which in turn have influenced supply and demand. Some producers have been unable to sell all their goods, leading them to lower prices to make their products more attractive. In these circumstances, the falling prices have caused many traders to go bankrupt. Finally, the authors of the report point out that low-income households have been hit hardest by price increases.

In contrast, Freund & Wallich (1996), Moshiri & Martinez Santillan (2018), and Renner et al. (2019) argue that when energy prices rise, trading quantities inevitably decrease; thus, declining welfare levels tend to be felt more by higher-income households.

Killian (2008) examines the economic effects of energy crises in the United States. The paper addresses several key issues and attempts to answer the following questions: how sensitive

is energy demand to changes in energy prices, how does consumer spending evolve in response to energy price shocks, how do energy price shocks affect real output, inflation, and stock prices in the US, why can energy price increases cause recessions while energy price decreases do not cause expansions? At the same time, the author argues that rising energy prices have little impact on real GDP because GDP is value-added, while energy use is only an intermediate input in the traditional model. Higher energy prices can impact both consumer and business welfare, slowing the pace of economic growth. Thus, when energy prices rise, consumers will primarily buy less durable goods (e.g. new cars and houses), and as consumer demand falls due to uncertainty, companies may cut back on investment spending. Furthermore, Killian & Zhou (2023) examine the extent to which sudden increases in the prices of diesel, jet fuel, natural gas and electricity create inflationary pressures. The authors' estimates suggest that energy price shocks affect headline inflation mainly through the energy component of the consumption basket and have only modest effects on core inflation.

Methodology

Using the qualitative research method, this article is the result of an integrative consultation of a large, rich, and recent scientific literature. The bibliographical documentation aimed to obtain a thorough understanding of the research area on the following dimensions: a critical analysis of the literature, knowledge of the theoretical basis of the field, and the framing of the investigative approaches in the epistemic of the current scientific context. To achieve the established objectives, official documents of the European Commission and the United Nations, reports of the International Monetary Fund (IMF), the European Central Bank (ECB), and the National Bank of Romania (NBR), academic articles and studies elaborated by various prestigious think tanks (World Economic Forum (WEF), Economics Observatory (ECO), Centre for the Study of Democracy (CSD), and the Romanian Observatory on Energy Poverty (ORSE)) were analysed. The study of Western scientific literature and works published in Romania allowed us to analyse different opinions and illustrate distinct perspectives.

Results and discussions

Energy crises

The analysis of rising energy prices is not complete without mentioning energy crises. The energy sector, closely interdependent with other economic sectors, is a pillar of any country's national economy. An energy crisis leads to economic stagnation, and changes in macroeconomic indicators, both in an energy-exporting and importing country, will lead to changes in the energy balance, which - in turn - will have a direct impact on the balance of trade, on the balance of payments and, on the welfare of the population.

The history of energy prices and costs shows major changes and impacts on the world economy. The 1970s and 1980s saw one of the most severe energy shocks of the twentieth century. The 1973 oil crisis was the Western world's first energy crisis after the Second World War. The major industrial powerhouses of the time, such as the United States, Canada, Australia, Japan, and the countries of Western Europe, faced major oil supply problems. Restrictions imposed by suppliers drove up prices, triggering a series of economic shocks. Over time, other crises have also affected the energy sector. In recent decades at the global level, the financial crisis of 2007-2008 and the current energy crisis have stood out.

The energy crisis that broke out in the fall of 2021 quickly became global, affecting several powerful economies around the world. The combined effect of the recovery in aggregate demand

following the lifting of all restrictions adopted during the COVID-19 pandemic, increased demand for natural gas for electricity, reduced oil stocks in the United States, a lack of wind in the United Kingdom causing wind power plants to shut down, and droughts in Brazil leading to a reduction in hydropower, have caused the price of fossil fuels to rise sharply internationally. The European Union, as a major importer of energy resources, has become the epicentre of this crisis, facing explosive increases in oil, gas, and electricity prices. The unexpected and excessive increase in the price of natural gas has caused chain price increases in all areas.

In the EU, in addition to the causes listed above, two specific factors have been added: low gas stocks after a long winter and short supply during the summer, and the market structure dominated by contracts with prices linked to the gas supply/demand ratio, to the detriment of contracts indexed to the oil price. Regarding electricity prices, the most important factor was the increase in the production costs of fossil fuel plants. In Romania, price increases were also accentuated by the liberalisation of the electricity market. At the same time, the armed conflict in Ukraine, which began in February 2022, has raised additional concerns for EU member states about ensuring energy security and diversifying fossil fuel supplies.

As a large part of business and household costs are related to energy, the price of oil, gas, and electricity matters a lot for headline inflation: half of the increase in inflation in 2021 was due to higher energy prices (ECB, 2021).

Impact on inflation

Higher energy prices cause inflation to increase. Fluctuations in electricity and gas prices directly influence the inflation rate, being felt by final consumers through the prices they pay. Since the increase in the prices of fuels, electricity, and natural gas influences the dynamics of consumer prices, in the analysis of the impact of the cost of energy on inflation, two interpretations will be taken into account: *stricto sensu* - the direct effect of the price of energy and, in a broad sense, the derived effects, which indirectly transmit through the channel the production costs of other goods and services in the consumption basket.

Increases in fuel, gas and electricity tariffs quickly create a knock-on effect. For example, rising fuel prices will increase the cost of transporting many other goods. Apart from the direct effects, proportional to the share of energy components in the CPI basket, the shock on the energy market will pass through into the annual inflation rate also via production costs, as energy is an input in the manufacturing process, along with commodities, materials, labour (NBR, 2021). For example, almost all enterprises use electricity.

Rising energy prices can have a significant impact on inflation, as measured by the Consumer Price Index (CPI), and consequently on citizens' living standards. As energy prices rise, so do the prices of agri-food products. For example, restaurants use energy for lighting, heating, and preparing dishes. Energy is also needed to maintain an optimal temperature in greenhouses, to heat animal farms, to cultivate the soil and harvest fruits, and to transport food to restaurants. So, when energy prices rise, do the costs of restaurants, and this will be reflected in higher prices (considered part of the services sector in the CPI) paid by final consumers. The situation is similar for other non-energy elements of the CPI, but the effects vary due to the different amounts of energy businesses use. The more energy-intensive the production process, the greater the impact, the most exposed sub-sectors being the intermediate goods or capital goods industries. (NBR, 2021).

The production process varies considerably between goods and services and between different sectors of activity. For example, crude oil accounts for a large share of refinery costs, as does natural gas in the costs of gas turbine power plants. In the basic chemical industry, oil and gas

are the main cost components, with oil being both the main synthetic intermediate and a source of energy. Rising oil prices have direct effects on the prices of most chemical intermediates used in the production of plastics and rubber (European Commission, 2016). On the contrary, less energy can be used in the production of other finished goods and services. This difference suggests the idea that the prices of some products may rise more than the prices of others. As higher energy prices drive up the marginal cost, companies will want to increase the price they charge for their goods and services. The major impact of higher energy prices on companies that use little energy will be to reduce demand for their products rather than increase their costs. This effect occurs when higher prices for energy-intensive goods in the manufacturing process lead to higher costs.

Both output prices in the energy and consumer goods industries are classified as first-round effects and are seen as transitory. The impact on the annual inflation rate persists for four quarters in the case of direct effects and, sometimes, for a longer period in the case of indirect effects, because the transmission of the rise in production costs into prices is not always immediate nor linear (NBR, 2021).

The successive increases in energy prices have the potential to amplify the tensions surrounding domestic macroeconomic equilibria. Risks to non-financial corporations stem from higher utility costs. A persistent rise in these costs can trigger second-round effects, hence higher overdue payments to the government budget, banks and suppliers, as well as the reduction in money flows across the economy. Moreover, bottlenecks could emerge in supply chains or the existing ones might worsen, as production capacities in energy-intensive sectors are being closed or limited. Thus, possible consequences are the deterioration of companies' financial standing, mainly in energy-intensive sectors, the reduction in household consumption, and higher inequality due to the differentiated impact depending on income level (NBR, 2022).

Subsequently, in the absence of a monetary policy response, second-round effects appear. As the effects of monetary policy are relatively lagged, it cannot help to counteract short-term price increases. Monetary policy cannot control the first-round effects generated by supply shocks (energy prices, food prices, increases in VAT or excise duties, etc.), which include both the direct impact on consumer prices and the indirect impact that influences other prices. Still, it has to react to second-round effects, manifested by rising inflationary expectations leading to higher core inflation.

Rising prices for energy resources generate a knock-on effect on the prices of all goods and services, while the incomes of the majority of the population remain intact. In a short time, the population will realize that it is becoming poorer. Inflation erodes nominal wage and, hence, employees and trade unions tend to seek compensation for expected inflation (NBR, *The Importance of Inflationary Expectations*). To the extent that consumer-employees can negotiate higher wages in response to rising prices, a wage-price spiral can occur, causing further increases in general prices. These increases may reappear periodically as wages reach consumer prices, or they may occur gradually if wage renegotiations are extended (Blanchard, 1986). To the extent that real wage dynamics are above the rate of labour productivity growth, companies will face higher unit labour costs. If it cannot be sustained by reducing profitability margins, the increase in costs will be passed on to consumer goods prices, leading to inflation. Sizeable price increases and reduced corporate profits for a prolonged period have the potential to affect economic agents' inflation expectations over the medium term, influencing their price- and wage-setting behaviour in the future (NBR, 2021).

Compared to those of the first round, the effects of the second round are more persistent, being able to mark the trajectory of prices over a longer time horizon, while also being more difficult to evaluate compared to those of the first round.

According to data published by the European Central Bank, in August, September and October 2021, inflation in the EU hit its highest level in 13 years. This happened for three main reasons: the fast reopening of the post-pandemic economy, higher energy prices pushing up inflation and the manifestation of a phenomenon that statisticians call the "base effect" (ECB, 2021).

Impact on economic activity

Rising energy prices affect both producers and consumers. First of all, the energy component in the cost structure of manufactured products and services provided increases, which inevitably leads to a decrease in the competitiveness of goods in the external and internal markets. The inflationary process is accompanied by the bankruptcy of companies, which in turn influences the rise in unemployment. According to Okun's Law, there is a negative correlation between Gross Domestic Product (GDP) and unemployment; thus, rising unemployment will influence the dynamics of real GDP. Among the relevant channels of transmission of these shocks are those related to real disposable household income and the resources available for investment by companies, given that energy inputs are difficult to substitute with other factors of production, at least in the short and medium term. Related shocks are projected to be reflected in both the cyclical component (the GDP gap), mainly as a result of dampening domestic aggregate demand, and the potential GDP dynamics. The latter may also be influenced by the economy's lower capacity to generate new jobs. The impact on investment can be combined with a deterioration in activity in several key sectors of the economy, including as a result of increases in production costs due to energy commodity prices. The fall in output has the potential to create downward pressure on nominal incomes, which, in turn, may lead to reduced demand for labour and higher unemployment. Exports of goods and services can reflect the difficulties of exporting companies caused by the increase in production costs (with an impact on external price competitiveness) and the decline in investment funds (with adverse effects on productivity). The dynamics of imports of goods and services are also envisaged to mirror domestic demand shocks, as well as shocks on exports of goods and services (NBR, 2021).

Rising energy prices have large distributional effects, which are equivalent to a deterioration in the terms of trade externally and within economies. Internationally, the economies that are net importers of energy and basic raw materials and cannot respond with compensatory price increases for the goods they export are the most damaged. Globally, rising oil prices result in a significant transfer of revenue from oil-consuming countries to oil-producing countries, and thus from the EU to a small number of third countries. Rising energy prices cumulatively contribute to sharp increases in consumer price inflation in most developing countries. When the result of this economic phenomenon is a general increase in wages and prices, inflation rates are at risk of continuously rising. In the case of energy-importing developing countries, higher energy prices influence food price increases, particularly affecting socially disadvantaged groups.

Deteriorating trading conditions mean a widening current account deficit and the need to identify additional sources of external financing. Higher energy import bills hurt the trade balance and can also affect the current account balance. For energy-exporting developing countries, the higher oil revenues create substantial inflows in foreign currency, which encourage the real exchange rate to appreciate and reduce the external competitiveness of the non-resource traded goods sector (Commission of the European Communities, 2008).

Domestically, energy producers and various intermediaries win at the expense of households and energy-intensive industrial sectors. Energy costs are an important part of household budgets. The simplest way to assess the extent to which energy prices affect the household consumer is based on the structure of the utility bill. The most disadvantaged households for whom energy and food are an important part of expenditure will be the most affected. Romanian households are among the most exposed to fuel poverty in the EU, with the third highest percentage of late utility bill payments and the second highest percentage in the EU of not being able to adequately heat their homes, even before the onset of the current energy crisis (Romanian Observatory on Energy Poverty, 2023).

Conclusion

To conclude, rising energy resource prices generate a knock-on effect on the prices of all goods and services, while disposable incomes remain unchanged. Higher energy prices affect both producers and final consumers. Food prices rise due to higher costs of transport and production factors. Higher prices reduce purchasing power, hitting low-income households hardest and putting pressure on all economic operators, particularly those in energy-intensive sectors.

In addition to the direct impact of the energy crisis on consumers through higher energy bills, there are also side effects that affect quality of life:

- higher prices for goods and services;
- higher inflation;
- reduced competitiveness of goods on both the external and internal markets;
- an increase in the number of companies going bankrupt;
- higher unemployment;
- a decrease of GDP.

The paper presents the scientific background of the subject and theoretically analyses the economic impact of rising energy prices. The abundance of recent information demonstrates that this topic is constantly debated and analysed. To create and present an overview, the most valuable and recent information has been selected. As the subject is very broad, there are certainly other relevant studies that can complete the research. The article complements existing studies in the field and can serve as a starting point for further and more comprehensive research, including statistical data analysis.

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