PART 4

04

Influencing Factors of COVID-19 Spreading: A Case for Government and Divine Intervention

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Crisis and Fragility:
Economic Impact of COVID-19
and Policy Responses

Influencing Factors of COVID-19 Spreading: A Case for Government and Divine Intervention

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Abstract

The pandemic, COVID-19, is a special one. It has created a disruption, like the ones seen in case of major wars, turning the growth trajectories of many economies' upside downs. What would be an ideal policy response? As countries across the world differ structurally, that is, some countries are more industrially advanced than the others; some are more populous, with a large dependence on agriculture and urban-informal sector; the nature of policy response to fight against COVID-19 varies across countries. Policy responses enacted through a combination of fiscal and monetary policies are meant to minimize loss of life and livelihoods. Some of the countries such as South Korea and New Zealand did well in containing the crisis. On the contrary India was not so successful. I compare and contrast the policy response of India, benchmarking it against South Korea and New Zealand. Although COVID-19 is spreading fast in India, the mortality rate is low. I attribute these to the exogenous factors. These factors such as demographic profile, tropical weather, dietary habits, large vaccination program, and ability to supply affordable drugs have been responsible for the low number of COVID-19 deaths in India.

Key Words: COVID-19, Testing, India, South Korea, New Zealand, Fatality Rate
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1. Introduction

The pandemic, COVID-19, is a special one. It has created a disruption, like the ones seen in case of major wars, turning the growth trajectories of many economies' upside downs. There is a prevalence of demand and supply-side shocks. Demand has fallen because of a lack of jobs, and loss in livelihood. Supply-side disruption is arising as firms have stopped manufacturing and imports of intermediate inputs, especially from China, affecting sectors such as pharmaceuticals and automobiles. For the economy to revive, these demand and supply-side shocks need to be addressed simultaneously. As private sector participants are stepping back in the face of uncertain demand conditions, the role of government in controlling the business cycle (cyclical fluctuation in output) is becoming even more important. Some economists and national leaders are advising for financial assistance by transferring money to the poor and needy. Usually, money transfer works as a temporary redistribution scheme when there is no dearth in supply of goods, but in the case of COVID-19, supplies are constrained by the lack of production resulting from a broken supply chain. Under this circumstance, money creation may lead to inflation and hurt the poor.

The future of many economies depends upon the capacity of the states around the world to contain the spread of this disease and ensuring a smoother flow of goods and services. For less-developed countries, the challenge is to strike the right balance between life and livelihood. Given their fragile health infrastructure, many of these countries are imposing a strict lockdown. The lockdown is a way to implement state-enforced social distancing. The virus spreads through person-to-person contact, and the only way to limit its spread is to identify the people who are infected. With proper screening and lockdown of the infected person, the virus can be eradicated within 14 days. Without containing the spread, the economy cannot be opened up. In addition to lockdown, a country has to consider other steps so that citizens are more informed about this disease, and to ensure that supply chains of essential items are not broken.

Lockdown has its own downsides. It affects livelihood, particularly those of unskilled workers who cannot take their work back homes. For the urban informal-sector workers and the agricultural laborers, lockdown means loss of jobs. As their income is hand to mouth, with zero savings, lockdown can be life-threatening. In fact, the inflationary impact of lockdown is

going to hit them the most. Also, the impact of a prolonged lockdown may boomerang as the migrant workers unable to sustain their family start traveling back from cities to their native hometowns, taking along the virus with them. Many of these migrant workers are also illiterate. On the other hand, the skilled workers, particularly, those employed in software services, academics, engineers, etc. can work from the comfort of home without their livelihood getting affected. Skilled workers are also more educated and are able to make better and informed decisions in the fight against COVID-19. For this group, the best strategy is to seek an extended lockdown, as their life and livelihood are little affected.

What would be an ideal policy response? As countries across the world differ structurally, that is, some countries are more industrially advanced than the others; some are more populous, with a large dependence on agriculture and urban-informal sector; the nature of policy response to fight against COVID-19 varies across countries. Policy responses enacted through a combination of fiscal and monetary policies are meant to minimize loss of life and livelihoods. However, there are few other exogenous factors that are not directly under the control of the policymakers. For instance, a number of COVID-19 related death are much higher in temperate countries such as Belgium, Italy, Spain, and the United Kingdom but not that much higher in tropical countries such as India, Ethiopia, Bangladesh, and Pakistan. This is in spite of the former group of nations being economically well-off and having access to a better healthcare infrastructure.

Although for India, the government pledged $265 billion to fight COVID-19,[1] and the exogenous factors such as climate and demography are acting favourably, there is a need for better implementation of policy measures that can contain the spread of COVID-19. The motivation for writing this paper is to see whether India can learn something from the best practices followed in South Korea and New Zealand. The latter two countries are successful in containing the spread of COVID-19.

The rest of the paper is organized as follow. I start looking at various policy alternatives available with the governments as part of the demand management policy. This is done in section 2. In section 3, I look at best practices for controlling COVID-19. I look at the case of two countries,

1. https://www.bloombergquint.com/global-economics/india-boosts-aid-to-economy-with-package-totaling-265-billion.

namely, New Zealand and South Korea, which have successfully controlled the spread of COVID-19. I also comment about India, which is the world's largest democracy and has the dubious distinction of having the world's second-largest coronavirus caseload, only behind the US. In section 4, I consider the factors such as, climatic condition, demography, dietary habit, and living conditions; which are outside control of policymakers and yet may impact the spread of this disease. Section 5 concludes with some policy recommendations.

2. Demand Management Policy at the time of COVID-19

Demand management policies refer to a combination of fiscal and monetary policies, laid down by the policymakers, to smooth out business cycles. Managing demand is important because when there is a greater demand for output relative to its supply, it causes inflation. On the other hand, slack demand conditions lead to excess supply. Firms unable to sell goods and services do not hire, and may even retrench workers, leading to unemployment. At the time of COVID-19, there is economic disruption caused by an extended period of lockdown. Firms are not able to sell goods because markets are closed and demand is less. Lockdown also means firms are not able to manufacture. As there is a disruption in economic activities, the governments are also collecting less money on account of taxes. And yet, the government had to spend money on account of cash transfer (for example, Iran and Malaysia), subsidizing utilities (Maldives), reducing or deferring social security payments (Brunei Darussalam), deferring student loans (Fiji), providing rental subsidies (Nepal) and providing free food and ration (India and Myanmar). Households who lose their income because of lockdown measures will need government support. Cash transfers are needed for the self-employed and those without jobs (Huang and Saxena, 2020).

Countries, across the economic stratum, are also spending on account of administrative costs, such as implementing travel restrictions, social distancing, and enforcing lockdown measures (Chinazzi et al., 2020). There are also costs involved in building additional hospitals, makeshift health care infrastructure (for example converting a football stadium into

a hospital), manufacturing greater number of personal protective types of equipment and other healthcare kits. To revive the demand, governments, particularly from the high-income countries, have already pledged more than $10 trillion, which is three times more than the response to the 2008-09 financial crises (Casim et al., 2020).

The flexibility for using fiscal policy is however less for the governments from low-income countries. With limited economic activities, the government must borrow money from banks and institutional investors. Foreign funding is likely to be difficult for low-income countries with an already lower sovereign rating. Disinvestment, wherein the government tries to sell its own assets to monetize the deficit, may not work either. The only option available with the government is to rely on the monetary policy.

The central bank can help the government finance the fiscal deficit by printing money. Printing money is a technical way of creating new money because the governments neither have to pay the interest rate nor the principal amount when it borrows from the central bank against its own securities. One downside of this policy measure is that it is inflationary. Since March, eight central banks from the developed economies made announcements for quantitative easing. The US initially announced a $700 billion purchase of government bonds on 16 March, followed by an announcement of 'unlimited' purchase on 23 March. The United Kingdom also announced a purchase of $200 billion on 19 March.[2] Money created through quantitative easing can also be used by private corporate and retail sectors, as private firms are struggling to survive with a fall in operating cash flow.

Money can also be created with central banks buying 'newly' issued government bonds. A popular approach to finance government expenditure at the time of COVID-19 is governments issuing COVID-bonds. In April 2020, governments across the globe (excluding the US) have already issued $55 billion worth of COVID-bonds. EU is raising Euro 750 billion from the bond market.[3]Among other countries, Israel is raising $5 billion, the Philippines raising $2.35 billion, Canada $78 billion, and another $1 trillion of sovereign bonds across the world are coming to market this year.[4]These

2. https://www.livemint.com/opinion/online-views/opinion-covid-19-triggered-unconventional-monetary-policy-india-s-concerns-11593930564483.html
3. https://www.ft.com/content/5a749314-89cb-4716-b348-eb0c0880ac39
4. https://www.livemint.com/market/stock-market-news/a-1-trillion-glut-of-bonds-is-dwarfing-central-bank-demand-11595390993213.html

securities typically come with a maturity period ranging between 15 days and 10 years. Central banks usually sell these bonds through auctions to other commercial banks, insurance companies, and mutual funds.

The funds raised by the government from the money market are used to finance expenditures related to COVID-19. In the next section, I look at the strategies that New Zealand and South Korea adopted which made them successful in containing the spread of COVID-19. Thereafter, I compare these strategies, with those followed in India, and why India was not that successful in containing the spread.

3. Ensuring the Life and Containing the Spread: The Case of South Korea, New Zealand, and India

3.1 South Korea

The reason why South Korea is successful in containing the spread has to do with testing and isolation of the infected people at a rapid speed. As early on 1 March 2020, Italy tested 0.357, UK tested 0.17, and the US 0.007 tested people, in comparison to South Korea testing 1.88 for every 1000 people (Our World in Data, 2020). Italy, UK, and the US have learned in a hard way for initially testing less number of people. The number of fresh cases has almost stopped emerging in the case of South Korea, whereas for the other three countries thousands of fresh cases started emerging, starting May 2020.

The result of early testing in South Korea was tell-tale. When countries around the world have shut down the spread of COVID-19, South Korea was actually opening up and people were able to come out back into the street. Starting late February 2020, South Korea was witnessing a sharp rise in the number of COVID-19 cases. They were registering the highest number of coronavirus cases around the world. South Korea decided to implement testing early. Early testing, isolation, and contact tracing, yielded results. While cases in most other countries continued to rise; Korea's number

started levelling off. It indicates South Korea managed to contain the spread of the virus, early on.

South Korea benefited from learning the lessons of responding to previous outbreaks of SARS (2003) and MERS (2015).[5] The role of an efficient and independent bureaucracy has been an additional advantage. Soon after the news of virus spread, the South Korean government started working with the biotechnology companies to develop testing kits for the COVID-19. By the time COVID-19 started spreading in South Korea, the country already had manufactured thousands of medical kits made available to conduct testing and implement contact tracing for the infected persons. In fact, economies across the world – Brazil, Colombia, Canada, Egypt, Ethiopia, the US, various European countries, including Italy, Bulgaria, Hungary, France, Poland, and Romania – have been importing medical kits from South Korea.[6] South Korea was not only able to contact trace and isolate infected people, but they also had all the necessary medical kits used for fighting the disease. Prior experience in handling SARS and MERS disease helped.

Contact tracing is a way to identify the people who have interacted with corona-infected people, and then testing these people to ascertain whether they have contracted the disease. The process is repeated if anyone from the new sample is tested positive. They are quickly isolated and treated at home or in the hospital. The testing is done free of cost so that it is made accessible to the entire population. But that's just the human-to-human transmission. The infected person may have travelled by bus and metros, and have touched subway poles and door handles. The South Korean government developed applications through which they collected data of the patients, their places of travel, and then disseminate this information to others using the mobile applications. The people are now aware of the place of travel of the COVID-infected persons and stayed away from where the patient travelled.

Apart from testing, the independent role of bureaucracy also helped to contain the spread. For example, a 'new regulatory system' was introduced in South Korea where the bureaucrat fast-track approval for newly-developed testing kits without obtaining permission from the political head (Hille and White, 2020). Such an independent role of bureaucracy may not be possible

5. https://ourworldindata.org/covid-exemplar-south-korea
6. https://thediplomat.com/2020/04/south-korea-ramps-up-exports-of-covid-19-testing-kits/

for India, where the politicians are powerful and at times are guided by religious interest groups.

3.2 New Zealand

New Zealand is another country that implemented a well-designed coordinated policy response to flatten the COVID-19 curve. Once the first case was registered on 28 February 2020, New Zealand was quick to close its border. Being an island country helped. In fact, over the years New Zealand has been successful in keeping biohazards away from the island nation. On 16 March 2020, New Zealand closed its border to foreigners.[7] For the New Zealanders returning back, they had to go through mandatory self-isolation for 14 days. In fact, in the process, New Zealand was able to stop the spread of coronavirus to various pacific island nations. After closing down its borders, New Zealand implemented what they learned from the experience of some Asian countries such as China and South Korea. They rigorously followed the principle of finding the cases, isolating the cases, and tracking the close contacts. The government joined hands with the private sector to manufacture personal protective equipment and other medical kits, early on. The government also ensured that the supply chain of essential items was not broken. The fully functional healthcare system was an added advantage. Having a small and educated population helped in implementing the lockdown. Starting 26 March 2020, apart from essential workers, the entire country was required to self-quarantine at home. Only grocery stores, pharmacies, hospitals, and gas stations stayed open, and movement of vehicles was restricted. The government reached out to people with the message that it trusts the citizens and responsibility lies with the people. This COVID-19 related message was aired through the Ministry of Civil Defence (so that people treat the message with importance) reaching the mobile phone of every citizens. The message read, *"This message is for all of New Zealand. We are depending on you. Follow the rules and STAY HOME. Act as if you have Covid-19. This will save lives."*[8] As a result, by 2 July 2020, New Zealand had 1180 confirmed cases and only 22 deaths.[9]

7. https://www.dw.com/en/jacinda-ardern-leadership-in-coronavirus-response/a-53733397
8. https://www.nzherald.co.nz/nz/news/article.cfm?c_id=1&objectid=12319899
9. https://www.who.int/westernpacific/news/feature-stories/detail/new-zealand-takes-early-and-hard-action-to-tackle-covid-19

3.3 India

Unlike New Zealand and South Korea, India is different in many ways.

First, India is a large populous country where many people are poor. An average middle-class Indian earns between $3,500 and $16,000 per annum.[10] Only 6% of the Indians earn more than that, and to get into the top 1% income-earning bracket, one needs to earn over $20,000 per annum in India. The average national income is around $1,900 per annum. However, considering the distribution of income, 80% of the Indians earn less than the average per-capita income. And when it comes to the lockdown, it is the livelihood of these people that gets the jolt. The biggest impact would be on the lives of the bottom 80% of the population. These people are mainly agricultural labourers and the urban informal-sector workers. Their number is 120 million with most of them being migrant workers with a subsistence level of income less than $5 per day (Banik and Banerjee, 2000). For these group of people, going out for work is more important than losing their livelihood to pandemics. Another related study pointed out that the most vulnerable group in India, in terms of loss in employment, are those who are into non-agricultural self-employment; such as street vendors, drivers, tailors, carpenters, painters, and petty shopkeepers (Centre for Equity Policy Studies, 2020). Nearly eight out of 10 such workers reported loss in employment during the lockdown. Therefore, irrespective of the government directive, the first best option for this group of people is to go to work without thinking much about social distancing.

Second, India also lacks adequate health care infrastructure. For instance, the States of Delhi and West Bengal in India, are suggesting home quarantine (The New Indian Express, 2020).Indian policymakers are finding it hard to quarantine "lakhs and lakhs of people". For India, given its fragile healthcare infrastructure, strict lockdown is seen as a preventive measure. With a community spread of COVID-19, India does not have enough doctors and hospital beds to provide treatment. India has 0.9 hospital beds and 0.7 doctors for every 1,000 people, against the WHO mandate of 1.9 hospital beds and 1 doctor per 1,000 population (World Bank, 2020).Additionally, India does not have adequate number of testing kits. As on 23 April 2020, India has tested only 0.362 for every 1,000 people in spite of having a much higher population than UK, South Korea, and the US (Our World in Data, 2020).

10. https://www.livemint.com/Opinion/uMcYLhhViH2IOX9jdzvHcM/How-can-India-bridge-the-gap-between-its-middle-and-median-c.html

And third, India also did not have prior exposure of handling a pandemic of this scale. Policymakers were caught off guard. There were no supply of medical kits available and during the initial months of March and April 2020, the numbers of testing done in India were pretty low. There is a belief that India was under-reporting the actual number of infected persons. The suggestion for home quarantine is a way to signal that there may be more number of infected persons than what the official figure suggests (Singh, 2020). As there was less number of testing during early months, the number of COVID-19 affected persons was less. During April 2020, India on average was reporting around 3,000 cases each day. Fast forward to July 2020, the number of COVID-19 affected persons increased manifold, with more than 60,000 people getting infected daily.[11] However, the numbers of deaths are much less, with a coronavirus death rate below 2%. A way to understand the fatality rate is to examine how many number of days it take for total deaths to double. As on 25 April 2020, this number was 9 days for India - there were 410 COVID-19 confirmed deaths on 16 April 2020, with the number doubling to 825 on 25 April 2020 (ICMR, 2020). For New York, which was at the same stage of pandemic, this number was 2.5 days. The lower fatality rate is because of other exogenous factors which I discuss in the next section.

3.3.1. Policy Response to fight COVID-19 in India

Initially, Indian policymakers wanted to contain the spread of COVID-19 through harsh lockdown measures. Given the poor state of healthcare infrastructure, lockdown seems to be a natural choice. However, lockdown has hit the economy hard. Recent estimate suggests around 122 million Indian lost jobs between March and April 2020.[12] Close to 90% of the workforce in India are in the informal sector, without any social security benefits.[13] In the period during and following the lockdown, most of the small manufacturing units, urban mom and pop stores, small time restaurants, amusement park, etc. got closed. These places used to employ a larger chunk of India's 500 million rural- centered, illiterate working class. Suppressed income due to low agriculture productivity in India prompted rural to urban migration. Economic shutdown means loss of livelihood for

11. https://www.livemint.com/news/india/usa-witnessed-50-000-covid-19-deaths-in-23-days-india-took-156-days-10-points-11597570938030.html
12. https://indianexpress.com/article/jobs/122-million-indians-lost-jobs-due-to-pandemic-these-skills-can-help-them-be-employed-again-6510032/
13. Employees are considered to have informal jobs if their employment relationship is, in law or in practice, not subject to national labour legislation, income taxation, social protection or entitlement to certain employment benefits (such as paid annual and sick leave).

these groups of people, most of whom live in hand-to-mouth existence. The International Labour Organization estimates around 400 million people working in the informal economy in India are at risk of falling deeper into poverty, and 195 million full-time jobs are expected to be wiped out.[14] All these call for an expansionary demand-management policy on part of the government and central bank in India.

The government announced a fiscal stimulus package of 20 trillion Indian rupees, almost 10% of GDP, to kick-start the Indian economy.[15] The fiscal stimulus came in the form of deferment of tax payment, distribution of free food grains, ease of doing business processes, and implementing some fundamental reforms. On 5 June2020, the government ushered in the much-needed reforms by changing the agricultural produce market committees (APMCs) act, permitting trade in agricultural produce between farmers and the corporate sectors. Such a move is likely to facilitate contract farming and increase farm income. Any person having a national identity card (such as PAN and Aadhaar cards) can operate and trade using electronic platform to transact in agricultural produce. Such activities were earlier not allowed, where trading in agriculture product only happened in government designated markets. A reform in the APMC act is expected to boost farm income. Around 60% of the rural households in India earn their livelihood from the agriculture sector.

The central bank, Reserve Bank of India (RBI), to complement the government's fiscal measures, also followed an expansionary monetary policy. The central bank reduced both repo and reverse-repo rates to 4.4% and 3.75%, respectively, which is a reduction by 25 basis points. This meant more money in the hand of the commercial banks, which in turn can be lent out. On 27 March, the RBI Governor Mr. Shaktikant Das said, "monetary policy needs to proactively arrest any deterioration in aggregate demand, and create enabling conditions for businesses to normalise production and supply chains."[16] In addition to buying government bonds, RBI provided additional fund at cheaper rates to the non-bank financial companies (NBFCs), and offered refinance options to small and medium business, and agriculture sectors. These measures are expected to enable banks

14. https://economictimes.indiatimes.com/news/economy/indicators/about-400-million-workers-in-india-may-sink-into-poverty-un-report/articleshow/75041922.cms.
15. https://www.livemint.com/news/india/rs-20-trillion-stimulus-going-by-govt-s-maths-rs-10-71-tn-package-at-disposal-11589331802344.html.
16. https://www.rbi.org.in/Scripts/BS_PressReleaseDisplay.aspx?prid=49659

and NBFCs, to extend additional loans at cheaper rates to the business communities.

Although India, like any other country, is following expansionary demand-management policies, there is a need for effective implementation. Fortunately, the exogenous factors are playing out in India's favor, explaining the lower mortality rates from COVID-19.

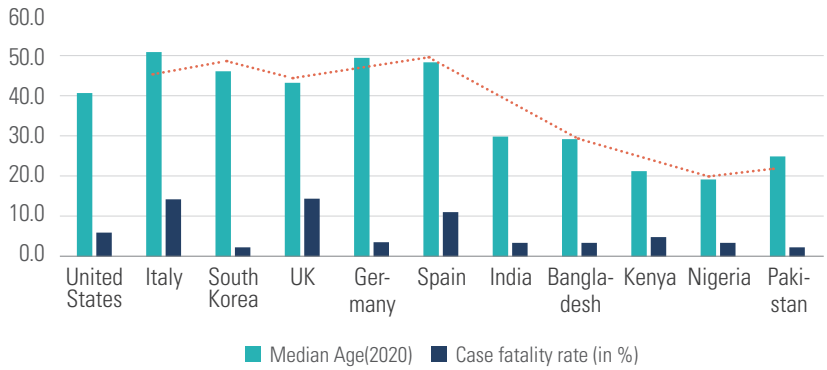
4. Exogenous Factors affecting COVID-19-related Death

Exogenous factors are the ones over which policymakers have little control. It can act as a boon or bane for any economy. Below I discuss a few of them.

Age Profile: A reason why the number of COVID-19 deaths is less in India is because India has a much younger population in comparison to the developed countries. With an increase in age the severity of the disease goes up. Elderly people are co-morbid and more likely to suffer from other types of diseases, such as diabetes mellitus, coronary artery disease, cancer, and upper respiratory tract infection (Valderas et al., 2009). For this group, chances of hospitalization and intensive care go up, leading to more deaths by the COVID-19 (Brurberg, and Fretheim, 2020). A report of 72,314 cases that occurred in mainland China shows for the people aged between 70 and 79, the overall fatality rate increases from 2.3% to 8.0%. For the people above 80 years, the fatality rate was at 14.8%. Similarly, for Italy, for the people aged between 70 and 79, the fatality rate is 12.8%; whereas for the people above 80 years of age the fatality rate increases to 20.2% (Onder et al., 2020). US Centers for Disease Control and Prevention conducted a study on the elderly cohorts and found elderly people with comorbidities such as heart disease and diabetes are twelve times more likely to die and 6 times more likely to be hospitalised because of COVID-19 (Sharma, 2020).

Figure 1.

Median Age and Fatality Rate



Source: Our World In Data (https://ourworldindata.org/age-structure)
Note: A 2 point moving average tracks data as an average of last 2 periods to smooth out the data.

As evident from Figure 1, India and countries such as Bangladesh, Kenya, Nigeria and Pakistan have a lower level of fatality rate in comparison to the developed countries – the US, Italy, South Korea, United Kingdom, Germany and Spain. India, Bangladesh, Kenya, Nigeria, and Pakistan have a younger population and also share similar economic profile (lower-middle income countries).[17] The trend is negatively slope, suggesting that an elderly population is more likely to have a higher fatality rate.

Tropical Climate: What is also particular about the sample of lower-middle income group of countries is that they also share similar climatic condition. Most viruses exhibit seasonality, varying across geographic locations and across diseases (Martinez, 2018). The COVID-19 virus is sensitive to high temperature and humidity (Chin, et al., 2020). A study that analyzed the meteorological data for 166 countries revealed a negative relationship to both - temperature and relative humidity - on the daily number of new cases and new deaths resulting from COVID-19. A 3.08% (95% CI: 1.53%, 4.63%; CI stands for "Confidence Interval") reduction in daily new cases and a 1.19% (95% CI: 0.44%, 1.95%) reduction in daily deaths could be

17. World Bank classifies countries into three groups: low-income, middle-income and high-income. In 2018, the high income countries are those with a per capita income more than US$ 12,376 per annum. Middle income countries are the ones with per-capita income between US$ 1,026 and US$ 12,376 per annum. Countries with per capita income less than US$ 1,026 per annum are classified as low income countries.

associated with a 1°C increase in temperature. Similarly, relative humidity increasing by 1% was associated with a 0.85% (95% CI: 0.51%, 1.19%) reduction in daily new cases and a 0.51% (95% CI: 0.34%, 0.67%) reduction in daily new deaths (Wu, et al., 2020). However, when temperature is below 3°C, the daily confirmed cases of COVID-19 increase by 4.861% (95% CI: 3.209, 6.513%) for every 1°C fall in temperature (Zhu and Xie, 2020). Cold and dry weather is favorable to virus survival and spreading. Also, the innate immune system's ability to function is hindered in cold and dry weather conditions (Sun et al., 2020). The reason why we may observe a higher mortality rate for the developed countries may be attributed to the temperate climatic condition characterized by cold and dry weather conditions. Moreover, Indians while growing up have an early exposure to vector-borne diseases such as malaria, dengue and chikungunya, and may have developed a state of resistance to COVID-19.

Dietary habit, associated living condition, and health policy: The Ministry of AYUSH, Government of India has issued guidelines for using the Indian system of ayurvedic (traditional) medicines with antipyretic properties to be used as a general immunity booster (Government of India, 2020). Ayurveda is a plant-based science. There is a belief that the phytocompounds present in herbs such as andrographis paniculata, vetiveria zizanioides, cymbopogon jwarancusa, ginger, cyperus rotundus, etc. can stop the virus from replicating and protect the body from COVID-19 (Tejonmayam, 2020). The suggested guidelines for developing immunity, as issued by the Ministry of AYUSH, are based on the idea of practicing yoga and eating a healthy diet.

Likewise, a cleaner air quality may help to reduce the chance of contracting COVID-19. The research done in the US and in Italy suggests people living in polluted areas are more likely to die from COVID-19 than those living under cleaner environment. High death rates in the northern industrial part of Italy (in Milan and Lombardy) are attributed to a higher level of pollution (The Guardian, 2020). In fact, in India, following a strict lockdown measures, air quality has improved. For example, in the national capital region of Delhi, the air quality index has fallen from the high of 900 micrograms per cubic meter in 2019, to around 20 micrograms per cubic meter during April 2020 (Ellis-Petersen, 2020). Moreover, unlike in the developed countries where people are used to working in a close office environment (with centralized air conditioning), the majority of the people in India work outside, or under conditions which do not require

centralized air conditioning. The virus is more likely to spread in close office environments, wherein, if one person gets infected they are more likely to affect others. A new found cleaner air quality in India and absence of indoor office environment may have helped to develop immunity to fight COVID-19.

Health policy in India encourages universal vaccination for poor income cohorts. A few studies have commented on the effect of BCG vaccine in reducing respiratory infections (Hegarty et al., 2020, and Curtis et al., 2020). Lower incidence of COVID-19-related death among South Asian countries and other African countries, in comparison to their counterparts in North American and European continents, can be partially attributed to BCG vaccination policy (Miller, et al., 2020). Countries with higher COVID-19 related death counts, such as USA, Canada, and Italy do not have universal BCG vaccination policy, whereas, United Kingdom, Spain, France, and Germany, earlier used to have an universal vaccination policies.

Generic pharmaceutical industry: India is home to 3,000 pharmaceutical companies and 10,500 drugs factories. India is the world's third largest manufacturers of medicines (by volume) and has emerged as a major exporter of generic drugs in such areas as diabetes, anti-depressants, high blood pressure, epilepsy and even cancer, in part because the Indian government allows foreign multinationals to invest in India. Tie-ups between Indian domestic drug manufacturers and foreign multinationals – Piramal Healthcare with Abbott Laboratories, Ranbaxy Laboratories with Daiichi Sankyo, Dr. Reddy's Laboratories with GlaxoSmithKline, Shantha Biotechnics with Sanofi-Aventis, and Biocon with Bristol-Myers Squibb – have allowed India to move up the value chain, with formulations and packaging moving in here. In fact, pharmaceuticals are an important component of Indian trade with the African and South American continent, with India supplying 85% of all anti-retroviral drugs used to treat HIV in Africa. Like in the case with HIV, India is also a major manufacturer of hydroxychloroquine, the drug that is used to prevent and treat malaria, lupus and rheumatoid arthritis, and now being used in India, Brazil, and the US as a preventive drug to fight against COVID-19.

5. Conclusion and Policy Recommendations

In this policy paper, I examine various policy options available with the government as part of the demand management policy. Doing this, I look at best practices for controlling COVID-19. I look at the case of two countries, namely, New Zealand and South Korea, which have successfully controlled the spread of COVID-19. At the other extreme is India. India, which is the world's largest democracy, has the dubious distinction of having the world's second-largest coronavirus caseload, behind only the US. India spent around $265 billion in the form of monetary and fiscal policies to contain the COVID-19. However, India has failed to contain the spread of the disease. To contain the spread the following steps are necessary:

1. Implementation: If the government is announcing any further lockdown, such a measure should be universal and complete except for food, medicines, and other essential supplies. In this regard, India should take a lesson from New Zealand. Movement of politicians and local leaders should be restricted as they are using this COVID-19 situation for their personal benefit. To garner sympathy the politicians are seen roaming in the streets and handing over the goodies, without maintaining social distancing. The army should step in to monitor the distribution of the essential items. Migrant laborers, unemployed people, and beggars should be broken down into small groups and given shelter and food in large convention halls, schools, parks, and stadiums. For this group the level of awareness is low, and economically they are the most vulnerable. India has 30.97 million metric tons of rice and 27.52 million metric tons of wheat, enough to feed its population for a year. Each camp should have a medical center or clinic nearby to pick up cases as fast as possible. Alternatively, the places of residence of the migrant workers in their native areas should be identified, and the local district magistrate should be held accountable in case anyone breaks the rule of self-quarantine.

2. Screening: Given our huge population and stigma associated with COVID-19, there are instances of under-reporting. It is essential that the central government make it mandatory for any person having upper respiratory tract infection and history of travel undertake rapid

tests for protective antibodies in a finger prick. This test is both cost-effective, scalable, and can be used for initial screening. All the data can be collected via a mobile application. This data then can be analyzed by Artificial Intelligence to detect high-risk areas.

3. Profiling: High-risk areas should be tested first followed by universal screening to detect community spread. Once screened, areas can be demarcated into 3 zones (red, orange and green) depending on the number of positive cases. In this regard, India should take a lesson from South Korea. These zones will be transitional as the recovery rates increase with time. Localized travel and relaxation of lockdown can be done in the green zones whenever they attain that status. Drones can be used to monitor the zones.

4. Treatment: Hospital care will depend upon the initial triage of the patients. Hospitals should be separated into 3 categories – with ventilators and Intensive Care Units, without ventilators but high flow oxygen devices, and the ones with moderate care to quarantine patients only. Already railway coaches have been turned into isolation wards.

5. Infrastructure: Drug trials and vaccine development should be the priority of all biomedical companies. 3D printing of PPE should be done at all automobile and defense equipment manufacturing companies. At times, when there is a shortage of PPE, government should refrain to send these essential medical kits to other countries (read, Serbia). Instead, there should be a way to bring back API from China in larger quantities. Drugs manufacturing are drying up and many medical stores are running short of supply as the distributors are not able to reach the retailers. The supply chain involving medicine has to be up and running on a priority basis.

The spread of COVID-19 can be controlled better if the policymakers in India follow these aforementioned policy recommendations. Luckily for India, the exogenous factors such as demographic profile, tropical weather, dietary habits, large vaccination program, and ability to supply affordable drugs, are playing in its favor. These factors may have been responsible for the low COVID-19-related mortality rates in India.

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