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Political determinants of COVID-19 restrictions and vaccine rollouts: The case of regional elections in Italy and Spain

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ABSTRACT

The COVID-19 pandemic is one of the most significant public health crises in modern history, with considerable impacts on the policy frameworks of national governments. In response to the pandemic, non-pharmaceutical interventions (NPIs) and mass vaccination campaigns have been employed to protect vulnerable groups. Through the lens of Political Budget Cycle (PBC) theory, this study explores the interplay between incumbent electoral concerns and political dynamics in influencing the implementation of NPIs and vaccination rollout within the administrative regions of Italy and Spain during the period spanning June 2020 to July 2021. The results reveal that incumbents up for the next scheduled election are 5.8 % more likely to increase the stringency of containment measures than those that face a term limit. The findings also demonstrate that the seats of the incumbent and coalition parties in parliament and the number of parties in the coalition have a negative effect on both the efficiency of the vaccination rollout and the stringency of NPIs. Additionally, the competitiveness of the election emerges as an important predictor of the strictness of NPIs. Therefore, our results suggest that incumbents may strategically manipulate COVID-19 policy measures to optimize electoral outcomes. The study underscores the substantive influence of political incentives, competitive electoral environments, and government coalitions on policy formulation during health emergencies.

1. Introduction

The SARS-CoV-2 (COVID-19) outbreak strained healthcare systems and presented unprecedented challenges for governments and societies [1]. Governments had to navigate uncertainty about the virus and its transmission, adapting policies based on daily epidemiological data. In doing so, governments had to consider the delicate trade-off between prioritizing population health and upholding fundamental democratic rights [2]. Simultaneously, governments had to weigh the impact of strict public health measures and efficient vaccination rollout on electoral outcomes. In this context, the efficiency of the vaccine rollout is defined as the government's ability to promptly administer available vaccine doses from their stock. Therefore, the interplay between containment measures and vaccination policies became a focal point, susceptible to manipulation by political candidates aiming to win elections due to their sensitivity to the electorate [[3–5]].

The influence of political incentives and elections on policy choices has been explored through the lens of Political Budget Cycle (PBC) theory [6,7]. According to PBC theory, politicians in office have strong incentives to choose policies that maximize their re-election prospects and promote their partisan agenda. Before elections, governments often engage in a consumption binge: taxes are reduced, transfers are increased, and government spending is shifted towards highly visible budget divisions [8,9].

Some scholarly discussions have focused on political factors explaining the outcomes of the responses against the COVID-19 or the

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results of the interventions, in particular emphasizing government ideology, political systems, and political preparedness [10,11]. However, little is known about the relationship between these factors and the choice of policy instruments, such as the stringency of the non-pharmaceutical interventions (NPIs) or the modalities of the vaccination campaigns.

With some relevant exceptions (Chen et al. [12–14]), scholars are yet to provide a clearer view of factors explaining different policy responses to the COVID-19 pandemic. Chen et al. [12] used the Oxford COVID-19 Government Response Tracker (OxCGRT) alongside a real-time dataset encompassing daily travel and movement data from 111 countries to reveal that autocratic regimes implemented stricter lockdown measures and placed greater emphasis on contact tracing. Pulejo and Querubin et al.[13] found that proximity to elections and reelection incentives make politicians adopt less stringent public health measures to attract votes across 65 countries. Sebhatu et al. [14] indicated that stronger electoral democracies across OECD countries are slower in enacting NPIs. Government policies in these countries are also more likely to be influenced by the policies implemented in neighboring countries.

As Capano et al. [15] have pointed out, all countries faced a similar policy problem, namely, to contain COVID-19. However, responses have been different in terms of stringency and timing. Furthermore, in several countries with federal or regional governance structures, policymaking during the pandemic emerged from a mix of national and regional decision-making processes. Notably, Italy and Spain experienced a devolution of policy response from national to regional governments, imposing an additional level of complexity to the policy analysis. This is different from other European countries, such as France, which adopted a central and uniform governance approach to cope with the pandemic [16]. Such heterogeneity in policy responses sets the ground to study the link between the policy interventions implemented and the underlying political factors that influenced the choices made by governing parties, here defined as incumbents, at the regional level.

In this paper, we build on PBC theory to analyze the political determinants of the regional authorities' responses to COVID-19 in Spain and Italy, considering the period from 3rd June 2020 to 18th July 2021. Both countries exhibit decentralized governance structures with healthcare responsibilities, such as provider accreditation and payment regulation, held by regional authorities. Furthermore, NPIs have been similar across regions in Spain and Italy. Precisely, we estimate which political factors affected NPIs stringency and vaccination rollout at the regional level.

We look at the policy response along two key dimensions: (1) the stringency of the containment policies (i.e., NPIs) and (2) the efficiency of the vaccine rollout. It has been shown that stricter containment measures resulted in better health outcomes and, potentially, better economic outcomes in the long term [17]. Similarly, more efficient vaccination rollout allowed countries to lift the restrictions earlier and move toward the endemic stage of the virus [18]. Therefore, politicians have incentives to alter these two dimensions of the policy response to COVID-19 as a way to improve their electoral prospects.

2. Material and methods

2.1. Related literature

PBC theory initially refers to governments adjusting their fiscal policies, such as spending and taxation, to strategically improve their electoral prospects [6,7]. Typically, they increase spending or reduce taxes before elections to win favor with voters, even if it means running deficits [19–21]. For instance, a government might announce infrastructure projects or tax cuts close to an election to boost popularity, then tighten spending afterward to manage debt.

Theories of PBC have been extensively used to explain fiscal policies in industrialized countries [19,22–24. PBC theory is not only relevant to fiscal policy but any policy decisions visible to the electorate [25]. Previous PBC studies document several relevant political variables. Katsimi & Sarantides [26] argue that the incumbent has the opportunity to shape fiscal policy far greater when elections occur during predetermined electoral periods than if early (endogenous) elections were held. Schneider [27] notes that only when the government coalition does not have a comfortable majority in the parliament, the government is incentivized to reduce the public deficit. It was also concluded that the number of different parties in the government have a substantial impact on voting strategies. Finally, Efthyvoulou [28] demonstrates that electoral competitiveness is a strong determinant of fiscal policy among EU-27 member states; the tighter the electoral competition, the higher the marginal benefits of winning additional votes.

Particularly relevant to our study is the PBC literature related to healthcare which focuses heavily on public health care expenditure (PHCE). Bellido, Olmos, & Román-Aso [29] identify the share of seats belonging to the ruling party (incumbent) as one of the drivers of PHCE growth per capita. In addition, the number of parties in government may affect votes received in the next election by the incumbent. Herwartz & Theilen [30] illustrate that single-party governments are more likely to induce higher growth in PHCE. Also, Potrafke [31] shows that incumbents increased public health expenditures in election years across 18 OECD countries in the period 1971–2004.

There is also emerging literature applying PBC theory to the COVID-19 context. Pulejo & Querubín [13] demonstrate that proximity to elections and whether the incumbent can run for another term make politicians adopt less restrictive measures to attract votes. They empirically studied the stringency of the NPIs across 65 countries characterized by presidential systems during the first COVID-19 wave, incorporating data on the timing of upcoming elections and constitutional term limits. They validated their analysis by replicating the same study on a limited set of countries (i.e., $n = 50$) with a two-term limit for incumbents. Grechyna [4] provides evidence in favor of the presence of PBCs by examining the influence of elections at the national level on policies between March 2020 and March 2021 across 54 countries that experienced elections in the same period. The analysis controls for unobservable characteristics specific to both time and country. Murray et al. [32] found that election timing and whether incumbents are running for the next election are determinants for less strict lockdown policies. However, a governor's political party affiliation was the major driver explaining the variation in the policy stringency, with Republicans more inclined to implement laxer policies compared to Democrats. In another example analyzing the early stage of the COVID-19 pandemic in the US, Gonzalez-Eiras & Niepelt [33] found opposing results. Here, early elections and career concerns of politicians were associated with the imposition of stricter restrictions. In this research, we include epidemiological, economic, and politico-economic factors to explain variations in NPIs and vaccination rollout restrictions during the COVID-19 pandemic.

In decentralized countries such as in Germany, the US, Italy and Spain, subnational governments have authority over public health restrictions and hold accountability for key components of health care systems, including the management and finance of emergency services and hospitals, as well as the organization of the primary care system [34]. Literature on PBCs argues that policy manipulation by subnational governments might be more accentuated because these entities lack access to other instruments available at the national level [9]. There is indeed evidence of policy manipulation at the subnational level in the literature. For example, Akhmedov & Zhuravskaya [35] provide evidence of an increase in transfers to voters before elections in Russian provinces, whereas Reid [36] and Kneebone and McKenzie [9] find that increases in taxes are temporarily halted and spending is increased in highly visible areas (e.g., schools and roads) during election years in Canadian provinces. Alesina & Paradisi [37] find evidence wherein municipalities tend to choose lower tax rates when close to elections in Italy.

Previous literature on vaccination against H1N1 pandemic influenza illustrates how politicians prioritize larger and earlier deliveries to avoid future damage to their popularity [38]. Accordingly, the emerging literature applying PBC theory to the COVID-19 policy response can thus be expanded to include also the COVID-19 vaccine rollout. As vaccines became available, local government officials implemented a vaccine distribution prioritization policy that addressed the fair allocation of limited vaccines whilst maximizing other objectives, such as reducing mortality, minimizing virus transmission, and ensuring essential services [39]. An efficient vaccination rollout can benefit the government. Indeed, it allows governments to protect the electorate from severe diseases and enables them to gradually lift NPIs containment measures.

We contribute to the existing literature by providing an analysis of the political determinants driving the stringency of the NPIs and, for the first time to the best of our knowledge, the COVID-19 vaccination rollout.

2.2. Data and variables

We collected data from 37 regions (i.e., 20 Italian and 17 Spanish regions) spanning from June 3rd, 2020, to July 18th, 2021. This resulted in unbalanced panel data consisting of 14,664 region-days, with observations covering 392 days for each of the 17 Spanish regions and 400 days for each of the 20 Italian regions. The timeframe was selected from the initial day when policy responsibility shifted from central to regional administration (i.e., June 3rd, 2020, in Italy and June 22nd, 2020, in Spain) and extends until July 18th, 2021, by which over 95 % of the distributed vaccines were administered. Table A1 in the appendix provides a list of the regions included in the sample. The primary data sources used in this study are: (a) Ministry of Health websites for epidemiological and vaccination data [40,41]; (b) regional official bulletin and archives on regional and national newspapers for the data collection on NPIs containment measures [42–46]; (c) national and regional newspapers, official websites of national market research centers and polling organizations for political variables [45–50].

Our two outcome variables, measured at the Spanish and Italian regional levels, are the stringency of the COVID-19 NPI containment measures (*SI*) and the efficiency of the COVID-19 vaccination rollout (*VACC*).

Our *SI* five-level variable uses the policy categorization framework (CPTI) proposed by Moy et al. [51], with levels ranging from (0), minimum (1), medium (2), significant (3), and very significant (4). Table A2 in the appendix provides more details on the gradient categorization structure and examples.

The *VACC* variable builds on the Götz et al. [52] metric, which systematically compares vaccine deliveries and stocks (input) with vaccines administered (output). It is computed dividing the number of vaccination by the sum of the deliveries in time t and the vaccine reserves available in $t-1$ (see online Appendix for the formula in the *Variables* section). For instance, $VACC=0.7$ would indicate that in the region i on day t, 70 % of the available doses for vaccination on day t are administered, whereas the remaining 30 % are held back as reserves. Data on containment interventions and vaccine deliveries and vaccines administered were collected and categorized daily. For the latter, dates were collected from the start of the vaccine rollout (27th December 2020 in Italy and 4th January 2021 in Spain) until 28th June 2021 in Italy and 18th July 2021 in Spain. Daily data on vaccination rates was standardized weekly since some administrations did not inoculate on weekends.

We now turn to our explanatory variables. As electoral concerns are more prevalent when election time is close, incumbents up for election soon might enact more popular policies to gain the support of the electorate. To evaluate the effect of the electoral timing on our two outcomes of interest, we calculated the distance in days to the next scheduled election for each region as '*Proximity*'. This variable is presumed to isolate the impact of 'nearing elections' on incumbent policy decisions, acknowledging the potential confounding effect of other political and personal factors. Despite these potential confounders, *Proximity* was selected for its clear coefficient interpretability in allowing cross-country comparative analyses [30,31]. Specifically, negative *Proximity* values indicate an election is approaching, while positive values suggest the election is further away, enablingcomparable and replicable analyses across various studies or contexts. The measure of proximity is slightly different whether *SI* or *VACC* are the outcome variables. To evaluate the effect of the electoral timing on the stringency of policies *(Proximity(SI))*, we calculated the distance in days from the day in which power of decision was transferred from the central government to the regional administration (d_1) until the next scheduled election ($d_{election}$). For the vaccine rollout *(Proximity(VACC))*, proximity to elections was gauged as the distance on days from the day of the first inoculated vaccine in each region (d_1) until the next scheduled election ($d_{election}$). This result was divided by 365 and then multiplied by -1, consistent with Pulejo & Querubín, [13](see online appendix for the formula).

As the effect of proximity to elections depends on the ability of the incumbent to run for another term [13], we used a dummy variable to measure whether the incumbent can run for another term (*Run again*). Following Katsimi & Sarantides [26], *Predetermined elections* measures whether the elections are predetermined. We capture the political force of the incumbent with a measure of the share of seats that the incumbent party has in the parliament *(Seats incumbent)* [29] and the difference in entrance polls between the party government and the largest opposition party *(Poll)* [28]. We also capture the existence of a coalition government, including the number of parties in the government coalition *(Coalition)* [30] and the share of seats that coalition parties have in the parliament *(Seats coalition)* [27].

Two additional political variables are included in the supplementary material to enhance the robustness of our findings. The first variable, *Distant ideology*, assesses whether the composition of coalition governments (i.e., coalitions with closer ideology versus coalitions with more distant ideology) is associated with the two outcomes of interest. Secondly, we measure the alignment of the regional government with the national government *(Alignment with central government*). Indeed, sharing the same ideology with the central government might impact the opportunistic behaviors of the incumbents. For example, one can expect that governments with the same ideology are more likely to adhere to central authority policies to reinforce its power and credibility. See Table A7 in the Supplementary materials for more information about these two variables.

Incumbents' decision-making over the pandemic was also determined by the epidemiological figures. To isolate the effect of political variables, epidemiological variables used by the Council of the National Health System of Spain and Italy were introduced in our model. These include a measure of COVID-19 contagiousness *(Rt)*, two-week incidence *(14 day incidence)*, and lethality captured by excess mortality (*Excess mortality*). Additionally, we included measures of healthcare system saturation, captured by the hospital *(Bed Saturation)* and intensive care unit *(ICU Saturation)* occupation due to COVID-19. More information on these variables is available in Table A3 of the Supplementary materials.

In Table 1 we show the descriptive statistics of the variables used in our model. On average, the incumbent parties hold 32 % of the seats and have merged into a 4 party-government coalition occupying an extra 23 % of the seats in case of a coalition government. The large majority of the regions have an incumbent running for the next election (89 %), with an election occurring on the predetermined constitutional date (97 %). On average, the distance to the elections is 2.2 years after the regional governments were given greater autonomy to manage the intensity of mitigation measures and 1.7 years following the first COVID-19 vaccine dose inoculated in each region.

Table 1

Descriptive statistics of variables.

Variable	Obs	Mean	Std. Dev.	Min	Max
VACC	7 012	.471	.425	0	1
SI	14 664	2.281	1.13	0	4
Proximity (SI)	14 664	−2.262	1.372	−4.652	−0.055
Proximity (VACC)	14 664	−1.709	1.372	−4.085	.482
Run again	14 664	.891	.311	0	1
Predetermined	14 664	.973	.161	0	1
Seats incumbent	14 664	.32	.131	.086	.6
Seats coalition	14 664	.234	.148	0	.529
Coalition	14 664	3.935	2.187	0	9
Poll	14 664	10.134	7.537	−0.425	30.3
Bed saturation	14 664	.081	.124	0	1
ICU saturation	14 664	.211	.216	0	1
Rt	14 664	1.056	.329	.029	5.55
Excess mortality	14 664	5.53	10.333	−8.95	70.53
14 day incidence	14 664	8 317.626	18 841.132	−35	154 055.64

2.3. Methods

Our central assumption is that the effect of the proximity to the next election and the eligibility of the leader to run for re-election on a country's response to the pandemic is isolated and separated from other factors that can impact a country's response to the pandemic. The main focus of the analysis is the proximity to the election and the re-election eligibility of the incumbent.

We define our regression models to understand the influence of political factors on *SI* and *VACC*, controlling for the epidemiological context and a country fixed-effect (see online appendix for the full specification of the models). *SI* is an ordered variable and can be analyzed with an ordered logit model, while *VACC* is a continuous variable and can be estimated using ordinary least squares (OLS) regression. The two dependent variables can however be jointly determined. Indeed, governments may use both as complement (improve vaccination rollout and policy stringency to better control the disease) or as substitute (improve vaccination rollout to relax policy stringency). To control for this co-determination, we use a conditional mixed-process modeling (CMP). CMP allows for ordered, discrete variables estimated by the ordered logit model [53], which we need given the nature of the *SI* variable. The CMP model makes it possible to account for the unobservable regional characteristics and time-varying effects that may affect both dependent variables, resulting in better estimations [54].

3. Results

Table 2 presents the results of our model specifications. The first two columns represent an ordered logistic regression of *SI* and *VACC*, assuming these decisions are independent. The third and fourth columns present the results of simultaneous regressions of these two dependent variables using the CMP estimator described above.

The degree of correlation between the two simultaneous equations in the CMP (Atanhrho) is −0.198 and is statistically significant at the 99 % confidence level—which justifies the use of the system estimation and confirms the cross-equation interdependence in both directions. The correlation between regression errors further confirms the simultaneity

Table 2

Ordered Logistic, Ordinary Least Squares and Conditional Mixed Process regression results for policies stringency and efficiency of vaccination rollout.

Ind. Var.	(1) Ordered Logistic Policy Stringency (SI)	(2) OLS Efficiency of vaccination (VACC)	(3) CMP Policy Stringency (SI*)	(4) CMP Efficiency of vaccination (VACC*)
Proximity	0.048 (0.215)	−0.005 (0.008)	0.030 (0.020)	−0.005 (0.004)
Run again (ref.=no)	−0.255 (0.717)	0.029 (0.024)	−0.096 (0.066)	0.023** (0.011)
Run again*Proximity	0.123 (0.228)	−0.006 (0.009)	0.058*** (0.021)	−0.002 (0.004)
Predetermined elections (ref.=no)	−0.068 (0.657)	0.069*** (0.026)	−0.007 (0.064)	0.057*** (0.012)
Seats incumbents	−2.83 (0.717)	−0.217** (0.089)	−1.415*** (0.208)	−0.194*** (0.041)
Seats coalition	0.403 (2.377)	−0.141 (0.093)	0.123 (0.219)	−0.149*** (0.042)
Coalition (ref.=no)	−0.102 (0.083)	−0.16*** (0.003)	−0.041*** (0.008)	−0.009*** (0.002)
Poll	0.011 (0.015)	>−0.001 (0.001)	0.004*** (0.001)	>−0.001 (0.000)
Country dummy (ref.=Spain)	0.164 (0.375)	−0.749*** (0.015)	0.035 (0.037)	−0.728*** (0.007)
Bed saturation	2.809*** (0.276)	0.045 (0.029)	0.865*** (0.112)	0.018 (0.018)
ICU saturation	5.731*** (0.139)	0.113*** (0.015)	3.251*** (0.062)	0.153*** (0.012)
Rt	0.143*** (0.049)	−0.019** (0.008)	0.035 (0.027)	−0.027*** (0.008)
Excess mortality	0.113*** (0.003)	−0.006*** (0)	0.050*** (0.001)	−0.005*** (0.000)
14 day incidence	<0.001*** (0)	<0.001*** (0)	<0.001*** (0.000)	<0.001*** (0.000)
Constant	–	0.907*** (0.059)	–	1.578*** (0.043)
Statistics				
R^2	–	0.851	–	0.853
Log-likelihood	−17 103.077	–	–	−13 992.367
X^2-test joint significance	5 740.813***	9 042.175***	–	21 984.496***
Atanhrho				−0.198***
$\rho_{1,2}$	–	–	–	−0.195

Note: Columns (1) and (2) represent the results of the ordered logistic and least squares linear regression respectively. Columns (3) and (4) show the results of the Conditional mixed process (CMP) regression. Standard errors in brackets. Country dummy: Italy (1). POLL coefficients: (2): −2.88e-04; (4): −7.76e-05. 14D coefficients: (1): 6.45e-06; (2): 2.00e-06; (3): 2.88e-06; (4): 9.68e-07.

*** $p < 0.01$.

** $p < 0.05$.

* $p < 0.1$.

of the decision. The error correlations between *VACC* and *SI* individual regressions, estimated by the coefficient $\rho_{1,2}$, are highly significant and negative (−0.195). This suggests that increased efficiency of the vaccine rollout is partially correlated with an easing of the restrictions. However, other relevant factors in our model explain the fluctuations in the policy response, and these factors do not necessarily have opposing effects on stringency and vaccination. A comparison between results from the CMP model and the OLS and the ordered logistic show some differences: the impact on *VACC* and *SI* seems to be overestimated when considering the two decisions independently from each other. Our interpretation of findings focuses on the CMP.

The last two columns of Table 2 represent the marginal effects for both stringency of policies and efficiency of the vaccination rollout using the CMP estimator. Among the set of variables proxying electoral concerns, we find a small but not statistically significant impact of *Proximity* on both dependent variables. On the contrary, the possibility to run for election (*Run again)* is found to increase the probability of having a more efficient vaccination rollout, ceteris paribus, but a minor and not statistically significant effect on *SI*. Looking at our main explanatory variable, the interaction between facing closer elections and the possibility to run for election, we find that incumbents closer to elections and that can run for re-election have a 5.8 % higher probability of implementing more stringent policies compared to those who cannot be re-elected or that are further away from the elections ($p < 0.01$). No statistically significant association is found with the efficiency of the vaccination rollout.

A higher proportion of seats for the incumbent party is associated with significantly lower severity of policies (−1.41, $p < 0.01$) and lower efficiency in the vaccination rollout (−0.19, $p < 0.01$). The coefficient representing the seats of the coalition describes the same direction for the vaccination rollout, indicating that with one additional seat held by the coalition in the regional parliament, the efficiency of the vaccine campaign decreases by 0.14, ceteris paribus. Similarly, the effect of one point increment on the number of coalition government parties is associated with 4 % ($p < 0.01$) less restrictive measures and 0.9 % ($p < 0.01$) less efficient vaccination. In conclusion, a one-point increase in the expected pool is associated with a minor (0.004) but statistically significant ($p < 0.01$) increase in the stringency of the policies enacted, while no influence is found on the vaccination rollout.

Regarding epidemiological metrics, the majority have a positive coefficient and are statistically associated with the stringency of the policy ($p < 0.01$), with the exception of the COVID-19 reproduction rate coefficient. However, turning to the vaccination rollout, an increase in the COVID-19 reproduction rate and excess mortality is associated with a reduction in the vaccination efficiency ($p < 0.01$). This may be related to resources being diverted from the vaccination rollout toward direct containment of the disease.

Table A4 in the Supplementary materials shows additional analysis, including the results of the marginal effects of the set of political and epidemiological variables on the five levels of the CPTI framework. Doing so helps clarify whether the association between political variables and policy stringency is driven by a change from minimum to moderate stringency, for example, or between other levels. Overall, we observe that most of the influence of the independent variables is happening from moderate restrictions (level 2) to significant restrictions (level 3). Figure A3 in the Supplementary materials illustrates these marginal effects. However it must be noted that the confidence intervals are quite large when looking at each level of the ordinal *SI* variable separately, most likely due to the small sample.

3.1. Sensitivity analysis

Given that governments adopted new measures some days after the saturation of hospitals, new cases and deaths, we run 3 sensitivity checks lagging back the set of epidemiological variables 7, 14 and 21 days in the CMP regression. This is line with the guidelines from the literature [55, 56].

The results in Table 3 indicate that the epidemiological variables continue to predict policy stringency and vaccination after being lagged for 7, 14 and 21 days. Crucially, the coefficients of the political variables remain remarkably stable across the models with different epidemiological lag structures, and are consistent with our main findings. This illustrates our important result, being that when a larger number of coalition partners and incumbents hold a higher share of seats, both the stringency of the restrictions and the efficiency of the vaccination rollout is reduced.

To further validate our results, we run an additional check. We control for country specific effects by running the CMP regressions for both countries separately. Table A5 in the Supplementary materials presents the results of the CMP regressions. The results confirm that both countries share the same behavior for the two main independent variables (*Proximity* and *Run again)* against both dependent variables.

Lastly, we conducted two separate regressions, controlling for the ideology between parties in the coalition (i.e., distant versus close ideology) and for the alignment of the regional government with the central government (see Table A8 in the Supplementary materials). Results from both regressions confirm our initial findings. The two new variables are statistically significant at the 5 % level. Coalitions composed of parties with a more distant ideology are less likely to implement stricter policies and are less efficient in the vaccination rollout. Alignment with the central government is expected to increase the stringency of the restrictions while reducing the efficiency of the vaccine rollout.

4. Discussion

4.1. Summary of main findings and comparison with existing research

The purpose of this paper was to explore whether political factors influence the policy response to the COVID-19 pandemic in a regional context. We leveraged the federalist structure in Italy and Spain to study the regional level governance dynamics and the link between electoral concerns and policy responses.

We found evidence that electoral concerns affect COVID-19 policy responses. Furthermore, electoral motives do not necessarily result in a substitution of lower stringency for a more efficient vaccination rollout. Specifically, we show that the interaction between re-election incentives and the proximity to an election might predict stricter containment measures, consistent with PBCs theory applied to Italian and Spanish regions during the COVID-19 pandemic. The ability to run for the next election is found to be correlated with a more efficient vaccine rollout.

These results would suggest that regional incumbents in Spain and Italy perceive protection of public health as more attractive for voters, instead of securing economic activity or rights to individual freedom, which differs from the conclusions of others. To this end, Grechyna [4] demonstrates that restrictions are less likely to be tightened within the three-week term before the elections. Murray et al. [32] find that COVID-19 lockdown policies were 3.3 to 5.5 points less stringent in US states with upcoming elections and that countries with incumbents up for elections within 0–3 months adopted policies that were much weaker than countries with incumbents up for election in 12–15 months. Pulejo & Querubin [13] show that proximity to the upcoming elections reduces stringency, but only in countries where the incumbent is eligible to run for an additional term. For instance, a 1-year reduction in the time to the next election was associated with an average decrease of 8 % in the overall stringency.

More aligned with our findings, Gonzalez-Eiras & Niepelt [33] find that US governors seeking re-election in the near future adopted lockdowns 15 days longer and in a more stringent fashion by 0.27 points. These differences may be explained by the time period covered (waves of COVID), differences in electoral level covered, as well as differences in electoral systems. Yet it is worth noting that the study with findings similar to ours takes a regional/state-level lens. It is also possible that

Table 3

Sensitivity analysis results for the Conditional Mixed Process regression on stringency of policies and efficiency of vaccination rollout including 7, 14 and 21 days lag in the epidemiological variables.

Ind. Var.	(1) Policy Stringency SI (7)	(2) Efficiency of vaccinationVACC (7)	(3) Policy Stringency SI (14)	(4) Efficiency of vaccinationVACC (14)	(5) Policy Stringency SI (21)	(6) Efficiency of vaccinationVACC(21)
Proximity	0.029	−0.006	0.031	−0.007*	0.030	−0.007*
	(0.019)	(0.004)	(0.019)	(0.004)	(0.019)	(0.004)
Run again	−0.089	0.020*	−0.099	0.022**	−0.085	0.017
(ref.=no)	(0.065)	(0.011)	(0.065)	(0.011)	(0.065)	(0.011)
Run again*Proximity	0.062***	−0.002	0.047**	−0.001	0.048**	−0.001
	(0.021)	(0.004)	(0.021)	(0.004)	(0.021)	(0.004)
Predetermined elections	−0.037	0.054***	−0.109*	0.044***	−0.153**	0.039***
(ref.=no)	(0.063)	(0.012)	(0.063)	(0.012)	(0.062)	(0.012)
Seats incumbents	−1.303***	−0.173***	−1.308***	−0.157***	−1.254***	−0.145***
	(0.207)	(0.041)	(0.206)	(0.041)	(0.205)	(0.041)
Seats coalition	0.159	−0.127***	0.190	−0.126***	−0.074	−0.103**
	(0.218)	(0.043)	(0.216)	(0.043)	(0.215)	(0.043)
Coalition	−0.041***	−0.010***	−0.057***	−0.011***	−0.037***	−0.012***
(ref.=no)	(0.008)	(0.002)	(0.008)	(0.002)	(0.008)	(0.002)
Poll	0.003**	>−0.001	0.006***	>−0.001	0.002	<0.001
	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)
Country dummy	0.067*	−0.722***	0.168***	−0.719***	0.027	−0.702***
(ref.=Spain)	(0.036)	(0.007)	(0.036)	(0.007)	(0.036)	(0.007)
(Lag)Bed saturation	1.097***	0.042**	0.561***	0.063***	0.853***	0.046***
	(0.112)	(0.018)	(0.109)	(0.018)	(0.109)	(0.018)
(Lag)ICU saturation	2.869***	0.107***	2.233***	0.040***	2.056***	0.004
	(0.060)	(0.012)	(0.057)	(0.012)	(0.057)	(0.012)
(Lag)Rt	0.486***	−0.030***	0.217***	−0.015*	0.984***	0.007
	(0.027)	(0.008)	(0.028)	(0.008)	(0.028)	(0.010)
(Lag)Excess mortality	0.050***	−0.004***	0.058***	−0.004***	0.039***	−0.002***
	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)
(Lag)14 day incidence	<0.001***	<0.001***	<0.001***	<0.001***	<0.001***	<0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant		0.895***		0.899***		0.869***
		(0.028)		(0.028)		(0.029)
$\rho_{1,2(-7)}$	−0.137					
$\rho_{3,4(-14)}$	−0.083					
$\rho_{5,6(-21)}$	−0.072					
Atanhrho $_{1,2(-7)}$	−0.137***					
Atanhrho $_{3,4(-14)}$	−0.083***					
Atanhrho $_{5,6(-21)}$	−0.072***					

Note: Standard errors in brackets. All models estimated by CMP. Columns (1) and (2) correspond to results including 7 days lagged variables, columns (3) and (4) include 14 days lagged variables and (5) and (6) include 21 days lagged variables. POLL coefficients: (2): −2.03e-05; (4): −2.44e-04;(6): 1.94e-04. Lag14D coefficients: (1): 1.95e-06; (2): 9.58e-07; (3): 8.07e-06; (4): 1.03e-06; (5): 2.38e-06; (6): 1.18e-06.

*** $p < 0.01$.

** $p < 0.05$.

* $p < 0.1$.

after being severely affected by COVID-19 at the onset of the pandemic, Italian and Spanish policymakers estimated that the preferences of their electorate would be to ensure their safety.

Our findings suggest that coalition governments reduce policy stringency and vaccine efficiency. The conflicting interests between the parties in the coalition may explain these findings [57,58], as demonstrated in our supplementary analysis of ideology alignment within a coalition. This alignment ultimately generates tensions and coordination problems that hamper the incumbent's power. This may be amplified with a larger number of partners in the coalition, and when partners hold a higher share of seats in the parliament. As Tsebelis [59] illustrates, federal democracies distribute responsibility and power between multiple government parties which leads to structures that create obstacles to the effective implementation of policies.

The percentage of seats held by the incumbent suggest that a larger share of seats is associated with less stringent policies and less efficient vaccination rollout. Following Bellido et al. [29], we can expect that if the incumbent position is weak, incumbents may feel a need to strengthen their positions by implementing stricter and more efficient policies. However, if the incumbent position is strong, they may have less incentive to enact such policies. In addition, electoral competitiveness seems to have a significant yet relatively minor role from the incumbent's perspective.

Predetermined elections seem to minimize manipulation of COVID-19 policies at expense of public health concerns. This is the only variable where a reduction of policy stringency is accompanied by an increase in the efficiency of the vaccination rollout, in most (but not all) specifications. This association occurs when controlling for a 14 and 21 day lag on the epidemiological variables, which was the period of time when regional governments were asked to revise the intensity of their containment measures throughout the pandemic [60,61]. The public health benefit associated with the increase in vaccine rollout may be an additional benefit of predetermined elections, adding to the evidence of opportunistic behaviors when the election dates are fixed [26,62].

Unlike most of the previous research, this study suggests that political elections in the near future may lead to more stringent policies. When it comes to electoral factors, it does not appear there is a clear trade-off between stricter policies and a more efficient vaccination rollout. This is consistent with PBC theory where the primary motivation is to stay in power based on voters' expectations, as opposed to acting in the interests of public health protection. Predetermined elections seem to reduce the likelihood of opportunistic behavior. These are our more remarkable results and depict the main contribution of our study to the literature, in addition to focusing on regional elections in countries that were initially hard hit by the pandemic and controlling for epidemiological factors. Our model can be adapted to other types of public goods and policies managed by the regional government body during periods of crisis (e.g. fiscal policies, unemployment allowances, welfare schemes, etc.). Furthermore, we demonstrated the importance of considering policy stringency and vaccination rollout simultaneously. Analyses that only look at one of the two dimensions may generate partial results.

An additional insight of our paper that makes our analysis more robust is that we address the short-lived effects reported in the PBC literature [35] through two different mechanisms. To begin with, we account for the incumbent's ability to adopt or lift interventions before elections by using the variable *Proximity*. As opposed to other studies that use a dichotomous variable to predict incumbent behavior in an election year versus a non-election year [22,28,33], our method is based on a continuous variable that identifies (short-term) the effects of having an election over time and in the near future. Secondly, by using daily data we examine how policy stringency and vaccine rollout efficiency have changed over time in a defined timeframe of one year.

4.2. Limitations and future research

Our study is not exempt from limitations. First, we cannot infer that the political variables used in our analysis are the only political driver of policy responses. Other factors could be at play, including the incumbent's ideology, regime type, or even the political relationships between central and regional governments [63–65]. However, our robustness checks including alignment with the central governments and the ideology between parties in the same incumbent coalition confirmed our findings. Future research should confirm our findings in different federalist political systems (e.g., Germany, US, Australia, etc.).

Second, despite greater autonomy being given to regional governments to manage the policy response during the period analyzed, central governments still had a role in the overall response to the pandemic. This dynamic poses a potential challenge to the validity of our theoretical and modeling assumptions about the independence of regional governments in implementing restrictions and vaccination rollout. While regional health authorities typically enjoy significant autonomy in decision-making during ordinary periods in both Italy and Spain, this equilibrium was disrupted during the pandemic. Throughout the pandemic, the autonomy of regional governments was affected by the imposition of national policies by the central governments during specific periods. Consequently, regional governors did not have full autonomy to decide on containment measures.

To address this limitation in our analysis, we specifically focused on the period between June 3rd, 2020, and July 18th, 2021. The initial date marks the beginning of the period when policy responsibility was transferred from the central government to regional administrations in Italy (i.e., 22nd of June in Spain) following the national lockdown imposed in March 2020 [66,67]. It was only in November 2020 that both national governments reintroduced national containment policies in the form of traffic light systems, thereby reducing regional autonomy [60, 61]. However, even in this scenario, regional governments still had the autonomy to marginally increase the intensity of restrictions beyond the level imposed by the national governments, maintaining a certain degree of independence that could still influence the electorate. Similarly, regional governments repeatedly put pressure on the central governments to implement specific restrictions or lift them [66,67]. Additionally, both countries launched their vaccination campaigns in December 2020. Regional governments had almost complete autonomy in deciding how to deliver vaccinations to their resident population [68]. Therefore, the adjustments in the timeframe considered for the analysis address the potential limitations of reduced autonomy in containment strategy decisions that could violate our assumption.

From a modelling perspective, we consider the two outcomes (SI) and (VACC) separately in ordered logistic and OLS regressions to allow for a potential differential in decision autonomy across them. Nevertheless, the CMP model remains our primary model of interest, as the level of restrictions, even if imposed by the national government, can still impact the efficiency of the vaccine rollout. It is worth noting that the model statistics clearly suggest that decisions on the two outcomes are not independent. Moreover, both our estimation strategies (separate regressions and CMP) reported very similar results reinforcing the robustness of our findings.

Third, when measuring the efficiency of the COVID-19 vaccination rollout we did not account for the impact of vaccine refusal or hesitancy due to the lack of region-specific data at the time of data collection. This omission could bias results against regions with higher rates of refusal or hesitancy, regardless of their political intent or administrative and logistical capabilities [69]. Moreover, low data accuracy on vaccine distribution and administration could compromise our dependent variable. Future research is needed to understand how vaccine hesitancy, refusal, and related electoral concerns may influence policy decisions.

Fourth, a potential limitation of this study is the delay in reporting total excess mortality. The variable used in our study reflects the weekly difference in reported deaths during the pandemic compared to the corresponding week in the previous year. While regional governors had access to these data, which influenced their decision-making, the time lag in reporting may impact the accuracy and relevance of the variable. However, the analyses, which accounted for lag in the epidemiological variables at intervals of 7, 14, and 21 days, are anticipated to mitigate this potential source of bias.

Finally, this analysis covers only a limited time of the pandemic and electoral cycle. Therefore, the available data does not provide enough variation to run the analysis separately in each country due to collinearity among regions and political variables. By pooling the two countries together and including a dummy variable to control for country's specific characteristics, we are still able to capture the role of political determinants on the stringency of COVID-19 policies and efficiency of the vaccine rollouts. To provide additional robustness to our results, we run a sensitivity check on the two countries separately, omitting these variables to ensure that the collinearity issue does not contaminate the sign and the robustness of other variables' coefficients (Table A6 in the Supplementary materials). Our results show consistency with our main analysis, validating our findings. Further research should confirm our findings by observing a longer timeframe and a larger number of elections.

5. Conclusion

Focusing on Italian and Spanish regions, we provide evidence that the ability to run for the next election improves COVID-19 vaccination rollout program performances. Further, the proximity of the election period results in more stringent COVID-19 containment measures from June 2020 to July 2021. We find that the presence of a coalition government reduces both the policy stringency and the efficiency of the vaccine rollout. This points towards potential coordination issues and veto playing in the coalition government, which may prevent the implementation of health protection policies that governments seeking re-election may want to introduce.

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Data availability

The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request.

CRediT authorship contribution statement

Pablo Arija Prieto: Conceptualization, Data curation, Methodology, Formal analysis, Writing – original draft, Writing – review & editing. **Marcello Antonini:** Conceptualization, Data curation, Project administration, Methodology, Writing – original draft, Writing – review & editing. **Mehdi Ammi:** Conceptualization, Methodology, Supervision, Writing – original draft, Writing – review & editing. **Mesfin Genie:** Conceptualization, Methodology, Writing – original draft, Writing – review & editing. **Francesco Paolucci:** Conceptualization, Methodology, Supervision.

Declaration of competing interest

The authors declare that they have no known competing interests.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.healthpol.2024.105082.

References

[1] ECDC. 2021. “COVID-19 Situation Update for the EU/EEA, as of 15 December 2021.” https://www.ecdc.europa.eu/en/cases-2019-ncov-eueea (October 15, 2021).

[2] Koyama M. Epidemic disease and the state: is there a tradeoff between public health and liberty? Public Choice 2021:1–23.

[3] Alsan, Marcella et al. 2020. *Nber Working Paper Series Civil Liberties in Times of Crisis*. http://www.nber.org/papers/w27972.

[4] Grechyna, Daryna. 2021. “Elections and Policies: the Case of COVID Responses.” *Available at SSRN 3811731*.

[5] De Vries Catherine E, Bakker Bert N, Hobolt Sara B, Arceneaux Kevin. Crisis Signaling: how Italy’s Coronavirus Lockdown Affected Incumbent Support in Other European Countries. Political Sci Res Methods 2021;9(3):451–67. https://www.cambridge.org/core/product/identifier/S2049847021000066/type/journal_article (January 26, 2022).

[6] Nordhaus William D. The Political Business Cycle. Rev Econ Stud 1975;42(2):169–90.

[7] Rogoff, Kenneth. 1987. *Equilibrium Political Budget Cycles*. Cambridge, MA. http://www.nber.org/papers/w2428.pdf (May 1, 2021).

[8] De Haan Jakob, Klomp Jeroen, De Haan J, Klomp J. Conditional Political Budget Cycles: a Review of Recent Evidence. Public Choice 2013;157:387–410.

[9] Kneebone Ronald D, Mckenzie Kenneth J. Electoral and Partisan Cycles in Fiscal Policy: an Examination of Canadian Provinces. Int Tax Public Financ 2001;8(5–6):753–74.

[10] Bosancianu, Constantin Manuel et al. 2020. “Political and Social Correlates of Covid-19 Mortality”.

[11] Cepaluni, Gabriel, Michael Dorsch, and Réka Branyiczki. 2020. “Political Regimes and Deaths in the Early Stages of the COVID-19 Pandemic.” *Available at SSRN 3586767*.

[12] Chen C, Frey CB, Presidente G. Disease and democracy: Political regimes and country responsiveness to COVID-19. J Econ Behav Organ 2023;212:290–9.

[13] Pulejo M, Querubín P. Electoral concerns reduce restrictive measures during the COVID-19 pandemic. J Public Econ 2021;198:104387.

[14] Sebhatu Abiel, Wennberg Karl, Arora-Jonsson Stefan, Lindberg Staffan I. Explaining the Homogeneous Diffusion of COVID-19 Nonpharmaceutical Interventions across Heterogeneous Countries. Proceedings of the National Academy of Sciences 2020;117(35):21201–8.

[15] Capano Giliberto, et al. Mobilizing Policy (in) Capacity to Fight COVID-19: understanding Variations in State Responses. Policy and Society 2020;39(3):285–308.

[16] Desson Z, Weller E, McMeekin P, Ammi M. An analysis of the policy responses to the COVID-19 pandemic in France, Belgium, and Canada. Health Policy Technol 2020;9(4):430–46. https://doi.org/10.1016/j.hlpt.2020.09.002.

[17] Oliu-Barton M, Pradelski BS, Aghion P, Artus P, Kickbusch I, Lazarus JV, Vanderslott S. SARS-CoV-2 elimination, not mitigation, creates best outcomes for health, the economy, and civil liberties. The Lancet 2021;397(10291):2234–6.

[18] Oliu-Barton M, Pradelski BS, Algan Y, Baker MG, Binagwaho A, Dore GJ, Lazarus JV. Elimination versus mitigation of SARS-CoV-2 in the presence of effective vaccines. Lancet Glob Health 2022;10(1):e142–7.

[19] Alesina A, Roubini N, Cohen GD. Political cycles and the macroeconomy. MIT press; 1997.

[20] Rogoff K, Sibert A. Elections and macroeconomic policy cycles. Rev Econ Stud 1988;55(1):1–16.

[21] Tufte EdwardR. Political control of the economy. Princeton University Press; 1978.

[22] Bove Vincenzo, Efthyvoulou Georgios, Navas Antonio. Political Cycles in Public Expenditure: butter vs Guns. J Comp Econ 2017;45(3):582–604.

[23] Murtinu S, Piccirilli G, Sacchi A. Rational inattention and politics: how parties use fiscal policies to manipulate voters. Public Choice 2022;190(3):365–86.

[24] Persson T, Tabellini G. Political economics: explaining economic policy. MIT press; 2002.

[25] D’Amato Alessio, Marin Giovanni, Rampa Andrea. Environmental Disasters and Electoral Cycle: an Empirical Analysis on Floods and Landslides in Italy. Environmental and Resource Economics 2019;74(2):625–51. https://doi.org/10.1007/s10640-019-00338-7 (May 5, 2021).

[26] Katsimi Margarita, Sarantides Vassilis. Do Elections Affect the Composition of Fiscal Policy in Developed, Established Democracies? Public Choice 2012;151(1–2):325–62.

[27] Schneider Christina J. Fighting with One Hand Tied behind the Back: political Budget Cycles in the West German States. Public Choice 2010;142(1–2):125–50.

[28] Efthyvoulou Georgios. Political Budget Cycles in the European Union and the Impact of Political Pressures. Public Choice 2012;153(3):295–327. https://doi.org/10.1007/s11127-011-9795-x.

[29] Bellido Héctor, Olmos Lorena, Antonio Román-Aso Juan. Do Political Factors Influence Public Health Expenditures? Evidence Pre- and Post-Great Recession. European Journal of Health Economics 2019;20(3):455–74. https://doi.org/10.1007/s10198-018-1010-2.

[30] Herwartz Helmut, Theilen Bernd. Partisan Influence on Social Spending under Market Integration, Fiscal Pressure and Institutional Change. Eur J Polit Econ 2014;34:409–24. https://doi.org/10.1016/j.ejpoleco.2013.10.003.

[31] Potrafke N. The growth of public health expenditures in OECD countries: do government ideology and electoral motives matter? J Health Econ 2010;29(6):797–810.

[32] Murray Benjamin, Parker Dominic P, Wong Soong Kit. Election Politics and Health Policy during the COVID-19 Pandemic. Agricultural & applied economics. Madison: University of Wisconsin; 2020.

[33] Gonzalez-Eiras M, Niepelt D. The political economy of early COVID-19 interventions in US states. Journal of Economic Dynamics and Control 2022;104309. https://doi.org/10.1016/j.jedc.2022.104309.

[34] Allain-Dupré D, Chatry I, Michalun V, Moisio A. The territorial impact of COVID-19: managing the crisis across levels of government. OECD; 2020.

[35] Akhmedov A, Zhuravskaya E. Opportunistic political cycles: test in a young democracy setting. Q J Econ 2004;119(4):1301–38.

[36] Reid BG. Endogenous elections, electoral budget cycles and Canadian provincial governments. Public Choice 1998;97:35–48.

[37] Alesina A, Paradisi M. Political budget cycles: evidence from Italian cities. *Economics & Politics* 2017;29(2):157–77.

[38] Baekkeskov Erik. Same Threat, Different Responses: experts Steering Politicians and Stakeholders in 2009 H1N1 Vaccination Policy-Making. Public Adm 2016;94(2):299–315.

[39] Gayle Helene, Foege William, Brown Lisa, Kahn Benjamin. Framework for Equitable Allocation of COVID-19 Vaccine. Framework for Equitable Allocation of COVID-19 Vaccine 2020:1–252.

[40] Istituto Superiore di Sanita. 2021. “Istituto Superiore Di Sanita. Special on COVID-19. Check the Figures.” https://www.iss.it/en/web/iss-en/check-the-figures.

[41] Ministerio de Sanidad. 2021. “Ministerio de Sanidad. Enfermedad Por Nuevo Coronavirus, COVID-19. Resumen de La Situacion.” https://www.sanidad.gob.es/profesionales/saludPublica/ccayes/alertasActual/nCov/situacionActual.htm.

[42] Gobierno de Cantabria. 2021. “Boletin Oficial de Cantabria.” https://boc.cantabria.es/boces/.

[43] Governo Italiano. 2021. “Covid-19, Domande Frequenti e Tabella Delle Attività Consentite.” https://www.governo.it/it/articolo/domande-frequenti-sulle-misure-adottate-dal-governo/15638.

[44] Junta de Castilla y Leon. 2021. “Boletin Oficial de Castilla y Leon.” https://bocyl.jcyl.es/.

[45] El Mundo. 2021. “El Mundo. Hemeroteca.” https://www.elmundo.es/hemeroteca/.

[46] El Pais. 2021. “El Pais. Archivo Web.” https://elpais.com/archivo/.

[47] Centro de Investigaciones Sociologicas (CIS). 2021. “Encuestas Electorales.” http://www.cis.es/cis/opencm/ES/1_encuestas/TiposEncuestas%0A/EncuestasElectorales/encuestaselectorales.jsp%0A.

[48] Corriere della Sera. 2021. “L’Archivio.” https://archivio.corriere.it/Archivio/interface/landing.html.

[49] La Repubblica. 2021. “Archivio.” https://ricerca.repubblica.it/repubblica/archivio/repubblica/.

[50] SWG. 2021. “Observatory of Italian Public Opinion.” Observatory of Italian public opinion.

[51] Moy N, Antonini M, Kyhlstedt M, et al. Standardising policy and technology responses in the immediate aftermath of a pandemic: a comparative and conceptual framework. Health Res Policy Sys 2023;21(10). https://doi.org/10.1186/s12961-022-00951-x.

[52] Götz Georg, Herold Daniel, Klotz Phil Adrian, Schäfer Jan Thomas. Efficiency in Covid-19 Vaccination Campaigns—A Comparison across Germany’s Federal States. Vaccines (Basel) 2021;9(7).

[53] Roodman David. Fitting Fully Observed Recursive Mixed-Process Models with Cmp. Stata J 2011;11(2):159–206.

[54] Cadavez Vasco A P, Henningsen Arne. The Use of Seemingly Unrelated Regression to Predict the Carcass Composition of Lambs. Meat Sci. 2012;92(4):548–53.

[55] Karaivanov Alexander, et al. Face Masks, Public Policies and Slowing the Spread of COVID-19: evidence from Canada. J Health Econ 2021;78:102475. https://www.sciencedirect.com/science/article/pii/S0167629621000606.

[56] Singh Surya, Shaikh Mujaheed, Hauck Katharina, Miraldo Marisa. Impacts of Introducing and Lifting Nonpharmaceutical Interventions on COVID-19 Daily Growth Rate and Compliance in the United States. Proceedings of the National Academy of Sciences 2021;118(12). https://www.pnas.org/content/118/12/e2021359118 (January 26, 2022).

[57] Baskaran Thushyanthan. Coalition Governments, Cabinet Size, and the Common Pool Problem: evidence from the German States. Eur J Polit Econ 2013;32:356–76. https://www.sciencedirect.com/science/article/pii/S0176268013000773.

[58] Hanusch Marek. Coalition Incentives for Political Budget Cycles. Public Choice 2012;151(1/2):121–36.

[59] Tsebelis George. Veto players: how political institutions work. Princeton University Press; 2002.

[60] Presidenza del Consiglio dei Ministri (2020), D.L. 3 Novembre: ulteriori disposizioni attuative del decreto-legge 25 marzo 2020, n. 19, convertito, con modificazioni, dalla legge 25 maggio 2020, n. 35, recante «Misure urgenti per fronteggiare l'emergenza epidemiologica da COVID-19», e del decreto-legge 16 maggio 2020, n. 33, convertito, con modificazioni, dalla legge 14 luglio 2020, n. 74, recante «Ulteriori misure urgenti per fronteggiare l'emergenza epidemiologica da COVID-19». https://www.gazzettaufficiale.it/eli/id/2020/11/04/20A06109/sg.

[61] Resolución de 30 de septiembre de 2020, de la Secretaría de Estado de Sanidad, por la que se da publicidad al Acuerdo del Consejo Interterritorial del Sistema Nacional de Salud sobre la Declaración de Actuaciones coordinadas en Salud Pública para responder ante situaciones de especial riesgo por transmission no controlada de infecciones causadas por el SARS-Cov-2, de fecha 30 de septimebre de 2020 (BOE núm 260, de 30 de septiembre de 2020).

[62] Dickson V, Farnworth M, Zhang J. Opportunism and election timing by Canadian provincial and federal governments. Canadian Public Policy 2013;39(1):101–18.

[63] Aksoy, Cevat Giray, Michael Ganslmeier, and Panu Poutvaara. 2020. "Public Attention and Policy Responses to COVID-19 Pandemic." *Available at SSRN 3638340*.

[64] Alon Ilan, Farrell Matthew, Li Shaomin. Regime Type and COVID-19 Response. FIIB Business Review 2020;9(3):152–60.

[65] Kosnik Lea-Rachel, Bellas Allen. Drivers of COVID-19 Stay at Home Orders: epidemiologic, Economic, or Political Concerns? Econ Disaster Clim Chang 2020;4(3):503–14.

[66] Berardi C, Antonini M, Genie MG, Cotugno G, Lanteri A, Melia A, Paolucci F. The COVID-19 pandemic in Italy: policy and technology impact on health and non-health outcomes. Health Policy Technol 2020;9(4):454–87.

[67] Henríquez J, Gonzalo-Almorox E, García-Goñi M, Paolucci F. The first months of the COVID-19 pandemic in Spain. Health Policy Technol 2020;9(4):560–74. https://doi.org/10.1016/j.hlpt.2020.08.013.

[68] Antonini Marcello, et al. An Analysis of the COVID-19 Vaccination Campaigns in France, Israel, Italy and Spain and Their Impact on Health and Economic Outcomes. Health Policy Technol 2021:100594. https://www.sciencedirect.com/science/article/pii/S2211883721001179.

[69] Pan J, Zhu W, Tian J, Liu Z, Xu A, Yao Y, Wang W. Vaccination as an alternative to non-drug interventions to prevent local resurgence of COVID-19. Infect Dis Poverty 2022;11(1):1–13.