9^{th} International Conference on Computational Social Science IC^2S^2
July 17-20, 2023, Copenhagen, Denmark

On the Impact of Political View to the Pandemic Outcomes

Keywords: COVID-19, Pandemic, Politics, Data Analysis, Spatial Correlation

Extended Abstract

The COVID-19 pandemic undoubtedly had a significant impact on society, in particular, to the global economy. While the scientific community has worked tirelessly to develop effective models of spread, treatments, and vaccines, we have politicians often playing some crucial role in shaping the response to the pandemic. From the earliest days of the outbreak, political leaders made decisions about how to handle the crisis, often with conflicting interests in mind. In this work, we examine the possible relation between populations political leanings and the effect the pandemic had on them.

We conducted an analysis of public data on COVID-19 cases and deaths. The data was extracted from the *Informe Semanal*, 43^{rd} week of the Fortaleza City Council (in Brazil), part of *Integra SUS* (Unified Health System), *SESA* (Secretary of Health of Ceará State), *SMS* (Municipal Secretary of Health); we use the number of cases and deaths from 1 Jan 2020 to 1 Nov 2022. For the political leaning data, we look at the results of the mayoral (2020) and presidential (2022) elections within the city of Fortaleza, Brazil. Data extracted from the website of the *TRE Ceará* (Regional Electoral Court of Ceará). With approximately 2.7 million inhabitants, Fortaleza is the fifth-largest city in Brazil by population and ranks fourth in terms of COVID-19 deaths[1], with 9,743 reported so far, and the sixth with the highest number of cases, 291,578 cases[2].

After analysing the data for each neighbourhood in Fortaleza, we discovered a correlation between people's political preferences and the number of reported COVID-19 cases and deaths. The maps in Figure 1A and Figure 1B illustrate some interesting patterns. The areas that appear in blue indicate a higher percentage of votes for the candidate from the right-wing party, while those in red represent a higher percentage of votes for the candidate from the left-wing party. In both maps, the right-wing party had more votes towards the left side of the maps. We also observed a similar trend in the number of COVID-19 deaths per neighbourhood, as shown in maps in Figure 1E.

Figure 1C illustrates the correlation between the standardized percentage of difference of votes and its spatial lag (on the right), which represents the standardized average density of percentage votes in the neighbourhood of each observation and an empirical test (on the left). Upon calculating the Moran's I statistic for this variable, we obtained a value of 0.25 (1 to -1). When we performed $\approx$1000 permutations and shuffled the variable's locations randomly, we obtained a value of 0.001. A significantly small value associated with the Moran's I implies that the map is not randomly distributed. In other words, the spatial distribution of the variable exhibits more clustering than we would expect if values were randomly assigned to locations. Still in Figure 1C, the blue line represents the mean value, while the red line represents Moran's I statistic calculated for the variable using the observed geographic locations in the dataset. It is evident that the observed pattern exhibits significantly higher clustering than expected under randomness.

[1] `https://coronavirus.fortaleza.ce.gov.br/boletim-epidemiologico.html`
[2] `https://covid.saude.gov.br/`

Figure 1D shows us where values cluster or disperse using the Local Indicator of Spatial Association (LISA). LISA (or local Moran) enables us to identify regions of atypical concentration of values. By using LISA, we can discern the precise type of local spatial autocorrelation present in the data, whether it be High-High (HH), Low-Low (LL), High-Low (HL), or Low-High (LH). The HH quadrant is located in the upper-right corner of the plot, LL in the lower-left, LH in the upper-left, and HL in the lower-right. The cluster in red HH indicates a high tendency to a greater difference of votes for the candidate more to the left, and in blue the difference in favour of the candidate more to the right. Green represents how significant are the clusters formed. Figure 1F and Figure 1G, represent the bivariate correlation between votes and COVID-19 cases. F is the Moran plot and in G LISA scatter plot, cluster map and choropleth map.

We can infer from the analysis that although Figure 1F displays a low degree of spatial autocorrelation (0.1) and suggests randomness, Figure 1 G exhibits the formation of significant clusters. The red clusters indicate regions with high numbers of COVID-19 deaths, and a larger difference in voting patterns towards the right wing in the neighbourhood. The dark blue clusters indicate regions with few COVID-19 deaths and a high margin of votes for the left wing. The orange clusters represent regions with many COVID-19 deaths but fewer votes for the right wing, while the light blue clusters represent regions with many votes for the left wing along with many deaths of COVID-19.

The most recent elections in Brazil highlighted the country's deep political polarization. The left-right divide has never been more apparent, and the clash extends beyond just the political arena. The polarization in Brazil has grown since 2018, when Bolsonaro was elected president and managed to secure victories for several leaders in 2018 and 2020, influencing the outcome of mayoral elections in cities like Fortaleza. Despite being less extreme than Bolsonaro, his chosen candidate in the 2020 election not only relied on his support, but also failed to question the contradictory decisions made by Bolsonaro in the handling of the COVID-19 pandemic.

While many articles confirm that denial of COVID-19 by supporters of the former president may have had a direct impact on the reported deaths [1, 2], further research is needed to confirm this the effect on people's behaviour. Our work sheds some light on the problem and opens a door for more work, given polarisation is a global phenomenon. Similar patterns can be observed in other parts of the world. For example, in the United States, states that were governed by Republicans had more COVID-19 deaths than those governed by Democrats. In the case of the pandemic, the role of political leaders has been critical. The refusal to implement recommended health measures, such as broader social isolation, has cost millions of Brazilians their lives.

References

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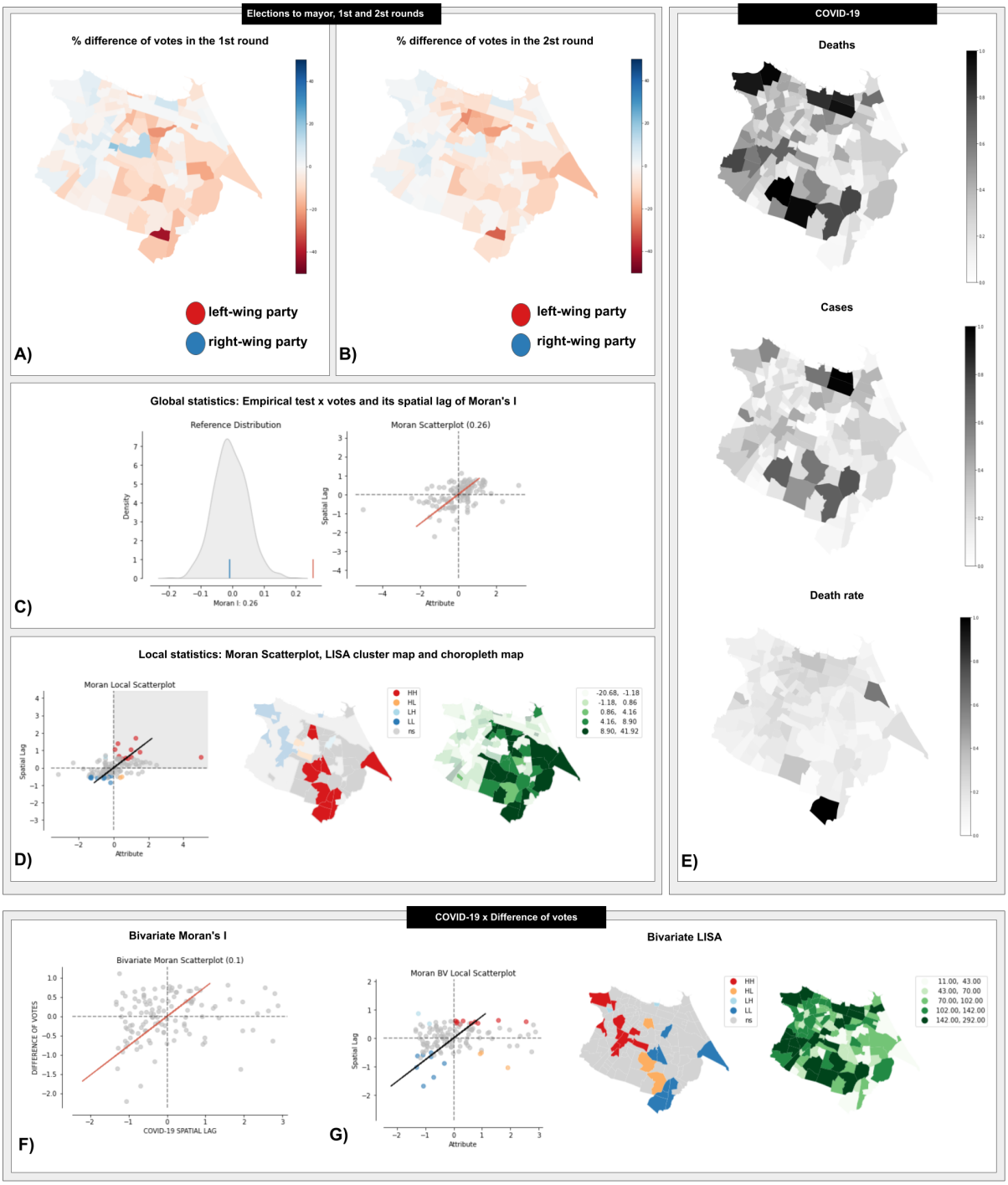

Figure 1: Percentage difference of votes between the two main candidates, mayoral elections, 2020. **(A)** first round and **(B)** second round. **(C)** Empirical test and Moran Plot for the difference of votes. **(D)** Visualization of a Moran Scatterplot, LISA cluster map and choropleth map applied to the difference of votes. **(E)** Shows the deaths, cases and death rate from COVID-19. Global **(F)** and Local **(G)** Bivariate Moran Statistics applied to the COVID-19 deaths and difference of votes.