HAL
open science

The COVID-19 pandemic in Brazil: An urge for coordinated public health policies

Lara Lucena Zacchi, Marcelo Menezes Morato

To cite this version:

Lara Lucena Zacchi, Marcelo Menezes Morato. The COVID-19 pandemic in Brazil: An urge for coordinated public health policies. 2020. hal-02881690v2

HAL Id: hal-02881690

https://hal.science/hal-02881690v2

Preprint submitted on 30 Jun 2020

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

The COVID-19 pandemic in Brazil: An urge for coordinated public health policies

Lara L. Zacchi[a], Marcelo M. Morato[b]

[a] *PPGH, FAED, University of the State of Santa Catarina (UDESC), Laboratory of Gender and History Studies* (LEGH), *Universidade Federal de Santa Catarina (*UFSC*), Florianópolis, Brazil.*
[b] *Renewable Energy Research Group* (GPER), *Automation and Systems Department* (DAS), UFSC, *Florianópolis, Brazil. Grenoble Institute of Engineering, Université Grenoble-Alpes, CNRS, GIPSA-lab, 38000 Grenoble, France.*

Abstract

In this brief communication, we comment and discuss the COVID-19 pandemic in Brazil in a broad sense. We point out the explicit burden of the Brazilian Federal Government in the handling of the SARS-CoV-2 viral spread and in its neglectful campaign against social isolation. The current presidential politics have further exposed and reinforced a scenario of large inequalities (in various aspects). The discussions are based on forecasts using consistent SIRD-type models, which compare the observed data to that of what would have been the conditions with coherent public health measures (consistent lockdown). As of 23/06/2020, Brazil counts over 51500 deaths due to COVID-19.

Keywords: COVID-19, Brazil, Health Policies, SIRD Model, Social Distancing.

1. Introduction

As of 23/06/2020, Brazil counts over 51500 deaths due to COVID-19, for a population of about 210 million people[1]. Much more than a health and sanitarian crisis, social and economical backlashes are felt all over the country as the SARS-CoV-2 virus spreads. These outcomes become especially evident in places with large social, racial and gender inequalities, such as Brazil. The effects of the virus on populations with poorer access to healthcare and sanitation facilities are strikingly stronger than in middle-income *quartiers*[2] (Kabir et al., 2020; San Lau et al., 2020).

In this paper, some social and political aspects of the Brazilian COVID-19 context are taken into account (Werneck and Carvalho, 2020; The Lancet Infectious Diseases, 2020). This tropical continent-sized country has 26 federated states, which have been choosing different social distancing measures since mid-March to face COVID-19. Up to now, there has been no coordinated action to detain the spread of the virus, since the federal government, led by Jair Bolsonaro, is very reluctant to implement nation-wide policies, disclaiming that the negative economic effects are too steep and that social distancing is an erroneous choice (The Lancet, 2020); the government suggests that the economy "cannot stop" and that forced herd immunity could be a solution. Although Brazil has a strong universal public health system (SUS), recent literature suggests that if quarantine measures are not enacted, SUS might collapse. The expectation are catastrophic, see e.g. (Rocha Filho et al., 2020; Morato et al., 2020).

The political authoritarianism of Jair Bolsonaro (Saad-Filho and Boffo, 2020) and his politics to face COVID-19 sets a great health threat to those residing in Brazil. The threat, once again, seems posed upon the lives which have been historically exposed to risk. The president uses delusive and unscientific information (Ricard and Medeiros, 2020) and explicitly rallies his supporters against social distancing[3] (Dyer, 2020), despite this been the most widely adopted measure to reduce the virus transmission rate.

To tacitly expose the current COVID-19 situation in Brazil, Figure 1 shows the evolution of the contagion over the last four months, regarding total confirmed cases and deaths[4]. Upon this Figure, we highlight some disparaging, mocking or misleading presidential statements from the period.

Email addresses: laralucenaz1@gmail.com (Lara L. Zacchi), marcelomnzm@gmail.com (Marcelo M. Morato)

[1] The whole continent of South America, excluding Brazil, has roughly 220 million inhabitants, and counts 19981 deaths due to this disease (23/06/2020).

[2] A very illustrative example of these differences can be seen in the city of São Paulo: the city hall released a technical note stating that the observed mortality rate is over 10 times larger in neighborhoods with worse social conditions and precarious housing, such as *favelas* and settlements. See https://www.prefeitura.sp.gov.br/cidade/secretarias/upload/saude/PMSP_SMS_COVID19_Boletim%20Quinzenal_20200430.pdf.

[3] The idea behind social distance is to prevent health systems from becoming saturated due to large amounts of COVID-19 patients being treated at the same time. Therefore, with social distancing policies, the health systems do not have to deal with hospital bed shortages associated with a large peak of infections, since the demands for treatment become distributed over time.

[4] In this paper, we do not consider sub-reports/uncertainty associated to the data, although the phenomenon is widely reported regarding the Brazilian data.

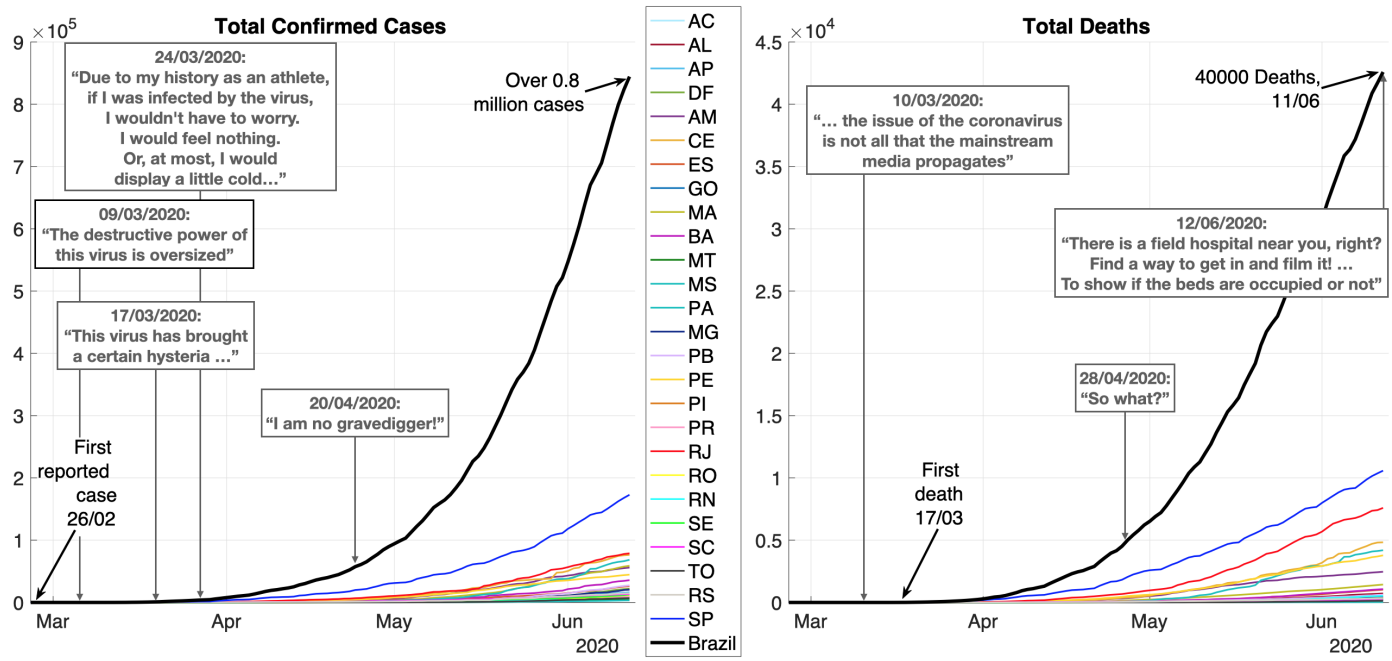

Figure 1: COVID-19 Evolution in Brazil: Total infected individuals and deaths. Consolidated dataset and per state. Presidential statements freely translated by the Authors.

With respect to the previous discussions, the motivation of this brief paper is to comment and denounce, in a broad sense, the irresponsible handling of the COVID-19 by the Brazilian presidency. We base our discussions on long-term forecasts using consistent SIRD-type models identified for Brazil, comparing the observed dataset to that of what would have been the conditions if coherent public health measures were adopted.

2. Possible Future Perspectives for Brazil

Recent literature has demonstrated how the COVID-19 contagion dynamics can be described with SIRD-kind[5] models (Peng et al., 2020; Kucharski et al., 2020). As 100 days have passed since the first confirmed SARS-CoV-2 case in Brazil, enough data is available to identify consistent model parameters; the estimates using different approaches, from different papers, are found to be convergent, e.g. (Bastos and Cajueiro, 2020; Fernández-Villaverde and Jones, 2020; Canabarro et al., 2020).

Therefore, we base our discussing on long-term forecasts derived from SIRD model, with parameters adjusted via Least Square procedures w.r.t. Brazilian data. These forecasts give the average expectation for active infections and deaths due to COVID-19 according to three scenarios: a) nominal conditions, with no coordinated social isolation by the federal government (as observed today), b) a 60 % social isolation condition strictly enforced from 17/06 onwards, and c) a strict 60 % social isolation condition enforced from the beginning of the contagion, 26/02. Figure 2 shows these forecasts. Model equations and parameters are given in Appendix A.

The main result is the following: the forecasts indicate that the number of deaths could mount up to over 190000 if no coordinated social isolation is enacted by the federal government. Today, we observe an accelerating/increasing contagion curve, which means that if social distancing is strongly enforced right now, the spread can be contained to the fatality of around 82900 cases. This means that if governmental action are employed through public health policies, **over** 107000 **lives could still be saved**. If quarantine measures were enacted back in March, this number could have been even larger, over 135000 lives.

These forecasts are only able to offer qualitative results, since the parameters estimated are performed based on the data available until 17/06. The parameters (infection, mortality and recovery rates) may change on the future, which directly influences the observed steady-state values. Withal, the scale of these steady-state values should remain roughly the same if stronger social isolation measures are not implied[6].

3. Discussions

Another crisis is seen today in a global scale, which became evident along with the COVID-19 spread: a crisis of the current economic system, exposed in its rawest

[5]SIRD: Susceptible, Infected, Recovered and Deaths.

[6]In this paper we have not even considered the issue of uncertainty/sub-notification that, according to recent papers (Bastos and Cajueiro, 2020; Morato et al., 2020), is very significant.

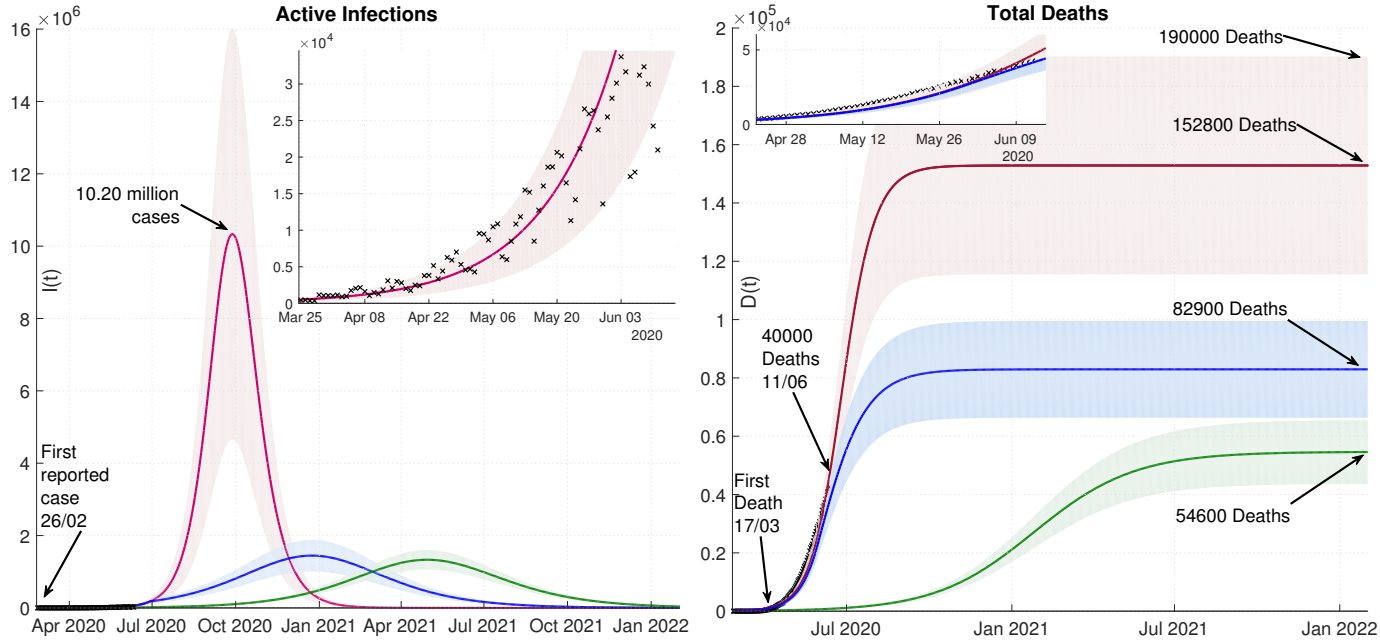

Figure 2: Long-term SIRD Forecasts for Brazil, Consolidated Datasets ($I(t)$ and $D(t)$): a) Nominal (−−), b) Lockdown Now (−−), c) Lockdown since March (−−) and d) Real data (×). Shades represent total variation, solid lines represent mean values. These forecasts consider a 90% confidence interval.

and cruelest forms. The racial, gender, social and class inequalities, for instance, have been shown as structuring aspects of this economic system which is precarious to life in favor of profit. As discusses Naomi Klein, the capitalist system has, by itself, established the sufficient conditions for this health crisis to trigger and expand with such ease (Davis and Klein, 2020).

The first COVID-19 case registered in Brazil dates late February, 2020. We have reached over a milion cases, with more than 51500 deaths in a period of four months, as shows Figure 1. If this pace is kept, with this overall lack of concrete public health policies, we will possibly reach over 190000 deaths in just another 120 days (Figure 2, nominal scenario).

Since the beginning of the contagion in Brazil, president Jair Bolsonaro neglected the seriousness of the SARS-CoV-2 virus and acted irresponsibly towards its mitigation. In his speeches and pronouncements, Bolsonaro explicitly discouraged social isolation measures and called out against possible quarantines. Through his discourse (Figure 1), he was able to shape and legitimate public opinion against health policies that master the viral spread, inciting violence and nurturing hate speech expressions[7]. By March, he described the SARS-CoV-2 virus as a "little flu" in open television. When Brazil reached 5000 deaths, he stated: "So what? What do you want me to do? I am no gravedigger!". By this time, the Intense-Care-Unit (ICU) beds in the state of Amazonas were nearly fully occupied with COVID-19 patients, with the local health system in the brink of collapse.

Regarding the Brazilian context, we can notice who are the ones most vulnerable to the contagion, and consequently most directly affected by Bolsonaro's policies, if we understand our State as embedded in a logic of necropolitics (Mbembé, 2003). The State detains the power of dictating who has the right to live and who does not; the State itself enforces violence politics and exclusion policies, which reproduce the precariousness of certain existences. The current politics in Brazil ensures race, class and gender inequalities (and their interconnections). These dissident subjectivities cannot reckon for the State protection in its totality, having to face and struggle with precariousness, in different levels.

These issues are partially evident in the COVID-19 contagion, which has affected those in worse social conditions much more fatally than the rest of society. This matter also permeates the racial issue, since, Brazil has an inherent and historical lack of racial democracy, as discusses Twine (1998). Furthermore, we also emphasize another fact: the SARS-CoV-2 virus is currently affecting some indigenous communities in great extent, such as the Yanomami and Ye'kwana ethnicities[8]. We believe that an-

[7] In editorial, The Lancet (2020) gives more details regarding Jair Bolsonaro's actions during these past months. Some of the political casualties of the pandemic are commented on by The Lancet Infectious Diseases (2020) in Editorial.

[8] Studies warn for the possible COVID-19 contagion of up to 40 % of Yanomami lands, amid the states of Amazonas and Roraima and along the border of Brazil and Venezuela, due to the presence of approximately 20000 illegal mining prospectors (Ferrante and Fearnside, 2020). Jair Bolsonaro has explicitly encouraged mining and deforestation, as widely reported in recent literature Phillips (2019);

other crucial aspect follows these lines: it is important to remark that women, along with their subjectivities, have also been affected by this pandemic in different scales, as debate McLaren et al. (2020) regarding the contexts of Sri Lanka, Malaysia, Vietnam and Australia. The same is true for Brazil, where domestic violence against women has increased and gender inequality became further apparent with the current scenario (Marques et al., 2020).

Therefore, to consider social isolation measures for Brazil, we also deem it very necessary to formulate public policies which embed perspectives that take into account the inherent racial, gender and class inequalities present in the country[9]. In the main, it is critical that public health efforts are proactive to mitigate the spread of the SARS-CoV-2 virus but also to devise transformative approaches for these subjects. For us, these actions seem to be the complete oposite of those being (irresponsibly) conducted by Jair Bolsonaro.

4. Final Remarks

Figure 3: Outdoor Propaganda

Figure 3 shows an outdoor propaganda in the city of Florianópolis, Brazil, stating:"The deaths are preventable. **SUS saves lives.** Bolsonaro doesn't'!". Indeed, as discussed in this brief paper, the lack of concrete health policies in Brazil, led by the authoritarian government of Jair Bolsonaro (along with his explicit discourse against social isolation), have been disregardful to face the COVID-19 pandemic. We ponder the direct effects of the current situation upon multiple social issues. Through SIRD models, we forecast that over 107000 lives could be saved if public health policies are put in practice. The nuances of these forecasts indicate how the social aspects and politics of a given place matters in pandemic scenarios and, thus, how irresponsible action could lead to catastrophic conditions, as those experienced in Brazil.

Diele-Viegas and Rocha (2020); Kröger (2020). See the datasets regarding the COVID-19 spread amid indigenous communities in `https://covid19.socioambiental.org`.

[9]We must note that social isolation can sufficiently contain the contagion spread in theoretically "perfect" conditions. Anyhow, in Brazil and many other countries, some realities must be taken into account. We see many people not being able to stay home due to a subsistence necessity for income, since the social aid the government is offering to those in such conditions is not enough and shows many bureaucratic difficulties. Recent findings suggest a need for long lasting income aids during social isolation periods (Ahamed and Gutierrez-Romero, 2020). Due to the fact that the Bolsonaro government disclaims that the negative economic side-effects of quarantine measures are too steep, many sectors from the economy have indeed chosen not to stop. In a country with such large social inequalities as Brazil, there are many people living in precarious conditions, such as erratic incarcerations, as those without homes, those in settlements and so forth.

Acknowledgments

L. L. Z. thanks the scholarship support by CAPES. M. M. M. acknowledges the partial financial support of CAPES and CNPq and the collaboration and previous discussions with D. O. Cajueiro, S. B. Bastos, M.V. Americano and J. E. Normey-Rico.

References

Ahamed, M., Gutierrez-Romero, R., 2020. COVID-19 response needs to broaden financial inclusion to curb the rise in poverty. arXiv preprint arXiv:2006.10706 .

Bastos, S.B., Cajueiro, D.O., 2020. Modeling and forecasting the early evolution of the COVID-19 pandemic in brazil. `2003.14288`.

Canabarro, A., Tenorio, E., Martins, R., Martins, L., Brito, S., Chaves, R., 2020. Data-driven study of the COVID-19 pandemic via age-structured modelling and prediction of the health system failure in brazil amid diverse intervention strategies. medRxiv .

Davis, A., Klein, N., 2020. Building movements: a conversation in pandemic times (Text in Portuguese).

Diele-Viegas, L.M., Rocha, C.F.D., 2020. Why releasing mining on amazonian indigenous lands and the advance of agrobusiness is extremely harmful for the mitigation of world's climate change? comment on pereira et al.(environmental science & policy 100 (2019) 8–12). Environmental Science & Policy 103, 30–31.

Dyer, O., 2020. COVID-19: Brazil's president rallies supporters against social distancing.

Fernández-Villaverde, J., Jones, C.I., 2020. Estimating and Simulating a SIRD Model of COVID-19 for Many Countries, States, and Cities. Technical Report. National Bureau of Economic Research.

Ferrante, L., Fearnside, P.M., 2020. Protect indigenous peoples from COVID-19. Science 368, 251–251.

Kabir, M., Afzal, M.S., Khan, A., Ahmed, H., 2020. COVID-19 economic cost; impact on forcibly displaced people. Travel Medicine and Infectious Disease .

Kröger, M., 2020. Field research notes on amazon deforestation during the bolsonaro era. Globalizations , 1–4.

Kucharski, A.J., Russell, T.W., Diamond, C., Liu, Y., Edmunds, J., Funk, S., Eggo, R.M., Sun, F., Jit, M., Munday, J.D., et al., 2020. Early dynamics of transmission and control of COVID-19: a mathematical modelling study. The Lancet infectious diseases .

Marques, E.S., Moraes, C.L.d., Hasselmann, M.H., Deslandes, S.F., Reichenheim, M.E., 2020. Violence against women, children, and adolescents during the COVID-19 pandemic: overview, contributing factors, and mitigating measures. Cadernos de saude publica 36, e00074420.

Mbembé, A., 2003. Necropolitics. Public culture 15, 11–40.

McLaren, H.J., Wong, K.R., Nguyen, K.N., Mahamadachchi, K.N.D., 2020. COVID-19 and women's triple burden: Vignettes from sri lanka, malaysia, vietnam and australia. Social Sciences 9, 87.

Morato, M.M., Bastos, S.B., Cajueiro, D.O., Normey-Rico, J.E., 2020. An optimal predictive control strategy for covid-19 (sars-cov-2) social distancing policies in brazil. 2005.10797.

Peng, L., Yang, W., Zhang, D., Zhuge, C., Hong, L., 2020. Epidemic analysis of COVID-19 in China by dynamical modeling. arXiv preprint arXiv:2002.06563 .

Phillips, D., 2019. Bolsonaro declares 'the amazon is ours'; and calls deforestation data 'lies'. The Guardian 19.

Ricard, J., Medeiros, J., 2020. Using misinformation as a political weapon: COVID-19 and bolsonaro in brazil. The Harvard Kennedy School Misinformation Review .

Rocha Filho, T.M., dos Santos, F.S.G., Gomes, V.B., Rocha, T.A., Croda, J.H., Ramalho, W.M., Araujo, W.N., 2020. Expected impact of COVID-19 outbreak in a major metropolitan area in brazil. medRxiv .

Saad-Filho, A., Boffo, M., 2020. The corruption of democracy: Corruption scandals, class alliances, and political authoritarianism in Brazil. Geoforum .

San Lau, L., Samari, G., Moresky, R.T., Casey, S.E., Kachur, S.P., Roberts, L.F., Zard, M., 2020. COVID-19 in humanitarian settings and lessons learned from past epidemics. Nature Medicine 26, 647–648.

The Lancet, 2020. COVID-19 in Brazil: "So what?". The Lancet 395, 1461.

The Lancet Infectious Diseases, 2020. Political casualties of the COVID-19 pandemic". The Lancet Infectious Diseases, 20, 755.

Twine, F.W., 1998. Racism in a racial democracy: The maintenance of white supremacy in Brazil. Rutgers University Press.

Volpatto, D.T., Resende, A.C.M., Anjos, L., Silva, J.V.O., Dias, C.M., Almeida, R.C., Malta, S.M.C., 2020. Spreading of COVID-19 in brazil: Impacts and uncertainties in social distancing strategies. medRxiv .

Werneck, G.L., Carvalho, M.S., 2020. The COVID-19 pandemic in brazil: chronicle of a health crisis foretold.

Appendix A. SIRD Model and Parameters

This SIRD set of equations includes the dynamics for susceptible (S), infected (I), recovered (R) and deceased (D) individuals. Considering N as the total population size, it follows as:

$$\begin{aligned}
\frac{dN}{dt}(t) &= -\frac{\rho}{1-\rho}\gamma I(t) \\
\frac{dS}{dt}(t) &= -\frac{\psi\beta I(t)S(t)}{N(t)} \\
\frac{dI}{dt}(t) &= \frac{\psi\beta I(t)S(t)}{N(t)} - \frac{\gamma I(t)}{1-\rho} \\
\frac{dR}{dt}(t) &= \gamma I(t) \\
\frac{dD}{dt}(t) &= \frac{\rho}{1-\rho}\gamma I(t)
\end{aligned} \tag{A.1}$$

were β stands for the average number of contacts that are sufficient for transmission of the virus from one individual, per unit of time t; γ stands for the recovery rate, which is the rate that each infected individual recovers; ρ gives the probability of an individual form the infected class $I(t)$ dying from infection before recovering; finally, ψ denotes the observed social distancing ($\psi = 1$ stands for no distancing and $\psi = 0$ represents a complete lockdown, with no social contacts). The parameters used for the presented simulations are given in Table A.1; the values are coherent with other papers (Bastos and Cajueiro, 2020; Canabarro et al., 2020; Volpatto et al., 2020).

Parameter	β	ρ
Mean	0.424426	0.00408
Interval	$(0.3395 - 0.5091)$	$(0.00367 - 0.0021)$
Parameter	γ	ψ
Mean	0.150876	0.7468
Interval	$(0.0754 - 0.2263)$	$(0.6754 - 0.8182)$

Table A.1: Epidemiological SIRD nominal parameters. The lockdown forecasts takes $\psi = \mathbf{0.6}$.