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# How did high inflation come about?

An analysis of factors that have contributed to the current increases in inflation

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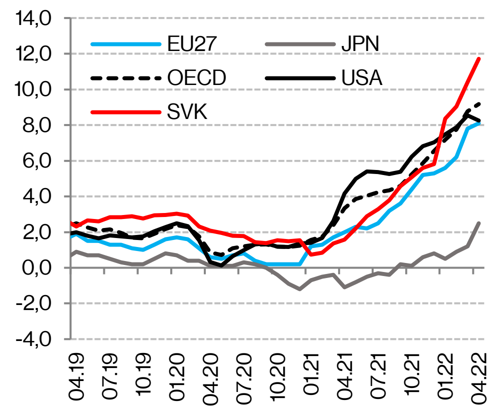
**Price growth accelerated during the pandemic both in Slovakia and abroad. At first, inflation was mainly fuelled by supply-side factors connected to the shift of demand from services to goods, which led to bottlenecks in global supply chains. While price growth was expected to ease in 2022, the war in Ukraine postpones the return to pre-crisis levels of inflation. The invasion has led to further price increases, predominantly through higher energy prices, but also through prolonging the ongoing supply bottlenecks. Significant rises in inflation threaten low-income households and those parts of the population which rely on social benefits, as these are adjusted for inflation with a delay.**

The war has delayed the return to pre-crisis levels of inflation.

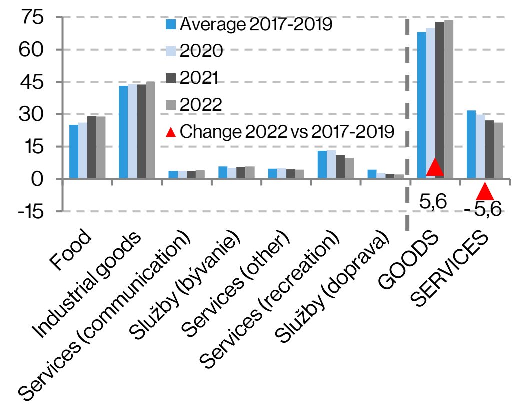
**After years of low and stable price growth, inflation started to accelerate globally over the past year** (Figure 1). While at first, higher levels of inflation were considered as a temporary phenomenon resulting from the pandemic and related factors, which were expected to ease off during 2022, the Russian invasion of Ukraine has postponed the return to pre-crisis levels of inflation. Given the combination of supply-side factors, which had contributed to higher price growth during the pandemic, and the impact of the conflict, the rate of price growth will not return to its pre-crisis levels in 2022.

**Figure 1: Inflation before and during the pandemic (year-on-year growth in %)**




*Sources: OECD, IFP*

**Figure 2: Weights in the Slovak HICP consumer basket (in %)**




*Sources: Eurostat, IFP.*

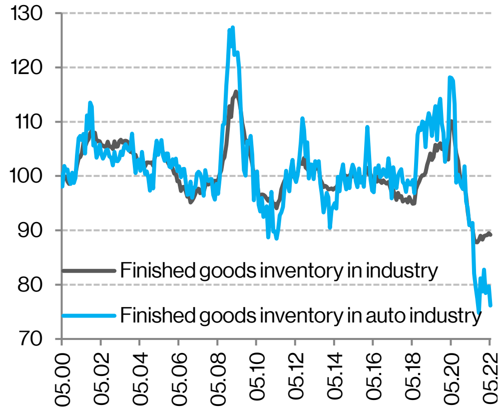
During the pandemic, demand shifted to goods...

**Inflation was at first fuelled by supply-side factors which were linked to the pandemic, mainly the unprecedented shift of demand from services to goods.** Services were constrained to a greater extent during the pandemic, as they often required personal contact. Hence, demand for various services was limited not only due to government restrictions, but also as a result of households' attempt to minimise their exposure to the virus. As a result, consumer demand moved to goods. The share of goods in the Slovak consumption basket, used for calculating the rate of inflation in Slovakia, have increased by 5.6 per cent during the pandemic (Figure 2).

...which put pressure on global supply chains.

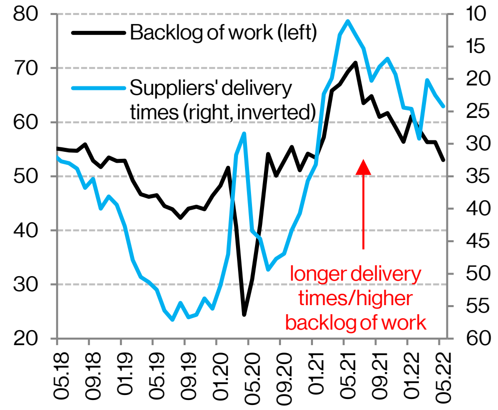
**The supply of goods was not able to immediately react to increases in demand,** as supply chains were affected by uncoordinated lockdowns across countries. Relative to services, the production of goods requires more materials, transportation, capital and logistics. The increase in demand for electronics led to shortages of microchips, whose production is difficult to increase rapidly owing to high fixed costs. Since supply could not readily satisfy demand, while firms' inventories of goods were diminishing quickly (Figure 3), both delivery times and the number of unfinished orders had increased (Figure 4). The imbalance between increased demand and constrained supply put pressure on inflation.

**Figure 3: German industrial firms used their inventories during the pandemic**




*Source: Ifo, Macrobond, IFP*

**Figure 4: Delivery times increased during the pandemic (PMI, Austria)**

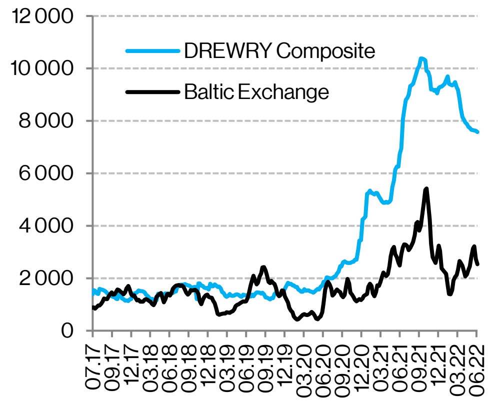



*Note: a value above 50 indicates an increase in unfinished orders (left) and a decrease in delivery times (right). Source: IHS Markit, Macrobond, IFP*

Prices of transportation soared...

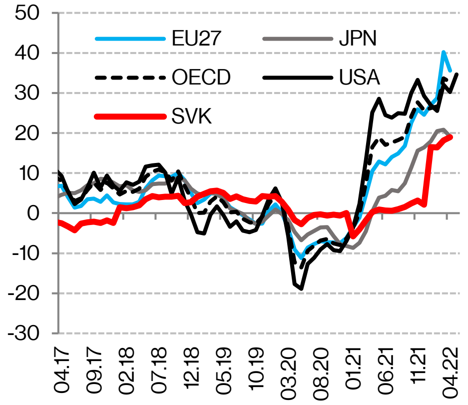
**Apart from component shortages, manufacturing was affected by increases in transportation costs.** Besides increased demand, various pandemic restrictions across countries contributed to the increase in the cost of transportation (Figure 5). Higher prices of transportation made the components more expensive and contributed to increases in the price of building materials too. The sanctions against Russia, the closure of Ukrainian ports, and closure of air traffic over the war-affected regions will delay the recovery of global supply chains. Hence, the price growth of transportation and components will return to their pre-crisis levels later.

**Figure 5: Container freight rates increased during the pandemic (USD)**




*Sources: Drewry, Macrobond, IFP*

**Figure 6: Energy prices began increasing during the pandemic (y-o-y change in %)**




*Sources: OECD, IFP*

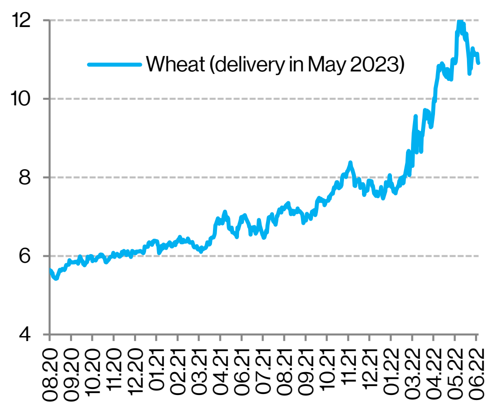
...as well as energy prices, which rose following the invasion.

**The increase in energy prices, which were further exacerbated by the war, also contributed to the rise in inflation** (Figure 6). On the one hand, the diminishing impact of the pandemic on the economy combined with the increased demand for goods, which are more energy-intensive, had led to the increase in energy prices. On the other hand, geopolitical tensions between Russia and Ukraine were manifesting themselves throughout 2021 and were raising energy prices due to limited gas supplies and relatively low levels of gas reserves. Energy prices were expected to normalise after the end of the heating seasons when demand for gas declines and the summer months provide an opportunity for gas storages to be replenished. The war, however, jeopardises future supplies of energy commodities, as Russia is a prominent exporter of gas and oil. The increase in the prices of these commodities can translate into more expensive fuel and food, as well as to higher prices of other goods and services through higher input prices.

The war has worsened the supply of certain commodities, raising their prices.

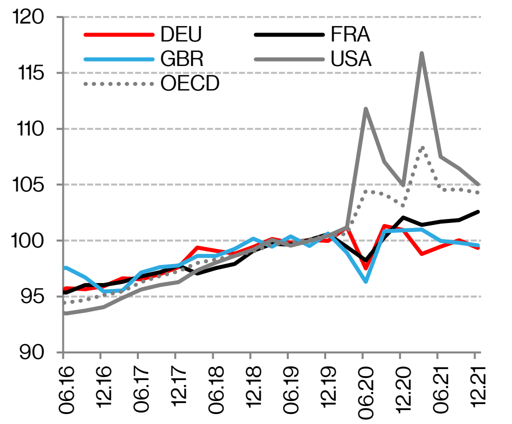
**Apart from energy, Russia and Ukraine are significant exporters of other commodities too, which will become more expensive as a result of the conflict.** Shortages of cable wires, palladium, and nickel, can threaten those industrial sectors which are dependent on these materials. Until new suppliers are found, these sectors may face higher inflationary pressures, which can gradually spread to other sectors as well. Moreover, Ukraine is a prominent producer of wheat whose prise has risen dramatically since the beginning of the war, raising the prices of food (Figure 7).

**Figure7: Wheat prices sky-rocketed following the invasion (USD)**




*Sources: Drewry, Macrobond, IFP*

**Figure 8: Disposable income is returning to its pre-crisis trend (100=2019)**




*Note: US disposable income rose during the pandemic mainly due to temporary government transfers to households. Sources: OECD, IFP*

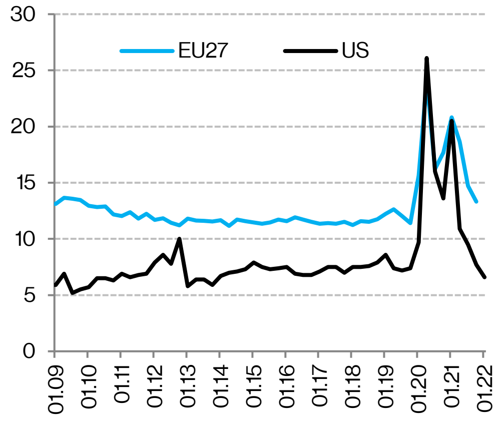
Demand-side inflation was mild during the pandemic.

**Inflation is generally influenced by supply and demand-side factors.** Factors that contributed to the rise in inflation in the early stages were predominantly linked to supply-side problems. **Inflationary pressures stemming from demand were not significant during the pandemic and the slowdown of economic growth following the war in Ukraine will limit them further.** Household disposable income in the Eurozone is approximately growing at the same pace as before the coronavirus crisis and, in the US too, has been returning to its pre crisis trend since the end of the pandemic aid provided by the government (Figure 8). During the pandemic, most central banks assumed that inflationary pressures will subside during 2022 and hence did not adjust their pre-crisis monetary policy, which among other things, allowed government to carry out fiscal transfers to households. Record high inflation figures in several countries which are caused by multiple factors have forced several central banks to re-evaluate their stances. The American FED too tightened its monetary policy, which led to fears of a potential hard landing.

Longer-lasting inflation may increase demand-side pressures.

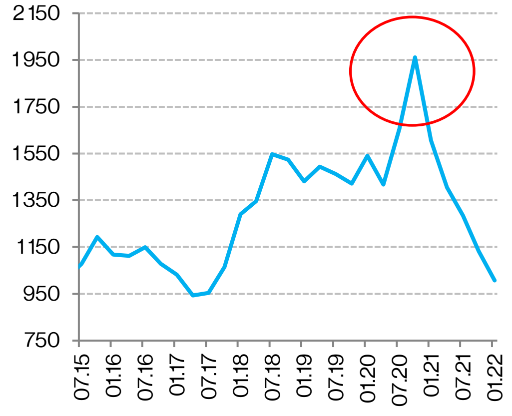
**Demand-side pressures may increase in the future if high inflation persists.** Wage negotioations do not reflect the current levels of inflation yet, but longer-lasting periods of rapid price growth may motivate people to increase their wage expectations. Prices of goods and services would then reflect these wage increases, as firm would attempt to pass on higher input costs to consumers. The risk of increasing demand-side pressures on inflation may also increase when households use their savings accummulated during the pandemic (Figures 9 and 10).

**Figure 9: The savings rate increased during the pandemic (% of disp income)**




*Sources: Macrobond, IFP*

**Figure 10: Slovak households increased their savings during the pandemic**




*Note: nominal, in mil. EUR, SA. Source: Macrobond, IFP*

## Inflation in Slovakia

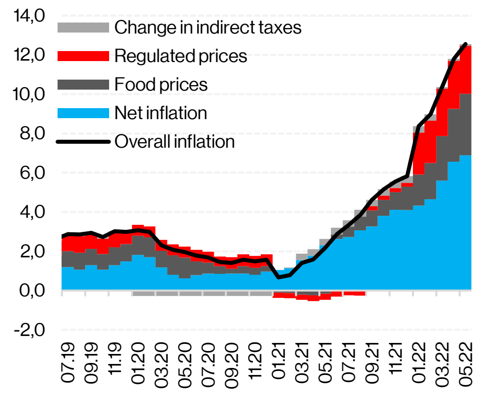
Prices in Slovakia follow a global trend.

**Inflationary developments in Slovakia to a great extent corresponded with global developments during the pandemic, as well as the early stages of the invasion.** Similary to prices in other countries, inflation in Slovakia reacted to shortages of components related to supply bottlenecks in manufacturing, increased costs of building materials, transportation and energy commodities, which were further fueled by the Russian invasion of Ukraine.

Inflation in Slovakia started to accelerate in May 2021.

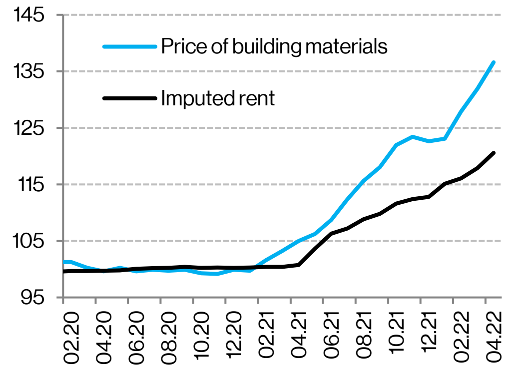
**Inflation in Slovakia started to accelerate in May 2021**, fueled by an increase in the cost of housing (imputed rent), higher fuel prices and towards the end of the year, by a rise in the prices of tradeable goods and food, which increased in response to a rise in input costs, such as fuel and energy (Figure 10). In 2021, consumer prices rose by 3.2 per cent in Slovakia, which then represented the highest rate rate of inflation since 2012.

**Figure 11: Y-o-Y growth of CPI inflation and its components (p. p.)**




*Sources: ŠÚ SR, IFP*

**Figure 12: Building material costs had grown during the pandemic (index, 100 = 2020)**




*Sources: ŠÚ SR, IFP*

Regulated prices increased significantly in January

**At the beginning of 2021, the increase in regulated energy prices contributed further to inflation.** The prices of energy (electricity, gas, and heat) usually change in the first month of the year and reflect the price development of energy commidities in the preceding period. The Slovak regulatory office (ÚRSO) set the maximum prices of electricity and gas for 2022 based on electricity and gas future contract prices from October 2020 to September 2021. In 2021, these had already been affected by the geopolitical situation related to gas supplies from Russia, as well as an increase in the price of emission allowances, and higher demand for gas in Asia. Higher energy prices translated into inflation trough rising food prices, which were also influenced by the global increase in the prices of agricultural commodities. **Inflation thus reached 12.6 per cent by May 2022**, which represents the highest rate of year-on-year growth in the last 22 years.

Most households will be unaffected by the rise in imputed rent.

**Some of the factors that contribtue to rising inflation will not affect the purchasing power of households to a great extent.** Imputed rent, for example, has been one of the major contributors to inflation since May 2021. This item in the consumption basket represents the implicit living costs of households who live in their own property. The increase in imputed rent, however, will not be felt by most households (Box 1). The growth of imputed rent prices has been negatively affected by the increases in building material costs. These make up approximately 75 per cent of imputed rents and have grown during the pandemic mainly due to bottlenecks in global logistics (Figure 11). In April 2022, imputed rent contributed to overall inflation by 2 percentage points.

### BOX 1: Imputed rent

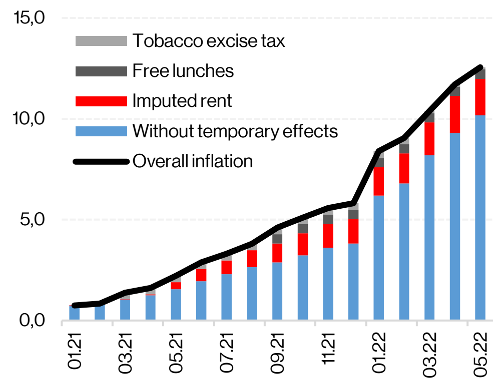
In order to capture price development accurately, inflation indicators should take into account each component of a household's consumption basket, including the costs of living in one's own dwelling. **In economic theory, these costs within the consumption basket are represented by imputed rent.** Statistical offices, however, have not yet found consensus in establishing a single agreed methodolody of estimating these costs. Two main methodologies are accepted in practice: the **net acquisitions approach** (which considers the costs of buying and maintaining a property; Eurostat) and the **rent equivalence approach** (living costs are estimated based on rent prices; USA, Germany).

The inclusion of imputed rent in the consumption basket is one of the main differences between the national index of consumer prices (CPI) and the Harmonised Index of Consumer Prices (HICP), which measures the development of inflation in the EU**. The harmonised index does not include imputed rent**, since consensus is yet to be reached on the approach the common European methodology should adopt when measuring costs of owner-occupied dwelling (Bonatti et al., 2021). Different availability and frequency of data for individual countries, as well as different housing market charactersitics across member states both present a challenge. **Given the steep increase in imputed rent in the recent months, CPI inflation currently significantly exceeds HICP inflation**, which does not include imputed rent.

One-off factors, which will diminish in 2022, have also contributed to the rise in prices.

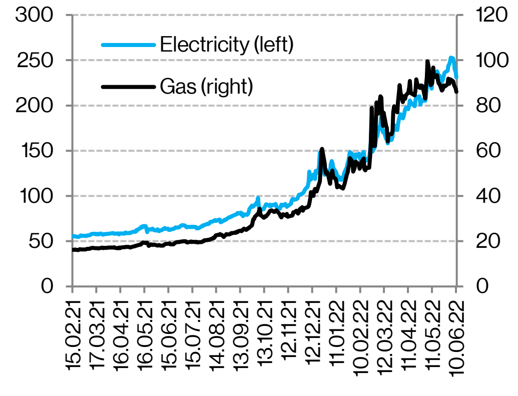
**Apart from global factors, Slovak inflation was influenced by various domestic factors too.** The increase in tobacco excise taxes from 1 February 2021, has translated into inflation since March 2021 and continued to affect year-on-year growth rates of inflation by 0.3 percentage points until February 2022 (Figure 12). Another round of tax increases will contribute to inflation by 0.1 pp from March 2022 onwards. The yearly rate of inflation has been also influenced by the cancellation of free school meals in primary schools since last September. In the first month without free lunches, this component contributed to overall inflation by 0.5 pp. This effect will influence year-on-year rates until August 2022.

**Figure 13: Contributions of various factors to year-on-year inflation rates (%)**




*Source: ŠÚ SR, IFP*

**Figure 14: Energy futures prices with delivery in 2023 have been steadily growing (USD)**




*Source: eex.com, IFP*

Energy prices pose a threat .

**The ongoing war in Ukraine represents a threat for inflation, as it drives up energy prices.** This, in turn, increases costs for firms which may translate higher input costs into their price setting. Households should be protected from further electricity price increases thanks to a memorandum between the government and major Slovak electricity producer Slovenské elektrárne which has agreed not to raise prices for households in 2023 and 2024. Gas prices, however, will continue to be set based on the original ÚRSO formula, taking into account futures prices from October 2021 and September 2022, and will thus be influenced by the currently elevated level of gas prices (Figure 13). The current development of gas prices will therefore continue to affect inflation in 2023.

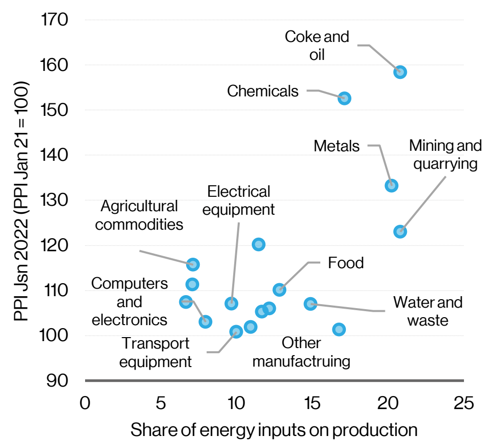
Inflation will mainly affect low-income households...

**The steep rise in inflation mainly threatens low-income households.** The fastest growing components of inflation – energy and food – represent a slightly higher share of the consumer basket for low-income households and pensioners. Food made up 18.7 per cent of the consumer basket for the average household, while it represented 21.5 per cent, and 21.9 per cent of the basket for pensioners and low-income households, respectively. Energy (electricity, gas, and heat) represent 9.2 per cent of spending for the average household, while they make up 11.8 per cent and 10 per cent of spending for pensioners and low-income households, respectively. We estimate that for these groups, the overall price increase will therefore be higher by 0.1 to 0.3 percentage points in 2022.

...and households which rely on social benefits.

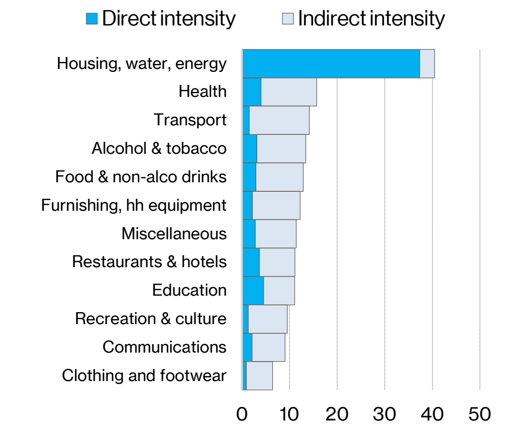
**Inflation also threatens those parts of the population which rely on income from social benefits.** The nominal amount of multiple benefits and transfers is indexed based on inflation. This should automatically cover rising prices of essential items, such as food, housing, and clothes. However, the indexation mechanism takes into account the inflation rate of the previous year, or in some cases, the inflation rate of the first half of the preceding year. This could temporarily result in a decrease in the value of these transfers, as the current levels of inflation will only be reflected in the value of these transfers in 2023. This methodology concerns the valorisation of pensions, benefits for people in material need, parental allowance, and child allowance. The delay in indexation poses a risk of falling into poverty for those groups of people that depend on social benefits, such as marginalised Roma communities, single parents and families with many children.

Figure 15: High energy-intensity translates into prices




*Sources: ŠÚ SR, IFP*

Graf 16: The energy intensity of the components of the consumption basket (share of energy inputs on production %)

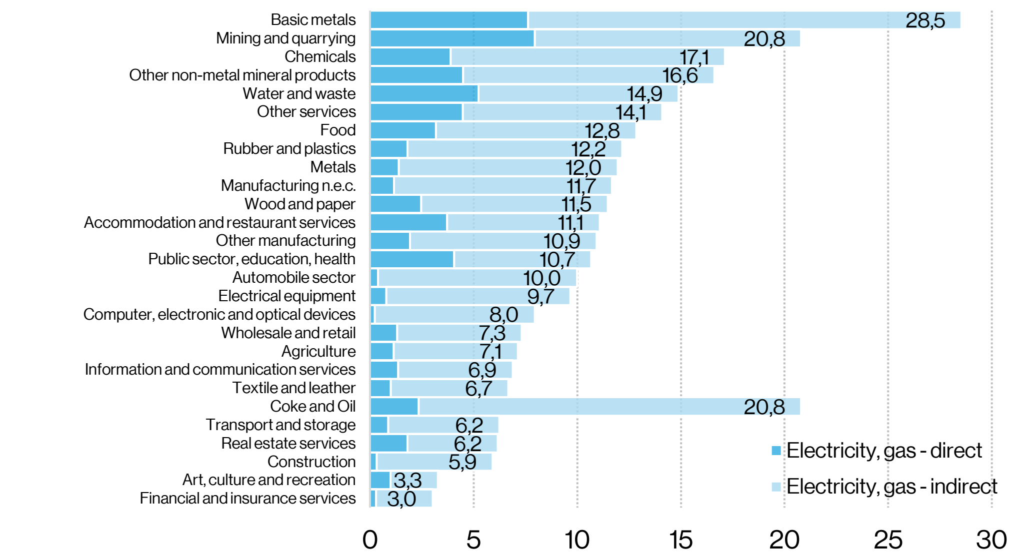



*Sources: ŠÚ SR, IFP*

The rise in energy prices also threatens energy-intensive sectors of the economy.

**The rise in energy prices does not only threaten households through higher costs of living, but also energy-intenstive sectors of the economy** (Figures 14 and 15). From the perspective or energy-intensity, firms in metal processing and mining and quarrying are the most vulnerable (Figure 15) though their share on overall industrial activity and employment is small. High energy prices can, however, gradually lead to increases in the final prices of other goods and services. How fast and whether at all this happens, will depend on various factors, such as the persistence of higher inflation, the size of inventories, the level of competitiveness in the economy, as well as the ability and willingness of firms to temporarily endure lower profit margins. As the production process requires time and often consists of several phases, firms usually react to rising inpt costs with a one-year delay or longer (Koestler et al., 2021). In times of high inflation, however, firms are motivated to re-evaluate their pricing strategies more often (Altissimo et al., 2006), which may cause final prices of goods and services to adjust to rising energy prices more rapidly than in the past.

Figure 17: Metal processing and mining and quarrying are among the most energy-intensive sectors of the economy (share of energy inputs on production %)




*Sources: ŠÚ SR, IFP*

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**Bibliography:**

Altissimo, F., Ehrmann, M. a Smets, F. (2006) „Inflation persistence and price-setting behaviour in the Euro area, A summary of the IPN evidence“, Occasional Paper Series, No. 46, June 2006, European Central Bank.

Bonatti, L. a Fracasso, A. (2021) „Including Owner-Occupied Housing Costs in the HICP: Some Technical and Policy Remarks“; Monetary Dialogue Papers, November 2021; Policy Department for Economic, Scientific and Quality of Life Policies, Directorat-General for Internal Polcies.

Koester, G., Rubene, I., Gonçalves, E. a Nordeman, J. (2021) „Recent developments in pipeline pressures for non-energy industrial goods inflation in the euro area“, ECB Economic Bulletin, Issue 5/2021.