

**LAPSE OF  
TIME**

SM/22/146  
Correction 1

June 30, 2022

To: Members of the Executive Board  
From: The Secretary  
Subject: **Slovak Republic—Selected Issues**

Board Action: The attached corrections to SM/22/146 (6/14/22) have been provided by the staff:

**Factual Errors Not Affecting the Presentation of Staff's Analysis or Views:**

**Pages 8 (paras. 8 and 9), 17, 21**

**Typographical Errors:**

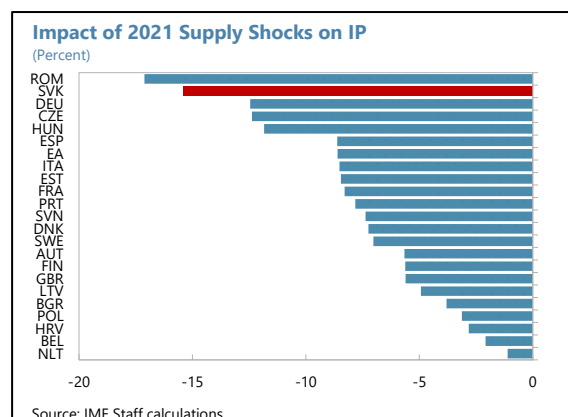
**Page 8 (para. 10)**

Questions:

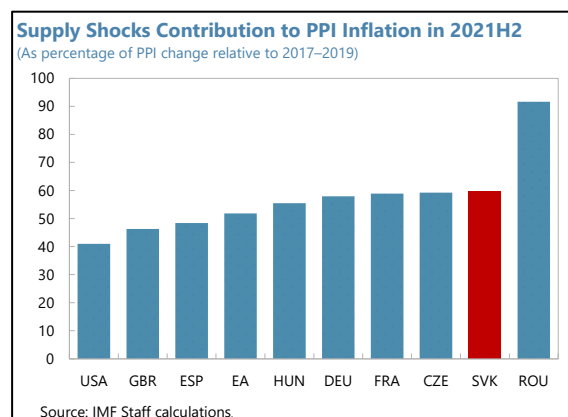
Ms. Topalova, EUR (ext. 39557)



**8. The drag of the 2021 supply shocks on manufacturing output has been large in Slovakia relative to other countries.** Manufacturing IP in Slovakia during 2021H2 would have been 15 percent higher in the absence of supply shocks, while in the Euro Area it would have been 9 points higher. (Figure 7). According to these estimates, Romania, Slovakia, Czechia, Germany, and Hungary were amongst the most severely affected countries, consistent with the deepening of supply disruptions in the automotive sector due to semiconductor shortages.



**9. The contribution of supply shocks to PPI inflation has been sizeable, but there is still a large fraction explained by demand.** Figure 7 displays the supply shocks' contribution to PPI inflation during 2021H2, expressed as a percentage of the increase in inflation relative to the 2017–2019 average. While this estimated contribution is sizeable (about 60 percent in the case of Slovakia), there is also a significant role left for demand shocks.



**10. The supply and demand shocks driving manufacturing PPI inflation have a measurable but relatively small pass-pass-through to core CPI inflation.** To examine whether these supply shocks have led to an increase in core CPI inflation, we estimate a local projection model, using the following specification:

$$\pi_{t+h}^{CPI} = \beta_h^d * demand_t + \beta_h^s * supply_t + \delta^h X_t + \varepsilon_t^h$$

where  $\pi_{t+h}^{CPI}$  is core CPI inflation (calculated in an analogous way to PPI inflation) and  $demand_t$  and  $supply_t$  are the demand and supply shocks derived from the SVAR. The estimated values of  $\{\beta_h^d\}_h$  and  $\{\beta_h^s\}_h$  underpin the impulse-response functions (IRFs) of interest, which are displayed in Figure 7. The peak impact of a “one-standard deviation” demand shock on PPI inflation is approximately 1.5 percentage points.<sup>5</sup> Meanwhile, the impact of the same shock on core CPI is smaller, peaking at about 0.4 percentage points. Turning to supply shocks, the impacts on inflation peak at similar values as with demand shocks, and the pass through to core CPI is again partial. As goods make up only a subset of the CPI basket, it is not surprising that the shocks driving manufacturing PPI have relatively muted effects on the overall core CPI index.

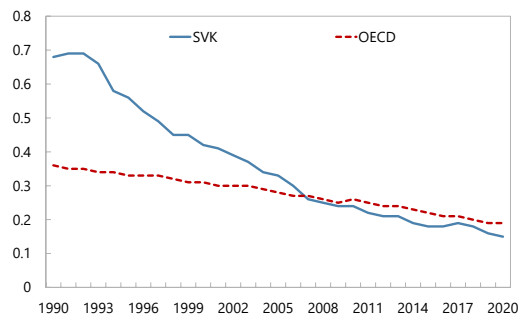
<sup>5</sup> Given that we calculate inflation over a three-month rolling window, the fact that the IRFs peak about 3 months after the shock indicates that monthly inflation is highest on impact and then declines.

production, emissions from energy production have declined by over 62 percent since 1990 (Figure 1, Panel 3 and 4). By 2019, emissions from industrial processes had taken over as the largest contributor, accounting for 22 percent of total emissions. Besides these two sectors, the transport sector contributes significantly to GHG emissions (20 percent), with emission growing steadily over time. Waste and waste management is another sector which has seen a significant increase in emissions over time.

**Figure 1. Slovak Republic: Emissions Intensity and GHG Emissions**

**CO2 intensity**

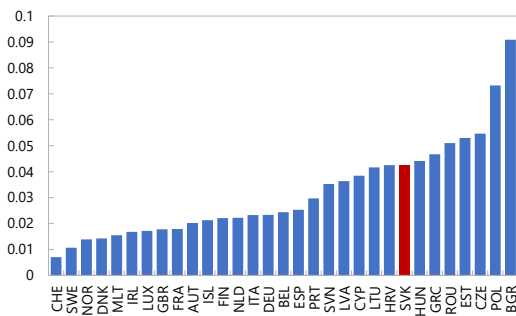
(CO2 per GDP - production based (kg/USD, 2015 PPP prices))



Sources: OECD Environment database; and OECD Green Growth database.

**Greenhouse Gas Emissions**

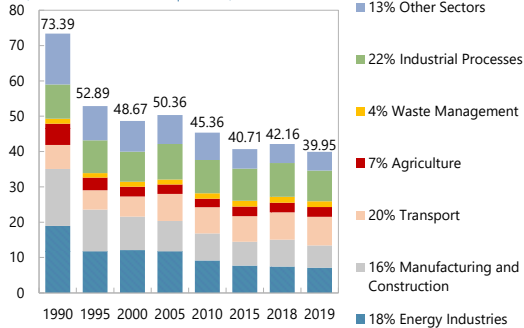
(CO2 equivalent tonnes per euro of GDP, 2019)



Sources: Eurostat; and IMF staff calculations.

**Greenhouse Gas Emissions by Sector**

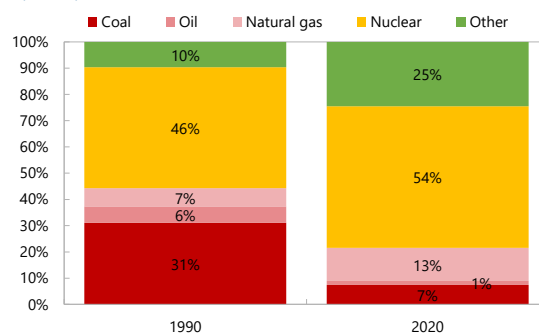
(In Million Tonne CO2 equivalent)



Source: United Nations Climate Change

**Slovakia: Electricity Generation by Source**

(Percent)



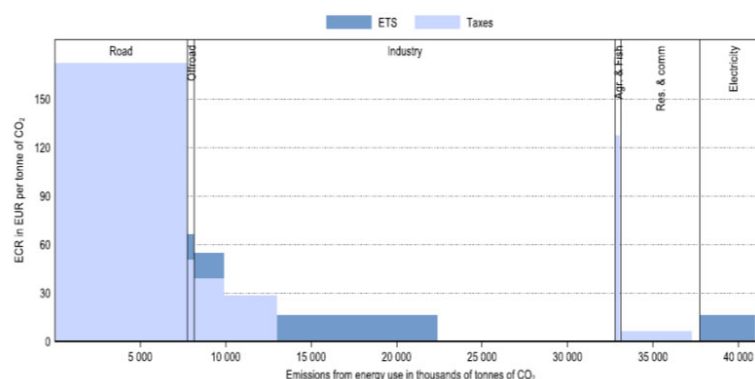
Source: Structure of Energy Supply, IEA, 2019.

Notes: In Panel 3, *Energy Industries* refer to electricity and heating, *Manufacturing and Construction* refers to energy use in manufacturing and construction, while *Industrial processes* refer to emissions from chemical reactions. Other sectors include buildings and services.

**8. Slovakia has an extensive set of policies to achieve its climate mitigation goals.** They include participation in the ETS covering large emitting sectors, energy taxes, transformation / decommissioning of solid fossil fuel power and heating plants, decarbonization of electricity generation through rising shares of nuclear and RES energy, promotion of biofuels and electrification of transport, various measures in agriculture and waste management, and so on. Annex [Table 1](#) provides a comprehensive list of these measures, while the most important ones are discussed below.

distributional impacts on different households and firms can be challenging politically, the revenues from such taxes can be used to compensate those who lose the most from the change in relative prices. Clear communication could help ensure price predictability and alleviate the negative impacts through the adjustment of behaviors.

**Figure 3. Slovak Republic: Average Effective Carbon Rates in Slovakia by Sector and Component in 2018**



Source: OECD Effective Carbon Rates 2021: Pricing Carbon Emissions through Taxes and Emissions Trading, OECD Publishing, Paris.

**12. Slovakia does not have an explicit carbon tax in effect, even though these are already adopted in many European countries.** For example, Finland, the first European country that introduced a carbon tax in 1990, had a carbon tax rate of 62 euro per ton of CO<sub>2</sub>e in 2021, covering more than a 1/3 of its GHG emissions. Sweden imposes an even higher carbon tax rate at 116 euro per ton of CO<sub>2</sub>e in 2021, with a 40 percent coverage for GHG emissions. Up until April 2021, 19 countries in Europe had introduced a carbon tax, with an average carbon tax rate of 36 euro per ton of CO<sub>2</sub>e and a coverage of 34 percent of GHG emissions (Annex-Table 2*II*). As argued by the OECD (2022), a carbon tax in Slovakia would introduce more uniformity in pricing of CO<sub>2</sub> across sectors and industries, which would provide more consistent price signals and contribute to more cost-effective abatement.

**13. Using the Climate Policy Assessment Tool (CPAT) developed by the IMF and the World Bank, we examine the potential effects of introducing a carbon tax in Slovakia in 2025.** The tool provides standardized analyses of carbon pricing and other mitigation instruments. The model starts with fossil and other fuels use in various sectors (e.g. power generation, transport, industrial, and household sector) and projects this forward in a business-as-usual (BAU) scenario based on assumptions about: (i) future GDP growth; (ii) income elasticities for energy products; (iii) rates of technological change (e.g., that improve energy efficiency); and (iv) future international energy prices.<sup>8</sup> The impact of mitigation on fossil fuel use and CO<sub>2</sub> emissions depends on (i) the policies' effect on fuel prices; and (ii) fuel price responsiveness.<sup>9</sup> We use the CPAT to construct a purely illustrative scenario in which a carbon tax is implemented in 2025 on the assumption that the current

<sup>8</sup> The general methodology is described in IMF (2019a), IMF (2019b) and Black et al. (2021).

<sup>9</sup> Price elasticities for electricity and fuels are generally taken to be around -0.5 to -0.8, based on extensive cross-country evidence and results from much more detailed energy models.