The 'Great Lockdown' and its Determinants*

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Abstract

Since COVID-19 was declared a pandemic, countries on the same pandemic trajectory have adopted very different lockdown strategies. Using data for over 132 countries, and employing an event-study design, this paper identifies the role of political, economic and institutional factors in explaining the differential timing and intensity of stringency measures undertaken.

KEYWORDS: COVID-19, lockdown measures, stringency index, institutions

JEL: E71, H12, I12, I18

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1 Introduction

The COVID-19 pandemic continues to spread around the world and a second wave (or a flare up), initially a distinct possibility, now it is a reality in many countries. This 'invisible enemy' has been disrupting economies and society on the scale never witnessed before. Nearly all countries to date have reported COVID-19 infected cases, but they have also followed different trajectories, as both their exposure to the virus, response to the pandemic, and level of preparedness have differed. To control the reproduction rate countries have announced measures which restrict the movement of individuals (colloquially referred to as 'lockdown'). Interestingly, these measures have varied significantly in intensity, with some countries announcing *stringent* measures very early in the pandemic cycle, whereas others taking a less restrictive approach. Greece and Belarus, for example, took early action, while Sweden tried to minimize social and economic disruption cultivating wider immunity (a strategy that the UK followed initially). The Czech Republic on the other hand imposed a locked down well before its first recorded casualty. Why do countries reacted so markedly differently? What are the determinants of lockdown measures? The objective of this paper is to seek answers to these questions. Understanding them is important as the global community seeks ways to combat and also adopt to the pandemic.

The literature has begun to investigate the determinants of social distancing, identifying variables such as expectations for the duration of self-isolation and belief and trust in science [Briscese et al., 2020], differences in risk perceptions [Alcott et al., 2020], political affiliation [Alcott et al., 2020, Painter and Qiu, 2020], social responsibility, social capital and social trust [Oosterhoff and Palmer, 2020, Bartscher et al., 2020]. Related to this paper are the contributions by Askitas et al. [2020] and Bonardi et al. [2020] who look at whether, and to what extend, the intensity of the lockdown measures reduces the spread of the virus, as well as the work carried out by Amat et al. [2020], Bargain and Aminjonov [2020], Brodeur et al. [2020] who consider trust in policymakers' ability to handle the crisis. The literature has also begun to investigate the effectiveness of the lockdown measure (see for example, Ferraresi et al. 2020 and Bharati and Fakir, 2020).

Countries experience the pandemic with different intensity along different periods and therefore their response has been differential. To evaluate the determinants of the lockdown a natural approach is an event study which uses daily observations of a measure that captures the stringency of countries' response during the period January 1st 2020 to April 20th 2020 and COVID-19 related cases across 132 countries for which data are available. To isolate the impact of the spread of the virus on the stringency measures we exploit the staggered time of the pandemic across the world, while controlling for country and daily fixed effects. In particular, for each country we capture the "day zero" of the

pandemic by identifying the moment when at least 10 COVID-19 related cases were identified. We then create its lag dummy variables to account for how quickly countries reacted as a consequence of the spread of the virus. Finally, we interact our lag dummy variables with frequently used variables that capture political, economic and institutional characteristics of countries. Following this approach, we found that, for the same level of the severity of the pandemic (as measured by the number of cases identified) countries characterized by i) low political stability; ii) low level of development; iii) low level of digitalisation; iv) high degree of decentralisation; v) closed-economy and vi) being away from electoral years, have adopted less stringent measures.

The remainder of the article is organized as follows: Section 2 presents the data, Section 3 develops the empirical framework, while Section 4 discussed the results. The last Section summarises and concludes.

2 Description of the data

To take into account the heterogeneity of the governments' response we make use of the *Government Response Stringency Index (Stringency Index)* developed by Hale et al. [2020]. The *Stringency Index* is a composite indicator (consisting of a series of standardized indicators) on specific governments' intervention, ranging from 0 to 100. As for the different institutional characteristics between countries, the following five different indicators from the World Bank[5] and Treisman [2000] are used: *Political Stability* (2018); *Number of government layers* (2000); *Digital Adoption Index* (2016); *GNI classification* (2018); *Openness (exports plus imports of goods as quota of GDP)* (2018). We also utilise information from the International Foundation for Electoral System on the timing of election to build our *pre-electoral year* variable.[6] Finally, data on the total number of COVID-19 related cases are taken from Johns Hopkins Center for System Science and Engineering. The final sample is composed of 132 countries observed starting from January 1st 2020 to April 20th 2020.

The summary statistics for all of the variables used in the analysis are reported in Table A1 of the Online Appendix.

[5]We use the Worldwide Governance Indicators (https://info.worldbank.org/governance/wgi/). Information on the *Digital Adoption Index* is taken from https://www.worldbank.org/en/publication/wdr2016/Digital-Adoption-Index. In bracket we report the year used, which coincides with the last year for which data are available.

[6]We consider a country in its pre-electoral year if parliamentary elections or presidential elections are scheduled in the year 2021.

3 Empirical strategy

The empirical analysis is based on a event-study analysis. More precisely, for each country we set a dummy variable which takes the value of 1 on the day when at least 10 COVID-19-related cases were discovered and zero otherwise. This variable represents our treatment indicator as it captures the "day zero" of the pandemic experienced by each country. The staggered timing of the "day zero" determines a type of random assignment of when the pandemic hit a country. Hence, starting from this variable, we create its lag dummy variables (one for each day after the first ten COVID-19 cases were found).[7] More specifically, the following specification is estimated

$$stringency_{cd} = \alpha + \sum_{\tau=1}^{83} \beta_{c(d+\tau)} + \sum_{\tau=0}^{83} \gamma_{c(d+\tau)} \times institutions_c + \delta covid_{cd} + f_c + f_d + \mu_{cd}, \qquad (1)$$

where $stringency_{cd}$ is the stringency measure index in country c and day d, ranging from 0 – when lockdown measures have not been adopted yet – to 100, with 100 denoting the maximum level of lockdown; $\beta_{c(d+\tau)}$, where $\tau = 0$, is a dummy variable equal to one the day when a country experienced at least 10 COVID-19 related cases and zero otherwise (the "day zero"), while the coefficients of the lags ($\beta_{c(d+\tau)}$, with τ going from 1 to 83) capture the day-by-day differential effect on the stringency index with respect to the "day zero". In practice, these coefficients capture how quickly countries reacted in adopting/increasing stringency measures as a consequence of the spread of the virus. We postpone discussion on the variable $institutions_c$ until the next paragraph. The variable $covid_{cd}$ denotes the number of confirmed cases for COVID-19 per 100,000 inhabitants in country c and day d; f_c are country fixed effects that control for unobserved heterogeneity between countries due, for example, to national differences in the contagion level, health-care systems (such as availability of testing and Intensive Care Unit capacity), as well as population density and the age profile of the population; f_d are daily fixed effects that capture shocks common to every country, such as the information available on the pandemic situation to all citizens around the world; and u_{cd} is the error term, clustered at the country level.

While the event-study approach sheds some lights on the dynamics between the spread of the pandemic and the stringency measures, it does not allow for other country's characteristics to be factored in. To make progress on this we investigate whether there has been a heterogeneous response in relation to six

[7] For example, in Italy the first 10 COVID-19-related cases were registered on 23th February, whereas in Greece this was on the 5th March. It follows that $\beta_{c(d+\tau)}$, where $\tau = 0$, is equal to 1 on the 23th February and the 5th March for Italy and Greece, respectively, and zero otherwise. Accordingly, since the time-span of the analysis ends on the 20th of April, for Italy it is possible to compute a post-treatment period from the 24th of February to the 20th of April (and so for 59 days), while for Greece the post-treatment period can be computed for 46 days (from March 6th to April 20th).

different dimensions, namely i) politics, ii) democracy, iii) digitalisation, iv) level of development, v) structure of government, and vi) degree of openness. For each of these indicators we group countries in terms of high/low level values and we then estimate Eq. (1), where $institutions_c$ is a dummy variable that is equal to one for countries with high-level values of the investigated dimension and zero otherwise. The reason for doing so is that the differential reaction of the two group of countries (high and low) in adopting lockdown measures can be compared, while controlling for the same level of the spread of the virus.[8] The approach taken here raises an issue regarding a bias that might arise by comparing countries over different periods in the pandemic. To mitigate against this, the analysis relies on a sub-sample of countries which have experienced the day zero between March 1st to March 16th, when estimating Eq. (1).[9] Results of this analysis are shown in Figures A1 through A3 of the Online Appendix and, reassuringly, confirm our main findings.[10]

4 Results

To help interpretation of the results, we report estimates of Eq. (1) in Figures 1 through 3. In particular, for countries where the dummy indicator $institutions_c$ is equal to zero, we plot the point estimates and their 95% percent interval of $\beta_{c(d+\tau)}$ coefficients; while for countries where the indicator $institutions_c$ is equal to one we use the estimated coefficients of Eq. (1) to compute the combination of $\beta_{c(d+\tau)} + \gamma_{c(d+\tau)} \times institutions_c$, and then plot the relative coefficients (and their 95% confidence interval).[11] Before moving to the discussion regarding factors explaining the lockdown strategies, it is worth noting that from "day zero" of the pandemic all countries in the sample show some delays in the adoption of stringency measures.

Political factors

Countries close to the election year might have different incentives to lockdown the economy relative to countries which find themselves in different part of the political cycle, as emphasised by the contributions of Healy and Malhotra [2009] and Reeves [2011]. To account for this, the institution indicator is set equal to one for countries that in 2020 are in their pre-electoral year and zero otherwise. Panel A of Figure 1 reveals that countries in a pre-electoral year adopted more stringent measures against

[8] Recall that in this framework the coefficients associated with $\beta_{\tau c}$ (with τ going from 1 to 83) capture the impact for countries with low level of the $institutions_x$ indicator, while $\gamma_{\tau c}$ (with τ ranging from 0 to 83) account for the differential effect for countries with high level of such indicator.

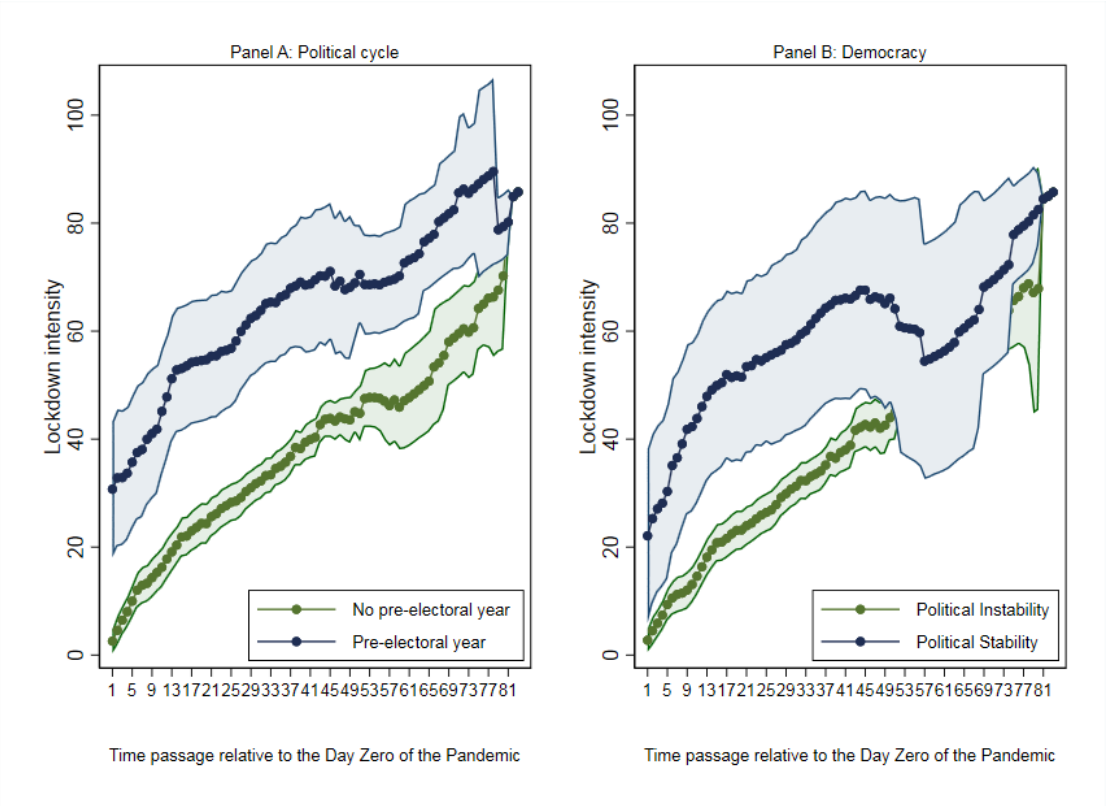
[9] In our dataset 97 countries experienced the day zero of the pandemic along the time-span of the analysis, among which 72 in March (37 from March 1st to March 16th, and 35 from March 17th to March 31st).

[10] For completeness, we have also estimated Eq. (1) on the sample of countries which had the day zero through March 17th to March 31st and the results, available upon request, are qualitative the same.

[11] All tables are available upon request.

the pandemic as compared to countries in other years of the term, suggesting that drastic confinement measures can be used as a tool to increase the political consensus, as recently pointed out by Blais et al. [2020]. This result lends support to the argument that early adoption of measures signals that incumbent politicians care about the health status of their citizens, which after the pandemic has become a very salient policy issue. In panel B of Figure 1 we test whether political stability – a proxy for the level of democracy – plays a role in handling the pandemic. This relationship is a priori ambiguous. As Gorodnichenko and Roland [2020] point out "one cannot claim that autocracy is more efficient than democracy – or vice-versa – in dealing with pathogen prevalence (pp. 11)" According to the estimates, stringency measures were significantly lower in countries characterized by political instability, thus indicating that political divisions make it harder to introduce stringent lockdowns.

Figure 1: *Stringency of lockdown measures and political factors.*

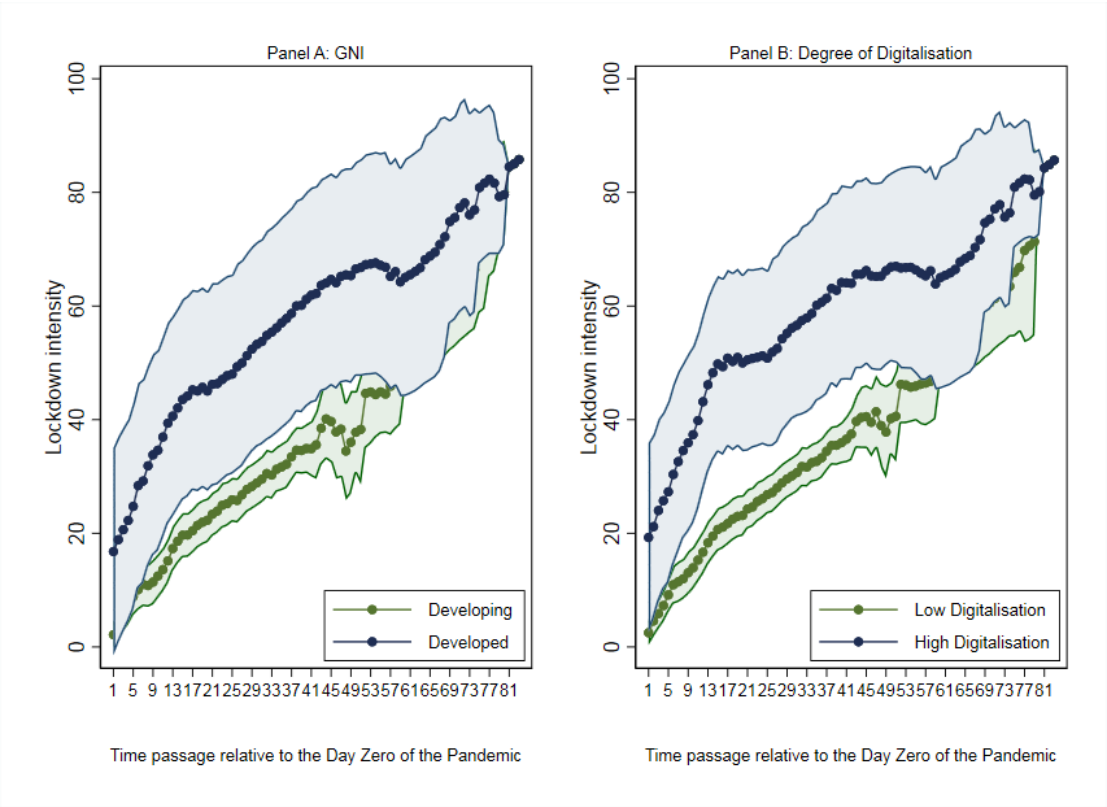


Economic factors

To see how the level of development affects the lockdown decision, we now split the sample, following the World Bank classification, in developing and developed countries. As it is shown in Panel A of Figure 2, developed countries (as measured by their level of Gross National Income – GNI) adopted

more stringent measures as compared to developing ones, at least in the initial phase of the pandemic. An explanation for this is that for developing countries the cost of lockdowns, namely the interruption of all economic activities, is much higher than that of developed countries: a finding also consistent with that of Barnett-Howell and Mobarak [2020]. In similar vein, the degree of digitalisation shapes the intensity of the lockdown as depicted in Panel B of Figure 2. Countries characterised by a low level of digitalisation (those that have a Digital Adoption Index below its 75th percentile) implemented less marked stringency measures than countries with high level of digitalisation (those that have a Digital Adoption Index above its 75th percentile), as the cost borne by low-digitalised countries in locking-down the economy is higher than that of the high-digitalised ones.

Figure 2: *Stringency of lockdown measures and economic factors.*



Institutional factors

To account for institutional factors we make use of two indicators: degree of decentralisation and degree of openess. To capture the dimension of centralisation/decentralisation we use the variable *number of government layers* and we group countries in centralised (number of government layers lower than its median value, 4) and decentralised. Panel A of Figure 3 reports the results indicating that in

decentralised countries lockdown measures are less stringent than those put in place by centralised ones. A possible (and quite convincing given the literature of fiscal and political decentralisation)[12] explanation is that in countries where policy making is decentralised coordination across the levels of government can be ineffective. This, to some extend, confirms the existing evidence regarding the difficulties in providing a well coordinated response to the COVID-19 emergency across government levels experienced by the Latin America countries (Ramírez de la Cruz et al. [2020]), and, possibly to a lesser extent, in the U.S.[13] While decentralisation has been shown to enhance accountability and be conducive to economic growth, when it comes to a collective response necessary to deal with the COVID-19 pandemic, it fares less well. There is, of course, an alternative explanation for this and one that relies on the fact that a more decentralised country may have different economic dynamics (and hence 'COVID-19 spread dynamics'). If the initial outbreak occurs in one region the country may be more reluctant to go for a nationally stringent measure, and instead adopt a more localised lockdown strategy.[14]

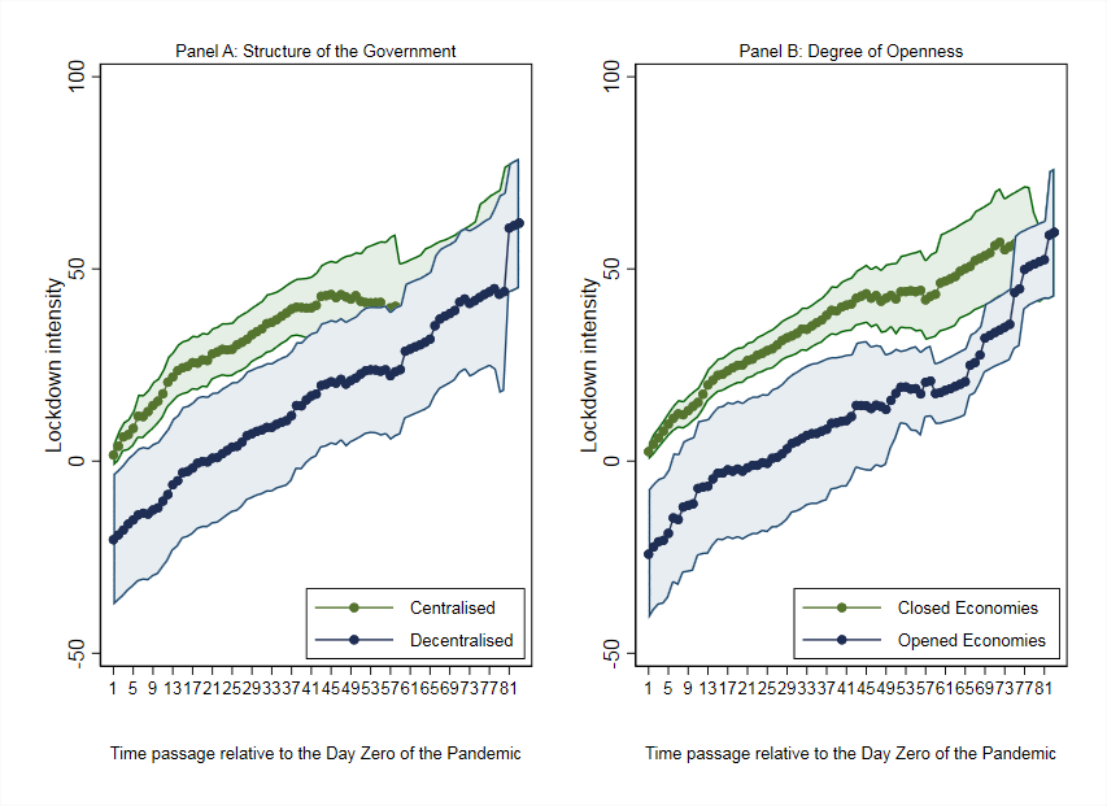
Does openness matter for the effectiveness of the lockdown? Intuition would suggest that more open economies react slower in imposing measures. The reason for this is that disrupting trade and movement is not only to costly but it also takes time. Indeed, grouping countries in closed (openness indicator below the 75th percentile) and opened (openness indictor above the 75th percentile) shows that the higher the level of openness of a country the less significant stringency measure will be adopted. Panel B of Figure 3 depicts the estimates.

[12] See for example Kessing et al. [2007].

[13] For example, at the end of May both Georgia and Texas decided to open up despite the increase of the number of cases, on the contrary Washington State and Oregon have extend lockdown measures until the summer. For more details on the timing of lockdown and re-opening measures in U.S.: https://www.nytimes.com/interactive/2020/us/statesreopen-map-coronavirus.html.

[14] We thank an anonymous referee for this alternative explanation.

Figure 3: *Stringency of lockdown measures and institutional factors.*



5 Summary and concluding remarks

This paper contributes to the literature that investigates the determinants of lockdown trying to identify mechanisms that might explain why some countries have been more decisive in restricting the movement of the population during the pandemic trajectory. What emerges from the empirical analysis is, perhaps not surprisingly, that a country's institutional features play a key role in shaping the country's attitude and response towards the implementation of lockdown measures. In particular, it has been shown that countries characterized by i) low political stability; ii) low level of development; iii) low level of digitalisation; iv) high degree of decentralisation; v) closed economy, and vi) not being in pre-electoral have adopted less stringent measures than other. Understanding the determinants of lockdown is important as are the factors for successful pandemic responses. Equally important is, of course, understanding the impact of the lockdown on economic outcomes and political institutions. Discussion on this has already started.[15]

[15] See Fukuyama, F. The pandemic and political order, Foreign Affairs, July/August 2020.

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