SGH WARSAW SCHOOL OF ECONOMICS AND ECONOMIC FORUM **REPORT 2020**

Major implications of the coronavirus pandemic for Poland and other countries of Central and Eastern Europe

As a result of the COVID-19 pandemic all the areas of human activities are under greater pressure to apply digital solutions. / A considerable number of industries and sectors recorded an income drop by 50%–90% or more.

The COVID-19 pandemic caused by SARS CoV-2 virus exposes an immense volume, pace, complexity, fundamental uncertainty and interdependence of phenomena usually connected with various levels of social system analysis. This is an unprecedented complex of phenomena in recent economic and political history of countries of Central and Eastern Europe (and globally).

The analysis of implications of the COVID-19 pandemic was carried out on five levels. The macroeconomic and mesoeconomic (sector-related) implications are presented below. The remaining levels, i.e. microeconomic (behavioural), institutional (limited to "economic" institutions) and global (international), are discussed in detail in the full edition of the SGH report.

MACROECONOMIC IMPLICATIONS (AGGREGATE LEVEL)

Most macroeconomic analyses provide charts of future GDP for the next two years in the form of letter V or, less optimistic, letter U. The great uncertainty about the course of the pandemic, as well as the scope and schedule of policies of "locking down and reopening" economies by national states, seems to indicate an intention to satisfy a common need for a "roadmap", to build confidence and leadership in the "war with the virus", rather than a need for traditional economic forecasts. Major consequences of the COVID-19 pandemic, both those already observed and those predicted, are presented below.

1. A sharp decline of the economic growth rate, after which a partial recovery will follow. There will be a considerable drop in output, especially industrial production, consumption spending, investments, sales and capital flow. We are definitely going to see a wave of bankruptcies of businesses, the range of which will be inversely proportional to the capital power and political support (SMEs will be more affected, *big-enough-not-to-fail* entities will be less affected).

These are indirect effects of the medical phenomenon of the epidemic: decrease in labour utilisation, disruption of market and inter-organisational transactions (including supply chains disruption), inability to perform contracts (production breakdown, regulator's response).

The drop in production is a direct effect of the disease infections and deaths among employees (reduced labour utilisation) and (partially indirect) effect of the quarantine and lockdown of workplaces, restriction of workers' mobility. Closing schools and kindergartens also restricts the work of parents who are forced to stay at home and take care of their children. As a consequence, supply (interrupted work and capital turnover) of many finished goods and physical services (quarterly

TABLE 1. Forecast for some macroeconomic indicators: CEE countries

Country	Real GDP			Inflation rate			Unemployment rate			Current account			Budget deficit		
	2019	2020	2021	2019	2020	2021	2019	2020	2021	2019	2020	2021	2019	2020	2021
Estonia	4.3	–6.9	5.9	2.3	0.7	1.7	4.4	9.2	6.5	2.3	1.1	2.2	–0.3	–8.3	–3.4
Latvia	2.2	–7.0	6.4	2.7	0.2	1.9	6.3	8.6	8.3	0.6	1.1	1.2	–0.2	–7.3	–4.5
Lithuania	3.9	–7.9	7.4	2.2	0.8	1.5	6.3	9.7	7.9	3.5	2.2	2.9	0.3	–6.9	–2.7
Slovenia	2.4	–7.0	6.7	1.7	0.5	1.2	4.5	7.0	5.1	6.8	6.8	6.8	0.5	–7.2	–2.1
Slovakia	2.3	–6.7	6.6	2.8	1.9	1.1	5.8	8.8	7.1	–2.6	–2.9	–2.4	–1.3	–8.5	–4.2
Euro zone	1.2	–7.7	6.3	1.2	0.2	1.1	7.5	9.6	8.6	3.3	3.4	3.6	–0.6	–8.5	–3.5
Bulgaria	3.4	–7.2	6.0	2.5	1.1	1.1	4.2	7.0	5.8	5.2	3.3	5.4	2.1	–2.8	–1.8
Czech Republic	2.6	–6.2	5.0	2.6	2.3	1.9	2.0	5.0	4.2	0.7	–1.5	–1.0	0.3	–6.7	–4.0
Croatia	2.9	–9.1	7.5	0.8	0.4	0.9	6.6	10.2	7.4	2.4	–1.7	0.5	0.4	–7.1	–2.2
Hungary	4.9	–7.0	6.0	3.4	3.0	2.7	3.4	7.0	6.1	–0.9	1.3	1.5	–2.0	–5.2	–4.0
Poland	4.1	–4.3	4.1	2.1	2.5	2.8	3.3	7.5	5.3	0.4	0.6	0.9	–0.7	–9.5	–3.8
Romania	4.1	–6.0	4.2	3.9	2.5	3.1	3.9	6.5	5.4	–4.6	–3.3	–3.4	–4.3	–9.2	–11.4
UE	1.5	–7.4	6.1	1.4	0.6	1.3	6.7	9.0	7.9	3.2	3.1	3.4	–0.6	–8.3	–3.6
Global	2.9	–3.5	5.2	.	.	.	.	.	.	.	.	.	.	.	.

Source: own study by SGH Warsaw School of Economics based on data of the European Commission.

drop in output for 2020 may reach 70%–90% in some sectors) is directly disrupted. Factors causing the drop include broken international cooperation relations, reduced production of intermediate products (especially in the processing industry), disruption of consumption of finished and intermediate goods and services caused by a decline in aggregate consumption (income drop), delayed consumption and investment purchases.

2. Decrease in employment, increase in open and hidden unemployment (unemployment benefits). Growing unemployment is and will be unequal: in the areas where gig contracts are common, it will be deeper, more permanent and difficult to reverse by an upturn, especially for new employees entering the labour market. So far, the decline in unemployment resulting from the increasing number of deaths has been statistically insignificant (in OECD countries).

3. Sharp inflation decrease. It seems that factors such as decline in total demand (smaller and different final consumption among some social groups, smaller income) or demand for some raw materials and commodities (crude oil) compensate the rise in prices related to production bottlenecks by a higher demand for the 'virus-complementary' goods (toilet paper). This short-term effect may however be off-set as soon as in the summer 2020, if re-opening industries and sectors will require for instance specific distancing rules (e.g. leaving 2, 3, 4 free spaces in the public transport, designating several square metres for each person), which would result in higher break-even point for businesses and justify a rise in ticket prices (3-fold in air transport).

4. Higher state budget deficit and government debt-to-GDP ratio. In many national economies "automatic stabilizers" worked, enhanced by discretionary "emergency" measures. The (highest) promised, granted, expended, (lowest) paid amounts exceed Keynesian interventions observed so far in the history of economic policy, and although they are within the range of 5%–25% of GDP, (according to published declarations) they may exceed a half of the national income, for example in Germany (estimates of Bruegel Think Tank of April 2020). Declarations of G20 leaders to do whatever is needed to rescue the economy indicate that financial involvement of the state may grow further if the epidemic (or political) situation becomes worse. Legislative measures undertaken so far by the US government are planned to total USD 3.6 trillion, among which money designated directly to workers and the unemployed seem to account for 10%–15%, in addition to at least USD 7.5 trillion from Federal Reserve, which implies even larger handouts in the future. In the EU, political discussions more and more openly mention ideas of corona-bonds, Euro-bonds, Pandemic Solidarity Funds (PSI), Symmetric Shock Stabilisation Fund (SSSF) etc.

The state reaffirms its role of the "lender of last resort". Since at the beginning of the third decade of the 21st century there is no more space to reduce interest rate, quantitative easing has become the main component of monetary policy, while "optimal" rules and limits recommended earlier have been "forgotten". This will entail unprecedented growth of the public finance deficit and (national and possibly foreign) debt. Introduction of new (national) (anti-)virus taxes or their substitutes seems probable in the mid-term. Political economy of each country will define its fiscal package and "adequate" burden distribution (more for the poor, less for the wealthy or other options), which will probably make them stay *en vigueur* for longer.

5. Finance. We are observing a decline in stock prices, especially for the most affected sectors, lower international capital flow, fall of the exchange rate of national currencies of peripheral countries (CEE) on the financial markets.

Indices of business confidence are also falling: at the beginning of the year the Polish consumer and investor confidence indices were low, but still positive; the breakdown came in April – CCCI (Current Consumer Confidence Index) dropped to -36.4 points, or by 37.7 points compared to March 2020, while Leading Consumer Confidence Index fell by 47.7 points.

As could be expected, the financial sector reacted by panic: all the three American indices (Dow Jones, S&P 500, NASDAQ) fell between the third week of February and the third week of March 2020 by about 35%, which was the largest drop caused by an epidemic in history. Stock prices bounced back in April 2020. In Asia the prices on major markets fell by several to 30% percent. The stock market slump means that the financial sector with its huge funds will have an opportunity to take over companies from all the sectors of the "real sphere" at lower prices. The European elites understand this, and prepare legislation counteracting mobility of "undesirable" (e.g. Chinese, but not American) capital, to prevent foreign acquisitions of national companies by buy-outs of large packages of company stocks by national states.

The fluctuations in exchange rates should also be noted, for instance the drop in the prices of national currencies of some CEE countries in the first four months of 2020 was, in the Visegrad Group: about 11% for the Hungarian forint, 8% for the Czech koruna, 7% for the Polish zloty (for the sake of comparison, the Russian rouble lost 24%, and the Ukrainian hryvnia lost 13%). Uneven spread of the epidemic and its consequences may cause even deeper decline.

6. All the areas of human activities are under greater pressure to apply digital solutions. Digitization of information aspects of production processes may in the midterm create an economy sector with new forms of competition, or so-called contact-free economy. These processes are in line with the political struggle for new competitive advantages and for a definition of the "new normal".

MESOECONOMIC (SECTOR-RELATED) IMPLICATIONS

The sector that was most affected by the pandemic is obviously the sector of medical services and healthcare. Illustrations of the physical aspect of the epidemic, morbidity and death rates, as well as examples of so-called epidemic curves used for modelling of epidemic phenomena can be easily found in the Internet. Mathematical models of the epidemic have become popular due to using the term "curve flattening" (e.g. for the rate of coronavirus deaths increase) in the political discourse.

The healthcare sector today is regarded to be an example of unreliability of the market (lower capacity of private hospitals and clinics, if they were open at all, marginal range of provided services, insufficient investments in the works on the vaccine) and of the state (also limited capacity, overworked medical staff, underpaid nurses and auxiliary workers, lack of laboratory, equipment, staff, financial reserves).

Outside the medical sector, a considerable number of industries and sectors recorded an income drop by 50%–90% or

more. Data prove particular vulnerability of retail trade, transport (especially passenger transport, including air travel), services involving personal contact of staff with customers (hotels, tourism – especially international, food services, health care, hairdressers and beauticians, leisure, gyms and fitness centres) and numerous audience (professional sports, culture institutions, amateur sports, scientific conferences, religious ceremonies), but also postal services and the *out-of-home advertising* segment.

In some industries remote work and contactless sales (e.g. all stages of education, internet trade, teleconferences, telehealth) allow for joining e-business sector and give a chance to make it through the crisis unscathed. Some newly digitized or digitally advanced sectors are going to experience a boom (telecommunications, social networks).

A significant aspect of the supply shock is the disruption of supply chains and the protectionist reaction calling for domestic manufacturing. It is quite easy to securitize this process, i.e. make it an issue of national security. Another example are food supply chains, criticized by environmentalists as too long and internationalised, although cheap food entails cheap labour, which makes it possible to reduce real wages (and pensions). Re-consideration of technology requirements, cost reductions, delivery times and risks of supply chain disruption will be a subject of continuous calculations of competitors, both for individual businesses and more "strategically" oriented and regulated national economies. This will naturally produce obvious implications for the international trade.

MARIUSZ PRÓCHNIAK, habilitated doctor of economic sciences, Department of Economics II of SGH Warsaw School of Economics; **JULIUSZ GARDAWSKI**, professor of economic sciences, Institute of Philosophy, Sociology and Economic Sociology of SGH Warsaw School of Economics; **MARIA LISSOWSKA**, professor of economic sciences, Department of Economics II of SGH Warsaw School of Economics; **PIOTR MASZCZYK**, doctor of economic sciences, Department of Economics II of SGH Warsaw School of Economics; **RYSZARD RAPACKI**, professor of economic sciences, Department of Economics II of SGH Warsaw School of Economics; **ALEKSANDER SULEJEWICZ**, habilitated doctor of economic sciences, Department of Economics II of SGH Warsaw School of Economics; **RAFAŁ TOWALSKI**, doctor of economic sciences, Institute of Philosophy, Sociology and Economic Sociology of SGH Warsaw School of Economics

Development paths of countries and regions of Central and Eastern Europe

Before the transformation, Poland was one of the least economically developed countries in the CEE-11 group; in respect of GDP per capita at PPP it exceeded only Romania. / In 1990–2019 the fastest growing economy in the CEE-11 group was Poland, whose GDP rose more than 2.5 times (the index was 256). It means that the average annual growth rate was 3.2%. The only CEE country that had undergone transformation and had a similar development rate was Slovakia (2.5% annually). / In 1990-2019 Poland managed to reduce the economic development gap with all the old Member States of the European Union (except Ireland).

The evaluation of economic development paths in the examined countries of Central and Eastern Europe in 1990-2019 should take into account deep economic decline (so called 'transformation recession') that occurred as a result of launching the process of political transformation. In the beginning of the transformation it caused a cumulated drop in national income by as much as 18% in Poland and almost 65% in Lithuania. The period of transformation recession in the region lasted from 2 years in Poland to even 8 years in Bulgaria.

The transformation recession additionally increased the gap between economic development of Central and Eastern Europe and the Western Europe in the initial years of the political transformation. For instance, while in 1989 GDP per capita adjusted by purchasing power parity (PPP) in Poland accounted for 38% of the average GDP in EU-15 countries, in 1991 (when the transformation recession ended) it fell down to 32%. It also should be added that before the beginning of the transformation, Poland was one of the least economically developed countries in the CEE-11 group and in respect of GDP per capita at PPP it exceeded only Romania.

Nevertheless, it was the fastest developing economy in the CEE-11 group in 1990–2019. Similar trends were observed for development paths of Poland and two reference groups in the 2004–2019 period, or after Poland's accession to the EU. The situation changed slightly after the 2008 global financial crisis (2010–2019). The development rates in that period were less diversified both among the CEE countries and comparing the average for CEE-11 and EU-15. That was also when Poland lost its leading position in the region.

Between 1990 and 2019 GDP of Poland, as the only country from the analysed group, grew by more than 2.5 times (the index was 256). It means that the average annual growth rate (taking into account the 1990–1991 transformation recession) was 3.2%. The only CEE country that had undergone transformation and had a similar development rate was Slovakia (2.5%

annually). Average economic growth rate in 1990–2019 in Poland in annual terms was 2.5 higher (3.2%) than the average for EU-15 (1.3%). Other countries that achieved economic growth rate higher than the EU-15 average were Estonia, Slovenia, Czechia, Romania and Hungary. At the opposite end were Croatia, Bulgaria, Latvia, Lithuania, where the economic growth was lower than the EU-15 average.

In the period following Poland's accession to the EU, its GDP grew by 80% (i.e. on average by about 4.2% a year). Similarly to the entire period of political transformation, Poland was in this respect a leader in the group of the new EU Member States (only Slovakia with 73% and Romania with 70% growth achieved a similar rate). Simultaneously, Poland also had a much higher growth rate than EU-15 countries. It should be highlighted that in 2004-2019 all the CEE-11 countries, except Croatia, had a higher economic growth rate than the average for EU-15 economies, which meant a reduction of the historical wealth gap with the Western Europe.

Although Poland was the only EU Member State that was not affected by the recession caused by the 2008 financial crisis, in the years 2010–2019 that followed it lost the leading position of the fastest developing economy among the CEE countries and its "growth yield" compared to the EU-15 also dropped. It was mostly caused by slower development pace in Poland – an average annual GDP growth rate in that period was 3.2% and it was by 1 percentage point lower than in the years 2004–2019, or after Poland's accession to the EU (4.2%).

As a result of interaction of these trends, Poland managed to reduce significantly (in 1990-2019) the economic development gap with all the old EU Member States, except Ireland. Improvement of the relative development position of the Polish economy was a consequence of not only higher economic growth rate, but also diversified demographic trends, as well as directions and pace of currency exchange rate fluctuations in individual countries.

MARIUSZ PRÓCHNIAK, habilitated doctor of economic sciences, Department of Economics II of SGH Warsaw School of Economics; **JULIUSZ GARDAWSKI**, professor of economic sciences, Institute of Philosophy, Sociology and Economic Sociology of SGH Warsaw School of Economics; **MARIA LISSOWSKA**, professor of economic sciences, Department of Economics II of SGH Warsaw School of Economics; **PIOTR MASZCZYK**, doctor of economic sciences, Department of Economics II of SGH Warsaw School of Economics; **RYSZARD RAPACKI**, professor of economic sciences, Department of Economics II of SGH Warsaw School of Economics; **ALEKSANDER SULEJEWICZ**, habilitated doctor of economic sciences, Department of Economics II of SGH Warsaw School of Economics; **RAFAŁ TOWALSKI**, doctor of economic sciences, Institute of Philosophy, Sociology and Economic Sociology of SGH Warsaw School of Economics

TABLE 1. GDP growth in Central and Eastern Europe countries in 1990-2019

Country	GDP growth rate (basic prices)				GDP in 2019[4]		
	Average annual growth rate (%)	Annual growth rate (%)					
	1990–2019	2010	2018	2019[1]	1989 = 100	2004 = 100	2010 = 100
Visegrad Group states							
Poland	3.2	3.6	5.1	4.1	256	180	137
Czech Republic	1.8	2.3	2.8	2.5	169	147	122
Slovakia	2.5	5.7	4.0	2.7	207	173	128
Hungary	1.7	0.7	5.1	4.6	164	134	130
Average[2]	2.3	3.1	4.3	3.5	199	159	129
Baltic states							
Estonia	2.0	2.7	4.8	3.2	184	149	138
Lithuania	1.1	1.5	3.6	3.8	137	158	138
Latvia	0.9	–4.5	4.6	2.5	132	146	135
Average[2]	1.3	–0.1	4.3	3.2	151	151	137
Southeast Europe							
Bulgaria	0.9	0.6	3.1	3.6	133	157	125
Croatia	0.5	–1.5	2.7	2.9	116	120	112
Romania	1.7	–3.9	4.4	4.1	163	170	141
Slovenia	1.9	1.3	4.1	2.6	173	134	118
Average[2]	1.3	–0.9	3.6	3.3	146	145	124
Western Europe							
UE15[3]	1.3	2.2	1.8	1.2	149	120	113

[1] Estimates. [2] Non-weighted average. [3] Weighted average
[4] For calculating growth rate based on 1989 = 100, historical data of the EBRD for the year 1989 were used.

Source: own study by SGH Warsaw School of Economics based on data of Eurostat and European Commission.

Economic climate in Central and Eastern Europe during the COVID-19 pandemic

The COVID-19 crisis is going to exacerbate the business activity decline in the EU that has lasted for two years now. / The drop in output and sales recorded in the EU in March and April 2020 was the deepest in the last 20 years. / Indices reflecting changes in the economic sentiments in the Visegrad Group recorded the largest decline in history. / Only 9% of Polish manufacturing and trade companies were not affected by adverse effects of COVID-19 restrictions, while one in four perceived them as severe. / In response to impediments for business activity, companies mostly cut non-employee related expenses (52%) and reduce working time (50%).

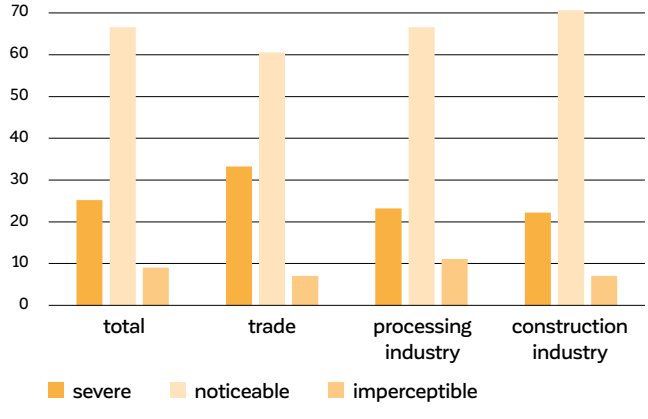
Restrictions introduced after the COVID-19 epidemic outbreak caused an immense economic shock. According to research carried out in April 2020 by the Institute of Economic Development of SGH Warsaw School of Economics, only 9% of Polish manufacturing and trade companies were not affected by the adverse effects of restrictions, while one in four perceived them as severe (Figure 1). Those who suffered the most were trade enterprises. Only 7% of them did not report negative effects of restrictions imposed by the government, while one third considered them to be severe. Those less affected by the crisis were construction companies, as 22% of which regarded the consequences of restriction as severe, and processing industry businesses, 11% of which were not affected by the negative consequences of measures introduced to control the epidemic.

The crisis manifested itself by a drop in basic economic activity measures: rate of output, sales, orders and investments, production capacity utilisation, prices and, to a lesser extent, employment. The slump in sales and prices strongly affected the financial situation of businesses. Economic climate indicators presenting in a synthesized manner the situation in the analysed fields of economy, reached historical lows. The situation in the processing industry, construction and trade has not been so bad in any of the crises during the last 20 years.

In response to impediments for business activity and the resulting decrease in income, companies mostly cut non-employee related expenses (52%) and reduce working time (50%) – Figure 2. In 27% of firms employee wages have been or are planned to be reduced, and every fifth enterprise is cutting down on staff. Measures undertaken in the first place by trade companies include reduction of working time, cutting non-employee related expenses and employment downsizing (63%, 52% an 29% respectively). Construction and industrial companies mostly attempt to cut non-employee related expenses (51% and 53% respectively), followed by employment changes through working time reduction (46% and 47%), workforce downsizing (29% for both types) and redundancies (22% and 17%).

At the moment of the COVID-19 pandemic outbreak the European Union (EU-27) was already experiencing economic slowdown, which began at the turn of 2018, thus ending the long expansion phase lasting from 2014. Restrictions of business activity introduced in March 2020 intensified the decline.

FIGURE 1. Impact of the economy lockdown on the situation of businesses (%)



Source: own study by SGH Warsaw School of Economics

FIGURE 2. Businesses' response to the crisis caused by COVID-19 epidemic (%)

Source: own study by SGH Warsaw School of Economics

TABLE 1. Changes (monthly – m/m, annual – y/y and aggregate since the last upper turning point, UTP) of the smoothed confidence indices in: industry (ICI), construction (CCI) and retail trade (RCI) in the European Union in 2020 (pts)*

	ICI			CCI			RCI		
Month	m/m	y/y	Since UTP	m/m	y/y	Since UTP	m/m	y/y	Since UTP
March	–4.5	–9.5	–18.1	–2.8	–6.3	–7.0	–7.7	–8.1	–6.7
April	–21.6	–28.8	–39.7	–19.4	–24.6	–26.4	–22.8	–29.5	–29.5
May	5.0	–24.8	–34.7	–1.0	–23.9	–27.4	0.9	–28.9	–28.6

* Last upper turning points: ICI – June 2019, CCI – January 2019, RCI – April 2019
Source: own study by SGH Warsaw School of Economics based on data of Eurostat.

TABLE 2. Monthly changes in the smoothed confidence indices in industry (ICI), construction (CCI), retail trade (RCI) and consumer sentiment index (CSI) in the Visegrad Group in 2020 (pts).

Country	Month	ICI	CCI	RCI	CSI
CZ	March	–5.0	0.9	–5.3	–1.0
	April	–20.4	–8.5	–14.4	–13.9
	May	2.4	–1.9	5.9	7.6
HU	March	–2.9	–7.1	–4.2	–0.4
	April	–20.8	–9.5	–23.6	–25.8
	May	–1.5	–9.2	9.1	6.1
PL	March	–21.8	–1.9	–1.5	1.5
	April	–8.0	–28.4	–31.4	–24.5
	May	8.0	3.7	–1.8	2.4
SK	March	–2.3	4.6	2.2	1.4
	April	–39.2	–41	–31.5	–22.1
	May	13.7	–2.4	2.5	2.1

Source: own study on the basis of data of Eurostat and IRG SGH.

The economic downturn was sharp. In the first quarter of 2020 the smoothed index of real GDP lost 3.6 points. Since the peak in the fourth quarter of 2018 the cyclical component of real GDP fell in total by 3.0 points, or on average by 0.6 per quarter. Therefore, the intensity of the fall is only slightly smaller than the one recorded during the global financial and economic crisis. In that time, or from the fourth quarter of 2007 to the third quarter of 2009, the cyclical real GDP was falling on average by 0.9 points per quarter. The GDP drop in the first quarter was coupled with a collapse in private demand. The rate of consumption fell by 4.6 points compared to the fourth quarter of 2019, and the investment rate shrank by 4.9. The demand shock was huge. The drop in the smoothed private consumption index was almost four times bigger than the biggest one recorded before (second quarter of 2000) and the biggest drops in the smoothed fixed assets expenses were recorded only in the first quarter of 2009 (by 6.7 points) and the third quarter of 2019 (by 5.1 points).

An analysis of data available for the second quarter 2020 shows that the crisis in the European Union exacerbated in April. The volume of industrial production decreased (the index shrank by as much as 17 points, in March by 12.7 points), the same happened for construction and assembly production (by 11.4 points and by 15.2 in March) and retail sales (by 11.2 points and 11.4 in March). The drop in output and sales recorded in March and April was the deepest in the last 20 years. The crisis especially negatively affected economic sentiments. The economic sentiment indicator (ESI) fell in March compared to February by 8.4 points, and in April by further 30.8 points (sic) (the biggest monthly decrease in history). The April rate of ESI (63.8) was the lowest since January 1996. Annual drops were also historical: the one from April was by 40.2 points (the largest previously recorded drop was 36.9 in March 2009). In total, since the last peak in August 2018, ESI has lost over 48 points – almost a half, over 39 points of which just in March and April 2020. Similar changes occurred in the industrial, construction and trade sectors (Table 1).

In May most EU-27 states started to gradually lift the restrictions introduced in March. As a consequence, the EU economy saw some symptoms of recovery. In May ESI grew by 2.9 points. Indicators of economic climate in processing industry and trade also improved (Table 1).

Similarly to the European Union, the Visegrad Group states also experienced huge anxiety caused by COVID-19, which accelerated the downturn forecast by economic sentiment indices already in 2018/2019. Indices reflecting changes in the economic sentiments recorded the largest drops in history. Already the decline in March was the deepest in almost 25 years. In April the economic slowdown exacerbated. The economic sentiment index that in a synthesized manner measures the economic situation and confidence of the economic actors, in both months lost: 52 points in Poland, 42.1 points in Slovakia, 31.8 in Czechia and 29.5 points in Hungary (39.2 points in EU-27). Slight improvement was recorded in May, which however did not include Poland, where ESI dropped by 0.3 points. In the three other Visegrad Group countries ESI grew by 3.9, 0.1, 1.2 points respectively (in the EU-27 the growth was 2.9 points). Table 2 presents changes in the fragmentary indices for the last three months. In each case the April drops were the biggest since the beginning of Eurostat's research on the economic situation, as they much exceeded average monthly drops of the indices.

The data presented in Table 2 show that individual economies of the Visegrad Group were differently affected by the crisis, despite its pervasive nature. In Czechia the crisis affected mainly the industry, while the consumer sentiment and retail trade were the least affected. In Hungary the crisis mostly depressed consumer sentiment and decreased consumer spending. The impact was felt most strongly in April and it was short. Consumer sentiment was still bad, although relatively

moderate. In Poland the crisis impacted mainly the processing industry. It was felt by the construction industry and the consumers in April. Poland is the country where the May upturn was the best visible. The producer sentiments were most affected in Slovakia – they fell down twice more than in other countries. In May in all the Visegrad Group states the situation in individual industries and consumer sentiments revived, except construction (not in Poland), the recovery of which is visibly more sluggish.

ELŻBIETA ADAMOWICZ, full professor, Institute of Economic Development of SGH Warsaw School of Economics; **SŁAWOMIR DUDEK**, former employee of SGH Warsaw School of Economics; **GRZEGORZ KONAT**, assistant, Institute of Economic Development of SGH Warsaw School of Economics; **KATARZYNA MAJCHRZAK**, habilitated doctor of economic sciences,Institute of Value Management of SGH Warsaw School of Economics; **EWA RATUSZNY**, doctor of economic sciences, Institute of Economic Development of SGH Warsaw School of Economics; **KONRAD WALCZYK**, doctor of economic sciences, Institute of Economic Development of the Warsaw School of Economics

Renewable energy – a challenge for the countries of Central and Eastern Europe

The global rate of RES (renewable energy sources) generation proves that it has been the fastest developing source of energy in the last decade. / The global rate of electricity production from RES (in TWh) was 12.59% for wind power, 28.91% for solar power and 6.98% for other sources, while in the European Union the rates were 4.63%, 7.29% and 3.44% respectively. This means that EU is below the global average and, what is even worse, below the average for OECD countries. / Poland has a large share of wind power (12.8 TWh) and a small share of solar power (0.3 TWh). / In Central and Eastern Europe the countries usually apply relatively passive renewable energy policy. / The COVID-19 pandemic caused a demand and supply shock on the market of energy raw materials. It also showed that the European Union depends too much on the imported RES technologies and RES intermediate products.

The global rate of RES (renewable energy sources) generation proves that it has been the fastest developing source of energy in the last decade. In 2007-2017 the global production of renewable energy, expressed in terawatt-hours (TWh), was 14.5%, and in 2018 it was also 14.5%. The growth rate of energy production from RES in the European Union, which is traditionally regarded to be the most determined to reduce CO2 emissions by the development of RES, was lower than the global growth rate; in 2007–2017 it was 12.8% and in 2018 it was 4.8%. Summing up, the European Union, producing 28.4% of energy from RES (in 2018), lowered its growth rate of energy production from RES.

Production of renewable energy is unevenly distributed among countries, which also refers to the sources of this production. The RES segment has a visibly large share of power production from wind (12.8 TWh in Poland and 6.5 TWh in Romania), and a small share of solar power production: 0.3 TWh and 1.7 TWh respectively in 2018. An inverse situation is in Czechia, where in 2018 solar power prevailed (2.3 TWh) over wind power (0.6 TWh). In some countries, such as Czechia (4.7 TWh) and Hungary (2.4 TWh) a considerable share of other sources in total RES production was observed in 2018 (Other sources of RES electricity are: geothermal energy, biomass and biogas). The global rate of electricity production from RES (in TWh) was 12.59% for wind power, 28.91% for solar power and 6.98% for other sources, while in the European Union the rates were 4.63%, 7.29% and 3.44% respectively. It is undoubtedly worth to bear in mind that EU (with the changes of 4.63% for wind, 7.29 for solar power and 3.44% for the other) is below the global average and, worse still, below the OECD average. Juxtaposition of percentage growth of electricity production from RES shows that the 4.76% growth is almost twice smaller than growth for OECD (8.56%). Only Ukraine showed exceptionally high rates for all the categories (wind, solar and other power) with its YOY (2017 to 2018) increase of 15.65%, and 69.71% and 33.70%. For the first two categories (wind and solar power) Belarus reached results exceeding the EU average – 21.63% and 51.11%. This group also includes Hungary (68.73%) and Poland (81.21%) in the solar power category.

Countries with low share of power production from a specific source showed high growth, which can indicate that, on one hand the process may be impermanent, and on other hand that increasing RES share faces barriers that restrict the growth.

There is considerable potential for the development of renewable energy in Central and Eastern Europe, but it is not utilised yet, since it still has not been subject to systemic energy transformation. The energy transformation based on civic energy assumes conveying renewable energy production to societies, or local communities, who are the infrastructure owners and who manage it. Such energy transformation aimed at renewable energy brings measurable benefits not only to large corporations, but also to households, local governments,

TABLE 1. Growth rate for power production from RES in 2017–2018

Country	2017 (TWh)				2018 (TWh)				Dynamika r/r (%)			
	wind power	solar power	other renewable energy	total	wind power	solar power	other renewable energy	total	wind power	solar power	other renewable energy	total
Belarus	0.1	0.1	0.1	0.3	0.1	0.1	0.1	**0.4**	21.63	51.11	2.97	23.84
Czech Republic	0.6	2.2	5.0	7.7	0.6	2.3	4.7	**7.7**	3.09	6.62	–4.76	–0.94
Germany	105.7	39.4	51.1	196.2	111.6	46.2	51.4	**209.2**	5.58	17.16	0.67	6.63
Hungary	0.8	0.3	2.1	3.2	0.6	0.6	2.4	**3.6**	–19.79	68.73	10.80	9.89
Poland	14.9	0.2	6.5	21.6	12.8	0.3	6.3	**19.5**	–13.84	81.21	–2.42	–9.68
Romania	7.4	1.9	0.5	9.8	6.5	1.7	0.5	**8.6**	–12.29	–9.81	–12.08	–11.80
Ukraine	1.0	0.8	0.2	1.9	1.1	1.3	0.2	**2.6**	15.65	69.71	33.70	38.82
Total (Europe)	**384.3**	**124.5**	**208.2**	**717.1**	**404.4**	**139.1**	**217.6**	**761.1**	**5.22**	**11.65**	**4.51**	**6.13**
Total (global)	**1128.0**	**453.5**	**585.0**	**2166.5**	**1270.0**	**584.6**	**625.8**	**2480.4**	**12.59**	**28.91**	**6.98**	**14.49**
OECD	695.1	285.7	363.9	1344.8	745.8	337.2	377.3	**1460.3**	7.29	18.01	3.66	8.59
Non-OECD	432.9	167.8	221.0	821.7	524.1	247.4	248.6	**1020.1**	21.09	47.47	12.45	24.15
European Union	362.0	119.1	192.4	673.5	378.8	127.8	199.0	**705.5**	4.63	7.29	3.44	4.76

Source: own study by SGH Warsaw School of Economics based on [*BP Report* 2019].

ENERGY AND COVID-19

The COVID-19 pandemic caused a demand and supply shock on the market of energy raw materials, resulting in very low prices of crude oil, gas and coal, which are the basic source of energy in the region and the rest of the world, despite the dynamic growth of power production from RES. WTI crude oil reached the lowest price on 27 April 2020 (USD 12.91 per barrel). Gas prices fell in the first half of 2020 by 25%, reaching USD 1.8 per Btu, while ARA coal price dropped from USD 61.15 per ton (2 January 2020) to USD 50.6 per ton (4 June 2020).

The supply and demand shock on the energy market is going to cause a problem with effectiveness of the currently applied instruments of RES support, since other traditional energy sources are becoming more competitive. Considering also substantial uncertainty about future consumption of energy in the region, and thus the scope of impact of the pandemic on GDP, it should be highlighted that enterprises and financial institutions are going to be willing to take risks of new investments in electricity production. Also the European Commission and some European Union States point out that a way to boost the economy may be not only further energy transformation, but also its acceleration. In consideration of the fact that the European Union lost its leading position in power production from RES before the pandemic, the aspiration to accelerate the development of renewable energy sources is justified.

The pandemic showed that the European Union is excessively reliant on imported RES technologies and intermediate products, which poses a significant problem that must be solved in the future (by high-level agendas). Otherwise the support mechanism will be able to drive the EU economy only to a limited degree. The possibility to materialize this idea will depend both on the effectiveness of the applied policy instruments (such as EU ETS, which turned out to be ineffective during the 2008–2009 crisis) and the volume of financial resources involved.

From the perspective of the region the biggest benefits from boosting the economy can be found in: development of offshore wind power (Poland, Lithuania, Latvia, Estonia), solar energy and hydropower in Romania and Bulgaria, development of electric power transmission grid and improvement of energy efficiency of family houses in Poland, while in Ukraine – both family and multi-dwelling units.

SMEs and farmers. In the entire EU, especially in Western Europe, the energy transformation based on civic energy is gaining momentum. In the countries of Central and Eastern Europe however the situation is utterly different – the states mostly effect passive policies regarding civic renewable energy, and projects aimed at building such energy system are practically non-existent.

KRZYSZTOF KSIĘŻOPOLSKI, doctor of humanities, Department of Public Policy of SGH Warsaw School of Economics; **DARIUSZ KOTLEWSKI**, doctor of economic sciences, Department of Economic Geography of SGH Warsaw School of Economics; **GRZEGORZ MAŚLOCH**, doctor of economic sciences, Department of Local Government Economy and Financing of SGH Warsaw School of Economics

Level of innovation of the economies of Central and Eastern Europe

Poland is an undisputed leader among the CEE countries in respect of number of introduced instruments of innovation policy. / The most common form of support for innovation in Central and Eastern Europe are research grants. / Development of information and communication technology (ICT) during and after the coronavirus pandemic may be a driving force of many economies.

In recent years innovation has become one of the key economic issues, determining international competitiveness. An analysis carried out for this study showed that since 1990s countries of Central and Eastern Europe had a low level of both innovation capacity (defined by indicators such as R&D spending) and poor innovation position. At the same time, individual CEE countries are diversified in respect of high-tech industries, for instance Czechia is a leader of production of computers, electronic and optical products, Poland is the leading producer of aircraft, spacecraft and related machinery; Hungary is the best at manufacturing basic pharmaceutical substances, medicines and other pharmaceutical products. Research on the efficiency of the innovation system, consisting in measuring relations between output measures (defining the innovation position) and input measures (reflecting innovation capacity) showed that the efficiency of the innovation system in Poland is poor.

The most common form of support for innovation in Central and Eastern Europe are research grants. This refers mostly to grants for projects carried out by public research institutes. They are followed by grants for businesses for R&D and introduction of innovation. It can be therefore stated that this instrument weighs the most, although it will probably change as money from structural funds for the region will be gradually reduced.

It is worth noting that an important and broadly applied instrument of innovation policy are information campaigns promoting innovations and their role. The number of national strategies, plans and agendas that are in line with the innovation policy is overwhelming. Although data in the STIP Compass base have been collected since 1992, and plans and strategies have to be amended and adjusted to social and economic changes, the number for this relatively long period is still enormous (over 14 on average per country). Hungary, Lithuania, Poland are leaders in this respect, but in most countries innovation

INNOVATIONS AND COVID-19

The situation of the global economy connected with COVID-19 increased the need for innovative solutions, especially in two areas:

1. development of information and communication technologies that make it possible to popularise remote work, remote education and remote health services, in order to raise health security and at least partially mitigate the consequences of the pandemic-related disruption;
2. works on innovative medicines, specifically the vaccine for COVID-19 virus.

Development of information and communication technology during and after the coronavirus pandemic may be a driving force of many economies. It is estimated that 10-percent growth of access to broadband Internet accounts for almost 2% of gross global product. The use of the Internet provides new opportunities for employers and employees, especially in respect of remote work and remote labour resources management. On-line work entails most of all time efficiency for both the employee and employer and avoidance of unnecessary costs. What is more, remote work means also flexible working time, or adjusting work to private life. That is why it has been observed that the number of employees working through digital platforms in the EU countries had been regularly growing even before the pandemic. Additionally, innovative solutions based on ICT, such as ProteGo Safe application, may be helpful in controlling the COVID-19 virus.

The use of information and communication technologies also stimulates development of tele-health services, which are a significant element of healthcare. Modern solutions are used for tele-monitoring, tele-supervision, tele-physiatry, tele-care, tele-diagnostics, tele-description, tele-psychiatry. Rendering these services requires both physicians at hospitals and health centres and patients to have special equipment. Development of tele-health improves communication of the patient with the doctor, and in some cases can replace traditional diagnosis and treatment methods. Considering the pandemic, another advantage of tele-health is limitation of patients' movement and reduction of disease spreading.

Use of technology gives the opportunity for a new form of education, i.e. on-line learning. Instruments for remote education have been developed and applied for a long time, but their significance rose in the face of the coronavirus pandemic.

TABLE 1. Number of innovation policy initiatives and instruments in selected countries of Central and Eastern Europe

Instruments of innovation policy	Bulgaria	Croatia	Czech Republic	Estonia	Hungary	Latvia	Lithuania	Poland	Romania	Serbia	Slovakia	Slovenia	Total
Cooperation infrastructure	**13**	**13**	**15**	**6**	**16**	**9**	**18**	**16**	**4**	**2**	**9**	**21**	**142**
Dedicated support for research infrastructure	3	3	4	2	5	3	2	3	2	1	1	2	31
Information services and access to data bases	4	9	5	3	5	4	7	2	–	1	3	11	54
Cooperation networks and platforms	6	1	6	1	6	2	9	11	2		5	8	57
Direct financial support	**22**	**11**	**24**	**33**	**56**	**32**	**61**	**124**	**19**	**6**	**12**	**53**	**453**
Centres of excellence – grants	2	2	1	1	4	–	3	2	–	–	1	2	18
Equity financing	–	–	2	2	4	3	14	8	–	–	1	2	36
Scholarships, student and graduate loans	–	1	1	5	6	5	10	15	1	1	–	7	52
Subsidies for business innovations, research and development	4	3	5	10	17	4	10	23	7	1	3	13	100
Innovation vouchers	–	–	1	3	1	1	1	3	1	1	–	–	12
Institutional financing of public research	4	1	4	4	5	5	3	3	1	1	–	7	38
Loans for business innovations	–	1	3	–	3	2	–	5	–	–	2	3	19
Procurement schemes for innovations, research and development	–	1	1	2	–	1	2	4	–	1	1	–	13
Project grants (public research)	12	2	6	6	16	11	18	61	9	1	4	19	165
Innovation policy management	**20**	**30**	**25**	**31**	**56**	**30**	**56**	**60**	**21**	**8**	**12**	**48**	**397**
Establishment or reform of management structures of institutions	3	8	1	2	4	2	1	6	–	1	–	2	30
Formal consultations with instrument beneficiaries or experts	1	2	2	–	1	2	2	4	1	1	–	4	20
Horizontal bodies coordinating STI	3	1	2	1	1	2	5	1	3	1	1	8	29
National strategies, schemes and plans	9	15	14	12	32	13	22	22	8	1	7	19	174
Analyses (e.g. evaluations, comparative analyses and forecasts)	3	–	3	8	6	6	8	10	6	1	–	4	55
Information campaigns and other information actions	–	4	3	8	10	5	7	13	–	1	4	9	64
Bodies of aesthetic supervision and consultancy	1	–	–	–	1	–	11	4	1	1	–	2	21
Norms and certificates for technology development and implementation	–	–	–	–	1	–	–	–	2	1	–	–	4
Guidelines, regulations and incentives	**1**	**6**	**13**	**11**	**4**	**4**	**17**	**15**	**2**	**5**	**4**	**11**	**93**
Regulations on new technologies	–	–	1	–	–	–	1	–	–	1	2	–	5
Regulations and incentives relating to intellectual property	1	3	1	–	2	–	4	2	–	1	–	1	15
Regulations and incentives relating to employee mobility	–	1	2	2	1	–	–	7	1	1	1	7	23
Awards and distinctions in the field of science and innovation	–	–	6	4	1	1	1	1	–	1	1	1	17
Business consultancy and consultancy on the use of technology	–	2	3	5		3	11	5	1	1	–	2	33
Indirect financial support	**4**	**1**	**4**	**1**	**5**	**2**	**1**	**4**	**3**	**2**	**1**	**1**	**29**
Tax relief for businesses for innovations, research and development	3	1	3	–	3	–	1	3	2	1	–	1	18
Guarantee instruments of risk management	–	–	1	1	1	1	–	–	–	1	–	–	5
Tax relief for people supporting innovations, research and development	1	–	–	–	1	1		1	1		1	–	6
Total	**60**	**61**	**81**	**82**	**137**	**77**	**153**	**219**	**49**	**23**	**38**	**134**	**1114**

Source: [EC-OECD 2020].

policy instruments are dispersed among various strategic documents and numerous government institutions.

The countries referred to above (Hungary, Lithuania and Poland) also have the biggest numbers of introduced innovation policy instruments, whereas Poland is the undisputed leader.

ARKADIUSZ MICHAŁ KOWALSKI, habilitated doctor of economic sciences, Department of East Asian Economic Studies of SGH Warsaw School of Economics; **MAŁGORZATA STEFANIA LEWANDOWSKA**, habilitated doctor of economic sciences, Department of International Management of SGH Warsaw School of Economics; **KRYSTYNA POZNAŃSKA**, professor of economic sciences, Institute of Enterprise of SGH Warsaw School of Economics; **MAŁGORZATA RÓSZKIEWICZ**, professor of economic sciences, Institute of Statistics and Demography of SGH Warsaw School of Economics; **MAŁGORZATA GODLEWSKA**, doctor of economic sciences, Department of Administrative and Financial Corporate Law of SGH Warsaw School of Economics; **MARTA MACKIEWICZ**, doctor of economic sciences, Department of East Asian Economic Studies of the Warsaw School of Economics

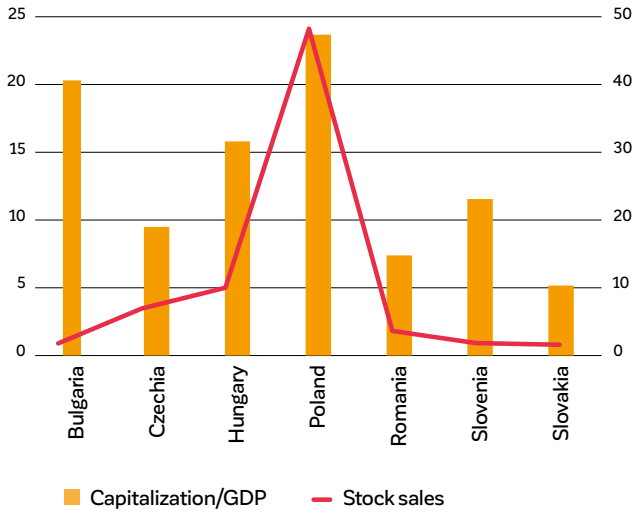
Development of capital markets in the Central and Eastern Europe region

Poland has the best developed capital market among the CEE economies. / Poland is the only country of CEE region classified as a developed market. Czechia, Hungary and Romania are still regarded as emerging markets, while Bulgaria, Croatia, Slovakia and Slovenia are classified as a still lower group – frontier markets. / The first phase of COVID-19-related falls on the Warsaw Stock Exchange occurred already by the end of February, when the WIG index dropped by 14% within five business days.

Poland has the best developed capital market among the analysed CEE economies. Poland has the best developed capital market among the analysed CEE economies. The leading role of our country is visible nominally, which may be explained by a large size of the Polish economy. However, even after the WSE capitalisation is adjusted by GDP, the great significance of the Warsaw stock market in the CEE region is still evident.

Since 24 September 2018 the Polish capital market has been classified as developed, while before it was rated as an emerging market. Thus, Poland found itself in one group with Western Europe countries, such as Germany, France, the Netherlands, Spain, Italy or Great Britain. The rating of our country is positive for all the index components, including gross national product per capita (according to the World Bank data), creditworthiness, regulatory environment, foreign exchange market and capital market (the highest share in the index) and clearing and fiduciary services. Poland is the only country of CEE region classified as a developed market. Czechia, Hungary and Romania (reclassification planned from September 2020) are still regarded as emerging markets, while Bulgaria, Croatia, Slovakia and Slovenia are classified as a still lower group – frontier markets. Promotion to the group of developed markets means recognition of changes carried out so far, and better perception of the Polish capital market by the investors, also foreign ones.

FIGURE 1. Capitalisation of national companies' stocks in relation to GDP (% – left axis) and volume of stock sales (EUR billion – right axis) for 7 CEE economies*



* Data for 2018
Source: own study by SGH Warsaw School of Economics based on data of ECB.

CAPITAL MARKETS IN CEE AND COVID-19

Capital markets were very quick to respond to the news about COVID-19 pandemic. Stock markets all over the world, including those in the CEE region, saw rapid sales of stocks. This resulted in a sharp drop of market indices, connected with decrease in capitalisation on individual markets. The first phase of stock price drops on the Warsaw Stock Exchange occurred already in the end of February, when the WIG index dropped by 14% within five business days. It was followed by a slight recovery, but due to bad news WIG started to fall again (by 28% in six business days), reaching the lowest value of 37,164.02 (closing value) on 12 March 2020.Since then the index was slowly growing until the end of May. WIG gained in total almost 30%, but is still significantly lower than at the end of 2019, just before the information about the pandemic. Similar trends could be observed on the remaining 7 stock exchanges of the CEE region (Tables 1 and 2). The sale off of stocks automatically translated into greater volume of trading, especially in March 2020. This is presented in Table 3. The only exception is Bulgaria, where the drops in relation to December 2019 are explained by the so-called base effect.

TABLE 1. Dynamics of major market indices in the CEE region between January and May 2020.*

Specification	Value – end of 2019	Dynamics Dec 2019 = 100 (%)				
		1	2	3	4	5
Poland – WIG	57,832.88	2.8	-0.4	-24.2	-21.8	-19.1
Hungary – BUX	46,082.82	-0.7	-1.4	-21.9	-26.3	-21.8
Czech Republic – PX	1,115.63	2.4	-1.3	-23.6	-23.8	-19.6
Slovakia – SAX	351.14	0.5	2.0	-3.0	-6.1	0.3
Romania – BET	9,977.33	1.2	0.5	-18.0	-19.7	-15.2
Bulgaria – SOFIX	568.14	5.3	1.9	-17.2	-20.0	-18.0
Slovenia – SBITOP	921.14	4.9	5.4	-14.9	-15.2	-11.3
Croatia – CROBEX	2,017.43	2.0	-0.6	-25.9	-21.8	-21.5

* Average data for individual months.
Source: own study based on data published by the stock exchanges.

TABLE 2. Dynamics of capitalisation value of national companies on the major stock exchanges of the CEE region between January and May 2020*

Country	Value (EUR bn) – end of 2019	Dynamics 30 Dec 2019 = 100 (%)				
		1	2	3	4	5
Poland	129.2	-2.0	-14.2	-26.5	-20.1	-16.3
Hungary	29.4	-7.0	-13.0	-32.3	-28.7	-30.3
Czech Republic	23.4	-2.7	-12.6	-24.9	-18.5	-17.2
Slovakia	2.8	-6.3	-5.3	-9.5	-12.1	-10.1
Romania	37.8	-1.0	-10.3	-33.5	-28.0	-23.5
Bulgaria	4.1	0.2	-2.6	-15.1	-11.3	-9.9
Slovenia	7.1	4.2	-2.0	-20.1	-13.3	-9.5
Croatia	19.9	1.7	-1.7	-14.8	-12.0	-9.7

* Data for the end of each month.
Source: own study based on data published by the stock exchanges.

Last year chairmen of stock exchanges of 7 CEE countries (Poland, Czech Republic, Hungary, Slovakia, Romania, Slovenia, Croatia) took a breakthrough decision that will definitely contribute to closer cooperation in our part of Europe. On 4 September 2019 they signed a letter of intent about launching a new index – CEEplus, or the Three Seas index. The initiative was announced on the last year's 29th Economic Forum in Krynica.

The index portfolio comprises over 100 most liquid companies listed on the regulated markets of stock exchanges of the Central and Eastern Europe region: Bratislava, Bucharest, Budapest, Ljubljana, Prague, Warsaw and Zagreb. Companies are included in the index based on the liquidity criterion: their mean trading volume per session has to be at least EUR 90 thousand for 6 consecutive months. The share of the companies in the index is established on the basis of the number of outstanding shares, taking into account certain limits, e.g. the biggest company cannot have a share exceeding 10%, and companies with a share exceeding 5% cannot account for more than a total of 40% of the index. Additionally, companies from one country cannot account for more than 50% of the index portfolio, which in practice refers only to companies listed on the Warsaw Stock Exchange. The base value of the index is 1 000 points and was established pursuant to data of 30 August 2019.

Further changes of indices, capitalisation and trading volume on the capital markets in the CEE region will depend on, among others, the rate of uncertainty and incoming macroeconomic data that will reflect the influence of the pandemic on the real sphere of the economy.

TABLE 3. Dynamics of stock trading volume on the major stock exchanges of the CEE region between January and May 2020*

Country	Value (EUR million) – Dec 2019	Dynamics Dec 2019 = 100 (%)				
		1	2	3	4	5
Poland	3,217.4	31.7	25.8	86.6	71.0	48.9
Hungary	695.0	9.8	31.6	117.9	58.8	12.2
Czech Republic	293.7	-2.9	58.2	182.8	62.4	36.0
Romania	107.6	89.4	68.5	206.4	67.9	37.3
Bulgaria	11.0	-46.3	-53.3	-6.5	-24.0	-50.7
Slovenia	30.2	19.2	12.6	108.1	-2.4	-4.5
Croatia	15.8	41.3	195.0	340.8	117.7	-1.2

*The juxtaposition does not include Slovakia due to negligibly low volume of stock trading.
Source: own study based on data published by the stock exchanges.

MAREK DIETL, doctor of economic sciences, Department of Business Economics of SGH Warsaw School of Economics; **MATEUSZ MOKROGULSKI**, doctor of economic sciences, Department of Applied Economics of SGH Warsaw School of Economics

Migration processes in the countries of Central and Eastern Europe – transformation from net emigration to net immigration countries

Central and Eastern Europe countries are subject, at a various pace, to transformation from negative to positive net migration rate. / A characteristic feature of CEE countries is a relatively low percentage of immigrants in their societies – the share of foreign citizens was the largest in the Czech Republic (4.1%), while in the next country – Hungary – it was only 1.4%, and in Poland it was 0.3%. / In 2019 Poland for the first time experienced a larger outflow of money sent by immigrants (USD 7.1 billion, or 1.3% of GDP) than the inflow of money from emigrants (USD 6.5 billion, or 1.2% GDP). In the remaining countries of the region transfers inflowing from emigrants prevailed over outflows sent by immigrants staying on their territories. / In 2018 around 1.1 million foreigners could be staying in Poland, which means that they accounted for almost 5% of the total supply on the Polish labour market, while five years later the share was less than 1%. / The work of immigrants contributed on average to GDP growth by around 0.5 percentage points annually. / The COVID-19 epidemic should not substantially change the transformation-related trend of shifting from negative to positive migration ratio in the countries of Central and Eastern Europe.

Faster development of CEE countries and intensified migration processes in recent years suggest that migration flows may play a more significant role in the future development of CEE countries than it has been presumed so far. Long-term migration statistics data, observation of short-term migration and latest demographic projections show that Central and Eastern Europe countries are subject, at a various pace, to transformation from negative to positive net migration rate. It seems that the phenomenon will grow stronger as the population in Central and Eastern Europe will be ageing. It will make the dilemmas of migration policy, which have been present in the public debate of developed countries for decades, more important also in the public debate of the CEE countries.

The feature of most Central and Eastern Europe countries in the past was permanent negative migration rate, which, in some of them, got even more negative after the EU accession. Data about net migration show that at the beginning of this decade two countries (Slovakia and Hungary) had a slightly positive rate of migrations recorded by statistical offices. Other countries in the 2010–2018 period went from a negative to a positive migration rate (Poland and Czechia), or reduced their negative migration rate (Lithuania and, in the last two years, Romania). In relation to the total population, the negative migration rate was most noticeable in the Baltic countries, such as Lithuania and Romania.

A characteristic feature of the CEE countries is a relatively low percentage of foreigners in their societies, resulting from historical conditions and – in the first decades of transformation – relatively small attractiveness of these countries for emigrants thinking about permanent stay. Eurostat data show that the share of foreign citizens was the largest in the Czech Republic (4.1%), while in the next country – Hungary – it was only 1.4%, and in Poland it was 0.3%. Most immigrants staying in the CEE countries are the citizens of other CEE countries, including Ukraine and Belarus. Significant groups of foreigners consist also of the Chinese, Vietnamese and Russians, and in the case of Romania – the French. On the other hand, the most common directions of emigration from the CEE countries are Germany, United Kingdom and Austria. The latest emigration

TABLE 1. Directions of migration and money flows in the CEE countries

Country	Directions of emigration	Sources of immigration	Share of immigrants (%)	Annual money transfers (USD billion)	
				outflow	inflow
Poland	Germany, United Kingdom, the Netherlands	Ukraine, Belarus, China/Vietnam	0.3	7.1	6.5
Lithuania	Germany, United Kingdom, Norway	Ukraine, Belarus, Russia	0.8	0.5	1.4
Czech Republic	Germany, Austria, Switzerland	Ukraine, Slovakia, Russia	4.1	2.0	3.9
Hungary	Germany, Austria, United Kingdom	Ukraine, Romania, Germany	1.4	0.9	4.7
Slovakia	Germany, Czech Republic, Austria	Czech Republic, Hungary, Romania	1.1	0.3	2.2
Romania	Germany, United Kingdom, Italy	Moldova, China, France	0.4	0.4	5.2

Source: own study by SGH Warsaw School of Economics based on data of Eurostat.

TABLE 2. Breakdown of the Polish GDP growth (YoY), showing the contribution of immigrants' work and changes in the structure of workers' features and their workplaces

Year	GDP growth (YoY)	Contribution GDP growth (YoY)				
		capital	PL work	work of immigrants	use of potential	TFP
2014	3.3	1.5	1.6	0.3	–0.5	0.3
2015	3.8	1.7	1.1	0.3	–0.1	0.6
2016	3.0	1.5	0.8	0.7	0.1	–0.1
2017	4.7	1.2	0.7	0.8	0.8	1.2
2018	5.0	1.3	–0.3	0.3	0.8	2.8
Average 2013–2018	3.9	1.5	0.8	0.5	0.2	1.0

Source: own study by SGH Warsaw School of Economics

history and the new history of immigration also stimulate considerable migrant money transfers received and sent by CEE countries. It is particularly evident in Poland, which in 2019 for the first time experienced a larger outflow of money sent by immigrants (USD 7.1 billion, or 1.3% of GDP) than the inflow of money from emigrants (USD 6.5 billion, or 1.2% GDP). In the remaining countries of the region transfers inflowing from emigrants prevailed over outflows sent by immigrants staying on their territories, although in the Czech Republic, similarly to Poland, the transfers sent by immigrants grew quickly.

Population projections prepared for the EU countries by Eurostat assume that in the next decades the positive net migration rate will be maintained in Poland, Czech Republic, Hungary and Slovakia. Romania and Lithuania should reach a state close to balance between migration inflows and outflows in the second half of the century.

Immigrants invisible in official statistics were an important factor on the Polish labour market. Estimates based on an attempt to integrate various data sources show that around 1.1 million immigrants could be staying in 2018 in Poland, which means that they accounted for almost 5% of the total supply on the Polish labour market, while five years later the share was less than 1%. Their contribution to the uptake in labour force supply in 2013–2018 was comparable to the increase in the Polish workers' employment in the same period and accompanied by a quickly reducing unemployment rate. In the whole 2013–2018 period the work of immigrants contributed on average to GDP growth by around 0.5 percentage points annually. The estimates took into account, apart from the number of immigrants, also the age and gender structure, education, professions and sectors in which they were employed in Poland.

MIGRATION PROCESSES AND COVID-19

COVID-19 epidemic forced countries all over the world to restrict travel and human contacts, which directly affected immigration. Economies of most countries are in recession. Both these factors considerably reduce the volume of migration flows in the short term but should not substantially change the transformation-related trend: from negative to positive migration ratio in the countries of Central and Eastern Europe being the members of the EU.

In the analysed CEE countries most immigrants before the COVID-19 were the citizens of Ukraine. Money transferred by them accounted for a substantial percentage of the Ukrainian GDP (10.5%). It can be therefore presumed that along with liberalisation of migrant flows and reopening of the economies many of those who had worked during short-term migrations might come to Poland again.

The survey proved that although the immigrants often pursue less productive professions requiring relatively small qualifications, their work contribution is increased by a much higher number of working hours than for local workers.

PAWEŁ STRZELECKI, doctor of economic sciences, Institute of Statistics and Demography of SGH Warsaw School of Economics; **MARTA PACHOCKA**, doctor of economic sciences, Department of Political Studies of SGH Warsaw School of Economics

Local responses to the issue of smog in the countries of Central and Eastern Europe

In Europe alone smog encumbers the economy with healthcare costs of EUR 4 billion a year and waste of working time worth EUR 16 billion. / Costs generated by smog due to lower work productivity, expenses of the health sector and lower agricultural production will reach 1% of global GDP by 2060. / Among almost 3 thousand cities analysed by WHO almost half of one hundred cities most polluted with PM10 are located in Poland. / Polish Supreme Audit Office has estimated the costs of bad air quality (PM2.5 concentration) only in five controlled regions for approximately PLN 12.6 billion a year. / Electromobility and micromobility are an opportunity for European cities to revolutionize communication systems and face up to challenges of air quality improvement. The COVID-19 pandemic is going to popularize micromobility.

Economic consequences of smog may be assessed in terms of costs generated by excessive greenhouse gas emission. They can also be analysed with reference to direct and indirect costs incurred by various economic stakeholders. First, it is estimated that (according to OECD data) increase in concentration of PM2.5 and ozone is going to raise global healthcare costs from USD 21 billion in 2015 to USD 176 billion in 2060. Additionally, a year-long absence at work affecting work productivity will then reach 3.7 billion days, while in 2015 it was 1.2 billion days per year. In Europe alone, according to European Commission's estimates, smog encumbers the economy with healthcare costs of EUR 4 billion a year and waste of working time worth EUR 16 billion. Total costs generated by smog due to lower work productivity, expenses of the health sector and lower agricultural production will reach 1% of global GDP by 2060. Economic impact of smog, covering also indirect costs, should include also premature deaths (6–9 million a year), costs of social welfare systems and change of trade flows. Indirect costs therefore are generated in areas similar to direct costs (healthcare, work productivity, agriculture), but they are delayed and more difficult to quantify.

High rate of air pollution is a critical problem, harmful for health and life of EU citizens. The air quality does not satisfy the norms in as much as 130 European cities. The situation is particularly bad in Poland. Among ten most polluted European cities in a rating of the European Environment Agency there are six Polish ones, including Katowice and Cracow.

The organisation CE Deft has also estimated that market and non-market costs of air pollution caused by traffic and transport in 2016 were between 67 billion and 80 billion, 75%–83% of which were generated by diesel engines. The costs could be reduced to about EUR 20–25 billion if the measures aimed at emission reduction applied so far are maintained.

Similar calculations have been produced by Polish Supreme Audit Office, which has estimated the costs of bad air quality (PM2.5 concentration) in five controlled regions for approximately PLN 12.6 billion a year.

The relation between urbanization and environment pollution seems obvious. Pollution usually concentrates around the place it has been produced and these are usually areas with compact residential structure (cities). City transport is responsible for 23% of gas emission in Europe. Over 80% of global population of cities has to breath air of poor quality (not meeting WHO norms), which results in around 4.5 million deaths a year. Cities of Central and Eastern Europe (except for the Baltic countries) are among areas with the worst air quality in Europe. For instance, among almost 3 thousand cities analysed by WHO, almost half of the hundred cities most polluted with PM10 are located in Poland.

Cities are considered to be the source of smog, but they can also be perceived as a source of solutions. In modern urban areas we can observe innovations, such as air filtering buses; paints absorbing pollution; plant installations cleaning the air around building structures. Considering the fact that over half of population of the Earth live in cities, the problem is serious enough to create a list of solutions that could be adapted by cities in order to reduce gas emission and improve air quality for around 6 billion people all over the world. Basically these solutions could be categorised into groups corresponding to main areas generating smog in cities. These are: transport, land development (quality of space covered with building structures and proportion of green areas), environmental impact of buildings, activities of enterprises and consumption. It is highlighted that only integrated approach to the issue of smog in cities will make it possible to find solutions of good quality. Selective solutions, despite being interesting and innovative, will not allow to change the quality of air, because there is simply too much of it.

The study analyses local dimension of the issue of smog and its impact on a city economy. It provides proposals of responses and instruments that can be applied locally, often by city dwellers themselves. The text indicates the impact that the changes introduced by municipal authorities have on the global problem of smog and how they can serve as effective instruments to counteract it. A majority of the solutions concern transport, since it is the field of activity generating a considerable portion of air pollution. The solutions include alternative ways of moving around the city, such as electromobility, micromobility and their adjustment to the needs of pedestrians. Also solutions connected with decarbonization of construction resources and counteracting smog are very important. They are largely based on modernisation of

public buildings, development of urban heating networks and replacement of heating devices in residential buildings. A response to the issue of air pollution at the level of a city is also adequate tourist traffic management and preventing excessive traffic concentration with the priority of reduction of environmental impact.

Unquestionably, both electromobility and micromobility are an opportunity for European cities to revolutionize transport systems and face up to challenges of air quality improvement. Many best practices may already be found not only in the cities of Western Europe, whose effective solutions are worth copying, but also in Central and Eastern Europe. Increased use of electric cars and personal transport devices is a realistic scenario of European agglomerations development. Implementation and acceleration of this process requires however further development of infrastructure and society education, as well as popularization of the advantages of alternative forms of transport. This requires faster pace of works on legal regulations concerning electromobility and mobility, covering also systems of financial and non-financial incentives.

This trend is in line with the concept of *walkability*. What is crucial from the perspective of adjusting cities to the needs of pedestrians, is not only the issue of air pollution (reducing forms of transport harmful for human health), but also challenges of social and health protection. Implementation of *walkability* in the cities requires infrastructural adjustment, promotion and education about benefits of *walkability* for the city as a whole and for individual citizens.

As regards buildings, the air pollution problem was considered in the context of public facilities, residential buildings and commercial buildings. Energy efficiency and the issue of heating buildings were taken into account. Measures aimed at decarbonization of construction resources and reduction of smog carried out so far in the analysed EU area are mostly based on modernisation of public facilities, development of urban heating systems and replacement of heating devices in residential buildings. Additionally, education and informing city dwellers about harmful effects of heating flats and houses with solid fuel or waste plays a substantial role. These measures should be supported by schemes of energy poverty reduction. Additionally, to reduce smog in cities, it is important to optimize commercial buildings, especially by cutting down power consumption when no people are inside. Regarding the analysed issue, the next EU 2021–2027 financial perspective will place emphasis on projects carried out as a part of the European Green Deal. It should be stressed that these measures will not be based on subsidies, but on financial benefits resulting directly from energy savings, which is a substantial change in the attitude to spending EU funds.

Correct tourism management, oriented towards reduction of exhaust fumes (smog) emission, requires most of all establishing car traffic routes followed by tourists, analysing traffic density, identification of areas of tourist traffic and mean duration of tourists' stay in such areas. Simultaneously, measures must be taken to create alternative tourist routes by showing and promoting less popular tourist attractions. It would be very desirable to develop context applications that

THE ISSUE OF SMOG AND COVID-19

The COVID-19 pandemic translated directly into the air quality in cities, although differently in different places. In Poland, as opposed to many European countries (such as the Netherlands), smaller business activity and urban traffic have not made the smog smaller, quite the opposite: at the turn of March and April 2020 the maximum level of PM2.5 and PM10 was exceeded several times. This was the case for, among others, Warsaw and Cracow. It was caused by so-called low altitude emissions, or emission of toxic dust and gases at low altitude from chimneys. The temperature in March and April was low, so people were heating their homes in which they were staying working or learning remotely. The air quality was not improved by less intensive use of office buildings, shopping malls and public facilities.

The pandemic was a time of increased interest in micromobility solutions. In the beginning of the lockdown, the mobility of city dwellers and demand for transport services fell down visibly. That was the time when city authorities started to think about how to ensure the inhabitants a safe way of transport during the pandemic, and also after reopening the economy and return to normal. For it is impossible for all the city inhabitants to move with cars or to opt for the public transport, the capacity of which for some time cannot be fully used. Many European cities saw a growing interest in personal means of transport such as bicycles. It was also a moment when an attempt was made to reorganise the city space in a way that would facilitate the movement for vehicles such as bicycles or scooters. For example in Berlin many cycle lanes were broadened, usually to the detriment of space dedicated for the car traffic. New cycle lanes were quickly marked out and separated from the car traffic with bollards. In Milan, strongly affected by the pandemic, an ambitious plan was announced to rebuild 35 km of streets to transform them into cycle- and pedestrian-friendly space. The demand for bicycles also jumped. After the time of home isolation the Europeans appreciated independence ensured by bicycles, not only as a means of transport, but also a source of leisure and fitness. According to data from the Polish bicycle market, in May 2020 the sales of bicycles were twice higher than in the same period in 2019. Because of supply chain disruptions some producers were not able to ensure adequate volume of sales. When the economy was reopening, people were encouraged to use city bicycles available as a part of *bikesharing* systems. Authorities of London, Chicago, Boston, lowered bike rental prices. In Prague and Berlin first half an hour of bike ride was free. In Poland the decisions were utterly different. During the pandemic city bike rental systems were closed. This was one of the causes of bankruptcy of one of the biggest city bike rental operators, Nextbike.

The coronavirus pandemic will definitely be conducive to popularizing micromobility in the cities, due to better awareness about the advantages of personal transport devices.

would be used to redirect tourist traffic in real time, taking into account suggestions based on habits of an individual tourist or a group of tourists on the one hand, and current situation on a given site (parking lot, tourist attraction, restaurant, accommodation establishment etc.) on the other hand.

It seems that other factors affecting air quality (e.g. energy consumption in tourist facilities) are merely products of tourist traffic density. Tackling the problem of *overtourism* will therefore translate into diminishing the intensity of air pollution.

EWELINA SZCZECH-PIETKIEWICZ, habilitated doctor of economic sciences, Institute of International Economic Policy of SGH Warsaw School of Economics; **MAGDALENA KACHNIEWSKA**, habilitated doctor of economic sciences, Department of International Management of SGH Warsaw School of Economic; **DOMINIKA P. BRODOWICZ**, doctor of economic sciences, Department of Innovative City of SGH Warsaw School of Economics; **ANNA PARA**, doctor of social sciences, Department of International Management of SGH Warsaw School of Economics

Silver economy – an opportunity for development for the countries of Central and Eastern Europe

The percentage of people aged 65+ in the countries of Central and Eastern Europe is going to increase threefold from 11.4% (Slovakia) – or 16.2% (Bulgaria) in 2000 to 27.7% (Hungary) or 31.5% (Lithuania) in 2050. / The best situation in respect of income is in Slovenia, where only 4.6% of households are in the group of the 25% households with the lowest income in the society. Bulgaria and Romania are at the opposite end (as much as 83.6% and 79.7% of households respectively). In all the countries of the region women are in a worse position than men in respect of income. / In all the countries of the region, except one (Czechia) over a half of the elderly struggle to make ends meet. / In Poland 23.1% of older people often experience constraints caused by a shortage of money.

A growth of share of ageing people in populations has been observed for years in all the European countries. So far, the countries of Central and Eastern Europe had younger age structures than the countries of Western, Northern and Southern Europe, but in recent years the pace of the process has increased in CEE countries. In 2000 the share of people aged 65 and older in these countries was between 11.4% (Slovakia) and 16.2% (Bulgaria), while in 2019 it was between 16.2% (Slovakia) and 21.3% (Bulgaria). According to Eurostat population projection, it can be expected that by 2050 the percentage of older people will rise to 27.7% (Hungary) – and 31.5% (Lithuania).

The income situation of people aged 65+ in the region is very diversified. It was analysed using information about average monthly income per person in a household. To compare incomes among the countries, the data were presented in the form of quartile groups, calculated for the entire sample. Thus, the population was divided into four equal groups arranged by income, from the lowest to the highest. The best situation in respect of income of older people is in Slovenia, where only 4.6% of households are in the first quartile group, or the group of 25% households with the lowest income in the society. Older people in Czechia, Slovakia and Estonia are in almost equally good situation – the percentage in these countries is not more than 7%. Bulgaria and Romania are at the opposite end, where as much as 83.6% and 79.7% of households respectively are the poorest in Europe. Against this background, the situation of Poland looks good, with the rate of 20.9%, higher only than the 4 countries with the best situation. Slovenia has definitely the highest rate of the wealthiest households, classified in the fourth quartile group: 57.9%. Relatively high rates of wealthy households are also observed in Czechia, Slovakia and Estonia, the lowest are in Bulgaria and Romania.

An important dimension of evaluation of financial situation are differences between men and women. In all the countries of the region the income situation of women is worse – they have a higher percentage of those classified in the first (poorest) group and a lower percentage of those classified in the fourth (wealthiest) quartile group. These differences are significant in Hungary, Bulgaria and Romania, while in Poland, Czechia, Croatia and Lithuania the percentages of the poorest among women and men are almost the same (although men still prevail among the wealthiest).

In all the countries except one (Czechia) over a half of the elderly struggle to make ends meet. The biggest difficulties are encountered by households in Bulgaria, where 88.4% experience some or big problems. Big difficulties are also experienced by older people in Latvia and Hungary, where over 3/4 of households have financial troubles. Relatively the best situation, except Czechia (29.4% of households experiencing difficulties) is in Slovenia and Estonia. The situation in Poland against this background is average – slightly more than 60% of households experience financial difficulties.

TABLE 1. Monthly income per person in a household (quartile groups) by age group (%)

Quartile group	CZ	PL	HU	SI	EE	HR	LT	BG	LV	RO	SK
	65 years and older										
1.	6.8	20.9	22.4	4.6	7.0	27.5	24.8	83.6	23.9	79.7	4.6
2.	14.1	44.6	43.4	12.2	26.0	40.4	58.9	14.0	62.0	15.6	27.9
3.	55.5	20.5	25.5	26.0	49.5	17.3	10.8	1.7	8.6	3.1	46.9
4.	23.7	14.1	8.7	57.3	17.6	14.9	5.6	0.7	5.6	1.6	20.6
N	990	3521	1122	209	168	492	367	1045	270	2176	541

Source: own study by SGH Warsaw School of Economics and the seventh wave of SHARE survey, weighted data.

In all the countries of the region women report greater problems making ends meet than men. Particularly large differences are observed in Slovenia, Croatia, Bulgaria, Latvia and Romania. In Poland women also encounter more financial problems than men (63.4% of women have large or some problems, while the percentage for men is 53.8%).

TABLE 2. Subjective evaluation of financial situation (how a household makes ends meet) by age groups (%)

Answer	CZ	PL	HU	SI	EE	HR	LT	BG	LV	RO	SK
	65 years and older										
with large difficulties	6.4	19.6	19.5	14.8	14.9	23.1	18.1	38.0	29.1	40.0	12.2
with some difficulties	23.0	40.7	58.7	42.6	39.5	45.2	42.5	50.4	50.0	32.1	48.4
relatively easily	38.3	27.6	19.8	30.3	32.5	23.5	29.5	7.8	18.2	21.0	28.6
easily	32.4	12.1	2.0	12.4	13.1	8.2	9.9	3.8	2.8	6.9	10.8
N	1215	4241	1259	254	178	527	390	1070	301	2424	542

Source: own study by SGH Warsaw School of Economics and the seventh wave of SHARE survey, weighted data.

Shortage of money may be a serious constraint for older people. The highest percentage of respondents feeling that they cannot do many things because of financial problems is in Lithuania, where 43.6% of people aged 65 and older declare such constraints. It is surprising, because both in respect of objective measures and the assessment of financial situation of households, Lithuanians were not in the worst position compared to other countries. Constraints caused by shortage of financial resources are not just a derivative of income, but also expectations and opportunities that the elderly can see but cannot use.

High percentage of those experiencing constraints caused by financial problems is also observed in Lithuania, Romania and Bulgaria. The research shows that citizens of Czechia, Slovenia and Slovakia feel the least constrained, as they are in the best financial situation in the context of objective measures. In Poland 23.1% of older people often experience constraints caused by a shortage of money.

TABLE 3. Subjective assessment of financial situation (how often shortage of money prevents the respondents from doing things they would like to do) by age groups (%)

Answer	CZ	PL	HU	SI	EE	HR	LT	BG	LV	RO	SK
	65 years and older										
often	15.4	23.1	22.6	17.7	23.3	25.7	43.6	33.0	39.3	36.6	16.3
sometimes	29.0	29.8	21.6	29.0	30.1	28.8	28.2	34.2	32.2	27.7	32.4
rarely	22.7	22.7	29.2	15.6	19.9	19.8	14.3	20.9	16.5	19.5	27.5
never	29.1	21.1	24.8	32.7	21.5	22.8	13.6	11.1	9.9	16.1	22.5
difficult to say	3.8	3.3	1.8	4.9	5.2	3.0	0.4	0.8	2.1	0.2	1.3
N	1970	6043	1802	378	250	794	534	1480	390	3355	769

Source: own study by SGH Warsaw School of Economics and the seventh wave of SHARE survey, weighted data.

SILVER ECONOMY AND COVID-19

Last but not least, the issue of the COVID-19 pandemic concerning especially the elderly, posing new questions as to how the sliver economy and some of its sectors could include older generations in their actions and enable them activities in specific areas in the conditions of social isolation / sanitary regime. New sectors of the economy that have to develop along with technology progress should also take into account various needs and preferences of the elderly, which change with time. Therefore opinions, attitudes and needs of old people should be monitored in order to adjust various solutions, products and services to the "silver generation".

ANITA ABRAMOWSKA-KMON, doctor of economic sciences, Institute of Statistics and Demography of SGH Warsaw School of Economics; **RADOSŁAW ANTCZAK**, doctor of economic sciences, Institute of Statistics and Demography of SGH Warsaw School of Economics; **PAWEŁ KUBICKI**, habilitated doctor of economic sciences, Institute of Social Economy of SGH Warsaw School of Economics; **JOLANTA PEREK-BIAŁAS**, habilitated doctor of economic sciences, Institute of Statistics and Demography of SGH Warsaw School of Economics; **ZOFIA SZWEDA-LEWANDOWSKA**, doctor of economic sciences, Department of Social Policy of SGH Warsaw School of Economics

Pension schemes as a challenge for new EU Member States from Central and Southern Europe

The 2020 crisis caused by the global pandemic is going to be the next challenge for pension schemes, due to forecast decrease in employment and worse situation of public finance. / For the sake of those working today, or the future pensioners, the upper limit of working age should be raised, as in CSE countries it is even by 10 years lower than in Sweden. / Even if birth rate grew significantly, it would affect the pension system financing only in 3–4 decades.

Countries of Central and Southern Europe are facing a crucial challenge of ensuring social and financial stability of pension schemes in the future. Changing labour market and demographic changes are going to determine solutions applied in these schemes in the future. The 2020 crisis caused by the global pandemic is going to be the next challenge for pension schemes, due to forecast decrease in employment on one hand and worse situation of public finance on other hand. The experience of the 2008 crisis shows that in short-term crises long-term solutions concerning pension schemes are not treated as a priority.

Comparing consumption and income from work makes it possible to identify lower and upper limit of working age, i.e. the age when income from work is not sufficient to finance consumption. For the sake of those working today, or the future pensioners, the upper limit of working age should be raised, as in CSE countries it is even by 10 years lower than in Sweden, where working age is the highest (Table 1).

As can be observed, average income of people aged 55 or younger is not sufficient to finance their consumption in 5 countries of CSE (Romania, Lithuania, Poland, Slovakia) compared to the age of 63 in Sweden. What is more, in the countries with the lowest upper limit of working age, larger differences between the working age of men and women are visible (especially in Romania, Poland, Czechia and Bulgaria).

Projections show that in almost all countries the age in which people stop working will go up. In the European Union by 2070 the age will reach almost 66 years both for men and women. In the CSE countries the biggest growth is expected in Slovakia (retirement age is raised according to changing life expectancy), in Latvia and Hungary (retirement age is raised to 67). In the countries with the lowest employment rates (Croatia, Romania, Slovenia, Poland) the expected rise of the upper limit of working age is smaller, and in Poland also, because of lower retirement age of females, no rise in the upper limit of women's working age is expected. However, it is not possible to maintain the same retirement age in the long term.

In the long-term perspective (of many decades) not much can be done to raise pension benefits from social pension schemes. The size of the benefits will be determined by the rate of employment in relation to the number of pensioners and the burden of financing pensioners' consumption costs by those who work. Here the age in which people start to receive pension will be significant. The older the age, the higher the pensions. Promises made by politicians, not supported by adequate receipts of pension schemes in the long term, will probably not be kept. Potential growth of birth rate would also not be a solution that could improve the finance of pension schemes in the mid-term. Even if birth rate grew significantly, it would affect the pension system financing only in 3–4 decades. Additionally, it should be borne in mind that so far, no OECD country managed to raise significantly its birth rate.

Politicians can boost pension spending *ad hoc* (so the pensions would also grow, but only at the cost of bigger burden for the working generation), with adverse effect on the growth of well-being and smaller spending on other social issues such as health or education. It is not politicians who finance the pensions, but the working generation which provides some of its income from work in the form of public or private transfers to finance consumption of inactive generations.

TABLE 1. Upper limits of working age in CSE countries and Sweden in 2010.

Country	Women	Men	Total	Age difference between men and women (in years)
Romania	45	57	53	12
Bulgaria	51	57	55	6
Lithuania	54	57	55	3
Poland	51	58	55	7
Czechia	52	59	56	7
Slovakia	55	57	57	2
Hungary	56	58	57	2
Latvia	56	58	57	2
Slovenia	55	58	57	3
Estonia	58	59	58	1
Sweden	62	64	63	2

Source: own calculations of SGH Warsaw School of Economics based on [Istenič et al. 2017; European National Transfer Accounts].

LABOUR MARKETS, PENSION SCHEMES AND COVID-19

Most countries, including those situated in Central and Southern Europe, introduced restrictions aimed at preventing the spread of COVID-19. These measures instantly caused shock for their economies, especially labour markets. There is a risk of decrease in employment and job loss, and consequently reduction of future pensions and higher risk of poverty after the end of professional activity. At the same time, lower employment will translate into smaller receipts from contributions and bigger deficits in basic pension schemes. Results of the SHARE survey also indicate that people aged 50+ in Central Europe (Poland, Czechia, Hungary) are less satisfied with their jobs, as a result of which in a situation of additional risk on the labour market they will opt for early retirement sooner than they planned before the COVID-19 pandemic outbreak.

In the new Member States welfare state solutions may be classified in two groups. Czechia, Hungary, Lithuania, Poland, Slovakia are in many ways similar to so-called "old Europe", while in Bulgaria, Estonia, Latvia, Romania and Slovenia transfers addressed to older people are below average. This also determines reactions to the COVID-19 pandemic in respect of social policy and labour market. The most common instruments are subsidies to salaries, easier access to social benefits or introducing additional paid leave. Bulgaria, Hungary and Slovenia ensured additional access to benefits in social schemes, and five countries introduced also a possibility of suspending or reducing social insurance contributions, which also affects the current situation of pension schemes. The effect of these instruments will be in the short term increased deficit in the basic pension schemes (smaller receipts, bigger spending), and in the long term – lower pensions for those who have not paid the contributions or opted for early retirement, which can deepen differences in the size of received benefits in the old age across societies.

The most effective method of ensuring adequate income in the old age is to plan longer professional activity, and thereby longer period of receiving income from employment or business activity, with shorter period when consumption is financed by transforming pension entitlements (in various forms) into pension transfers. This will make the pension benefits higher.

As a matter of fact, the most important issues concerning financing consumption in the old age remain the same. The situation has been changed by inability to finance this consumption easily due to demographic dividend. A challenge that all the developed societies are facing (currently to a various extent, but ultimately the same), is to adjust institutional structures and individual behaviours to the conditions of the 21st century, significantly different than those we were used to in the 20th century.

To sum up, challenges for the developed countries, including Central and Southern Europe, concerning economic security for citizens in the old age are:

- satisfying, by pension schemes, the interests of not only the pensioners' generation but also the working generation;
- promoting professional activity of people across their lifetime and raising effective retirement age, especially for women;
- reducing political interference with the long-term allocation of income, because politics is about "here and now", while allocation of income for the old age covers many decades, so it cannot be subject to discretionary management;
- ensuring stable principles of public pension systems (both actual and in their social perception);
- public education and providing transparent information about income allocation; the information must be not only complete, but also comprehensive;
- building an easily accessible system enabling allocation of income in a simple and comprehensible manner, and resistant to manipulation (also in respect of information);
- establishing institutions enabling common and cheap access to competent education services, offered to the society during entire life;
- developing and applying principles of registering long-term liabilities of social schemes in a way adequate to the situation of the 21st century, so as to avoid superficial actions forced by currently binding rules; they will cause not only confusion, but also worse understanding of the way pension schemes work and less confidence in them.

AGNIESZKA CHŁOŃ-DOMIŃCZAK, habilitated doctor of economic sciences, Institute of Statistics and Demography of SGH Warsaw School of Economics; **EWA CICHOWICZ**, doctor of economic sciences, Financial System Department of SGH Warsaw School of Economics; **MAREK GÓRA**, professor of economic sciences, Department of Economics I of SGH Warsaw School of Economics; **JOANNA RUTECKA-GÓRA**, habilitated doctor of social sciences, Institute of Statistics and Demography of SGH Warsaw School of Economics

Systems of support for start-ups in the Central and Eastern Europe

Estonia, Poland, Lithuania, Czechia and Slovenia are the leaders of development of start-up support systems in Central and Eastern Europe. / The start-up support infrastructure is the worst developed in Albania, Bulgaria and Croatia. / As a result of the pandemic it will be more difficult for start-ups to receive financing from venture capital funds.

Start-ups are innovative businesses looking for an effective business model, oriented towards fast growth, global availability and therefore use of state-of-the-art technology. The authors stress the significance of start-up related aspects highlighted in the last year's survey edition, including the tendency of such enterprises to build global monopolies and generate the biggest possible economic value, and also their perception as organisations seeking for repeatable and scalable business model.

Countries of Central and Eastern Europe have recently undertaken many measures to improve their start-up support systems in place and to make them more enterprise- and investor-friendly, as well as to encourage their dynamic growth, international expansion and global success.

In order to systematize the research methods, the team decided, as a part of a panel of experts consisting of entrepreneurship and innovation researchers and the authors of this study, to examine 10 factors comprising (according to the experts) systems of start-up support of a CEE countries. These factors include:

1) social and economic development;
2) taxation system;
3) intellectual property protection;
4) academic entrepreneurship;
5) government agencies;
6) start-up accelerators;
7) regulatory sandboxes;
8) clusters and network organisations uniting start-ups;
9) venture capital funds;
10) successes of start-ups in respect of their visibility and recognisability for the start-up support system stakeholders.

In order to evaluate the development stage of each CEE country, the research was conducted in a panel of experts using the Delphi technique – each factor comprising the start-up support system in each examined country was given a score

TABLE 1. Detailed evaluation of factors comprising start-up support systems in CEE countries and aggregate evaluation of each country compared to CEE *

Factor	Weight (%)	Countries of Central and Eastern Europe											
		Albania	Bulgaria	Croatia	Czech Republic	Estonia	Lithuania	Latvia	Poland	Romania	Slovakia	Slovenia	Hungary
Development	13.64	0.41	0.41	0.55	0.55	0.55	0.68	0.68	0.68	0.55	0.55	0.41	0.68
Taxes	9.09	0.27	0.36	0.27	0.45	0.45	0.36	0.27	0.27	0.27	0.27	0.45	0.36
IP	6.36	0.19	0.19	0.13	0.19	0.25	0.19	0.19	0.19	0.13	0.13	0.19	0.13
Academic entrepreneurship	6.36	0.06	0.19	0.19	0.32	0.32	0.25	0.13	0.32	0.13	0.25	0.32	0.19
Government agencies	10.00	0.10	0.10	0.20	0.40	0.50	0.40	0.40	0.50	0.10	0.40	0.50	0.30
Accelerators	12.73	0.38	0.51	0.38	0.64	0.64	0.51	0.64	0.51	0.38	0.51	0.64	0.25
Sandboxes	1.82	0.04	0.07	0.04	0.05	0.07	0.09	0.05	0.05	0.04	0.05	0.05	0.09
Clusters	12.73	0.38	0.38	0.38	0.64	0.64	0.64	0.64	0.51	0.38	0.38	0.64	0.38
Venture capital	18.18	0.18	0.36	0.55	0.55	0.91	0.73	0.55	0.91	0.91	0.36	0.55	0.73
Start-up successes	9.09	0.18	0.27	0.18	0.36	0.45	0.36	0.27	0.45	0.36	0.27	0.36	0.36
Total evaluation	100.00	2.20	2.85	2.86	4.15	4.78	4.22	3.82	4.40	3.25	3.18	4.11	3.48

Source: own study by SGH Warsaw School of Economics

Product of evaluation within a criterion from 1 (very low) to 5 (very high) and weight of a given factor. "Leaders" ( ), "raising stars" ( ), "developing" systems ( )

START-UPS AND COVID-19

Because of the pandemic it will be more difficult for start-ups to receive financing from venture capital funds. Many funds have already limited their investments. It can be expected that in the nearest future to receive VC financing businesses will have to demonstrate very well considered ideas, actual scalability of activities, experience in start-up projects. In current circumstances high-risk, uncertain projects rather will not succeed. It is also expected that the industries who are taking advantage of the pandemic, offering solutions particularly useful and desired during the pandemic crisis, will be have the financing priority.

Those most affected by the pandemic are the start-ups operating off-line, especially in the tourism, event and *LendTech (Lending Technology)* sector. It is also a difficult time for start-ups delivering various products made of components imported from abroad, such as enterprises manufacturing hardware, for whom the main source of supply so far was China.

However, for many start-ups the pandemic is an opportunity. So far unprecedented opportunities for dynamic development have opened for enterprises offering innovative solutions for remote education (Education Technology – *EdTech*), e-commerce, tele-health, medical technology (*MedTech*), biotechnology, cybersecurity, computer games, e-sports, supplies, logistics, on-line media.

It can also be expected that the new business conditions would spur further innovativeness of these types of firms. Many start-ups have offered traditional enterprises various free applications in the area of *FinTech*, *CleanTech* (Clean Technology) and *MedTech*, allowing for effective functioning in new, remote conditions.

Owing to the pandemic, some start-ups will be able to directly increase their revenues. For instance one of them, Warsaw Genomics, started to provide molecular coronavirus tests.

A positive aspect of the new reality is that it creates an opportunity to materialize new ideas, highlights new needs of societies trapped in homes and restricted functioning in real space. For those who perceive the situation as a challenge, not a threat or impediment, the COVID-19 pandemic is just a set of new conditions, an opportunity to demonstrate greater innovativeness and flexibility.

from 1 (very low) to 5 (very high) by an expert responsible for research work on that factor. In order to establish the weight of each factor, a binary comparison method was used, or comparison in pairs (each factor was compared with each other factor and a simple majority vote of experts decided about its weight).

It was assumed in the Delphi technique survey of the panel of experts that a synthesized measure (aggregate evaluations for each factor) will make it possible to identify the most developed start-up support systems in CEE. The experts adopted three grades for the start-up support systems, reflecting their degree of development. It was agreed that to call a start-up support system a "leader" of the analysed group of countries in this year's study edition, the total score must be at least 80% of the number of points possible to receive from 1 to 5, namely 4. To be called a "rising star" a start-up support system had to receive in total 60% to 79.99% of all the points from 1 to 5, which is from 3.00 to 3.995 points. Those start-up support systems which were evaluated below 60% of all the score (3.00 and less) are called "developing" systems.

The results of the research allowed to identify 5 "leader" grade start-up support systems (Estonia, Poland, Lithuania, Czechia and Slovenia), 4 "raising star" grade systems (Latvia, Hungary, Romania and Slovakia) and 3 "developing" systems (Albania, Bulgaria, Croatia).

RAFAŁ KASPRZAK, habilitated doctor of economic sciences, Department of Consumer Behaviour Research of SGH Warsaw School of Economics; **MARCIN WOJTYSIAK-KOTLARSKI**, habilitated doctor of economic sciences, Institute of Management of SGH Warsaw School of Economics; **ALBERT TOMASZEWSKI**, doctor of economic sciences, Department of Strategic Management of SGH Warsaw School of Economics; **MARIUSZ STROJNY**, doctor of economic sciences, Institute of Value Management of SGH Warsaw School of Economics, Rector's Representative for Technology Transfer; **MAŁGORZATA GODLEWSKA**, doctor of economic sciences, Department of Administrative and Financial Corporate Law of SGH Warsaw School of Economics; **ANNA MASŁOŃ-ORACZ**, doctor of economic sciences, Institute of Management of SGH Warsaw School of Economics; **ELENA PAWĘTA**, doctor of economic sciences, Institute of International Economics of SGH Warsaw School of Economics; **MARIA PIETRZAK**, doctor of economic sciences, Institute of management of SGH Warsaw School of Economics; **TOMASZ PILEWICZ**, doctor of economic sciences, Institute of Enterprise of SGH Warsaw School of Economics; **OLGA PANKIV**, Project Support Office of SGH Warsaw School of Economics; **BARTOSZ MAJEWSKI**, director of the Centre for Entrepreneurship and Technology Transfer of SGH Warsaw School of Economics; **MIROSŁAW ŁUKASIEWICZ**, doctoral student, Department of Strategic Management of SGH Warsaw School of Economics; **HANNA RACHOŃ**, cooperates with SGH Warsaw School of Economics; **KAMIL FLIG**, Centre for Entrepreneurship and Technology Transfer of SGH Warsaw School of Economics

Trends in the fiscal policy in the countries of Central and Eastern Europe: taxation of enterprise income

Taxation systems in place in CEE are far from theoretically effective models. The current direct tax system in CEE countries comprises in fact diversified national tax systems. / Income taxes encumbering enterprises do not prevail in the tax revenue structure of CEE countries. / Fiscal instruments encouraging enterprises to undertake innovative activities, purchase or develop new technologies have been to a various extent applied by CEE countries. / Convergence research indicates that in times of crises income tax systems in CEE countries were usually becoming similar to each other.

The study analyses income tax solutions functioning in the CEE countries for almost 30 years. During this long period the factors that clearly left their stamps on the tax systems of Central and Eastern Europe countries included: various paths of transformation, reforms of public finance systems, EU membership and the necessity to harmonize taxes, the financial crisis, international capital mobility, international tax competition, pressure of fiscal and short-term needs of state budgets. All the surveyed countries carried out tax reforms in order to adjust their tax legislation to their current stage of social and economic development. The current system of direct taxation in the CEE countries is basically a range of diversified national tax systems. It is worth to pay attention to:

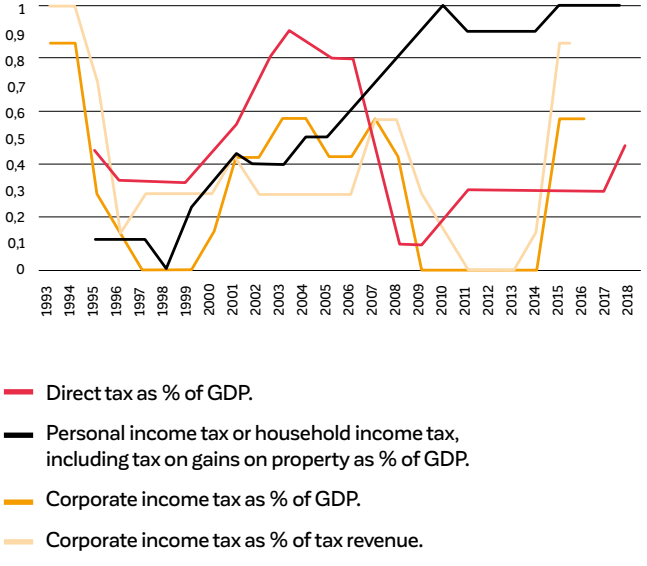
1) different basic taxation rules: taxation of profit (income) versus taxation of profits paid to owners (Estonian system, Latvian system);
2) diversified relations between balance sheet law and tax law (relation between tax income and balance sheet profit, permanent differences, temporary differences);
3) adoption of different rules concerning the revenue/tax expenses generation point: accrual basis versus cash basis accounting;
4) adoption of diversified rules of calculation of tax base (e.g. definition of tax-deductible expenses, scope of exclusions, transfer pricing adjustments, deductions).

Due to the above-mentioned reasons, bare comparison of tax systems in the form of juxtaposition of selected structural elements of tax, such as tax rates, lists of revenues or tax expenses, cannot produce reliable conclusions. Whether the direct taxation system had been subject to a convergence process was established in a comprehensive manner, based on, among others, data clustering algorithms, time series similarity measures using hidden Markov models, and most of all expert analysis of data available for each country covered by the study. A key part of statistical analyses was based on the relation of tax revenue from some types of tax to GDP, or total tax revenue.

Convergence research indicates that in times of crisis countries become similar to each other in respect of direct taxes as a percentage of GDP or corporate income tax as a percentage of GDP or as a percentage of total tax revenue. The only exception are personal income taxes, which differentiate the analysed countries compared to the reference country (Latvia), thereby generating processes of group divergence.

Despite numerous differences in taxation policies of CEE countries, reflected by our original method of classification of countries, a range of regularities can be observed. First of all, taxation systems in place are far from theoretically effective models. Major pillars of the taxation systems of the analysed countries are, apart from turnover tax, corporate income tax and personal income tax. However, they do not prevail in the tax revenue structures of the CEE countries. A positive feature was the fact that most of these countries reduced tax burden of income tax. The process of tax burden reduction should however be perceived in the context of not only stimulation of global tax competition, but also exploration of taxation rate adjusted to long-term economic growth. We should also mention some tax incentives that could

FIGURE 1. Pace of convergence for CEE countries covered by the research



Source: own study by SGH Warsaw School of Economics

support R&D activities. For the innovation imperative as a condition of economic growth is so obvious that it is perceived almost as a tenet of contemporary economics.

PAWEŁ FELIS, habilitated doctor of economic sciences, Institute of Finance of SGH Warsaw School of Economics; **MICHAŁ BERNARDELLI**, habilitated doctor of economic sciences, Institute of Econometrics of SGH Warsaw School of Economics; **MARCIN JAMROŻY**, habilitated doctor of economic sciences, Institute of Finance of SGH Warsaw School of Economics; **JACEK LIPIEC**, habilitated doctor of economic sciences, Institute of Enterprise of SGH Warsaw School of Economics; **ELŻBIETA MALINOWSKA-MISIĄG**, doctor of economic sciences, Institute of Finance of SGH Warsaw School of Economics; **JOANNA SZLĘZAK-MATUSEWICZ**, doctor of economic sciences, Institute of Finance of SGH Warsaw School of Economics; **GRZEGORZ OTCZYK**, doctoral student, Collegium of Management and Finance of SGH Warsaw School of Economics

TAXES AND COVID-19 (I)

CEE countries introduced some changes in their income taxation systems due to the coronavirus pandemic. Let us list solutions applied in Poland that affect the volume of tax base. A possibility of back-settlement of a tax loss was introduced. Under some conditions entrepreneurs will be able to deduct tax loss incurred in 2020 from their revenue earned in 2019. They can also use tax allowance for donations granted for counteracting COVID-19, deduct from their income R&D expenses aimed at developing products necessary to control the coronavirus epidemic. Enterprises manufacturing goods connected with combating COVID-19 can include one-off depreciation expense in tax expenses. Other solutions include: a possibility to resign from simplified advance tax payments in 2020 for small taxpayers, resignation from charging extension fee, resignation from penalties for delay in filing PIT declaration for 2019.

Trends in the fiscal policy in the countries of Central and Eastern Europe: tax obligations of entrepreneurs

Fiscal policy in Poland in the analysed period was mostly oriented towards maximisation of the fiscal effect, practically disregarding the expenses incurred by enterprises, including small and mid-sized ones. / Analysis of judgements of the Polish Supreme Administrative Court indicates that the time between the moment of an economic event determining the size of VAT and the issuance of a final decision appealed in a court is usually about 5 years. / Many changes that were to be introduced in connection with the COVID-19 pandemic were delayed (such as changes concerning the new SAF-T, new rules of tax deducted at source, new matrix of VAT rates or deferral of tax on retail sales). Thus, the legislator in a way admitted that there will probably be problems with implementation of new instruments.

Analyses of instruments for tightening the tax system introduced after 2016 allow to assess their effectiveness, understood as a relation of the fiscal effect to costs generated by the economy as a whole. The collected data make it possible to draw a couple of conclusions about fiscal policy of the examined countries of Central and Eastern Europe. As a part of the integration association of which these countries are members, measures are undertaken to maintain at least formal compliance with the EU law. In a more long-term perspective legislation measures are determined by the social and economic situation and legislative system of each country. Against this background differences among individual countries are best visible. The differences include:

1) very strong resistance to discretion of the fiscal administration's actions (typical for Polish tax legislation), which is not visible to such an extent in other similar countries; this situation can be perceived positively as a broader legal scope of effective administrative authority in Hungary and Slovakia, which is connected with greater confidence in the fiscal administration;
2) the legislator's focus on Poland's internal economy compared to much greater openness to new taxpayers in other examined countries (mostly the case of the Czech and Slovak taxation systems), which minimises the burden of legal institutions, even at the cost of state revenues.

In Poland individual taxes are treated unequally when it comes to complexity and coherence of regulatory policy. While some tendency to secure coherence of fiscal policy can be identified in indirect taxes, which are the main source of state budget funds, income taxes are characterised by a lack of coherence in fiscal policy and greater acceptance for legislative initiatives from outside the Council of Ministers, disregarding detailed economic analyses and undertaking *ad hoc* regulatory measures.

Summing up the detailed survey, it should be highlighted that the data seem to confirm the thesis that fiscal policy in the analysed period was most of all oriented towards maximisation of the fiscal effect, practically disregarding the expenses incurred by enterprises, including small and mid-sized ones. An example may be the way the SAF-T currently in force was

TAXES AND COVID-19 (II)

It is too early to establish how the COVID-19 crisis will impact the situation of taxpayers in their relations with tax authorities. It seems that, apart from the legislative aspect (and related uncertainty caused by both the complexity and a clearly visible scope of the legislator's interference with economic processes) the process of law enforcement during tax and customs control will be of key significance.

Previous experiences show what role the mechanics of the fiscal authority activities plays in this process. For instance, an analysis of judgements of the Polish Supreme Administrative Court indicates that the time between the moment of an economic event determining the size of VAT and the issuance of a final decision appealed in a court is usually about 5 years. Such factors seem to impact the effectiveness of the fiscal authority activities not only from the perspective of the number and amounts of fiscal and customs control findings, but also all the funds received on this basis by the state budget.

Attention should also be paid to measures undertaken by the legislator in the circumstances of the pandemic. For apart from extension of tax payment or settlement deadlines, many changes that were to be introduced were delayed, such as changes concerning the new SAF-T, new rules of tax deducted at source, new matrix of VAT rates or deferral of tax on retail sales. These measures were often a response to proposals of entrepreneurs, who said that it would be particularly difficult to adjust to new legal regulations during the pandemic. Therefore, by making the aforementioned changes, the legislator in a way admitted that introducing new instruments would entail problems and many doubts which should be minimized after the crisis. It is a clear evidence that the legislator is aware of significant problems that enterprises encounter in practice in the face of fiscal law changes.

introduced, largely duplicating already existing information obligations related to VAT declaration, which it could replace. Thus, the costs of measures that are supposed to increase the volume of tax revenue are transferred to taxpayers, and they seem to be more burdensome for smaller entities which cannot count on the support of specialised legal and tax departments.

This tendency is reflected by an analysis of regulatory impact assessment (RIA), which is an instrument for creating law based on evidence. In principle, these documents are not precise or even at variance with reasons for introduction of normative changes (e.g. assessment of fiscal impact of spreading the SAF-T obligation to all entities). It seems characteristic that among the analysed instruments the most thorough assessment of fiscal impact concerned allowance for R&D.

The effectiveness of fiscal policy instruments – a category of economic sciences – is expressed by the construction of the proportionality principle, which is one of the foundations of the EU law. It involves adequacy of objectives and measures of introduced regulations, creating not only instruments implemented at the international level (such as ATAD Directive), but also actions undertaken to implement them. It seems that the importance of paying much more attention to these matters should be highlighted in proposals directed to the Polish legislator.

DOMINIK JAN GAJEWSKI, habilitated doctor of legal sciences, Institute of Law of SGH Warsaw School of Economics; **ALEKSANDER WERNER**, habilitated doctor of legal sciences, Department of Administrative and Financial Corporate Law of SGH Warsaw School of Economics; **PIOTR KARWAT**, doctor of legal sciences, Department of Administrative and Financial Corporate Law of SGH Warsaw School of Economics; **ADAM OLCZYK**, doctor of social sciences, Institute of Law of SGH Warsaw School of Economics; **JAROSŁAW WIERZBICKI**, doctor of economic sciences, Institute of Law of SGH Warsaw School of Economics