EMERGING EUROPE'S CHRONIC DISTRUST:

LESSONS FROM THE REGION'S COVID PUZZLE

Editors: Piroska Nagy-Mohácsi and Előd Takáts

Előd Takáts

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Contents

Foreword

Előd Takáts · *Corvinus University of Budapest*

The Russian invasion of Ukraine places Central and Eastern Europe once again at the centre of international policy attention. The region is experiencing a sharp crisis: economies are slowing dramatically as Russian gas and energy supplies are being scaled down or cut altogether, while inflation is rising. Yet, most societies in the region are standing firm to confront aggression and its economic consequences, and all societies are rallying to welcome and support refugees from Ukraine – a sharp contrast to their rejection of refugees from the Middle East just a few years ago.

We clearly need more research to understand what drives these societies. The region's perplexing response to the COVID pandemic – an initial good performance that later reversed dramatically – provides some answers.

Part of it is the tragic footprint left upon the region by the 20th century, particularly by World War 2 – a series of historical events which prompted historian Timothy Snyder to call the region the "Bloodlands". Here, the fabric of society was torn asunder by, in turn, communist terror, the Holodomor, Nazi mass murder, and the Holocaust. After the war, systemic efforts to destroy what remained of civil society behind the Iron Curtain atomised societies and deepened distrust in government and between individuals.

Social forces rooted in history played a pivotal role in COVID-19 responses. However, the lessons identified from these responses are not only relevant for this specific epidemic. We need to better understand the root causes of the region's "trust deficit" and develop strategies to reduce it.

This book is the result of a joint workshop that we organised in March 2022 for researchers from Corvinus University, Budapest, and the London School of Economics and Political Science (LSE). This volume contains many of the papers presented and discussed at that workshop.

I hope and trust that the work presented here will not only help improve the region's pandemic preparedness, but will also further discussions on how to start dealing with the region's notorious trust deficit.

Előd Takáts
Rector, Corvinus University of Budapest
September 2022

Overview

Piroska Nagy-Mohácsi · *London School of Economics and Political Science (LSE),*
Előd Takáts · *Corvinus University of Budapest*

Emerging Europe has followed a curious path during the COVID pandemic, which we call the "COVID puzzle of Emerging Europe."[1] During the first and second waves of the COVID crisis until about mid-2021, the region performed better than Advanced Europe, with significantly lower output losses and mortality. But since then, the region has backslid to end up with the worst health record not only in Europe, but globally as well.

Our book investigates this puzzle. Understanding the drivers behind such a dramatic reversal of fortune is critical for managing any heath-related crisis in the future.

A key factor that this volume identifies is the role of trust – or rather the lack thereof. Emerging Europe suffers from an endemic "trust deficit," which in turn that may have acted as a "double-edged sword" in the region during the pandemic – initially helpful, but ultimately strongly detrimental.

What drives this mistrust?

Researchers in this book zero in on the region's legacy of dictatorial regimes during much of the 20th century, which created survival instincts and incentives to circumvent prevailing dubious laws and regulations, while fostering fear and mistrust among individuals, too. Some argue that the region's path dependence goes back even further in time, if we were to explain the region's deeply-rooted ambivalent attitude towards – if not the idea, but the local applicability of – Western European values. These findings resonate with the historian Ivan Krastev's assertion (2018) that the region's post-communist transformation through a strict copy-and-paste adoption of European Union rules and regulations has triggered an inevitable backlash in the region, and possibly deepened mistrust.

This book can thus also hold lessons for policymakers that go beyond specific pandemic management issues and highlight the urgency with which we must identify the factors that can help build lasting confidence in state institutions and among fellow citizens in the region.

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[1] We include in this category former socialist countries in Central-Eastern and Southern Europe. For exact definition see the book's papers.

Relatively good outcomes in Emerging Europe during the initial phases of the pandemic

Emerging Europe's (EE) growth and health outcomes were considerably more favourable than those of Advanced Europe (AE) in the first wave of the COVID crisis. In the former, the recession was shallower and death tolls lower until about the middle of 2021. Both results surprised positively, given the region's generally weaker policy and institutional capacity.

Jean-Marc Bedhat Atsebi, Maria de Mar Domenech Palacios and **Anil Ari** investigate the reasons behind the relative economic success of the region in the initial phases of the pandemic. Governments and central banks in both AE and EE put together and implemented packages of fiscal, monetary policy, and regulatory measures to support the economy and households as the COVID crisis hit in early 2020. Countries in the EE region offered a significantly lower level of support packages than those in AE, given their lower national income, as well as weaker general fiscal and institutional capacity.

Yet the EE region succeeded in doing more with less: even though its scale of government support was significantly smaller, its effectiveness was higher: the fiscal multipliers of government COVID packages proved to become larger in EE than in AE, with one unit of fiscal support "producing" more output growth than in AEs. In addition, several countries in the region had more monetary policy room to cut from their initially higher interest rates. The authors identify several specific reasons for this relatively better economic performance: more favourable initial conditions in terms of trend growth, better demographics (EE's younger population is less vulnerable to COVID), and lower population density.

Other research also points to advantages in terms of geographic distance from initial COVID hot-spots (Bluhm and Pinkovskiy, 2020) as well as positive spillovers from Advanced Europe's much larger policy packages, and the European Central Bank's radically reformed approach to currency swap and repo lines (Nagy-Mohácsi, 2020). In contrast to its negligible support during the Global Financial Crisis of 2008-9, during the pandemic, the ECB provided as many as six currency swaps and repo lines for countries in the EE region, several of which were not even members of the European Union. The amount covered in some cases was even open-ended, leaving open the (market-wise most helpful) possibility for access beyond the pre-announced amount (Boris Vujcic 2020).

On the health front, researchers in this volume have identified the level of trust in society as a critical variable.

Timothy Besley and Christopher Dann investigate the extent to which trust can explain Emerging Europe's COVID puzzle. They provide compelling econometric evidence for the region's endemically low level of trust in state institutions as well as mistrust between citizens. Emerging Europe suffers from a massive trust deficit. Relative to Advanced Europe, residents in the region are 16%

less likely to have trust in the justice system, 25% less likely to trust the police and 10% less likely to trust parliament. Perhaps even more strikingly, they are 25% less likely to trust each other.

The region's trust deficit has had a "knock-on effect" on voluntary compliance. As trust and compliance are positively correlated, low levels of trust implied low levels of compliance. The resulting slower vaccine uptake and lower vaccination rates in EE (just below 60%) compared to AE (80%) is a likely key factor behind the much higher mortality rate in EE to date.

What are the origins of the region's trust deficit? Besley and Dann point to the legacy of mistrust from the region's communist regimes, as they find a lower level of trust and vaccine uptake in the former East Germany compared to the former West Germany region.

In a similar yet complementary vein, **Attila Virág** emphasises the exceptionally high level of individualism in the region, coupled with low level of compliance with norms. He argues that the latter derives from a perceived survival instinct in this region of the "Bloodlands" (Snyder, 2010), in the wake of both communist and Nazi dictatorships through much of the 20th century. Survival under such brutal regimes often required breaking rather than following the accepted norms and rules. Virág recalls also that trust in healthcare services was already very low before the COVID disaster.

In addition, Virág reminds that while trust in government is low in the region, trust in civil society (NGOs, the church, and trade unions) is even lower. He considers that successful pandemic management requires aligning policy approaches with basic national characteristics in order to achieve social consensus.

What explains Emerging Europe's dramatic backsliding from mid-2021?

Bence Ságvári considers trust as a "double-edged sword" during the pandemic. Initially many had expected that in general, higher levels of trust in government and among individuals would allow for less stringent lockdown measures and other restrictions on gathering and mobility. Yet reality proved more complex. The low level of trust and high level of individualism that characterise much of the EE region propelled individuals in the initial phases of the COVID lockdown to act fast to isolate (presumably as horrifying reports of COVID causalities came in from Italy and Austria, which subsequent government lockdowns only confirmed). Meanwhile, in some countries a high level of trust may have also triggered undue complacency on part of individuals, leading to a presumption that everything was under control and that individual behaviour was immaterial in the fight against COVID.

Ságvári confirms that the two main types of trust – institutional and interpersonal – are closely related and can be associated with several COVID indicators such as infection and mortality. He also asks whether country-level trust

in Europe has changed in response to the pandemic. Based on early evidence, he finds that, while trust levels have fluctuated throughout the pandemic, in the aggregate trust has not changed in Europe as a result of the pandemic – there are no tectonic shifts in Europe's trust map.

The critical interplay between levels of trust and vaccine acceptance has been clear from the outset. As noted already, Emerging Europe has lagged behind Advanced Europe both in terms of speed of vaccine uptake and overall size, despite the fact that the region's EU members have been part of the joint EU procurement effort and had access to EU facilities to speed up vaccine delivery.

Researchers in this book strongly suggest that legacy/path dependence plays a vital role in the region's trust deficit. This relates in particular to the region's communist regimes, but may possibly date back even earlier. Besley and Dann's already cited comparison of Germany's East and West regions isolates the lasting legacy of distrust in the post-communist region, even in data collected over 30 years after the unification of Germany. As their comparison controls for many variables such as vaccine availability, fiscal capacity and quality of healthcare (given that Germany now is a united country), Eastern Germans' lower rates of trust in government and vaccine acceptance point strongly to communist legacy issues.

Joan Costa-Font's research provides unique evidence in this regard. From his investigation of vaccine hesitancy and trust among minority groups in the United Kingdom, he finds that legacies of exposure to repressive political regimes still exert detrimental effects on people's trust. The white British population has had a higher vaccine uptake than the UK's immigrant minorities, including Eastern Europeans. Beyond the fact that minorities are more exposed to the virus due to their over-representation in higher risk jobs, Costa-Font finds that negative attitudes towards COVID vaccines were highest among Eastern Europeans and Caribbeans. Eastern Europeans are also much less likely to trust traditional media outlets. Moreover, vaccine-hesitant citizens also have a lower level of trust in community and religious organisations.

These findings of immigrant Eastern European attitudes towards vaccination and low levels of trust echo those of populations in their countries of origin (i.e. in Emerging Europe), and thus further underscore the vital importance of legacy issues in understanding the interrelations between trust, compliance and vaccine hesitancy in this region.

Zoltán Ádám and **György Hajnal** argue however that **path dependence** in the region goes back much further than the communist regimes in the second half of the 20th century. Central-Eastern Europe has long struggled with its ambivalent relationship with the West. Squeezed between Western (Prussia and the Habsburg Empire) and Eastern (Russian and Ottoman Empires) powers, nations in the region have been subjected to delayed and incomplete historical development processes. This has had a major impact on societal organisations, capitalist modernisation and state building, often interrupted by brutal wars and violent social upheaval.

In this context, as the elites took Western Europe as a criterion and goal of modernity, local realities often frustrated the implementation of policies. This created what Ádám and Hajnal consider to be irreconcilable tensions between "Westerners" and traditional nationalists – a dynamic which one can see in today's political polemics. The resulting socio-political process led to a hybrid system that has been neither democratic nor purely dictatorial. The well-known detrimental effects on trust of the region's communist regimes thus came on top of deeply rooted historical ambivalences and commonalities.

László Czaller argues that while vaccination is an important solution to the pandemic-induced health crisis, the effective allocation of vaccines has been a complex task in which ethical, economic and social considerations need to be taken into account. The biggest challenge is to use the limited number of vaccines available in a way that protects vulnerable groups, prevents further spread of infection, and reduces economic uncertainty. Czaller argues that prioritizing between remote and on-site workers is critical. Based on a simple economic model and using pre-COVID data from Sweden and Hungary, he shows that the optimal vaccine allocation between remote and on-site workers in the tradable sector should depend on the infection risk of on-site workers and their share in labour in the tradable sector. In Hungary and Central Europe, where on-site work is dominant, the optimal vaccination strategy (after healthcare workers and the most vulnerable groups) is to give priority to the vaccination of on-site workers.

Additional research indicate that some other factors may have been also be at play.

First, there is the low level of social capital and "social infrastructure", which Baer et al. (2021) define as networks of kinship and care within and between families, friends, and communities. The authors argue that economic life and pandemic recovery rely on the strength of these foundational relations. Their research revealed that, during the pandemic, people in the United Kingdom have fallen back on their families, neighbourhoods and religious organisations. In the second and third wave of the COVID crisis, UK policies increasingly tried to leverage such social infrastructures in order to better target aid and vaccine delivery, particularly for vulnerable groups.

Unfortunately, Emerging Europe has seen more of a "one-size-fits-all" COVID policy and implementation, with little differentiation in its approach to COVID policy and vaccine distribution. Accordingly, this may have lessened the effectiveness of vaccination drives and the delivery of health support.

Second, this highlights the problem of insufficient detailed data on the most vulnerable groups, such as the Roma population. For better informed policy decisions and effective targeting, better and more data are needed.

Third, the region has shown a limited capacity to learn and adapt during the crisis, which impacted performance – particularly in the later stages of the pandemic. Governments in Western Europe adapted their approaches through the pandemic,

learning from specific problems and failures of policy response in the first wave. This included collecting data on the impact of COVID on specific groups/communities, feeding this data into policy decisions, and decentralising some of the policy delivery at the local/community level for maximum impact. The latter recognised the importance of – and increasing reliance on – multi-levels of governments, particularly the lower local levels of government, as well as the aforementioned social infrastructures.

As Adnan Khan (2020) demonstrated, active learning and continued adaptation offers a "smart" approach for smaller, less advanced economies. This can help tailor policy responses to specific local contexts, but require, again, intense use of detailed data in policy design and implementation. Such policy learning was less evident in Emerging Europe, and the application of "smart" approaches via learning has not developed at a scale that would have impacted policy outcomes.

Fourth, and more generally, communication on COVID policies around the world was often suboptimal and confusing. Better, more timely, and more community-targeted communications would have been critical, particularly to speed up vaccination in communities with high vaccine hesitancy, such as in Israel (Ran Balicer, 2021). A more tailored approach involving community leaders and religious authorities delivered good results in the region where it was implemented.

Going forward, we can draw a few lessons with a view to improving future pandemic management in Emerging Europe. Some are "low-hanging fruit", such as recognising from the outset the possibility of diverse group impact and community outcomes. This starts with collecting data on health (and other critical) policy outcomes, and using this data to inform policymaking in order to design approaches which are more differentiated and closer to the communities they serve. As well, fine-tuning government policy responses can leverage existing social networks and social infrastructure. In addition, communications in a crisis situation should also be more community-based to strengthen trust and thereby maximise impact.

Yet there remains the critical problem of endemic mistrust in the region, both with regards to government as well as between fellow citizens. Strong past dependency in the region cautions against searching for quick fixes. "The journey of a thousand miles begins with a single step", as the Chinese proverb goes. We must strive to better understand the historic root causes of mistrust, the possible factors currently contributing to it, and design approaches that promote greater social cohesion.

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Output Losses in Europe during COVID-19: What Role for Policies?[1]

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Jean-Marc B. Atsebi · *International Monetary Fund,*
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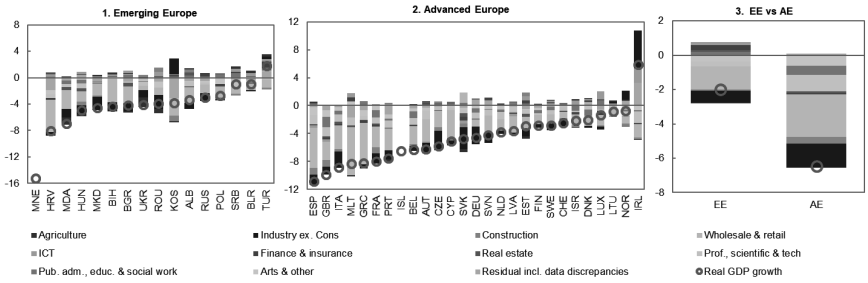
1. Introduction

The COVID-19 pandemic has caused substantial and unprecedented disruption (see, e.g., Baldwin and Weder di Mauro 2020; Gopinath 2020); however, the growth impact of the COVID-19 pandemic has been highly uneven across Europe (Figure 1), as countries have pursued different containment and economic policies, and given their different social, economic, and demographic characteristics. While real activity contracted by more than 10% in the worst-hit countries, a few managed to avoid a recession in 2020. On average, emerging economies in Europe experienced significantly shallower recessions, with real GDP contracting by 2.1%, on average, compared to the 6.7% average decline in advanced economies.[2]

[1] A previous version of this paper was circulated as Chapter 2 of the October 2021 Regional Economic Outlook for Europe, "Growth during the Pandemic". The authors are grateful to Ivanna Vladkova Hollar, Petia Topalova Borissova, Jaewoo Lee and Jörg Decressin for their encouragement and insightful suggestions. The authors would also like to thank seminar participants at the IMF and at the Corvinus-LSE Workshop on the "COVID Puzzle of Emerging Europe" for helpful comments. Excellent research assistance was provided by Vizhdan Boranova, Sabiha Mohona and Samuel Victor Romero Martinez. Any views expressed are only those of the authors and do not represent the views of the IMF, its Executive Board or IMF management.

[2] For the remainder of the paper, we refer to emerging and advanced European economies following IMF WEO classification (https://www.imf.org/-/media/Files/Publications/WEO/2021/April/English/stasapp.ashx).



Sources: Haver Analytics; Eurostat; and IMF, *World Economic Outlook*.
Note: ISL and MNE do not have a decomposition in panels 1 and 2 and are excluded from panel 3 due to lack of sectoral data. PPP-weighted averages are shown in panel 3. Excluding Turkey and Russia from the averages reduces the GDP contraction gap between EE and AE by half.

Figure 1. Real GDP Growth by Sectors, 2020

During the pandemic, many European countries enacted large fiscal stimulus packages to mitigate economic scarring, to ensure the functioning of essential sectors and to sustain household and corporate balance sheets. Monetary policies were also quick to react, with several central banks employing unconventional policies used during the global financial crises of 2008–09 and providing liquidity support to the financial system.

- This paper aims to shed light on the causes of growth differentials during the pandemic and on the role of fiscal and monetary policies in alleviating output losses. To this end, we seek to answer the following questions:
- What explains the large heterogeneity in growth outcomes across Europe?
- To what extent can differentials in growth outcomes be attributed to differences in countries' sectoral composition?
- Were other country fundamentals at the onset of the pandemic – including macroeconomic and health conditions – a quantitatively important factor for growth outcomes?
- How important was the role of economic policies in mitigating the pandemic's adverse impacts?
- What was the efficacy of different policy instruments?

To address these questions, we decompose 2020 GDP growth outcomes for 43 European countries (including 27 advanced and 16 emerging economies) into the impact of i) the underlying growth momentum, ii) sectoral composition, iii) fiscal and monetary policies, iv) and country fundamentals at the onset of the pandemic (such as trade openness, informality, inequality, the current account balance and health factors).

In addition to the decomposition analysis, we also employ a calibration approach to estimate the policy contributions by relying on fiscal and monetary multipliers identified in prior literature. This method allows for heterogeneity in

multipliers based on the composition of policy support and country characteristics, yielding significantly higher estimated effects of announced measures.

Finally, we study heterogeneities in the fiscal multipliers across countries by analysing the relationship between the magnitude of the fiscal multiplier and certain country fundamentals. These include income inequality, the degree of informality, whether the country had an IMF- supported programme in 2020, and the size and composition of fiscal support measures.

Our findings suggest that differences in 2020 growth outcomes can be largely explained by differences in mobility, underlying growth trends, pre-pandemic fundamentals and macroeconomic policies. The decline in mobility in 2020 contributes the most to output losses in all countries, while differences in sectoral composition played a more limited role. We also find that the shallower recessions in emerging economies can be attributed to higher underlying growth and demographic and health factors that may have reduced the population's vulnerability to the pandemic (such as a lower median age). While economic policies played an important role in cushioning the impact of the pandemic, their quantitative contribution varies across countries, reflecting the size of policy support measures and differences in fiscal multipliers.

Regarding fiscal support measures, our analysis further suggests that multipliers were higher in countries where above-the-line measures accounted for a larger proportion of the total fiscal package; and where the size of the total fiscal package was smaller, indicating diminishing returns to fiscal stimulus. We also find that the marginal fiscal multiplier tends to be larger where inequality and informality are greater, likely reflecting a larger share of liquidity-constrained consumers and relatively weak enforcement of pandemic containment measures. Finally, we also find a larger fiscal multiplier in the countries where there was an IMF-supported programme during the pandemic. Altogether, these factors help explain relatively larger fiscal multipliers in emerging economies.

There are three important caveats to our findings. First, our methodology may fall short of capturing the causal effects of macroeconomic policies due to endogeneity, omitted variable bias and anticipation effects. For example, countries that were more vulnerable to the pandemic and its economic fallout may have deployed larger policy support measures, while households and firms might have adjusted their behaviour in anticipation of transfers and liquidity support, they expected to receive from policymakers. Second, in exploiting the variation across countries, our methodology is unable to capture the impact of easy financial conditions that policymakers around the world ensured through their synchronous actions (e.g., loans provided by international financial institutions (IFIs), spillovers from coordinated interest rate cuts, asset purchase programmes and stimulus packages). Third, as our study covers only 2020, it is silent on the important role of vaccinations contributing to the economic recovery.

Our paper contributes to a growing literature on the effects of the COVID-19 pandemic. Several studies find that the output contraction and economic losses due

to the pandemic can be explained by the uncertainty it creates, notably by increasing subjective uncertainty in business expectations, household spending, and financial markets (see e.g., Alfaro et al., 2020; Baker et al., 2020; Hanke et al., 2020, Andersen et al., 2020a, 2020b; Chen et al., 2020; Bartik et al., 2020, Fetzer et al., 2020). For instance, Andersen et al. (2020a) use data on credit card spending from Denmark to show that total card spending was reduced by 25% during the early phase of the pandemic. Chen et al. (2020) use high-frequency indicators to analyse the economic effects of the COVID pandemic in European countries and the United States during the early phase of the pandemic and conclude that larger outbreaks are associated with more considerable economic losses. These economic losses are mainly driven by a voluntary reduction in people's mobility rather than containment measures. Similarly, Aum et al. (2020) present causal evidence on the effects of the spread of the pandemic on labour markets. They show that the number of infections, regardless of lockdown policies, result in job losses, which underlines the role of voluntary social distancing and health and demographic factors.[3]

Our paper also relates to studies analysing the effectiveness of economic policies during the COVID-19 pandemic. Chudik et al. (2021) find that fiscal policy played a key role in mitigating the effects of the pandemic with countries that provided larger fiscal support experiencing less output contraction. In addition, countries have benefited from the spillovers of synchronized fiscal actions. In the United States, the Hutchins Center on Fiscal and Monetary Policy show that the local, state, and federal tax and spending policy contributed to raising GDP growth in the second quarter of 2020 by 3.6 percentage points when large swaths of the economy were shut down because of the COVID-19 pandemic.

The rest of our paper is organized as follows. Section II presents the data and selected stylized facts. Section III describes the decomposition methodology employed to quantify the importance of each factor and our main findings. Section IV proposes a calibration exercise to quantify the impact of policies in each country. Section V analyses the determinants of fiscal multipliers across countries. Section VI concludes.

[3] A subset of this literature has focused on the effects of containment measures and voluntary social distancing using the Susceptible Infected Recovered (SIR) epidemiology model by Kermack and McKendrick (1927) (see, e.g., Acemoglu et al. 2020; Alvarez et al., 2020; Bricco et al., 2020; Eichenbaum et al., 2020; Favero et al. 2020; Jones et al., 2020, Deb et al., 2020; Maloney and Taskin, 2020). A key insight from this literature is that targeted mitigation policies (e.g., targeting risks/age groups) outperform uniform policies in reducing the pandemic's economic and human costs. These studies also show that the absence of testing, contact tracing, social distancing could result in higher economic costs of the pandemic, lower welfare, and higher deaths.

2. Data and stylised facts

A. Data

We use quarterly data from 2020. Our main data source is IMF World Economic Outlook from where we obtain real GDP, trade openness (defined as the sum of imports and exports divided by GDP) and current account balance data.[4] Data on sectoral GVAs is based on Eurostat, where available, and IMF staff calculations based on national sources otherwise. We use data for the size of the shadow economy as a share of official GDP in 2017 from Medina and Schneider (2018). Other initial conditions such as the Gini coefficient for inequality, hospital beds per 1000 people, share of smokers in population and population density (average number of people by square km of land) are obtained from the World Development Indicators database of the World Bank.

We use the IMF COVID-19 Policy Survey to retrieve fiscal support measures, reflecting the announced measures as a percent of 2019 GDP, and where time variation reflects different vintages of the survey. Real interest rate data and central bank assets as a percentage of 2019 GDP are obtained from Haver Analytics, Eurostat, the European Central Bank and national sources.

Regarding mobility measures, we use the stringency measure provided by the Blavatnik School of Government at the University of Oxford. We also construct an indicator of de facto mobility by retaining the residuals from a regression of Google mobility indicators for retail, recreation and workplaces on the stringency of containment measures and country-quarter fixed effects.

B. Stylised facts

Several factors were likely at play in causing the observed growth differentials in Europe. As widely documented, the pandemic's impact varied significantly across sectors (Figure 1; Figure 2). The wholesale and retail sectors were the largest contributor to the recession in nearly all countries, followed by industry and professional services, while the expansion in information and communications technologies (ICT) helped mitigate the recession in many countries. Hence, differences in economic structure might explain the observed growth differential.

Growth outcomes during the pandemic were also associated with a range of other country fundamentals at the onset of the pandemic, as well as containment policies. Countries hit worse by the pandemic (as measured by a sharper rise in excess mortality) and those that introduced more stringent containment measures experienced a deeper recession. On the other hand, lower median age was associated with better growth outcomes (Figure 2).

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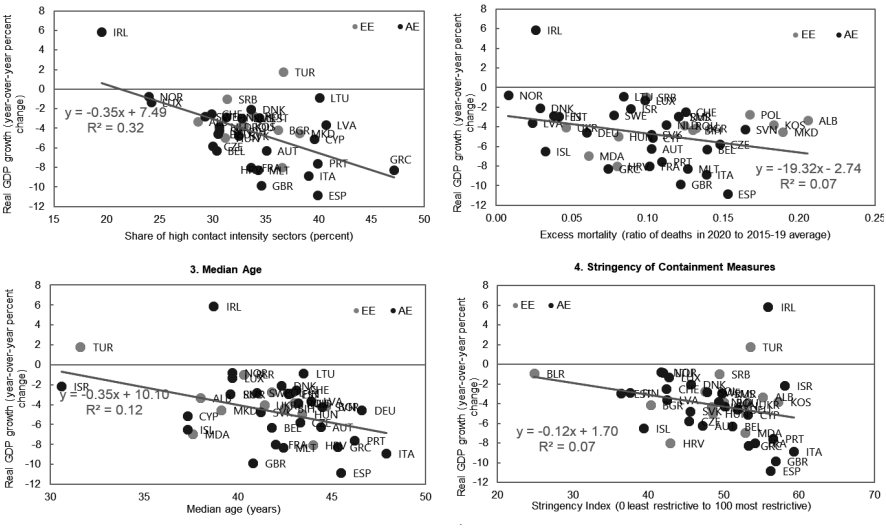
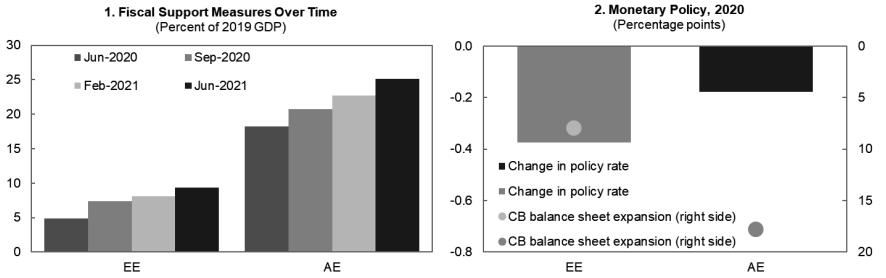
[4] See Table A1 in the Appendix for more information on data sources and construction of variables.



Source: Haver Analytics; Eurostat; Karlinsky & Kobak, 2021; Blavatnik School of Government at the University of Oxford; and IMF, World Economic Outlook.

Figure 2. Correlates of Real GDP Growth, 2020

While all countries responded to the pandemic with fiscal and monetary accommodation, the extent and form of policy support also differed across Europe, and in turn influenced economic activity (Figure 3). Fiscal support measures, most of which were announced by June 2020 and augmented over the course of the pandemic, were substantially larger in advanced countries. Emerging economies were able to cut policy rates further, while advanced economies relied to a greater extent on unconventional monetary policy instruments, as they entered the pandemic at or near the effective lower bound constraint.



Sources: Haver Analytics; European Central Bank; National authorities; IMF policy tracker; and IMF staff calculations.
Note: Total fiscal support measures include above-the-line, below-the-line, and liquidity measures.

Figure 3. Policy Support during the Pandemic

3. Decomposition exercise

A. Methodology

This section presents the technical details of the growth decomposition analysis (see Figure 4). The analysis builds upon the methodology of Caceres et al. (2021) by extending it to all European countries and analysing the role of policy support and pre-pandemic country fundamentals.

While the analysis is conducted at quarterly frequency over 2020Q1-Q4, the quarterly time dimension is not denoted in the remainder of this section in the interest of simplifying exposition and the results are presented in the form of 2020 annual values in the next section.

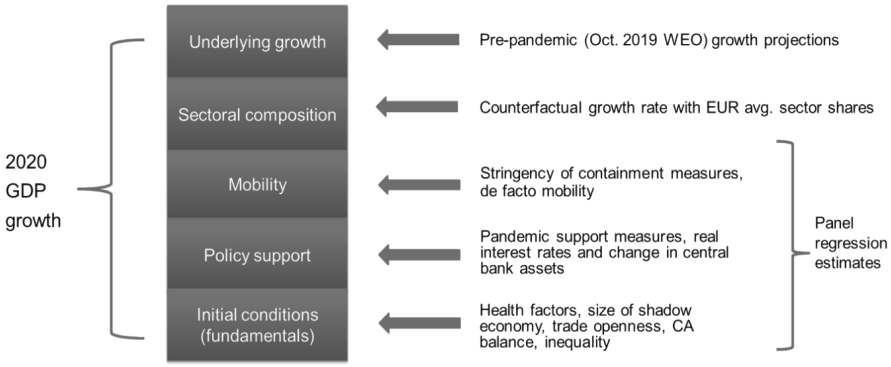


Figure 4. Decomposition Approach

Starting with 2020 real GDP growth outcomes, $g_{2020,}$ the first step of the analysis deducts pre-pandemic growth trends g^{*}, proxied with October 2019 WEO growth projections for the same period. This yields the first layer of the decomposition, which accounts for differences in underlying growth between countries and captures output losses due to the pandemic.

$$g_1 \equiv g_{2020} - g^*$$

The second step focuses on the contribution of sectoral composition to output losses, as some sectors (e.g., retail and hospitality) were affected more by pandemic containment measures than others, leading to higher output losses for countries where such sectors account for a larger share of GDP. To this end, output losses are first de-constructed to the sectoral level such that

$$g_1 = \sum_{i=1}^{N} w_i (g_{2020,i} - g_i^*)$$

where i denotes sectors, of which there are N = 10 (see Figure 1), wi represents sector i's weight, given by its share in gross value added in 2019 and $g2020,i$ represents sector i's growth rate in 2020. g_i^* is the pre-pandemic growth trend for sector i. Given the absence of WEO projections at the sectoral level, g_i^* is proxied with the sectoral growth rate that would have led to the same annual shift in sector shares as observed between 2015 and 2019, that is

$$g_i^* = \left(\frac{w_{i,2019} - w_{i,2015}}{4 w_{i,2015}} + 1 \right) g^*$$

where $w_{i,2019}$ and $_{wi,2015}$ are the 2015 and 2019 sector shares.[5]

The contribution of sectoral composition, $g_{2,}$ is then attained by benchmarking actual output losses of each country against a counterfactual output loss where each sector's weight in GDP is equal to the PPP-weighted average sectoral weight of European countries, $\tilde{w}i$, such that

$$g_2 \equiv \sum_{i=1}^{N} (w_i - \tilde{w}_i)\left(g_{2020,i} - g_i^*\right)$$

$$= g_1 - \sum_{i=1}^{N} \tilde{w}_i \left(g_{2020,i} - g_i^*\right)$$

This yields the second layer of the decomposition, where the difference between the actual and counterfactual output losses indicates the contribution of sectoral mix.

The third layer of the decomposition uses panel regressions to estimate contributing factors to within-sector output losses ($g_{2020,c,t} - g^*_{i,c,t,}$). The aim is to estimate the relative role of the decline in mobility, policy support and initial country conditions at the onset of the pandemic.

A separate panel regression is run for each sector i, each with country-time dimensions

(c, t) over 2020Q1-2020Q4 such that

$$\left(g_{2020,i,c,t} - g_{i,c,t}^*\right) = \alpha_i + \beta_i X_c + \gamma_i P_{c,t-1} + \phi_i M_{c,t} + \varepsilon_{i,c,t}$$

[5] $g*$ is calculated at quarterly frequency using the data from the corresponding quarters in 2015 and 2019. If sectoral data for 2015 is not available for a country, the latest year that has available data for all quarters is used instead.

where αi is the intercept, Xc is a vector of pre-pandemic fundamentals (i.e. initial conditions from 2019), $Pc,-1$ is a vector of lagged policy variables, Mc,t is a vector of contemporaneous mobility variables, $\varepsilon i,c,t$ is the residual and βi, γi and ϕi are coefficients to be estimated.[6]

Initial conditions are standardised such that their contribution can be interpreted as the outcome of differentials from the sample average. Policy support measures and variables capturing mobility are not standardised so that their contribution captures their changes from 2019 in absolute terms, rather than against an average benchmark.

Table A2 in the Appendix displays the estimated coefficients from sectoral panel regressions. The contributions are calculated by aggregating the products of independent variables and corresponding coefficients across sectors.[7] For example, the contribution of mobility variables in each quarter t are given by

$$\sum_{i=1}^{N} \widetilde{w}_i \hat{\phi}_i M_{c,t}$$

where counterfactual sector weights are used instead of actuals since the second layer already captures the contribution of sectoral composition.

Finally, as the dependent variable is already net of pre-pandemic growth trends, the sum of the intercept and residuals together constitute the unexplained portion, given by:

$$\sum_{i=1}^{N} \widetilde{w}_i \left(\alpha_i + \varepsilon_{i,c,t}\right)$$

The unexplained portion also absorb any data discrepancies between sectoral and aggregate, or quarterly and annual growth rates.

B. Results

Figure 5, Panels 1 and 2 display the results of the decomposition analysis by country. Panel 3 of the same figure compares the relative importance of the drivers of output performance on average in advanced and emerging countries.

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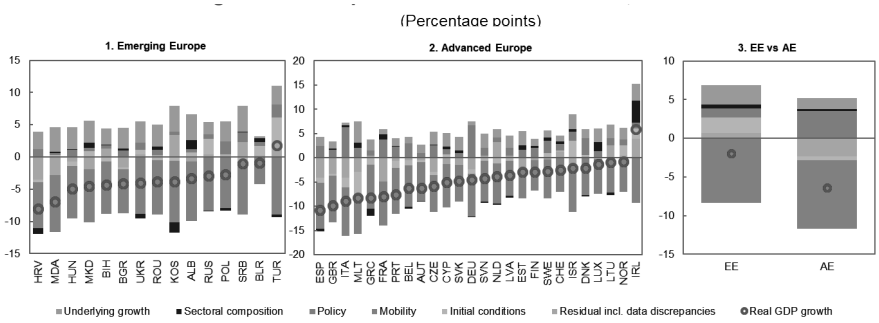
[6] Policy variables are lagged to alleviate endogeneity, while mobility variables are included in contemporaneous time to fully capture the effects of containment measures.

[7] This makes the contributions invariant to the scaling of independent variables.



Source: Haver Analytics; and IMF staff calculations
Note: PPP-weighted averages are shown in panel 3.

Figure 5. Decomposition of Real GDP Growth, 2020

The growth decomposition exercise reveals several key patterns. First, output losses due to the pandemic are significantly larger than the GDP contraction observed in 2020 given the positive contribution of underlying growth. The stronger underlying growth momentum in emerging market economies at the onset of the pandemic is an important contributor to their relatively mild recession.

As expected, the single largest contributor to output losses in all countries is the decline in mobility. However, with similar contributions of mobility across Europe, it accounts for a relatively minor share in the differential outcomes across emerging and advanced economies.

The contribution of sectoral composition is negative for economies with large tourism sectors, such as Croatia, Spain, Malta or Greece, but its quantitative contribution to aggregate outcomes is of a limited magnitude in most countries. As this finding may be counterintuitive, various caveats and clarifications need to be made.

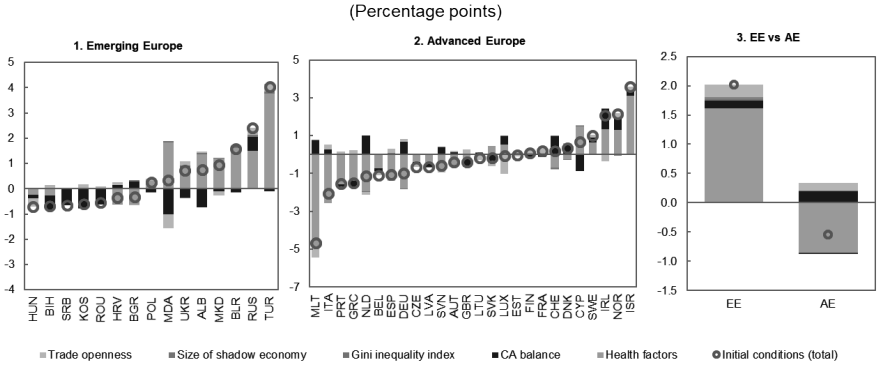
First, our exercise aims to determine the role of sectoral composition in explaining growth differentials within Europe. Therefore, we calculate the contribution of sectoral composition by benchmarking actual output losses of each country against a counterfactual output loss where each sector's weight in GDP is equal to the PPP-weighted average sectoral weight of European countries. This differs from analysing the contribution of sectors to the economic contraction. For example, in the case of tourism, the latter approach would call for a comparison against a no-tourism benchmark, whereas our counterfactual has a relatively high sector weight on tourism given the large tourism sectors in some large European economies such as Turkey and Spain.

Second, the negative correlation between the weight of contact-intensive sectors and industry, another sector hit hard by the pandemic in the first half of 2020, leads to offsetting effects, reducing the net contribution of sectoral composition in many countries.

Third, due to data constraints, we are only able to use a 10-sector breakdown. A more granular sectoral breakdown may uncover a larger role for sectoral

composition. Finally, since our methodology is based on benchmarking rather than regressions, cross-sectoral spillovers are not captured within the contribution of sectoral composition.

Initial conditions contribute significantly to the greater resilience in emerging market economies. Among those, demographic and health factors stand out in their importance, with the younger populations in emerging market economies likely limiting their vulnerability to the pandemic (Figure 6). Higher informality, which may have reduced the impact of containment measures on economic activity, also contributes positively to the growth differentials. Conversely, higher pre-pandemic current account surpluses in advanced economies somewhat offsets the advantage of emerging market economies possibly because it reflects a lower reliance on domestic demand, which was hit hard by containment measures.



Source: IMF staff calculations
Note: PPP-weighted averages are shown in panel 3. Health factors is the sum of contributions from median age, hospital beds per capita, share of smokers in population and population density

Figure 6. Decomposition of Initial Conditions

Finally, regarding the role of policies, the empirical analysis confirms the important role that these played in cushioning the impact of the pandemic. The quantitative contribution of policies varies across countries, reflecting the size of policy support measures, but the analysis suggests that policies helped mitigate the crisis in all countries covered in this study.

As shown in the stylised facts section, advanced economies enjoyed more substantial fiscal and monetary policy support than emerging economies. Consequently, the role of policy measures in mitigating the crisis is considerably larger in advanced economies, also helping reduce the gap in economic performance between the two country groups.

An important caveat, however, is that empirical estimates of fiscal and monetary policy multipliers underlying the growth decomposition analysis are likely to be biased downward due to a range of identification issues, including reverse causality, omitted variable bias and anticipation effects. For example, countries that were more

vulnerable to the pandemic and its economic fallout likely deployed larger policy support measures. Households and firms might have also adjusted their behaviour in anticipation of the transfers and liquidity support they expected to receive from policymakers. Finally, by exploiting the variation across countries, the analysis is unable to capture the full effect of the easy financial conditions that policymakers around the world ensured through their synchronous actions (e.g., policy rate cuts, asset purchase programmes). Thus, the estimated policy contributions in Figure 5 should be interpreted as a lower bound.

4. Calibration exercise

A. Methodology

In view of the downward bias in our regression estimates for the contribution of policy measures, we also undertake a calibration exercise. For this, we rely on data on the composition of announced fiscal support measures, which are available from the IMF COVID-19 Policy Survey. Particularly, the survey data permits a breakdown of fiscal support measures between above-the-line measures, liquidity measures, and below-the-line measures.[8] For each country and in every quarter, an average fiscal multiplier, Fc, is calculated using the following expression

$$F_{c,t} = M_{ATL}P_{ATL,t} + M_{LIQ}P_{LIQ,t} + M_{BTL}P_{BTL,t}$$

where P_{ATL}, P_{LIQ} and $P_{BTL} = 1 - PA_{TL} - P_{LIQ}$ are respectively the share of above-the-line, liquidity and below-the-line measures and (M_{ATL}, M_{LIQ}, M_{BTL}) are the corresponding multipliers, which are calibrated according to recent literature on fiscal multipliers during the COVID-19 pandemic:

- M_{ATL} is calibrated to 0.83 as an average of the multipliers for spending, unconditional transfers, payroll tax cuts and unemployment insurance provided by Bayer and others (2020), Guerrieri and others (2020), and Faria-e-Castro (2021).
- M_{LIQ} is calibrated to 0.45 according to the multiplier for liquidity assistance given by Faria-e-Castro (2021).

[8] Above-the-line measures refer to additional spending and forgone revenue in both the health sector and in areas other than health sector. This includes additional government spending such as health services and unemployment benefits; capital grants and targeted transfers (for example, wage subsidies or direct transfers) or tax measures, such as tax cuts or other reliefs. Liquidity measures refer to accelerated spending and deferred revenue in areas other than health. The category "other fiscal measures" contains below-the-line measures (equity injections, asset purchases, loans, debt assumptions, including through extra-budgetary funds) and contingent liabilities (guarantees on loans, deposits, etc., and quasi-fiscal operations such as non-commercial activity of public corporations on behalf of the government). These various types of fiscal support have different implications for public finances. See Box 1.1 of IMF's April 2020 Fiscal Monitor for further details.

– M_{BTL} is set to $M_{BTL} = rM_{LIQ}$ where the take-up coefficient, r, is set to 1/3 in view of the low take-up of below-the-line measures in many countries.

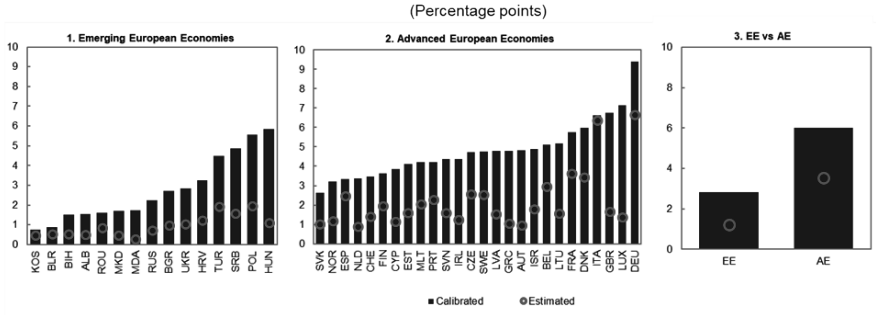
Note that the average fiscal multipliers vary over country and time due to the shifting compositions of fiscal measures. For each country, the contribution of fiscal policy is calculated by multiplying fiscal measures with the average multiplier for the corresponding quarter, and then using the four quarters to attain annualized values for 2020.

The calibration of monetary policy multipliers differentiates between policy rate cuts and an increase in the central bank balance sheet, which captures unconventional monetary policy instruments. In view of the impact of country characteristics (such as financial depth) on monetary policy transmission, the multipliers applied are differentiated between countries to the extent that the existing literature permits.[9] Table A3 in the Appendix provides detailed information on the multipliers used for each country and monetary policy instrument, and their sources.

Finally, the calibrated policy contributions are attained by adding up the contributions of fiscal policy, policy rate cuts, and the expansion in central bank balance sheets.

Results

The calibration analysis allows for heterogeneity in policy contributions based on the composition of policy support. Figure 7 contrasts the results obtained with the calibration analysis with the previously estimated contributions of policy measures and shows significantly higher effects of announced measures in mitigating output losses, raising the potential contribution of policies by over 70% in advanced economies and more than doubling it in emerging market economies.



Source: IMF staff calculations
Note: Country abbreviations are International Organization for Standardization country codes. PPP-weighted averages are shown in panel 3. AE = advanced European economies; EE

Figure 7. Policy Contributions to Real GDP Growth, 2020

[9] Given the unavailability of estimates for each country in our sample, literature estimates are extrapolated to countries with similar characteristics whenever needed.

5. An analysis of the determinants of fiscal multipliers

While the previous sections depict the extent to which policies helped mitigate the economic effects of the pandemic, what explains the differences in the effectiveness of these policies remains unexplored. This section aims to provide a better understanding of several factors that could explain differences in the efficacy of fiscal policies in Europe.

The aim is twofold: on the one hand, we aim to understand what types of policies contributed more to mitigating the crisis and whether IMF-supported programmes helped amplify the effects of these policies. On the other hand, we want to know whether different country characteristics (such as inequality and informality) contributed to making fiscal policy more effective at tackling the crisis.

To this end, the econometric specifications are similar to those in the decomposition analysis. The dependent variable is output performance during 2020 at the country level, where we remove underlying growth and the contribution of the sectoral composition. We introduce fiscal policy variables with a lag to minimise reverse causality, and we use data starting from the second quarter of 2020, when the pandemic hit most European countries. To capture the evolution of policies over time, and identify quarterly fiscal support, we continue to rely on data on the magnitude and composition of fiscal support packages reported by the IMF COVID-19 Policy Survey. As in the previous section, the fiscal policy measures are classified into three categories: above-the-line measures; liquidity measures; and other measures and normalised by the pre-pandemic GDP level. Because of concerns similar to those mentioned in the decomposition analysis, such as reverse causality and anticipation effects, our estimates might potentially suffer from a downward bias and can thus be interpreted as lower bounds.

In contrast to the previous sections, we now include country fixed effects to control for characteristics of countries that remain constant over time. This is because we are no longer focusing on the relative importance of time-invariant characteristics in explaining the recession, but rather on understanding whether a number of these characteristics had an impact on the effectiveness of policy support measures.

A. The role of the composition and types of fiscal policies

As discussed previously, advanced economies introduced relatively large fiscal packages to attenuate the crisis compared to emerging countries. This applies to all three types of policy support. While above-the-line measures accounted, on average, for 0.7% of pre-crisis GDP in advanced economies, this figure is 0.4% for emerging countries. The numbers are 0.2% against 0.03% for liquidity measures, and 2.5% against 0.5% for other fiscal measures.

Countries mostly relied on above-the-line measures, which accounted, on average, for 56.9% of all fiscal measures. Other fiscal measures were also implemented

(34.4%), and liquidity measures were sparely used (8.7%). However, these proportions are not identical across the two groups of countries. Emerging countries relied more on above-the-line measures than advanced countries (69% of all fiscal measures against 50%). In contrast, they relied less on other measures (27% of all fiscal measures against 38.5%) and liquidity measures than advanced economies (3.8% of all fiscal measures against 11.8%). As a result, the different amounts and types of fiscal policies between advanced economies and emerging countries have led to differentiated contributions of fiscal policies.

	(1)	(2)	(3)	(4)
Total fiscal package	0.404*** (0.000)	0.948*** (0.000)		
Quadratic term: Total fiscal package		-0.021*** (0.000)		
ATL measures			1.032*** (0.000)	2.413*** (0.000)
Liquidity measures			0.182 (0.570)	0.899 (0.160)
Other fiscal measures			0.218** (0.042)	0.493*** (0.000)
Quadratic term: ATL measures				-0.202*** (0.001)
Quadratic term: Liquidity measures				-0.212** (0.027)
Quadratic term: Other fiscal measures				-0.013*** (0.001)
Observations	123	123	123	123
R-squared	0.784	0.842	0.819	0.865
Country FE	YES	YES	YES	YES
Time FE	NO	NO	NO	NO

Table 1. Multipliers for the Different Types of Fiscal Measures

Note: Each column presents the relevant coefficients for each panel regression, where the dependent variable is GDP growth during 2020 at the country level, where we remove underlying growth and the contribution of the sectoral composition. The regressions include country fixed effects and controls for Stringency index, de facto mobility, Central Bank policy rate and central bank balance sheet expansion. Robust pval in parentheses.*** p<0.01,** p<0.05,* p<0.1. See Table A4 in the Appendix for details on the specification.

Our results are reported in Table 1. While the first column includes a linear coefficient for fiscal support, we add a quadratic term to explore the non-linearities of the effectiveness of fiscal support in the second column. One could argue that the first units of currency spent on each type of fiscal support have a larger multiplier than those after a substantial amount is disbursed. Indeed, government transfers to households first allows them to increase consumption to a certain extent. However,

after a point, and especially given the restrictions on mobility and contact-intensive economic activities, a large proportion of government transfers would be translated into household savings, hence dampening the fiscal multiplier. To account for these potential non-linearities, we introduce a quadratic term for the total fiscal packages and for each type of fiscal policies in our specification.

Our results reveal that the fiscal multipliers are non-linear in the size of the fiscal package. Indeed, the quadratic terms are significant and negative, indicating that there are diminishing returns to fiscal support in alleviating economic losses due to the pandemic. As a result, lower amounts of fiscal support announced in emerging economies would partially explain a larger estimated fiscal multipliers in these countries.

Next, we focus on fiscal multipliers for each type of fiscal support. Column 3 reports the multipliers for each of the fiscal measures when only linear terms are included, and column 4 includes quadratic terms for each of the types of measures. We find that above-the-line measures have the highest multiplier, above one, indicating that each dollar spent on above- the-line measures led to an increase of real GDP by more than one dollar. Fiscal multipliers for other fiscal measures are also statistically significant, but around five times lower in magnitude compared to fiscal multipliers for above-the-line measures. The coefficient for liquidity measures is not statistically significant. As a result, countries that deployed more above-the-line measures benefited from larger fiscal multipliers, partly explaining the differences between advanced and emerging economies. This indicates that the composition of the fiscal packages matters for the effectiveness of fiscal support.

Moreover, the non-linearities of fiscal multipliers are more pronounced for above-the-line and liquidity measures compared to other fiscal measures as indicated by the size of the quadratic term, as shown in column 4. Failing to introduce the quadratic terms would lead to a downward bias in the coefficient for the countries whose fiscal packages were relatively small (e.g., emerging countries) and an upward bias for the rest.

B. The role of inequality and informality

In this section, we explore the role of inequality and informality in shaping the effectiveness of fiscal support measures. We do so by interacting our measures of inequality and informality with all fiscal support measures.

First, inequality in emerging countries is on average slightly higher than in advanced economies. Average Gini coefficient over 2016–19 is 32.2 for emerging countries, against 31.3 for advanced economies. It also varies between countries, ranging from 24.8 in Slovenia to 42 in Turkey. The interplay between fiscal policy effectiveness and inequality is ambiguous from a theoretical perspective. On the one hand, inequality can be associated with a higher proportion of liquidity-constrained households with a high marginal propensity to consume. This is argued by Brinca et al. (2016) who observe that wealth inequality and fiscal multipliers show positive

correlation in the data and, theoretically, that fiscal multiplier is highly sensitive to the fraction of the population who face binding credit constraints. On the other hand, however, more inequality at the top might cause a higher proportion of the government transfers to increase savings, pushing down the fiscal multiplier.

Second, we find that average informality, measured as the average contribution to GDP of the shadow economy over the period 2015–17, is higher in emerging countries (29.3% of GDP) than in advanced economies (14.8%). Higher informality can affect the efficacy of fiscal policy in different ways. On the one hand, it can decrease the effectiveness of government programmes, as informal sector workers may not be able to access furlough, unemployment benefits or other fiscal support measures, thereby reducing fiscal multipliers. On the other hand, it can also limit the enforcement of containment measures, which tend to curtail spending, thereby raising fiscal multipliers.

Panel A. Fiscal multiplier and inequality

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Total fiscal package	0.404*** (0.000)	0.948*** (0.000)	0.404*** (0.000)	0.402*** (0.000)	0.428*** (0.003)	0.985*** (0.000)	0.922*** (0.000)	0.767*** (0.000)
Fiscal package *Inequality (level)			0.0320 (0.567)			0.090* (0.051)		
Fiscal package *Inequality (quartiles)				0.0031 (0.981)			0.325*** (0.002)	
Fiscal package *Inequality (dummy)					-0.009 (0.852)			0.107** (0.015)
Total fiscal package, quadratic term		-0.021*** (0.000)				-0.027*** (0.000)	-0.028*** (0.000)	-0.025*** (0.000)
Observations	123	123	123	123	123	123	123	123
R-squared	0.784	0.842	0.784	0.784	0.784	0.849	0.863	0.853
Country FE	YES	YES	YES	YES	YES	YES	YES	YES
Time FE	NO	NO	NO	NO	NO	NO	NO	NO

Note: Each column presents the relevant coefficients for each panel regression, where the dependent variable is GDP growth during 2020 at the country level, where we remove underlying growth and the contribution of the sectoral composition. Level refers to the relative level of the variable of interest in a given country; quartile refers to the quartile in which a given country is regarding that variable; and dummy is a variable equal to 1 if a given country is above the median for the given variable. The regressions include country fixed effects and controls for Stringency index, de facto mobility, Central Bank policy rate and central bank balance sheet expansion. Robust pval in parentheses. *** p<0.01, ** p<0.05, * p<0.1. See Table A5 in the Appendix for details on the specification.

Panel B. Fiscal multiplier and informality

	(9)	(10)	(11)	(12)	(13)	(14)
Total fiscal package	0.491*** (0.000)	0.352*** (0.000)	0.194 (0.144)	0.964*** (0.000)	0.897*** (0.000)	0.790*** (0.000)
Fiscal package *Informality (level)	0.180* (0.063)			0.107* (0.077)		
Fiscal package *Informality (quartile)		0.144 (0.294)			0.114 (0.104)	
Fiscal package *Informality (dummy)			0.110* (0.093)			0.066 (0.109)
Total fiscal package, quadratic term				-0.020*** (0.000)	-0.021*** (0.000)	-0.020*** (0.000)
Observations	123	123	123	123	123	123
R-squared	0.798	0.789	0.798	0.847	0.846	0.847
Country FE	YES	YES	YES	YES	YES	YES
Time FE	NO	NO	NO	NO	NO	NO

Table 2. Regression Results on Fiscal Multipliers given by Inequality and Informality

Note: Each column presents the relevant coefficients for each panel regression, where the dependent variable is GDP growth during 2020 at the country level, where we remove underlying growth and the contribution of the sectoral composition. Level refers to the relative level of the variable of interest in a given country; quartile refers to the quartile in which a given country is regarding that variable; and dummy is a variable equal to 1 if a given country is above the median for the given variable. The regressions include country fixed effects and controls for Stringency index, de facto mobility, Central Bank policy rate and central bank balance sheet expansion. Robust pval in parentheses. *** p<0.01, ** p<0.05, * p<0.1. See Table A5 in the Appendix for details on the specification.

The results are displayed in Table 2. Panel A explores the role of inequality while Panel B focuses on informality. For reference, columns 1 and 2 of Panel A show the model with total fiscal packages and with its quadratic terms, respectively. In columns 3 to 8, we use different measures of inequality and informality, added additionally as an interaction with the total fiscal packages variable. In columns 3 and 9, respectively, we include levels of inequality and informality; then, we insert the quartile in which a given country would be found regarding these variables (columns 4 and 10), and finally a dummy measure indicating whether a given country is above the median for the variable across out sample (columns 5 and 11). Columns 6, 7, and 8 in Panel A and 12, 13, 14 in Panel B add quadratic terms for the total fiscal measures.

The results from Panel A suggest that higher levels of inequality are associated with a higher fiscal multiplier when non-linearities are accounted for. These results are consistent with Brinca et al. (2016) and with the hypothesis that economies with higher proportion of liquidity-constrained households had larger fiscal multipliers during the pandemic. In Panel B, the interactive term between informality and fiscal policy support are positive, but significant only in some specifications. They suggest that a higher level of informality is weakly associated with a higher efficacy of fiscal policy. These findings point towards a relatively higher impact of fiscal policies in emerging countries.

C. The role of IMF-supported programmes

After the onset of the pandemic, countries around the world requested the assistance of the IMF through a number of IMF-supported programmes with the aim of alleviating the economic damage from the pandemic. In Europe, Albania, Moldova, Ukraine, Bosnia and Herzegovina and Kosovo received IMF funding in 2020 through IMF-supported programmes. In addition to IMF funding, these programmes typically included enhanced policy recommendations and technical assistance from IMF staff, and – in the case of Ukraine and Moldova – conditionalities.

There are several channels through which IMF programmes may have led to higher fiscal multipliers. First, the financing provided by the IMF may have relaxed fiscal space constraints, helping countries enact stimulus packages without crowding out private investment and/or raising sovereign yields. Second, IMF programmes may have catalysed capital inflows from private and other official creditors by acting as a signal of sound macroeconomic policies. Third, the enhanced policy recommendations and technical assistance (and conditionalities in the case of Ukraine and Moldova) accompanying IMF- supported programmes may have increased the effectiveness of fiscal policies (e.g., by targeting stimulus spending towards higher multiplier elements).

We test this hypothesis by interacting fiscal policy support with a dummy variable for countries with an IMF-supported programme in 2020. The results of this exercise are presented in Table 3. Columns 1 and 2, for comparison, are as in Table 1. In columns 3 and 4, we add the interaction term between fiscal packages and the presence of an IMF-supported programme. In both specifications, we obtain a significant coefficient for the interaction, indicating that the fiscal multiplier is higher in countries with IMF programmes.

However, an important caveat to our findings is that our regression might be capturing selection effects. First, countries with the tightest fiscal space constraints would have the strongest incentive to request an IMF-supported programme. If these countries also have the highest return to a marginal increase in fiscal impulse, then the positive coefficient for the interaction term may be driven by selection effects. Second, countries which requested an IMF-supported programme may have also received disbursements from other official creditors (beyond the aforementioned catalytic effects of IMF programmes), in which case a positive coefficient would capture the impact of broader international support rather than IMF-supported programmes on their own.

	(1)	(2)	(3)	(4)
Total fiscal package	0.404*** (0.000)	0.948*** (0.000)	0.407*** (0.000)	0.947*** (0.000)
Total fiscal package, quadratic term		-0.021*** (0.000)		-0.021*** (0.000)
Fiscal package *IMF			1.624** (0.027)	1.584** (0.020)
Observations	123	123	123	123
R-squared	0.784	0.842	0.800	0.858
Country FE	YES	YES	YES	YES
Time FE	NO	NO	NO	NO

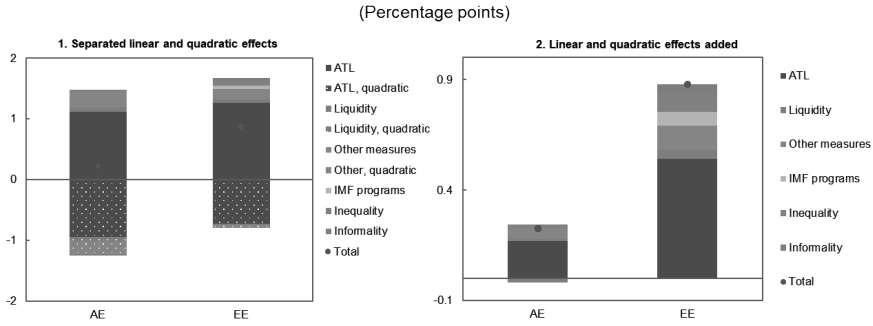
Table 3. Regression Results on Fiscal Multipliers and IMF-supported programmes

Note: Each column presents the relevant coefficients for each panel regression, where the dependent variable is GDP growth during 2020 at the country level, where we remove underlying growth and the contribution of the sectoral composition. The regressions include country fixed effects and controls for Stringency index, de facto mobility, Central Bank policy rate and central bank balance sheet expansion. Robust pval in parentheses. ***p<0.01, **p<0.05, *p<0.1. See Table A6 in the Appendix for details on the specification.

D. Differences in marginal fiscal multipliers

In Figure 8, we compare the fiscal multiplier that we would observe if an additional unit of fiscal support was considered, on average, in advanced and in emerging countries. To do this, we use the coefficients obtained in the previous exercises and compute a country-by- country marginal fiscal multiplier, using the country specific data on inequality, informality, IMF-supported programmes, fiscal policy magnitudes and compositions.[10] In Panel 1 of Figure 2, we present the findings separately for linear and quadratic effects. In Panel 2 of Figure 2, the findings are reported for combined linear and quadratic effects.

[10] Using the composition and magnitude of the announced fiscal policies in each country, together with the coefficients obtained in the previous regressions, and the interaction terms, we estimate a fiscal multiplier at the margin (i.e. the expected impact of an additional unit of currency spent, if it was spent using the average country composition of the different fiscal policies). The effect is set to 0 if the quadratic term is larger than the linear term.



Source: IMF staff calculations
Note: PPP-weighted averages are shown. Health factors is the sum of contributions from median age, hospital beds per capita, share of smokers in population and population density

Figure 8. Average Marginal Fiscal Multipliers

The figures show larger multipliers for additional fiscal support in emerging countries compared to advanced countries. This, as depicted in the previous sections, is explained by a number of reasons. We showed previously that fiscal multipliers are larger where above- the-line measures account for a higher proportion of the fiscal package, where fiscal packages are smaller, where there is an IMF-supported programme during the pandemic in place, where inequality is higher, and where the shadow economy is larger. All these support marginal fiscal multipliers are on average substantially greater in emerging countries compared to advanced economies.

While fiscal multipliers are estimated to be lower in advanced economies than emerging countries, our decomposition analysis revealed that the role of policies in advanced economies was, however, much more important in mitigating the crisis than in emerging countries. This is due to the considerably larger size of announced policies in advanced economies.

6. Conclusion

The substantial variation in the growth outcomes of European countries during the pandemic can be explained by differentials in underlying growth, decline in mobility, pre-pandemic country fundamentals pertaining to health and macroeconomic factors, and policy support measures, while differences in sectoral composition have had a limited impact. We find that the decline of mobility in 2020 contributes the most to output losses in all countries, while differences in sectoral composition played a more limited role. We also find that the shallower recessions experienced in emerging countries are due to higher underlying growth and younger populations which are less at-risk from COVID-19 infections, and despite more substantial policy support in advanced economies. We complement the decomposition analysis with a calibration exercise, allowing for heterogeneity in policy contributions based on the composition of policy support, to provide an estimate of the contribution of

economic policies in alleviating the costs of the pandemic. This analysis suggests a more substantial impact from policy measures in mitigating output losses, raising the potential contribution of policies by over 70% in advanced economies and more than doubling it in emerging economies.

Our analysis of the effectiveness of fiscal policy support suggests that fiscal multipliers are on average higher in countries where above-the-line measures account for a larger proportion of the total fiscal package, where total fiscal packages are smaller, where there was an IMF-supported programme during the pandemic, and where inequality and informality are more significant. These factors help explain relatively large fiscal multipliers in emerging countries compared to advanced economies.

Overall, our analysis sheds light on the causes of growth differentials during the pandemic, and on the role and effectiveness of fiscal and monetary policies in mitigating output losses. With many countries have yet to fully recover from pandemic-related economic scarring, continued risks of new COVID-19 variants that may cause a resurgence of the pandemic, and a volatile global growth outlook, we hope that the analysis presented in this paper may provide useful insights for macroeconomic forecasting and policy design.

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Appendix

Table A1. Data Sources and Construction

	Variable	Note	Source
Initial conditions	Trade openness Current account balance	Defined as sum of imports and exports divided by GDP	IMF WEO IMF WEO
	Gini inequality index		WB WDI
	Size of shadow economy	As a share of official GDP in 2017	Medina & Schneider (2018)
	Median age		UN Population Division, World Population Prospects, 2017 Revision
	Hospital beds per 1000 people		OECD, Eurostat, WB WDI, National Authorities
	Share of smokers in population	Average of male and female smokers ratios	WB WDI
	Population density	People per sq. km of land	WB WDI
Policy	Fiscal support measures	Announced measures as% of 2019 GDP. Time variation reflects different vintages of the survey	IMF COVID-19 Policy Survey
	Real interest rates	Ex-post real interest rates calculated as key policy rates less CPI inflation, in quarterly averages.	Haver Analytics, Eurostat, European Central Bank, National Authorities, IMF staff calculations
	Central bank assets	As percent of 2019 GDP	Haver Analytics, European Central Bank, National Authorities
Mobility	Stringency of containment measures	Quarterly average of higher frequency data	Blavatnik School of Government at the University of Oxford
	De facto mobility	Quarterly average of residuals from a weekly panel regression with google mobility (defined as average of mobility indicators for retail and recreation, and workplaces) as dependent variable and stringency of containment measures and country-quarter fixed effects as independent variables.	Google Mobility Reports, IMF staff calculations

Panel A. Table A2. Results for the Sectoral Panel Regressions

VARIABLES	(1) 2020 Real GDP growth net of underlying growth & sectoral composition effects	(2) Agriculture	(3) Industry exc. Cons.	(4) Construction	(5) Wholesale & retail
Fiscal support measures	0.274*** (0.0518)	0.126* (0.0696)	0.360*** (0.104)	0.214** (0.0893)	0.406*** (0.0690)
Real interest rate	0.120 (0.213)	-0.343 (0.463)	0.351 (0.422)	0.389 (0.378)	-0.0764 (0.387)
Change in central bank assets	-0.0294 (0.0273)	0.0563 (0.0605)	-0.157* (0.0788)	-0.0531 (0.0870)	-0.0699 (0.0641)
Stringency of containment	-0.178*** (0.0133)	-0.0825*** (0.0243)	-0.140*** (0.0305)	-0.168*** (0.0331)	-0.338*** (0.0255)
De facto mobility	0.144** (0.0672)	0.0660 (0.0869)	0.163 (0.121)	0.225 (0.160)	0.148 (0.119)
Median age	-0.337*** (0.0905)	-0.290 (0.240)	-0.732*** (0.213)	0.491 (0.374)	-0.723*** (0.213)
Hospital beds per 1000 people	0.200 (0.185)	-0.0789 (0.581)	-0.380 (0.441)	-0.406 (0.695)	1.245** (0.509)
Trade openness	-0.994* (0.560)	-2.002 (1.281)	-0.563 (1.496)	0.346 (1.169)	-0.520 (0.892)
Size of shadow economy	-0.0204 (0.0573)	-0.0597 (0.120)	0.0139 (0.112)	0.280* (0.150)	-0.130 (0.136)
Share of smokers in population	-0.0478 (0.0620)	0.265 (0.184)	0.0481 (0.147)	0.0520 (0.238)	-0.282 (0.170)
Gini inequality index	-0.0134 (0.0939)	-0.122 (0.270)	-0.175 (0.229)	0.125 (0.260)	0.0139 (0.251)
Population density	-0.00441*** (0.00122)	-0.00129 (0.00313)	-0.00156 (0.00352)	-0.000464 (0.00250)	-0.0145*** (0.00366)
Current account balance	0.155* (0.0875)	0.317* (0.177)	0.395 (0.286)	0.0175 (0.237)	-0.111 (0.225)
Constant	-1.767*** (0.524)	-0.523 (1.160)	-0.892 (0.842)	2.925** (1.357)	1.690 (1.070)
Observations	164	164	164	164	164
R-squared	0.616	0.123	0.321	0.225	0.594

Note: Robust standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1. Column (1) is for demonstration only while columns (2)-(11) reflect sectoral regressions used in growth decomposition.

Panel B. Table A2. Results for the Sectoral Panel Regressions

VARIABLES	(6) ICT	(7) Finance & insurance	(8) Real estate	(9) Prof., scientific & tech	(10) Pub. adm., educ. & social work	(11) Arts & other
Fiscal support measures	0.105** (0.0445)	0.0653 (0.0657)	0.0239 (0.0310)	0.230*** (0.0707)	0.126*** (0.0447)	0.319** (0.120)
Real interest rate	0.343 (0.392)	-0.913 (0.794)	0.157 (0.243)	0.0157 (0.351)	0.0158 (0.262)	0.0888 (1.145)
Change in central bank assets	-0.00965 (0.0705)	-0.0401 (0.0602)	0.0629** (0.0246)	-0.0988 (0.102)	0.0360 (0.0257)	0.0561 (0.216)
Stringency of containment	-0.102*** (0.0165)	-0.0448** (0.0219)	-0.0470*** (0.0118)	-0.258*** (0.0261)	-0.0720*** (0.0141)	-0.485*** (0.0670)
De facto mobility	0.0943 (0.0682)	0.0481 (0.103)	0.0779** (0.0355)	0.0866 (0.0780)	0.105 (0.0668)	0.166* (0.0977)
Median age	-0.261 (0.219)	-0.148 (0.328)	-0.0550 (0.143)	-0.325** (0.144)	0.0467 (0.102)	-0.645 (0.467)
Hospital beds per 1000 people	0.433 (0.405)	-0.0928 (0.486)	-0.0549 (0.223)	0.353 (0.491)	-0.202 (0.195)	-0.431 (1.007)
Trade openness	2.665*** (0.980)	-1.407 (1.227)	-1.488 (0.979)	-0.569 (1.016)	0.586 (0.746)	1.552 (3.103)
Size of shadow economy	0.0272 (0.120)	0.397** (0.176)	-0.0436 (0.0751)	-0.104 (0.107)	0.0211 (0.0797)	0.0599 (0.226)
Share of smokers in population	-0.226 (0.152)	-0.261* (0.140)	-0.0711 (0.0590)	0.111 (0.139)	0.194*** (0.0519)	0.108 (0.345)
Gini inequality index	0.561*** (0.183)	0.0536 (0.196)	-0.0243 (0.128)	0.127 (0.153)	0.0552 (0.0871)	0.427 (0.404)
Population density	-0.000937 (0.00202)	-0.00131 (0.00205)	-0.00288* (0.00164)	0.000982 (0.00219)	-0.00192 (0.00127)	0.0183** (0.00745)
Current account balance	0.129 (0.186)	0.515*** (0.167)	-0.00962 (0.0965)	-0.140 (0.177)	0.0431 (0.0919)	-0.759 (0.546)
Constant	4.880*** (1.063)	-0.215 (1.136)	-0.843* (0.459)	3.369*** (0.987)	-0.0230 (0.564)	5.277*** (1.942)
Observations	164	164	164	164	164	164
R-squared	0.316	0.176	0.234	0.502	0.265	0.460

Note: Robust standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1. Column (1) is for demonstration only while columns (2)-(11) reflect sectoral regressions used in growth decomposition.

Table A3. Calibration of Monetary Policy Multipliers

Country	Impact of 1 p.p. cut in policyrate	Literature reference	Impact of increase in central bank assets by 1% of 2019 GDP	Literature reference
Albania	0.33	Jarociński (2010)	0.24	Burriel & Galesi (2018)
Austria	0.42	Jarociński (2010)	0.11	Burriel & Galesi (2018)
Belarus	0.33	Jarociński (2010)	0.24	Burriel & Galesi (2018)
Belgium	0.42	Jarociński (2010)	0.06	Burriel & Galesi (2018)
Bosnia and Herzegovina	0.33	Jarociński (2010)	0.24	Burriel & Galesi (2018)
Bulgaria	0.33	Jarociński (2010)	0.24	Burriel & Galesi (2018)
Croatia	0.33	Jarociński (2010)	0.24	Burriel & Galesi (2018)
Cyprus	0.42	Jarociński (2010)	0.05	Burriel & Galesi (2018)
Czech Republic	0.42	Jarociński (2010)	0.24	Burriel & Galesi (2018)
Denmark	0.42	Jarociński (2010), Mountford (2005)	0.08	Burriel & Galesi (2018)
Estonia	0.42	Jarociński (2010)	0.33	Burriel & Galesi (2018)
Finland	0.42	Jarociński (2010)	0.12	Burriel & Galesi (2018)
France	0.42	Jarociński (2010)	0.08	Burriel & Galesi (2018)
Germany	0.42	Jarociński (2010)	0.14	Burriel & Galesi (2018)
Greece	0.42	Jarociński (2010)	0.03	Burriel & Galesi (2018)
Hungary	0.33	Jarociński (2010)	0.24	Burriel & Galesi (2018)
Iceland	0.42	Jarociński (2010), Mountford (2005)	0.06	Burriel & Galesi (2018)
Ireland	0.42	Jarociński (2010)	0.13	Burriel & Galesi (2018)
Israel	0.42	Jarociński (2010), Mountford (2005)	0.04	Gambacorta, Hofmann & Peersman (2014)
Italy	0.42	Jarociński (2010)	0.07	Burriel & Galesi (2018)
Kosovo	0.33	Jarociński (2010)	0.24	Burriel & Galesi (2018)
Latvia	0.42	Jarociński (2010)	0.18	Burriel & Galesi (2018)
Lithuania	0.42	Jarociński (2010)	0.33	Burriel & Galesi (2018)
Luxembourg	0.42	Jarociński (2010)	0.15	Burriel & Galesi (2018)
North Macedonia	0.33	Jarociński (2010)	0.24	Burriel & Galesi (2018)
Malta	0.42	Jarociński (2010)	0.03	Burriel & Galesi (2018)
Moldova	0.33	Jarociński (2010)	0.24	Burriel & Galesi (2018)
Montenegro, Rep. of	0.33	Jarociński (2010)	0.24	Burriel & Galesi (2018)
Netherlands	0.42	Jarociński (2010)	0.04	Burriel & Galesi (2018)
Norway	0.42	Jarociński (2010), Mountford (2005)	0.10	Gambacorta, Hofmann & Peersman (2014)

Country	Impact of 1 p.p. cut in policyrate	Literature reference	Impact of increase in central bank assets by 1% of 2019 GDP	Literature reference
Poland	0.33	Jarociński (2010)	0.24	Burriel & Galesi (2018)
Portugal	0.42	Jarociński (2010)	0.04	Burriel & Galesi (2018)
Romania	0.33	Jarociński (2010)	0.24	Burriel & Galesi (2018)
Russia	0.14	Vymyatnina (2005)	0.24	Burriel & Galesi (2018)
Serbia	0.33	Jarociński (2010)	0.24	Burriel & Galesi (2018)
Slovak Republic	0.42	Jarociński (2010)	0.11	Burriel & Galesi (2018)
Slovenia	0.42	Jarociński (2010)	0.06	Burriel & Galesi (2018)
Spain	0.42	Jarociński (2010)	0.02	Burriel & Galesi (2018)
Sweden	0.42	Jarociński (2010), Mountford (2005)	0.10	Gambacorta, Hofmann & Peersman (2014)
Switzerland	0.42	Jarociński (2010), Mountford (2005)	0.01	Gambacorta, Hofmann & Peersman (2014)
Turkey	0.75	Büyükbaşaran, Can & Küçük (2019)	0.24	Burriel & Galesi (2018)
Ukraine	0.33	Jarociński (2010)	0.24	Burriel & Galesi (2018)
United Kingdom	0.43	Mountford (2005)	0.25	Weale & Wieladek (2016)

Note: The calibrated multipliers for an increase in central bank assets in Albania, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Hungary, Kosovo, North Macedonia, Moldova, Montenegro, Poland, Romania, Russia, Serbia, Turkey, Ukraine are extrapolated fromthe average of the multipliers estimated by Burriel & Galesi (2018) for Estonia, Latvia, Lithuania and the Slovak Republic.

Table A4. Regression Results on Fiscal Composition

VARIABLES	(1)	(2)	(3)	(4)
ATL			1.032***	2.413***
			(2.92e-08)	(5.92e-07)
Liquidity			0.182	0.899
			(0.570)	(0.160)
Other			0.218**	0.493***
			(0.0423)	(8.67e-05)
ATL, quadratic				-0.202***
				(0.00148)
Liquidity, quadratic				-0.212**
				(0.0273)
Other, quadratic				-0.0132***
				(0.00143)
Policy rate	0.0980	-0.280	-0.0630	-0.322
	(0.831)	(0.453)	(0.857)	(0.293)
CB Balance Sheet	-0.118	-0.0610	-0.0946	-0.0697
	(0.127)	(0.368)	(0.149)	(0.184)
Stringency Index	-0.165***	-0.104***	-0.123***	-0.0578*
	(3.57e-06)	(0.000693)	(0.000778)	(0.0854)
De facto mobility	0.151*	0.159**	0.181**	0.148**
	(0.0526)	(0.0207)	(0.0174)	(0.0431)
Fiscal measures	0.404***	0.948***		
	(6.49e-06)	(0)		
Fiscal measures, quadratic		-0.0211***		
		(3.81e-08)		
Constant	-3.035	-8.277***	-6.757***	-11.67***
	(0.160)	(8.08e-05)	(0.00586)	(7.02e-06)
Observations	123	123	123	123
R-squared	0.784	0.842	0.819	0.865
Country FE	YES	YES	YES	YES
Time FE	NO	NO	NO	NO

Robust pval in parentheses
***p<0.01, **p<0.05, *p<0.1

Panel A. Table A5. Regression Results on Fiscal Multipliers given by Inequality and Informality

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Fiscal measures	0.404*** (6.49e-06)	0.404*** (8.52e-06)	0.402*** (3.19e-05)	0.428*** (0.00323)	0.491*** (4.86e-07)	0.352*** (0.000247)	0.194 (0.144)
Fiscal* Ineq (level)		0.0320 (0.567)					
Policy rate	0.0980 (0.831)	0.0607 (0.900)	0.0968 (0.837)	0.108 (0.820)	0.121 (0.771)	0.0589 (0.895)	0.0253 (0.953)
CB Balance Sheet	-0.118 (0.127)	-0.119 (0.122)	-0.118 (0.125)	-0.117 (0.132)	-0.138 (0.111)	-0.130 (0.110)	-0.137 (0.101)
Stringency Index	-0.165*** (3.57e-06)	-0.165*** (4.05e-06)	-0.165*** (4.28e-06)	-0.164*** (5.58e-06)	-0.151*** (9.59e-06)	-0.162*** (2.73e-06)	-0.160*** (2.59e-06)
De facto mobility	0.151* (0.0526)	0.140* (0.0786)	0.150* (0.0758)	0.154* (0.0656)	0.142* (0.0670)	0.142* (0.0663)	0.142* (0.0681)
Fiscal* Ineq (quartile)			0.00311 (0.981)				
Fiscal* Ineq (dummy)				-0.00874 (0.852)			
Fiscal* Inf (level)					0.180* (0.0627)		
Fiscal* Inf (quartile)						0.144 (0.294)	
Fiscal* Inf (dummy)							0.110* (0.0926)
Fiscal, quadratic							
Constant	-3.035 (0.160)	-3.040 (0.163)	-3.028 (0.158)	-3.073 (0.160)	-3.952* (0.0620)	-3.253 (0.119)	-3.473* (0.0920)
Observations	123	123	123	123	123	123	123
R-squared	0.784	0.784	0.784	0.784	0.798	0.789	0.798
Country FE	YES	YES	YES	YES	YES	YES	YES
Time FE	NO	NO	NO	NO	NO	NO	NO

Robust pval in parentheses
***p<0.01, **p<0.05, *p<0.1

Panel B. Table A5. Regression Results on Fiscal Multipliers given by Inequality and Informality

VARIABLES	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Fiscal measures	0.948*** (0)	0.985*** (0)	0.922*** (0)	0.767*** (1.80e-07)	0.964*** (0)	0.897*** (8.63e-11)	0.790*** (4.10e-06)
Fiscal* Ineq (level)		0.0901* (0.0514)					
Policy rate	-0.280 (0.453)	-0.412 (0.279)	-0.535 (0.151)	-0.474 (0.212)	-0.242 (0.509)	-0.305 (0.405)	-0.298 (0.413)
CB Balance Sheet	-0.0610 (0.368)	-0.0607 (0.353)	-0.0526 (0.325)	-0.0606 (0.344)	-0.0770 (0.301)	-0.0713 (0.312)	-0.0758 (0.297)
Stringency Index	-0.104*** (0.000693)	-0.100*** (0.000765)	-0.0949*** (0.000656)	-0.0982*** (0.000682)	-0.1000*** (0.000793)	-0.103*** (0.000606)	-0.105*** (0.000645)
De facto mobility	0.159** (0.0207)	0.129* (0.0680)	0.107 (0.119)	0.118* (0.0988)	0.154** (0.0275)	0.153** (0.0274)	0.153** (0.0278)
Fiscal* Ineq (quartile)			0.325*** (0.00236)				
Fiscal* Ineq (dummy)				0.107** (0.0147)			
Fiscal* Inf (level)					0.107* (0.0772)		
Fiscal* Inf (quartile)						0.114 (0.104)	
Fiscal* Inf (dummy)							0.0645 (0.109)
Fiscal, quadratic	-0.0211*** (3.81e-08)	-0.0226*** (4.95e-09)	-0.0283*** (5.27e-09)	-0.0254*** (1.81e-08)	-0.0197*** (1.21e-06)	-0.0207*** (1.70e-07)	-0.0197*** (1.22e-06)
Constant	-8.277*** (8.08e-05)	-8.664*** (2.10e-05)	-9.251*** (2.99e-06)	-8.892*** (8.71e-06)	-8.482*** (3.78e-05	-8.361*** (4.41e-05)	-8.198*** (0.000103)
Observations	123	123	123	123	123	123	123
R-squared	0.842	0.849	0.863	0.853	0.847	0.846	0.847
Country FE	YES	YES	YES	YES	YES	YES	YES
Time FE	NO	NO	NO	NO	NO	NO	NO

Robust pval in parentheses
***p<0.01, **p<0.05, *p<0.1

Panel A. Table A6. Regression Results on Fiscal Multipliers and IMF-supported programmes

	(1)	(2)	(3)	(4)	(5)
Fiscal measureso	404*** (6.49e-06)	0.407*** (5.80e-06)	0.947*** (0)	0.410*** (8.03e-06)	0.418*** (8.94e-06)
Fiscal measures, quadr			-0.0209*** (2.18e-08)		
Fiscal *IMF		1.624** (0.0272)	1.584** (0.0201)	1.891** (0.0173)	1.174*** (0.00392)
Policy Rate	0.0980 (0.831)	0.239 (0.560)	-0.140 (0.706)	0.0908 (0.853)	0.169 (0.718)
CB Balance Sheet	-0.118 (0.127)	-0.100 (0.233)	-0.0445 (0.552)	-0.0988 (0.251)	-0.0981 (0.255)
Stringency Index	-0.165*** (3.57e-06)	-0.135*** (3.79e-06)	-0.0755*** (0.00182)	-0.140*** (8.57e-06)	-0.137*** (5.75e-06)
De facto mobility	0.151* (0.0526)	0.161** (0.0292)	0.169*** (0.00870)	0.152** (0.0372)	0.164** (0.0372)
Fiscal *IMF *Inequality				0.710 (0.255)	
Fiscal *Inequality (level)				0.0311 (0.566)	
Fiscal *IMF *Ineq (quartile)					0.745 (0.552)
Fiscal * Ineq (quartile)					-0.0139 (0.915)
Fiscal *IMF *Ineq (dummy)					
Fiscal *Ineq (dummy)					
Fiscal *IMF *Informality					
Fiscal *Informality					
Constant	-3.035 (0.160)	-5.095** (0.0119)	-10.25*** (1.64e-07)	-4.902** (0.0193)	-5.017** (0.0109)
Observations	123	123	123	123	123
R-squared	0.784	0.800	0.858	0.803	0.800
Country FE	YES	YES	YES	YES	YES
Time FE	NO	NO	NO	NO	NO

Robust pval in parentheses
***p<0.01, **p<0.05, *p<0.1

Panel B. Table A6. Regression Results on Fiscal Multipliers and IMF-supported programmes

	(6)	(7)	(8)	(9)	(10)	(11)
Fiscal measureso	0.443*** (0.00163)	0.486*** (5.79e-07)	0.989*** (0)	0.927*** (0)	0.777*** (7.06e-08)	0.973*** (0)
Fiscal measures, quadr			-0.0225*** (2.31e-09)	-0.0277*** (1.71e-09)	-0.0251*** (6.32e-09)	-0.0202*** (3.33e-07)
Fiscal *IMF	-0.337 (0.719)	2.457 (0.175)	1.876*** (0.00421)	1.032 (0.113)	-0.178 (0.860)	2.817* (0.0730)
Policy Rate	0.121 (0.799)	0.0793 (0.875)	-0.391 (0.358)	-0.462 (0.261)	-0.444 (0.280)	-0.321 (0.482)
CB Balance Sheet	-0.0956 (0.271)	-0.117 (0.222)	-0.0406 (0.585)	-0.0359 (0.558)	-0.0407 (0.575)	-0.0514 (0.535)
Stringency Index	-0.141*** (8.18e-06)	-0.133*** (1.49e-05)	-0.0759*** (0.00322)	-0.0713*** (0.00237)	-0.0758*** (0.00239)	-0.0791*** (0.00255)
De facto mobility	0.170** (0.0263)	0.153** (0.0361)	0.141** (0.0246)	0.121** (0.0467)	0.133** (0.0327)	0.165*** (0.00972)
Fiscal *IMF *Inequality			0.759 (0.200)			
Fiscal *Inequality (level)			0.0888** (0.0411)			
Fiscal *IMF *Ineq (quartile)				0.715 (0.538)		
Fiscal * Ineq (quartile)				0.303*** (0.00151)		
Fiscal *IMF *Ineq (dummy)	0.975** (0.0147)				0.878** (0.0307)	
Fiscal *Ineq (dummy)	-0.0125 (0.783)				0.102** (0.0101)	
Fiscal *IMF *Informality		-0.724 (0.381)				-0.894 (0.215)
Fiscal *Informality		0.153 (0.128)				0.0776 (0.178)
Constant	-4.782** (0.0220)	-5.380*** (0.00796)	-10.45*** (1.11e-07)	-10.92*** (5.92e-09)	-10.52*** (5.28e-08)	-10.12*** (4.98e-07)
Observations	123	123	123	123	123	123
R-squared	0.805	0.811	0.867	0.876	0.872	0.862
Country FE	YES	YES	YES	YES	YES	YES
Time FE	NO	NO	NO	NO	NO	NO

Robust pval in parentheses
***p<0.01, **p<0.05, *p<0.1

A Political Economy Perspective on State Effectiveness and the COVID-19 Pandemic in Emerging Europe[1]

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Abstract

We examine the so-called "Emerging Europe puzzle", that during the first and second waves of COVID-19, countries in Emerging Europe performed better in pandemic management than those in Advanced Europe. Yet, during the onset of the pandemic's third wave, from approximately mid-2021 onward, there is a reversal of fortune. We take a political economy perspective on the puzzle, drawing on ideas on the origins of state capacity, trust and voluntary compliance. We isolate the possibility that endemically low levels of trust in state institutions and other citizens has had a "knock-on" effect on voluntary compliance. Slower vaccine uptake is an additional consequence of these initial conditions, with the legacy of mistrust fostered under communism being a possible driver.

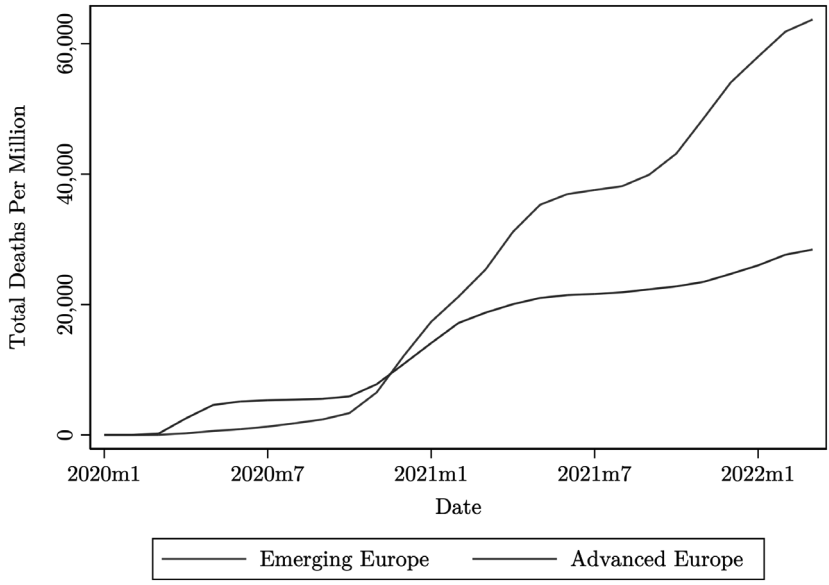
1. Introduction

Since the outset of the COVID-19 pandemic, there have been distinct trajectories in outcomes and regions. Among these patterns, the divergent fates of two collections of countries, those in Emerging Europe and Advanced Europe, are particularly striking.[2] Initially, countries in Emerging Europe performed well relative to those in Advanced Europe. This can be seen in Figure 1 that, during the first wave of the pandemic, Emerging Europe (the red line) is more or less flat with a slight change

[1] We thank participants at the joint Corvinus-LSE workshop on the Covid Puzzle of Emerging Europe. We also thank the Periscope project for supporting this research. The Periscope project has received funding from the European Union's Horizon 2020 Research and Innovation programme, under the Grant Agreement number 101016233.

[2] Throughout this paper, "Emerging Europe" refers to Albania, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Macedonia, Moldova, Montenegro, Poland, Romania, Russia, Serbia, Slovakia, Slovenia, Turkey and Ukraine. We refer to "Advanced Europe" as comprising the countries Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the UK.

in the gradient during the second wave. However, as the blue line shows, there is a sharp take off in total deaths in Advanced Europe during the initial phase of the pandemic (beginning in March 2020) and deaths remain higher throughout the first and second waves. Yet, during the third wave of the pandemic, total deaths per million in Emerging Europe are almost double Advanced Europe.



Note: data comes from Ritchie et al.'s (2020) Our World in Data COVID-19 dataset.

Figure 1. Total Deaths per Million in Emerging and Advanced Europe.

This short paper offers some evidence-based conjectures that cast light on the "Emerging Europe puzzle". It takes a political economy approach rooted in our understanding of state capacity, trust and voluntary compliance. We highlight a range of factors that could have contributed to the puzzling divergence between Emerging Europe and Advanced Europe. We argue that, at the outset of the crisis, Emerging Europe had lower levels of trust in both state institutions and other citizens and, when the vaccine began, this led to low levels of voluntary compliance towards combating the pandemic. We are not able to establish convincing causal evidence to support this view since there are many other sources of heterogeneity in the initial conditions; for example conventional measures of state capacity are lower in Emerging Europe. But there are interesting correlations in the data that we highlight and are consistent with a narrative that low levels of trust reflects low voluntary compliance. Superficially, this further reflects a legacy from communism and some of the experience of institutions during and after the fall of communism (Acemoglu and Robinson 2012).

The paper is organised as follows. Section 2 outlines the general theoretical intuition that underpins the importance of state capacity and voluntary compliance vis-á-vis COVID-19 outcomes. Section 3 provides some basic empirical evidence to showcase the endemic low levels of trust in Emerging Europe and the possible knock-on effects upon voluntary compliance. Section 4 grounds the results in section 3 in the context of vaccine hesitancy. Section 5 concludes.

2. State Capacity, Trust and Voluntary Compliance

2.1 State Capacity

There are many definitions of state capacity, but a common theme is the organisational structures that enable policies to be implemented effectively. Enhancing the state's tax raising powers (i.e. fiscal capacity) can increase the range of public goods government can choose to provide. Bolstering markets through contract enforcement and protecting property rights (i.e. legal capacity) can allow government to reap the rewards from increased economic productivity.[3] Whether a government implements effective policies is not a priori guaranteed. Yet effective states often require conducive political environments.

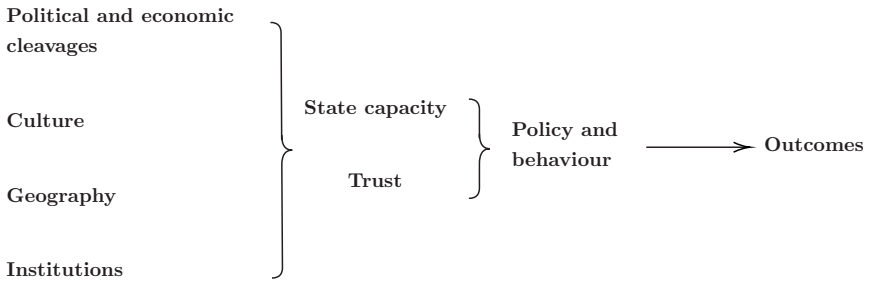


Figure 2. Theoretical Framework

Figure 2 gives a schematic representation of why state capacity matters and the factors that influence and are influenced by it. This is only a sketch and there is an extensive literature which underpins this. Key underlying factors on the far left represent those things that shape interests (political and economic cleavages, culture and geography), while institutions mediate these factors in building trust and state capacity. These affect policy and the behaviour of citizens, which in turn shape a range of outcomes.

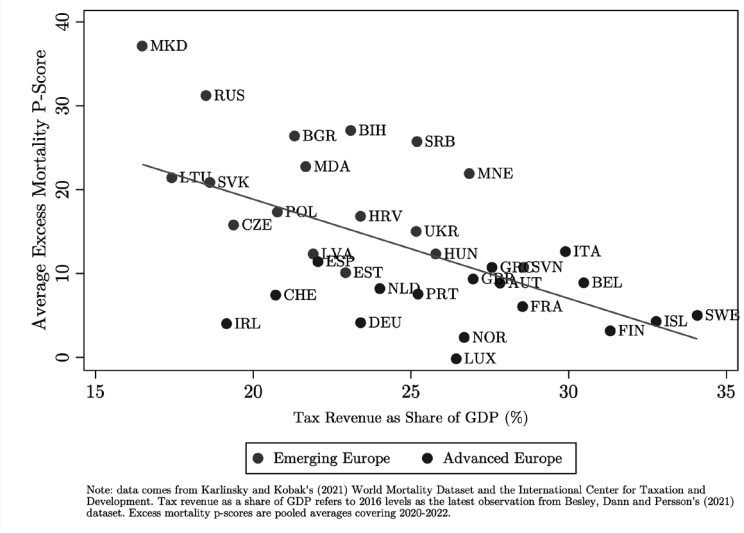
Crudely speaking, there are two (complementary) approaches to thinking about building effective states: top-down and bottom-up. We will review the implications of each for how states were able to respond to the pandemic.

[3] See Besley and Persson (2011) and Besley, Dann and Persson (2021) for overview of different dimensions of state capacity.

2.2 Top-Down: Investing in State Capacity

State-building as a "top-down" activity focuses on the importance of investments by governments to increase the state's coercive apparatus in order to foster compliance by citizens. This has been the focus of research programs such as Besley and Persson (2010, 2011). Some might term this a Hobbesian view of the state, whereby coercion is deemed the primary modus operandi of implementing effective policies. Enhancing fiscal capacity for the government to fund selective transfers or provide collective public goods is an archetypal example of this perspective when it comes from far-sighted decisions by incumbent governments, aware of the utility of making such changes.

Strong state capacity is important in dealing with crises because it expands the range and depth of tools available (Besley and Dann 2022). Stimulus packages and fiscal support for consumers and businesses are a case in point. Without high fiscal capacity, as manifested say in the ability to raise debt, resources may be limited. And having a competent bureaucracy to effectively roll-out state support for businesses and individuals can bolster social support during periods of crisis.[4] Fiscal capacity may also be important when it permits government to have resources to support people during a period of lockdown, as many countries did when infection rates were at their peak. Consistent with this logic, Figure 3 provides evidence that strong fiscal capacity, as measured by tax revenues as a share of GDP (a standard metric in the literature), was indeed negatively associated with excess mortality.[5]



Note: data comes from Karlinsky and Kobak's (2021) World Mortality Dataset and the International Center for Taxation and Development. Tax revenue as a share of GDP refers to 2016 levels as the latest observation from Besley, Dann and Persson's (2021) dataset. Excess mortality p-scores are pooled averages covering 2020-2022.

Figure 3. Excess Mortality and Fiscal Capacity

[4] The furlough program in the UK is a good example of a policy that was swiftly conjured and implemented nationwide.

[5] This association is robust to controlling for the (log of) GDP per capita to reassure us that it is not just differences in income levels driving this association.

2.3 Bottom-Up: Trust and Voluntary Compliance

The second approach to building state capacity is in the spirit of ideas often associated with thinkers such as Rousseau and Locke. This sees the state in terms of a social contract underpinned by the establishment of civil and political rights.[6] Thus, reciprocity and mutual obligation lie at the heart of building state capacity, hence connoting a more "bottom-up" approach.

This view highlights the role of "trust" and "voluntary compliance". Different ways of thinking about trust have emerged across the social sciences. The political science and political economy literature have generally honed in on two general dimensions that can be measured in survey data: trust in state institutions and interpersonal trust.[7],[8] The former category can include confidence in various branches of the state, including the legislature, politicians, the judiciary/courts, the police, and supranational bodies (e.g. the United Nations). Interpersonal trust primarily concerns whether individuals trust their fellow citizens. A large body of work tends to find that both dimensions are positively correlated with a component of trust labelled as "civic culture" or "social capital"; these can support an effective state by encouraging political participation and a variety of pro-social behaviors (Almond and Verba 1963; Putnam 2000; Putnam, Leonardi and Nanetti 1993).

One positive byproduct of a civic culture is "voluntary compliance" with state policies. Levi (1988) introduced the idea of "quasi-voluntary compliance" in the context of tax raising efforts, where citizens voluntarily comply with paying their taxes. Compliance is "quasi-voluntary" because of sanctions and punishment.[9] Building quasi-voluntary compliance is facilitated if government is trustworthy, such as when citizens see their taxes being put to fruitful uses. It can also be enhanced if there is mutual trust amongst fellow citizens to follow the rules; free-riding towards a given policy is less likely to incentivise individual compliance if others do not similarly obey. Voluntary compliance is thus a consequence of the two dimensions of trust.

These arguments can be applied to the experience during the COVID-19 pandemic, such as lockdowns. Although the benefits of lockdowns are societal, the costs of complying are almost exclusively private – a classic collective action problem (Olson 1965). In this scenario, if there are high levels of interpersonal trust, and citizens trust each other to follow the rules, then governments can rely on mutual compliance towards social distancing and respecting lockdown mandates without

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[6] See Besley (2020) for further discussion.

[7] Trust in state institutions is sometimes coarsened to simply being trust or "confidence" in government.

[8] See Mishler and Rose (2001) for further discussion on "cultural" versus "institutional" origins of trust. Also see Devine et al. (2020) for review of contributions studying trust and COVID-19 outcomes.

[9] This also relates to another concept of "contingent compliance", developed in Levi (1997), which emphasises the reciprocal nature of compliance.

the need to invest in coercive sanctions.[10] This should subsequently bolster the effectiveness of a lockdown to limit the spread of the COVID-19 virus.

The vaccine is also another felicitous example, but also drawing on trust in state institutions. Given vaccines have largely been administered by the state, then low levels of trust in the state will naturally precipitate lower levels of compliance. Mistrust in the state could amplify the effects of belief in conspiracy theories versus expert, government-backed scientific evidence. A culture of suspicion around the benefits of the policy will thus make it difficult for any government to persuade citizens to get vaccinated.

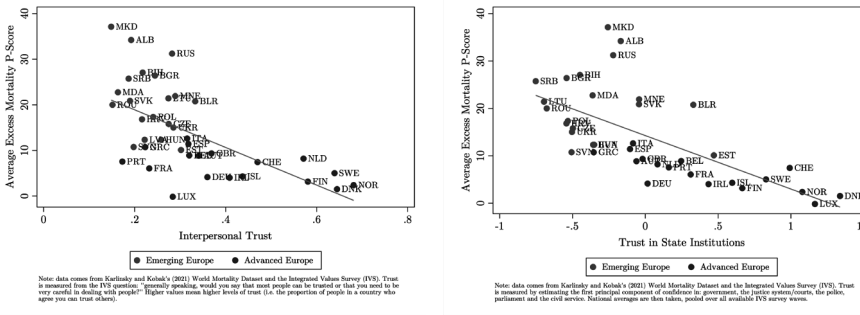


Figure 4: Excess Mortality and Trust in Others and State Institutions

These examples of lockdowns and the vaccine are crude, given the multi-faceted nature of the policy responses to COVID-19. However, in terms of understanding the logic of trust and voluntary compliance during a global health crisis, they illustrate the importance of norms and values (i.e. social infrastructures) in supporting public and private action (Bear and Simpson et al. 2021). Figure 4 provides evidence of a sharp negative correlation between levels of trust and excess mortality during the pandemic. The left-hand panel shows this for average levels of interpersonal trust as measured from the Integrated Values Survey (IVS), and the right-hand panel evinces this for trust in state institutions (see note for explanation on measurement).[11] But as with Figure 3, one should be cautious in interpreting these associations as reflecting underlying causal relationships.

[10] See Gelfand et al. (2021) for further discussion on the role of social norms during COVID-19 in the context of "tight" and "loose" cultures.

[11] The left-hand panel also holds in a global sample, as shown in Besley and Dann (2022).

3. Empirical Evidence

3.1 Trust Levels in Emerging Europe

When reflecting on the divergent experience of Emerging and Advanced Europe, it bears remarking that fiscal capacity is generally lower in Emerging Europe than in Advanced Europe. This is visible from the clustering of countries in Figure 3, with most of Emerging Europe being in the North-West of the figure. So we would have expected Emerging Europe to have less fiscal fire-power to cope with the pandemic. However, it is also conceivable that it is not state capacity per se that is important but having a cultural and institutional environment that is conducive to building state capacity.

In light of other contributions in this volume which focus on the direct effects of fiscal policy in Emerging Europe during COVID-19, we focus on correlations reflecting a more bottom-up perspective on state effectiveness which emphasises the significance of trust and compliance for effective policy-making. We ask to what extent low levels of trust might allow us to understand the patterns seen in Emerging Europe.

A striking feature of both panels in Figure 4 is the clustering of countries, mirroring what we saw in Figure 3. Countries in Emerging and Advanced Europe form distinct clusters differentiated along trust lines, with Emerging European countries having generally lower levels of trust relative to Advanced Europe. Whatever their historical roots, these differences in levels of trust are likely to have been predetermined before the onset of the pandemic. Figure 4 is hence suggestive of a "trust deficit" in Emerging Europe relative to Advanced Europe at the start of the pandemic.

The relationships found in Figure 4 are just cross-national correlations. But micro-data can cast further light on them and to test the hypothesis that citizens in Emerging Europe are, on average, less trustworthy of state institutions and other citizens relative to Advanced Europe. We use data from the Integrated Values Survey (IVS) to explore the dimensions of trust. To measure trust in state institutions, we create dummy variables for whether respondents reply with "a great deal" or "quite a lot" of confidence in: i) government, ii) the justice system/courts, iii) the police, iv) parliament and v) the civil service. We also take the first principal component across these five dummies as an overall measure of trust in "state institutions", creating a dummy based on whether respondents were above/below the median. Finally, we also create another dummy variable to gauge interpersonal trust based on whether respondents agree with the statement "most people can be trusted".[12] We run the following specification:

[12] A key issue with these survey questions is that they are agnostic about what exactly respondents should trust. As Levi (1998) notes, "[t]rust has three parts: A trusts B to do X" (p. 78). The IVS survey questions do not satisfy this. Trust fellow citizens to do what exactly? Trust state institutions to do what exactly? Notwithstanding this, various empirical pieces evidence that such survey questions do have some internal validity (Glaeser et al. 2000; Johnson and Mislin 2012).

$$\tau_{iwcta} = \alpha + \beta(\text{Emerging Europe}) + \gamma \mathbf{X'}_{iwcta} + \varepsilon_{iwcta} \quad (3.1.1)$$

Here, τ_{iwcta} refers to the seven dummy variables in the various survey questions regarding trust in state institutions and other citizens. The independent variable of interest is a dummy variable which is equal to one if respondent *i* in survey wave *w* in survey year *t* of age *a* lives in country *c* that comprises "Emerging Europe". We are therefore comparing residents of Emerging Europe to those who live in Advanced Europe. In $\mathbf{X'}_{iwcta,}$ we include a range of fixed effects across all specifications to capture differences concerning time: year of birth, survey wave, year survey was conducted and three age bands.[13] We also control for a range of fixed effects to capture differences in individual characteristics: sex, tertiary education, self-reported health status and income scale. Finally we cluster standard errors, $\varepsilon_{iwcta,}$ at the country level. If we expect respondents to be less trusting in Emerging Europe than Advanced Europe, we should estimate $\hat{\beta} < 0$.

Table 1 shows evidence that trust levels are indeed lower in Emerging Europe relative to Advanced Europe (i.e. $\hat{\beta} < 0$), even after controlling for other characteristics. Although correlations, it supports the view that endemic mistrust is greater across the board in Emerging Europe. Specifically, when looking at cross-country variation in Panel A, respondents living in Emerging Europe are 16% less likely to have trust in the justice system/courts, just more than 25% less likely to trust the police and 10% less likely to trust parliament. When aggregating these measures of trust in state institutions by taking the first principal component of the measures across all columns 1-5, Emerging Europeans are 9% less likely to trust the state. In line with this general pattern of mistrust, column 7 of panel A shows that respondents in Emerging Europe are 25% less likely to trust others, and this is statistically significant to the 1% level.[14]

[13] We have three age band dummies: under 30, middle aged (30-60) and over 60. Throughout all regressions we use over 60 as the base dummy.

[14] These results exploiting cross-country variation are also robust when using the European Social Survey (ESS). See Appendix A.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Full Sample						
Panel A	Government	Justice System/ Courts	Police	Parliament	Civil Service	State Institutions	Others
Emerging Europe	0.005	-0.164***	-0.268***	-0.098**	-0.011	-0.093**	-0.249***
	(0.040)	(0.049)	(0.051)	(0.040)	(0.040)	(0.045)	(0.061)
Observations	67,844	58,919	68,901	67,025	65,935	54,054	68,118
Mean Dep. Var.	0.399	0.511	0.554	0.361	0.454	0.497	0.293
Panel B	Bordering Regions Sample						
Emerging Europe	-0.051***	-0.228***	-0.449***	-0.242***	-0.336**	-0.409***	-0.164***
	(0.006)	(0.004)	(0.008)	(0.009)	(0.006)	(0.007)	(0.016)
Observations	4,088	4,051	4,116	4,057	4,059	3,889	4,056
Mean Dep. Var.	0.245	0.424	0.581	0.205	0.333	0.509	0.278
Survey Wave Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Survey Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Birth-Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Individual Characteristics Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: *** p < 0.01, ** p < 0.05, * p < 0.10. Robust standard errors, clustered by country, are reported in parentheses. All dependent variables are dummies for whether respondents have trust in each of the listed entities. Trust in State Institutions is transformed into a dummy variable by taking the median of the distribution and giving a 1 to those respondents above the median and 0 otherwise. Individual Characteristics Controls refer to dummies for sex, tertiary education, self-reported good health status and income scale. All specifications are linear probability models. Panel A refers to the country-wide sample. Panel B refers to the bordering regions sample as outlined in Figure 5.

Table 1. Results from Trust Regressions

Notwithstanding any estimates of specification (3.1.1) using cross-country variation, there could still be underlying unobserved differences between Emerging and Advanced Europe that drive differentials in trust levels. This could subsequently bias our estimate of β in panel A. Hence, a more robust approach is to compare those regions in Emerging Europe and Advanced Europe that border each other geographically. This might help to control for some confounding variables by exploiting border "discontinuities" between Emerging and Advanced Europe when geography and culture vary more continuously. There is, of course, a price to pay in terms of a smaller sample size. Specifically, we focus on the most westerly parts of the Czech Republic, Hungary, Poland, Slovakia and Slovenia, and compare this to the

most eastern regions of Austria, Germany and Italy.[15] Figure 5 outlines the regions used. This sample is now restricted to only those respondents located in the shaded regions. We repeat specification (3.1.1), but with a more limited set of observations.

It is interesting to note that the results in panel B are more or less qualitatively identical to those in panel A when using our more restricted sample of bordering regions, whilst mostly being quantitatively larger. Those respondents in Emerging Europe living in regions that border Advanced Europe are 23% less likely to have trust in the justice system/courts, 45% less likely to trust the police and 24% less likely to trust parliament. Despite the effects being estimated as larger and smaller between panels A and B for trust in state institutions and interpersonal trust respectively, we still find statistically significant negative associations. The only major point of difference between both sets of regressions concerns trust in the civil service and government, which are now both statistically significant – respondents in bordering regions of Emerging Europe are 34% less likely to trust the civil service and 5% less likely to trust the government. Overall, the results in panel B hence provide additional evidence of a "trust deficit" between Emerging and Advanced Europe.

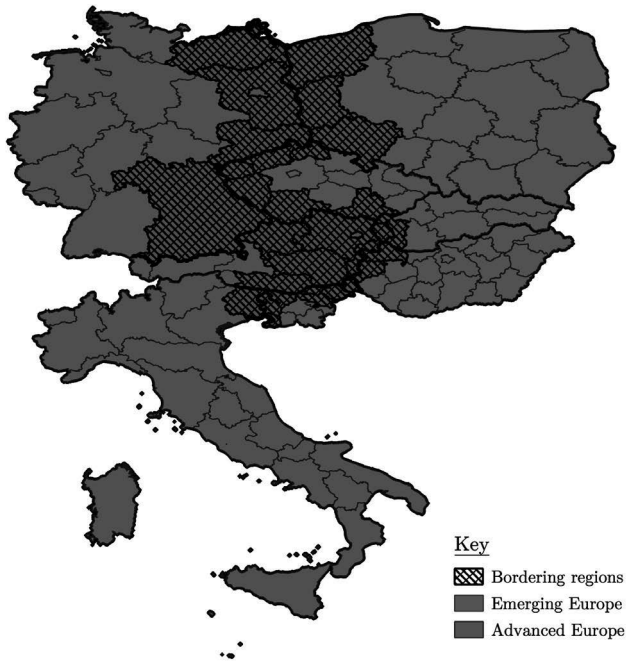


Figure 5. Bordering Regions between Advanced and Emerging Europe

[15] Due to missing data in the IVS on Greece, we do not include the bordering regions between Greece (Advanced Europe country) and Albania, Bulgaria, North Macedonia and Turkey (Emerging Europe countries). However, using the ESS as an alternative data source, we are able to include some of these regions, and continue to find similar results. See Appendix A.

3.2 Voluntary Compliance in Emerging Europe

We now explore whether there is a positive correlation between trust levels and voluntary compliance using micro-data.[16] Specifically, we now focus purely on Emerging Europe and include country fixed effects, α_c, to account for unobservable country-level factors, such as history, culture or geography, which could plausibly affect levels of trust and attitudes towards voluntary compliance through various channels (assuming these are time-invariant). We also include country × survey wave fixed effects to control for a range of country-specific time-varying shocks. We now run the following specification:

$$\kappa_{iwcta} = \alpha_c + \rho\tau_{iwcta} + \gamma X'_{iwcta} + \varepsilon_{iwcta} \quad (3.2.1)$$

The dependent variable of interest is now $\kappa_{iwcta,}$ a measure of voluntary compliance. To construct this, we take the first principal component of three questions from the IVS: whether it is unjustifiable to cheat on one's taxes, whether a respondent is willing to fight for their country, and whether he/she is willing to pay higher taxes to reduce environmental pollution.[17] For ease of interpretation, we create a dummy variable for whether the respondent is greater than the median value of the voluntary compliance principal component. Our independent variables of interest, $\tau_{iwcta,}$ are now the various trust measures from specification (3.1.1), although for brevity we focus on confidence in government, the trust in state institutions principal component, and interpersonal trust. We include the same range of fixed effects and individual-level characteristics as used in specification (3.1.1).

[16] See Besley and Dray (2022) for the development of an underpinning theoretical framework. They also explore a wide range of determinants of differences in trust across individuals depending on their lifetime exposures to significant events.

[17] These are largely activities associated with compliance towards state activities (e.g. Levi 1997).

	(1)	(2)	(3)	(4)	(5)	(6)
	Dependent variable is: Voluntary Compliance					
Confidence in Government	0.087*** (0.012)	0.087*** (0.012)				
Trust in State Institutions			0.101*** (0.012)	0.102*** (0.012)		
Trust in Others					0.022 (0.015)	0.021 (0.016)
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Survey Wave Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Survey Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Country × Survey Wave Fixed Effects	No	Yes	No	Yes	No	Yes
Birth-Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Individual Characteristics Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	24,174	24,174	18,418	18,418	24,217	24,217

Note: *** p < 0.01, ** p < 0.05, * p < 0.10. Robust standard errors, clustered by country, are reported in parentheses. Trust in State Institutions is transformed into a dummy variable by taking the median of the distribution and giving a 1 to those respondents above the median and 0 otherwise. Individual Characteristics Controls refer to dummies for sex, tertiary education, self-reported good health status and income scale. All specifications are linear probability models. The sample of countries refers only to Emerging Europe.

Table 2. Results from Voluntary Compliance Regressions

Table 2 shows a clear pattern within the countries of Emerging Europe, with a strong correlation between beliefs of trust in the state and attitudes towards voluntary compliance. Columns 1 and 2 show that respondents who have confidence (i.e. "trust") in government are around 9% more likely to be voluntarily compliant, based on our measure. The effects are slightly larger when looking at our aggregate measure of trust in state institutions across columns 3 and 4. However, the evidence is less compelling for interpersonal trust in light of the statistical insignificance of the results across columns 5 and 6.

These results are intriguing in light of the Emerging Europe puzzle that motivated this exploration and are consistent with the evidence provided in Figure 4 and Table 1. If trust is positively correlated with voluntary compliance, yet trust is lower in Emerging Europe, then it is plausible that this will have a knock-on effect to voluntary compliance in the region.

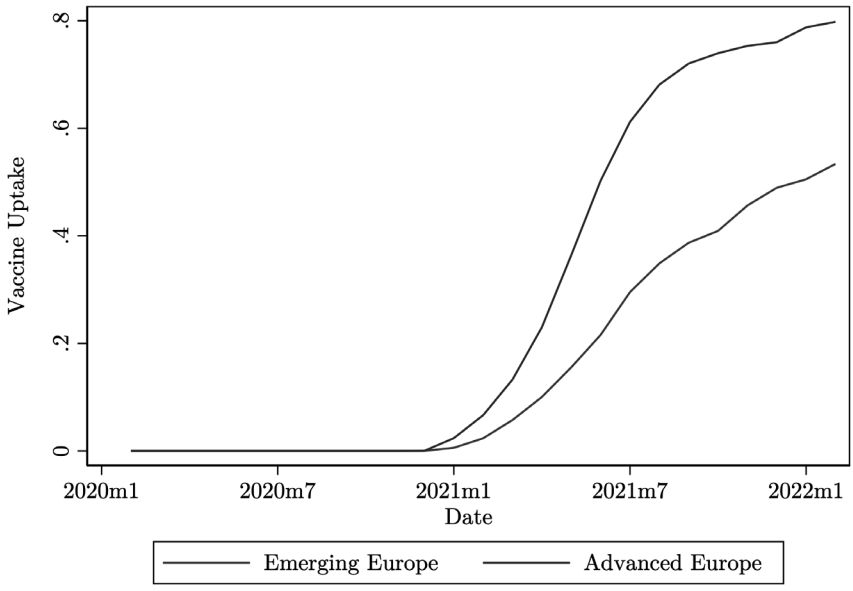
4. Vaccine Hesitancy

We now explore the period of the vaccine. Recall from Figure 1 that total deaths per million in Emerging Europe are almost double that of Advanced Europe by mid-2021. This is interesting as the vaccine had been underway for five to six months. That said, the strategies pursued were very different across countries, ranging from

a more universal policy to something more targeted (e.g. by age group or those sub-populations most in need). It is difficult to capture these nuances in a quantitative measure, so we will continue to look at broad correlational patterns across Emerging and Advanced Europe.

A range of studies have emerged on the determinants of vaccine uptake (Macdonald and the SAGE Working Group on Vaccine Hesitancy 2015). Several contributions have specifically focused on the impact of trust. For example, in a global survey of acceptance towards COVID-19 vaccines, Lazarus et al. (2021) find a positive correlation between trust in government and greater willingness to accept inoculation against the virus. Given the trust deficit we have found evidence for in Emerging Europe, and the potential knock-on consequences this has on voluntary compliance from section 3.2, it is hence plausible that slower vaccine uptake could have been a material consequence. Figure 6 provides some evidence for this, comparing the cumulative number of eligible individuals who have been fully vaccinated against COVID-19 across both regions of Europe.

Despite taking off from zero around December 2020, Figure 6 shows that vaccine uptake was substantially faster in Advanced Europe relative to Emerging Europe, i.e. the gradient in the figure is much steeper. Even based on most recent outcomes, just less than 60% of eligible individuals in Emerging Europe have been fully vaccinated, in contrast to Advanced Europe where the figure lies at 80%. Of course we should be cautious in using vaccine uptake as a direct measure of vaccine hesitancy, since many factors could go into the slow roll out, such as lower access to public resources. This underlines the importance of other, more conventional measures of state capacity. Thus, Emerging Europe may simply have had slower access to vaccines with a poorer national health system infrastructure; it is well-known that vaccines were more readily available in Advanced Europe than in poorer countries. But the idea that mistrust in the state could have slowed the roll out of the vaccine seems plausible, given the other pieces of evidence that we have presented, although any kind of definitive conclusion would require more evidence.



Note: data comes from Ritchie et al. (2020). Vaccine uptake refers to the cumulative total proportion of the population in Emerging and Advanced Europe (respectively) who are fully vaccinated.

Figure 6. Vaccine Uptake between Advanced and Emerging Europe

4.1 Institutions and the Legacy of Communism

The origins of Emerging Europe's "trust deficit" are varied. Apart from Turkey, almost all countries in Emerging Europe experienced a period of communist dictatorship, albeit heterogeneously depending on their closeness to the former Soviet Union. This domination of political life via the iron fist of dictatorship may have left a legacy of mistrust in the state, feeding back into mistrust amongst others.[18] This connection between low levels of trust with low vaccine uptake and the history of communism is intriguing in the context of the patterns that we saw during the pandemic.[19] Using the second wave of the SHARE (Survey of Health, Ageing, and Retirement in Europe) COVID-19 Survey, Berniell et al. (2021) find that vaccine uptake is starkly lower among respondents living in ex-Communist countries. They also compare respondents in East and West Germany, finding that the probability of getting inoculated is also much lower in the East – a former communist country. Costa-Font et al. (2021) also

[18] See Mishler and Rose (1997, 2001) for discussions with regards to post-Communist societies.

[19] There is also a larger literature on the long-run effects of communist regimes in political economy. See for example Alesina and Fuchs-Schündeln (2007) and Becker, Mergele and Woessmann (2020).

provide similar evidence, using a pre-Covid survey on trust in vaccines. The role of exposure to communism is frequently mentioned in terms of attitudes towards the state, with the FT Editorial Board (2021, para. 4) remarking that "[c]ollapsed socialist systems bequeathed deep distrust in government and a lack of respect for rules and the authorities – providing fertile ground for vaccine scepticism". And with the region replete with vaccine disinformation and the spread of conspiracy theories, a consequence of this endemic mistrust, it is apparent as to why vaccine uptake has been sluggish (Ghodsee and Orrenstein 2021).

Inspired by the work of Berniell et al. (2021) and Costa-Font et al. (2021), and to better control for concerns about common omitted variables driving the patterns present in Figure 6, we home in on the case of Germany, comparing the East and West regions. Although there may be many factors at work shaping the differences, this arguably does control for a variety of plausible confounding factors (a similar justification for the exercise in section 3.1). It also helps to address the possibility that there is heterogeneous timing in the vaccine, given all 16 regions in Germany rolled-out vaccines on the same day: December 26th 2020.

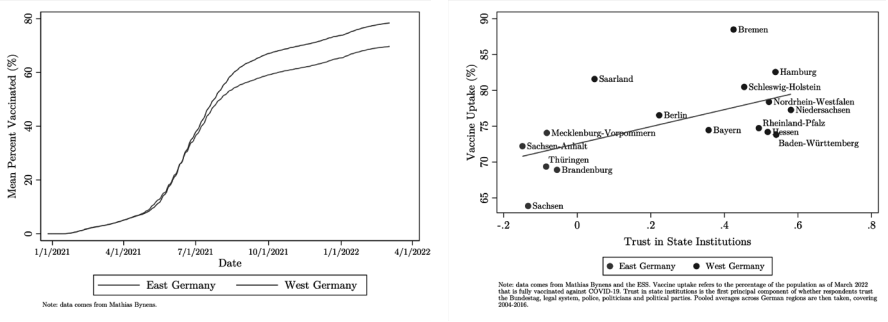


Figure 7. Vaccine Uptake in East versus West Germany

The left-hand panel of Figure 7, shows different trajectories in vaccine uptake between East and West Germany, somewhat similar to the pattern found in Figure 6. Despite vaccine uptake being similar in levels up until mid-2021, the series start to diverge, with West Germany continuing to increase relative to East Germany. There is some evidence that links this to levels of trust in state institutions. To explore this, we now use the European Social Survey (ESS) to get region-level measures of trust in the state for Germany. There is again a striking clustering of regions along trust lines, and this correlates positively with vaccine uptake as of March 2022. Apart from the outlier of the Saarland, all regions that comprised the former German Democratic Republic cluster tightly towards the lower end of the trust in state institutions spectrum, relative to the western regions. Although only correlational evidence, these figures are consistent with the idea that mistrust as a legacy of communism

may be part of the story when it comes to understanding the Emerging Europe puzzle.

5. Conclusion

We have explored ideas relating state capacity, trust and voluntary compliance to understand the "Emerging Europe puzzle". There is evidence of a clear trust deficit in Emerging Europe relative to Advanced Europe, which could have had a knock-on effect to lower levels of voluntary compliance. Connecting this to vaccine hesitancy has illustrated not only why Emerging Europe may have deteriorated in performance during the pandemic, but it also sheds light on the possible origins of endemic mistrust in the region, resulting from the legacies of communist dictatorship.

The evidence presented here is only suggestive. There is also a risk that trust and compliance are correlated with other "hard-to-measure" factors, although we have tried to exploit bordering regions as an identification strategy to better control for other confounding idiosyncrasies. Moreover, there is no sense in which factors surrounding state capacity are exclusively responsible for the "Emerging Europe puzzle". Other channels merit careful investigation. These include the actions of politicians and others during the pandemic. But placing the spotlight on trust can open up important debates, and the trust deficit in Emerging Europe is worthy of more careful investigation. Without doubt though, the pandemic has been an important testing ground for these ideas, given the centrality of voluntary measures and citizen compliance in combating the virus.

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Appendix

Appendix A Robustness Checks with Bordering Regions using ESS

One of the issues with using the IVS region-level data is the general inconsistency across countries over time – some respondents were classified by region for certain countries in given survey waves, but this was unavailable in other countries and periods. For example, it was difficult to precisely track down the regions of Greece that border Albania, Bulgaria, North Macedonia and Turkey based on the classifications used in the dataset. In light of these inconsistencies, we rely on the European Social Survey (ESS) for robustness purposes to also run our region-level analysis using those regions in Emerging and Advanced Europe that border each other.

This has two advantages. Firstly, we are now able to get regional data on a slightly wider set of countries, now including Greece, Bulgaria and Turkey (unfortunately there was still missingness on region classifiers for Albania and North Macedonia). Secondly, unlike the IVS where surveys are asked in periodic waves, some of which did not have region-level classifiers for some countries, the ESS more or less consistently classifies respondents by region every two years, when the survey is carried out. Both of these advantages substantially increase our sample size, thus making estimates of any differential in trust between Emerging and Advanced Europe more precise even when using subnational region-level data. Figure A.1 outlines the regions used with ESS.

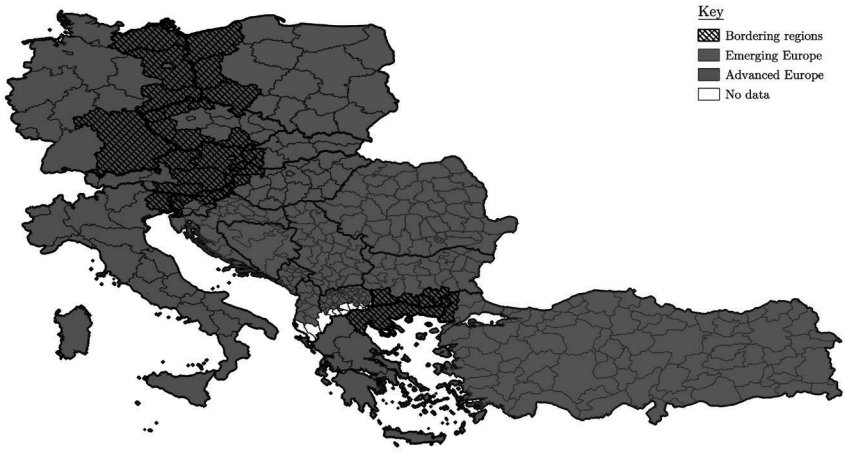

Figure A.1: Bordering Regions between Advanced and Emerging Europe, ESS

The IVS and ESS ask similar questions with regards to trust in various institutions of the state and other fellow citizens, although the correspondence is not precisely one-for-one regarding the former dimension of trust. To get a similar aggregate measure of trust in state institutions, we take the first principal component of the

following survey questions, whereby respondents are asked whether they trust: i) parliament, ii) the legal system, iii) the police, iv) politicians and v) political parties.[20]

Table A.1 outlines the results using ESS. We also repeat specifications using the country-wide sample as another robustness check on the results in Table 1. Even when using this alternative dataset, we again see similar results. Using cross-country variation in columns 1 and 3, respondents in Emerging Europe are 24% less likely to trust state institutions and 16% less likely to trust others. When using the more restricted sample by focusing only on regions that border each other, columns 2 and 4 yield fairly similar results, both in direction and magnitude. Overall, the evidence from both Tables 1 and A.1 provide further confidence in the notion that there is indeed a noticeable "trust deficit" in Emerging Europe relative to Advanced Europe, even after controlling for survey wave and year fixed effects, observable individual-level characteristics and unobservable region-level idiosyncrasies.

	(1)	(2)	(3)	(4)
	State Institutions		Others	
Emerging Europe	-0.236***	-0.207***	-0.162***	-0.093**
	(0.056)	(0.050)	(0.052)	(0.040)
Mean Dep. Var.	0.533	0.521	0.466	0.371
Survey Wave Fixed Effects	Yes	Yes	Yes	Yes
Birth-Year Fixed Effects	Yes	Yes	Yes	Yes
Individual Characteristics Controls	Yes	Yes	Yes	Yes
Observations	234,095	18,714	269,484	21,349
Sample	Country level	Bordering regions	Country level	Bordering regions

Note: *** p < 0.01, ** p < 0.05, * p < 0.10. Robust standard errors, clustered by country, are reported in parentheses. Trust in State Institutions is transformed into a dummy variable by taking the median of the distribution and giving a 1 to those respondents above the median and 0 otherwise. Individual Characteristics Controls refer to dummies for sex, tertiary education and self-reported good health status. We also control for the natural logarithm of household income (not dummies for income deciles as in Table 1). All specifications are linear probability models. institutions we do not include these variables.

Table A.1: Results from Trust Regressions using ESS

[20] There are also questions relating to the European Union and United Nations, but given our focus on domestic institutions we do not include these variables.

Community, Trust, and Security: Lessons Learned from the Management of the Pandemic in Hungary

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Abstract

The emergence and recurrence of the severe acute respiratory syndrome coronavirus (SARS-COV-2, which causes COVID-19) of unknown origin in Wuhan, China in late 2019 has become one of the most serious and complex crises in the world, including Hungary, since March 2020. The pandemic has brought extreme uncertainty and the ideal means to ensure protection against it is anything but clear. This paper sets out to review the policy challenges of coping with the COVID-19 pandemic, which was experienced as an exogenous shock in Hungarian society.

Keywords: pandemic, COVID-19, pandemic management, social attitudes

1. Introduction

The emergence of COVID-19 has caused humanity world to face a complex, unprecedented crisis that caught all political communities and countries unaware. In planning a response, the steps to be taken in pandemic management,[2] scientific knowledge – including the opinions of virologists, immunologists and epidemiologists – is indispensable. Social scientists must play an important role alongside the natural sciences. Appropriate pandemic management steps[3] can only be taken if we are aware of the social scope for making temporary or permanent changes that may alter (temporarily or permanently) the rules governing interpersonal relationships

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[2] Stoto et al., for example, distinguish between five main areas of public health emergency preparedness: 1) detection and assessment of health threats, 2) development, adaptation and implementation of relevant policy measures, 3) provision of health services, 4) coordination and communication within the public health emergency preparedness system, 5) public communication about emergency risk (Stoto et al. 2017).

[3] By steps, we mean the formulation of solutions, i.e. proposals, their implementation and the unfolding of the corresponding actions (Szepesi, 2018, 415).

as well as the knowledge and beliefs that shape norms and conventions. Political and management science should therefore play a key role in the analysis of the psychological, and thus attitudinal, aspects of concerted action, with a focus on the human/virus encounter.

It is good to know ourselves as thinking, feeling and acting beings. What do we think about the pandemic crisis? How do we see our individual roles and relationships with each other in dealing with this crisis? What do we expect from political leaders in terms of pandemic management?[4]

It is important to note that this paper is not meant to be a response to the idealised notions of virologists, epidemiologists and immunologists, nor does it seek to analyse the economic impact of the crisis or assess the pandemic management strategy of the political elite. Instead, it aims to review the political feasibility of pandemic management in the context of social habits as revealed by political sociology. Thus, the focus of the analysis is not the "economy vs. health" dichotomy expounded in public discourse, but the relationship between citizens' habits, which was presumably the origin of the two preceding extremes for policymakers.

Tackling the crisis involves high political stakes. If the government fails to meet the inherent demands of society, emotions can run high and the legitimacy of the political elite can be called into question.

My hypothesis is that the *relative success*[5] of pandemic management in Hungary depends on the extent to which it relies on the community's character and social identity developed in the course of past processes. In my opinion, pandemic management goals and strategies (ultimately changes) that are best supported by the features of national character, or which adopt an appropriate strategy, are the most likely to result in a social consensus. This does not, of course, imply that this paper should evaluate the outcome of crisis management in the light of pandemic management objectives, strategies and societal changes. Also, this paper analysis does not include normative elements on the perception and objectives of the political and economic elites and Hungarian society in relation to values and pandemics; it is left to the reader to judge this in the light of the analysis that will be presented.[6]

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[4] Of course, the economic strength of a political community, the capacity of its health system and the general health status of its population impact how it manages epidemics. This study only partially addresses these aspects in the context of national character and related social beliefs.

[5] This means any community-level goal that is to be achieved.

[6] The study uses data from Worldometer and the University of Washington (Seattle) for the Hungarian pandemic, and Eurostat data on economic growth (GDP) and unemployment for the economic consequences.

2. Special features of protection against SARS-CoV-2

The new coronavirus causes a disease called COVID-19.[7] At the time of writing, more than 500 million people had been infected with the virus and the pandemic had caused more than 6 million disease-related deaths (Worldometer, 2021).

The pathophysiological impact of the SARS-CoV-2 virus poses a particular societal challenge. It is crucial for pandemic management to evaluate pandemic potential, which is determined by two factors: the speed at which the pathogen can spread and the severity of the disease it can cause. This was not known initially and may change in the future.[8] The pathophysiology of the virus is not easy to characterise because several variants of the pandemic virus have been identified which are of concern to the WHO, and many of which spread more rapidly than the wild type and are more easily symptomatic in younger age groups.[9]

As more and more experience has been gained with the characteristics of the virus, it has become apparent that the infection has such a high mortality rate and places such an extraordinary burden on health care systems that immediate action is needed to contain it.

3. Attitudes of Hungarians in connection with the pandemic

The role of attitudes and cultural characteristics of countries and nations, i.e. their collective value systems, is difficult to probe in the social sciences, including economics and political science (Falk et al., 2018). When examining the history of a political community, researchers often associate the existence or absence of certain values with success (Phelps, 2006). These special community-level cultural beliefs, formed over historical periods, are worthy of examination in this particular epidemiological situation. In my view, the success of pandemic management is based to a large extent on knowledge of these unique features, and this is no different in the case of Hungary.

Before moving on to an overview of the attitudes that are most relevant to pandemic management, two points should be briefly clarified. It is important to note that attitudes should not be understood[10] as some kind of genetically determined, immutable and simplistic national character traits. As regards the dilemmas of adopting political strategies in the pandemic situation, it is fair to say that different attitudes, expectations and fears may require that the government take different

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7 Coronavirus Disease 2019.

8 For details on the systematic, scientific methodology and results of epidemiological modelling in Hungary, see Oroszi et al., 2021.

9 Multi-organ inflammation is a rare but serious complication of paediatric inflammatory multisystem syndrome (PIMS). The predisposing factors remain unknown. Symptoms are caused by an immune response following infection, with patients usually no longer infected and PCR testing usually negative. For details, see Constantin et al., 2021.

10 Just as it is a mistake to ignore the values and attitudes of a society when making decisions, it would be a mistake to consider them immutable. A country's or nation's cultural heritage is a specific endowment, and, similarly, attitudes may change in the future and steps can be taken to ensure that they do.

focuses as it deals with a pandemic situation. It should also be stressed that any reference to "the attitudes and cultural characteristics of Hungarians" means the dominant value system, i.e. the general features of the vast majority of the community, knowing that within the group under study there are a significant number of smaller communities or minorities that do not necessarily fit the description.

Certain attitudes should be highlighted for pandemic management in Hungary: what are the characteristics of the majority of Hungarians? What general norms do they consider important? What are their fears? What are their basic perceptions and expectations of society? What is their attitude to the state and the members of society like? All this will help us to better understand the processes that have taken place in the waves of the pandemic in Hungary.

4.1. Community responsibility

Hungarians predominantly seek to achieve individual success. One of the most important general characteristics of Hungary is its high level of individualism. According to this view, Hungarians in general put individual interests before the interests of the community, and thus their sense of responsibility towards the community, collectivism and willingness to cooperate with others is among the lowest in the developed world (Hofstede Insights, 2021).

Hungary shares the highest level of individualism with the Netherlands in the European Union. This means that in terms of individualisation, Hungary is ahead of more economically developed societies, such as the Nordic countries, and close to the levels in English speaking countries, such as the US, the UK and Australia (Hofstede Insights, 2021). International comparisons show that Hungarians think of themselves primarily as individuals, able to find happiness for the benefit of others rather than in cooperation with others.

4.2. Trust

High levels of individualism are also associated with high levels of distrust in Hungary, which also has historical reasons. In general, there is no disagreement among social scientists that the lack of trust and distrust has remained a characteristic feature of Hungarians even after the political changeover, and thus Hungary's value structure is characterised by a low level of trust (Kopp & Skrabski, 2008, p. 727; Tárki, 2013). This does not primarily refer to trust in institutions[11] but rather to the circle of trust of individuals and especially family, acquaintances and friends. This also means that Hungary has very weak ties in the wider community (national, religious and civic) compared to other countries.

[11] However, there has been an improving trend in recent years towards public and non-public institutions. (See Medgyesi & Boda, 2018.)

Daniel Kahneman (2019) observed that, instead of relying on information from distant, abstractly factual "sources", many people prefer experiential interpretations of the world, validated through personal relationships, i.e. through the secondary public sphere of family and acquaintances, even if much of this comes from social media. In the case of Hungary therefore, this is doubly true, as this general tendency comes on top of ingrained attitudes of mistrust.

4.3. Social cooperation

In Hungary, high levels of individualism and mistrust are also coupled with a low willingness to comply. Although adherence to social norms is highly supported in principle, and thus the relationship with different rules (laws, formal procedures and the community's written or unwritten conventions) is good, in practice these norms are not always respected.[12]

Research conducted by Tárki in 2013 shows that seeing oneself as fair and others as mostly dishonest is problematic in terms of social cooperation and frustrating in terms of respecting community norms. This can easily prompt us to individually absolve ourselves from observing rules that we would expect others to observe. The low level of willingness to comply goes back to both historical reasons and current experiences.

> In a country whose 20th century history was defined by inhuman ideologies and repressive states, and where the dominant experience after the change in political regime remained that it is often the use of loopholes and subterfuge rather than merit that leads to success, it is understandable that the survival instinct often drove people to break rather than follow the norm (Boros et al., 2020 p. 33).

The distrust and loophole-seeking inherited from unjust systems reinforces the already strong individualism in Hungary as a kind of vicious circle.

4.4. Values and fears

The triad of individualism, a general lack of trust and a low level of social cooperation also implies that Hungarians attach particular importance to the protection of privacy, driven by a special desire for independence.

According to Hungarian writer Mihály Babits, "the Hungarians are interested only in their own rights and freedom, and in no other foreign principles." (Babits,

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[12] The data from the 2013 Tárki surveys show that, in principle, the Hungarian population is highly norm-following, but our experience in the form of anecdotal stories shows the opposite, that is, it shows high levels of non-compliance (Tárki, 2013, p. 27).

2005 p. 543) Here, the struggle means the self-defence of a community prone to passivity, the defence of its own private sphere (Prohászka, 1936 p. 93). Accordingly, the struggle is invariably inevitable and at the same time futile (ibid. p. 103).[13] The aim is not to create an abstract vision of freedom based on solid community relations among Hungarians. Instead of collective discipline, the main aim is to preserve the individual private sphere and to obtain or preserve the tranquillity that goes with it.

In Hungary, in this "struggle", the role of those we know best is becoming more important, and making the importance of the family in Hungary especially prominent. According to self-reported rankings, Hungarians consider the protection of families, and thus of the most intimate private sphere, to be among the most important values (Nézőpont, 2019).

The majority of Hungarians are against anyone trying to interfere in their most intimate personal and family life. For Hungarians, after the priority of the family and the protection of the private sphere, the most important thing is work and its protection. According to OECD statistics, Hungarians work hard even by European standards (OECD, 2019). This is not only due to the intrinsic value of work, but also to the fear of unemployment and the perception of the importance of consumption based on the existence of work.

The overwhelming majority of Hungarians have materialistic values, even by European standards. Specifically, they find pleasure in consumption and shopping; the criterion of success is also linked to these activities, complemented by the desire to accumulate goods and property. Related to this, their collective fears are also mostly related to maintaining their livelihood (Andorka, 2003, p. 499). The acquisition and preservation of financial security is therefore of paramount importance for the majority of Hungarians, which also means that the loss of these is the most feared issue in the country (Boros & Laki, 2018, pp. 26-27).

Closely related to this is the fact that the majority of Hungarians are wary of change and unpredictability (Boros & Laki, 2018), and are suspicious of reform and social experimentation. The three most important fears of society are "uncertainty and unpredictability of life", "serious illness, hospitalisation" and "financial insecurity, the inability to pay bills at the end of the month" (Boros & Laki, 2018, p. 67).

4.5. Relationship with the State

Overall, a special condition – relevant to the topic – follows from the above attitudes. This is the special expectations of the Hungarian population and its relationship with the state and its institutions. It can be concluded that a high level of individualism, coupled with a lack of trust and a low willingness to cooperate, has created an ambivalent relationship between Hungarians and the state.

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[13] "The Hungarians, if forced to join the struggle, always do so in a state of 'exuberance' against the 'encroaching world', where the only motive for the struggle is the desire for independence." (ibid., p. 104)

Their low level of willingness to cooperate and scepticism towards the state at the community level result in a level of trust that is anything but outstanding. It is important to note that trust in the state depends to a large extent on our party political orientation, which can be interpreted as a kind of tribalism[14] (Boros et al., 2020, p. 36).

At the same time, self-centredness and materialism, often driven by fear of losing one's livelihood, place expectations on political institutions that go beyond reality. This also means that the majority of Hungarians do not expect the market to provide jobs, health care and education, but primarily that the state should do so, despite the fact that the majority believes that private companies do more for them than whichever government is currently in office.

To put it facetiously, this means that "we want a lot from the state, but we don't believe we can expect much from it." (Boros et al. 2020, p. 36) This idea is complemented by the fact that Hungarians have less trust in sub-state actors (NGOs, trade unions and churches) than in the state, but more trust in supra-state actors, such as the European Union (Boros & Laki, 2017, pp. 47-55).

In the context of the pandemic, it is worth highlighting that Hungarians' main expectations from and fears of the state are related to health care. Public health care for all is ranked above all other expectations, with the state of the health care system being the main concern, in addition to personal health, i.e. the deterioration of the Hungarian health care system is among the main concerns in Hungary, according to the surveys (Boros & Laki, 2018, pp. 54-56). It is important to note that, as with trust in the state, fears are also highly politicised, with respondents' party preference having a significant effect on how much they fear a particular problem and which problems they consider most serious (ibid., p. 68).

In Hungary, the culture of conspiracy is highly developed, not only in politics but also in science, industry and technology.[15] An event of such magnitude as the SARS-CoV-2 pandemic, which is manifesting itself in our daily lives as a serious economic, social and political crisis, gives rise to a strong temptation for many to interpret this series of events, with their unknown origins and outcomes, with extraordinary explanations. The coronavirus is spreading faster than our sound knowledge of the pandemic.

5. SARS-CoV-2 and the attitudes of Hungarians

After the preceding overview of Hungarian attitudes relevant to SARS-CoV-2 and the pandemic, the challenges of pandemic management are now reviewed in the context of the most important national characteristics related to the issue. We will examine the types of resistance that decision-makers may encounter in the case of

[14] For more on tribal gangs, see Chua, 2018.
[15] For the results of related research in Hungary, see Krekó, 2021, pp. 170-177.

certain pandemic management measures due to the community character and social identities that have emerged during past processes.

Similar measures have been taken worldwide to respond to the outbreak and control the spread of the virus, with differences mainly in response times, the severity and enforcement of containment measures and the effectiveness of asset procurement.

- **Reducing the number of physical contacts and the likelihood of transmission of infection**

At the start of the first wave in spring 2020, the lack of knowledge about the new coronavirus and the limited tools and resources to help control it meant that the negative epidemiological impact experts had assumed overshadowed all other considerations. The Hungarian outbreak management strategy was to reduce the number of physical contacts as the primary means of control.

Curfew restrictions introduced during the first wave proved sufficient to contain that wave of infection by reducing contact rates between 60 and 70%. At that time, the mass infection phase did not take place as it did in other countries in Central and Eastern Europe. Thus, Hungary succeeded in not overloading the health care system and in protecting vulnerable risk groups.[16]

It can be concluded that measures to limit the number of contacts, which were introduced during the first wave of the pandemic, were met with a high degree of social consensus, which may have been supported by fears of infection (Publicus Research, 2020) and concerns about the collapse of the health care system, as indicated earlier. However, the drastic decline in physical mobility and employment led to an unprecedented economic shutdown, and the isolation associated with protection led to significant mental health consequences.

In the case of Hungary, the trend in economic growth was broadly in line with the EU average, while the trend in unemployment was significantly worse (Bartha et al., 2020, p. 101).[17] A particular cognitive and psychological paradox about the need for prevention has developed in a broad section of society, making it difficult to accept the subsequent steps in pandemic management.

> From an epidemiological point of view, less stringent measures are sufficient to achieve the same effect if they are introduced earlier. The higher the number of cases, the more restrictive the measures to be introduced and the longer the restrictions need to be maintained in order to bring the pandemic back under control. (Oroszi et al. 2021, p. 49)

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[16] This was confirmed by the H-UNCOVER survey conducted in spring 2020, one of the largest nationally representative surveys in the world. The study estimated the number of people affected by the first wave of the epidemic at 56,439, 0.68% of the total population. For details, see Merkely et al., 2021.

[17] The consequences of closure have varied depending on social groups, industries and employment groups.

At the same time, timely action may be met with strong social resistance, as many people are unaware of the worsening pandemic dynamics and the resulting public health risks, due to low case rates and mild course of infections. The assessment of the timing of centrally imposed restrictive measures is not the subject of this analysis, but it is important to see that social preconceptions about the pandemic situation, individual financial considerations, the characteristics of virus transmission and anomalies around social perceptions of the virus make it very difficult to achieve adequate compliance with pandemic measures in an atomised, distrustful society.

Based on the *Institute for Health Metrics and Evaluation* (*IHME*) mobile phone mobility data,[18] it is clear that Hungary has the highest mobility data among EU member states in terms of social distancing during critical periods of the pandemic period, which may be closely related to the compliance propensity of the Hungarian population (See Figure 1). Of course, this does not in itself imply a deterministic mass violation of the rules, but it does raise the possibility of the violation of the spirit of the rules by many, which may be due to an excessive attachment to the protection of our way of being, which is linked to the existing suspicion and resistance to privacy reforms in Hungarian society. Behind all this, there is also the traditionally ambivalent relationship of trust between Hungarians and the state.

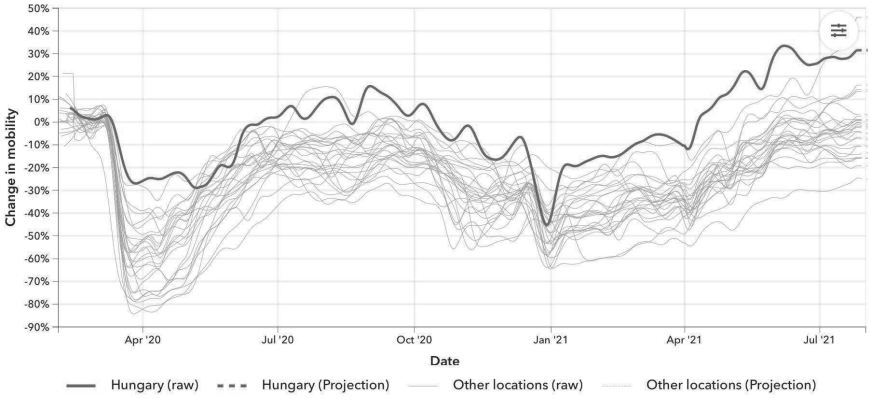

Figure 1: Social Distancing in Hungary and Other EU Member States, IHME, 2021

- **Control of the infectious source**

An important tool in pandemic management is control of the infectious source, which can be achieved through extensive testing, comprehensive follow-up, contact tracing and the isolation of confirmed infected persons from those likely to be

[18] Mobility refers to the personal movement of the population and is based on anonymous mobile phone data provided by a number of technology companies to combat COVID-19. For details see IHME, (2021) Social distancing. Available at: https://www.healthdata.org/covid/faqs#social%20distancing, retrieved on 12 August 2021.

infected. Experts note that time is of the essence in this approach to pandemic management. If, however

> it is too late to isolate patients and quarantine symptomatic infected individuals, the epidemiological impact will be minimal, while the burden on society and the economy will increase as people are unnecessarily withdrawn from work and education. (Oroszi et al., 2021, p. 43)

The degree of responsibility towards the community, i.e. whether someone with mild symptoms risks infecting others, trust in the testing procedure, and whether, in the spirit of social cooperation, one agrees to participate in testing and to be isolated from the community (quarantined) as an infected person. A review of previous attitudes suggests that the general character of the Hungarian population in these areas does not facilitate the effective use of source control, an important tool in pandemic management.

- **Reducing the proportion of the population susceptible to infection**

Many of us have lost our immunity not only to the virus, but also to rumours about the virus. In 2018, before the outbreak of the pandemic, Political Capital showed that there was a significant minority in Hungary who believed that vaccines do more harm than good (Political Capital, 2018). Unfortunately, subsequent surveys on vaccine willingness have also shown that a sizeable proportion of the population does not want to be vaccinated voluntarily (Ipsos, 2021).

As discussed earlier, many people in Hungary tend to create their interpretation of the world and their associated beliefs based on a peculiarly suspicious and distrustful attitude, mostly relying on personal or narrow experiences. Although such attitudes have often been key to their survival throughout history, these characteristics of the Hungarian population now present decision-makers with a particular challenge in terms of their choice of pandemic management strategy and communication, as they address crises in the health and economic sectors. If trust in authority is low, this will also affect the willingness of the population to comply (Krekó, 2021, 259). This seems to be supported by research conducted in Hungary by the Department of Social Psychology at ELTE's Faculty of Pedagogy and Psychology, which surveyed more than 5,000 people (ELTE, 2020).

If we look at the social perception of the pandemic from the perspective of fears and expectations, an interesting element is the attitude of Hungarians towards the health care system, as the main collective concern is the fear of that it will collapse. However, this creates a paradoxical situation for pandemic management. It is not entirely clear whether a transparent view of health capacities in the context of the pandemic situation is favourable or unfavourable. A strong and transparent presentation of the capacity limitations of the system could build on the fears of Hungarian society and hence increase compliance with pandemic measures, or it

could reduce public confidence in the health care system, which may lead to delays by those who need medical help, thereby increasing the number of fatalities.

6. Conclusion

Policymakers are seeking to manage the pandemic while balancing the dichotomy of health and economic considerations. The two main considerations are:

1) to protect human lives and keep the health care system functioning, and
2) to maintain the viability of the economy and to ensure the livelihood of the population.

The smooth functioning of the whole of social cooperation is crucial for crisis management. This also means that a pandemic requires social change, in which the organisers and shapers of action as well as stakeholders overlap in many ways.

Compliance with epidemiological measures depends on a community's political culture, attitudes and level of knowledge about the virus. Health risks increased due the experience of the first wave of the pandemic, after which the risk of viral infection appeared to be less significant than the economic and psychological consequences of the restrictions.

Unfortunately, the emergence of the virus in Hungary, and especially its rapid spread from autumn 2020 to spring 2021, has led to a spike in mortality rates among the elderly. The pandemic has demonstrated that, more than any other crisis management, it is important that people recognise the need for social change, that they do not impede this process and accept the need for action, i.e. a change in norms and rules during an emergency.

However, in the case of crisis management, it is essential to clarify a few questions: What do we mean by effective and successful pandemic management? What steps need to be taken to achieve this? All of these questions have their roots in unique national characteristics, which vary from one political culture to another.

In summary, the effectiveness of pandemic management from a public health and economic perspective depends crucially on the behavioural responses of citizens. Any crisis management strategy that ignores or disregards the special character of a given political community may – regardless of how ambitious it is – be thwarted in its implementation due to the passive or negative reactions or opposition from citizens. This is no different in Hungary.

The main risk factor for the SARS-CoV-2 pandemic is the emergence of new virus variants. This gives rise to many questions: What might be the epidemiological characteristics of the new virus variants? What level of protection will be required, how long-lasting and how much protection will be provided by existing and future vaccines? And finally, how will global vaccination coverage evolve and will it be sufficient to meet future needs?

There is also a message from the highest political and scientific circles that we are living in an era of pandemics due to emerging infectious diseases. This should make us all proactive. To do so, it is essential to take into account the habits of society, the national character analyses, so that we know, if necessary, which basic thinking and behavioural characteristics should be preserved in these changing times and which ones should change from one locality to another, including Hungary.

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The double-edged sword of trust in the pandemic

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1. Introduction

The COVID-19 epidemic has brought unprecedented challenges both for individuals and governments. Although several small-scale epidemics (e.g. SARS, MERS, H1N1) have hit different parts of the world in recent decades, COVID-19 has presented humanity a challenge of global dimensions which is unparalleled in living memory. The massive disruption of normal life, the introduction of social distancing measures, the dramatic reduction of personal interactions and the hibernation of economic life were the collective experience of hundreds of millions of people around the world. Citizens and governments found themselves caught up in an unprecedented social experiment, with the apparent result that COVID-19 fundamentally changed many aspects of the way societies function, with profound short-term and very likely long-term effects.

Inequalities increased at all levels: some countries appeared more exposed than others, simply because of their geographical proximity, or economic and social connections to the first epicentres of the virus or because of the state of their health care systems (Evenhuis et al., 2021) Later, unequal access to vaccines and various government regulations further increased the inequalities between and within countries.

From the moment of the pandemic's outbreak, members of scientific communities all around the world found themselves in a difficult situation: there was a sudden need for new information and data, and also an insatiable hunger for guidance in understanding the situation.

Features of national institutional frameworks, the speed and strategic capabilities of political decision-making in governments on the one hand, and the prevailing norms and attitudes of citizens on the other hand have suddenly become life-and-death issues. Without doubt, government policies, the reliability of their institutions, people's overall level of trust and willingness to comply with new regulations have all influenced how the epidemic spread as well as its immediate impact on health and the economy (Clark, 2020; McFadden, 2020; Sibley, 2020).

Simply put, trust in a society can be interpreted on several levels. There is an abstract level, derived from the basic values and norms of a particular society, which refers to the level of generalised trust between people, while we can also speak of trust with regards to the functioning of various institutions. From the beginning of the pandemic, many saw the different manifestations of these two types of trust as a salient factor that could provide clues in understanding (1) to what extent people are willing to comply with restrictive measures; (2) the extent to which citizens accept governments' economic measures; (3) how people will change their everyday social interactions; and (4) the extent to which people tend to believe verified scientific facts, as opposed to misconceptions based on conspiracy theories, which directly affect their vaccine willingness. Another important question – albeit one which was probably too early to judge in 2020-2021 – was to what extent the severe social and economic shock of the pandemic triggered long-term changes in trust levels.

The preliminary expectation was that greater trust in government and institutions would result in greater compliance with health policies, such as quarantine measures and restrictions on mass gatherings. These assumptions were based on past experiences, as similar trends have been observed in the epidemics of the last two decades such as Ebola in West Africa, H1N1, and bird flu (Devine et al., 2021)

The question of trust was echoed by The Economist magazine as it considered, shortly after the outbreak of the pandemic, whether high or low trust in countries leads to better results ("Do Low-Trust Societies Do Better in a Pandemic?," 2020). By that time, it seemed that countries with high levels of trust had adopted less stringent measures to restrict the movement of citizens, as they were more confident that people would comply voluntarily. Similarly, low trust tended to mean stricter government measures. However, it soon became clear that the role of trust was much more complex.

Mid-2022 was a better time to draw conclusions on the role of trust compared to one or two years ago when the word was still reeling from the initial shock of the pandemic. It is therefore with the benefit of hindsight that this paper aims to contribute to this ongoing debate by providing a macro-level perspective on the link between various levels of trust and the progress of the pandemic in 27 European countries, and also aims to demonstrate how general levels of trust have changed after two years the pandemic. It poses the following four research questions:

1. Is there an association between basic indicators of the pandemic (infections, mortality, vaccine uptake) and trust measures at country level?
2. How did trust at country-level change during the pandemic? Can we state that in general, COVID-19 had an impact on trust in Europe?
3. Is there a correlation between the stringency of government measures and country-specific trust-levels in different phases of the pandemic?
4. Does individual trust level predict government performance ratings and vaccination willingness across Europe?

As will be shown in more detail in the next section, empirical research on the role of trust is diverse and sometimes contradictory. The reasons for this are at least twofold. First, in the early stages of the epidemic, there were many (often even preliminary) research results that used small or convenience samples to examine the role of trust. It is also evident that different phases of the epidemic have revealed very different social responses. Thus, the early (Spring/Summer 2020) phase of the epidemic cannot be compared with its "mature" period (i.e. Autumn 2020, Spring 2021) and then its slow decline (starting from the autumn of 2021) as vaccine uptake reached the critical threshold in most countries.

Second, it is crucial to know at what level we can measure trust and, accordingly, whether the analysis can identify individual-level associations or if it is limited to the use of aggregate data which certainly cannot cope with individual variations in trust.

One of the main reasons for the lack of in-depth and internationally comparable analyses is that, apart from a few surveys (e.g. Eurobarometer), there are currently still only very few databases available that contain data on (1) people's level of trust at the individual level, (2) what happened to them during a COVID-19 (infection, vaccine uptake, change in mobility behaviour, public health compliance) and (3) opinions and attitudes towards the pandemic. (e.g. perceptions of restrictive measures, attitudes towards the effectiveness of vaccines, satisfaction with government measures, etc.).

This paper is structured follows: the next section briefly discusses the role of trust from the perspective of the pandemic. After that I will show the data and methods used for the analysis, followed by the results for the four questions. The paper ends with a few conclusions.

2. The role of trust from the perspective of the pandemic

On the everyday importance of trust

One of the most important factors related to social capital, which has a fundamental impact on the social environment and integration, is the trust between people (interpersonal) and between different institutions (institutional).

Interpersonal trust, i.e. generalised trust between people, is, to put it in simple terms, one of the most important "lubricants" of interpersonal relations and, at the social level, one of the most important factors supporting social integration. Trust in interpersonal relationships reduces uncertainty and risk, which may increase effective social cooperation. In other words, when trust is present in a relationship, there is no need to "keep tabs" on each other. Trust therefore implies an acceptance of the functioning of a given social and economic system, which can also positively influence the social behaviour of individuals through specific social psychological mechanisms (Festinger, 1962).

In contrast, in distrustful relationships, suspicion becomes the dominant attitude and people develop defence mechanisms based on pessimism to avoid further risks and reduce their vulnerability. However, this obviously limits opportunities, inhibits cooperation at both individual and societal levels, minimises risk-taking, and results in people becoming uncertain about the meaning and outcomes of their actions. Furthermore, communication channels for the spread of social cooperation patterns are blocked.

In sociological terms, the functions of trust become more meaningful at the level of the community. In a high-trust community, there are more opportunities for cooperation and communication, the network is denser, and creative ideas flow more freely. But trust also contributes to greater tolerance, acceptance of differences and the peaceful coexistence of people with diverse cultural backgrounds and political beliefs. In the latter context, it is important for the community to recognise that difference is not a threat to its existence. Trust can therefore strengthen one's sense of belonging to a community, but it does not imply the exclusion of other groups or the creation of "walls" of thought between groups.

Lack of trust, however, leads to the erosion of social capital, resulting in isolation, atomisation, the disintegration (or even non-formation) of organisations, the "clogging up" of communication channels, and, overall, the decline of human relations, the proliferation of harmful stereotypes and rumours, and the reinforcement of prejudice and xenophobia (Allport, 1954). Trust can also have important institutional functions: if members of a community trust each other, the transaction costs incurred can be reduced. But where there is no trust, contractual relations tend to be over-regulated (Knack & Keefer, 1997).

In his monographic overview of trust, Piotr Sztompka identifies four macro-societal conditions that can contribute to the development of a culture of trust[1] (Sztompka, 1999, pp. 121–125). The first of these are the characteristics of the normative cohesive forces of society (law, morality and customs). If these forces are functioning and predictable, they form an underlying framework of social coexistence based on fairness, honesty and reciprocity, thus creating a sense of security and predictability at the society level.

The second structural condition relates to the stability and a degree of permanence of the existing social order. The organisations, institutions and conventions that represent stability and permanence become points of reference that people can rely on for security, support and a sense of comfort. Indirectly, they strengthen a culture of trust. Of course, it is not always the case that social change erodes trust, especially if the pace of change is gradual and follows a definable course. However, rapid and radical change always tends to erode trust, and it always takes longer for trust levels to normalise again.

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[1] Sztompka also mentions a fifth factor (familiarity and familiarity with the environment around people), but this is less relevant to the impact of trust on the epidemic, and will thus not be discussed in detail.

The third factor relates to the transparency of the way institutions are organised. If the public is sufficiently informed about the rules governing their operation and these rules are held as common norms, the level of certainty and predictability that fosters a culture of trust in people can be increased. However, if the prevailing social belief is secrecy and a lack of transparency, the resulting rumours, gossip and conspiracy theories will lead to a loss of social trust.

Finally, the fourth element – the responsibility or accountability of people and institutions, or the opposite: arbitrariness or irresponsibility – is the most important pillar of institutional trust in a society and therefore of effective social (and economic) innovation. When roles and responsibilities, oversight and accountability frameworks are well defined and function well, they can create greater trust among community members, both in the functioning of institutional mechanisms and in others. However, where these conditions are not in place, people's natural reaction is to become suspicious, develop individual survival strategies and reinforce a culture of breaking the law and norms.

To simplify somewhat, the above structural circumstances have a fundamental impact on the extent to which people will be willing to "bet on trust", i.e. to believe that trust-based action will pay off for them. Members of a community are, of course, not all the same in terms of this willingness. Sztompka (2003:125) identifies two basic ideal or typical personalities whose characteristics can be defined in terms of the following pairs of contrasts: having a future orientation or tradition-following, a high or low aspirational level, an orientation towards success or adaptation, a propensity to innovate (i.e. innovativeness) or conformity. These personality types do not, of course, exist in their pure form, but their proliferation in a community can be a self-generating process. If one value orientation becomes stronger as a consequence of a changing social climate, it does not necessarily require direct, personal experience to develop into a pattern that will be followed by members of the community. The dominance of social groups characterised by one or the other personality orientations may lead to a reinforcement of a social culture of trust or suspicion (mistrust), which may have a direct impact on the spread of the epidemic and its management.

The role of trust in the pandemic

Since the start of the pandemic, several studies have been published from that sought to understand the role of trust in the development of infections, in government actions and in people's compliance with these actions. These studies were mostly limited to smaller (often non-representative) sample sizes and/or only relied on aggregate macro-level statistics. One of their most important conclusions is that there are no obvious associations. Depending on the time period of the pandemic, the countries and social groups involved, and the way in which the concept of trust has been conceptualised and operationalised, a wide range of results have emerged.

Bargain and Aminjonov (2020) showed that people living in European regions with high levels of trust had a greater reduction in their level of daily mobility than those living in regions with lower levels of trust. Brück et al. (2020) found a negative correlation between having been in contact with someone who might be ill and trust in people or institutions. That is, as the infection spread, trust indicators showed a decline. Brodeur and colleagues (2021) found that counties in the United States with relatively higher trust in others significantly reduced their mobility once closure mandates were introduced.

Barrios et al. (2021) and Durante et al. (2021) provided evidence that regions with stronger civic cultures adopted more voluntary social distancing. Aksoy, Ganslmeier and Poutvaara (2020) found that high levels of public awareness (as measured by the proportion of Google searches containing COVID-19-related cases and deaths) are significantly correlated with the timing of implementation of social distancing measures. This correlation is most pronounced for countries with better institutional qualities. Finally, Bartscher et al. (2021) showed that higher levels of social capital (as expressed through participation rates in parliamentary elections) lead to a lower accumulation of cases per capita between mid-March and mid-May 2020 in European countries.

It is also reasonable to assume that the relationship between trust (whether interpersonal or institutional) and the social changes brought about by government action is not linear. A sufficient level of trust can help governments make the right decisions and ensure that people abide by those decisions. However, excessive, unconditional trust can also lead citizens to naively believe that the government has everything under control and can effectively deal with challenges, even when this is not the case.

Research has also looked at the impact of the pandemic on trust. Aksoy, Eichengreen and Saka (2020) found that the degree of exposure individuals to pandemic (especially between the ages of 18 and 25) had a negative impact on their trust in political institutions. These people also had less trust in their health care system during the pandemic. In an experimental survey (one of the few internationally comparative studies), Daniele et al. (2020) showed that among German, Italian, Dutch and Spanish respondents, COVID-19 led to a deterioration in interpersonal and institutional trust. They concluded that "[d]isappointment and disillusion are to some extent unavoidable and undermine trust."

The challenges of measuring trust

This paper does not intend to go deep into methodological problems of measuring trust. However, it is worth noting an important concern that relates to the widely used method of empirical research on trust, in connection with the standard questions that have long been used to measure the level of generalised trust in surveys. One of the most commonly used questions is: "Generally speaking, would you say that most people can be trusted, or that you can't be too careful in dealing with people?"

Its use dates back several decades, with the US General Social Survey (GSS) already including it in its questionnaire from the late 1950s. It was then adopted by the World Values Survey (WVS) in 1981, and later by the ESS from 2000.

The clarity and therefore reliability of this simple question has generated a long-standing debate, one not covered here in detail; however, several authors have suggested – with only a slight exaggeration – that every single word in this sentence is problematic. Just to name a few: What does "generally" mean? What situation is the question focusing on? Should I trust somebody when interacting with my family members or taking care of my investments? Would I ask him/her to post a letter for me?

The important point is that each situation implies a different set of expectations and therefore trust. Another issue is the definition of "most people" in the wording, since presumably that would mean different things (which we cannot know) to different people. Finally, there is the issue of what people mean by whether someone can be "trusted" (Nannestad, 2008). Even people within the same linguistic culture may interpret this question, and there is further potential for bias when it is translated (Messing et al., 2019).

Moreover, it is clear that this question (and other similar questions) primarily predicts attitudes towards trust, rather than trust-based behaviour itself (Glaeser et al., 2000). We are not talking about the same trust if it refers to "all people" in general, or to a narrower group of people known personally by the respondent (Sturgis & Smith, 2010). We can safely assume that there is no such thing as trusting everyone. We derive our expectations about the trustworthiness of others largely from our experiences and information derived from our own moral communities, and from individuals outside these circles; all of which further complicates the comparability of results.

In the world of survey research, one important rule is that measuring a complex concept, such as social attitudes and behaviours using a single question is a risky exercise, as people tend to answer the same question less consistently over time – even if they otherwise have the same opinion about the question. Obviously, adhering to the principle of "measure with more questions" is not possible in most cases, since usually there is a lack of both time and funding. As a result, large comparative surveys contain different numbers of questions to measure (generalised) trust. For example, the World Values Survey asks only one question, while the European Social Survey uses three different questions measuring the same phenomenon, as we will see below in the "Defining country-specific trust indicators" section.

Another important – and, of course, controversial – issue is the scale on which responses are measured in the different surveys. The most commonly used solutions are simple yes/no questions (General Social Survey – GSS); a choice between "yes", "to some extent", and "no" (World Values Survey – WVS); or multi-degree scales (e.g. 0-10 for the European Social Survey – ESS). Secondary analyses of the data or combined analyses with other data show that the latter provide better quality data (Lundmark et al., 2016). Various validity analyses have shown that the volatility of the confidence index calculated from the above question in different ways is not

significant and that its magnitude strongly correlates with other important social variables.

Despite all these doubts, this measure has stood the test of time overall and – especially considering the lack of other alternative data sources that can be considered representative – is indispensable for comparing different societies and social groups.

3. Data and methods

In this analysis, several data sources are used:

- Infection and mortality statistics for COVID-19 were downloaded from the Our World in Data thematic database hosted by Oxford University (Hannah Ritchie & Roser, 2020).
- For information stringency measures the Oxford COVID-19 Government Response Tracker database was used (Hale et al., 2021).
- Data on country level trust measures was calculated from the 9th round of the European Social Survey (ESS). Fieldwork for this survey took place in 27 European countries in late 2018 and early 2019.
- A smaller sub-sample of 10 countries from the 10th round of the ESS that was conducted during the pandemic (in 2021), therefore it can be used to track the developments of the pandemic at individual level.

For the country-level analysis, a dataset for 27 countries was created that included all aggregate measures. Associations were measured by Bayesian correlation tests, while individual level data from ESS Round 10 was analysed by multivariate logistic regression.

Three distinct phases of the pandemic

The data on COVID-19 covers the period from January 2020 to February 2022. In order to capture the characteristics of the pandemic during its various waves, the two-year period was divided into three phases. The boundaries of each period were defined to reflect the typical stages of the epidemic, and were set by the decline in the number of infected, where the figures for infection have reached their local minimums and they have not started to grow again. As these periods reflect changes in the aggregate infection and mortality figures for the 27 countries, they may have started and ended at different times in different countries. Nevertheless, these phases provide a suitable framework for the analysis and can capture the time-based characteristics of the pandemic (Figure 1).

The first phase covers the period from January 2020 to July 2020, which is essentially the first wave of the epidemic. It is followed by the second phase, from August 2020 to mid-June 2021, which covers the second and third waves of the epidemic in most countries, with mass vaccinations starting in its second half, but

during this period most people were not yet protected against the virus. Finally, the third phase begins in mid-June 2021 and lasts until the end of February 2022; the bulk of this period is taken up by the upsurge of the Omicron variant.

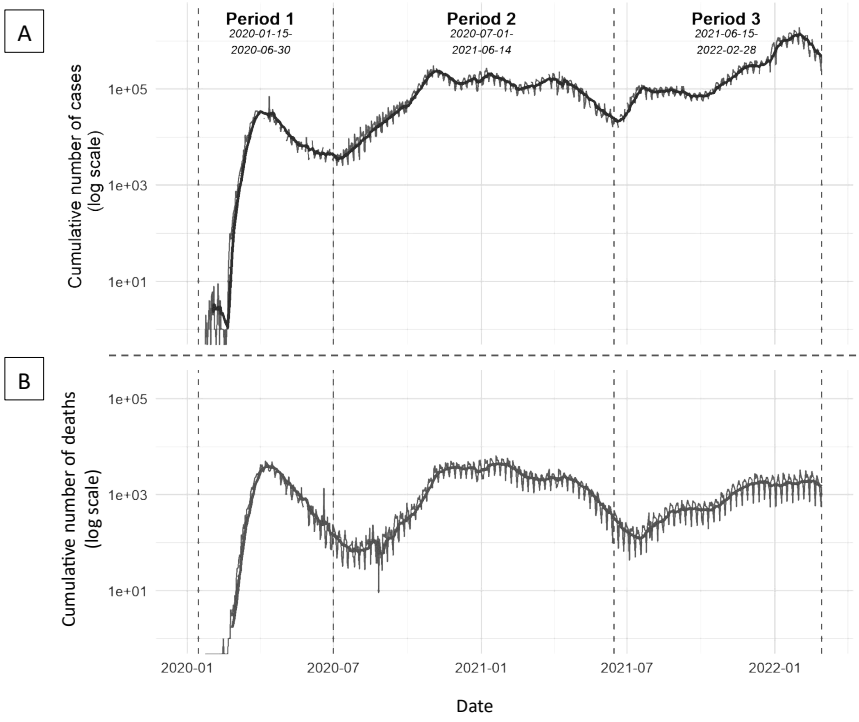

Figure 1. Total daily cases in 27 European countries in the three periods covered by the analysis

Defining country-specific trust indicators

The data of the ESS contains three separate items measuring perceptions of other people's behaviour in interpersonal relationships on a scale of 0 to 10, with higher scores indicating higher levels of trust.[2] Using simple averages, the Interpersonal Trust Index was calculated from the three items.[3] This measure is widely used in the

[2] The three questions that comprise the Interpersonal Trust Index are: 1) "Generally speaking, would you say that most people can be trusted, or that you can't be too careful in dealing with people?", 2) "Do you think that most people would try to take advantage of you if they got the chance, or would they try to be fair?" and 3) "Would you say that most of the time people try to be helpful or that they are mostly looking out for themselves?" Responses could range between 0 and 10, where 0 indicated extremely low levels of trust and 10 extremely high levels of trust.

[3] The Cronbach's alpha for the 27 countries in the ESS data was 0.785.

literature (Borgonovi, 2012; Caferra et al., 2021; Lolle & Torpe, 2011)A similar method was applied to calculate the Institutional Trust Index from five factors measuring trust in various institutions (a country's parliament, legal system, police, politicians and political parties).[4]

It should be noted, however, that simple averages for both types of trust tend to mask the different patterns of distribution that exist at country level. Figure 2 shows some typical examples of the distributions that the index for interpersonal (A) and institutional (B) trust can take in different countries. For interpersonal trust, Belgium is the only country where the shape of the distribution is close to the symmetrical bell curve of the normal distribution. In all other countries there are visible deviations. It is interesting to observe that there is a clear difference in how many respondents are willing to mark their choice at the two ends of the scale.

For example, in Bulgaria (for both types of trust) and in Croatia and Slovenia (for institutional trust) a significant part of the population was extremely distrustful during the 9th round of ESS data collection. In fact, while the most frequent mean values (mode) for personal trust ranged between 5 and 7, the mode for institutional trust was 0 (!) in Bulgaria, Croatia and Slovakia. A mean response of 0 for the trust index could only be obtained if the answers to each question were all 0, i.e. indicating complete distrust. In Denmark, on the other hand, almost all people have at least a medium level of interpersonal trust.

[4] The Cronbach's alpha for the composite index was 0.895, indicating that item-level values are closely related and that the index tends to measure the underlying concept of general trust in institutions.

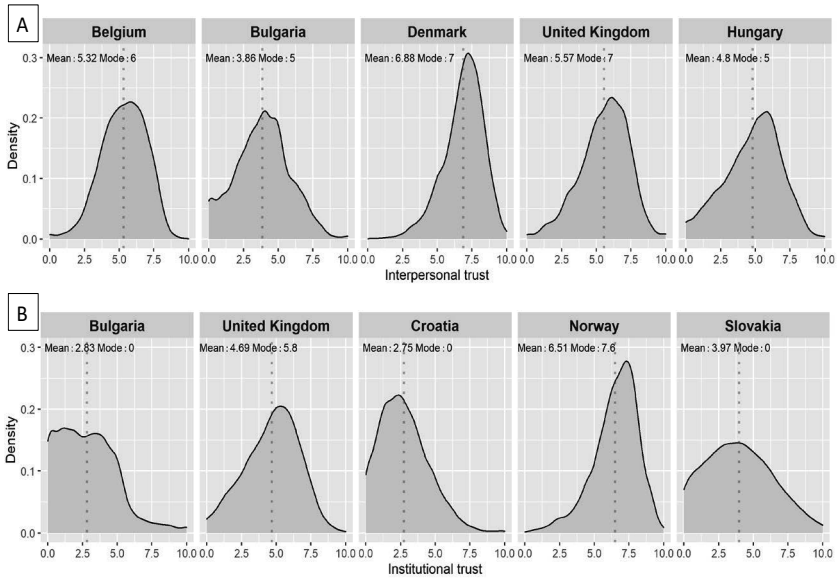

Figure 2. Examples of the distribution of Interpersonal (A) and Institutional (B) Trust Indexes (ESS R9, 2018)

Why it this important? It has been suggested that so many people moving towards an extreme lack of trust is not fully captured by a simple mean value. Therefore, we defined an alternative measurement for trust that can better reproduce the asymmetry found in the data. We assumed that responses in the middle range of the scale (scores 4-5-6), and the average of these scores would correspond to an intermediate level of trust. In general, we expected that a significant proportion of respondents would have average values in this range. The level of trust in a country is thus better expressed by the proportion of people who trust and those who do not. In practice, values below 1 indicate that there are more people how are more distrustful than trustful, while values above 1 mean the opposite (see Figure 3 for a visual representation).

4. Results

Infections, mortality and vaccine uptake

To test the impact of trust on the number of infections, deaths and vaccinations (weighted by population) in each country for the three different phases of the pandemic, a simple Bayesian correlation test was performed (due to the small sample size). The results show that the two types of trust show similar patterns, therefore we could not identify a separate interpersonal vs. institutional trust effect. Also, the size of the population infected with COVID-19 was not affected by either type of trust.

However, this was not the case for the number of people who died after they were infected by the virus. Except for the first phase of the pandemic (from January until the end of June in 2020) COVID-19 mortality by 1 million inhabitants was negatively correlated with the level of both interpersonal and institutional trust. This implies that countries with generally lower levels of trust performed worse, while countries with higher levels of trust performed better. This association was even stronger in the 3rd phase (between June 2021 and February 2022) compared to the 2nd (between July 2020 and June 2021).

Mass vaccinations started in early 2021 across European countries, and as of June 2022, three-quarters (75.3%) of the total population in EU/EEA countries had received at least one dose vaccine.[5] The results show that country-level vaccine uptake and trust levels are positively correlated, however this association is weak, and it is affected by a few outlier countries. For example, institutional trust is relatively low in Portugal, but as of February 2022 this country was the top-performer in terms of vaccine uptake. At the other extreme, Bulgaria – traditionally a country with very low level of institutional trust – was inevitably the least vaccinated country in Europe.[6]

Parameter 1	Parameter 2	rho	% in ROPE	BF	
Interpersonal trust	Cases total	0.137	79%	0.6	
Interpersonal trust	Cases P1	0.314	97%	2.0	
Interpersonal trust	Cases P2	-0.386	98%	5.5	
Interpersonal trust	Cases P3	0.310	96%	2.1	
Interpersonal trust	**Deaths total**	**-0.646**	**100%**	**1016.8**	***
Interpersonal trust	Deaths P1	0.102	72%	0.5	
Interpersonal trust	**Deaths P2**	**-0.608**	**100%**	**336.6**	***
Interpersonal trust	**Deaths P3**	**-0.576**	**100%**	**153.8**	***
Interpersonal trust	**Vaccine uptake**	**0.527**	**100%**	**55.8**	***
Institutional trust	Cases total	0.095	71%	0.5	
Institutional trust	Cases P1	0.242	91%	1.1	
Institutional trust	Cases P2	-0.308	97%	1.9	
Institutional trust	Cases P3	0.224	89%	0.9	
Institutional trust	**Deaths total**	**-0.620**	**100%**	**476.7**	***
Institutional trust	Deaths P1	0.119	75%	0.5	
Institutional trust	**Deaths P2**	**-0.518**	**99%**	**54.6**	***
Institutional trust	**Deaths P3**	**-0.643**	**100%**	**910.7**	***
Institutional trust	**Vaccine uptake**	**0.499**	**100%**	**31.1**	***

Table 1. Correlation matrix (Bayesian method)

[5] https://vaccinetracker.ecdc.europa.eu/public/extensions/covid-19/vaccine-tracker.html#uptake-tab

[6] According to ESS Round 10 data, 62% of the population was not vaccinated or not planning to receive the vaccine.

Changes in the level of trust

On average, 41.4% of all respondents in the 9th round of ESS fell into the middle category for interpersonal trust, while the same figure for institutional trust was 37.2%. The differences at country level are shown in Part B of Figure 2. For interpersonal trust, Denmark, Finland, Iceland, Norway, Sweden, France and Slovakia have a significantly lower proportion of respondents with medium trust levels. Apart from the latter two, the other countries all belong to the historically high-trusting segments of Europe. France is in the mid-range of countries, while Slovakia has a relatively low level of interpersonal trust. With regards to institutional trust, the outlier countries are Denmark, Finland and Norway (from the high trust countries), as well as Bulgaria and Croatia (from the low trust countries).

Part A of Figure 2 shows distributions outside the range in intermediate trust in the form of a ratio comparing the proportion of people with high (above 6 points on average) and low (below 4 points on average) of both interpersonal and institutional trust. Switzerland, Sweden, Iceland, the Netherlands, Norway, Finland and Denmark belong to the high trust group of countries. Czechia, France, Hungary, Ireland, Latvia, Spain and the United Kingdom are medium trust countries, where the levels of interpersonal and institutional trust do not move together. The third group of countries is characterised by low levels of trust: Bulgaria, Croatia, Cyprus, Italy, Latvia, Poland, Portugal, Slovakia and Slovenia.

On Figure 3, the black dots represent data from 2018 and 2021 data is indicated by the red dots (for a smaller number of countries). The distance between the two colours of dots and the statistical analysis in the table inside the figure suggest that for several countries, trust levels do not differ significantly from values measured before the outbreak of the pandemic. Moreover, in a number of countries there is a slight increase in the level of institutional trust (four countries) and interpersonal trust (two countries). This implies that trust levels in several countries of Europe have not deteriorated as a consequence of COVID-19.[7]

[7] Data for more countries will be available in late 2022 and early 2023 to fill in the gaps in our knowledge on trust patterns across Europe.

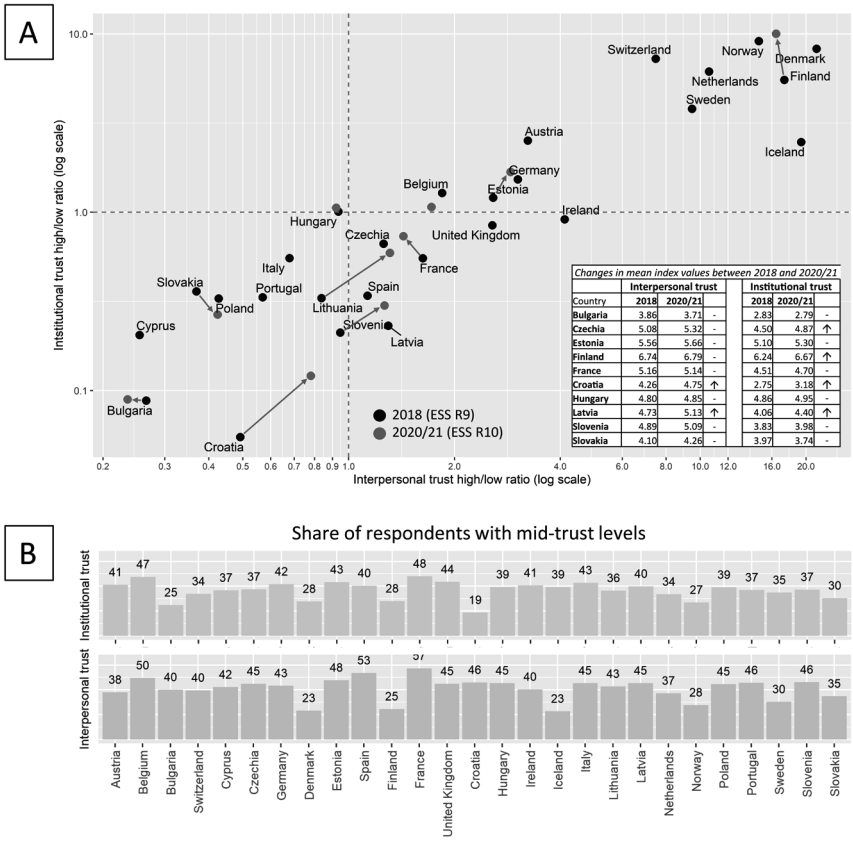

Figure 3. Changes in interpersonal and institutional trust between 2018 and 2020/21

Stringency measures and trust

The third question of this paper pertains to whether the general country-level trust was associated with the stringency of government measures during the pandemic – as described in the Introduction. To answer this, countries were grouped into three categories based on their levels of trust. In high-trust countries (AT, BE, DK, EE, FI, DE, IS, NL, NO, SE, CH) the levels of both interpersonal and institutional trust are high. In countries with mixed trust (CZ, FR, HU, IE, LV, ES, GB) interpersonal trust is average or above average, but institutional trust is lower. In countries with low trust (BG, HR, CY, IT, LT, PL, PT, SK, SI) the level of both types of trust is low.

Figure 4 shows the average Stringency Index for the three groups of countries over time, indicating that the average stringency of measures in high-trust countries was generally the same or lower (but never higher) than in the other two groups of

countries. However, due to country-specific differences and multiple aggregations in the data, this result is not robust and would require more in-depth analysis. The Bayesian correlation test also showed that the mean of the stringency index differed significantly across the three country groups. However, on closer examination of the individual countries, this appears to have been the case only in the first phase of the pandemic, when the level of trust correlated with the highest value of the Stringency Index in 27 countries.

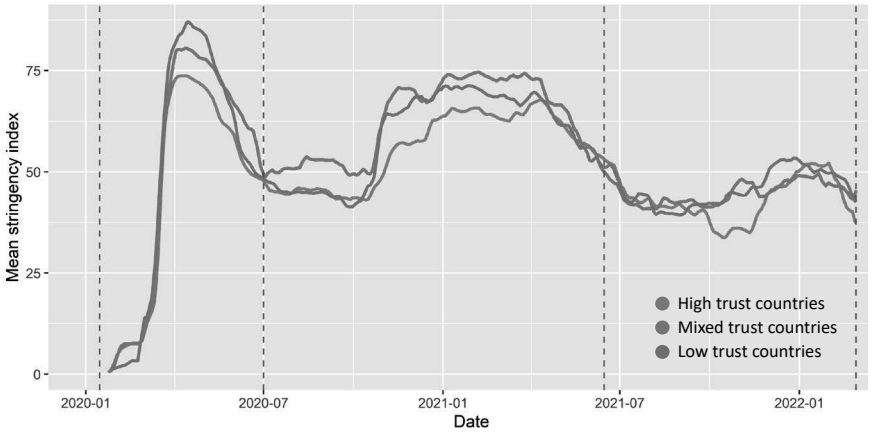

Figure 4. Mean of Stringency Index during the pandemic, grouped by three trust categories of countries

Vaccine hesitancy and trust at individual level

The 10th wave of the European Social Survey was fielded during the pandemic in most European countries. At the time of writing this paper, data was only available for 10 countries.[8] Although these countries provide only an incomplete overview of the European landscape, the availability of individual-level data enables us to begin understanding the micro-reality of trust and the pandemic from a cross-national perspective. At the individual level, the same trust measures (interpersonal and institutional trust indexes) were calculated, and their association was tested with vaccine uptake. Respondents were coded into two groups: (0) does not want to be vaccinated, and (1) is already vaccinated or will get the vaccine.

Results show that in all countries, people who were vaccine hesitant had lower levels of institutional trust. In statistical terms, the analysis of variance (ANOVA) showed that the two groups differ in accordance with their trust levels. However,

[8] Bulgaria, Czechia, Estonia, Finland, France, Croatia, Hungary, Lithuania, Slovenia and Slovakia.

these differences are rather small, and there are numerous other factors (confounding variables) that affect this relationship.

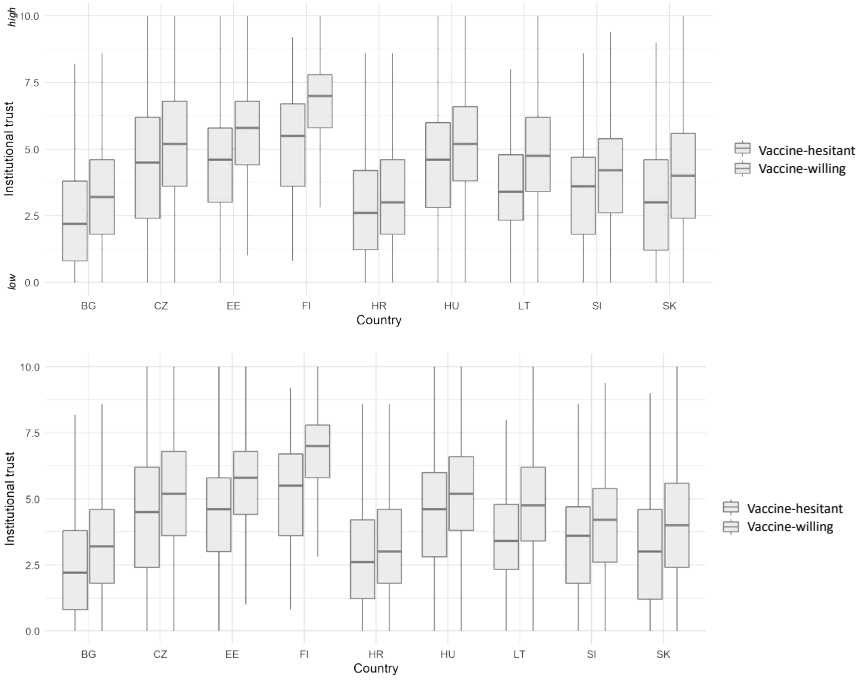

Figure 5. Institutional trust among "vaccine-hesitant" and "vaccine-willing" people in 10 countries (ESS Round 10)

5. Conclusions

In this study, I have examined the role of trust in the dynamics of the pandemic. Based on the country-level statistical and survey data, the following observations can be made.

At the general level, interpersonal and institutional trust are closely related to each other, and both are associated with certain basic indicators of the pandemic. It seems that the sheer number of infections did not correlate with country-level trust measurements, although mortality and vaccine uptake figures did. I suggest that both types of trust behaved as proxies for describing the broader social and economic conditions in individual countries. Underperforming health systems and malfunctioning states lead to low levels of trust. Health sectors across Europe were under constant pressure during the pandemic, however their pre-COVID preparedness largely impacted their performance during the worst periods.

Many believed that the pandemic would have a long-lasting impact on people's level of trust. The direction of this change was not straightforward: both increases and decreases were foreseen. However, early data from the European Social Survey including 10 countries suggests that trust levels have remained relatively stable, and that so far no tectonic changes have been detected on Europe's "trust map".

Trust levels seem to have some connection with the stringency of government measures, but this relationship is weak and does not follow clear patterns. In general, low and mixed trust countries had the most stringent policies, while those in high trust countries were less stringent – especially in most of the first and second phases of the pandemic. However, this association is much more complex, and it would be a mistake to settle for a simple explanation to the connection between trust levels and government measures.

A limited analysis of individual level data confirmed that the level of trust is likely to be good candidate for understanding the complex phenomenon of individual strategies and attitudes in coping with the pandemic. Moreover, a simple one-dimensional analysis indicated a statistically significant relationship between institutional trust and vaccine hesitancy. However, more research (with data offering larger geographical coverage) is needed to verify and fine-tune these findings.

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Vaccine Hesitancy and Trust among Minority Groups[1]

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Institutional legacies and vaccination

Institutional legacies exert an influence on preferences towards health services, and especially certain checks and procedures that tightly depend on people's trust such as vaccine uptake. Indeed, legacies of trauma and experience of neglect can have long-lasting effects on people's behaviours. For instance, in Costa-Font et al. (2021), we showed that exposure to repressive politico-economic regimes still exerts detrimental effects on people's trust. Part of such effects results from the fact that vaccine uptake requires proactive behaviours of individuals, and more generally, vaccine uptake is a pro-social behaviour.

One of such examples is that of minority groups in the United Kingdom, which varies widely across ethnic groups. Whilst the white British population is more prone to vaccination, some groups like Eastern Europeans, Black Caribbean and Pakistani communities appear to be significantly less prone (Asaria et al, 2022). The government policy response to lower vaccination rates in minority ethnic populations has largely been predicated on a "deficit model", where people from minority ethnic communities are assumed to be culturally and behaviourally deficient as compared to the White British majority. However, it is increasingly more obvious that those disproportionate impacts were in fact due to structural factors in society, whereby certain groups in the population were more exposed to the virus, due to their over-representation in higher risk jobs and the poor living conditions they were likely to endure. However, in addition to those conditions, it is possible to identify other factors that cause some communities to be more vaccine hesitant.

Given this context, we have embarked on a project to investigate the factors that have led to the differences in attitudes towards vaccination across different ethnic groups. We conducted an online survey funded by the LSE Research Support Fund in September 2021 asking about attitudes towards COVID vaccination. We had 458 respondents to our survey which were split roughly equally across eight key

[1] This research was funded by the LSE Research Support Fund and conducted by Miqdad Asaria (LSE), Joan Costa-Font (LSE) and Faical Akaichi (SRUC)

ethnic groups: African, Bangladeshi, Caribbean, Chinese, Eastern European, Indian, Pakistani, and White British.

Institutional health inequalities

Our provisional estimate suggested negative attitudes to COVID vaccination were highest in people belonging to the Caribbean and Eastern European ethnic groups, among whom almost a third of respondents said they were unlikely or very unlikely to take the vaccine. Significant levels of vaccine hesitancy were also observed in the African and Pakistani ethnic groups, while positive attitudes to vaccination were highest among people from the White British, Chinese, Indian and Bangladeshi ethnic groups. These effects can be traced back to experiences of distrust in the past, especially among the Black Caribbean population, who are more likely to undertake unhealthy behaviours, for instance.

The prevalence of stroke among African Caribbean and South Asian men is 40% to 70% higher than for the general population. Such inequalities refer to differences in prevention, and start early on. Whilst on average 90% of children in the UK have visited a dentist, only 40% of Bangladeshi and 60% of Pakistani children have done so.[2] All ethnic minority patients, in comparison to white British patients, were less likely to give a positive response to the question "Did the doctor treat you with respect and dignity?"[3]

Vaccine Hesitancy during COVID-19

In our preliminary evidence reported in Asaria et al. (2022), we found that the vaccine hesitant population had much lower levels of trust in advice received from doctors, scientists and the National Health Service (NHS). In some communities – most strikingly among people of Caribbean ethnicity, but also amongst those of African, Pakistani and Bangladeshi ethnicities – participants reported experiencing very high levels of chronic discrimination. These respondents were also much more likely to report previous negative experiences in their interactions with the NHS or the government. These experiences likely explain some of their distrust in the official advice regarding the COVID vaccine and their resulting high levels of concern.

Another key pattern observed amongst some of those who were vaccine hesitant was that they felt at lower risk of contracting the virus and suffering serious consequences in the near future. These respondents typically were also much less likely to trust traditional sources of news media. This pattern was particularly prevalent amongst participants of Eastern European ethnicity. Some perceived both

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[2] https://www.bdct.nhs.uk/wp-content/uploads/2016/12/Race.pdf

[3] Report on the self-reported experience of patients from black and minority ethnic groups, June 2009, DH and National Statistics, citing the National Survey of Adult Inpatients 2008/09.

a significantly higher risk of contracting and suffering from severe consequences of COVID while, at the same time they experienced higher levels of discrimination, including an increased likelihood of negative experiences of the health services, and generally a higher than average concern regarding the safety and efficacy of the vaccine. For these people, it seems that the increased level of risk they felt was enough to override their concerns regarding the jab, leaving them largely in favour of vaccination. Such patterns were most often observed among participants of Bangladeshi ethnicity.

Vaccine policy failure

To reduce vaccine hesitancy, there have been a series of interventions designed to incentivise individuals and reduce potential constraints. However, so far, we have found little evidence to support the existing policies that have been used to overcome vaccine hesitancy in minority ethnic communities, such as promoting vaccination through community or religious leaders and providing vaccines at community centres or places of worship. In fact, those who were vaccine hesitant had lower levels of trust in community and religious organisations than the other survey participants and were also less likely to be politically engaged.

Finally, we asked participants how various policies might change their attitudes towards vaccination, ranging from giving people the choice of which of the available vaccines to take, to providing financial incentives and making it a mandatory condition for continued employment. We found that policies such as mandatory vaccination and financial incentives had polarising effects on our vaccine hesitant respondents – some reported that such policies would convince them to take the vaccine, but higher numbers said that such policies would fuel their distrust and further decrease their likelihood of getting vaccinated. The most promising of the policies we asked about was providing a choice regarding which of the available vaccines to take. Given this choice, a fifth of vaccine-hesitant respondents reported they would take it.

Other results

We find no evidence in our research that the lower levels of COVID vaccine uptake in minority ethnic populations are due to deficits in the cultures or behaviours of ethnic minority populations. Instead, our findings suggest that these lower rates of vaccination are due to failures of the government and the media in establishing trust with people from minority ethnic communities. We also find that while distrust lies at the heart of much of the observed vaccine hesitancy, there is significant heterogeneity in the causes of this distrust and how it interacts with attitudes to vaccination, both across and within the different minority ethnic groups.

Conclusion

The reduction of ethnic-specific inequalities in vaccine uptake requires interventions to tackle the institutional origins of such inequalities and more specifically, rebuilding trust among communities and healing previous trauma.

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Why has CEE proved so vulnerable to COVID-19?

Contemplating historically rooted mechanisms resulting in high excess death rates in the region

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A truly puzzling and indeed dramatic finding in the more recent waves of COVID-19 has been that pandemic-related death rates as well as excess death rates are very high in Central and Eastern Europe (hereinafter: CEE, referring to the 11 post-communist member states of the EU) in comparison to the older member states. At the same time, the CEE region trails behind Western and Southern Europe in terms of vaccination rates. However, differences in vaccination rates seem to offer an insufficient explanation for high excess death rates in CEE. Moreover, the differences in vaccination rates themselves call for an explanation as well.

Our ambition here is to propose plausible – though admittedly hypothetical and untested – explanations to the above twin puzzle. In our view, several interrelated factors deserve special attention. The first factor we put forward is path dependence in terms of historically evolved, rival conceptualisations of historical development across different groups of national elites; that is, representative perceptions of the specific historical development paths characterising the CEE region. Secondly, we argue that region-specific historical development paths have resulted in poor institutional qualities across CEE, including the efficiency and social embeddedness of democratic representation. Thirdly, weak institutional and democratic qualities translate into low levels of institutional trust – a key determinant of the efficiency of pandemic responses.

In terms of their historical development paths, observers frequently focus on the shared communist legacy of CEE countries. However, commonalities in societal organisation and state development go back to much earlier times. Both Jenő Szűcs (1983), in his work The Three Historical Regions of Europe, and and George Schöpflin (1990) highlight the ambivalent relationship of the region with the West in general, and with modernisation in particular. Squeezed between the major Western (Prussia and the Hapsburg Empire) and Eastern (Russia and the Ottoman Empire) powers – or, in Huntington's (1996) terms, different civilisations –the region's nations and countries were subjected to a delayed and incomplete

historical development process. This has had a decisive impact on societal organisations, in particular on the process of capitalist modernisation, as well as on nation building and state building, which processes were frequently interrupted by episodes of highly destructive wars, extended periods of foreign occupation and violent social upheavals.

Consequently, whereas elites of these countries "took Western Europe as their criterion of modernity" (Schöpflin 1990, p. 64), that is, as a goal to be reached, local realities inevitably contradicted such Western ideals. This irreconcilable tension and permanent frustration created and maintained a broad divide in practically all societies, cutting across cultural elites, but to some extent also across other layers of societies. The cultural, ideological and also highly political divide between "Westerners" and traditionalists/nationalists thus became a deeply embedded feature of the region. While the former group regards Western modernity as the etalon of societal, economic, political and institutional development, the latter argues that Western models do not fit the national tradition and character and that nations must find their own ways, different from both the Western/capitalist and the Eastern (therefore communist, in much of the 20th century) development paths.

Throughout the 20th century, this socio-political development led to political systems that were neither democratic, nor purely dictatorial. Between 1900 and 1939, practically no incumbent government lost elections in the region. The quality of democratic institutions, compared to standards of the time, was poor as the division of powers was usually formal only, and opposition parties played a marginal role. The well-known, undeniably strongly homogenising effects of the communist era on societal, state and institutional development thus came on the top of much more deeply rooted historical commonalities, the latter ones continuing to exert subtle but powerful influence.

This leads to the second element of our explanation: present-time institutional quality in general, and democratic quality in particular. In light of the V-Dem Institute's comparative database,[1] the democratic quality of CEE countries is clearly below that of the older EU member states. There are only three CEE states, Slovakia, Lithuania and Estonia, in which V-Dem's liberal democracy score is higher than in Greece, the worst-performing old EU member state in this respect.

Democratic quality, in turn, seems to be related to policy performance during COVID-19. According to Bayerlein et al. (2021), governments dominated by populist parties or populist political leaders systematically underperformed non-populist or liberal democratic governments. Bayerlein and his co-authors proposed three explanations for this: (1) populist governments, seeking short-term popularity, are less likely to politically invest in far-reaching policy responses to contain the pandemic; (2) in a populist political environment, citizens are less likely to exert self-

[1] https://www.v-dem.net/vdemds.html

discipline to limit the spread of the disease; and (3) the severity of the pandemic impact is jointly determined by citizen efforts and government policy responses.

But why, one can ask, populist governments – or, in somewhat more general terms, governments less devoted to the principles of liberal democracy – would, as we suggest, deliver more permissive lockdown measures, permit people to have relatively more contacts with each other, and induce less-disciplined behaviour with respect to such measures among the population? Would not the practice of China and other powerful dictatorships that intend to exert full control over their citizenry go against this pattern?

In response to this, we need to emphasise that populist or semi-democratic governments underperform their liberal democratic counterparts in the effectiveness of their pandemic response, but not necessarily that of relatively developed, high-capacity totalitarian regimes, such as China. Although the latter ones might have introduced highly effective containment measures against the pandemic, lacking reliable statistical data on infection and COVID-19-related excess mortality we cannot evaluate this. At the same time, we know that the brutal and indiscriminate imposition of zero tolerance towards COVID-19 in China has had enormous costs.[2]

The third and final element of our proposed explanation is citizens' trust in (government) institutions. Based on European Social Survey data, Boda and Medve-Bálint (2014) have showed that institutional trust is generally lower in CEE than in Western Europe (although comparable degrees of "materialistic trust" prevail in CEE, i.e., the materialistically more successful have more trust in institutions). Because of the relative lack of institutional trust on the part of the citizenry, people are also less likely to obey COVID-19 containment measures, including social distancing and vaccination, the latter typically being relatively less stringent and lousily implemented anyway. It is reasonable to expect that this contributes to poorer public health outcomes. Naturally however, our second factor, low institutional quality and our third one, low institutional trust are endogenous to each other and emerge through a long historical process of two-way interactions.

Taken together, lower democratic quality and lower institutional trust may trigger mechanisms leading to policy responses resulting in lower vaccination and higher excess death rates during the pandemic. Based on available research and our own findings, we propose three such mechanisms.

In the first place, populist parties and political entrepreneurs fighting elections on populist tickets are often preferred by the relatively disadvantaged, inward-looking, and culturally and/or economically insecure segments of society. In other words, they ride the waves of what Pippa Norris and Ronald Inglehart called the "cultural backlash" in a globalising, post-material world. Hence, such political actors

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[2] See, for example, Wu, K. and Kang, D. "Shanghai Hospital Pays the Price for China's Covid Response", Bloomberg. https://www.bloomberg.com/news/articles/2022-04-09/shanghai-hospital-pays-the-price-for-china-s-covid-response

are, by definition, opposed to the dominance of rational science that they tend to politically frame as the rule of "oppressive technocratic elites". This has been a major part in the argumentation of such populist leaders as Donald Trump and Jair Bolsonaro, and has been a recurring topic for the European far-right too.[3]

Secondly, relatively mild lockdown measures – costly in terms of excess deaths – seem to have been associated with a relative ease in overcoming pandemic-induced recessions and strengthening post-crisis economic recoveries. This has resulted in tough trade-offs[4] for national and subnational governments worldwide. For example, Republican-led US states with earlier easings of – in many cases already relatively soft – containment measures experienced relatively quicker and stronger economic recoveries.[5] In a similar vein, last year both Hungary and Poland experienced strong economic recoveries in light of data[6] provided by the Blavatnik School of Government at Oxford University, with 7.1% and 5.9% economic growth, respectively, along with relatively less stringent COVID-19 measures. Relatedly, we argued (Ádám, 2020) that maintaining a relatively strong economic performance and limiting the role of fiscal expansion was particularly beneficial for the Orbán government in the early period of the crisis when the suspension of EU excessive deficit rules was not yet clear, and the government, having an intensifying conflict with Brussels, was increasingly relying on market financing at rising interest rates.

Finally, populist and semi-democratic governments, along with outright dictatorships, have introduced restrictions on press freedoms and the freedom of speech and other civil liberties during the pandemic. Curtailed press freedoms help semi-democratic and populist governments manipulate public discourse and avoid to being held accountable for unnecessary COVID-19 casualties.

In conclusion, all we can argue is that historical development paths, institutional qualities and institutional trust seem to matter in attaining public policy results during major shocks such as COVID-19. In this article, we have speculated on potential region-specific factors that seem to have made CEE particularly vulnerable to the pandemic. Although such factors have been obviously impossible to alter in the time span of necessary public health measures responding to COVID-19, it might be useful to be aware of their potential presence as neglecting them may cost unneeded human suffering.

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[3] See, for example, Bennhold, K. "Threats emerge in Germany as Far Right and Pandemic Protesters Merge", The New York Times. https://www.nytimes.com/2022/02/28/world/europe/germany-covid-far-right-protests.html Also see Recio-Román et al. (2022).

[4] OECD. (2020). *The territorial impact of COVID-19: Managing the crisis across levels of government*

[5] https://www.politico.com/news/2021/06/24/gop-states-fight-uneven-recovery-495762

[6] https://www.bsg.ox.ac.uk/research/research-projects/covid-19-government-response-tracker

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Allocating vaccines to remote and on-site workers in the tradable sector

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Abstract

Vaccination may be the solution to the pandemic-induced health crisis, but the allocation of vaccines is a complex task which raises important ethical, economic and social considerations. The biggest challenge is to use the limited number of vaccines available in a way that protects vulnerable groups, prevents infections from spreading further and reduces economic uncertainty. We argue that once the vaccination of healthcare workers and the most vulnerable groups has been completed, prioritising the vaccination of on-site workers is important not only to slow the spread of the infection, but also to ensure the smooth running of economic production. We propose a simple economic model in which remote and on-site workers complement each other in the short run, thus a negative shock to the supply of either one may decrease the demand for the other, leading to unemployment. By using pre-COVID employment data from Sweden and Hungary to illustrate the model, we show that the optimal vaccine allocation between remote and on-site workers in the tradable sector should be based on different proportions depending on the relative infection risk of on-site workers and the degree of vaccine availability. As long as the number of vaccines is limited and on-site workers are at a higher risk of infection, they should generally be preferred. However, as more vaccines become available, countries like Sweden, where the share of occupations that can be done remotely is higher, should start immunising remote workers. In Hungary, where on-site work is dominant in the tradable sector, the continued vaccination of on-site workers is more beneficial.

Introduction

Restricting individual mobility and introducing different social distancing measures can slow down the spread of respiratory viruses (Kraemer, Chang), but these measures entail enormous economic consequences (Koren). During the first waves of the COVID-19 pandemic, the unprecedented fall in consumer demand led to many job losses and disruptions in production chains (Guerrieri, Barrero, Kong), through which the negative effects of preventive interventions have spread throughout the economy (Guan, Lenzen). To strike a balance between the epidemiological benefits and economic costs of mobility restrictions, commuting to work was allowed in most countries despite the fact that work-related virus transmission had been found to be considerable in early COVID-19 outbreaks (Lan). People were advised to work from home where possible and employers were encouraged to consider "hybrid" models with home and on-site working. However, the option of working from home is not equally available to all. Remote work is a realistic option in occupations where physical presence and personal contacts with others are not prerequisites for productive work (Koren, Dingel, Gottlieb). Those who cannot work from home have to face higher risks of infection in order to keep their jobs (Angelucci, Mongey). This makes on-site workers a vulnerable socioeconomic group that has an impact on virus transmission.

The development of vaccines has created a new situation in which governments must decide quickly how to allocate the limited number of early vaccines to curb infection and ease the restrictions. The consensus is that vaccine allocation must be optimised to save lives and must favour vulnerable groups (National Academies, Bubar). However, some argue that vaccination plans should favour those who come into contact with many people and carry more infections (Matrajt, Forslid, Babus, Pieroni). Despite their importance (Manski), economic rationales are almost completely ignored in this discussion. One exception is Çakmaklı *et al.* which illustrates that an ethical distribution of vaccines across countries (Emanuel) can pay off in functioning global production and supply chains. Yet, the notion that risk of infection between remote and on-site workers may differ is still missing from this discourse and left out from vaccination strategies in most countries. The primary aim of this paper is to highlight the economic rationale behind the vaccination of on-site workers, especially in the tradable goods sector, which has been the least restricted industry during the pandemic. While a high vaccination rate for workers in non-teleworkable occupations may be justified from an epidemiological point of view (due to their higher exposure to infection), favouring on-site workers also serves to reduce unemployment.

We consider a simple model in which workers perform two tasks to produce goods. The important difference between the two tasks is that while one can be performed from home, the other can only be performed on site. The central element of our model is that in the short run, firms can adjust production by changing the number of employees in both tasks, but they cannot change the production

technology that determines the exact proportion of task inputs. Hence, in the short run, the two types of tasks are perfect complements and must be used in fixed proportions. Under such conditions, if the infection risks of remote and on-site workers differ, mass infection among on-site workers will reduce the demand for workers who can perform tasks from home, which may lead to excess unemployment. Hence, although remote workers are presumably less exposed to infection, they also bear the burden of job loss due to the complementarity of different tasks.

Our analysis is based on the assumption that the infection risk differs among occupations in the short run. Recent empirical studies show that occupational characteristics – such as interfacing with the public, working indoors and being in close quarters with others – put on-site workers at high risk for infection, while those working in isolation face lower risks (Baker & Seixas). This is consistent with the finding that excess mortality tends to be higher in occupation groups where remote work is less feasible (e.g. food and agriculture, manufacturing, transport and logistics) (Chen), even after controlling for individual characteristics such as race, ethnicity, place of residence or income (Green). These results suggest that, even though the majority of the population is expected to contract the infection in the long run, there may be significant differences between remote and on-site workers in terms of infection probability over a shorter time period. We build this possibility into the model by assigning different infection risks to remote and on-site workers. These risk parameters give the expected proportion of infected workers in job types within a given time period. Although this approach is undoubtedly abstract and differs from those used in SIR models, it makes it easier to model how short run task complementarity contributes to the rise in unemployment during the pandemic and helps to make straightforward claims about how vaccines should be distributed between remote and on-site workers in order to minimise unemployment.

The model focuses on industries that produce tradable goods (i.e. agriculture, manufacturing, electricity, mining and quarrying) because it intentionally abstracts out a number of factors that have been proven to contribute to the rise of unemployment in non-tradable services during the pandemic. Such factors are the restrictions imposed by governments to curb infections, and changes in consumption habits due to fear of infection (Kong; Baker, Farrokhnia *et al.*). These effects were probably most pronounced in the non-tradable sector, where restrictions made it impossible to carry out certain activities (i.e. accommodation and food services, arts, entertainment and recreation, etc.), and where consumption demand was substantially reduced by fear of infection (i.e. retail, personal services, public administration) (Kong). Hence, the economic mechanism we consider in the paper is relatively less important in the non-tradable sector. However, in the tradable sector, where production is not necessarily for final consumption and sales do not require the physical presence of the consumer (because they mostly happen through retail and wholesale), short-run adjustment decisions of firms may play a relatively greater role in explaining the rise in unemployment.

We illustrate the model using pre-COVID employment data for the tradable sector of Hungary and Sweden. According to the model, if the amount of vaccines available is enough for a small fraction of workers in the tradable sector, a larger proportion of vaccines should be given to on-site workers in Hungary than in Sweden to keep unemployment to a minimum. However, as more vaccines become available, the immunisation of remote workers is becoming increasingly important in Sweden, especially if there is a small difference in the infection risk between remote and on-site workers. However, on-site workers should be preferred in case their risk of infection is much higher than that of remote workers. Moreover, in countries like Hungary, where the tradable sector relies on mostly non-teleworkable tasks, continued vaccination of on-site workers is more beneficial.

The purpose of the paper is not to make specific recommendations on vaccine distribution, but to highlight the economic rationale of distinguishing between remote and on-site workers in the later phases of vaccination schedules when it comes to immunising non-essential (and non-vulnerable) workers.

Model

Basic setup

Consider a sector, where competitive firms produce a single tradable good by combining two types of tasks: (1) teleworkable tasks that can be done from home, and (2) non-teleworkable tasks that must be performed on-site (Koren, Dingel). Depending on who performs which task, we distinguish between two types of workers. Those who perform teleworkable tasks are referred to as remote workers (r), while those who perform tasks requiring physical presence are referred to as on-site workers (s). Suppose that workers are able to perform both tasks with unit productivity but once they are trained for one of the tasks, they cannot switch to the other. Since firms are unable to change technology or redesign business organisation in the short-run, worker proportions remain fixed. This implies that the production function is Leontief,

$$Y = \min(\alpha_r L_r, \alpha_s L_s), \tag{1}$$

here L_r refers to the number of remote workers, L_s refers to the number of on-site workers performing non-teleworkable tasks,

α_r and α_s are unit input requirements and Y is output. Taking labour supply, wages and unit input requirements as given, firms optimise L_r and L_s in order to maximise profit that implies

$$Y = \alpha_r L_r = \alpha_s L_s. \tag{2}$$

The pandemic starts after firms have optimised labour usage. Once the outbreak occurs, the government obligates firms to send workers performing teleworkable tasks to home-office. As a consequence, the probability of becoming infected will be decreased for remote workers, while the exposure of on-site workers performing non-teleworkable tasks will remain unaffected. Formally, let β_i be the short-run probability of infection for worker type $i \in \{r,s\}$ such that $\beta_r \leq \beta_s$. Opportunities for remote work, however, come with a price. Although working from home benefits employees by eliminating their daily commutes it may decrease their productivity by making communication, negotiation and instructing more cumbersome, and also by increasing reaction time in decision situations (Koren, Bartik). Thus, we assume that the productivity of remote workers decreases to $\gamma \in (0,1)$ as long as they work from home.

Production decreases during the pandemic because effective labour in both tasks deviate negatively from optimal amounts.

Without any available vaccines the supply of effective labour is reduced to

$$\bar{L}_s = (1 - \beta_s)L_s$$

and

$$\bar{L}_r = (1 - \beta_r)\gamma L_r.$$

Since tasks are perfect complements, reduction of effective labour in one task decreases labour demand in the other task and workers become unemployed. Suppose that $\beta_s > 1-(1-\beta_r)\gamma$ holds, so β_s reduces the supply of labour in non-teleworkable tasks to a greater extent than β_r and γ decrease labour supply in teleworkable tasks. In such cases, $[(1-\beta_r)\gamma - (1-\beta_s)]L_r$ healthy remote workers will be unnecessary for production. However, if $\beta_s < 1-(1-\beta_r)\gamma$, exactly $[(1-\beta_s)-(1-\beta_r)\gamma]L_r$ on-site workers will become redundant. Hence, without vaccines, unemployment will inevitably rise despite the extensive spread of home office possibilities.

Optimal vaccine allocation

Now suppose that a social planner distributes V amount of vaccines across L workers in the sector. Vaccination of the workforce has two effects: First, it immunises workers and therefore increases the amount of effective labour, and second, it makes social distancing among vaccinated workers unnecessary. After getting the vaccine, remote workers performing teleworkable tasks restore their full productivity because they are allowed to go back to the office. Vaccines are scarce and not all workers can be immunised ($V \ll L$). Therefore, the social planner aims to distribute the vaccines to minimise job losses of healthy workers. Note that the problem of minimising unemployment among healthy workers and maximising output provides similar solutions.

We quantify the share of vaccines that should be allocated to a certain type of worker. Let v_i be the number of immunised workers $i \in \{r,s\}$. Assuming that

all vaccines are used, $\sum i\in(r,s)vi = V$ and every worker accepts the vaccine, labour supplies can be expressed using vs only as:

$$\bar{L}_s = (1-\beta_s)L_s + \beta_s v_s, \tag{3}$$

and

$$\bar{L}_r = (1-\beta_r)\gamma L_r + (1-\gamma+\beta_r\gamma)(V-v_s). \tag{4}$$

The social planner's problem is to minimise job losses arising from task complementarity. This aim can be formalised by the objective function

$$\min_{v_s} |\alpha_s \bar{L}_s - \alpha_r \bar{L}_r|, \; 0 \le v_s \le V$$

The global minimum of the objective function is zero which can be found at

$$\underline{v}_s = \frac{\alpha_r[(1-\beta_r)\gamma L_r + (1-\gamma+\beta_r\gamma)V] - (1-\beta_s)\alpha_s L_s}{\alpha_s\beta_s + \alpha_r(1-\gamma+\beta_r\gamma)}$$

Equation 5 can be obtained by substituting $\bar{L}_s$ and $\bar{L}_r$ from equations 3 and 4 into the objective function and then solving it for v_s. The threshold defined in the above equation ensures that remote and on-site workers are available in exactly the proportion required by the production technology in equation 1. Depending on the value of $\underline{v}_s$, the solution to the social planner's problem is

$$v_s^* = \begin{cases} 0, if\ \underline{v}_s \le 0 \\ \underline{v}_s, if\ 0 < \underline{v}_s < V \\ V, if\ \underline{v}_s \ge V. \end{cases}$$

Solutions are depicted in Figure 1. If $\underline{v}_s$, ≤ 0, we get the corner solution of $v_s^*=0$, which means that all available vaccines should be given to those who perform teleworkable tasks. In such cases, effective labour in teleworkable tasks determines output and the total amount of on-site labour used for non-teleworkable tasks:

$$\tilde{L}_s = (1-\beta_r)\gamma L_s + \frac{\alpha_r}{\alpha_s}(1-\gamma+\beta_r\gamma)V.$$

Substituting $v_s^*=0$ into equation (3), and subtracting $\tilde{L}_s$ gives the number of unemployed on-site workers:

$$U_s = [(1-\beta_s) - (1-\beta_r)\gamma]L_r - \frac{\alpha_r}{\alpha_s}(1-\gamma+\beta_r\gamma)V.$$

Note that, although this vaccine allocation cannot maintain full employment among healthy on-site workers, it still reduces unemployment by $(\alpha_r/\alpha_s)(1-\gamma+\beta_r\gamma)V$.

If $\underline{v}_s$ lies within the interval (0,V), the social planner is able to find a vaccination plan that provides the optimal proportion of remote and on-site workers. This implies that nobody drops out of work due to the reduction of work capacity in complementary tasks, so $\tilde{L}_i = \bar{L}_i, \forall i \in (r,s)$.

Finally, if $\underline{v}_s \geq V$, all vaccines should be given to on-site workers, $v_s^*=V$, in order to minimise unemployment among workers in teleworkable activities. When on-site workers are the bottleneck of production, employment in teleworkable tasks becomes

$$\tilde{L}_r = (1-\beta_r)L_r + \frac{\alpha_s}{\alpha_r}\beta_s V,$$

which implies

$$U_r = [(1-\beta_r)\gamma - (1-\beta_r)]L_r - (\alpha_s/\alpha_r)\beta_s V$$

unemployed remote workers. Compared to the baseline case, this vaccine allocation scheme reduces unemployment in teleworkable tasks by $(\alpha_s/\alpha_r)\beta_s V$.

The optimal allocation of vaccines depends on labour supplies (L_r and L_s), the parameters describing the structure of the economy (α_r, α_s, and γ), the number of vaccines available (V) and the task-specific probabilities of infection (β_r and β_s). It follows that there is no uniform recipe for the distribution of vaccines which derives solely from the characteristics of the economy. By differentiating equation (5) with respect to β_s we obtain

$$\frac{\partial \underline{v}_s}{\partial \beta_r} = \frac{\alpha_s}{\alpha_s\beta_s+\alpha_r(1-\gamma+\beta_r\gamma)}(L_s - \underline{v}_s),$$

so if the probability of infection for on-site workers increases (e.g. safety regulations are not followed by employees at the workplace), more vaccines should be given to them not just to avoid workplace transmission of the virus but also to minimise redundancy of remote labour. Clearly, if all on-site workers are vaccinated, $\underline{v}_s = L_s$, β_s has no further effects on vs. In contrast, by differentiating vs with respect to β_r we find that an infinitesimal change in the infection risk of remote workers decreases the optimal number of vaccinated on-site workers ($\underline{v}_s$),

$$\frac{\partial \underline{v}_s}{\partial \beta_r} = \frac{\alpha_r\gamma}{\alpha_s\beta_s+\alpha_r(1-\gamma+\beta_r\gamma)}(V - L_r - \underline{v}_s),$$

as long as $v_r < L_r$.

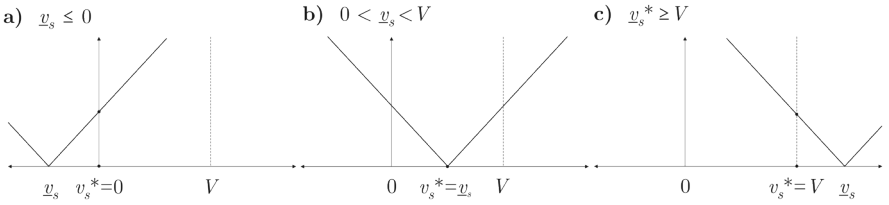

Figure 1. Solutions to the social planner's problem: (a) if $\underline{v}_s \leq 0$, all available vaccines should be given to those who can work from home in order to avoid layoffs among on-site workers. (b) If $0 < \underline{v}_s < V$, then, $v_s^*=\underline{v}_s$, which means that there is no unemployment among healthy workers. (c) If $\underline{v}_s \geq V$ all vaccines should be given to on-site workers to minimise unemployment among healthy remote workers.

Results

We illustrate the results of our model with numerical simulations. We relate our model to Swedish and Hungarian employment data to examine the extent to which v_s^* varies across economies of different structures and various short-run epidemiological scenarios. Since the model considers a sector where tradable goods are produced, the simulation focuses exclusively on the tradable sectors of both countries. All parameters are based on observational data, except task-specific infection probabilities (β_s and β_r). Since these parameters, as they appear in the model, are difficult to relate to real-life estimates, we consider all combinations of β_s and β_r parameters where $\beta_s \geq \beta_r$. For a more detailed description of the data, see the "Material and Methods" section.

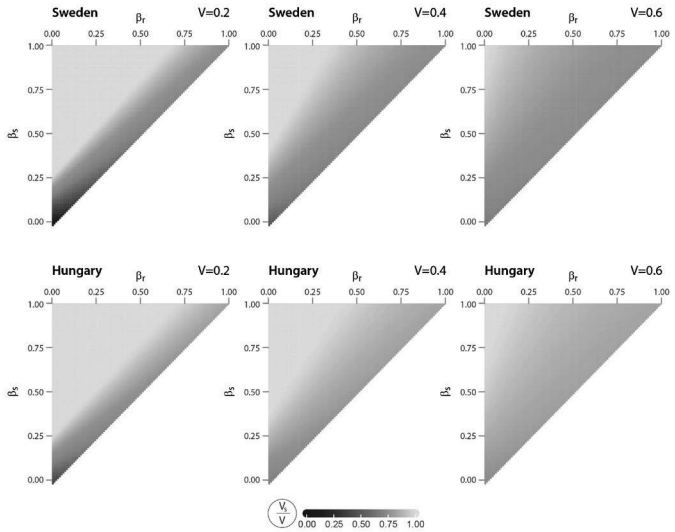

Figure 2. Vaccine allocation by occupation-specific infection risks and available vaccines. Colours represent values of on-site worker fraction in vaccines v_s, β_r is theoretical infection risk of remote workers, β_r is theoretical infection risk of on-site workers. *V/L* stands for the share of worker population that can be vaccinated with available vaccines.

Figure 2 depicts the share of vaccines given to on-site workers (v_s/V) as a function of β_s and β_r for two countries with different shares of on-site jobs in the tradable sector: Sweden (high L_s/L), and Hungary (low L_s/L). While in Sweden almost a quarter of jobs can be done from home in the tradable sector (22.6%), in Hungary the share of teleworkable jobs is only 13%. Each subplot considers three scenarios that represent different levels of vaccine scarcity. For example, the first scenario described by $V/L = 0.2$ means that only 20% of employees receive a vaccine, while the $V/L = 0.6$ scenario describes the case when there are enough vaccines to immunise 60% of workers. We consider only those parameter combinations where $\beta_s \geq \beta_r$ (above the matrix diagonal) to avoid the cases when the simulation covers unrealistic infection rates, such as remote workers being exposed to the virus, while those working on site are protected.

Perhaps the most conspicuous pattern of this figure is that seen in Sweden: the share of remote workers is high, thus optimal vaccine allocations favour remote workers for many epidemic scenarios, especially when vaccines are a scarce resource and the risk of infection is low in both groups of workers. In such cases, vaccinating remote workers compensates for the productivity loss from teleworking. However, if on-site workers have a much higher chance of infection during waves of virus diffusion, the focus shifts from remote workers to on-site workers. In Hungary, where remote work is less common, high v_s/V ratios can be observed even in some cases where β_r is high as well. Such economies will do well if they concentrate on vaccinating on-site workers throughout the pandemic. The differences between countries are blurred when vaccines are widely available. In this case, on-site worker vaccination should exceed remote worker vaccination in most risk scenarios. On this basis, a higher proportion of available vaccines should be given to individuals who, due to the nature of their jobs, cannot work from home.

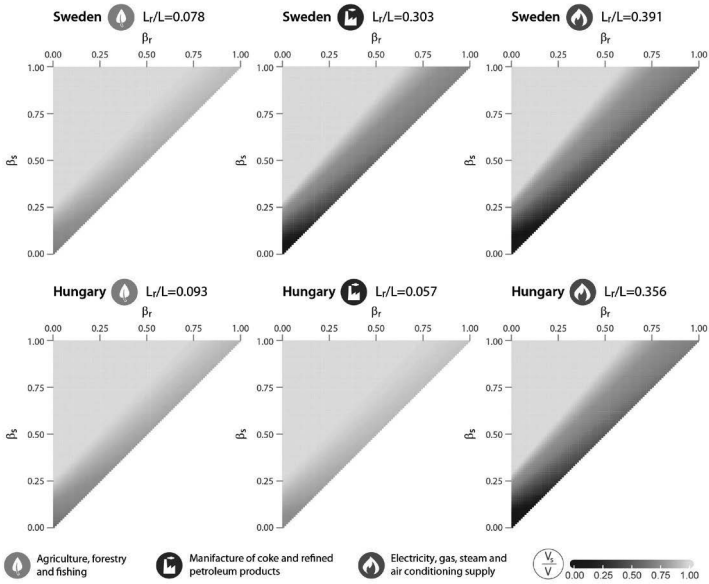

Figure 3. Vaccine allocation by occupation-specific infection risks and available vaccines in selected sectors. The colour scale shows the fraction of vaccines given to on-site workers (v_s/V), where β_r and β_s are the short-run infection risk of remote and on-site workers, respectively, and V/L represents the share of workers that can be vaccinated with available vaccines.
$V/L = 0.2$

Given that industries within the tradable sector differ in terms of the proportion of jobs that can be done from home, it is worth looking at the optimal v_s/V ratios at the level of industries. Figure 3 depicts the optimal share of vaccines given to on-site workers as a function of task-specific infection probabilities for a selection of industries in the tradable sector. On the left side of the figure are the v_s/V ratios calculated for agriculture, forestry and fishing. Due to the low prevalence of teleworking (the share of teleworkable jobs is below 10% in both countries), on-site workers receive the vast majority of vaccines in most infection scenarios. However, when looking at the manufacture of coke and refined petroleum products, there are significant differences between the two countries. In Hungary, this industry relies almost exclusively on on-site work ($L_r/L = 0.06$), and the share of vaccines given to remote workers is minimal even when β_r is high. In Sweden, however, remote work plays a greater role in the production of coke and processed petroleum products; thus, vaccination should be more intensive in the case of small differences in infection probability.

However, if we look at the subplot to the right of the figure (electricity, gas and steam supply), we can again draw the same conclusions for the two countries. As long as the chances of infection are equally low in both worker groups and the

availability of vaccines remains limited, vaccinating remote workers can ensure the smooth flow of industry production during the pandemic. Overall, the extent to which the pandemic affects individual industries within the tradable sector may vary significantly depending on the prevalence of teleworking (as long as infection risk and vaccine availability are constant).

So far, the optimal share of vaccines given to on-site workers is calculated for different combinations of arbitrary task-specific infection probabilities. Since these parameters are difficult to match with real-life observations, the model cannot be used to make specific proposals on the value of v_s/V for any country. This would not make much sense anyway, because β_r and β_s may vary depending on the phases of the pandemic and the protective measures imposed. However, previous figures can be used to provide a crude measure that informs us about the need to vaccinate on-site workers in general.

Finally, to get a better resolution on the role of teleworkability in optimal vaccine allocation, we calculate the proportion of β_s and β_r infection risk combinations where $v_s/V = 1$. This measure captures the proportion of epidemiological scenarios when the optimal vaccine allocation strategies strongly prefer on-site workers over remote workers. These proportions are calculated for each industry and for the tradable sector as a whole.

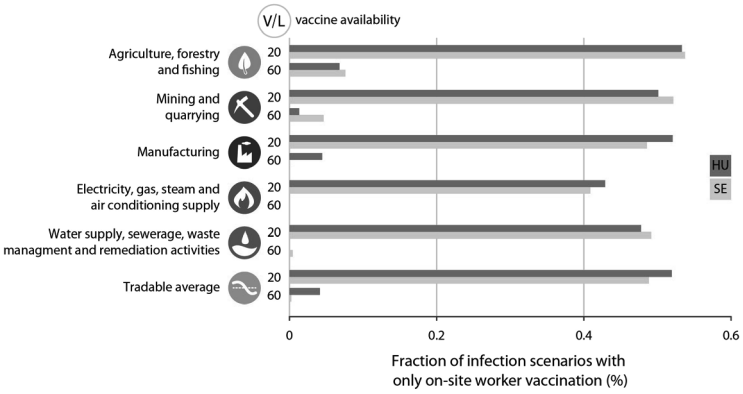

Figure 4. On-site worker vaccination saves jobs in the tradable sector. *V/L* denotes vaccine availability for 20 to 60% of all employees. Percentage values represent the share of infection scenarios when on-site workers receive all of the available vaccines to save the most jobs.

Figure 4 presents two cases of vaccine availability: the first is vaccine shortage (only 20% of workers can be vaccinated), while the second is vaccine abundance (the social planner has enough vaccines to immunise 60% of workers). In cases of vaccine shortage, our results indicate that a significant proportion of optimal vaccine distribution scenarios should concentrate on immunising on-site workers

only to minimise unemployment, both in Hungary and Sweden. In a case of vaccine abundance, the proportion of vaccine distribution scenarios concentrating on on-site workers alone is much lower in both countries. However, these proportions vary by sectors. In the agricultural sector, we still observe scenarios in which vaccinating only on-site workers can be optimal. Nevertheless, sectoral differences between the countries can be seen. While focusing on vaccinating on-site workers in the mining sector can be optimal in Sweden, ensuring on-site worker immunity is critical in the Hungarian manufacturing industry even when vaccine doses are widely available.

Findings

Vaccinating those who must go out to work even during the most severe phases of the pandemic can save lives by limiting their risk and their ability to further transmit the disease. However, only very few European countries – such as Ireland and, to some extent, Spain (Pieroni) – differentiated between occupations in their early vaccination plans (apart from health care and social workers). Our paper shows that immunisation of on-site workers who can't work from home can save jobs as well. We build a simple model to show that if teleworkable and non-teleworkable tasks are complements in production, a fall in the supply of on-site workers performing non-teleworkable tasks makes some remote workers redundant in the short-run. Thus, prioritising on-site workers in vaccination strategies can be economically beneficial for remote workers as well. We show that the optimal share of vaccines allocated to on-site workers depends on short-run infection probabilities and the share of jobs that can be done from home. As long as the vaccine supply is limited and the risk of infection is similar for both worker groups, productivity loss from teleworking should be compensated by vaccinating more remote workers.

However, in times of infection waves, when infection risks of on-site workers exceed the risks of remote workers, the optimal allocation favours on-site workers. In this case, after vaccinating the most vulnerable groups and frontline healthcare workers, it is advisable to favour those who must commute to work when distributing "residual" vaccines. Later, as more vaccines become available, more advanced economies (e.g. Sweden) should increasingly immunise workers working from home, lest there be redundancies among on-site workers. However, in less developed economies (e.g. Hungary) where the role of teleworkable tasks is less significant in production, the focus should be kept on the vaccination of on-site workers.

Further work is needed to overcome the limitations of the model presented here. In this study, we assume that economic agents are not adjusting themselves to the dynamically changing circumstances over the pandemic job losses – an assumption which may be valid in the short run, but less so in the case of a prolonged pandemic, when there is enough time for economic actors to adapt to the changed situation. Another limitation of the model is that it considers a single sector and does not take into account input/output relationships between industries. Mass infection of the

labour force in a given industry reduces output not only in that particular industry, but also in other related industries. Extending our basic model in this direction could be used to assess the economic impacts of NPIs (Santos), or to tell which industry's workforce should be vaccinated first in order to keep aggregate unemployment as low as possible. This may depend both on the centrality of the industry in the input/output network and the proportion of occupations that can be done from home.

Finally, there are issues to be resolved regarding the parametrisation of the model. Infection risk is incorporated into the model in a very abstract way which does not allow us to relate risk parameters to simulate realistic epidemiological scenarios. Besides, home office productivity losses are assumed to be identical across countries and industries, which is probably not true, given the technological and cultural differences that might influence the efficiency of working from home.

Materials and methods

Data

For the simulations, we collect pre-COVID employment data on the tradable sectors of Sweden and Hungary. For Sweden, we rely on register data from the ASTRID database provided by SCB (Statistics Sweden). This matched employer/employee data covers all workers in the Swedish economy on an annual basis and provides detailed information on employees and employers. Each person is linked to one of 4-digit NACE Rev.2 industries through the characteristics of the employer, which allows us to extract employment aggregates for the year 2019. Unfortunately, we do not have such a complete database for Hungary, so we used large sample survey data instead: the 2018 wave of the Annual Wage Survey owned by the National Employment Service. This is also a matched employer/employee dataset that covers all employees of all budgetary institutions and a large sample of employees in the private sector. The survey covers all firms employing more than 20 workers, and a random sample of firms employing 20 workers or less. In private firms with over 50 employees, the individual data relate to a random sample of workers, while in smaller firms, the data cover all employees (including part-time). Like in the ASTRID database, workers are assigned to 4-digit NACE Rev.2 industries.

Although both databases are quite detailed and include 4-digit ISCO occupation codes for each worker, they do not provide direct information on whether these occupations are suitable for teleworking in the country concerned. To produce estimates for the potential number of remote and on-site workers (L_s and L_r) for both countries, we use Dingel and Neiman's work-from-home classification, in which 6-digit SOC (Standard Occupational Classification) occupations can be done from home (Dingel). Since occupations are coded according to the ISCO (International Standard Classification of Occupations) in the Swedish and Hungarian data, we merge the 6-digit SOC nomenclature with the 4-digit ISCO using the official

crosswalk provided by the US Bureau of Labor Statistics. Since the mapping of 6-digit SOC occupations to 4-digit ISCOs is not one-to-one, it can be quite complicated to determine whether certain ISCO occupations are suitable for teleworking.

To address this issue, when more than one SOC occupations can be mapped to an ISCO code, we took the weighted average of the SOC values (0 or 1) using employment counts in the target country as weights. If the resulting value is between 0 and 1, above 0.5 the occupation is considered teleworkable. After merging the work-from-home classification of Dingel and Neiman with the Swedish and Hungarian data, L_r and L_s was estimated for the whole tradable sector and its constituent industries. The tradable sector is defined by a selection of non-service NACE Rev.2 industries including agriculture, mining and quarrying, manufacturing, electricity and water supply. Although there are several definitions for the tradable sector, these industries are usually included in most definitions (De Gregorio, Castillo).

Parametrisation

All parameters other than task-specific infection probabilities are determined on the basis of real observations. Unit input requirements (α_r and α_s) are calibrated so that aggregate employment data fit the model's structure. As a first step, α_r is normalised at unity and then α_s is estimated by substituting data on L_r and L_s into equation (2). Remote work productivity (γ) is set to 0.8, a value gathered from a recent firm-level survey on the possibilities of teleworking during the COVID-19 pandemic (Bartik).

Data availability

The ASTRID database is available by permission and for a fee from Statistics Sweden only. As the authors of this paper are prohibited by law from sharing the data, interested researchers must contact the data host (Statistics Sweden). The Hungarian annual Wage Survey is available for researchers of the Centre for Economic and Regional Studies (Budapest, Hungary), their co-authors, and students, while the work-from-home classification of Dingel and Neiman can be downloaded from the authors' Github page.[1]

Notes on the study

Code will be deposited upon acceptance

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[1] "How Many Jobs Can Be Done at Home?" by Johnathan Dingel and Brent Neiman, https://github.com/jdingel/DingelNeiman-workathome

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Among the authors of this study, L. C and G. T. designed the research, L. C. developed the economic model and collected data, G. T. carried out the simulations. L. C., B. L., and G. T. wrote and reviewed the manuscript. The authors hereby declare that they have no competing interests.

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Central-Eastern Europe's performance under the COVID pandemic presents a "puzzle": after relatively good economic and health outcomes in the first and second waves, the region saw a reversal of fortune, ending up with one of the worst mortality rates in the world. This innovative book investigates this puzzle from different angles. It offers insights that bring us closer to understanding the reasons for, and the impact of, the region's deep-rooted "trust deficit". The authors also raise broader issues around the importance of trust for the effectiveness of policies and how trust can be built to increase state capacity.

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Why did the countries of 'Emerging Europe' seem to fare better during the first part of the COVID crisis? And why did they later backslide from the middle of 2021? This book presents a range of approaches to solving this puzzle. Starting with an analysis of the initial positive economic performance it is followed by evidence of the lack of public trust, understood as the legacy of historical oppression under former dictatorships. This characteristic manifests during the COVID pandemic as an interrelationship between levels of trust and vaccine acceptance. Further research demonstrates the importance of strategic vaccine allocation and community engagement. Finally, this book offers insights into improving future pandemic management.

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