



Pandemic Misery Index: How to Overcome the Effects of the COVID-19 Pandemic?

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Abstract

COVID-19 disrupted both social and economic development in several dimensions. Governments of the vast majority of countries implemented strategies to battle the pandemic and its negative consequences. The question is, which countries can be assessed as successful in that matter? In this study, we use empirical tools to investigate which governmental actions and state characteristics appear proper, as reflected by pandemic misery indices. The results of our study imply that fiscal measures taken solely are not enough to confront the negative outcome of the pandemic. Interestingly, a strong rule of law, high government effectiveness, and low corruption seem to help countries get through COVID-19. These conclusions may be useful for policymakers in the context of the current and future negative shocks.

Keywords COVID-19 pandemic · Pandemic misery · Fiscal response · Institutional environment · Law and economics

Mathematics Subject Classification E02 · E62 · K40 · O17 · O43 · P48

1 Introduction

The COVID-19 pandemic hit the globe hard and brought unprecedented consequences. Given our focus, it cast a shadow over public health (Heymann & Shindo, 2020; Peters et al., 2022a, 2022b), politics (Lynch et al., 2022; Rieger & Wang, 2022; Ullah & Ferdous, 2022), society (Fulkerson et al., 2023; Liu et al., 2023) and the economy in various dimensions (Al-Thaqeb et al., 2022; Fernandes, 2020; Iqbal et al., 2020; Loayza, 2020; McKee & Stuckler, 2020; Semmler et al., 2023). Its adverse outcomes left a mark that will remain for many years (Jordà et al., 2020; Karmaker et al., 2023). Governments of most countries were given a severe policy challenge to address quickly. In response, various ad hoc fiscal measures, often combined with monetary policy actions, were proposed (Devereux et al.,

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2020; Jinjara et al., 2020; Costa Junior et al., 2021; Elgin et al., 2023a, 2023b). However, the question remains: should we consider these policy measures as potentially adequate instruments for mitigating the most obvious negative consequences of the pandemic?

The research gap we identify is the lack of systematic research on the impact of the pandemic fiscal measures and their institutional context in the perspective of social and economic issues like excessive deaths, unemployment, or GDP growth taken together. Understanding how fiscal packages impact public health and overall mortality rates is crucial for evaluating the success of these programs in curbing the spread of the virus and reducing the loss of life. While fiscal packages were aimed at stimulating economic recovery and job retention, assessing their effectiveness in preventing significant job losses and promoting employment opportunities amidst the pandemic remains a research challenge. Although fiscal interventions were primarily designed to stimulate economic activity, it is essential to investigate how these measures translated into observable economic growth. Investigating the impact of fiscal measures on excessive deaths together with economic indicators allows for addressing the trade-off between securing public health and economic prosperity during the pandemic crisis.

Considering the above, the core research question we pose in our study is: *What are the barriers against and remedies for the COVID-19 pandemic misery?* We address this issue with quantitative tools and a particular focus on the role of fiscal anti-crisis measures and their institutional environment, approximated by the rule of law, government effectiveness, and control of corruption. Misery indices being a combination (sum or difference, respectively) of two components describing the social and economic situation (excessive deaths and unemployment or excessive deaths and GDP growth), allow for uncluttered inter-country comparisons. An analysis of misery indices seems more comprehensible than a multivariate inquiry. Our study covers the year 2020 since it was the first year of the pandemic (COVID-19 became considered a pandemic by WHO in March 2020) and our intended goal is to investigate the initial responses to the pandemic. Concerning the geographical scope of our research, we refer to the 149 countries listed in Sect. 3.1.

Our contribution to the existing literature is two-fold. First, we build upon Vlandas' (2020) proposition of the pandemic misery index and develop one that reflects the health costs and economic costs of COVID-19 in terms of excess mortality and dynamics of GDP, respectively. Apart from the novelty of this approach, we believe that it somehow reflects the negative impact of the COVID-19 pandemic on the core spheres, which are public health and the economy. In fact, this fits the nature of the challenge faced by policymakers in 2020 and allows for assessing which countries or their governments were successful. This dimension, even if it is very interesting, has been missing in the literature so far.

Second, we extend the available literature on the instruments aimed at mitigating the negative outcome of the pandemic, primarily thanks to fiscal-monetary policy measures (Bergant & Forbes, 2023; Devereux et al., 2020; Jinjara et al., 2020; Romer, 2021), by considering institutional factors – to our knowledge not yet addressed in the described context. Thus, we are not limited to assessing whether public spending to limit the impact of the pandemic was adequate. Instead, we also refer to the role of institutions as measures to prevent the misery of the shock we faced during the pandemic (institutions as a vaccine) and as instruments to design and allocate the anti-crisis transfers optimally (institutions as a cure). Apart from the contribution to the literature regarding COVID-19 and, more generally, about dealing with external shocks, our study has some practical implications, potentially useful for policymakers and governments.

The paper is structured as follows. Section 2 covers the literature review regarding government response to pandemics. In Sect. 3, we report the data, empirical design, results,

and model extensions, and then we discuss the obtained output. Finally, Sect. 4 contains the conclusions of the study.

2 Government Responses to Pandemics

2.1 Fiscal Measures

COVID-19 brought forth both a medical crisis and an economic crisis simultaneously, and the challenges that were comparable to the Spanish Flu pandemic and the Great Depression at the same time (Susskind & Vines, 2020). Notably, the literature has commented on a terrible trade-off between excessive deaths due to the pandemic and lives lost because of deprivation fueled by lockdowns (Hausmann & Schetter, 2022). Excessive fiscal measures were undertaken mostly by advanced economies that were able to preserve the incomes of employees and firms until (most likely) long-awaited recovery (McKibbin & Vines, 2020). High-income countries introduced more extensive fiscal policies than lower-income ones (Benmelech & Tzur-Ilan, 2020). Poor countries and emerging markets, on the other hand, were not able to finance appropriate anti-crisis actions due to low levels of income, high public debt, or external financial constraints, and, as a result, international cooperation is highly recommended in this case (McKibbin & Vines, 2020; Susskind & Vines, 2020). There was notable debt-free support from the International Monetary Fund for poor and middle-income countries to address the crisis caused by the pandemic (Cashman et al., 2022).

Some observable fiscal interventions are considered to have a relevant impact on the pandemic crisis (Susskind & Vines, 2020). Similarities and differences between these actions can be identified in the context of their size, targets, and types of fiscal policy responses, and it appears clear that there is no one-size-fits-all approach (Chen et al., 2021).

From a broader perspective, the crisis was dramatically different from the previous economic or public health ones, which posed a challenge in policymaking. This leads us to questions about the appropriateness of the fiscal response and possible alternatives to these kinds of anti-crisis measures (Bajaj & Datt, 2020; Elgin et al., 2023a, 2023b). Importantly, some mismatches and mistargeting in developing countries have already been identified (Cirera et al., 2021). Some fiscal measures can be evaluated as too expansive or inappropriate (Makin & Layton, 2021). On the other hand, at the beginning of the pandemic, it was not evident that some extraordinary measures would have to be in force for more than two years. Importantly, given our focus, the fiscal measures mentioned above have not been considered so far in one shot with institutional aspects.

2.2 Institutional and Macroeconomic Factors

Party ideology and the public narrative may make a difference in future policies in various aspects (Consterdine, 2015; Imbeau et al., 2001; Natter et al., 2020; Tavits & Letki, 2009). The available literature deals with, e.g., political party affiliation, populism, or right-wing views during the pandemic (Albertazzi et al., 2021; Buščíková & Baboš, 2020; Howard, 2022), but it is not the only party characteristic that may impact pandemic misery. In addition to party or parliament features, governments may be strongly linked with their political leaders. In this context, a leader's characteristics, like gender, education, professional beliefs, or experience, as well as the political power they can exert, affect the shape and

pace of policymaking (Dreher et al., 2009; Dyson & Preston, 2006; Ferreira & Gyourko, 2014; Han & Han, 2020; Li et al., 2020; Rosati, 1988). This might have influenced the outcome of the pandemic. There is even empirical evidence that COVID-19 medical populism, experienced as downplaying the impacts of the coronavirus or proposing oversimplified solutions, has recently been propagated (Lasco, 2020).

The rule of law is crucial in providing the foundations for freedom and economic prosperity (Zywicki, 2003). In a broad sense, it means that people should obey the law, which is also addressed to the executive (Raz, 2005). Thus, a strong rule of law implies that society is ruled by the law instead of the whims of influential individuals (Radin, 2005). Firstly, the law provides powers for governments, but at the same time, regulations constitute legal enforcement of the adequate limits of those powers (Feldman, 1990). While some extraordinary limitation of rights and freedoms during the pandemic seems to be inevitable, for instance, as a state of emergency, there is a considerable risk of misuse of emergency powers for power grabbing or rent-seeking, leading to democracy backsliding (Bjørnskov & Voigt, 2022; Flinders, 2021; Petrov, 2020). In this context, legislative and judicial checks and balances, corresponding to the rule of law, may have a detrimental effect (Guasti, 2020). Thus, a solid rule of law is generally expected to prevent the misuse of emergency powers during the pandemic that might, in turn, bring about severe inefficiencies in combating the adverse outcomes of the coronavirus.

International cooperation in the context of the current pandemic seems essential for the global public goods supply (Brown & Susskind, 2020). It has been proposed to treat controlling infectious diseases like COVID-19 as global public goods, which would be underprovided given a lack of effective international cooperation (Brown & Susskind, 2020). Moreover, this kind of enhanced cooperation may bring positive effects for tackling problems other than future pandemics. Undoubtedly, the COVID-19 pandemic is a lesson for countries and international organizations on how to cooperate and design some standard policies against the spread of the coronavirus, sometimes in the face of complicated geopolitical circumstances (Peters et al., 2022a, 2022b).

Last but not least, the urbanization rate and population density are significant factors affecting the spread of the coronavirus and the corresponding response from the government (Alvarez et al., 2021; Arin et al., 2022). The available studies imply that COVID-19 can be transmitted by wind or air circulation, and population density may explain the variance in virus spread (Coşkun et al., 2021). Thus, population density was a common catalyst for the proliferation of the coronavirus (Kadi & Khelfaoui, 2020). Namely, highly urbanized areas were relatively more vulnerable to the spread of infectious diseases, such as COVID-19 (Connolly et al., 2020). The reason behind this observation lies in social inequalities affecting social mobility, access to sanitation, or the opportunity for self-isolation (Connolly et al., 2020). The extended patterns of urbanization required adequate responses to be undertaken by governments to control outbreaks of diseases, slightly different than in the case of rural and less population-dense regions, corresponding, e.g., to contact tracing or limits on public gathering. We are aware that at the regional level of analysis, other environmental factors, such as temperature, might have also played a role in the spread of COVID-19. Empirical studies find a positive relationship between temperature and COVID-19 (Shahzad et al., 2020) or lack thereof (Iqbal et al., 2020), depending on the geographical scope and quantitative approach. Although we acknowledge the relevance of such factors, given the country-level character of our empirical analysis, we do not include them in the model.

3 Empirical Analysis

3.1 Data and Empirical Design

The misery index was first proposed by Arthur Okun, advisor to the then-president of the United States, Lyndon Johnson. The index was meant to be a simple and understandable measure of the current economic situation. As a plain sum of unemployment and inflation rates, the index can be interpreted that the higher the values, the worse the economic outlook. The relative simplicity weighed on its widespread usage and further developments, depending on the particular context (Barro, 1999, to name one).

To reflect the outcome of the coronavirus crisis, Vlandas (2020) proposed the pandemic misery index based on excess mortality and unemployment rate.¹ The index is a sum of the excess mortality and unemployment rates. Building upon this, we propose an alternative index incorporating the number of excessive deaths provided by the World Health Organization (2023) and the GDP growth rate published by the World Bank. Following the misery indices logic, the proposed index equals the excessive death rate minus the GDP growth rate. Both indices were calculated for 2020. Both indices were calculated for 149 countries and their list is presented in the Appendix.

The advantages of the index based on the GDP growth rate lie in the fact that it covers a relatively broader impact of the pandemic on the economy (not restricted to the labor market²). The pandemic led to widespread lockdowns and restrictions on businesses, which resulted in many companies reducing their workforce or shutting down completely. This resulted in a rapid increase in unemployment levels as businesses struggled to stay afloat. Certain industries, such as hospitality, tourism, and retail, were hit particularly hard by the pandemic. These industries tend to have a high number of low-wage workers, who are more likely to be laid off during economic downturns, leading to a disproportionate increase in unemployment compared to the overall GDP impact (e.g. Stefański, 2022). Many countries implemented strict border closures and travel restrictions to contain the spread of the virus. This made it difficult or impossible for people to migrate for work, leading to disruptions in cross-country work migrations. On the contrary, some governments decided to support employees by limiting redundancies, especially by entities that received public support during the pandemic (e.g. Fernández-Villaverde & Jones, 2020). Additionally, cross-country work migrations are often concentrated in certain industries, such as agriculture, construction, and healthcare. These industries were impacted differently by the pandemic, with some experiencing increased demand for workers (e.g., healthcare) and others facing significant challenges (e.g., hospitality). Additionally, it was argued that COVID-19 affected the rate of participation in labor force (e.g. Coibion et al., 2020). Taking this into consideration, it seems that the unemployment level was more vulnerable to the consequences of the COVID-19 pandemic and fiscal responses in various countries as compared to GDP, which represents the total monetary value of all goods and services produced within a country's borders over a year.

¹ By courtesy of T. Vlandas, we used the index in our initial analyses, however due to limited number of countries the index covered we decided to calculate the index on the basis of the WHO excess mortality data and unemployment from the World Bank.

² Note also that many of the pandemic support measures required beneficiaries to maintain employment levels, which clearly may have had an impact on unemployment dynamics observed in 2020.

To verify what the drivers of the pandemic misery are, we estimate the regression model of the following form:

$$\begin{aligned} \text{pandemic misery}_i = & \alpha + \text{fiscal measures}'_i \beta \\ & + \text{institutional environment}'_i \gamma + X'_i \delta + \varepsilon_i \end{aligned}$$

In the model, *pandemic_misery_i* is a variable expressing the pandemic misery in country *i*, approximated by the pandemic misery index. We start with the original pandemic misery index proposed by Vlandas (2020), underpinned by unemployment. Regarding additional specifications, we also look at the index based on GDP dynamics. *fiscal_measures_i* is a vector of variables designed to capture the relevance of fiscal measures: additional spending or foregone revenues and liquidity support measures in response to the COVID-19 pandemic. These variables were published by the International Monetary Fund in the Fiscal Monitor. *institutional_environment_i*, in turn, is a vector of variables aimed at capturing the core effect of the institutional environment: the rule of law, government effectiveness and control of corruption (World Bank Worldwide Governance Indicators). *X_i* is a vector of other covariates that control for characteristics of a given country, which may play a role in the context of pandemic misery, including economic (GDP per capita; World Bank), demographic (population density and urban population; World Bank) and institutional-political controls (ideology, populism, power of the head of state, impartial public administration, transparent law, high court independence, compliance with high court, constitutional compliance, or government attacks on judiciary; selected V-DEM (Coppedge et al., 2021) and V-Party (Lührmann et al., 2020) indicators). In case of the latter category, our intention is to account for the political and ideological environment (as sketched in Sect. 2.2.) that could have mattered for the outcome of the pandemic, primarily because of the general attitude of those in power towards COVID-19. Factors related to the law, high court, constitutional compliance and judiciary are, in turn, conceptually related to the rule of law, but they are much more nuanced. They approximate various dimensions of judicial and legislative checks and balances and their factual execution. Table A1 (Annex) presents the description of our variables and their sources. Finally, α is an intercept, and vectors β , γ and δ contain unknown parameters to be estimated.

Moreover, the exogenous character of the two employed indices may reasonably be doubted. The logic behind this reasoning is that the countries expecting severe consequences from the pandemic can allocate more funds to cope with it. In such circumstances, not only do fiscal measures affect the misery indices, but also the latter affect fiscal measures. Consequently, the assumption of independence of the error term for fiscal measures appears no longer satisfied. Furthermore, the OLS method yields biased and inconsistent estimates. This is the reason for extending our analysis with the instrumental variables (IV) approach to cope with potential endogeneity due to endogenous regressors. To validate IV results, the Hausman-Wu and Sargan tests are used. The first verifies whether endogeneity can be omitted, and the latter is the instrument's appropriateness test.

To instrumentalize the endogenous variables, we proposed using three groups of factors. The first group consists of the share of the world GDP, and the second—is the participation of global value chains as a share of gross exports. The third includes three indicators from the Global Financial Development Report—World Bank (2020). The last group is made up of the percentage of the population having an account at a formal financial institution (access variable), financial institutions' stability bank Z-score index (stability), and stock market capitalization to GDP (depth). We believe these instruments are highly correlated with the endogenous variables and uncorrelated with the error term. The correlation

Table 1 Descriptive statistics and sources of variable employed in the analysis

| Variable | Source | Obs | Mean | SD | Min | Max |
|--|--------------------|-----|----------|-----------|-----------|-------------|
| <i>Panel A: dependent variables</i> | | | | | | |
| Misery index (GDP-based) | Own calc. # | 149 | 11.7956 | 13.8421 | - 32.4158 | 61.8644 |
| Misery index (unemployment-based) | Tim Vlandas | 149 | 32.5152 | 34.3667 | - 11.6248 | 262.7507 |
| <i>Panel B: Exogenous explanatory variables</i> | | | | | | |
| GDP per capita USD '000 | World Bank | 150 | 14.0135 | 20.2052 | 0.2168 | 117.3705 |
| Population density | World Bank | 150 | 323.5559 | 1499.1248 | 2.1086 | 15,195.7820 |
| Urban population | World Bank | 150 | 59.7660 | 22.2996 | 13.3450 | 100 |
| WGI rule of law | World Bank | 150 | - 0.1001 | 0.9717 | - 1.8803 | 2.0209 |
| WGI gov effectiveness | World Bank | 150 | - 0.0795 | 0.9867 | - 2.3619 | 2.2845 |
| WGI control of corruption | World Bank | 150 | - 0.0936 | 1.0198 | - 1.7114 | 2.2364 |
| Ideology | V-Dem | 150 | - 0.4117 | 1.2468 | - 3.2600 | 2.4190 |
| Populism | V-Party | 141 | 0.3940 | 0.2471 | 0.0490 | 0.9800 |
| Relative power of the HOS | V-Dem | 150 | 0.5333 | 0.4869 | 0 | 1 |
| Executive respects constitution | V-Dem | 150 | 0.6458 | 1.1817 | - 2.5320 | 3.4940 |
| Transparent law with predictable enforcement | V-Dem | 150 | 0.7948 | 1.3152 | - 2.4450 | 4.0560 |
| Rigorous and impartial public administration | V-Dem | 150 | 0.5608 | 1.4336 | - 2.7460 | 4.0060 |
| Government attacks on judiciary | V-Dem | 150 | 0.4957 | 1.3422 | - 3.5820 | 2.7380 |
| High court independence | V-Dem | 150 | 0.5320 | 1.4366 | - 3.4210 | 3.3320 |
| Compliance with high court | V-Dem | 150 | 0.5734 | 1.3828 | - 3.4520 | 2.9790 |
| <i>Panel C: Endogenous explanatory variables</i> | | | | | | |
| Additional spending or foregone revenues (% GDP) | IMF Fiscal Monitor | 144 | 4.2332 | 3.7401 | 0.0169 | 19.0633 |
| Health sector | IMF Fiscal Monitor | 133 | 0.8077 | 0.7738 | 0.0100 | 5.3405 |
| Non-health sector | IMF Fiscal Monitor | 133 | 3.4346 | 3.4196 | 0 | 17.8564 |
| Liquidity support | IMF Fiscal Monitor | 91 | 4.8397 | 6.7800 | 0.0173 | 35.4801 |
| <i>Panel D: Instrumental variables</i> | | | | | | |
| Share of world GDP | World Bank | 150 | 0.0063 | 0.0248 | 0 | 0.2442 |
| Global value chains share | World Bank | 144 | 47.2976 | 62.0231 | 20.1689 | 772.1985 |

Table 1 (continued)

| Variable | Source | Obs | Mean | SD | Min | Max |
|--|----------------------------------|-----|---------|---------|--------|---------|
| Access—account at a formal fin. inst. (%. age 15+) | World Bank GFDR ^{&} | 126 | 58.0700 | 29.7546 | 8.7535 | 99.9174 |
| Stability—fin. institutions—bank Z score | World Bank GFDR ^{&} | 145 | 14.2669 | 8.7059 | 0.8353 | 48.5169 |
| Depth—stock market capitalization to GDP (%) | World Bank GFDR ^{&} | 58 | 63.8533 | 59.1568 | 0.2289 | 328.361 |

Data on GDP from the World Bank were supplemented with excess mortality published by the World Health Organisation

& GFDR stands for Global Fiscal Development Report published by the World Bank

between the abovementioned instruments and financial outcomes might be explained threefold. First, the higher the share of the world GDP, the more the country can raise capital from external investors and, consequently, the more it can spend on anti-pandemic programs. Secondly, with the increasing participation of global value chains, the country has become more vulnerable to global shocks as the COVID-19 pandemic. Thirdly, more financially developed countries might have more possibilities to access capital from domestic investors. What is more, we expect the abovementioned indicators not to have any direct effect on misery indices and, therefore, to be valid instruments.

3.2 Empirical Results

With the two measures of misery, we hope to shed light on the characteristics and attributes of successful governments in the first year of the pandemic. The following subsections present the results of the models for the unemployment rate misery index and the GDP growth rate-based misery index, respectively. Additionally, [Sect. 3.2.3](#) extends the analysis with endogeneity.

As stated in [Sect. 3.1](#), the misery indices under consideration were calculated as a plain sum of their components. One may argue that the components' different scales could affect the findings. For this reason, we decided to standardize the p-scores, that is excessive deaths, GDP growth rate, and unemployment rate. For each component, we subtracted its median value and divided it by its standard error. Having standardized the components, we calculated new standardized misery indices. In the following step, we repeated the regressions using the new standardized indices. What we found is the original models and the new models, based on standardized components, are qualitatively equivalent. Having similar conclusions based on both approaches we decided to follow the original proposal by Okun to simply sum growth rates.

When discussing the below-presented estimates and findings one should have in mind that the data sample consists of 149 countries. The data is not a random sample of countries, thus the results cannot be extrapolated for all countries of the world. It is argued that autocracies might have underreported COVID-19 deaths (e.g. [Cassan & van Steenvoort, 2021](#)). Having this in mind, the conclusions drawn below hold for this specific sample of countries. All the parameters and findings are suitable for the data sample under consideration. Furthermore, the data covers only one year, which is the result of the data availability of the additional spending or foregone revenues variables in the IMF Fiscal Monitor. In other words, the conclusions apply to the first year of the pandemic.

3.2.1 Unemployment-Based Misery Index

Initial specifications of the models for the unemployment-based misery index indicated all variables' joint insignificance. These specifications included all variables mentioned in panels B and C of [Table 1](#). This inability to find a valid specification resulted in more in-depth data analysis. Upon it, we decided to divide the sample into two subsamples. The criterion was the threshold of the misery index value equal to 30. The value of 30 splits countries into low and high misery index categories. [Liang et al. \(2020\)](#) presented an analysis of COVID-19 mortality across subsamples defined either by government effectiveness or income. The rationale of [Liang et al. \(2020\)](#) constituted an argument for splitting the sample of countries on the basis of either the misery index or government effectiveness. Taking this into account, we considered splitting the sample based on the

government effectiveness variable, and the respective results are available upon request. Finally, we decided to keep the splits based on the misery index and the rule of law because of two reasons: the quality of the models and the logic behind the importance of the rule of law in the face of external shocks. About the latter, it is expected that governments in countries with high levels of the rule of law would obey the law even in the face of extreme shocks and states of emergency, instead of taking advantage of this difficult situation to strengthen political dominance. Having the countries divided, we managed to find valid specifications.

Table 2 presents 7 empirical models for the misery index based on excess mortality and unemployment.³ Model (1) was estimated with all countries included and its F statistic indicated the joint insignificance of all the variables. Models (2)–(4) were estimated for countries with low misery index values, while models (5)–(7) were estimated for countries with high values of the index. The joint significance of all variables in models (2)–(7) allows for concluding. Due to a limited number of observations, we decided not to include certain variables that were insignificant in the initial specifications.

First of all, the inability to model the entire population jointly can be observed from the standpoint of the instability of the parameters. Secondly, the major conclusion from models (2)–(4) is that population density matters. This finding seems consistent with statements of the World Health Organization that the spread of the virus, and consequently the excess mortality, depends on population density. Thirdly, the more power in the hands of the head of the state, the lower the misery. Fourthly, the additional spending and foregone revenues variable appeared statistically significant in models (3) and (4). However, due to their significance levels, the additional spending and the relative power variables were on the verge of significance.

Surprisingly, the estimates of models (5)–(7) revealed a distinct impact of the selected factors in countries that were more severely hit by the pandemic. More extreme values of the misery index were associated with higher GDP per capita. The effect of the relative power in the hands of the head of the state turned out to be opposite to that observed for countries with lower misery. Furthermore, an additional percentage of the population living in urban areas was accompanied by lower pandemic misery.

To conclude on models presented in this section, the variables of the utmost interest appeared insignificant or on the verge of statistical significance. This observation is strengthened by the fact that the liquidity support remained insignificant throughout all specifications.

3.2.2 GDP Growth-Based Misery Index

Table 3 presents the estimates of the models for the misery index based on excess mortality and the GDP growth rate.⁴ Their better fit in comparison to the models presented above

³ The output for the supplementary specifications with the interactions between the fiscal measures and institutions are available upon request. The institutions we considered are government effectiveness, control for corruption, rule of law indices, and clear and transparent law. However, upon analyzing the estimates, we found that the introduced interaction terms were insignificant. Additionally, the rule of law index, which was previously significant, also became insignificant once we controlled for the interaction term.

⁴ In the supplementary specifications, interaction terms were added between variables related to additional spending or foregone revenues and the rule of law. However, the inclusion of this interaction term adversely affected the statistical significance of the variables related to GDP per capita and urban population. Across all specifications, the interaction term was found to be statistically insignificant.

Table 2 Models for misery index based on excess mortality and unemployment

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|----------------------|------------------------|------------------------|------------------------|------------------------|------------------------|-------------------------|
| GDP per capita USD*000 | 0.1312 (0.2595) | 0.0936 (0.0682) | 0.0790 (0.0618) | 0.0551 (0.0406) | 1.4176* (0.8131) | 1.3496* (0.7889) | 1.0808** (0.5191) |
| Urban popula- tion | 0.0754 (0.1752) | - 0.0161 (0.0464) | | | - 0.8750 (0.5380) | - 0.9129* (0.5247) | - 0.9868** (0.4277) |
| Population density | - 0.0005 (0.0019) | 0.0011** (0.0005) | 0.0011** (0.0005) | 0.0011** (0.0005) | - 0.0021 (0.0048) | | |
| Additional spending or foregone revenues | 0.5766 (0.9663) | - 0.4477 (0.2779) | - 0.4482* (0.2652) | - 0.4819* (0.2559) | 0.2967 (2.3544) | 0.0405 (2.2547) | |
| Ideology | - 1.0171 (2.6508) | 0.1622 (0.7451) | | | - 5.5798 (6.0159) | - 5.8513 (5.9132) | |
| Relative power of the HOS | 9.3132 (7.3593) | - 3.7980* (2.0729) | - 3.6658* (1.9519) | - 3.4302* (1.8898) | 45.2358** (19.1702) | 46.7931** (18.6190) | 48.6310*** (13.2514) |
| Populism index | 6.1646 (12.3097) | 0.1446 (3.3807) | | | 35.0589 (28.9057) | 36.1207 (28.4627) | 31.7845 (24.9552) |
| WGI rule of law | - 3.6436 (6.2355) | - 0.7158 (1.6433) | - 0.7583 (1.4763) | | - 8.6384 (18.2114) | - 6.9460 (17.5921) | |
| Constant | 14.3361 (12.8311) | 19.4000*** (3.4332) | 18.7266*** (2.1358) | 19.1938*** (1.9249) | 61.3433 (37.2341) | 63.8864* (36.3487) | 76.9540*** (25.7466) |
| F | 0.4067 | 1.4307 | 2.2038 | 2.7100 | 1.9158 | 2.2139 | 4.1078 |
| R ² | 0.0250 | 0.1187 | 0.1059 | 0.1034 | 0.3171 | 0.3131 | 0.2964 |
| Adjusted R ² | - 0.0364 | 0.0357 | 0.0579 | 0.0652 | 0.1516 | 0.1717 | 0.2243 |
| N | 136 | 94 | 99 | 99 | 42 | 42 | 44 |

* $p < 0.10$

** $p < 0.05$

*** $p < 0.010$

was revealed in terms of both R² statistics and joint significance criteria. The factor that significantly limits the number of observations is the liquidity support variable. For this reason, this variable was omitted in models (5)–(7).

The initial specifications (1) and (2) revealed that it is the percentage of population living in urban areas, the liquidity support, and the rule of law that are significantly associated with the misery index. The adherence to the rule of law was correlated with the decrease in the severity of the pandemic’s impact. What should be noted, the effect disappeared when the rule of law index was substituted with the government effectiveness or the control of corruption variables in models (3) and (4). Furthermore, the significance of the ideology and the level of government’s attacks on the judiciary strengthened the conclusion for the rule of law variable. Last but not least, the stability of the results was positively verified

with specifications (6) and (7) in which the sample was split into countries with respectively lower and greater values than the median of the rule of law index.

What follows, it is the rule of law, political ideology, and attacks on the judiciary that are associated with the misery index. The additional spending and foregone revenues appeared to be statistically significant only when the liquidity support variable was omitted. Finally, the positive sign of the estimate for the liquidity support gave certain grounds for models with endogeneity.

3.2.3 Misery Index Modelling with the Fiscal Measures Treated as Endogenous

Intrigued by the positive estimate of the liquidity support variable parameter, we hypothesized about the endogenous character of the fiscal measures in the models presented above. The rationale behind this hypothesis is the possibility that countries expecting or experiencing the severe impact of the pandemic could have allocated more funds to overcome its negative impact on both the economy and mortality. We found no valid empirical models for the misery index based on unemployment. More specifically, in no specification we were able to find a model with jointly significant regressors. In particular, we were unable to provide any statistically significant link between the fiscal measures with the misery index based on unemployment.

Table 4 presents the results of the models for the misery index based on the GDP growth rate with the fiscal measures treated as endogenous. Initial specifications yielded the additional spending or foregone revenues variable as statistically insignificant. This observation constituted an argument for splitting the variable into spending in the health and non-health sectors. Further specifications contained all the regressors exploited in the previously presented estimations. In Table 4 we decided to present only the selected, superior estimations, however, they provide analogous conclusions to the omitted models.

What all these estimations had in common was the insignificance of the fiscal measures under consideration. The conclusion remains identical regardless of the set of instruments exploited.⁵ The rest of the conclusions are in line with the previous sections. The percentage of the urban population is positively associated with the misery index, while adherence to the rule of law diminishes the severity of the impact of the pandemic. Interestingly, when controlling for endogeneity in the fiscal measures, the government's effectiveness appears to be a significant factor in weakening the negative impact of the pandemic.

3.3 Discussion

The results obtained in our study introduce a new thread to the discussion on the socio-economic consequences of the pandemic, with a strong focus on institutional aspects. One of the apparent responses of governments worldwide to the COVID-19 outbreak consisted of fiscal measures aimed at boosting health expenditures, raising welfare payments, transferring income, or subsidizing wages, all to mitigate the negative impact of

⁵ The endogeneity approach was exploited in the context of the research question, whether or not the additional extra fiscal measures were beneficial in the first year of the pandemic. Not only did the elimination of the GVC variable deteriorate the F statistics in the first-step regressions, but also the joint significance of all variables – half of the models had all the variables jointly insignificant. A minor argument in this context would be the fact that the GVC variable covered the year 2015. The validity of the exclusion restriction was supported by the results of the Sargan test.

Table 3 Models for misery index based on excess mortality and GDP growth rate

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|------------------------|-----------------------|------------------------|------------------------|-------------------------|-----------------------|-----------------------|
| GDP per capita USD'000 | - 0.0950 (0.0931) | | - 0.1755* (0.0898) | - 0.1271 (0.0863) | - 0.1096* (0.0615) | 1.3395 (0.8749) | - 0.0852 (0.0766) |
| Urban population | 0.2524*** (0.0727) | 0.2451*** (0.0616) | 0.2481*** (0.0695) | 0.2563*** (0.0667) | 0.3011*** (0.0520) | 0.2120* (0.1060) | 0.2153*** (0.0727) |
| Population density | 0.0005 (0.0012) | | | | 0.0018*** (0.0006) | - 0.0096 (0.0091) | 0.0017*** (0.0006) |
| Additional spending or foregone revenues | - 0.4339 (0.3604) | | - 0.4125 (0.3280) | - 0.3324 (0.3340) | - 0.5358* (0.2876) | - 0.3356 (0.6869) | |
| Liquidity support | 0.4819** (0.1948) | 0.3621** (0.1767) | 0.3876** (0.1851) | 0.4046** (0.1817) | | | |
| Ideology | - 1.3539 (1.2242) | - 1.7806* (0.9459) | - 1.8642* (1.0331) | - 2.0463** (1.0272) | | 0.6468 (1.5764) | - 2.0586* (1.0839) |
| Executive respects constitution | - 0.3650 (2.2370) | | | | | | |
| Relative power of the HOS | 0.5763 (3.0248) | | | | | | |
| Transparent laws with predictable enforcement | - 1.3936 (1.8308) | | | | | | |
| Rigorous and impartial public administration | 0.2480 (1.8109) | | | | | | - 2.4945* (1.4463) |
| Government attacks on judiciary | - 2.2152** (1.0852) | - 1.6954* (0.8758) | - 2.5626** (1.0175) | - 2.3026** (0.9912) | - 2.2187*** (0.7415) | - 2.6515* (1.4143) | - 1.7717* (0.9532) |
| High court independence | 1.7047 (1.7941) | | | | | | |
| Compliance with high court | 1.3053 (1.8490) | | | | | | |
| Populism index | - 6.9021 | | - 5.5291 | - 4.9560 | | - 8.8132 | |

Table 3 (continued)

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|-------------------------|----------------------------------|-------------------------|----------------------|----------------------|----------------------|--------------------|--------------------|
| WGI rule of law | (5.2705) - 3.8182 (3.4261) | - 5.2971*** (1.6192) | (4.9478) | (4.9075) | | (5.8877) | |
| WGI gov effectiveness | | | - 0.2533 (2.5026) | | | | |
| WGI ctrl corruption | | | | - 2.0973 (2.1728) | | | |
| Constant | 0.3605 (5.3190) | - 3.8330 (3.9714) | 2.5248 (5.0993) | 0.4712 (4.9607) | - 2.2171 (2.9481) | 1.8784 (6.1963) | 2.3303 (4.4003) |
| F | 2.5332 | 6.0698 | 4.2810 | 4.4461 | 9.4900 | 5.0684 | 3.5168 |
| R ² | 0.3454 | 0.2631 | 0.3024 | 0.3105 | 0.2573 | 0.3878 | 0.2316 |
| Adjusted R ² | 0.2091 | 0.2198 | 0.2318 | 0.2406 | 0.2301 | 0.3113 | 0.1658 |
| N | 88 | 91 | 88 | 88 | 143 | 64 | 77 |

**p* < 0.10

***p* < 0.05

****p* < 0.010

the pandemic (Makin & Layton, 2021). The tasks that policymakers had to solve were challenging and extraordinary (Susskind & Vines, 2020). But, the question that remains valid is whether those fiscal actions played first fiddle.

In this context, our research indicates that additional spending due to the pandemic, as a tool to mitigate the negative impact of the coronavirus on society and the economy, was *ceteris paribus* not enough. Although we do not deny the necessity of fiscal anti-crisis measures, we assert that other factors may be even more critical in addressing pandemic misery. Thus, we add to the literature debating the heterogeneity of fiscal stimulus across countries and the impact of those fiscal packages on public finance (Makin & Layton, 2021) by evaluating the extent to which these policies fulfill their primary role.

What appears especially crucial in the context of our study is the rule of law and government effectiveness. Thus, we can see that the institutional environment not only fosters social and economic development (Barro, 1996; Menard & Shirley, 2005) but may also be regarded as a factor protecting against the adverse effects of shocks like the pandemic. Another point is that these institutions may contribute to better (quick and more optimal) solutions to deal with the pandemic, relatively free from rent-seeking and other types of opportunistic behavior of the rulers. The intuition behind this outcome is quite clear. The rule of law makes the expectations about the legitimacy of governmental actions justified. It implies that various political actors take advantage of their position to serve their society instead of opportunistic rent-seeking. Government effectiveness, in turn, corresponds to the ability of the government to undertake adequate actions and appropriately allocate the available assets in response to the crisis. Considering this, it seems that continual evaluations of legal and political institutions are suggested, as it may affect the current pace of development and act as a shield against future adverse shocks.

Most significantly, what seems to have deepened the pandemic misery further, depending on the version of the pandemic misery index that we refer to, was the share of the urban population, population density, and the power of the head of state. It would be challenging to adjust urban planning to tackle possible pandemics in the future. On the other hand, these plans in some cities have to consider problems like warming, digitalization, and social movement, so maybe pandemics will appear as another essential factor. Getting back to the latter issue, what we can think about now is to design adequate mechanisms of checks and balances on the heads of state to avoid excessive power during possible crises, as it does not produce effects desirable from the perspective of society. However, this may be not just up to formal rules but also a culture that shapes the political and social debate. Thus, informal rules must not be neglected in this context. The complex interrelationships described above reflect the sophisticated character of the institutional environment, consisting of multiple interrelated spheres.

At the same time, we know that more precise evaluations of the drivers of pandemic misery will be available in the foreseeable future when more will become known about post-crisis health care, labor markets, public finance, and the financial sector. We do hope that new sources of data will be accessible. This would make more advanced analyses of the pandemic spillovers feasible. Another point of getting back to this research subject after some time is that it would enable us to see which changes are taking place now, like remote work, adjusted global supply chains, or democracy backsliding, will stay with us for good.

Table 4 Models for misery index based on excess mortality and GDP growth rate with endogeneity

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---------------------------------------|-----------------------|------------------------|-----------------------|-------------------------|-----------------------|-----------------------|
| Additional spending health sector | 1.5055 (15.7984) | 4.3986 (13.9055) | -11.8946 (13.2676) | 12.2332 (16.2182) | 3.6602 (12.8285) | -10.7876 (16.5850) |
| Additional spending non-health sector | 0.2808 (1.1761) | -0.5789 (1.3793) | 2.3390 (2.0057) | -0.2837 (1.2813) | -0.5988 (1.1813) | 1.2224 (2.0677) |
| Liquidity support | 0.1219 (1.6181) | 0.5616 (0.7136) | | 0.6471 (1.0360) | 0.2286 (0.8546) | |
| Urban population | 0.1493 (0.2393) | 0.3081*** (0.0836) | 0.3844*** (0.0981) | | 0.3282*** (0.0934) | 0.3723*** (0.1140) |
| Ideology | -4.1825* (2.1873) | -1.2468 (1.3950) | -2.0300 (1.5666) | -4.0545* (2.1106) | | |
| Populism index | 3.3171 (10.4334) | | | | | |
| GDP per capita USD'000 | | | -0.1292 (0.1193) | | | |
| Relative power of the HOS | | | -3.8080 (3.6446) | | | |
| WGI rule of law | -12.3000* (6.2440) | -7.5581*** (2.8106) | -8.0325** (3.9571) | | | |
| WGI gov effectiveness | | | | -17.0702*** (5.8096) | -6.2919** (2.5710) | -6.1081* (3.4431) |
| Constant | 4.3068 (11.9173) | -10.1062 (7.4748) | -8.0216 (7.5572) | 13.7946* (7.3073) | -8.3764 (5.9442) | -6.9013 (5.9379) |
| F | 3.4154 | 4.0547 | 3.0071 | 4.5713 | 4.3236 | 4.2928 |
| R ² | 0.4165 | 0.2813 | | 0.3248 | 0.2699 | |
| Adjusted R ² | 0.3031 | 0.2222 | | 0.2382 | 0.2206 | |
| N | 44 | 80 | 113 | 45 | 80 | 113 |

Table 3 (continued)

| Method | (1) | (2) | (3) | (4) | (5) | (6) |
|--------|-----|-----|-----|-----|-----|-----|
| | IV& | IV# | IV® | IV& | IV# | IV® |

* $p < 0.10$

** $p < 0.05$

*** $p < 0.010$

& Instrumental variables method with the share of the world GDP, GVC share, and three GFDR variables: access, stability, and depth used as instruments for additional spending or foregone revenues and liquidity support

Instrumental variables method with the share of the world GDP, GVC share, and two GFDR variables: access and stability used as instruments for additional spending or foregone revenues and liquidity support

® Instrumental variables method with the share of the world GDP, GVC share, and two GFDR variables: access and stability used as instruments for additional spending or foregone revenues

4 Conclusions

COVID-19 has brought severe consequences in several social and economic dimensions. To name a few: public health, global supply chains, labor markets, and tourism. Most of the countries have not expected this kind of shock. Even at the beginning of the spread of the coronavirus in China, some rulers hoped that it would not affect their countries. However, COVID-19 appeared across the globe in 2020, and appropriate anti-crisis measures had to be undertaken.

Our study aimed to identify the drivers of the COVID-19 pandemic misery. To approximate the considered misery, we built upon the index proposed by Vlandas (2020) and developed a novel one referring to health and the economy by including excess mortality and dynamics of GDP. The output of our econometric models implies that ad hoc fiscal measures failed, in general, to mitigate the rise of the pandemic misery. The real winners, instead, are those countries with a strong rule of law and high government effectiveness. The output of our quantitative research implies that these institutional features matter in the context of the condition of public health and the economy during the current pandemic. However, we would like to stress that, based on the evidence above, we are not able to state whether these institutions generally prevent the upcoming negative consequences of the shock or enable governments to tackle the problem quickly and efficiently. Nevertheless, taking the outcome of our empirical study and a wide range of positive consequences of strong institutions (both formal and informal) into consideration, policymakers and societies should constantly put an effort in making or maintaining the quality of institutional environment high, as alleviating negative shocks with ad hoc fiscal measures may not necessarily be a sufficient solution.

We believe that our research sheds new light on the struggles of states with the consequences of the pandemic. Besides contributing to the literature, these data-driven conclusions may be useful for policymakers in future crises. Naturally, we are aware of the limitations of our study due to the data and methods we use. Indisputably, there are various options for future studies on pandemic misery. One worth investigating would be to use high-frequency data regarding the several waves of COVID-19 and state aid or the condition of economies as soon as it is made available. More variants of the pandemic misery can also be developed to reflect the impact of COVID-19 on other particular spheres. Last but not least, country-specific studies may provide more detailed insight into the spread and consequences of the pandemic.

Appendix

List of countries for which misery indices were calculated:

Afghanistan, Angola, Albania, United Arab Emirates, Argentina, Armenia, Australia, Austria, Azerbaijan, Burundi, Belgium, Benin, Burkina Faso, Bangladesh, Bulgaria, Bahrain, Bosnia and Herzegovina, Belarus, Brazil, Barbados, Bhutan, Botswana, Canada, Switzerland, Chile, China, Ivory Coast, Cameroon, Democratic Republic of the Congo, Republic of the Congo, Colombia, Comoros, Cape Verde, Costa Rica, Cyprus, Czechia, Germany, Djibouti, Denmark, Dominican Republic, Algeria, Ecuador, Egypt, Spain, Estonia, Ethiopia, Finland, Fiji, France, Gabon, United Kingdom, Ghana, Guinea, The Gambia, Guinea-Bissau, Equatorial Guinea, Greece, Guatemala, Guyana, Honduras, Haiti, Hungary,

Indonesia, India, Ireland, Iran, Iraq, Iceland, Israel, Italy, Jamaica, Japan, Kazakhstan, Kenya, Kyrgyzstan, Cambodia, South Korea, Kuwait, Laos, Lebanon, Liberia, Libya, Lesotho, Lithuania, Luxembourg, Latvia, Morocco, Moldova, Madagascar, Maldives, Mexico, Mali, Malta, Burma/Myanmar, Montenegro, Mongolia, Mozambique, Mauritania, Mauritius, Malawi, Malaysia, Namibia, Niger, Nigeria, Nicaragua, Netherlands, Norway, Nepal, New Zealand, Oman, Pakistan, Panama, Peru, Philippines, Papua New Guinea, Poland, Portugal, Paraguay, Romania, Russia, Rwanda, Sudan, Senegal, Singapore, Solomon Islands, Sierra Leone, El Salvador, Sao Tome and Principe, Slovenia, Sweden, Seychelles, Chad, Togo, Thailand, Tajikistan, Turkmenistan, Timor-Leste, Trinidad and Tobago, Turkey, Tanzania, Uganda, Ukraine, Uruguay, United States of America, Vietnam, Vanuatu, Yemen, South Africa, Zambia, Zimbabwe.

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Declarations

Conflict of Interest On behalf of all authors, the corresponding author states that there is no conflict of interest.

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