

## THE IMPACT OF POLICY RESPONSE TO COVID-19 ON THE TRANSPORTATION AND STORAGE SECTOR IN VISEGRAD COUNTRIES (V4)

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**Abstract** – The paper is devoted to analysing national policy responses to the economic consequences of the COVID-19 pandemic in the Visegrad countries (Czechia, Hungary, Poland, and Slovakia) – on both the macroeconomic and microeconomic level. Focus is given to the transportation and storage sector (NACE Rev. 2 code H). The pandemic unevenly impacted this sector: while specific subsectors were thriving during this period (e.g. parcel delivery services), others were suffering due to abrupt mobility changes (e.g. public & individual mobility services). Public policies were presented not only as a tool to reduce the negative impact of the pandemic but also to provide a platform to build new competitive advantages for national business entities, thus providing the rationale for an analysis of the actual impact of programs aimed at the transportation and storage sector. The impact of the state-aid focusing on the analysed was uneven between the analysed countries. Even though, the deployed programs have helped the industry to return to pre-pandemic levels within 4 quarters. This proves that apart from the structure of state-aid programs and schemes, an important factor was the pre-pandemic value chains. This could serve as a starting point for further research as more data become available.

**Key words** – Visegrad countries, state-aid, transportation and storage, Covid-19

**JEL Classification** – R40, R48, E61, H54

### INTRODUCTION

Analysing the pandemics' impact on the socioeconomic system has become a common theme among academics. The transportation and storage sector is scrutinised among the industries, which provides an essential linkage between all other economic activities. Thus, any restrictions will have several ramifications on the general economy.

The article aims to assess the impact of the state-aid on the transportation and storage sector (NACE code H) in Visegrad countries (Czechia, Hungary, Poland, and Slovakia). The economies of those countries are heavily dependent on value chains managed to a large extent by nosiness entities registered in EU15 countries. Thus making them an ideal example of how public policies can diminish the negative impact of an external shock on a highly open and competitive sector.

This area of study has been, to a large extent evading more in-depth scrutiny due to a lack of adequate data on the economic performance of companies in the Visegrad countries and issues with a comparability of resources used to counteract the negative impact of the pandemic. As more data become available, we can provide a rudimentary analysis of the effects of public policies in those countries on a sector that was only partially negatively affected by the adverse situation. A counterfactual scenario for the research was provided through an exponential triple smoothing forecasting algorithm, tweaked using macroeconomic assumptions from the IMF. Even though the available data quality limits this approach, it delivers specific insights into the efficiency of used public policies and their impact on the transportation and storage sector.

1. LITERATURE REVIEW

The impact of the SARS-Cov-2 pandemic on different socio-economic aspects has become widely analysed in the last months. At the very beginning, the attention of researchers was focused on the link between mobility and the spread of the virus – e.g. Chinazzi et al. [2] or Zhanga [25]. Further works expanded into the restrictions imposed to curb mobility, thus decreasing the negative impact on the healthcare systems [Huang et al., 2020].

As the pandemic began to spread worldwide and become a threat to global supply chains, several authors seized the opportunity to look into the challenges arising before the maritime sector and its subsequent links toward road freight transport. Among the authors we should highlight are e.g.: Millefiori et al. [19], Gray [10], Botha & Dednam [2], Loske [2020], Łącka & Suproń [17] and Zhanga, Hayashi & Frank [26].

The air transport sector became a particular area of interest, as it operated under the strictest rules, and on some occasions – it was forbidden to operate at all. Among the authors that analysed the impact of COVID on the business models of air carriers and the future of the industry, we should highlight e.g.: Dube

[5], Myeonghyeon & Jeongwoong [20], Truxal [22].

Growing areas of studies linked to SARS-Cov-2 were public policies and state-aid-related instruments implemented in various countries to counteract the adverse effects of the pandemic. After a wave of more general works and texts – e.g.: Desvars-Larrive, Dervic, et al. [3]; Haug, Geyrhofer, Londei, et al. [12], more sector-related became to surface – e.g. Stanczyk [21]; Norde, Mesquita & Wang [21]. However, there are still shortcomings and a general lack of data concerning the impact of the state aid employed on the transportation & storage sector, especially in Visegrad countries.

2. THE IMPACT OF COVID ON THE ECONOMY AND THE TRANSPORTATION & STORAGE SECTOR OF THE VISEGRAD COUNTRIES

SARS-Cov-2 became a black swan for the global economy when the World Health Organization (WHO) declared it a “Public Health Emergency of International Concern” on 30 January 2020. Then in March 2020, the WHO upgraded the disease to pandemic status. Even though the effects of the pandemic on the real sector materialised to their fullest in 2q20, one cannot ignore its impact on 1q20 as well.

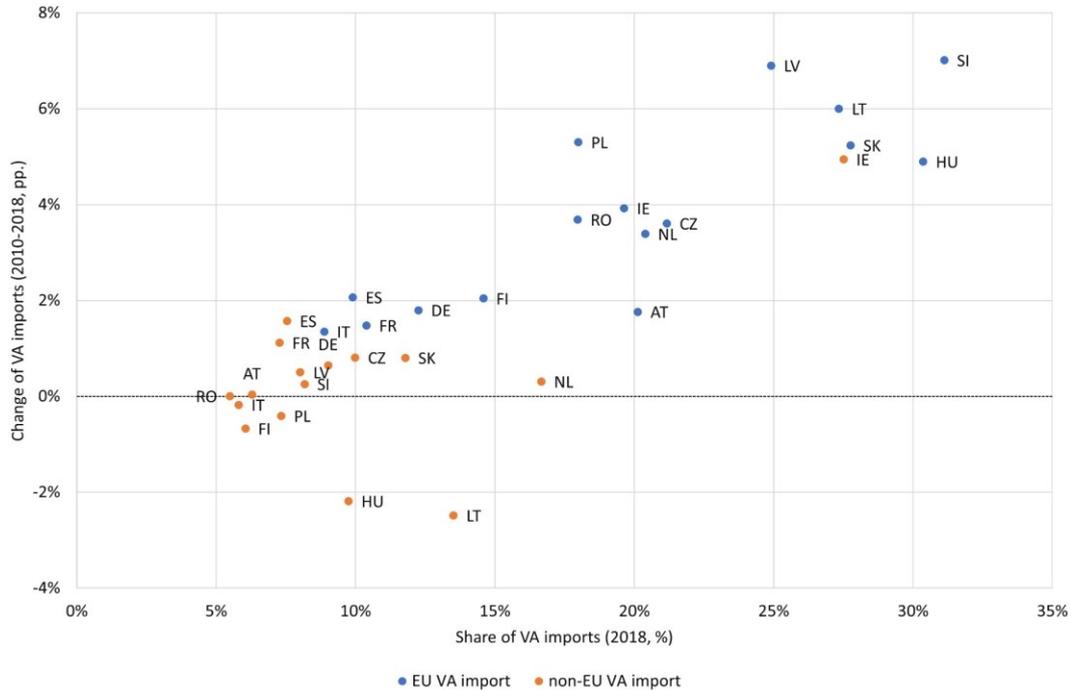
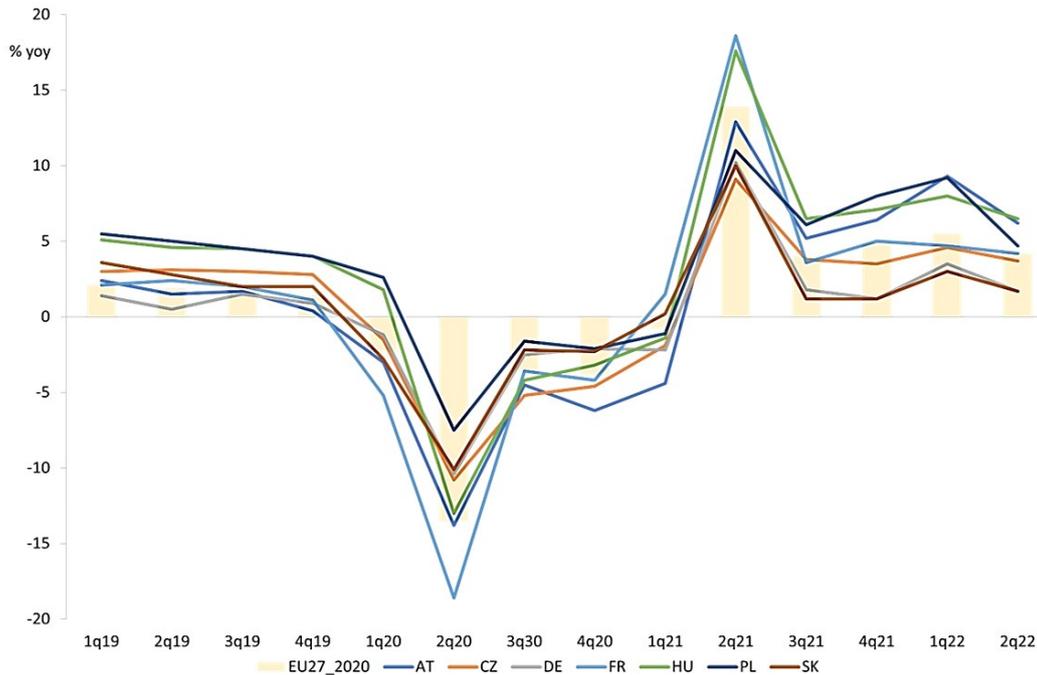


Fig. 1. Share of Value Added imported from EU and non-EU countries



**Fig. 2. Quarterly GDP growth (YoY, SCA)**

Analysing the influence of the disease on the chosen economies cannot be effected without taking into account the structure of Value Added (VA) generated within each of the countries. The Visegrad can be characterised by a higher share of VA formed by the industrial sector (NACE codes: B-C-D-E) – usually scoring more than 4 to 5 pp. Usually, the percentage generated by the manufacturing industry in the analysed countries is close to 20 per cent (slightly above the EU average). Another feature of the economic model of the Visegrad countries is a more minor role than in the EU27 of the financial and real estate sectors. However, the variation between the EU27 scores and the individual Visegrad countries is not very high (Figure 1 below).

One should also emphasise the difference in the value-added sources (in terms of imported vs domestic value). Eurostat data [8] for 2017 shows that the Visegrad countries generate domestically between 61% (Slovakia) and 75% (Poland) of their VA. This score is significantly lower than that of Austria (73%), Germany (79%), or France (82%). This element should be considered when analysing the impact of the pandemic on the respected economies, as it illustrates the susceptibility for value and logistic chains rupture.

The impact of the pandemic began to materialise during 1q20, as Eurostat data [9, SCA] demonstrate that the GDP growth rate decreased between 4q19

and 1q20 by an average of 3 percentage points. Poland and Hungary were among the least affected, sustaining a decrease slightly lower than e.g., Germany (2 percentage points vs 2.8). In contrast, Czechia and Slovakia were much more susceptible to the pandemic (with a decrease of respectively 4.4 and 5.2 percentage points, well above the EU score of only 3.9).

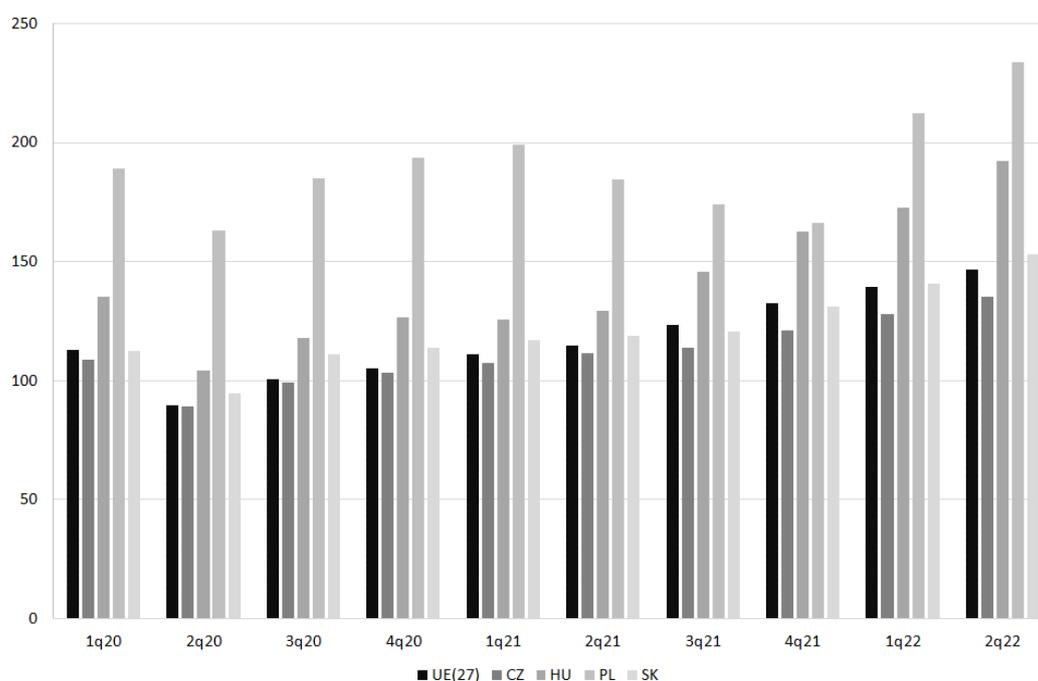
GDP should be used jointly with measures describing imports and exports. This is especially true during downturn periods, especially one such as powerful as the crisis generated by the pandemic. Available data (Table 1) demonstrates to a certain extent that the direct impact of the pandemic was not as harsh on the Visegrad countries as on other EU countries.

The direct impact of the pandemic was uneven among the different subsectors of the transport and storage sector. Using an index (2015=100), we represent the quarterly turnover level of the section and its significant sectors (H49, H50, H51, H52, H53). This measure is not ideal (as a production index could provide additional information concerning the utilisation level of the tools of the trade of the analysed sector). However, due to data constraints, we must rely on it (lack of data for Poland and Czechia in some industries). Still, additional computational adjustments are needed to fill data gaps (depending on VA values and price indices).

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**Table 1. Quarterly export and import of goods and services (YoY change, pp., SCA)**

	Export of goods and services					Import of goods and services				
	EU27	CZ	HU	PL	SK	EU27	CZ	HU	PL	SK
1q20	-2.3	-4.2	-0.2	+3.2	-4.9	+2.2	-3.9	+2.8	+1.4	-1.7
2q20	-21.0	-25.6	-23.9	-13.4	-26.1	-20.3	-20.5	-16.3	-15.7	-26.1
3q20	-8.1	-5.0	-3.5	+2.3	+1.2	-8.0	-6.7	-4.7	+1.3	-5.2
4q20	-3.3	+2.6	+3.2	+7.7	+0.2	-6.2	-2.1	+2.3	+8.1	-0.6
1q21	+0.3	+4.5	+5.1	+6.9	+10.7	-4.1	+6.1	+2.4	+9.2	+5.8
2q21	+26.2	+33.1	+36.2	+29.4	+37.7	+22.8	+34.5	+26.6	+33.9	+36.6
3q21	+9.7	-0.2	+3.4	+7.5	-2.1	+10.1	+10.63	+7.0	+12.1	+4.9
4q21	+7.7	-3.9	+2.8	+6.7	+1.7	+8.8	+6.0	+2.1	+11.7	+3.5
1q22	+7.9	+0.4	+5.0	+2.6	-5.2	+9.6	+5.1	+8.2	+8.4	-2.6
2q22	+7.2	+1.8	+7.5	+4.9	-0.3	+8.6	+2.7	+7.3	+8.3	+0.0



**Fig. 3. Turnover in the transport and storage section (NACE H) (2015=100)**

That exercise shows that the business entities did not fully return to their pre-covid strength in most cases. The sectors that currently list results far better than those in 2019 are H53 (including postal and courier activities) and H52 (including support activities for transportation). The most affected sector is H51 (air transport) and, to some extent, H49 (including e.g., land transport).

### 3. COUNTERFACTUAL SCENARIO AND COMPUTATIONAL MODEL

To provide a counterfactual scenario, we rely on the IMF's macroeconomic assumptions in its January 2020 World Economic Outlook [2020]. The forecast assessed a global GDP growth of 3.3% YoY for 2020 and 3.4% YoY for 2021, with sluggish development prospects for the developed economies (including

Japan, the USA, and the Eurozone). Concerning international trade (which directly influences the transportation and storage section), the document stipulated that the volume of world trade would grow in 2020 by 2.9% YoY and in 2021 by 3.7% YoY.

Those factors will be used as the background over which we will be forecasting the turnover of the business entities (additional details below). We have assessed that the systems of state aid provided by the Visegrad countries did have a strong positive impact on the revenue side of the analysed sectors. Thus, considering other types of indicators, for example, the production index that would very precisely show the level of limitation imposed on the work performance, would not be adequate, especially since the demand for transportation and storage services should be seen as a function of overall economic development (primary vs secondary).

The following assumption led to the choice of the forecasting method:

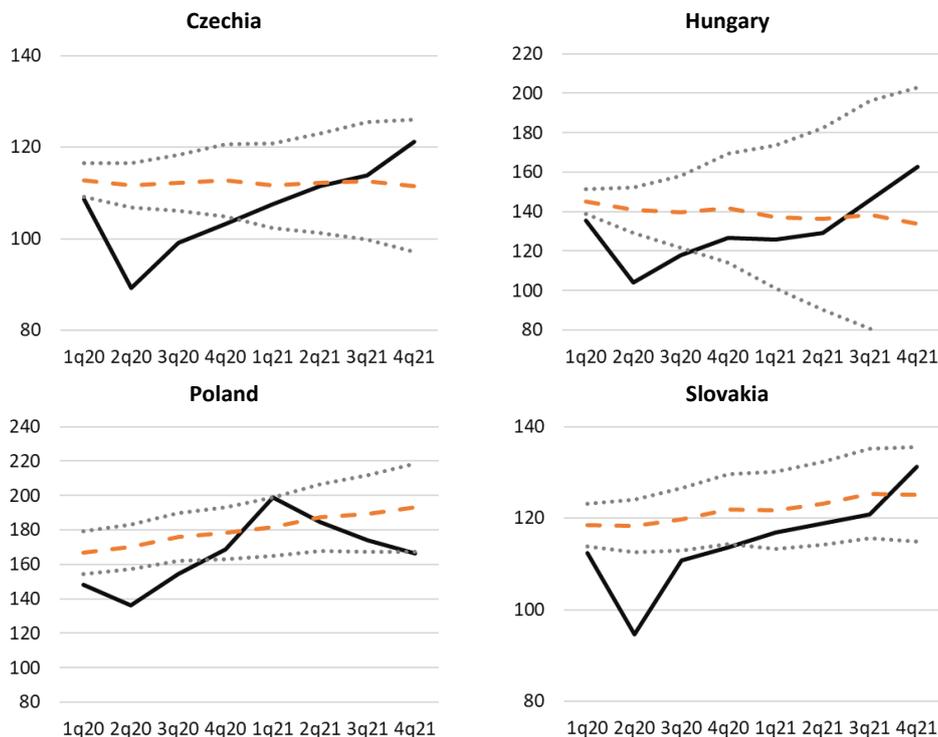
1. Turnover data offers a relatively long time series (we omitted data from before 2010 to diminish the impact of the previous crisis);
2. Data show a relative seasonality.

Thus, the exponential triple smoothing forecasting approach (algorithm) was chosen [Holt, 1957; Winters, 1960]. Please note that the model used is based on the seasonal algorithm, accounting for (1) additive error, (2) additive trend, and (3) additive seasonality. Table 2 shows the results of the calculation for the smoothing constants, as well as error metrics.

**Table 2. Computation results of smoothing constants and error metrics**

	Czechia	Hungary	Poland	Slovakia
Alpha	0.67	0.90	0.67	0.90
Beta	0.17	0.90	0.17	0.00
Gamma	0.17	0.10	0.17	0.10
MASE	1.40	1.46	0.55	0.62
SMAPE	0.02	0.02	0.02	0.01
MAE	2.12	2.62	3.30	1.38
RMSE	2.48	3.22	4.14	1.66

Using the above-mentioned predicting algorithm, we forecasted the turnover index (2015=100) for the period starting from 1q20 (to accommodate the above-mentioned first wave of the pandemic manifestation in the real sector) till 4q21 (Fig. 4).



**Fig. 4. Turnover index forecast and actual realisation in the Visegrad countries for 1q20-2q21 (2015=100)**

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The results obtained from the forecasting exercise did not fully match the actual realisation of the index. The difference within the analysed quarters exceeds 20 pp. For 2q20 but decreases below 10 pp. for 3q20-4q20 and then moves within an acceptable difference of less than 5 pp. for 1q21 and 2q21. The only country which does not follow this pattern is Hungary, for which the computational exercise has demonstrated the highest forecasting errors of all the Visegrad member states. Even though this outlying result, all of the analysed cases showed that the actual realisation was within the confidence limit starting from 3q20 or 4q20.

#### 4. PUBLIC SUPPORT POLICIES FOR THE ECONOMY AND THE TRANSPORTATION & STORAGE SECTOR IN VISEGRAD COUNTRIES

The Visegrad Countries have enacted fiscal and monetary measures supporting the general economy and a chosen economic sector. According to the methodology prepared by Diamond & Potter [1999], for the International Monetary Fund (IMF), the analysed countries employed the following categories of instruments:

1. Additional spending or foregone revenues that consisted of wage subsidies for employees, benefits for self-employed, preferential liquidity loans;
2. Accelerated spending and deferred revenue, which was made of deferral of taxes in the form of partial or complete cancellations, providing instalments for certain types of taxes;
3. Equity injections, asset purchases, loans, debt assumptions, including through extra-budgetary funds;
4. Guarantees (on loans, deposits, etc.).

Some measures differentiated between the Visegrad countries (Table 3) – for example, lump-sum payment varied greatly for self-employed and the level of public wage subsidies for employees. The IMF

[2021] stated that the fiscal measures equalled between 9.2% and 23% of the analysed countries' GDP. With Czechia achieving the highest level of aid provided as a share of the nation's gross domestic product.

The relief mentioned above programs and schemes were not evenly distributed over time. That could have caused several distortions between the Visegrad countries' economic policies and their impact on the real sector (e.g., GDP, conjuncture indexes, unemployment, etc.). Please refer to Figure 5 for a graphical representation of the quarters in which state-aid materialised in the analysed countries. Data within that Figure was calculated and further estimated using the different iterations of the IMF database to reflect quarterly information. A more thorough analysis was conducted for Poland which has shown slight discrepancies (up to 10% between quarters). However, this was deemed satisfactory as GDP data is still provisional, and the European Commission is still scrutinising several state-aid measures.

Data analysis clearly shows that most state aid was concentrated in the 2nd and 3rd quarters (between 50% and 60%), especially programs based on additional or accelerated spending. Differences can be seen in the case of equity injections and liabilities-based supports, where most financings were provided in the 4th quarter of 2020 and at the beginning of the year 2021.

Considering previously presented data, one must state that the Transportation and Storage sector was unevenly affected by the pandemic and public policies enacted to stop the spread of the virus. The most striking were general passenger services (especially air and road provided, with railway and water being mildly affected).

This, in turn, means that the number of measures aiming specifically at the transportation and storage section was somewhat limited in the Visegrad countries.

**Table 3. IMF assumptions on the socio-economic costs of COVID-related measures in the Visegrad Countries**

	Poland		Hungary		Czechia		Slovakia	
	USD, bln	GDP, %						
Additional spending or foregone revenues (non-health sectors)	34.7	5.8	9.3	6.0	10.2	6.9	4.3	4.2
Accelerated spending	0.0	0.0	0.0	0.0	1.6	0.6	0.6	0.6
Equity injections, loans, asset purchase	9.7	1.6	0.0	0.0	0.0	0.0	0.0	0.0
Liabilities	19.0	3.2	6.5	4.3	37.2	15.5	4.6	4.4
TOTAL	63.4	10.6	15.8	10.3	49.0	23.0	9.5	9.2

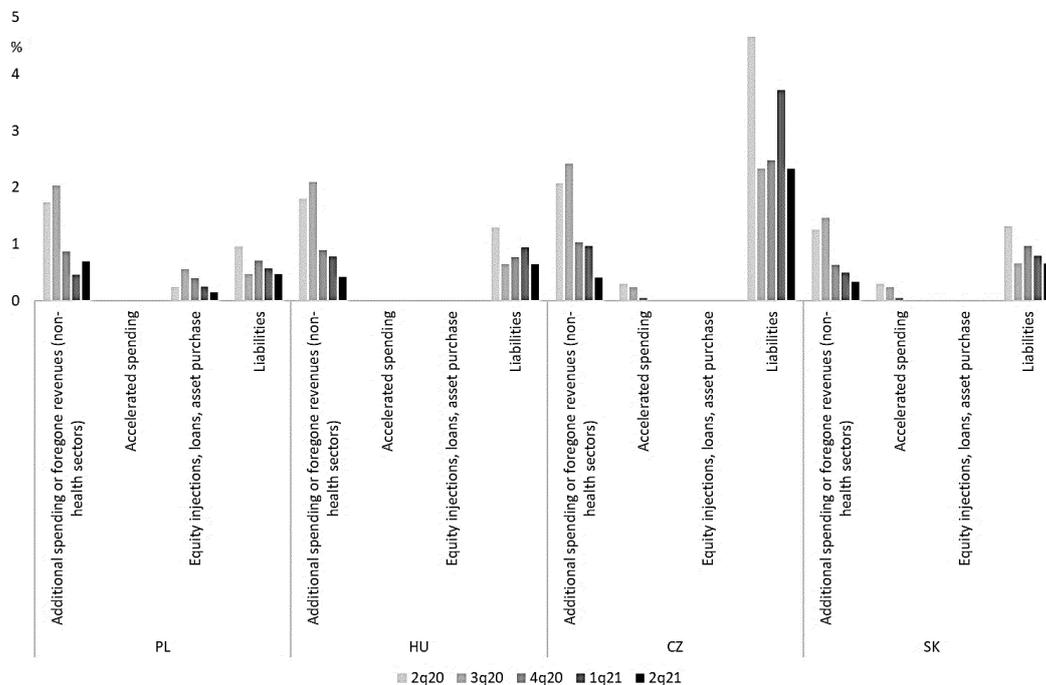


Fig. 5. A quarterly distribution of state aid in the Visegrad Countries (% of GDP, 2020)

Table 4. Covid-19 state-aid in the Visegrad countries targeting exclusively beneficiaries belonging to NACE 2 section H

Mode of transport	Poland		Hungary		Czechia		Slovakia	
	eur, mln	GDP, %						
Rail	0.0	0.0000	0.0	0.0000	31.4	0.0146	0.0	0.0000
Road	199.7	0.0382	59.0	0.0436	303.9	0.1412	15.6	0.0170
Air	682.0	0.1304	25.2	0.0186	0.0	0.0000	0.0	0.0000
Waters	0.0	0.0000	0.0	0.0000	1.0	0.0005	1.0	0.0011
TOTAL	881.7	0.1686	84.2	0.0622	336.3	0.1562	16.6	0.0181

From April 1st, 2020, the four countries notified only 14 schemes or programs helping the scrutinised sector in general. Seven programs turned towards national postal operators (3) or long-term support toward rail infrastructure (4); out of the seven schemes left – 5 aimed at the aviation industry or the air transportation sector. The same can be stated about other EU member states. An analysis of the DG Competition database [European Commission 2021a]

shows that out of almost 150 measures that were notified to the Commission (excluding de minimis support schemes), nearly 70 targeted the air transportation sector (aids for carriers and infrastructure operators). With 52 strategies targeting passenger services (road, rail, water). The remaining 40 notified programs were helping either national postal operators or freight transport.

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Looking into more details about those seven programs, we should start with the air transport sector. Dedicated programs were set up in Poland (SA.59017 (2020/N); SA.59158 (2020/N)) – the first supporting airport operators, the latter – the national carrier (PLL Lot), Hungary (SA.57109 (2020/N); SA.57767 (2020/N)), the first supporting airport operators, the latter – the aviation industry. Their scope is very similar – they provide liquidity for airport operators through direct grants (as less distortive public policy measures are deemed unavailable alternatives in the current economic situation). Two specific programs were set up by Czechia (SA.61808 (2021/N)) and Slovakia (SA.62256 (2021/N)) to support the tourism sector (with a focus on ski-related tourism). These programs provide substantial aid targeted at transportation companies operating in the affected regions.

Further support was provided for passenger road carriers in Poland, Czechia, Hungary, and Slovakia. Those three programs provided subsidy payments based on the number of seats within the transport vehicle and its EURO emission class. Only the Polish program was subjected to the approval of the European Commission, as the two others were constructed based on the de minimis scheme. Support was also provided for rail passenger carriers in Czechia (SA.62375 (2021/N)). However, its scope should be somewhat limited in terms of budget allocation.

Only two programs were exceptionally prepared for freight carriers – one in Poland (using below-the-market leasing and loan facilities) and the other in Czechia (offering a reduced road tax rate for vehicles above 3.5 t and a decrease in excise tax on diesel oil).

However, entities belonging to the transportation and storage section could also profit from more

“general” policies introduced by the governments. A complete list of beneficiaries of the COVID-19-related program is currently unavailable for Czechia and Hungary. However, we assessed the public support share in all Visegrad countries using data from Poland and Slovakia. This exercise should be repeated in the future when more data will be made available to the general public. Please refer to Figure 6 for the data results, which clearly show that the support towards the entire transportation and storage section was 4 to 5 times higher than that provided through schemes and programs targeting it exclusively.

However, those “general” policies were not always the best suited for entities of the analysed sector, as the Polish example shows it clearly. The aid scheme offered by the state-owned Agencja Restrukturyzacji Przemysłu [1], with a budget of almost 369 mln euro, is used at only 7% of its available financing. The major challenge of such low usage of the abovementioned scheme seems to be the aid cost and additional requirements. This proves that proper parametrisation of the aid scheme is crucial for its operational success.

To evaluate the efficiency of the employed state aid, we must consider the relative distance between the prepared counterfactual scenario and the factual realisation. The computation can be assessed in Table 5, which clearly shows that the highest difference can be identified in 3q20. This difference is limited in most Visegrad countries (the only outlier being Hungary). However, one must take into consideration that certain assumptions are inextricably linked with the dates of state aid disbursement and affect computations.

Considering those results, we should assess the level of provided state aid and the actual reduction of the turnover of the analysed sector. An element of the

**Table 5. State aid in the Visegrad Countries, including direct and potential aid for NACE H (as % of GDP)**

	Czechia	Hungary	Poland	Slovakia
Total Covid-19 aid	23.00	10.30	10.60	9.20
Aid dedicated toward Section NACE H	0.16	0.06	0.17	0.02
Aid not exclusive for Section NACE H	1.61	0.86	0.80	0.82

**Table 6. The difference between the forecast and the factual scenario**

	Czechia	Hungary	Poland	Slovakia
4q20	+9%	+12%	+6%	+7%
1q21	+4%	+9%	-9%	+4%
2q21	+1%	+6%	+2%	+4%
3q21	-1%	-5%	+9%	+4%
4q21	-8%	-18%	+16%	-5%

analysis that cannot be taken out is the quarterly disbursement of the state aids (both the general system and the sectoral one), shown in Figure 5 (above). Thus, both the dedicated sectoral aid and the potential schemes from which the analysed sector could benefit (described in Table 4) are needed to properly assess the actual outcome of the chosen policies in the Visegrad countries.

The analysed countries offered respectively: 0.84% (Slovakia), 0.92% (Hungary), 0.97% (Poland), and 1.77% (Czechia) of their GDP in the form of state-aid that directly and indirectly benefited the transportation and storage sector. The structure of those aids was in large part similar. However, their implementation and further disbursement to potential beneficiaries varied to a certain extent over the analysed period. Thus the obtained results (in terms of the turnover index) were more than differentiated, as the measure in question decreased in the period of 1q20 to 2q20 between 16% (Slovakia) and 23% (Hungary). In the subsequent quarters, those results started to flat out, with two countries (Poland and Slovakia) showing better results starting from 2q21 than in the next year.

This proves clearly that other factors should be taken into consideration. The Visegrad countries present different internal structures of the transportation and storage sectors (with Poland possessing the most diversified, including a well-developed air transport sector lacking in the rest of the Visegrad countries). This element should be further linked with the share of foreign Value Added in the analysed economies. Having the lowest percentage of the four Visegrad countries, Poland suffered slightly more than Czechia and Slovakia (two economies with a higher by more than 5 pp. share of foreign Value Added). However, additional data concerning transportation services (freight and personnel) provided in other EU countries [9] points out a possible correlation of the turnover with cash flows generated outside of the analysed country. And thus hint that the efficiency of state-aid schemes in the transportation and storage sector was trumped by the interdependence of the transportation subsector on services provided in other EU states. The demand for these services was frozen essentially and has negatively impacted the entire sector.

### CONCLUSIONS

The evaluation of the state-aid schemes employed in Visegrad countries shows that their deployment fostered the return of the transportation and storage sector to close to pre-pandemic levels (as characterised by the turnover index) within 3 to 4 quarters. However, the strength of this rebound was highly uneven

between the analysed countries (with Hungary lagging in the results). Emphasis should also be put on the different transport modes (with road transport rebounding the fastest, while train transport takes a more extended period to recoup the losses). Similar results were attained in a recent study prepared for the European Parliament [11] and IRU [16]. Those two reports also show structural preferences for specific modes of transport that provide an additional supply-type of instrument helping specific subsectors recover under an external shock.

Furthermore, our computational model clearly shows that the most decisive impact of state aid schemes could be identified in Czechia and Poland (two countries with the highest available funds for the transportation and storage sector). However, even though those two have shown the most substantial rebound, the tools employed were similar to a certain level. One should also note the results obtained by Slovakia, which offered one of the lowest aid schemes for the analysed sector but among the best rebound dynamics. This example proves that under quite specific circumstances (a heavy dependence on the German-controlled automotive industry), the results obtained provide a strong rationale for the effects of the pre-existing distribution networks.

Available data concerning the structure and timetable of the deployment of support schemes provide a further hypothesis for a possible linkage between the analysed sector pandemic results and its pre-existing insertion into value and distribution chains. Especially the deployment of different schemes should be further explored as Osińska & Zalewski [28] provide similar outcomes, at least in the short run for smaller entities. This should be studied more deeply as the national statistical organisations will make the additional database public. However, particular research suggests that a more crucial role could be attributed to legal constraints on the specific labour markets, as shown by e.g. Mack et al. [27].

Further work should also be provided on the forecast method employed to provide a counterfactual scenario. We stipulate using additional information to accentuate the seasonality of transport and the relevance of the service supplied regarding international trade.

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### WPLYW POSTPADEMICZNYCH POLITYK PUBLICZNYCH NA SEKTOR TRANSPORTU I MAGAZYNOWANIA W KRAJACH GRUPY WYSZEHRADZKIEJ

Artykuł poświęcony został analizie wpływu polityk krajowych mających na celu przeciwdziałanie lub mitygację gospodarczym konsekwencjom pandemii COVID-19 w krajach Grupy Wyszehradzkiej (Czechy, Węgry, Polska i Słowacja). Dokładniej analizie poddano sektor transportu i magazynowania (kod H

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NACE Rev. 2). Pandemia nierównomiernie wpłynęła na ten sektor - podczas gdy określone podsektory rozwijały się w tym okresie więcej niż dynamicznie (m.in. usługi doręczania paczek), inne ponadprzeciętnie ucierpiały z powodu nagłych zmian w mobilności (m.in. usługi mobilności publicznej i indywidualnej). Polityki publiczne zostały zaprezentowane nie tylko jako narzędzie do ograniczania negatywnych skutków pandemii, ale także jako platforma do budowania nowych przewag konkurencyjnych dla krajowych podmiotów gospodarczych. W ten sposób dostarczając uzasadnienia dla analizy rzeczywistego wpływu programów skierowanych do sektora transportu i magazynowania. Wpływ pomocy publicznej skoncentrowanej na analizowanych krajach był nierównomierny pomiędzy analizowanymi krajami. Mimo że wdrożone programy pomogły branży powrócić do poziomów sprzed pandemii w ciągu 4 kwartałów. Świadczy to o tym, że oprócz struktury programów i schematów pomocy publicznej ważnym czynnikiem były przedpandemiczne łańcuchy wartości. Może to służyć jako punkt wyjścia do dalszych badań, gdy dostępnych będzie więcej danych.

**Słowa kluczowe:** Grupa Wyszehradzka, pomoc publiczna, transport i magazynowanie, Covid-19

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