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The economics of a pandemic: the case of COVID-19

EDITOR'S NOTE

By Tanja Porčnik*

A pandemic is a great threat to the health and safety of the people. In addition, it profoundly disrupts people's lives and the economy.

The COVID-19 pandemic of 2020 has unexpectedly and significantly disrupted the economic patterns of societies around the globe. It has infected millions and brought economic activity to a near-standstill as countries imposed strict and far-reaching restrictions on movement to limit the spread of the novel coronavirus (SARS-CoV-2). The World Bank (2020) predicts that the COVID-19 pandemic will plunge most countries into recession in 2020, with per capita income contracting in the largest fraction of countries globally since 1870.

In responding to the exigencies of the current global health crisis caused by an outbreak of the coronavirus, governments worldwide have made vast and unprecedented decisions to combat the spread of the virus and protect lives by detecting disease, reducing new cases, and limiting mortality. These state emergency measures, which are, on the one hand, vital to the health and safety of the people, on the other hand, have put their economies into a state of hibernation. The latter has severely impacted the economic performance of countries and the economic standing of their citizens. In such times, governments need to exercise prudence when introducing emergency measures to control the virus, weighing carefully what limitations to impose on human rights and freedoms.

It is with great pleasure that I present Issue 5 of *The Visio Journal* that features four papers exploring the economic implications of the coronavirus pandemic for the citizens, workers, households, businesses, state budgets, and economies. In the first one, Dr. Aleksander Łaszek explores how the COVID-19 pandemic affected companies in Poland and discusses policy responses to it. The paper portrays both steps taken by the Polish government to limit the COVID-19 virus spread and economic policy responses aimed at mitigating economic fallout due to a pandemic. Additionally, Dr. Łaszek articulates the changes in the overall situation of companies in Poland during the pandemic, as well as discusses the efficiency of a policy response to the problems faced by companies and what macroeconomic effects can be expected.

Next, Dr. Jure Stojan uses a state-space framework of time series analysis to examine the changes in seasonality brought about by the coronavirus pandemic of 2020. The paper finds that while no significant crisis effects appear in daily euro-denominated transfers from Slovenia to Bosnia and Herzegovina, trend levels in Slovenian aggregate electricity consumption did decline noticeably. The day-of-the-week patterns remained stable even in times of the lockdown. Not so in Apple mobility data, where seasonality is shown to have altered significantly in Slovenia but also in Sweden, Serbia, Romania, Germany, and Austria.

Third, Dr. Octavian-Dragomir Jora explores whether the new coronavirus is a blindfolded leveller or, on the contrary, a balance destroyer. In this effort, the author surveys the emerging liter-

ature on pandemics and inequalities and treats it with a tint of classical liberal common-sensical logic. In this endeavor, Dr. Jora examines the routes by which the pandemic leads to even-more-uneven social access to money, jobs, education, healthcare, or empathy. He concludes that even prior to a COVID-19 cure, humankind needs a thoughtful vaccine against even more sophisticated and deeply sophistic, viruses of the mind.

Fourth, Dr. Damir Bećirović, Faruk Hadžić, and Admir Čavalić analyze economic implications of the COVID-19 pandemic in Bosnia and Herzegovina. In addition to the macroeconomic analysis, the paper draws on surveys to provide insight into the economic impact of COVID-19 on small businesses in Bosnia and Herzegovina, as well as their view of COVID-19 governmental measures and their effectiveness, and their anticipation of the future. Their original research yields that the business community in Bosnia and Herzegovina is genuinely concerned about the economic consequences of the COVID-19 crisis, both for the overall economy and their business. In addition, their major concern is personal finances and job stability. However, while most respondents believe that the pandemic will affect people's consumption and lifestyle, they also view the pandemic as a chance to modernize businesses and business models.

Finally, I would like to recognize the generous contribution of the Friedrich Naumann Foundation for Freedom for supporting the journal that is before you.

World Bank (2020, June 8). *The Global Economic Outlook During the COVID-19 Pandemic: A Changed World*, https://www.worldbank.org/en/news/feature/2020/06/08/the-global-economic-outlook-during-the-covid-19-pandemic-a-changed-world

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Evaluating COVID-19 policy responses in Poland

By Aleksander ŁASZEK*

COVID-19 reached Poland a few weeks later than Western Europe, to which the Polish government responded promptly by introducing a nation-wide lockdown. Administrative restrictions to constrain the spread of the virus coupled with reactions of wary consumers led to economic disruptions that peaked in April 2020. This paper presents data showing how COVID-19 affected companies in Poland and discusses policy responses to it.

The first part of the paper points to the strengths and weaknesses of the Polish economy on the eve of a pandemic. In the second and third parts, the paper portrays both steps taken by the Polish government to limit COVID-19 spread and economic policy responses aimed at mitigating economic fallout due to a pandemic. In the fourth part, it presents how the overall situation of companies changed during the pandemic. In contrast, the fifth part discusses in detail the most pressing issues for companies at the height of the lockdown. In the final part, the paper discusses the efficiency of a policy response to the problems faced by companies and what macroeconomic effects can be expected.

Key words: COVID-19, policy response, lockdown, administrative restrictions.

1. Strengths and weaknesses of the Polish economy facing COVID-19 pandemic

Later arrival of COVID-19 in Poland could be a result of weak international connections (see Figure 1). In Poland, the first case of COVID-19 was recorded on March 4, 2020, which is over a month later than in Western Europe, where the virus was confirmed at the end of January 2020. However, recent reports from France indicate that COVID-19 might have been present there as early as December 2019. Although after 30 years since the fall of communism, Poland has moved from the periphery of the global economy much closer to its center, it is still poorer and less globalized than Western peers. Fewer passengers of transcontinental flights could have delayed the arrival of COVID-19.

Figure 1. Passengers of trans-continental flights per population, 2018
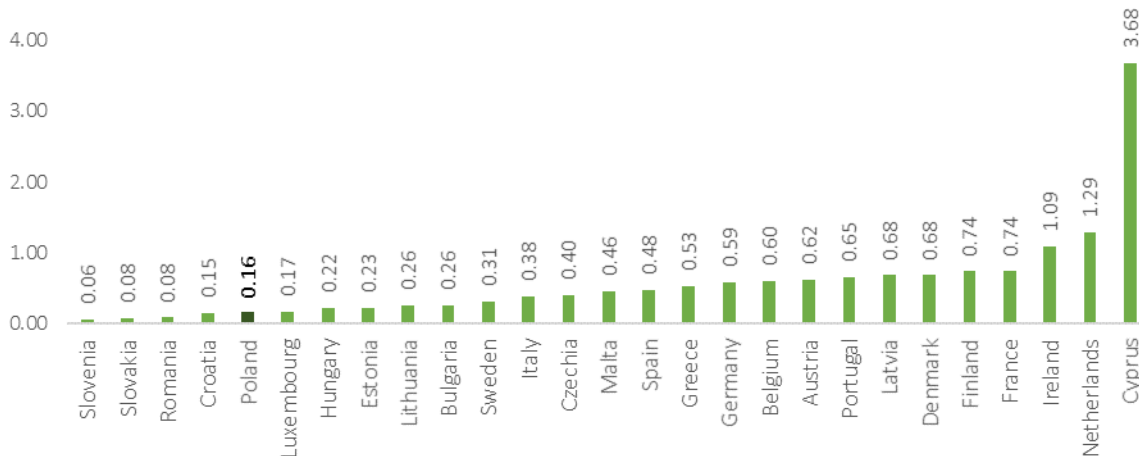
Source: FOR (forthcoming).

The slow spread of COVID-19 in Poland could be a result of a low level of urbanization (see Figure 2). Compared to other highly developed OECD countries, Poland's low level of urbanization might have slowed the spread of the pandemic. Around half of the cases were recorded in just two voivodeships in Poland: Silesian (Katowice agglomeration) and Mazovian (Warsaw). Along with a low level of urbanization, Poland also benefited from having a lower share of people aged 65+ (17.7%), which is below the EU average (20.3%) and far below the Italian average (22.8%).

Figure 2. Share of population living in urban areas with 50 thousand or more people, 2015
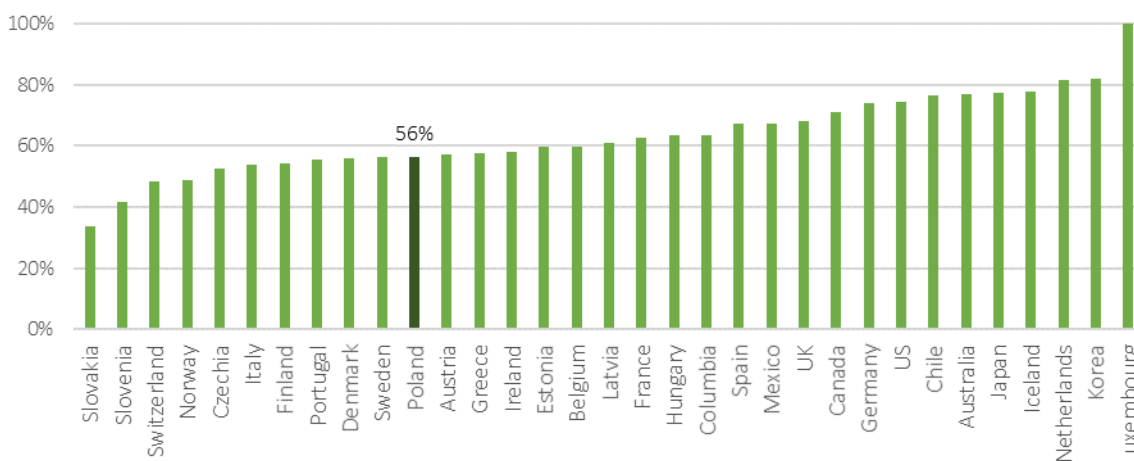
Source: FOR (forthcoming).

Structure of the Polish economy put Poland in a favorable position compared to the majority of Western European peers. Tourism does not contribute significantly to the Polish GDP. Among OECD countries, only in Luxembourg tourism generates smaller part of GDP than in Po-

land (OECD 2020). Further, Polish manufacturing is well diversified. Compared to regional peers, Polish economy is less dependent on the global automobile industry, which suffered significantly from both distortions in supply chains and contracting demand.

The state of both healthcare and bureaucracy, coupled with burdensome regulation, has been the main weaknesses of Poland in the wake of a pandemic. The poor state of Polish healthcare has been an ongoing issue for years, concerning both sizes of public expenditure (4.8% GDP in 2018 vs. EU average of 7.1%) and the efficiency with which those resources are used. A limited capacity of healthcare system can be illustrated by a low share of doctors in the population (practicing physicians per 100 thousand inhabitants in 2017: PL 238 vs. EU27 361) that could become a bottleneck in case of massive breakout of a pandemic. Concurrently, weak bureaucracy and complicated rules (according to World Bank Doing Business, Polish tax system is the second most time-consuming in the EU) have limited government's capacity to efficiently introduce and administer COVID-19 recovery packages.

2. Lockdown and social distancing

Strict lockdown in Poland was promptly introduced within two weeks of first confirmed cases. While there has been a huge variation in policy responses in Western Europe in terms of the speed and stringency of restrictions on people's movement, business and other activities, the reaction of Visegrad countries followed the same pattern of strict restrictions implemented within 2-3 weeks since the first cases were reported. Such actions were driven on the one hand by the experience of the hardest-hit countries like Italy and, on the other hand, by the fears that understaffed healthcare system in Poland could break down in case of massive breakout of COVID-19. As a result of prompt state action, number of COVID-19 cases per 1 million people remained limited both in Poland and our regional peers (see Figure 3).

Figure 3. Confirmed COVID-19 cases per 1 million population (as of July 15, 2020)
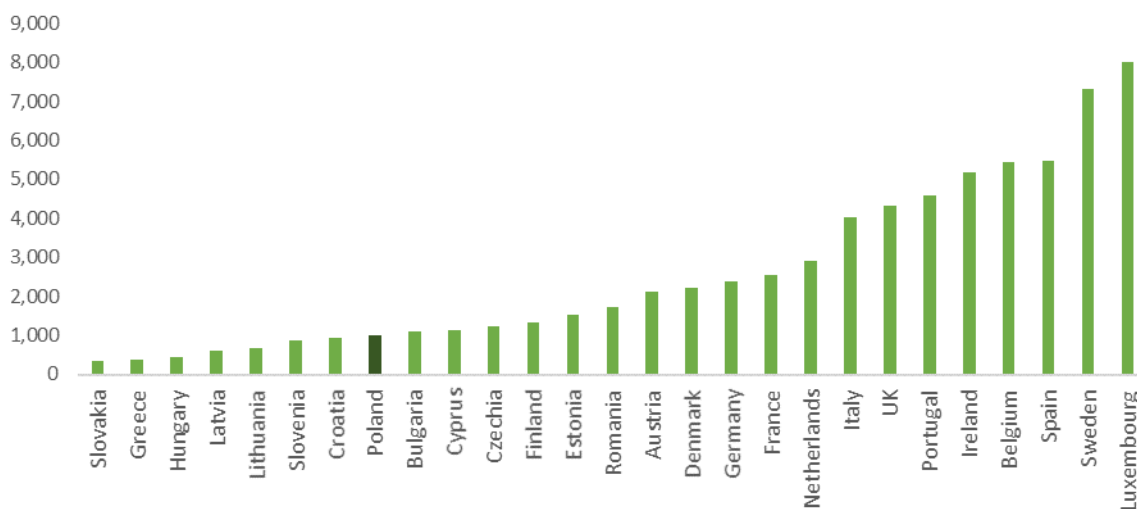
Source: Hale et al. (2020).

Majority of restrictions in Poland was introduced in the second half of March:

- March 10, 2020 – the cancellation of mass events (over 1.000 participants outdoors or 500 indoors).
- March 14, 2020 – closure of schools (initially by March 25, later extended); prohibition of public gatherings; masses and funerals restricted to 50 people; closure of restaurants (take away and delivery allowed); closure of shopping malls, except for groceries and pharmacies (shops outside of malls were allowed to operate but with restrictions on the number of costumers); suspension of cultural institutions (theaters, cinemas, museums, etc.).
- March 15, 2020 – closure of international borders for ten days, later extended multiple times.
- March 24, 2020 – gatherings limited to two people (excluding families), except weddings, funerals and masses (up to 5 people), restrictions on "non-essential travel".
- March 31, 2020 – closure of parks, boulevards, and beaches, as well as hairdressers, beauty, tattoo, and piercing salons; and closure of hotels (with some exceptions).
- The government has started to lift restrictions on April 20, 2020. The majority of them were lifted by May 30. For businesses, particularly relevant was the opening of shopping malls (May 4th), gastronomy (May 18th) and the international borders with EU member countries (June 13th). However, schools remained closed and businesses that reopened had to apply new sanitary restrictions, like wearing masks and using hand sanitizers.

It seems that lockdown in Poland was successful in limiting the death toll. Putting aside controversies concerning methodology of counting COVID-19 deaths (Hirsch and Martuscelli 2020), no excess mortality in Poland has been recorded in April or May 2020 compared to the corresponding period of the previous year. In fact, there was even a slight decline in the number of deaths despite aging population. However, the pandemic is not over yet and the next wave(s) might change that picture. Although lockdown and social distancing have allowed to avoid a spike in deaths so far, they took a heavy toll on the economy.

3.   Economic policy response

The development of policy response took the Polish government more time than the introduction of lockdown. Government has started to work on its economic response ("anticrisis shield") at the beginning of March 2020. However, it took nearly a month to prepare it and pass it through Polish parliament. In subsequent weeks, the so-called anticrisis shield was modified several times, as well as supplemented by actions of the Poland's central bank.

The economic policy response has been a mixture of budgetary programs, extra-budgetary measures, and actions by the central bank and regulators in Poland. They can be grouped into three broad categories:

- So-called **anti-crisis shields** – drafting of it started at the beginning of March 2020; however, it took until March 31 before it passed through parliament. The main instruments were tax holidays, workplace subsidies, and regulatory adjustments (mainly to delay certain new regulatory and tax burdens). Since March 2020, the anti-crisis shield

has been modified several times.

- So called **financial shield** and **anti-COVID-19 fund** - as economic disruptions escalated and the initial anti-crisis shield felt short of expectations, the Polish government on April 8, 2020 announced additional program to subsidize companies that run within the Polish Development Fund (Polski Fundusz Rozwoju – PFR). PFR will also manage the anti-COVID-19 fund, which will be used to finance selected public expenditures outside of existing fiscal rules.
- Actions by National Bank of Poland (NBP) and Financial Stability Committee (Komitet Stabilności Finansowej - KSF) – along with governmental actions, the National Bank of Poland has lowered interest rates three times and announced an asset purchase program, while Financial Stability Committee lowered capital requirements for banks to keep credit flowing.

The anti-crisis shield is a broad umbrella for multiple evolving and overlapping support instruments for companies. Instruments included in the shield have been changing and vary significantly in terms of promptness and efficiency. The Polish government estimated at the end of April 2020 in Convergence Program that the overall cost of the program will amount to 3.2% GDP. Among the most important are:

- Standstill benefit for persons working under civil law contracts and self-employed persons – with a large scope of non-standard working agreements, many workers immediately lost their income and were not entitled to unemployment benefit. The cost of the program was expected to amount to 0.7% GDP, but until the beginning of July 2020, costs were around 0.2% GDP; however, this benefit goes in hand with EUR 1250 loan for microenterprises, that great majority of the companies will not have to pay back. The cost of loan scheme is around 0.4% GDP which taken together gives amount similar to initial governmental plans.
- 3-month exemption from social security contributions applicable to micro-firms (up to 9 insured people) and self-employed who do not insure anyone except themselves (subject to revenue condition); later it was broadened to partially include small firms (10-49 insured people), for which the exemption is capped at 50% of social security contributions. An exemption was introduced swiftly, but the instrument is costly (according to governmental estimates it will cost 0.65% GDP, but till the end of July costs exceeded 0,75% GDP) and poorly targeted: even micro-firms not affected by COVID-19 have benefited from the exemption, while larger companies in sectors heavily affected by pandemic were still obliged to pay the full cost of contributions.
- Cofinancing part of employees' salaries for companies– there are two, slightly different schemes of cofinancing of workplaces, both conditional on the significant fall in companies' revenue. The first problem is that there are two programs addressing the same issue, and the second problem is the bureaucratic approach to applications. The jury is still out how many companies have applied and how swift were administration decisions – according to information from the beginning of July 2.8 million workers were covered by the program (out of 10 million working in non-financial corporations. The cofinancing was capped at 40% of average wage (PLN 2453 or EUR 550, including social security contributions) in the more generous scheme. The Polish government estimates that the overall cost of the program will amount to 0.5%—0.6% GDP, which is in line with figures reported by the end of June.
- Support to the Polish healthcare system in the measures related to an epidemic – 0.3% GDP

- Additional capital to Polish Development Fund – 0.2% GDP
- Additional care allowance for those caring for children aged 8 or less – 0.2% GDP.

The financial shield was announced on April 8, 2020, to speed up support for companies. With worsening business confidence and complicated procedures for larger companies applying for instruments from anticrisis shield government announced an additional program of financial shield run by Polish Development Fund (PFR). Microenterprises, SMEs and large enterprises can receive up to PLN 100 billion (4.5% GDP) in subsidies, of which about PLN 60 billion (2.7%) may be retained by the enterprises as a non-refundable grant under the condition that they continue to operate after the support has been granted and jobs are preserved. The program is much simpler than anticrisis shield and runs in cooperation with banks, which allowed prompt transfers to companies; the biggest weakness of the program is that support is conditional on the fall of revenue in just one month, enabling some unaffected companies to apply for support just by shifting part of the payments. However, the promptness of the program is its huge advantage. Running program by PFR, however, raises other doubts about it financing – instead of receiving a direct transfer from budget PFR issued bonds that are only guaranteed by the Polish government, thus allowing the government to treat it as an off-balance item. A similar construct was applied to an anti-COVID-19 fund of similar size to financial shield. In the initial version from the first anti-crisis shield the fund was meant as another budgetary fund created to support investment and recovery after the pandemic. Later, however, it was moved into PFR so that its expenditure and debt issued to finance it would not be covered by domestic fiscal rules. Also, the aim of the fund was broadened and now it seems that it will be used as a "shadow budget", allowing different Ministries to fund projects that are over the standard budget. Eurostat most probably will treat both financial shields an anti-COVID-19 fund as part of the general government.

The National Bank of Poland (NBP), besides lowering interest rate, launched a bond purchase program. The first cut of reference rate from 1.5% to 1% was announced on March 18, 2020 and was followed by an additional cut to 0.5% on April 9, 2020, and to 0.1% on May 28, 2020. Besides lowering reference rate, NBP also cut the reserve requirement for banks from 3.5% to 0.5% starting April 30, 2020, while Financial Stability Committee (KSF) recommended waiving the systemic risk buffer (% of a given bank's total risk exposure) which was approved by Polish Ministry of Finance. The most controversial part of the COVID-19 policy response has been governmental bond purchases on the secondary market by NBP that started in March. NBP claims that operations are aimed at supplying liquidity and stabilization of long-term interest rates. Still, in reality, such actions breach the prohibition of financing of public debt by NBP that is written in the Polish constitution. Limiting operations to the secondary market does not change much, as large share of lately issued government bonds were bought by state-owned banks that later sold them to NBP. Besides buying governmental bonds, NBP also announced that it would buy bonds guaranteed by government, which in practical terms allows purchases of PFR bonds, thus providing financing for financial shield and anti-COVID-19 fund.

4.   State of the Polish companies over time

Initial macroeconomic data indicate that COVID-19 had the strongest impact in April 2020. COVID-19 had an impact on the Polish economy through two channels – official restrictions that limited business activity and consumer reactions, as many consumers changed their behavior ir-

respective of formal regulation, just to limit the risk of contracting COVID-19. Unfortunately, in Poland, official statistics are reported with a significant lag, but we can see already that in line with the heaviest restrictions, both domestic sales and export experienced a significant fall (over 20%) in April 2020 (see Figure 4). In the case of retail sales before the fall in March and April 2020, increased sales in February 2020 can be observed as households stocked themselves before lockdown. Although May figures are not available for export yet, in the case of retail sales, a strong rebound can be observed, as the restrictions were gradually lifted, and people also felt safer. Nevertheless, sales in May this year were below the level of May 2019.

Figure 4. Retail sales and export of goods (change from corresponding period of previous year)
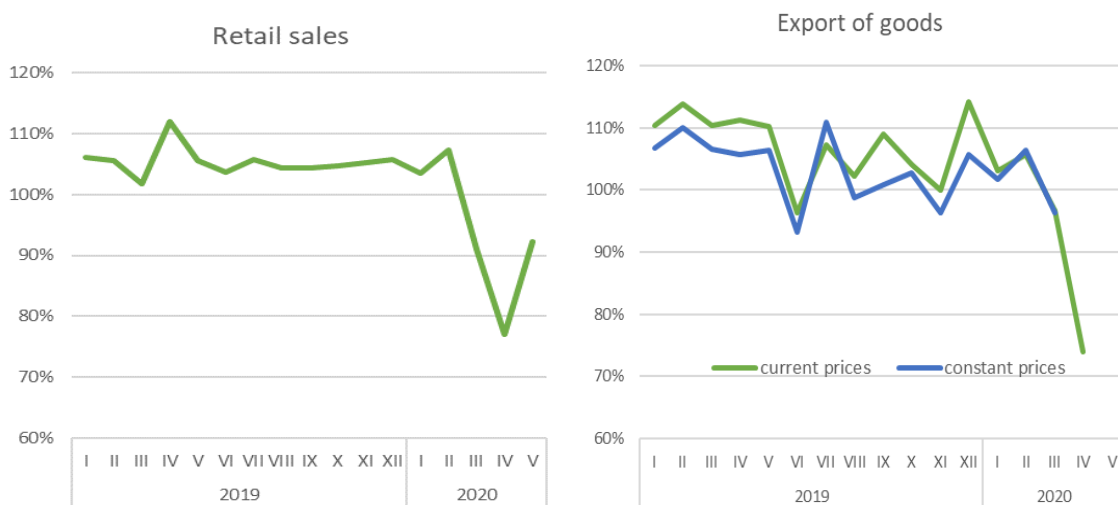
Source: Statistics Poland (2020a, 2020b).

Company–level data for Poland indicate that the impact of COVID-19 was the strongest in April 2020. Rapidly changing situation and huge lags in official statistics prompt many organizations to conduct surveys to gauge developments in the Polish economy. To follow how the impact of COVID-19 changed over time, surveys conducted by the Polish Economic Institute (PIE), governmental economic think tank, are particularly informative. Most importantly, PIE (2020) conducted seven surveys, initially in 2-week intervals asking companies in Poland about their financial situation and plans. While most companies reported a falling number of orders during the entire April 2020, the share of them was the highest at the beginning of the same month (see Figure 5).

Figure 5. Change of orders (% of companies reporting fall/no change/growth of orders)
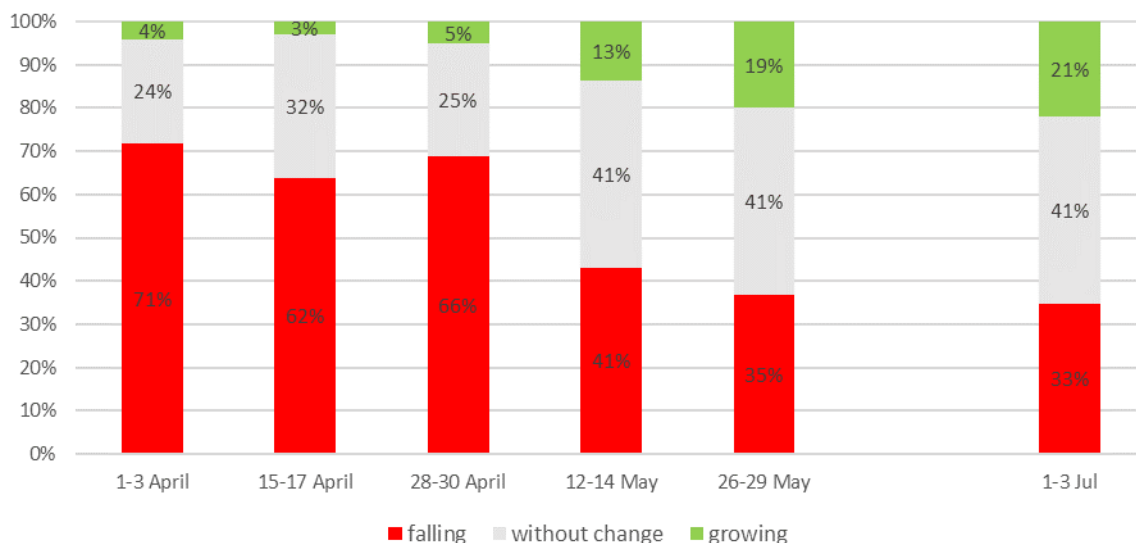
As far as current sales are concerned, the biggest drop was observed at the end of April 2020, when over 2/3 of companies were reporting it (see Figure 6).

Figure 6. Change of sales (% of companies reporting fall/no change/growth of sales)
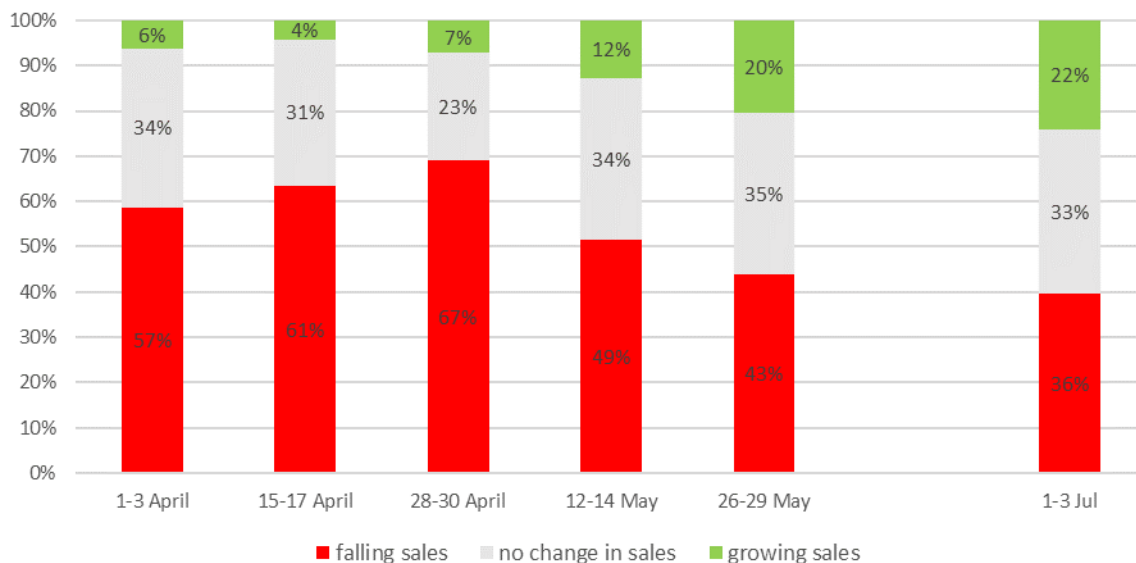
With falling sales, liquidity became an issue. In April 2020, around 10% of companies in Poland struggled to retain liquidity while further 50% of companies declared that their cash buffers would not last for more than three months (see Figure 7).

Figure 7. Liquidity buffers (% of companies reporting cash buffers sufficient for more than 3 months, 1-3 months or already facing liquidity problems)
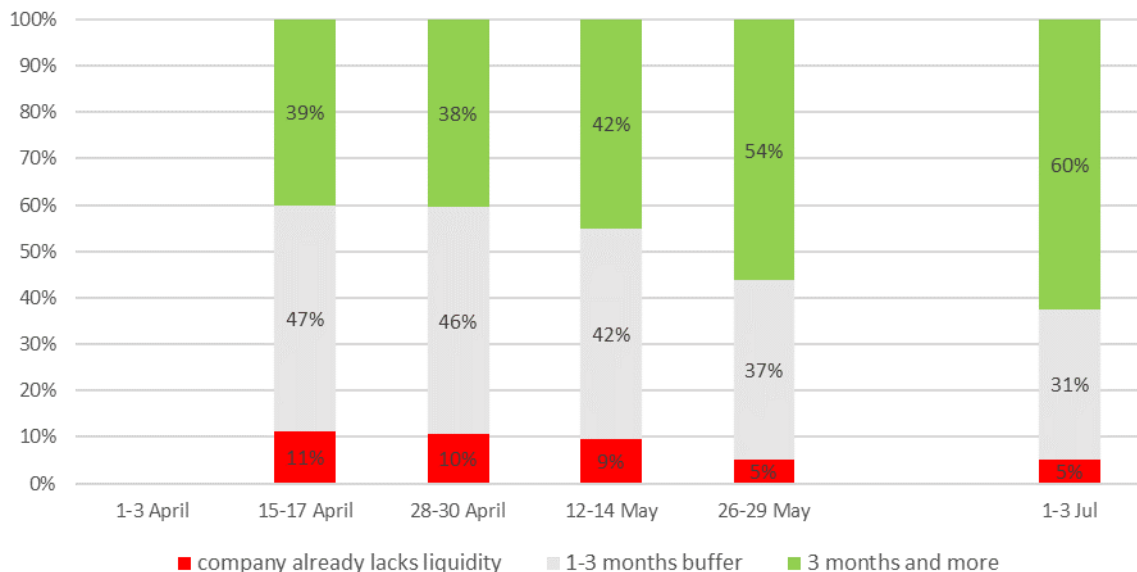
Source: PIE (2020).

Initially, nearly 30% of companies in Poland considered laying people off. However, by the end of April this percentage had fallen to 12% (see Figure 8).

Figure 8. Employment change (% of companies planning reduction/no changes/increase of employment)
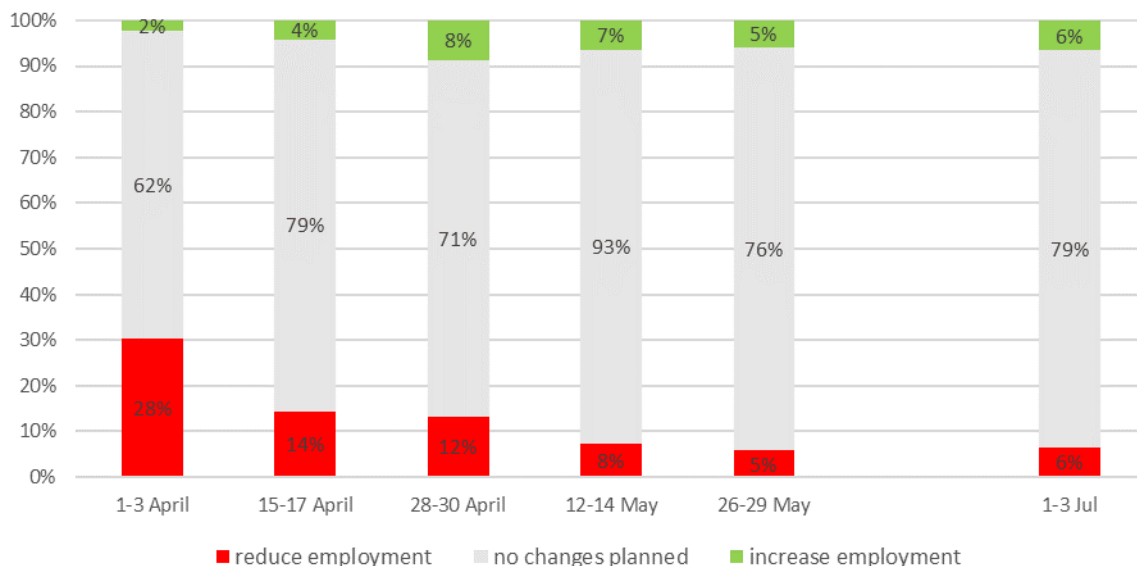
Source: PIE (2020).

During the same time, the percentage of companies declaring wage cuts went down from 50% at the beginning of April 2020 to 22% at the end of the same month (see Figure 9).

Figure 9. Wage change (% of companies planning reduction/no changes/increase of wages)
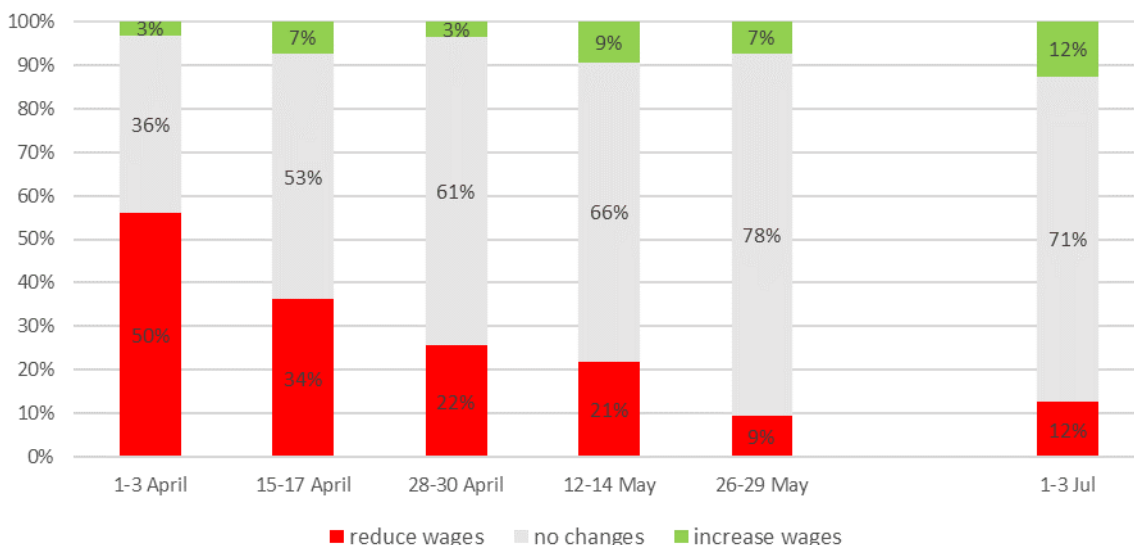
Source: Statistics Poland (2020a, 2020b).

In the last wave of the survey (beginning of July 2020), more than 1/3 of companies reported sales to still be lower than a year ago (see Figure 6). However, the percentage of companies with liquidity problems felt to 5% (see Figure 7). Simultaneously, the percentage of companies planning wage cuts felt to 12% (see Figure 9) and only 6% are planning layoffs (see Figure 8), indicating that most companies that stayed in business do not expect further downsizing.

To explain the changing state for companies in Poland in the next section, the paper first discusses the main problems reported by them and later discusses to which extent they were addressed by government response to the COVID-19 crisis.

5.   Main problems for companies in Poland during the COVID-19 pandemic

In the most challenging month of April 2020, companies reported several problems (see Figure 10). To explore issues facing companies from particular sectors of the economy paper uses a survey by Centrum Monitoringu Sytuacji Gospodarczej – CMSG (2020), a joint initiative of employer's assassinations, Civil Development Forum (FOR), and Warsaw School of Economics (SGH). The first wave of the survey was conducted in the first half of April 2020, at the peak of the lockdown in Poland and a moment of the highest uncertainty for its business community. Overall, the biggest obstacle facing companies was lower domestic demand, followed by administrative orders to desist from trading for retail and commercial businesses, apart from those providing essential services. Importantly, in the third position of challenges were payment back-

logs. The non-availability of employees due to quarantine was among the lowest concerns for the businesses. Such order of worries might suggest that the direct consequences of pandemic (people getting ill by it) had an only minor impact on business. Much more significant was that people in order not to get ill stayed confined to their homes, lowering demand, and administrative actions, explicitly temporarily closing many businesses. The jury is still out on the main driver of the contraction in demand – administrative closures or voluntary reactions of customers that to minimalize human contact avoided businesses that were legally permitted to operate. Obviously, for businesses closed by law, the first factor was decisive, but for the economy, as whole customer reactions might have been even more important. Primary evidence from the US indicates that consumer reactions have been a key, as differences in the timing of the opening of the economy in neighboring states led to no visible impact on the consumption dynamics (see Chetty et al. 2020). It is also worth noting that among high-uncertainty companies started to hoard cash and stop paying their suppliers, generating payment backlogs.

Figure 10. Challenges facing companies in the first half of April 2020 (% of companies reporting given item as a serious obstacle)
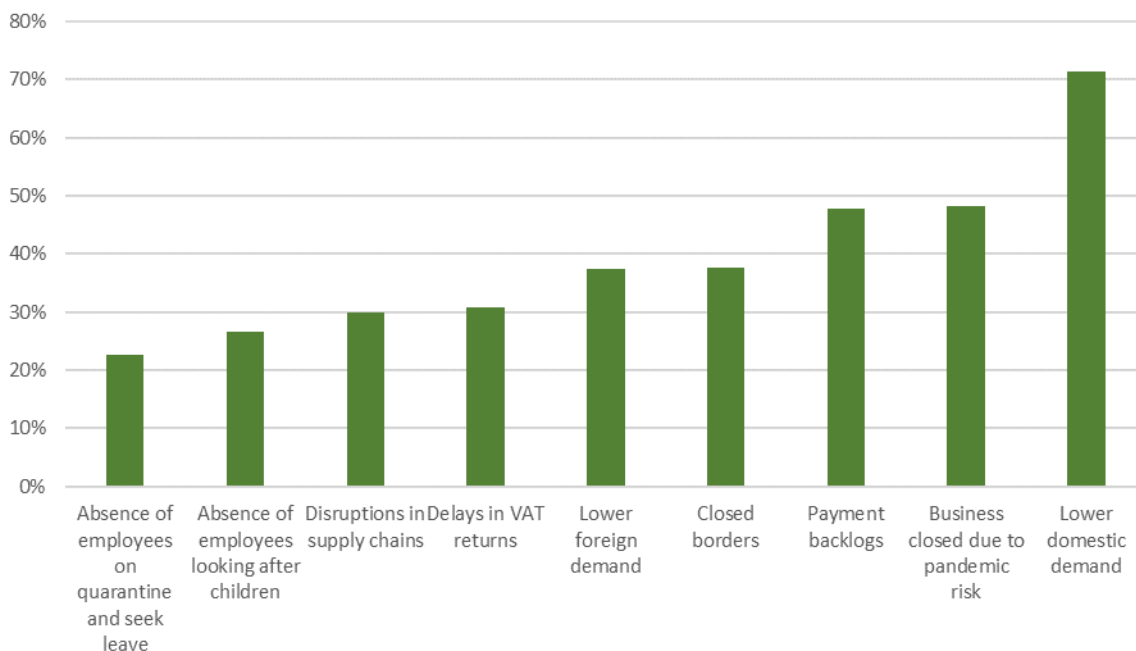
Source: CMSG (2020).

Along with weaker domestic demand, which was the biggest challenge reported by Polish companies in most sectors, the relative importance of other problems differed.

- The second biggest problem for construction companies was payment backlogs, which are unfortunately common in this sector and were further exuberated by delays in VAT returns. Their fourth biggest problem was caused by disruption in supply chains. It is worth noting that none of the major problems (maybe with the exception of closed international borders that to some degree might also disrupt supply chains) of the sector

was caused by the administrative closures that were designed to limit the spread of the COVID-19 virus.

- Payment backlogs were a second major problem for manufacturing companies, just after weaker domestic demand. Not surprisingly, among all the sectors, manufacturing was most affected by weaker external demand. Poland is integrated with global value chains, and economic struggles of other countries are directly felt by the most important export sector in Poland – manufacturing.
- Transport and logistics companies were directly affected by administrative restrictions. As transport companies offer their services primarily to other companies, payment backlogs became a severe issue. Beside those two problems, these companies also pointed to troubles caused by closed international borders and VAT settlements.
- A broad category of companies providing business services (consultancy, IT, professional education, etc.) was among the least affected by the COVID-19 crisis. Furthermore, such services were one of two sectors where lower demand was not the most important issue. Instead, their main problem was payment backlogs.
- Retail and wholesale companies beside payment backlogs reported problems with many employees staying at home to look after their children. Among all the sectors, this problem was most visible in retail and wholesale.
- Companies operating in tourism, gastronomy, and hospitality were directly affected by administrative closures – the harms caused by closures were nearly as often reported as lower demand. Furthermore, compared to other sectors for tourism and related activities, closed borders were a serious issue.
- The personal services sector was most affected by administrative restrictions – for hairdressers and beauticians, closure of business was a bigger obstacle than lower demand.
- Also, companies providing healthcare were affected by administrative restrictions. However, in their case, lower demand was the key issue. Beside those two problems, companies also reported problems with the acquisition of supplies.
- Companies providing financial services beside lower demand reported increasing problems with late payments.

Fall in domestic demand was an expected result of lockdown, but it affected the liquidity of companies. Encouraging people to stay at home meant that they would purchase fewer goods and services. Putting aside administrative restrictions, it would be hard to expect that people will be as eager as before to attend theaters, cinemas, or fairs and risk contracting the COVID-19 virus. Falling sales led to problems with liquidity, but the scale of the problem varied between sectors. Overall, the most resilient were the largest companies of 250 employees or more (see Figure 11). More than 50% of them had liquidity buffers for three months or more, while for smaller companies the liquidity issues were a bigger problem. In terms of sectors, most problems were reported by companies providing services for households, hospitality, and gastronomy, which were sectors most directly affected by lockdown and changed behavior of cautious consumers.

Figure 11. Liquidity problems (% of companies)
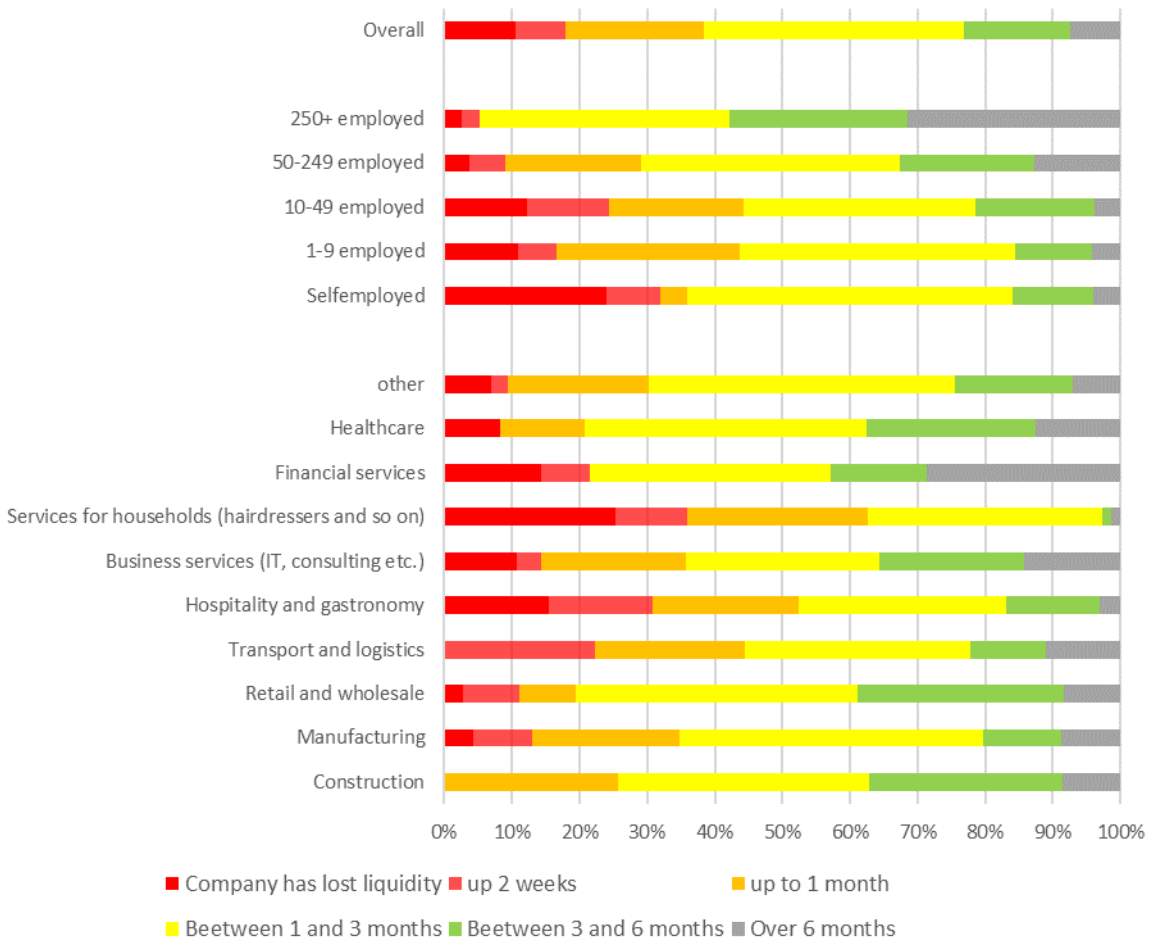
Source: CMSG (2020).

The liquidity problems of companies created a threat of negative spillovers. With falling demand, companies had to adjust their operations. Assuming that impact of the COVID-19 virus is temporary, two actions declared by companies having liquidity problems were particularly worrying: delaying payments to contractors and layoffs (see Figure 12). Delaying payments to contractors created a risk that problems will be passed from one company to another, increasing uncertainty, and breaking down intercompany linkages. Layoffs had a similar effect, reducing household confidence and purchases. Of course, layoffs should be avoided only under the assumption that COVID-19 is a temporary problem.

Figure 12. The liquidity position and actions taken or considered in the light of COVID-19 (% of companies)
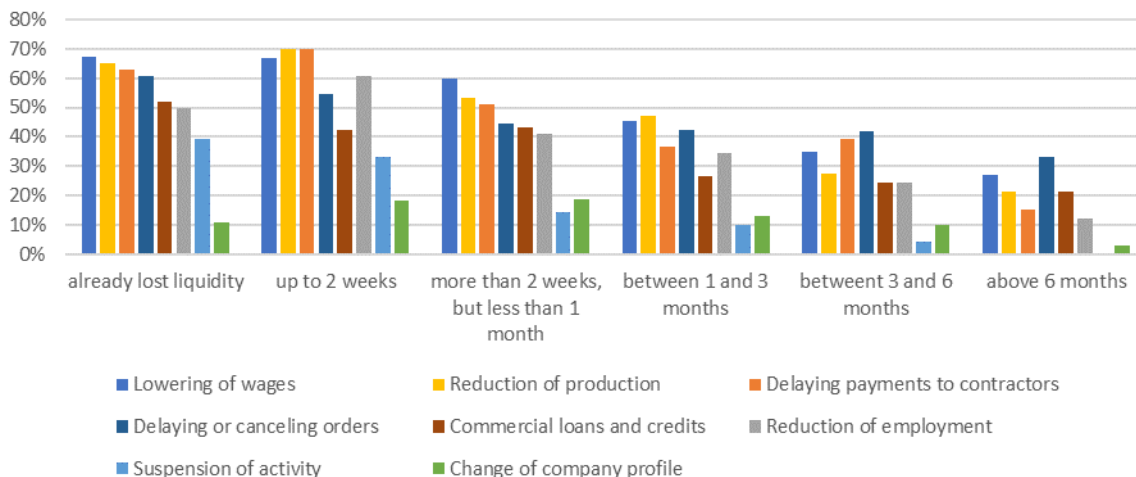
Source: CMSG (2020).

6.   The efficiency of policy response to combat the spread of the COVID-19 virus

Support packages and lifting of the restrictions improved situation of companies. As already mentioned, the percentage of companies reporting significant liquidity problems and planning layoffs felt considerably by July 2020. Although the PIE survey is designed to be representative, it should be noticed however that part of the effect might be a result of the weakest companies going out of the market. However, available data about business registrations and closures suggest that such effects most probably were very limited.

Enormous fiscal costs raise questions about the efficiency of the used state measures. It is too early to sum up overall fiscal costs, but at the moment, the price tag at the anticrisis shield and financial shield stands well above 5% GDP. Taken together with a large initial structural deficit (above 2% GDP) and fall of revenue (at least 2% GDP) general government deficit this year most probably will be above 10% of GDP. Considering indexation rules of multiple expenditure items and expected only limited rebound of revenue, most probably large deficits will constitute a policy challenge past year 2020. Considering probable problems of public finances' poor targeting of policy responses is an issue. As indicated by George Mankiw, setting a priori criteria for the help would be challenging (Mankiw 2020). FOR proposed more money-wise approach – grant support to each individual and company that requests it, but as a loan, that ex-post could be conditionally converted into a grant. The conversion would depend on the change in revenue during the whole year 2020 compared to year 2019, so households and companies most affected would not have paid it back. Taking the whole year as a reference point would make shifting revenue much harder, ensuring that help would go to the most affect-

ed entities. For the rest of the companies, the help would be just liquidity support, which also should help them pass through the most challenging moment. To some extend government introduced this approach in a financial shield in Poland, but the previous anticrisis shield was less targeted.

It is too early to assess the overall efficiency of the support. As mentioned at the company level, results are rather good, but it comes at a too high fiscal cost. The overall macroeconomic impact is still debatable. As discussed in the first part of the paper, the Polish economy had several strengths that limited the impact of the COVID-19 shock. According to the Summer 2020 Economic Forecast prepared by European Commission EC (2020) the fall of GDP in Poland in 2020 will be the smallest in the EU (see Figure 13). However, it should be taken into account that before the COVID-19 crisis growth forecasts for Poland were also among the highest in the EU, so the forecasted relatively good performance is not only a result of policy response but also a favorable starting position. Furthermore, all current forecasts are of limited reliability, as the circumstances are extraordinary. So, it is worth to mention that contrary to the European Commission, OECD is less optimistic, forecasting that several OECD member countries will weather COVID-19 better than Poland (see Figure 13).

Figure 13. GDP growth (%) forecasts for 2020
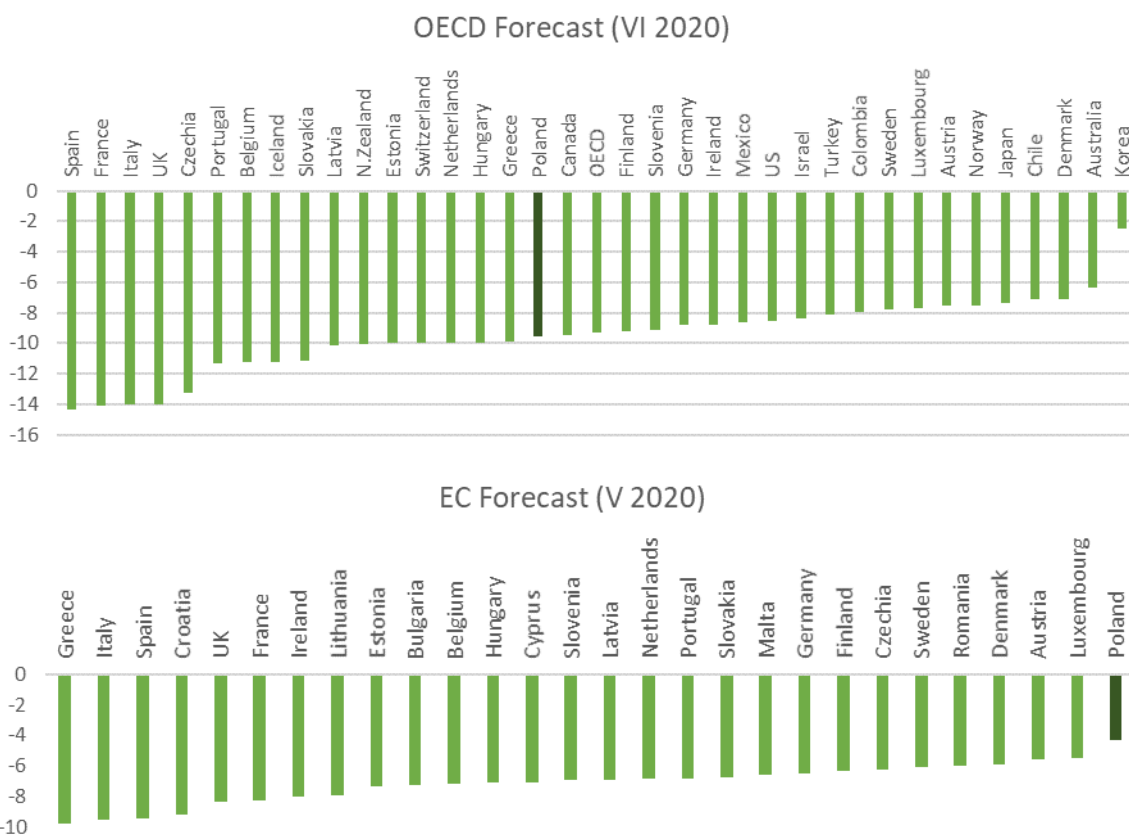
Source: OECD (2020) and EC (2020).

7.   Conclusion

This paper presents how the COVID-19 virus and subsequent policy responses by the Polish government affected companies in Poland. Although the number of COVID-19 cases in Poland has been rather limited, policy actions aimed at limiting the spread of the virus and general uncertainty heavily affected business confidence. The most severe problems were reported by companies in April, at the heist of the lockdown. The subsequent gradual lifting of lockdown and restrictions on business, coupled with generous support programs resulted in improved business confidence as the economy has slowly rebounded. While the economic policy responses seem to help companies now, they were poorly addressed, which inflated their costs. It is too early to evaluate the efficiency of programs from a macroeconomic perspective, as GDP data are not available yet, and the dispersion in economic forecasts is vast.

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We had joy, we had fun, we had seasons in the sun: pandemic disruptions in economic seasonality

By Jure STOJAN*

Economic time series exhibit periodically recurrent movements at the daily, weekly, and monthly levels. Also known as seasonality, it has been usually treated as a nuisance to be removed prior to analysis. Often, data is already deseasonalised by data providers since it distracts from medium-term time trends and long-term cycles. Moreover, seasonality disappears when data are aggregated to a yearly basis – it is a phenomenon at work at shorter time frames. It is an expression of the cyclical nature of much of human activity. For example, most workers do not work on weekends, days off work tend to cluster around public holidays, and income is usually received on a fixed day of month. Therefore, sudden changes in seasonality can be interpreted as a measure of economic disruption. Using a state-space framework of time series analysis (wherein seasonality is modelled as time-varying, and estimated using the Kalman filter), this paper analyses the changes in seasonality brought about by the coronavirus pandemic of 2020. While no significant crisis effects appear in daily euro-denominated transfers from Slovenia to Bosnia and Herzegovina, trend levels in Slovenian aggregate electricity consumption did decline noticeably. The day-of-the-week patterns remained stable even in times of the lockdown. Not so in Apple mobility data, where seasonality is shown to have altered significantly in Slovenia but also in Sweden, Serbia, Romania, Germany, and Austria.

Key words: time-varying seasonality, pandemic disruption, mobility.

Introduction

"Seasonality means special annual dependence. Many weekly, monthly, or quarterly economic time series exhibit seasonality" (Sargent 2001). It is a property that can be only detectede when data is measured more than just once a year. In fact, seasonality is meant to cancel out when high-frequency data is aggregated to lower frequencies. This, in turn, usually means that seasonal effects are constrained to sum up to zero if assumed additive (Hyndman et al. 2008, 123).

In times of crisis, seasonality can be expected both to change and reassert itself. It can no longer be ignored. After all, seasonality is one way the predictable economic activity rhythm is re-

flected in economic data. It captures the effects of recurring monthly deadlines, annual vacations, bank holidays, and the seasons of nature. If economic activity is disrupted, so are the seasonal patterns in economic data. Conversely, changes in seasonality can be used as a quantitative measure of how a crisis disrupts the daily workings of an economy. Indeed, seasonality was found to have profoundly altered during the Great Recession, reflecting the shattered economic lives of the many (Wright 2013).

Has seasonality been changing during the pandemic of 2020? This article aims to collect stylised facts about the disruptions in seasonal patterns at the weekly level. This is the time scale where disruption to daily life, the basic rhythm of economic activity, should manifest itself. Also, it is the only time frame where seasonal patterns can be reliably identified even few months into an ongoing pandemic. For Slovenia, at least three data sources are sufficiently granular to identify day-of-the-week effects in real time: (1) money transfers to high-risk countries, (2) electricity use, and (3) Apple mobility data. The latter also allows for international comparisons. To keep the analysis tractable, five European countries represent markedly different trajectories: Sweden, Serbia, Romania, Germany, and Austria.

Using seasonality as a measure of economic (dis)order is conceptually not new. The stylised fact that seasonality appears more pronounced in 19th-century macroeconomic datasets than 20th-century ones has been long interpreted as an indicator of economic progress. "The loss of seasonality, the separation of credit flows from natural rhythms, and a totally socially constructed reality might be seen by some as indications of economic development and the progress of human civilization" (Klein 1997, 118).

What follows is a short review of the main approaches to seasonality taken in economics (Section 1). In a nutshell, there are three of them (Subsection 1.1). Daily seasonality raises further issues (Section 2). The statistical significance of seasonal effects is explored in a state-space structural framework, which is then adopted throughout the article (Subsection 2.1). Two case studies drawn from Slovenia demonstrate that seasonality should be treated neither as given nor as necessarily time-varying (Subsection 2.2). However, seasonal effects in daily mobility data are both significant and dynamically changing (Section 3). This is inferred within a multivariate setting (Subsection 3.1), with particular attention given to lower-frequency patterns that remain beyond full identification for data reasons (Subsection 3.2). Later, stylised facts are collected (Subsection 3.3).

1 Seasonality in economics

Most studies that explicitly address seasonality tend to look at either (1) month-of-the-year effects (that is, seasonal patterns appearing at lag 12 in monthly data) or at (2) quarterly effects (at lag 4 in quarterly data). Researchers have documented stably recurring patterns in several different time series, sometimes even arguing that one variable is a cause for another based on a similar seasonality structure of the two.

Lam and Miron (1991) illustrate both the abundance of seasonal data, and the conundrum seasonality can create for causal interpretation. For example, they find "that births are highly seasonal in all human populations, even for very recent periods in highly industrialized low-fertility populations. The timing of the seasonal patterns, however, differs widely across populations." Traditionally, these patterns have been linked to other series with pronounced monthly seasonality. Therefore, Lam and Miron consider weather data such as air temperature, labour force participation, the agricultural harvest cycle, the number of marriages, and the distribution of holidays throughout the year. Nonetheless, none of these patterns provides a consistent explanation for the significant yet country-specific monthly seasonality in births.

This list of seasonal variables is by no means exhaustive. Text-book examples of monthly seasonality include industrial production, retail sales of clothing, and retail credit, while both daily and monthly patterns can be found in the S&P500 stock index (Ghysels and Osborn 2001). Also, seasonality "is one of the most remarkable features of tourism. It is a global phenomenon that affects the vast majority of tourist destinations." Vergori (2016).

1.1 Three approaches to seasonality

"Seasonality has been a major research area in economics for several decades," summarise Brendstrup et al. (2004). They identify three interrelated groups of economic approaches to seasonality. "The first group, pure noise model, consists of methods based on the view that seasonality is noise contaminating the data or, more correctly, contaminating the information of interest for the economists. The second group, time-series models, treats seasonality as a more integrated part of the modeling strategy, with the choice of model being data driven. The third group, economic models of seasonality, introduces economic theory, that is, optimizing behavior into the modeling of seasonality."

In recent years, the tide has been turning against the first group. Seasonality is increasingly seen in economics as "an integral part of the modeling process, and where there is an increased awareness that use of seasonally adjusted data very easily leads to errors and in addition throws away valuable information" (Brendstrup et al. 2004). In fact, substantive economic insights can gleam from seasonality. For instance, "the observed seasonality of box-office revenues has been found to reflect both seasonality in underlying demand for movies and seasonality in the number and quality of available movies" (Einav 2007).

It is not only the possibility of economic interpretation that speaks in favour of explicit models of seasonality. The existing approaches used by statistical authorities around the world have repeatedly been found wanting. Crucially, they fail to remove the seasonal patterns completely – some seasonal variation can remain even after the supposed deseasonalisation. Since economic data are widely used in decision-making, this is more than an academic concern. If no patterns are expected and yet continue to exist, bad decisions are likely to be made. "This phenomenon, called residual seasonality, makes it difficult for policymakers to know whether a weak first quarter is due to an actual downturn or an understated number" (Owyang and Shell 2018). For

US GDP data, the "size of this residual seasonality is economically meaningful and has the ability to change the interpretation of recent economic activity" (Lunsford 2017).

2 Conceptual issues with daily seasonality

To identify inter-day patterns, the minimum requirement is having data spaced at daily or even finer intervals. This severely limits the scope of available data sources – publicly available macroeconomic series are only rarely reported at such granularity. Also, daily data is a necessary but not a sufficient condition. Not all daily data exhibit stable patterns at lag 7. In other words, seasonality is not necessarily an artifact of statistical analysis, even though inappropriate modelling has been shown to generate spurious seasonality (cf. Franses et al. 1995). Just because an economic variable is measured every day, it does not necessarily display day-of-the-week patterns. Moreover, there is no inherent reason why seasonality, when it exists, should always vary with time. For some series, the time variance of seasonality is indeed negligible, and the data generating process can be much more parsimoniously modelled with a fixed, deterministic formulation.

These points can be illustrated with two daily time series covering the period from 1 January 2018 to 31 May 2020: (1) euro-denominated money transfers from Slovenia to Bosnia and Herzegovina (Office for Money Laundering Prevention 2020), and (2) Slovenia-wide electricity usage measured in megawatts (MW) (Eles 2020). Note that both series are constructed from public sources, i.e., they were not reported as a daily series to begin with (the first is compiled from a list of time-stamped transactions, the second is aggregated from hourly data). There appear to be no significant COVID-19-related changes in either's seasonality. In the first example, it is because there is no daily seasonality to speak of. In the second example, fixed daily seasonality remains the favoured formulation even when the sample includes the pandemic.

2.1 The testing set-up

To reach these conclusions, both variables are investigated univariately, using structural state-space systems of equations estimated with the Kalman filter (Harvey 1989, Durbin and Koopman 2012). Each time series is transformed to natural logarithms and decomposed into its structural components:

$$y_t = \mu_t + \gamma_t + \psi_t + \sum_{j=1}^{k} \theta_{j,t} x_{j,t} + \varepsilon_t, \, \varepsilon_t \sim NID\left(0, \sigma_\varepsilon^2\right), \qquad t = 1, \dots, T, \qquad (1)$$

so that μ_t is the trend, γ_t is the seasonal, ψ_t is the cycle, and ε_t the irregular. Dummy variables identifying calendar effects and bank holidays are $x_{j,t}$ while $\theta_{j,t}$ are corresponding unknown regression coefficients. The list of work-free days is sourced from the Slovenian government (Ministry of Public Administration 2020). The notation $\varepsilon_t \sim NID\left(0, \sigma_\varepsilon^2\right)$ means the irregular component is normally and independently distributed with mean zero and variance σ_ε^2. In other words, it is a Gaussian

disturbance, and it is different from disturbances affecting other structural components. All disturbances are mutually independent. The trend can be time varying. The money transfer series is modelled with the local linear trend specification:

$$\mu_t = \mu_{t-1} + \beta_{t-1} + \eta_t, \qquad \eta_t \sim NID\left(0, \sigma_\eta^2\right), \tag{2}$$

$$\beta_t = \beta_{t-1} + \zeta_t, \qquad \zeta_t \sim NID\left(0, \sigma_\zeta^2\right), \tag{3}$$

For electricity usage, the trend is described using the simpler local level model – the slope terms β and the stochastic slope disturbance ζ_t are omitted so that the specification simplifies to a random walk with noise. Since there is an odd number of days in a week (the number of seasonal frequencies $s = 7$ for electricity data and 5 for transactions), the seasonal component is modelled as

$$\gamma_t = \sum_{j=1}^{\frac{s-1}{2}} \gamma_{j,t}, \tag{4}$$

where each $\omega_{j,t}$ is given as

$$\begin{bmatrix} \gamma_{j,t} \\ \gamma_{j,t^*} \end{bmatrix} = \begin{bmatrix} \cos\lambda_j & \sin\lambda_j \\ -\sin\lambda_j & \cos\lambda_j \end{bmatrix} \begin{bmatrix} \gamma_{j,t-1} \\ \gamma_{j,t-1^*} \end{bmatrix} + \begin{bmatrix} \omega_{j,t} \\ \omega_{j,t^*} \end{bmatrix}, \qquad \begin{matrix} j = 1, \dots, \frac{s-1}{2}, \\ t = 1, \dots, T, \end{matrix} \tag{5}$$

where $\lambda_j = 2\pi j/s$ stands for the frequency (in radians) while $\omega_{j,t}$ and ω_{j,t^*} are two mutually independent Gaussian white noise disturbances with zero means and common variance σ_ω^2. Similarly, the cyclical component is

$$\begin{bmatrix} \psi_t \\ \psi_{t^*} \end{bmatrix} = \varrho \begin{bmatrix} \cos\lambda_c & \sin\lambda_c \\ -\sin\lambda_c & \cos\lambda_c \end{bmatrix} \begin{bmatrix} \psi_{t-1} \\ \psi_{t-1^*} \end{bmatrix} + \begin{bmatrix} \kappa_t \\ \kappa_{t^*} \end{bmatrix}, \qquad t = 1, \dots, T, \tag{6}$$

where ϱ is a positive damping factor (no larger than 1), λ_c is the frequency (in radians), κ_t and κ_{t^*} are two mutually independent Gaussian white noise disturbances with zero means and common variance σ_κ^2.

2.2 Seasonality test results

Considering the money transfer data (see Figure 1), the formal statistical test for the significance of seasonality components is performed on the final state vector. The value of the seasonal χ² test is 1.71 (corresponding to a probability of 0.788), implying the seasonal pattern is so weak to be practically indistinguishable from zero. Moreover, there is no individual single day-of-the-week effect that comes even the hurdle of statistical significance, let alone passing it (the estimated probabilities range from 0.289 to 0.685).

In the electricity usage series, in contrast, seasonality is highly statistically significant throughout the estimation sample (see Figure 2). The value of the seasonal χ² test is 4716.00 (corresponding to a probability of 0.000). However, seasonality is also revealed to be fixed, that is, deterministic – the variance of seasonal disturbances is estimated at 0.000.

Figure 1. Euro-denominated transfers from Slovenia to Bosnia and Herzegovina (January 2018–May 2020)
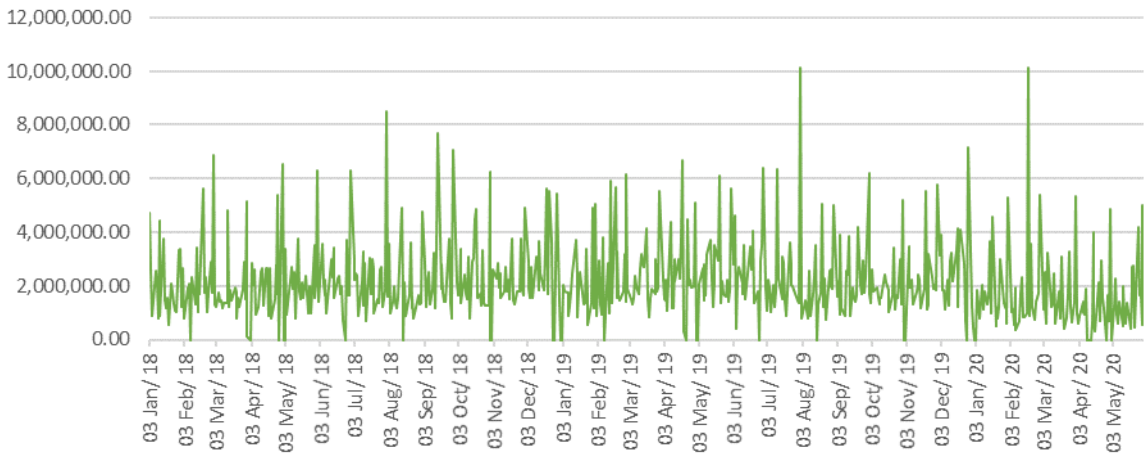
Source: Office for Money Laundering Prevention (2020) and own calculations.

Figure 2. Electricity usage in Slovenia (January 2018–May 2020, trend level and seasonal components)
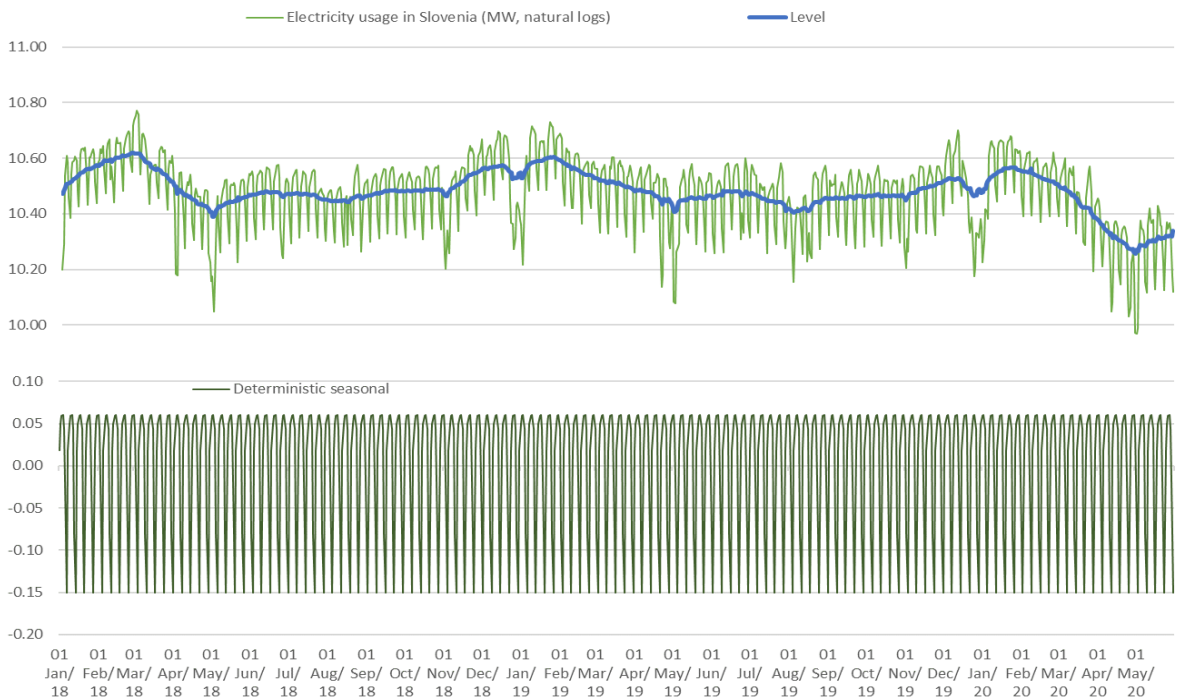
Source: Eles (2020) and own calculations.

These results not only introduce the state space approach, which is also used in sections bellow. They also provide reassurance that this methodology is indeed able to differentiate between

time-varying, fixed, and non-existent seasonality. The stylised facts uncovered using this type of procedure are not spurious. Also, the trend in electricity usage experienced a clear and significant downturn in spring 2020. What pandemic did not do, however, is to alter the seasonal patterns, indicating that the largest electricity consumers, despite decreasing consumption, kept the same consumption schedule.

3 Changes in mobility

Since seasonality reflects basic patterns of everyday life, it should be perhaps expected that the lives of ordinary consumers are more disrupted by the pandemic than the schedules of heavy industrial electricity users. Mobility data is especially well-suited to capture such an effect on society at large. Considered through the lens of movement, the daily human life consists of long stretches of relative immobility interspersed with bursts of intensive activity. The morning commute from home to the workspace and then back home again, perhaps with further movement in the afternoon related to leisure activities, generates seasonal patterns. This section looks at how this daily rhythm was disrupted in 2020, comparing changes in Slovenian mobility with those in Sweden, Serbia, Romania, Germany, and Austria.

To aid the monitoring of 2020 epidemiological containment efforts against COVID-19, the two dominant providers of smartphone operating systems (iOS and Android) decided to publish anonymised data on the mobility of their phone users globally (Apple 2020, Google 2020). While Apple data is based on the volume of direction requests in Apple Maps, Google tracks smartphone location data. Both corporations report rescaled data, that is, values divided by a baseline. However, its particular form of normalisation renders Google's data less appropriate for modelling day-of-the-week effects. Namely, Apple uses a single day, the 13 January 2020, as its benchmark. In contrast, Google divides by the median value of the same day of the week during the 3 January – 6 February 2020 five-week period, which can be thought of as a simple form of seasonal adjustment. This is why Apple data is preferred for seasonal analysis, even though it is relatively less precise.

3.1 The statistical model

First, we relax the assumption that drivers and walkers are each facing mutually independent shocks – despite living in the same country and experiencing the same COVID-19 containment measures. In other words, shocks can correlate across different mobility series within a given country. This can be achieved with a system of seemingly unrelated time series equations (SUTSE). Rather than analysing each time series in isolation, each with its own univariate system of state and measurement equations, both series for each country are stacked into a vector and analysed simultaneously (Harvey 1989, Durbin and Koopman 2012):

$$\boldsymbol{y}_t = \boldsymbol{\mu}_t + \boldsymbol{\gamma}_t + \boldsymbol{\psi}_t + \sum_{j=1}^{k} \boldsymbol{\theta}_{j,t} \boldsymbol{x}_{j,t} + \boldsymbol{\varepsilon}_t, \ \boldsymbol{\varepsilon}_t \sim NID\left(\boldsymbol{0}, \boldsymbol{\Sigma}_{\boldsymbol{\varepsilon}}^2\right), \qquad t = 1, \dots, T, \qquad (7)$$

Figure 3 illustrates the results of this decomposition on Slovenian mobility time series.

Figure 3. State-space decomposition of Slovenian mobility series
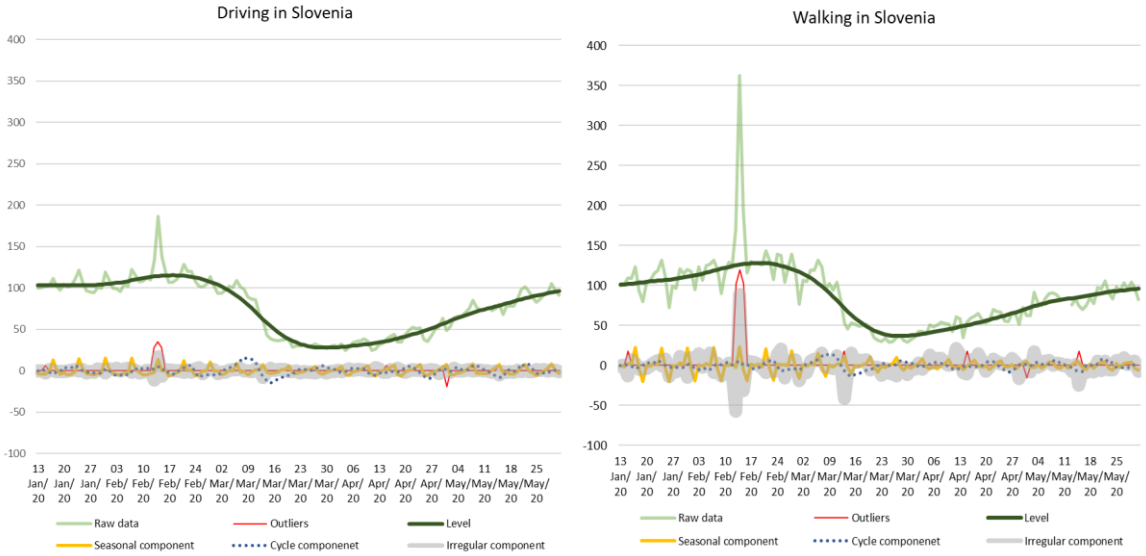
Note: Data is normalised to 100 (January 13, 2020 being the benchmark). Components are in % points.
Source: Apple (2020) and own calculations.

Since Apple reports figures rescaled relative to the 13 January benchmark, data is analysed directly in levels (that is, in contrast with the money transfer and electricity usage series, it is not log-transformed). The model-set up mirrors the univariate case (Equations 1–6) except that $\mathbf{y}_t$ (notice the bold notation) is now a vector of N × 1 observations. The same holds for other unobserved components. Stochastic disturbances are vectors with N × N variance matrices. Given the short sample size, it is particularly important to avoid overfitting. Therefore, the smooth trend specification is chosen:

$$\boldsymbol{\mu}_t = \boldsymbol{\mu}_{t-1} + \boldsymbol{\beta}_{t-1}, \tag{8}$$

$$\boldsymbol{\beta}_t = \boldsymbol{\beta}_{t-1} + \boldsymbol{\zeta}_t, \qquad \boldsymbol{\zeta}_t \sim NID\left(\mathbf{0}, \boldsymbol{\Sigma}_\zeta^2\right), \tag{9}$$

As for the cycle, the damping factor ϱ and frequency λ_c are the same for both series in each system (that is, fixed by country), where $\boldsymbol{\psi}_t$ and $\boldsymbol{\psi}_{t*}$ are N × 1 vectors:

$$\begin{bmatrix} \boldsymbol{\psi}_t \\ \boldsymbol{\psi}_{t*} \end{bmatrix} = \left\{ \varrho \begin{bmatrix} \cos\lambda_c & \sin\lambda_c \\ -\sin\lambda_c & \cos\lambda_c \end{bmatrix} \otimes \boldsymbol{I}_N \right\} \begin{bmatrix} \boldsymbol{\psi}_{t-1} \\ \boldsymbol{\psi}_{t-1*} \end{bmatrix} + \begin{bmatrix} \boldsymbol{\kappa}_t \\ \boldsymbol{\kappa}_{t*} \end{bmatrix}, \qquad Var\begin{bmatrix} \boldsymbol{\kappa}_t \\ \boldsymbol{\kappa}_{t*} \end{bmatrix} = \boldsymbol{I}_2 \otimes \boldsymbol{\Sigma}_\kappa \tag{10}$$

3.2 Approaching seasonality at other frequencies

Why the cycle and the dummy variables? Since Apple mobility starts with 13 January 2020, day-of-the-week effects are the only type of seasonality that can be estimated reliably. Unfor-

tunately, it is far from being the only one. Banking holidays also form a recurring annual pattern. Another source of monthly spikes in activity are various bureaucratic deadlines that tend to cluster around the first or the 15th day of the month, effectively doubling the number of seasons to 24. At the monthly level, mobility should reflect natural seasonal variation in weather. For example, spring is more conducive to taking walks than winter. Clearly, the sample provides only single realisations of recurrent processes operating at lower frequencies. This is much less than the theoretical minimum required for a simple exponential smoothing model of monthly seasonality – 17 months' worth of data points, which itself might not be enough to "deal with randomness in the data" (Hyndman and Kostenko 2007).

In the structural state-space approach to time series decomposition, it is possible to partly recover such month-of-the-year effects by extending the model with a stochastic cycle and a set of dummy regressors (set 1 on the date of a bank holiday and 0 otherwise). Table 1 summarises the lower-frequency seasonality terms in mobility models. The estimated cycle can be as short as two weeks in Germany (implying that significant deadlines occur twice a month), or longer than in a month in Austria and Serbia. During the first wave of the 2020 pandemic, Easter failed to significantly affect mobility patterns in Austria and Slovenia.

Table 1. Recovering annual patterns from a few months' data (January 13 – May 31, 2020)

	Period of the cycle (in days)	Significant day-of-the-month dummies	Significant holiday dummies (outliers)
Austria	33	–	–
Germany	14	–	*Driving*: St. Valentine's, Easter, May Day
Romania	22	*Driving:* the 15th day of the month (or the last working day preceding the 15th if the latter happens to be work-free).	*Driving*: Orthodox Easter, May Day
Serbia	37	*Driving*: the 1st day of the month, the 15th day (or the last working day preceding the 15th if the latter happens to be work-free).	*Driving and walking*: Orthodox Easter, May Day.
Slovenia	20	*Driving and walking*: the 15th day of the month (or the last working day preceding the 15th if the latter happens to be work-free).	*Driving and walking*: St. Valentine's (coinciding with the start of the winter school break in the Western half of the country). *Driving*: May Day.
Sweden	27	–	*Driving and walking*: Easter, May Day.

3.3 Lessons in mobility

The estimated smooth trends are shown in Figure 4. Such visualisations are the suggested way to inspect mobility series – "Day of week effects are important to normalize as you use this data" (Apple 2020). In other words, seasonality and other presumed noise are to be filtered away to reveal long-term tendencies.

Figure 4. Estimated trends in Apple mobility series
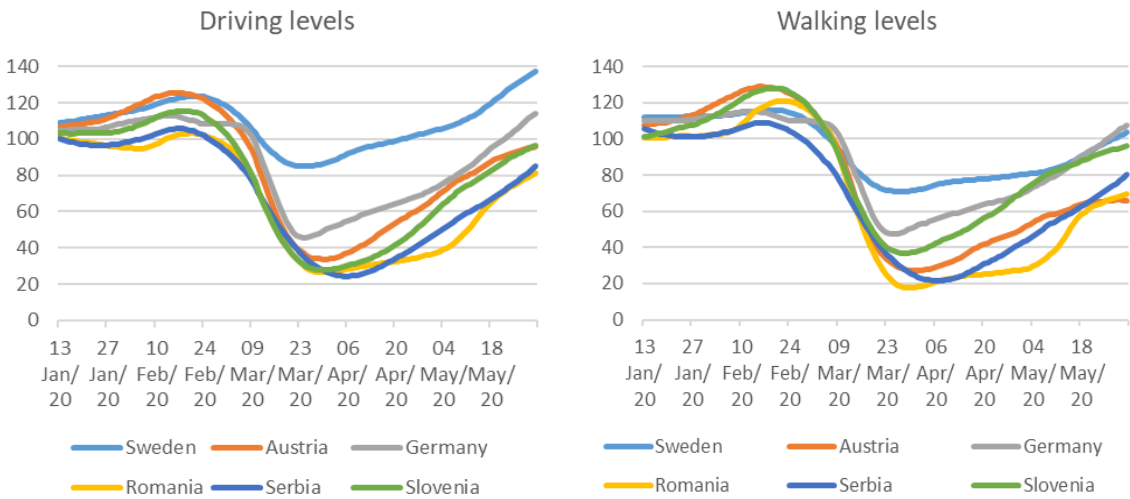
Note: Data is normalised to 100 (January 13, 2020 being the benchmark). Levels are measured in % points.

In early March 2020, mobility trends declined precipitously across the entire sample, both in driving and walking. By early April, the tide had again turned and in late May, many countries already exceeded pre-crisis levels. Also, the recovery in mobility levels appears to be much quicker in driving data than in walking. The asymmetrical impact of the COVID-19 crisis on the two modes of personal mobility is even more pronounced in the seasonal components. In Figure 5, weekly patterns in mobility are displayed overlaid for each country. In general, walking used to exhibit significant weekly variation before the pandemic. Except for Serbia, walking was by far the more seasonal activity compared to driving. During the first wave of the pandemic, both series started to exhibit similarly subdued patterns. Moreover, the changes in seasonality are slower to revert to pre-crisis levels than those in the slope of the trend level. By late May, mobility trends might have returned to their winter peaks but still, they displayed weekly patterns remarkably alike those at the height of the epidemic.

Figure 5. Estimated seasonality in Apple mobility series
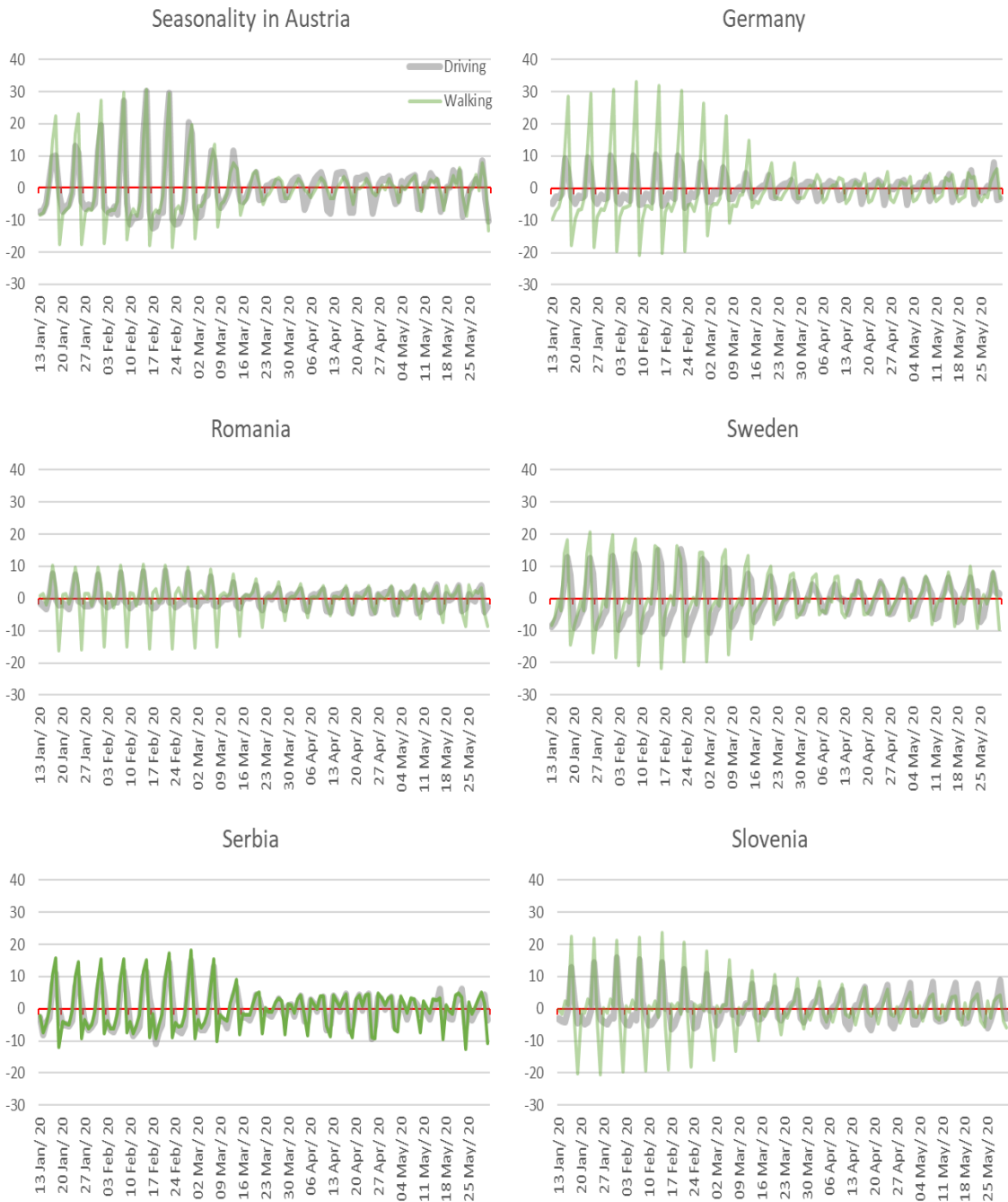
Note: Day-of-the-week effects are expressed as % point deviations from the trend level.

The results of the seasonal decomposition are further explored in Table 2. Daily effects are compared over two periods, namely the first and the last week in the time sample. In the course of 2020, seasonal variation decreased markedly. The most pronounced form of seasonal dis-

ruption appears when the seasonal component switched signs. For example, Thursday used to lie slightly below the weekly average for driving in Slovenia. In late May, it was one of the most popular days for driving. Two observations stand out: (1) most sign changes affect Thursday effects, and (2) no such flips occurred on Friday. Which remains one of the most popular days for both driving and walking.

Table 2. Estimated day-of-the-week effects (% points)

		MONDAY		TUESDAY		WEDNESDAY		THURSDAY		FRIDAY		SATURDAY		SUNDAY	
		13–19 Jan. 2020	25–31 May 2020	13–19 Jan. 2020	25–31 May 2020	13–19 Jan. 2020	25–31 May 2020	13–19 Jan. 2020	25–31 May 2020	13–19 Jan. 2020	25–31 May 2020	13–19 Jan. 2020	25–31 May 2020	13–19 Jan. 2020	25–31 May 2020
Driving	Austria	-8	0	**-7**	**1**	**-5**	**3**	3	2	10	8	**10**	**-3**	-3	-10
	Germany	-5	-1	-3	-1	**-3**	**1**	**-2**	**0**	9	8	**5**	**-3**	-2	-3
	Romania	**-1**	**1**	-2	0	-3	-1	1	2	8	4	0	-4	-2	-3
	Serbia	**-3**	**0**	-8	-3	-4	-1	**-3**	**0**	8	4	11	4	**0**	**-3**
	Slovenia	-3	-6	-4	-4	-4	0	**0**	**3**	13	9	3	0	-4	-3
	Sweden	-9	-7	-7	-6	-5	0	**-3**	**2**	4	7	13	2	7	2
Walking	Austria	-8	-1	**-8**	**1**	**-5**	**4**	**2**	**-1**	15	8	23	2	-17	-13
	Germany	-9	-4	-7	-2	-6	-3	**-2**	**2**	14	5	29	6	-18	-3
	Romania	1	4	1	1	**-2**	**2**	1	2	10	3	**4**	**-5**	-16	-9
	Serbia	**-2**	**2**	-7	-1	**-5**	**1**	0	3	11	5	16	2	-12	-11
	Slovenia	**0**	**2**	-2	-3	2	2	1	4	23	4	-4	-4	-20	-6
		-8	-2	**-6**	**1**	0	-2	**-4**	**1**	14	8	18	3	-14	-10

Note: Number pairs where the seasonal effect switched signs during 2020 are shown in bold.

4. Conclusion

The Convid-19 pandemic of 2020 severely unsettled the daily life of nations, which is reflected in the changing seasonal pattern across several variables for Slovenia and five other European countries. However, the impact is far from uniform. No significant changes can be detected in money transfers. In data on electricity usage, COVID-19 affects the trend but leaves seasonality alone. Both trend levels and seasonal effects change in Apple mobility data. Moreover, these disruptions turned out to be far more persistent in the seasonal components compared to the trend components, where mobility can already be seen exceeding pre-crisis levels. In terms of the changes in weekly patterns, Thursday effects have reversed signs in almost all countries in the sample, across both modes of mobility. In contrast, no such flips occurred on Friday, which remains one of the most popular days for both driving and walking.

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In pursuit of the vaccine against viral inequalities? Notes on pandemic, panacea, poisons and placebo

By Octavian-Dragomir JORA*

We all stand equal in front of death, though we live in unequal ways, for our gifts and fates that Gods or odds reserve for us are profoundly different and unevenly distributed. We, the ruled ones, are allegedly equal before the law, while rulers one-sidedly legislate a fake uniformity. At the same time, statisticians sequestrate us in income/wealth quartiles, deciles, percentiles only to fuel lamentations for redistributive justice. While getting bored in the suffocating safety of our lazaretto homes, a question hits us: is the new coronavirus a leveller, an equalizer? But more than that, is not the ever-haunting ghost of egalitarianism a more dangerous contagion? This essay examines the routes by which the pandemic leads to even-more-uneven social access to money, jobs, education, healthcare or empathy. Adding an extra-layer of disdain, in times of a pandemic, towards market-freedom capitalism (de-homogenized from the state-infiltrated surrogate), for democratic social fairness reasons, invoking socio-macroorganisms' infirmities in front of bio-microorganisms, is so deceptive. First, it is simply faulty, since capital and labour are the two sides of the same coin: they face and fall together to natural hazards. Second, this optic gives the floor to fraudulent policymaking of control-and-command equality, powerless in front of both poverty and pandemics. Prior to a COVID-19 cure, humankind needs a thoughtful vaccine against even more sophisticated, and deeply sophistic, viruses of the mind.

Key words: personal freedom, social fairness, inequality of chance, redistributive justice, market vs. governmental failures.

Introduction

Reflecting and reporting on the impact of the new coronavirus on the ages-old obsessive *(in)equality* academia, media and others are swinging between claims that SARS-CoV-2 / COVID-19 (the pathogen / the disease) is either a blindfolded leveller or, on the contrary, a balance destroyer. Prior to any numbers or metrics, it is about rule-of-thumb hypothesizing. Therefore, on the one hand, we might be facing a leveller (by virtue of the ultimate exposure to death or of the universal depression that accompanies it, which indiscriminately hurts people, irrespective of their locus in socio-economic classes or hemispheres); on the other hand, we might be witnessing some kind of a balance destroyer (by virtue of deepening the already suffocating

burden of today's polarized economies and, especially, labour markets' usual losers). Withal, such an opinionated pair of scales seems itself unbalanced.

Indeed, *inequalitarian-ism* weighs more in the ideological balance. In fact, inequality is viewed as a kind of cynical facilitator of the pandemic havoc—a corona-driven poverty trap is being equipped. The sentiment already seeded by the signallers of the contemporary intra- and international inequality vertigo is receiving extra fuel. Markets are said to fail in minding and filling in the gaps (states too, yet somehow less so than markets), as these two evils feed on each other: pandemic hits unequally, while inequality goes pandemic. Such narratives are spread by settled scholarly journals and by breaking news reports (warning that Brazilian favelas look like incubators for the walking-dead while American billionaires raise their net worth). The need for a healthy, soundly discriminative (not discriminatory) grasp of human inequality, of the natural versus artificial parts in this mixed (and messed-up) societal reality, is a legitimate concern in normal junctures and in "times of cholera" equally.

As a matter of *fact*, the already existing wealth and welfare gaps definitely become sensibly more acute, for the lockdown translates into even more uneven *social access to money* (i.e., in terms of blatant decreasing purchasing power, despite eventual price freezing), *work* (i.e., in terms of keeping the jobs slightly above or just below wage-productivity parity), *education* (i.e., in terms of keeping up with IT&C replacing traditional teaching/learning), *health* (i.e., in terms of shortage of or disease-risk within baffled public medical institutions) or *empathy* (i.e., with precisely the society's underdogs—the minorities, the migrants, the meagre—facing extra-discriminative attitudes from fear of them being agents of contagion or merely the wrong persons at the wrong time). It is hard to deny this (in)humane state of affairs. But as a matter of values, bleak *anti-inequalitarianism* has infectious and contagious leanings.

The present essay aims at surveying the emerging literature on pandemics and inequalities and treats it with a tint of *classical liberal* common-sensical logic. Upfront, a synopsis of some discussions that bring in the same playground the idea of pandemic and that of inequality, be their conjunction observed either amid or across nations; after that, a snapshot is being taken, emphasizing the way inequality is portrayed as a social malady, though it can be argued that no matter how unethical or inaesthetic it is, some cures become much worse than the disease; thereafter, brief scrutiny concerning the self-proclaimed and self-acclaimed availability of governmental means/resources to address equally/neutrally any kind of socio-economic crises; in the end, a point with respect to how securing/restoring the authentic liberties and the real sense of democracy, while not being an equalizer of fortunes or *fortunes* (nor needing to be), contributes to balanced moral healing for societies. For clear mindedness is the crux of cures.

One incog *pandemic*. On a certain bias in investigating the scene

The International Monetary Fund (IMF) guesstimates a contraction of the global economy by three percent in 2020; the World Bank (WB) foresees the global per capita income to fall four

percent and that around 40-60 million people just extracted from extreme poverty may fall back into it; the International Labour Organization (ILO) warns that 1.6 billion informal economy workers, that is almost half of the worldwide workforce, have their means of existence threatened by the insecure times and the insecurity of their jobs, as remittances to developing countries fell by 20 percent; the World Food Programme (WFP) envisages 265 million people to face crisis levels of hunger. The toll for the global economy could be US$10 trillion. As for those enamoured more with mondo-designs than mondo-figures, the Sustainable Development Goals—the 17 globally agreed anti-poverty, pro-equality, pro-peace, pro-environment/climate targets, for whom the moral custodian is the United Nations (UN)—look endangered these days. The UN Deputy Secretary-General, Amina Mohammed, considers that the pandemic shows "*the frailties and inequalities of our societies*" (UN 2020), as it accommodates a triple emergency of sanitary, humanitarian and developmental natures, perversely intermeshed with the already existing emergencies in both developed and developing countries. But this can be reversed, as she argues: "*We have the tools available globally to provide developing countries with the fiscal space and the resources needed to support the incomes of the poorest; to protect their communities from the worst effects and to be ready for recovery. And building on this, we can recover better—increasing the coverage of essential services; generating green jobs for a green recovery*" (Ibid.).
Lesson #1: It is the very call of duty and the responsibility of governments to be ingenious, generous and, surely, green during a pandemic.

Looking then at one of the most composite indicators in developmental economics, prepared by the United Nations Development Programme (UNDP) to measure world education, health and living standards, the Human Development Index (HDI) is expected to decrease for the first time since its inception in 1990. It is suspected that the decline will equal to rubbing out the progress from the last six years. Their glossing states that "*the pandemic was superimposed on unresolved tensions between people and technology, between people and the planet, between the haves and the have-nots*" (UNDP 2020a). The panoply of inequalities is exceptionally varied: "*Developing countries, and those in crisis, will suffer the most, along with the already vulnerable all over the world; those that rely on the informal economy, women, those living with disabilities, refugees, and the displaced, as well as those that suffer from stigma*" (UNDP 2020b). In consequence, the UNDP advises, beyond its econometrical projections, to normatively (re)view the policy responses to the corona-crisis via an equity lens. Such a vision is in line with appeals from prominent scholars like A. Sen (2020), who puts on guard that "*in the policies against the present pandemic, equity has not been a particularly noticeable priority*". He then points to the shortages of food and health services during World War II in Britain, which were treated with a more fair distribution of food and medical attention, an approach that prepared the genesis of a more robust post-crisis design—viz., the welfare state. He concludes: "*A concern with equity in crisis management would lessen suffering in many countries now, and offer new ideas to inspire us to build a less unequal world in the future*" (Ibid.). This leads us to…
Lesson #2: It is the very call of duty and the responsibility of governments to be ingenious, generous and, surely, green during a pandemic.

Another institutional crusader against inequality is the Organisation for Economic Co-operation and Development (OECD), devoted, in its own wording, to "*build better policies for better lives*". The researchers enrolled in or collaborating with the organization are as well engaged to collect and compile data coming from areas beyond the current scale and scope of the 37-member organization, preparing assessments and advice for member and non-member governments to document and deliver coordinated policy responses in confronting this enormous collective challenge. The novel series of OECD Policy Responses to Coronavirus (COVID-19) is impressive in both breadth and depth, with subjects ranging from (according to the most popular self-evaluation from its website): evaluating the initial impact of containment measures on economic activity; small and medium enterprises responses; education and health systems confidence and resilience; and fiscal policy. Featuring high on the list, like in the other international-institutional messages, there can be noticed the (interventionist) environmentalist calls: "*Governments have a unique chance for a green and inclusive recovery that they must seize—a recovery that not only provides income and jobs, but also has broader goals, integrates strong climate and biodiversity action, and builds resilience*" (OECD 2020), according to Angel Gurría, OECD Secretary-General, who terminates the line of reasoning with a solemn promise to "*[c]ount on the OECD to support an inclusive, low-emissions and resilient recovery in the post-COVID world. Protecting the planet is the most important inter-generational responsibility we have today*" (Ibid.). Once again, this calls for…
Lesson #n: It is the very call of duty and the responsibility of governments to be ingenious, generous and, surely, green during a pandemic.

The illusive panacea. On anti-inequality as the fix for all (d)evils

The image of the inherently market-driven, currently coronavirus-enhanced and invariably (inter)governmentally solvable inequalities is, in itself, a parallel pandemic. And a persistent one.

Immersing into the scientific literature devoted to the causes and effects of inequality looks like a life-long project rather than a several-lines-or-pages summary and it exceeds the purpose and pretences of the current essay. Reflecting on the inequalities of inter-human powerfulness and productivity, of inter-personal natural endowments and artificial statuses, of chances for people belonging to different and divergent classes, races and genders rises an inexhaustible (and an immortal) fascination. It predates Plato's reflections on the *aristocratic rule* and it comes back to J.J. Rousseau's perception of private property as the ultimate originator or perfect epitome for inequality; it rough- or fine-tunes K. Marx's and F. Engels' *dialectic sophisms*, refurbished by the present *social-democratic kind of liberal conscience* voiced by P. Krugman, T. Piketty, J. Stiglitz, A. Sen or any of their like-minders or disciples. As for the *classical liberal* reply to egalitarian nostalgias or utopias, it stays exotic, even eccentric, with L. v. Mises, F. Hayek, M. Rothbard, M. Friedman, et al. being packed wholesale (despite deep doctrinal divides) under the heading of depositories of naïve or noisy un-progressive discourse. For those interested in eloquent exhortations, yet not necessarily theoretically and historically flawless, on inequalities across populations, times and territories, a must-reads list includes Aghion and Howitt (2009), Acemoglu and Robin

son (2012), Stiglitz (2013), Piketty (2014), Atkinson (2015), Galbraith (2016), Scheidel (2017), to name just a few.

When it comes to the branch *inequality-economics of pandemics*, it is nevertheless in a full process of capital accumulation, to put it metaphorically, and it is rather instrumental than ideational/ideological.

Among the recent works from independent scholars, but subtly aligned with (inter-)governmental bodies' literature, a palatable and predictable conclusion is consecrating: *pandemics raise inequality*. There are some notable studies on the socio-economic effects of the pandemics before the 21st century, e.g., Barro, Ursua and Weng (2020) or Jordà, Singh and Taylor (2020) for recent and more distant past scrutiny, as well as hot-off-the-press surveys on sequences of recent episodes, e.g., SARS (2003), H1N1 (2009), MERS (2012), Ebola (2014) and Zika (2016), meant to predict the image or the magnitude of inequality disruption of the COVID-19 unfolding crisis. Furceri et al. (2020a; 2020b) observe, analysing recent past experiences, that "*pandemics lead to a persistent and significant increase in the net Gini measure of inequality*". The authors make two key observations: firstly, the impact on the net-Gini surmounts the one registered on the market-Gini, therefore deducing that the past public policies might have had some regressive effects; secondly, the preliminary assessments of a series of government programmes directed so far against COVID-19 suggest that, once again, the rich are the main beneficiaries (JCT 2020). Changing the focus, however, the pandemic has also (apparently) paradoxical features. Mereuță (2020) observes that infections replicate the worldwide GDP distributions, meaning that the most important contributors to global wealth, the so-called *node-countries*, take the lion's share also in terms of contaminations, too.

So, do we speak of a disease of the relatively poor, but rather from relatively rich countries, with internal or external liberties as ferocious facilitators? Is (global) inequality the *flaw*, as is limited freedom the *fix*?

A *poisonous* musing. On side-effects of one-sided equality furores

All in all, most corona-inequality studies state that it is *benefic*ial to add *equality* concerns in *policy* responses. However, such a progressive route obscures several perils.

Of *collectivist correctivism*. Regarding interventionism—be it of social-democratic pedigree (pro-equalization) or conservative one (anti-change)—, two frailties are notable. Firstly, *a culture of public support entitlement* (read aid from the state) sets in motion, with a variety of socio-economic categories claiming public props in moments of distress, demanding custom-made regulations, subsidies/grants, charge-free access to public goods for chronic or acute (e.g., of pandemic nature) hardships, whose weightiness can be inflated by the potential receptors and carelessly met (particularly in electoral eves) by the politicians. Secondly, *an erosion of the culture of independence* gets instilled, with political entrepreneurship blossoming at the expense of market

industriousness, as people accept, during harsh periods (e.g., states of emergency) the "offer [one] can't refuse", of giving up freedoms in exchange for economic support and social protection, that only later turn out hardly reversible. For the praxeological sociology of statist socialization of expropriation and disempowerment, see Hoppe (1989); for an overview of the law-and-economics perspective of the modern Austrian School's classical-liberal rejoinder, see, as well, Zywicki and Boettke (2017).

Of *conceited constructivism*. F. Hayek warned us in his Law, Legislation and Liberty trilogy (1973, 1976 and 1979) with regard to the destructive arrogance—*a fatal conceit*—according to which man is endowed by the mere possession of reason to *invent and build social institutions*, such as law and morals. He dismissed the attribution of social order simply to rational designs and conscious intentions (constructivist/naïve rationalism). Constructivism ignores the *developmental and discoverable processes* which are, in fact, responsible for the actual advancements of our civilization (evolutionary/critical rationalism). In 2020, this lesson is still misapprehended, as governments from the developed countries (in fact, worldwide) thought that their bureau(techno)cratically-designed institutions are so powerful that an exotic pathogen cannot make them budge. Moreover, the paternalist mentalities instilled by their welfare states have led to the old individual vigilance's anaesthesia, pertaining to the good, old, classical liberal mindset (Croitoru 2020). Now, calls are made to reform, via top-down policies and on *equal-footing* principles, healthcare and education, to make lives more digital and greener, even if the best way to make a society vulnerable is to deal with it as a *mechanical* device to be set and levelled.

Of *cynical consequentialism*. There are several errors in applying consequential reasoning within social affairs (Iacob 2016). For instance, the *post hoc ergo propter hoc* fallacy: if inequality is observed in market economies, it might mean that it exists not *because* but *despite* the *market* element, since there are many aspects related to the policy toolbox that hamper the access of certain people to productive self-sustainability, e.g., inflation, welfare provisions and labour regulations. Then, there is the issue of the *interpersonal comparison*, with the troubles associated with the *measurement* of income, wealth or chances that are to be levelled; or when they eventually are, concluding that the very fact of pseudo-equalizing has granted an overall *betterment*, it overlooks subtle behavioural feats (Damoc 2020), not captured in neoclassical macro-modelling. There is an *intertemporal* aspect as well, which has, in the case of inequalities, a dual significance: on the one hand, few analysts focus on observing changes in the standard of living for the very same persons during their lifespans (the yesterday's poor maybe today's middlemen); on the other hand, the perverse/erosive effects of redistributive-justice measures in time (some reflected on the very statistical distributions of income/wealth) are carelessly missed or misjudged.

Thence, be it in pandemics or not: "Is inequality *the* issue, or should we fixate on something else— on *liberty, on letting it be*?".

Liberty as a *placebo*. On given versus un-/forgivable (un)evenness

In the exhibitionistic world of mass-mediatic capitalism, it is now a fad, if not a compulsion, to measure and compare private fortunes. Most people would care to know their neighbours' wealth and how they have come to make it (or lose it). There is no shortage of tops (e.g., Forbes), which the vainglorious try to overtake while the more dissimulative try to keep away from indiscreet eyes. The fact that we are witnessing never-ending dawn of a market economy makes many of us regard the rich not so much as creative drivers of general wealth who serve their fellow men, as opposed to ensnaring them into *serfdom*, but rather as sinister deviants who defy the law of (allegedly)-natural equality (Rothbard 1974). The distorted idea of wealth is subject to an implicit presumption of guiltiness. At the same time, for the vast majority, poverty becomes the call sign of those who possess the highest moral virtues. Even philanthropists are blamed for not donating more, even though charity comes from market-values and profit-making. Noteworthy: charities are a capitalist (by-)product.

Eventually, it is fair to understand that, despite any social(ist) experiments, *personal freedom* is the only sound premise for social welfare—to the extent that the latter is desired, because there are, in the word, free yet austere/ascetic communities as well. Poverty is, on the other hand, a virtue only when it is pursued with dignity. The idle and unskilled do not qualify for that virtue; even less, if they long in fact to amass riches effortlessly. Those who were impoverished because of theft and robbery also do not gain automatic virtue through their misfortune alone, for virtue is not merely a spiritual patch to fill in material gaps. Finally, the poor in spirit have the promise of an everlasting inheritance transcending worldly confines, but only if their poorness is assorted with humbleness, not with envy. That said, material wealth can be morally constructive, alongside hard work and unabridged honesty, patience and persistence against uncertainty, defining traits of the providential, community-builder, more than mere firm-maker, *entrepreneur*.

Although still bearing the deep print of the Protestant revolution, Christian dogma continues to view wealth with a modicum of moral opprobrium. If wealth was accumulated via deceit, theft, robbery, the sin is obvious. Case closed. But when we hear the call "*Help thy neighbour!*", this does not necessarily equate kindness simply to the dole, nor does it compel us to blindly aid the others to the extent of our nigh-complete patrimonial sacrifice and ruin. In fact, we cannot truly help the poor by impoverishing ourselves (Jora et al. 2020), at least not sustainably—a notion in fashion this epoch. If we trust in God, and in the coherence of His work, we should be convinced that the basic logical tenets are entirely in line with moral commandments. You can help others only if you are not helpless—morally or materially. The road to salvation is not destined exclusively to the monks. For if it were so, our bloodline would have long since died out, yet this does not seem to be the Grand Plan. Conscience passes through the stomach, some say. The catch is that it should not stay there.

We flick through glossy magazines about business trends, we measure wealth in our community, we share this information with the general public and thus we elicit reactions. Two main poles define the emotions we experience as a result: *respect and envy*. By reading the true stories be-

hind figures and probing how those individuals have built their fortunes, we can distinguish among those whom we can deem to be creators of wealth in the community and those who have amassed their riches by parasitically confiscating wealth from it. Deifying and demonising thriving capitalists without fair judgment do poison the social fabric. We risk instating ever-increasing taxes for the wealthy, and, in blissful democratic ignorance, punishing hard work, patience and perseverance in the face of uncertainty and honesty just as well as punishing idleness, greed and theft. As an aside, what happens to the money taken from the rich (and the rest of us)? It goes to a breed of rich political animals (parasites/viruses): the *state-raptors*.

Conclusion

Almost all media outlets entered the frenzy of interrogating global masterminds about, "*How the World/Economy Will Look After the Coronavirus Pandemic*" (Foreign Policy 2020a; 2020b). In response, J. Stiglitz airs that "*the coronavirus crisis has been a powerful reminder that the basic political and economic unit is still the nation-state*"; R. Shiller warns that "*the pandemic has created a wartime atmosphere in which fundamental changes suddenly seem possible*"; C. Reinhart speaks of "*another nail in the coffin of globalization*"; A. Posen foresees that "*economic nationalism will increasingly lead governments to shut off their own economies from the rest of the world*"; E. Prasad notices that "*the world looks to central bankers for deliverance*"; while A. Tooze comes with a bleak verdict: "*the normal economy is never coming back*". All these ideas represent exquisite bits of realpolitik rumination.

As for *ideal politics*, i.e., fighting the social injustice of the economic inequalities, there is hardly something like this at hand right now, if ever was. It seems the fight against this inequality scourge is misled. This ethics-and-economics-of-envy, upon which the anti-inequality crusades build-up, is inferior in meaningfulness to the more decent and coherent struggle against unwanted poverty. True enough, the social game is based on relative perceptions and positions (e.g., market rivalry and competition, the system of relative prices that helps us rationally master scarcities). Though, installing the fight against inequality as a universal (bad!) habit diverts our individual energies from *improving our own* state to *levelling* the playing field even by scraping their yards. This looks like an infinitely more perverse virus, for, as one might have learned, *Bruce Willis and bad habits… die hard.*

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The COVID-19 crisis: economic implications for Bosnia and Herzegovina

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In mid-March 2020, close to complete government paralysis of economic activities due to the COVID-19 pandemic put the economy of Bosnia and Herzegovina (B&H) into hibernation. Like in other countries, this decision had a devastating impact on the economy of B&H, with quickly and sharply rising unemployment, falling consumption and public revenues, closure of businesses, and the like. In following April, different government levels in the country began to formulate and partially implement economic measures in response to the crisis. This paper analyzes the economic implications of the COVID-19 pandemic in B&H, with particular consideration of governmental 'corona' measures. In addition to the macroeconomic analysis, the paper also explores the perceptions of the business community regarding the impact of the pandemic on their business, government measures and their effectiveness, and their anticipation of the future - present optimism. Measures taken by various levels of government in B&H to address the economic and other consequences of the COVID-19 pandemic are viewed as insufficient and belated. Most respondents believe that the pandemic will change people's consumption and lifestyle, but also that it represents a chance to modernize businesses and business models.

Introduction

The outbreak of the new coronavirus disease 2019 (COVID-19) has infected millions of people worldwide, with hundreds of thousands of dead (European Centre for Disease Prevention and Control 2020). Countries are battling the spread of the virus to protect their citizens by closing international borders and imposing restrictions on movement, gatherings, and working hours (CMS 2020). According to ILO (2020a), full or partial lockdown measures were in March alone affecting almost 2.7 billion workers – four in five of the world's workforce. As of 1 April 2020, the ILO's (2020b) new global estimates indicate that working hours will decline by 6.7 per cent in the second quarter of 2020, which is equivalent to 195 million full-time workers. Also, 1.6 billion workers in the informal economy stand in immediate danger of having their livelihoods destroyed. However, the shock to the labour market is far from uniform, with specific sectors bear-

ing the brunt of the collapse in economic activity. The current estimated impact on global GDP growth for 2020 is from -3% (IMF 2020a) to -4.6% (Fitch Ratings 2020). In a baseline scenario that assumes that the pandemic fades in the second half of 2020 and containment efforts can be gradually unwound, the global economy is projected to grow by 5.8% in 2021 as economic activity normalizes (IMF 2020a).

By June 2020, B&H recorded 2,493 coronavirus cases since the epidemic began in March (Worldometers 2020). In the meantime, the country reported 152 coronavirus deaths (Trading Economics 2020). According to healthcare experts, B&H health sector managed to respond well to the pandemic, primarily in organizational and professional terms, because it did not have a significant number of cases, as well as deaths (Privredna komora FBiH 2020).

Before COVID-19, the economy showed its first signs of a slowdown already in 2019. The causes are mainly external factors. B&H has a high share of goods in total exports and thus is tightly connected to global value chains (World Bank 2020b). The main trading partners are Germany, Italy, Croatia, and Austria, with a strong focus on textiles and basic metals and close links with the car industry. Indeed, foreign trade has deteriorated significantly due to negative economic trends in trading partners, as well unexpected developments in relations with them (i.e., economic recession in Italy, the slowdown in the German economy, the introduction of a 100% import tax on products from B&H by Kosovo, and the decline in the value of the Turkish lira in the second half of 2018). Further, due to the closure of Mostar's industrial giant "Aluminij" in mid-2019, problems in the operations of chemical company GIKIL Lukavac, as well as the oil refinery in Bosanski Brod, the rest of 2019 was marked by a decrease in exports compared to the same period in 2018. These individual events, combined with the overall slowdown in the economy, created the preconditions for a strong negative impact of the global crisis caused by the outbreak of the COVID-19 pandemic.

The economic effects of the crisis in B&H began in January 2020, when the closure of the Chinese economy threatened global supply chains. In mid-March 2020, B&H declared a state of emergency, hindering or preventing companies from operating, resulting in many of them to close. The impact on revenues of all big companies was extreme (Deloitte 2020). Various restrictions, implemented by the state, entities (The Federation of Bosnia and Herzegovina and the Republika Srpska) and local governments in B&H, drastically slowed the economy down, forcing many of the small and mid-size businesses to close permanently. A noticeable rise in unemployment and slowdown of production in almost all sectors, as well as a sharp decline in the exports (EBRD 2020) estimates that exports will decline more than 40% of GDP) due to the drop in foreign market demand throughout the April 2020 were the top concerns for the domestic leaders and experts (Stopić 2020). In April and May 2020, the so-called "Corona laws" were passed to support the economy. These measures differ according to the complex federal structure of the state (Hogić 2020). By violating freedom of movement, as well as freedom of assembly, the executive power in B&H, left citizens in a state of legal uncertainty (Muratagić 2020), which also affected economic uncertainty. To address the additional financing needs, the authorities have requested emergency financial assistance from the IMF, the World Bank, and the European Union. On April

21, 2020, the IMF Board approved a EUR 330 million loan under the Rapid Financing Instrument (RFI) to help the country meet its financing needs (Stopić 2020). From the middle to the end of May, as the state of emergency was lifted, the economy was becoming more and more open.

Strict lockdown in B&H has caused a sharp halt to economic growth, with supply chains being disrupted and service sector being hit hard. Researching the impact of COVID-19 on tourism in B&H, Peštek (2020) finds that, based on information on March 2020, 79.4% of respondents expect a reduction in business volume between 61% and 100%. The Foreign Trade Chamber of B&H (2020) finds that on a sample of 410 companies, mostly from the manufacturing industry, 92% felt the consequences of the pandemic, while 71% felt the implications for both exports and imports. Crucially, UNDP (2020) analysis shows that smaller firms in key sectors have already been more exposed to the negative effects of the COVID-19 pandemic and are less prepared to deal with the forthcoming indirect impacts. However, larger firms tend to have greater, more developed supply chains and will, therefore, be subject to more significant external shocks. Low-skilled workers and young professionals are two vulnerable groups most prone to being negatively affected as a result of the pandemic-induced economic downturn.

Estimates of the economic downturn for B&H vary. IMF (2020b) predicts an economic decline of 5% in 2020 and recover to 3.5% in 2021. The EBRD (2020) predicts a decline of -4.5% in 2020 and a recovery of 6% in 2021. Earlier, the World Bank (2020a) had a pre-COVID-19 crisis projection of economic growth of 3.4%. Čavalić, Hadžić and Bećirović (2020) estimate that the economy will fall by 3,97% to 9,53%, with a loss of 30,000 to 100,000 jobs, according to different macroeconomic scenarios. Regarding the financial markets, OECD reports that the local currency "BAM" has depreciated around 3% since the beginning of the year, signaling a potential capital outflow and rendering international trade and investment decisions more difficult. When it comes to the stock market, the SASX-10 index lost around 11% of its value from 10 January to 20 May (OECD 2020).

The World Bank, as a key economic challenge for B&H in the light of the COVID-19 pandemic, lists long-term unemployment, as well as several financial risks originating in pensions, arrears, and SOE liabilities. The most significant external risk is related to low growth in the EU and political tensions in the region (World Bank 2020a). As the B&H economy relies heavily on trade, manufacturing, and remittances, with the latter accounting for more than 10% of GDP, it is vulnerable to both the breakdown of EU production chains and a drop in workers' remittances. Indeed, EBRD (2020) estimates that remittances shall drop for 11% of GDP, which will have a further negative impact on consumption.

An extensive public opinion poll conducted by Ipsos B&H shows that on a national level concern for one's own health is at amount the same level as concern for the economic consequences of the epidemic. In contract, the Sarajevo canton citizens are particularly concerned about economic prospects (job loss, global recession, etc.) (UNICEF 2020).

Research methodology

The analysis consists of two segments. The first part of the research is the analysis of macroeconomic indicators for B&H during the crisis caused by the COVID-19 pandemic. To estimate the decline in GDP in 2020, a linear regression model was used with a time series of 48 quarterly values. The collected data were analyzed and processed in Python.

The second part of the analysis examines the attitudes of business owners and managers towards the the aftermath of the COVID-19 pandemic and its consequences. Primary data were used, collected by a questionnaire with a four-point Likert scale in the period May 1-29, 2020 on the territory of B&H. The obtained data were analyzed using descriptive statistical analysis, ANOVA, and t-test of independent samples.

Analysis of macroeconomic indicators after the outbreak of the COVID-19 pandemic

This part of the research analyzes data related to changes in foreign trade, industrial production, unemployment, and tax revenues. It also provides a projection of GDP for this year, based on the first, preliminary available data on consumption due to a fall in indirect tax revenues.

In March 2020, imports and exports declined significantly, as shown in Figure 1. Imports in B&H decreased by EUR 149,9 million compared to March 2019, while exports decreased by EUR 71,9 million in the same comparison. Data for April 2020 show an even more significant decline, as exports decreased by EUR 173,1 million and imports decreased by EUR 315,5 million, both in comparison to March 2019.

Figure 1. Change in Export / Import from previous period (EUR 000)
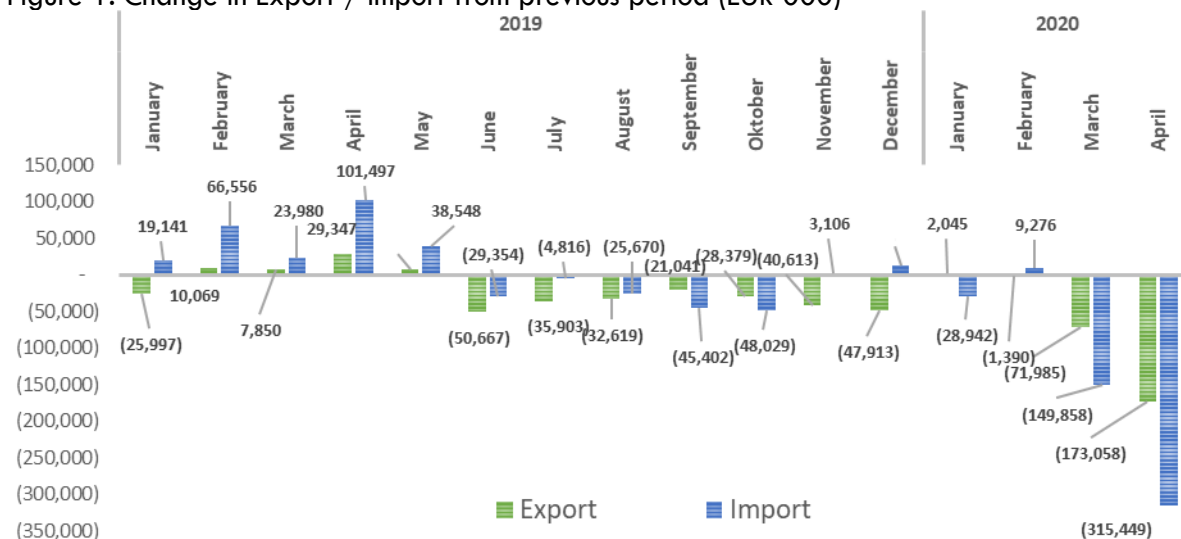
Source: Agencija za statistiku BiH (2020c and 2020d).

A similar trend was recorded in the segment of industrial production (see Figure 2). Industrial production was recording a constant decline from November 2018 to January 2020. A further decline at the beginning of 2020 is even more significant because it occurs on the already reduced basis from 2019. Indeed, in April 2020, this decline amounted to as much as 15.9%.

Figure 2. Change in industrial production in B&H (% of previous period)
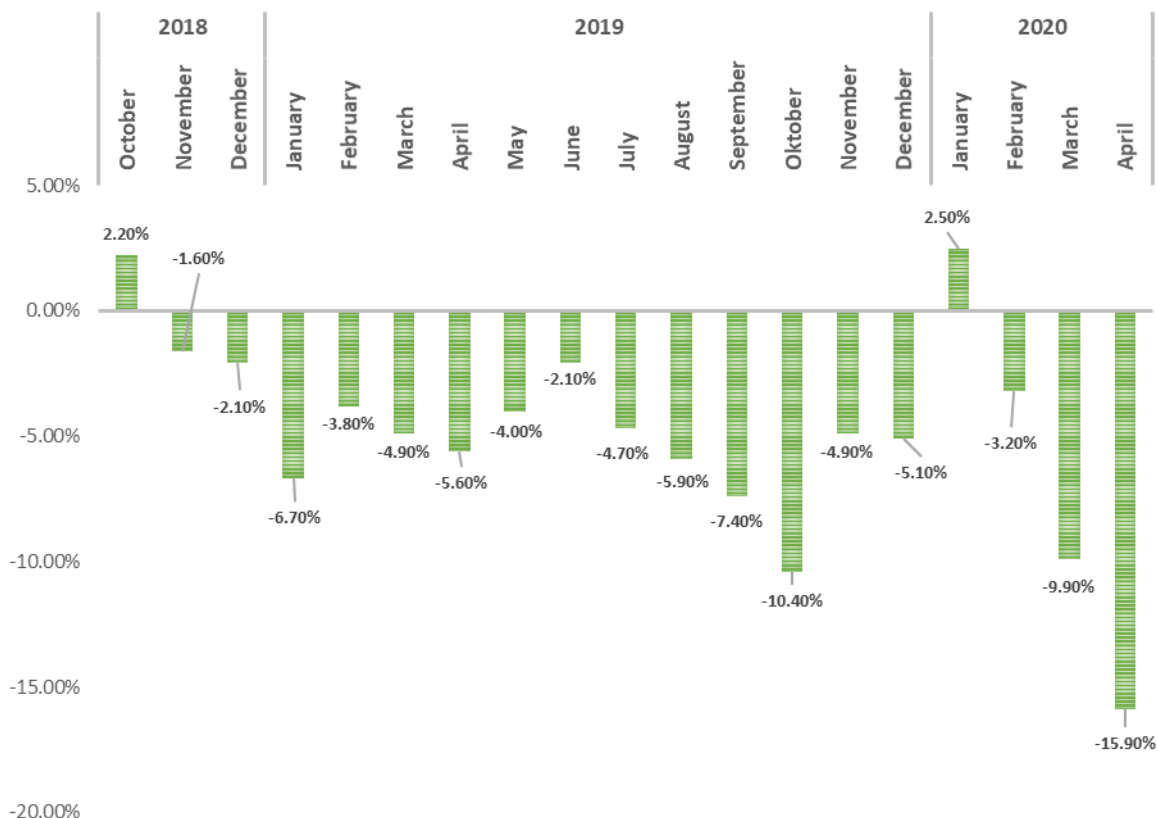
Source: Agencija za statistiku BiH (2020b).

Unlike industrial production, which declined throughout 2019, employment in B&H grew until December 2019. The number of employees in 2019 increased by 18,000 employees. During this period, employment did grow in both the private and public sectors (Agencija za statistiku BiH 2019, 2020e). The COVID-19 pandemic reduced employment by 31,000 in the period March-April 2020. Four main private sectors (manufacturing - C, wholesale and retail - G, accommodation and food service – I, and art and entertainment - R) accounted total of 54,14% rise in employment during the 2019, with 89,58% rise in the unemployment at the end of April 2020 (Agencija za statistiku BiH 2020). Five main public sectors (scientific and technical activities - M, administration - N, public defense - O, education - P, healthcare - Q) increased number of employed workers by 598 at the end of the April 2020 comparing to December of 2019 (Agencija za statistiku BiH 2020). The last time, this level of employment in B&H was recorded was in April 2018 (see Figure 3).

Figure 3. Unemployment in Bosnia and Herzegovina (January 2018 – April 2020)
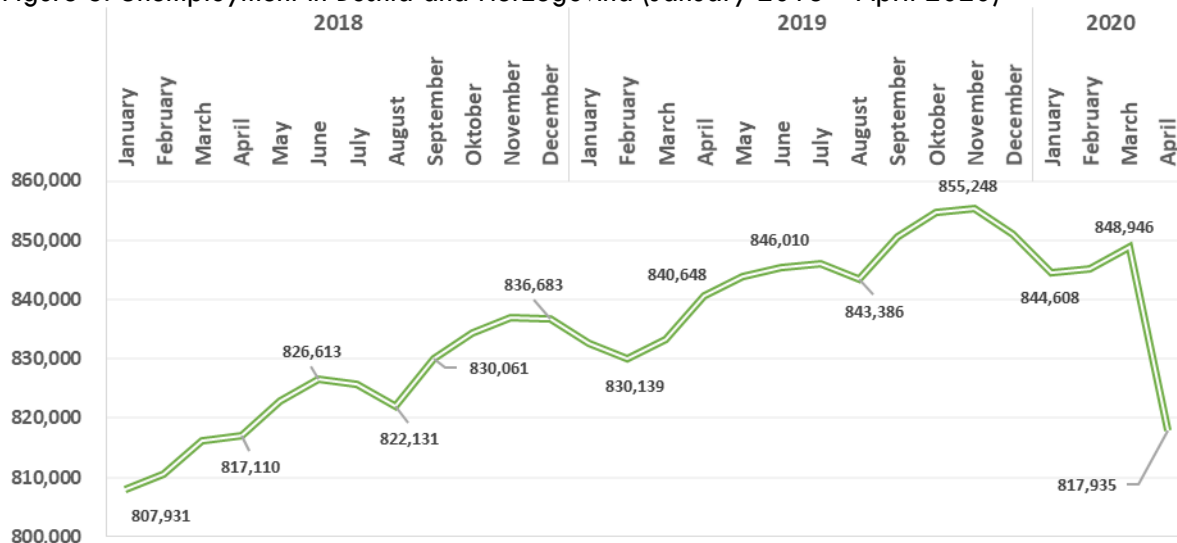
Source: Porezna uprava FBiH (2020), Agencija za statistiku BiH (2019, 2020e, 2020f) and Fond PIO Republike Srpske (2020a and 2020b).

Figure 4 shows the comparison of tax revenues in the first quarter of 2019 and 2020. The leading components in the structure of indirect taxes are VAT and excises, while direct taxes are composed of contributions, income tax, and corporate income tax. There was a decline in all types of tax revenues and the total reduction in tax revenues for B&H amounted to EUR 134 million between the compared periods.

Figure 4. Tax revenues in Bosnia and Herzegovina (in billion EUR)

Source: UIO BiH (2020), Porezna uprava Federacije BiH (2020) and Poreska uprava RS (2020).

In the regression model, the household consumption of the population and GDP in B&H are linked, in constant prices, according to the expenditure principle. The linear regression model:

$$Y = -3.405.700 + 1.8496X$$

where Y represents estimated GDP, X represents the consumption value, -3.405.700 is a constant, and 1.8496 represents the coefficient.

The value of R-squared is 0.905, which indicates a very strong relationship between household consumption and GDP, which is to use estimating GDP trends for 2020. Due to limited and fragmented official statistics related to the decline in household consumption by quarters, we made an assessment of a decline in consumption in second quarter based on available data on the decline in collected indirect consumption taxes (VAT and excise duties). In April 2020, the decline in collected indirect taxes was 23% compared to the same period last year. It is assumed that the fall in indirect taxes after the abolition of restrictive measures to fight coronavirus will amount to 15% in May 2020 and 5% in June 2020. Based on the above, it is also estimated that household consumption will continue to decline in the second quarter of the year. Assuming that the total decrease in consumption in the third quarter will amount to 5% and that consumption in the fourth quarter will be at the level of 2019, we estimate GDP for B&H in 2020.

Table 1. GDP projections for Bosnia and Herzegovina

Period		Household Consumption (000 EUR)	GDP (000 EUR)
2019*	Q1	3.243.513	4.325.173
	Q2	3.409.883	4.584.418
	Q3	3.543.606	4.783.294
	Q4	3.454.946	4.575.315
	TOTAL	13.651.948	18.268.200
2020**	Q1	3.243.513	4.325.173
	Q2	2.955.232	3.724.690
	Q3	3.366.425	4.485.233
	Q4	3.454.946	4.575.315
	TOTAL	13.020.116	17.110.411

* Agencija za statistiku BiH data.

** Own projections.

Source: Agencija za statistiku BiH (2020a) and own calculations.

Based on the GDP data for 2019 (Agencija za statistiku BiH 2020a), we estimate for B&H a decline in second quarter (2020) spending of EUR 454,6 million that leads to a second quarter (2020) decline in GDP of EUR 859,7 million. Ultimately, the expected decline in GDP for 2020 on an annual basis is 6.34%, if the negative effects are primarily expressed in the second quarter of this year.

Analysis of the attitudes of business owners and managers regarding the COVID-19 pandemic

The second part of the research examines the attitudes of business owners and managers towards the aftermath of the COVID-19 pandemic and its consequences. Primary data were used, and the original survey questionnaire with a four-point Likert scale was used as an instrument for obtaining them. The survey was conducted via the Internet (social media and e-mail) in the period May 1—29, 2020 on the territory of B&H. 1,300 accurately completed survey questionnaires were obtained, with 385 participants indicating that they belonged to a group of business owners and managers (represents a sample in this survey).

Table 2. Respondents' views on government actions and measures to the COVID-19 pandemic

Attitudes	Fully disagree (%)	Disagree (%)	Agree (%)	Fully agree (%)
I believe the media has created an exaggerated panic.	9.4	12.2	22.6	55.8
I believe that strict quarantine measures were justified.	34.3	31.4	21.1	13.2
In my opinion, governments in B&H are coping well with the COVID-19 pandemic.	52.5	27.7	13.8	6
I believe that economic assistance measures adopted by the governments of B&H 's entities are right.	74.3	16.9	6.2	2.6
I believe that the city authorities in my local community reacted well to the crisis.	46.5	29.9	15.6	8
I believe the government 's measures to help the economy in B&H are too late.	10.1	6	8.8	75.1

Source: Own calculations.

Table 2 presents the views of the respondents regarding the measures taken by the authorities in B&H, in terms of healthcare and economics in view of the COVID-19 pandemic. The highest level of the agreement ("agree" and "fully agree") is on the view that government's measures to assist the B&H economy came too late, as 83.9% of respondents agree with this statement. Interestingly, 78.4% of respondents agree that the media created an unwarranted panic regarding the COVID-19 pandemic. A large percentage (91.2%) of respondents stated that they did not agree ("fully disagree" or "disagree") that the economic assistance measures adopted by the B&H governments were right. Also, 80.2% of respondents do not agree ("fully disagree" or "disagree") that the B&H government is coping well with the COVID-19 pandemic.

Respondents' assessments of threats to business operations and personal business threats posed by the COVID-19 pandemic are given in Table 3. The largest percentage (94.2%) of respondents believe that COVID-19 pandemic crisis poses a severe threat ("large" or "very large") to the domestic economy. The smallest percentage of respondents (65.7%, which is still a very large number) believe that the COVID-19 pandemic poses a severe threat ("large" or "very large") to their job loss. The majority (59.9% and 51.7%, respectively) of respondents estimate that the COVID-19 pandemic poses a "very large" threat to their company's operations in the short and long term.

Table 3. Assessment of COVID-19 pandemic threats to business

Attitudes	Very Small (%)	Small (%)	Large (%)	Very large (%)
How much of the financial threat the pandemic COVID-19 poses to your family?	5.5	16.9	26.2	51.4
What is the threat of a pandemic COVID-19 for your company's business in the short term?	4.9	10.7	24.9	59.5
What is the threat of a pandemic COVID-19 for your company's business in the long term?	2.3	13	33	51.7
What is the threat of a pandemic COVID-19 for my work-place?	15.6	18.7	27.3	38.4
What economic threat does the pandemic COVID-19 pose to B&H?	1.3	4.5	21	73.2

Source: Own calculations.

Respondents' views on the impact of the COVID-19 pandemic on personal and business future are shown in Table 4. It can be seen that majority (62.9%) of respondents disagree with the statement that life will normalize during the summer 2020, as well as that the economy will recover even if social distancing measures remain in force (75.6%). While 62.9% of respondents believe that the COVID-19 pandemic is a chance to build new business models and as such modernize business, only 23.6% of respondents believe that this crisis will have a positive effect at the state level in terms of initiating the necessary structural social changes. 64.7% of respondents believe that their life after a pandemic will not be the same in terms of lifestyle and consumer habits.

Table 4. Respondents' attitudes about the impact of the COVID-19 Pandemic on the future

Attitudes	Fully disagree (%)	Disagree (%)	Agree (%)	Fully agree (%)
I believe that life in B&H will be normalized in the summer.	31.2	31.7	21.8	15.3
I believe the economy will recover despite the measures of the social distancing.	43.4	32.2	18.2	6.2
A condition for the recovery of the economy in B&H is the disappearance of the virus in the world population.	31.4	28.6	22.9	17.1
Pandemic COVID-19 is a chance to introduce new business models and modernize business.	19.7	17.4	30.4	32.5
I believe that the COVID-19 pandemic will have a positive impact on the B&H society in terms of launching structural changes in the country.	47.8	28.6	13	10.6
After the pandemic, my lifestyle and consumption will be the same as before.	33.5	31.2	21.3	14

Source: Own calculations.

Using the t-test and ANOVA, we tested the significance of differences between respondents' responses with respect to their socio-demographic characteristics: the position in the company, sector, type of activity and place of residence. Table 5 shows the statistically significant results of the t-test of independent samples. Differences in attitudes between business owners and managers were tested.

Table 5. Independent Samples Test (position in company

	T-test for Equality of Means			Mean	
Attitudes	*t*	*df*	*Sig. (2-tailed)*	*Owner*	*Manager*
Pandemic COVID-19 is a chance to introduce new business models and modernize business.	-3.417	237.878	.001	2.64	3.04
How much of the financial threat the pandemic COVID-19 poses to your family?	4.016	383	.000	3.35	2.95
What is the threat of a pandemic COVID-19 for your company's business in the short term?	4.286	383	.000	3.51	3.10
What is the threat of a pandemic COVID-19 for your company's business in the long term?	3.278	383	.001	3.42	3.14
What is the threat of a pandemic COVID-19 for my workplace?	4.705	383	.000	3.05	2.49

Source: Own calculations.

Table 6 shows the results of the t-test of independent samples where the subjects were observed from the private and public sectors. There are statistically significant differences in attitudes towards state and local government responses to the COVID-19 pandemic, where respondents from the public sector have a more positive attitude. Respondents from the private sector assess that the pandemic is a greater danger to the economy of B&H and compared to those from the public sector.

Table 6. Independent Samples test (sector)

	T-test for Equality of Means			Mean	
Attitudes	*t*	*df*	*Sig. (2-tailed)*	Private Sector	Public Sector
In my opinion, governments in B&H are coping well with the COVID-19 pandemic.	-2.694	379	.007	1.7	2.42
I believe that the city authorities in my local community reacted well to the crisis.	-2.389	379	.017	1.83	2.5
What economic threat does the pandemic COVID-19 pose to B&H?	2.301	11.323	.041	3.69	3.08
In my opinion, governments in B&H are coping well with the COVID-19 pandemic.	-2.694	379	.007	1.7	2.42
I believe that the city authorities in my local community reacted well to the crisis.	-2.389	379	.017	1.83	2.5

Source: Own calculations.

When it comes to differences in respondents' attitudes concerning whether they come from larger local communities that are also regional administrative centers or smaller local communities, a statistically significant difference was found only to the attitude of local authorities to the crisis (p = 0.001). Although both groups have a negative attitude towards local authorities' reactions, this attitude is somewhat milder among respondents outside administrative centers. In the ANOVA analysis, the type of activity (production, services, etc.) was observed as an independent variable, while the dependent variable was the respondents' attitudes. There was a statistically signif-

icant difference in attitudes between incoming respondents and production and services in relation to measures of municipal/local authorities (p = 0.0005). Although both groups have a negative attitude towards reactions to the local government pandemic, this negative attitude is more pronounced among respondents from the service industry. When assessing to personal finances, short-term and long-term business, and job security, statistically significant differences were shown between respondents belonging to the service industry and the other two groups of respondents, with these first threats being higher (for the first three respondents' attitudes p value is 0.0005, for the fourth p value is 0.006).

Conclusions and discussion

Even before the economic crisis caused by the COVID-19 pandemic, B&H showed the sensitivity of the economy to negative external influences. With the closure of the economy in view of the pandemic, there has been a deterioration in most macroeconomic parameters. In the first four months of 2020, there was a significant decline in exports and industrial production in B&H compared to the same period last year. The number of employed persons is at the level of employment as in April 2018. Thus, in just one month the negative effects of the COVID-19 crisis managed to undo the positive effects that had been accumulating for two years.

Although in the first two months of 2020, there was an increase in tax revenues compared to the same period in 2019, the COVID-19 lockdown measures from mid-March this year, the decline in employment, exports and imports, and industrial production, harmed the growth of collected tax revenues this year. The decline was particularly pronounced in April 2020, with both indirect taxes under the jurisdiction of the state level and direct taxes under the jurisdiction of the entities. According to the model presented in this paper, which is based on the ratio of consumption and GDP, the B&H economy will decline in 2020 for 6.34%, with ceteris paribus of other parameters.

Analysis of the original research conducted by the authors of this paper concludes that the business community in B&H is genuinely concerned about the economic consequences of the COVID-19 pandemic crisis, both for the overall economy and their business. In addition, their high level of concern for personal finances and job stability has been documented. Business owners statistically significantly assess these hazards more than managers in B&H. The reason could be that a significant share of small business owners and crafts is represented in the sample, given that their share in the population is higher than the one from owners of medium and large businesses.

Business owners and managers in B&H assess that measures taken by various levels of government in B&H to address the economic and other consequences of the COVID-19 pandemic were insufficient and overdue. The business community also believes that the B&H authorities are not coping well with the COVID-19 pandemic, which aligns with the general perception of the domestic authorities even though the COVID-19 pandemic has not endangered the country's healthcare system. Respondents view strict quarantine measures as unjustified with the negative role of the media in spreading unnecessary panic. The latter may be because the survey was

conducted after the lifting of the ban on movement and when it became clear that the COVID-19 pandemic did not cause significant health consequences. Respondents from the private sector rate the government's response to the pandemic worse than those from the public sector. It is also interesting that respondents from local communities that are not administrative centers rate local government measures more positively than respondents from administrative centers.

The results confirm that the service sector in B&H is particularly endangered in this crisis since it is largely focused on direct contact with customers. Respondents belonging to this group rated statistically significantly higher personal and business risks compared to respondents from other sectors of the B&H economy. Also, they had a more negative attitude towards local government measures, which was expected given that a large part of the service sector was not operating as usual.

The future does not look optimistic. Respondents believe that life in B&H will not return to normal during the summer 2020 and that measures of social distancing that remain in place are further hampering the economic recovery. Also, most respondents believe that the pandemic will affect people's consumption and lifestyle. On the other hand, they view the pandemic as a chance to modernize businesses and business models, with the managers having a more positive attitude about it than the company owners. When it comes to the impact of the COVID-19 pandemic on B&H society, most respondents do not believe that there will be positive structural changes in the country.

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