

Rising Energy Prices: The Impact on Inflation, Economic Activity and the Results of the Fight Against Global Warming

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Please cite this paper as:

Radulescu, C.V., Gole, I., Troaca, V.A. and Gombos, C.C., 2022. Rising Energy Prices: The Impact on Inflation, Economic Activity and the Results of the Fight Against Global Warming. In: R. Pamfilie, V. Dinu, C. Vasiliu, D. Pleșea, L. Tăchiciu eds. 2022. *8th BASIQ International Conference on New Trends in Sustainable Business and Consumption*. Graz, Austria, 25-27 May 2022. Bucharest: ASE, pp.58-65.

DOI: 10.24818/BASIQ/2022/08/006

Abstract

Energy is an indispensable resource for carrying out daily activities, whether we are thinking of the population as an end consumer, whether we are referring to the economic operators, and consequently at the entire economics chains. Return to global activity, as restrictions imposed by pandemics and the complete recovery of economic activities to the precedent level, has led to the rapid growth of energy demand, specifically for the natural gas used in electricity generation. In the summer months, there was a strong pick of electricity demand, exacerbated during the background of heatwaves, simultaneously with the reduction of energy coming from alternative sources (hydro and wind) and the manifestation of some constraints at the level of the offer, determined by the events extreme weather or prolonged maintenance. The originality of this paper consists in identifying the causes that have generated such growth in the gas and electricity market and their nature (structural or transitional), as well as to quantify the impact that these increases will have on the future dynamics of prices and economic growth in EU. In order to bring arguments, we used the comparative analysis which allowed us to understand the gas storage evolution during 2021 or EU energy mix progression in the last two decades. We also used descriptive analysis, for highlighting the mechanism of uniform pricing on the wholesale electricity market but also for bringing evidence on how the fluctuations in the quotations of electricity and natural gas are transmitted in the inflation rate.

Keywords

energy prices, inflation, economic activity, global warming, fossil energy.

DOI: 10.24818/BASIQ/2022/08/006

Introduction

After a difficult period characterized by numerous lock-dawns due to the pandemic, the global economy resumed its growth. Some countries even succeeded to recover the loss suffered because of the Covid-19. Unfortunately, the prices for electricity, gas, and even oil reached unseen levels. It is known since 1970 (Painter, 2014), that every unpredicted increase of prices regarding the energy market would create volatility and disturbance on the market (Price-Smith, 2015). Still, compared with oil shocks that the global economy was confronted specifically in 1973 and 1979, today it appears the causes of this situation are even more profound. Usually, after reaching a certain peak the prices used to go back to more or less acceptable levels (Bodislav et al, 2020). The actual situation is a bit different because the society decided to take actions against global warming and so it may imply that the prices for fossil energy to remain high to reach the CO₂ target accepted in COP21 (OECD, 2015).

In this paper, we will try to analyze the issues that such a proposal of reducing the greenhouse gases produced by fossil fuels may have in a macroeconomic context, especially from fiscal, inflation, and monetary policies perspectives. The debate comes from the necessity of governments to push some “green” measures further on and advance with the ecological transition programs while there is a significant number of a person (in some countries the size is larger than others) that needs to be protected from energy poverty

(European Commission, 2018). On the other side, Central banks will have to analyze if the transition to clean energy will not too much influence the general rise of prices and so their target of inflation will not be missed by these policies. Price stability is one of their concerns so there is a very thin line between the government's policies and the established mandate.

1. Rising energy prices: impact on inflation and economic activity

Energy is an indispensable resource for carrying out daily activities, whether it is about the population, whether we are referring to economic operators. Thus, growth of its prices in recent times at the European level is likely to reflect sooner or later on the dynamics of consumer prices, the general increase in inflation rates at the Community level may signal the onset of such adjustments (Angheluta et al, 2019)). At the same time, concerns began to mount on the potential effects on medium and long-term of these shocks (Diaconu et al., 2019). There is also the uncertainty regarding the inflation expectations of economic operators and consequently the worries concerning the recovery of economic activity at a slower pace. We consider it will be interesting to identify the causes that have generated such growth in the gas and electricity market and their nature (structural or transitional), as well as to quantify the impact that these increases will have on the future dynamics of prices and economic growth (Sarbu et al, 2021).

2. What has happened in the energy market since the second half of 2021 and how persistent is this shock?

The return of global activity, as the restrictions imposed by the pandemic, were lifted and the reopening of economies started to happen, has determined a pressure from the demand side, specifically for natural gas, used mainly for electricity generation but for other industrial activities as well. The last summer months were characterized by an increasing demand for electricity, there was a strong pick of demand in this sector, exacerbated during the background of heatwaves, simultaneously with the reduction of energy coming from alternative sources (hydro and wind) and the manifestation of some constraints at the level of the offer, determined by the events extreme weather, prolonged maintenance work (given the postponement of some of the latter in the acute phases of the pandemic).

Concerning the European market, the most influential argument that contributed to the quick ascension of natural gas prices (up to historical highs, as opposed to what happened in other parts of the world) was a circumstantial situation. If we compared the level of gas stock that EU had in October 2020 (which was 95%) with 77% (what could be found in storage, on the same month in 2021), we can understand how a longer winter, with temperatures below the seasonal average, may influence the short-term situation.

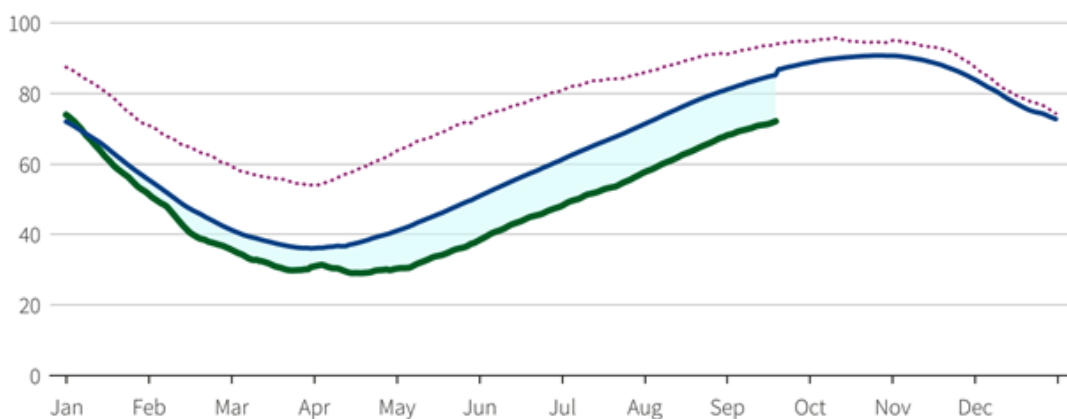


Figure no. 1. EU Gas storage

Source: Buli and Chestney, 2021

Gas storage is a real buffer used during times with high demand or peak prices. Usually, the winter gas season is starting from October 1st till 31st March and is characterized by higher prices and larger withdrawing of gas quantities.

The effect was exacerbated by the impossibility of refilling the stocks during the summer, amid the supply of limited quantities of natural gas by major players, either due to structural causes (natural decline in production, the tendency to abandon coal-fired power plants and, restricted investment in fossil fuels) in the context of the decarbonisation process, the initiation of procedures to shut down the extraction from the

main gas field from Netherlands – which is the largest EU producer. In the same time there was also observed a higher competition concerning the liquefied natural gas coming from Asian countries, as a consequence of the EU greenhouse gas emissions reduction plan. We cannot forget the geopolitical issue – the historical dependence of the EU on Russian gas. At the same time, the structure of the European market also played a role in increasing quotations, in which the dominant share (80 % in 2020) belongs to contracts with prices established according to the ratio between demand and supply of natural gas (to the detriment of contracts indexed to the oil price), this feature favouring the faster transmission of market-specific pressures.

In addition, there is a natural decline in production (although that some new sources were found, man others were closed), which has led to increasing imports in recent years, thus larger exposure to external shocks.

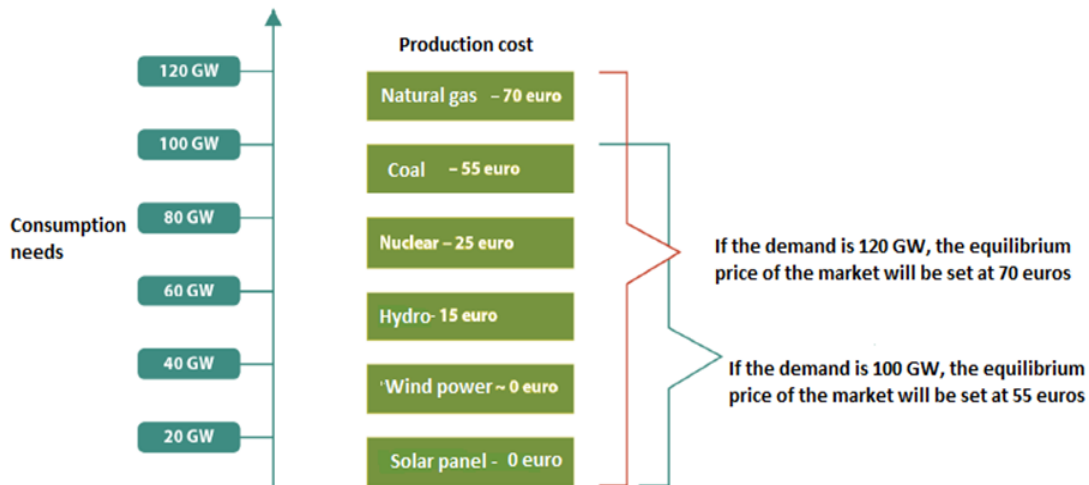


Figure no. 2. Illustration of the mechanism of uniform pricing on the wholesale electricity market

Source: Zinglersen, 2021

The price offered by each producer is located at the specific level of its marginal cost of production, each of them receiving, in the end, the equilibrium price of the market, dictated by the last unit of production necessary to satisfy the demand.

Regarding the advance of energy quotations, in the second half of 2021 on European markets, an important factor is also the major increase of costs of operations for fossil power plants. The result is a major bounce of natural gas prices to around 5 times, comparing the last year at the same time. Consequently, the coal quotation is also going up by 3 times – there is a contagious effect on prices.

There is also another impact derived from the measures taken by the EU in order to speed up the transformation of the economy through a green one: the permanent increasing prices of CO2 emissions, for example, greater lowering of carbon emission or faster removal of unused certificates from the market (Bua et al., 2021).

To these influences was added the decrease in electricity production of hydropower and wind farms due to a short number of rainy or/and windy days. This lack of green energy had to be replaced in the national electric system by fossil energy, specifically by power plants, but this sector was already confronted with high production costs.

Nevertheless, the increases of megawatt price are due also to the specificity of how the pricing mechanism is settled in this area. Finally, all prices of different electrical energy sources have to be equal, and they will be levelled up at the marginal cost of the most expensive sources, which are needed in the system in order to fulfil the demand (Blume-Werry et al., 2021). Concerning the EU zone, despite the fact during the last decades there was a permanent willingness to replace the pollutant electricity sources with cleaner ones and real progress was achieved still, the power plant using fossil fuels are significant.

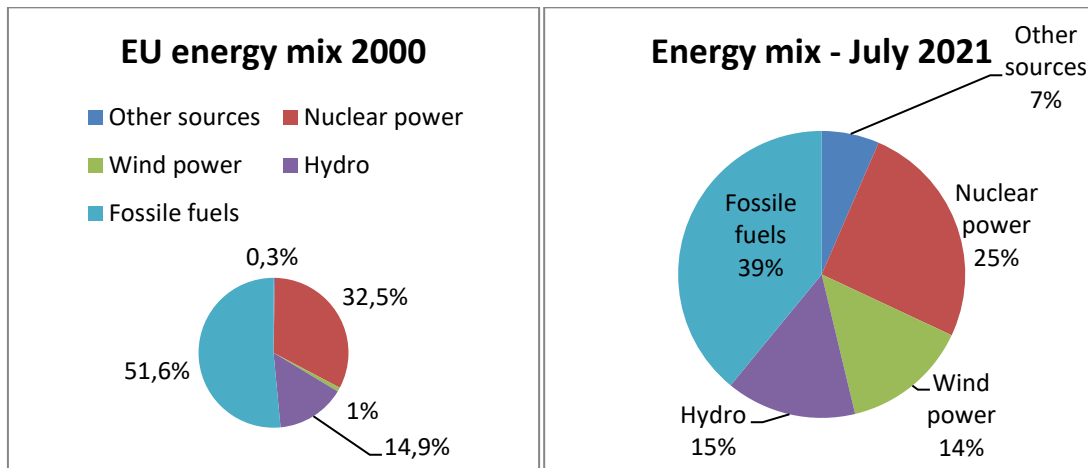


Figure no. 3. EU Energy mix progression

Source: Data from European Commission, 2021

The progress concerning the energy mix, in the sense of the higher presence of non-pollutant sources of energy, is eloquent. The energy coming from fossil fuels diminished in 20 years from more than 50% to 39%. Other sources of clean energy (solar and wind) have increased a lot. Nuclear energy, despite its sensible problems, became to be seen as a non-pollutant source also in some countries, but this is another subject to analyze.

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Starting with the spring of 2022, after the end of the cold season, the markets anticipate a certain correction of prices at the European level, in anticipation of an improvement of the acute imbalance between supply and demand that is manifesting at this moment. For example, the futures quotations of the TTF2 natural gas index show for the second half of next year a halving of prices compared to the maximum recorded in October 2021 on the spot market. But, as it is already known, these quotations are only previsions. If other events (like an invasion of Russia in Ukraine will occur, the situation will dramatically change and probably the price of energy will reach unseen levels). A similar picture emerges on the electricity market, with futures quotations in some representative European economies (Germany, France, the Netherlands, Italy, Spain) hovering around 100 euros / MWh next year, compared to current levels of on the spot market, by about 200 euro / MWh in October 2021. However, in the case of both natural gas and electricity, delivery prices for 2022 continue to be significantly higher than in 2019 (values of 2,5-3 times higher), thus indicating the importance of factors with more persistent action. The extension of the unfavourable influence of the conjuncture factors cannot be excluded, in the scenario in which the cold season 2021-2022 will be longer and colder than normal.

Over the longer term, European energy prices could stabilize at lower levels, under the dominant action of a structural factor, namely accelerating the transition to a green economy at the EU level. The process involves a rapid switch of energy production from fossil to green sources. At the same time, it is required that all houses have an electrified central heating system (European Commission, 2021). This new policy will have as a final result a lower importance of the costly production costs of fossil energy prices in final customers' electricity bills (European Commission, 2021).

It is expected that the transition would not be smooth, given the commitment of European Commission (a policy that will be put into practice by national governments) to diminish the level of GHG emissions in the EU area much faster (by 55 % by 2030 compared to 1990 levels - the prior target being established at 40 %). The strategy involves a faster abandonment of fossil energy, especially the one coming from coal. We should see a switch between fossil and clean energy sources (specifically wind and solar) in global recipes. The final objective is to accelerate the low-carbon sources so higher importance will be given to nuclear plants construction. Hydro is also important and it will benefit from larger attention but we have to admit that there is an issue - the permanent debate between the huge investment necessary to produce clean energy and the destruction of biodiversity, so not everyone is convinced that this is the way to go further in the renewable energy sector.

The main problem of all green energy sources remains the volatility, the incertitude of production that may fulfil the demand at all times. The precariousness will likely lead to high energy price variability during the next years. The solutions might come from developing much faster storage reliable and reasonably priced renewable electricity, respectively increasing the energy efficiency of final consumers.

3. Impact on the inflation rate

Fluctuations in the quotations of electricity and natural gas are transmitted in the inflation rate directly, through the prices paid by final consumers, but also indirectly, through the production costs of other goods and services in the consumer basket. These first-level effects are considered transient, with their impact persisting at the annual rate of inflation for four quarters in the case of direct effects and sometimes a longer period in the case of indirect effects because the transmission of rising costs production in prices does not always occur immediately or linearly. Furthermore, in the absence of a monetary policy response, long-term price increases have the potential to affect the medium-term inflation expectations of economic agents, influencing their future pricing and wage behaviour. These effects, of the second round, have a more persistent nature, being able to mark the trajectory of prices on a longer horizon compared to those of the first round.

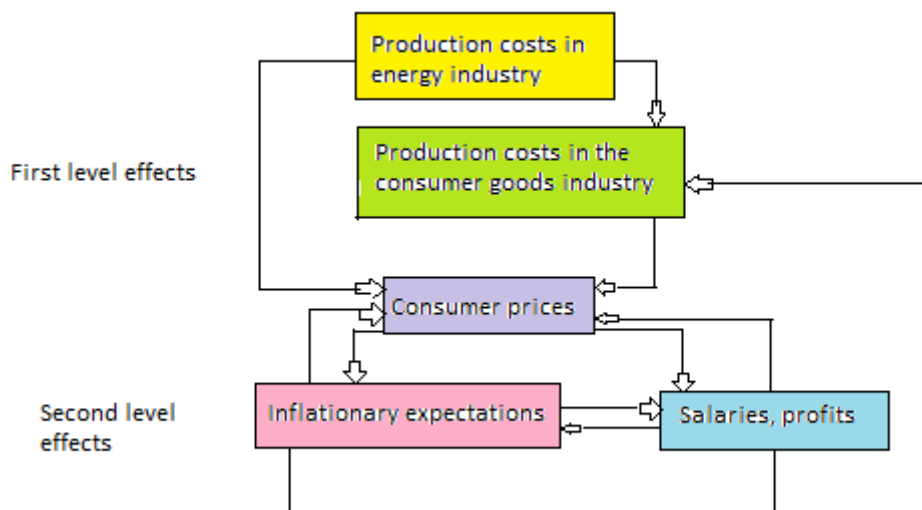


Figure no. 4. Transmission channels of the variation of production prices of the energy industry in the variation of consumer prices.

Source: own representation

In addition to the direct effects, proportional to the share of energy components in the CPI basket, the shock in the energy market will be transmitted on the annual rate of inflation and through production costs, with energy being input into the manufacturing process, along with raw materials, materials, labour. The impact will be even greater as the production process is more energy-intensive, with the most exposed branches being those that produce intermediate or capital goods. In the case of industries directly producing consumer goods for final prices, the share of energy expenditure varies between 1 % and 3%. However, the approach is incomplete as it does not take into account the energy consumption used along the production chain to manufacture the other factors of production. Nevertheless, if direct energy consumption is added to the indirect one, made by the upstream sectors of the production chain, the weights vary from less than 5% in the production of food and clothing to about 7% for pharmaceutical goods and furniture production, respectively over 8% in the case of appliances (Asian Development Bank, 2021).

4. Impact on economic activity

The rise of energy bills, together with the increase of the prices for all raw materials, will be reflected in the next years and we will see how the GDP will be affected, probably for longer periods. Among the relevant channels of transmission of these shocks are those of the available real revenue of every family

and the resources available for investment by firms, given that energy inputs are difficult to replace with other factors of production, at least in the short and medium-term.

The aggregate consequence of increasing energy values on GDP evolution cannot be other than negative, the magnitude of this impact being conditioned by the assumptions adopted and the set of information available. The related shocks are projected to reflect both the cyclical component (GDP gap), mainly as a result of the attenuation of aggregate domestic demand, and the dynamics of potential GDP. The evolution of household consumption, already marked by uncertainties regarding the perspective of the medical situation, is expected to be burdened by the impact on the disposable income of households from price increases.

The deterioration of the investment trajectory, which has nevertheless shown notable resilience in a pandemic context, translates into lower capital accumulation and inefficiencies in the use of factors of production, with an impact on potential GDP dynamics. The latter will be influenced by the lower capacity of the economy to generate new jobs. The impact on investment can be analysed related to a deterioration of activity in several key sectors of the economy (for example industrial production), including rising production costs generated by the prices of energy goods. At the same time, the exports of goods and services are already affected by the persistence of problems related to the supply chains are expected to reflect the difficulties of exporting firms caused by rising production costs (with an impact on external price competitiveness) and declining investment resources (with adverse effects on productivity). The dynamics of imports of goods and services are also considered to be affected by the shocks of domestic demand and, respectively, those on exports of goods and services. However, imports could gain market share in certain segments of goods where domestic producers would be more affected by higher energy prices than external competitors (with access to more energy-efficient technologies).

5. Consequences of rising energy prices on global warming

The rising of prices will affect the results of the fight against global warming. Some of the ancient fossil energy might become more interesting despite the political recommendations. There is a contradiction between what is happening in Brussels and what is decided by each country. The price of the energy bill is quite important for each citizen and every business, the national vote is matters for every nation, and so what the EU decides may not be followed strictly by national governments.

If we have a look at the next graphic, we can see that actually in the times of expensive clean energy, the price of energy produced by coal became accepted because is cheaper.

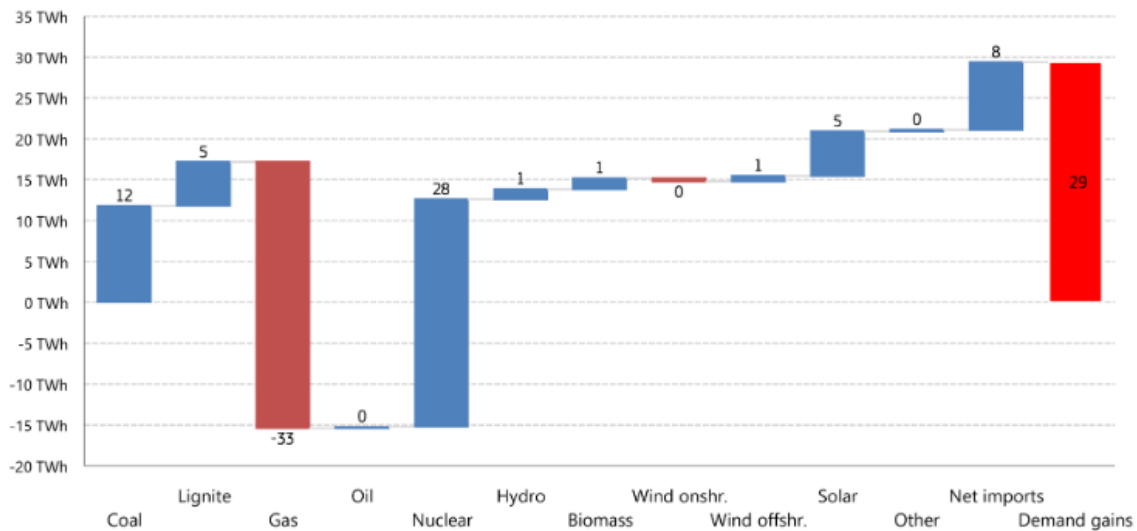


Figure no. 5. Evolution of energy sources, inside the EU, Q3 2020 against Q3 2021.

Source: European Commission, 2021

As we could see, there is a decrease of 33% of energy coming from gas power plants while fossil fuels are growing consistently while nuclear power plants became more and more seriously being considered as the first source of energy. To deal with these two contradictory concepts (encouraging green energy at a lower price) the EU Commission decide that nuclear energy is cleaner (Anett, 2022) – but how clean that could be?

Conclusions

The rise in energy prices, as well as the prices of other commodities and materials, will be reflected in the coming periods in the dynamics of real GDP, in a contractionary manner, with the expected effects of persisting for at least a period. Among the relevant channels of transmission of these shocks are those on the real revenue per family and the resources available for investment by firms, given that energy inputs are difficult to replace with other factors of production, at least in the short and medium-term.

The evolution of household consumption, already marked by uncertainties regarding the perspective of the medical situation, is expected to be burdened by the impact on the disposable income of households from increases in energy prices. The deterioration of the investment trajectory, which has nevertheless shown a notable resilience in a pandemic context, translates into a lower accumulation of capital and a loss of efficiency in the use of factors of production, with an impact on the potential GDP dynamics. The latter would also be influenced by the lower capacity of the economy to generate new jobs.

The impact on investment can be compounded by a deterioration in activity in some key sectors of the economy (for example industrial production), including rising production costs generated by the prices of energy goods. In turn, exports of goods and services, already affected by persistent disconnections over the supply chains are expected to reflect the difficulties of exporting firms in increasing production costs (with an impact on external price competitiveness) and declining investment resources.

Nevertheless, it is more and more complicating to put in practice green energy policies while the price of fossil energy is well below. In the end, the energy budget for energy and other direct consequences are limited and cannot be extended indefinitely.

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