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A MODEL TO UNDERSTAND STATE ACTION AND INDIVIDUAL RESPONSES DURING COVID-19 PANDEMIC

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A Model to Understand State Action and Individual Responses during COVID-19 Pandemic

Abstract

A major learning from the spread of COVID-19 in Kerala has been that the State restrictions have only 'delayed' the spread of the disease but were unable to 'stop' its spread. Was there a single best response scenario which would have lifted the economy as well as saved its people from the pandemic? The paper attempts to explain this through a simple model taking into account the strategic interaction of the State with its citizens.

Introduction

Most of the State of Kerala’s responses to COVID-19 pandemic were in fact responses to counter the impact of the lockdown imposed by the State itself. This came in the form of fiscal stimuli, monetary and financial support to wade the economy amidst production and output decline and job losses. The phased lockdowns and reopening of the economy were heavily dramatised. The processes never coincided with the actual figures of COVID deaths or number of infected people. While lockdowns were initiated when the number of cases and deaths were at its lowest, the phased reopening never coincided with such declines. Rather, the State’s decision to reopen has gone alongside the largest spikes in infection rates and deaths in the country. This might raise the question of what then would have been the best response? Was there a single best response scenario which would have lifted the economy as well as saved its people from the pandemic? The paper attempts to explain this through a simple model taking into account the strategic interaction of the State with its citizens.

Strategies of the State and Individuals

The model is based on different strategies available with the State and the individuals constituting it. While the State as well as the individuals could have different mechanisms and strategies by which they could interact with each other, we assume for simplicity that both of them play the game using two strategies each. The strategies available with the State as a primary measure to combat the pandemic is either to “Intervene” or “Not to Intervene” in controlling the spread of the disease. The Individual on the other hand could use the strategies of “Comply” or “Not to Comply” with the State restrictions. So, there are basically four scenarios in which the State and the individual play the game as shown in Table 1. These four scenarios could produce different payoffs for the State and the individual.

Table 1: Strategies Available with the State and Individuals

	Individual	
State	Intervene, Comply	Intervene, Non-Compliance
	Not to Intervene, Comply	Not to Intervene, Non-Compliance

Assigning Payoffs for Each Strategies

How do we assign arbitrary payoffs in such a context? In the model, it is assumed that “What” and “How much” people respond to State’s strategies has an impact on how the State stands to gain or lose in the situation. Four criteria have been taken to assess the gains and losses of the two players. The major criteria which the State will be concerned of is the economic crisis which looms large; and as far as the ruling government is concerned, the extent to which its credibility is affected in the way it handles the pandemic. Therefore, “economic crisis” and “credential loss” are the two factors identified as the State’s concerns while playing its strategies. On the other hand, as far as the individual is concerned, he or she would be more preoccupied with how much he or she can engage in productive activities, while maintaining a good quality of life. Therefore, the individual stands to gain or lose from how much he or she “can engage in productive activities” and how much loss he or she suffers from “loss of quality of life”. Here, a positive value has been assigned for each of the gains and a negative value for the losses for the respective players. Table 2 indicates the values.

Table 2: Arbitrary Payoffs from the Outcome of Each Strategies

	State	Individual	
Economic Crisis	-1	Do not engage in productive activities	-1
No Economic Crisis	1	Engage in productive activities	1
Credential Gain	1	Quality of life maintained	1
Credential Loss	-1	Quality of life lost	-1

Table 3: Total Payoffs of Each Strategic Responses of the State and the Individual

Strategies and Payoffs Assigned	1st Stage	2nd Stage	3rd Stage	4th Stage	Total Payoffs
State Intervenes	Gain Credentials (1)	Do Not Engage in Productive Activities (-1)	Economic Crisis Worsens (-1)	Low Income, Low Quality of Life (-1)	-1
	Risk of Spread Reduced; Maintain Quality of Life (1)				
State Does Not Intervene	Lose Credentials (-1)	Engage in Productive Activities (1)	Lessen Spread of Economic Crisis (1)	Earn Income, Maintain Quality of Life (1)	1
	Risk of Spread; Loss of Quality of Life (-1)				
Individuals Comply	Gain Credentials (1)	Do Not Engage in Productive Activities (-1)	Economic Crisis Worsens (-1)	Low Income, Low Quality of Life (-1)	-1
	Risk of Spread Reduced; Maintain Quality of Life (1)				
Individuals Do Not Comply	Lose Credentials (-1)	Engage in Productive Activities (1)	Lessen Spread of Economic Crisis (1)	Earn Income, Maintain Quality of Life (1)	1
	Risk of Spread; Loss of Quality of Life (-1)				

Tables 2 and 3 Explained

The model assumes that each of the strategic responses of the State and the individuals is carried out with certain expectations as mentioned above. A negative value (-1) has been added for each loss of these expectations and a positive value (+1) has been added for each gain. All these effects could be further broken down into sub effects, but to keep the model simple the broader impact of each of the strategies has been considered.

Table 3 has classified the impact of each of the strategic responses in the payoff matrix into four stages. In each stage, the losses and gains are mentioned. The fifth column cumulates these values. For instance, if the strategic response of the State is to intervene the stages are the following: there will be a gain in credentials in the initial stage which will

be associated with lesser spread of COVID-19 (for each of these positive outcomes a positive value has been assigned). However, from the second stage onwards these gains become losses when people lose their jobs and the crisis worsens. In future, such insecurities could worsen the quality of life. Adding the gains and losses, we arrive at the final payoff for this strategy.

Assuming the outcomes for each of the strategic responses, we can calculate a payoff matrix from the strategic interactions of the State and the individual.

Payoff Matrix

The payoff matrix is calculated by using different strategies and assigning different values corresponding to each of the strategies as calculated in Table 3 using the values assigned in Table 2. The dominant strategy for each of the players can be

calculated. We see that the dominant strategy is also the Nash equilibrium in this context.

Table 4: Payoff Matrix

		Individual	
		Comply	Do not Comply
State			
	Intervene	-1, -1	-1, +1
	Do not Intervene	+1, -1	+1, +1

Analysing the payoff matrix, we find that there exists a dominant strategy for both the State as well as the individual. The strategy for the State is “Do not Intervene” and for the individual it is “Do not Comply”.

Conclusion

A major learning from the spread of COVID-19 has been that restrictions have only ‘delayed’ the spread

of the disease but were unable to ‘stop’ its spread. Most of the advisories from the health sector have focussed on how individuals should take care of themselves rather than on abject bans or restrictions in travel and daily routine. There are various instructions from competent authorities accessible everywhere on how we could control the spread of COVID-19. The State too has been a vehicle in disseminating this information to the public. However, direct interventions on the life of individuals and bans on economic activity need not necessarily go far in containing the spread of the disease. As we have seen above, it probably worsens economic conditions. While interventions and restrictions might make the State feel comfortable in the first stage, later stages would only make matters worse. A win-win strategy would be to reduce restrictions of the State and allow individual initiatives to respond to the crisis.

