



Healthcare: Public Policies, Social Practices, and Individual Experiences

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The Politics of Covid-19 Vaccination Hesitancy in Southeastern Europe

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Abstract: The execution of Covid-19 vaccination drives in former Yugoslavia's successor states has been disappointing. The rapidly evolving literature on the Covid-19 pandemic suggests the levels of support for vaccination are correlated with education, trust in public-health institutions, and exposure to the negative economic and health effects of the pandemic. The explanations of the political foundations of vaccination hesitancy, however, need better empirical grounding. We shed light on this subject by analyzing the results of a survey conducted on more than six thousand respondents from Bosnia-Herzegovina, Croatia, and Serbia, as well as a combination of public-health, economic, and sociodemographic data across more than five hundred municipalities in Croatia. Most notably, we find the political sources of vaccination hesitancy to be strongly related to people's support for the ideas of political parties committed to nationalist populism.

Keywords: Covid-19; vaccination hesitancy; Southeastern Europe; populism; nationalism

Introduction

By June 2023, five out of seven successor states of former Yugoslavia—Bosnia-Herzegovina, Croatia, Montenegro, North Macedonia, and Slovenia—had been placed in the global top-10 of countries in terms of Covid-19 mortality per capita. With an official death toll of more than seventy thousand people in the region and projected excess mortality figures surpassing the figure of one hundred and thirty thousand, the pandemic has arguably been as lethal as the wars of Yugoslavia's

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dissolution in the 1990s.¹ In many ways, this is a sobering surprise considering the strong initial response of the local governments that was effective in mitigating the most negative consequences of the pandemic during its early stages. Things fell apart, however, concurrently with the disappointing execution of the vaccination drives in the region. With vaccination rates ranging from only 26 % in Bosnia-Herzegovina to 58 % in Slovenia, former Yugoslavia's successor states are some of the worst performers on the continent. The reasons behind these dismal figures are certainly related to difficulties with procurement, distribution, and poor organization of the local public-health authorities. The bulk of the problem, nevertheless, lies in the exceedingly high levels of vaccination hesitancy among the citizens of these countries. What could explain this state of affairs? Why are people in Southeastern Europe not accepting Covid-19 vaccines?

The rapidly evolving literature on the Covid-19 pandemic suggests a number of likely correlates with the levels of support for vaccination efforts on the individual and aggregate level: from education attainment (Albrecht 2022; Khubchandani et al. 2021; Wynen et al. 2022) and socioeconomic status (Fojnica et al. 2022; Khubchandani et al. 2021; Reiter et al. 2020; Viswanath et al. 2021) to trust in public-health institutions (Bagić, Šuljok, and Ančić 2022; Musa et al. 2022; Popa et al. 2022) or the level of exposure to the economic and health consequences of the pandemic (Reiter et al. 2020). We argue also that taking a vaccine has become a political act. Consequently, vaccination hesitancy should be approached with the same analytical framework that political scientists use to explain other types of political behavior, such as voting and participating in protest. When it comes to the political foundations of vaccination hesitancy beyond the US context, however, much more research is needed. Having closely observed the politicization of public-health provision during the pandemic, and having studied the character and proliferation of conspiracy theories related to Covid-19 (Glaurdić, Lesschaeve, and Mochtak 2023), we believe politics is at the center of people's acceptance of vaccines, not only in Southeastern Europe. After all, a state's mandate over bodily autonomy and the question of individual social responsibility inherent in vaccination, strike at the core of people's ideological worldviews.

We seek to fill this gap in the literature by analyzing two sets of data. First, we examine the results of a large survey administered on representative samples of more than six thousand respondents in Bosnia-Herzegovina, Croatia, and Serbia in the spring of 2021, i.e., at the onset of the second large wave of Covid-19 cases and deaths, as well as at the onset of the vaccination drives in the region. We supplement

1 Mathieu, Edouard, Hannah Ritchie, Lucas Rodés-Guirao, Cameron Appel, Charlie Giattino, Joe Hasell, Bobbie Macdonald, et al. 2020. "Coronavirus Pandemic (Covid-19)." *OurWorldInData.org*. <https://ourworldindata.org/coronavirus> (accessed 19 September 2022).

this analysis of individual-level data with an examination of vaccination data across more than five hundred relatively small municipalities in Croatia. Both sets of analyses use a wealth of attitudinal, public-health, sociodemographic, and economic data, but our primary focus is on the political determinants of vaccination hesitancy in the region.

Our analyses support our claim that taking or refusing the vaccine is fundamentally political. Both the individual- and aggregate-level findings suggest vaccine hesitancy in Southeastern Europe to be closely positively related to people's level of trust in the political class, as well as to their level of support for rightwing and populist ideas and political parties. These findings correspond perfectly to similar findings in the USA and West European contexts, suggesting that the underlying logic of vaccination hesitancy as a public-health crisis—at least during the Covid-19 pandemic—has a globally consistent transnational dimension.

Political Determinants of Vaccination Hesitancy: Theoretical Propositions

Vaccination hesitancy is commonly defined as the “delay in acceptance or refusal of vaccination despite availability of vaccination services” (MacDonald et al. 2015, 4163). This phenomenon has been a public-health problem arguably since the invention of vaccines, but more so in recent years with the proliferation of conspiracy theories related to vaccination, particularly in Western societies. Research on vaccination hesitancy conducted prior to the Covid-19 pandemic on both the individual and aggregate level has found its determinants to be varied and highly context-specific. Virtually every possible correlate of vaccination hesitancy prior to the Covid-19 pandemic has had mixed results in the literature. Income and higher education, for example, have been found to be both barriers and promoters of vaccine acceptance in highly developed, as well as in developing, countries. Arguably, the only sociodemographic variable that seems to have had a stable record of effect on vaccination hesitancy has been religious commitment, with the more committed respondents consistently showing higher levels of vaccination hesitancy (Larson et al. 2014).

Public health is, obviously, political, with the state's mandate over bodily autonomy and the question of individual social responsibility inherent in vaccination striking at the core of people's ideological worldviews. The first important factor in shaping people's willingness to be vaccinated is whether they trust those who are in charge of public policy regarding vaccines, i.e., the level of trust the people have in government and health officials. Political trust plays a complicated role in the

functioning of democratic polity. On the one hand, up to a certain point, mistrust can be considered healthy in a democracy, making citizens vigilant and engaged in monitoring the actions of the government (van der Meer 2017). On the other hand, political trust is a key ingredient in a functioning democracy, being the grease that allows the wheels of policy making to turn (Dalton 2004). A regime that is deeply mistrusted will have a hard time implementing its policies, eventually threatening to undermine its very stability.

Trust comes into play when there is a power differential due to information asymmetry (Larson et al. 2018). This information imbalance has been a key characteristic of the Covid-19 pandemic, as the public is almost entirely dependent on policy makers to assess information on the efficacy of the various vaccines and to make the right call (Pertwee et al. 2022). In other words, people, with little opportunity for verification, need to have faith that the system works and that those who make the decisions know what they are doing. Consequently, trust (or lack thereof) is expected to play a role in people's willingness to accept a Covid-19 vaccine, and indeed this is what much of new research shows when it comes to trust in health officials or the political system in general (Bagić, Šuljok, and Ančić 2022; Musa et al. 2022; Popa et al. 2022; Wynen et al. 2022).

Political mistrust has often been linked, even equated, with populism. Yet the two concepts are not identical, and they are able to contribute to vaccination hesitancy in their different ways (Geurkink et al. 2020). Political mistrust and populist attitudes both indicate that people believe politicians do not serve the interest of the populace. However, political mistrust first and foremost means that politicians are seen primarily as incompetent and self-serving. Populism goes beyond that, adding the notion of an antagonistic relationship between political elites and citizens (Geurkink et al. 2020). This antagonistic sentiment increasingly extends to the domain of public health, which Lasco and Curato (2019) have labeled "medical populism." In the environment of constant media scrutiny, explosion of unfiltered and personalized news, and conspiracy theories accelerated by social networks, public-health policies have become increasingly politicized, with populist political entrepreneurs aiming to capitalize on public fears. Recent public-opinion research, using data from the period immediately preceding the Covid-19 pandemic, suggests that Europeans holding populist views are indeed more likely also to be vaccination-hesitant, though this finding does not seem to travel from the individual to the aggregate level (Stoeckel et al. 2022).

The difference between political distrust and populism is subtle but important. One who has little trust in politicians does not necessarily believe that they intend to cause harm to people. This way, both distrust in politicians and populism can contribute to vaccination hesitancy, one capturing assessments of incompetence and

the other embodying perceptions of malevolent intention on the part of elites. These are our first two hypotheses.

Apart from their view on politicians, people's ideological commitments and worldviews can also affect their willingness to accept vaccination. Vaccination can put some foundational political beliefs to the test, as it challenges people's preferences when it comes to the nature of the social contract between citizens and the state and the nature of the relationship between individual freedoms and social responsibilities (Michaud, Carlisle, and Smith 2009). In practice, what this has meant, when it comes to vaccination, is that conservative or rightwing respondents—at least in the United States—are more vaccination-hesitant (Baumgaertner et al. 2018; Calvillo et al. 2020; Fridman et al. 2021; Hornsey et al. 2020; Khubchandani et al. 2021; Mesch and Schwirian 2015; Reiter et al. 2020; Viswanath et al. 2021). This was already the case before the Covid-19 pandemic, and it has only been further heightened since virtually every aspect of the pandemic and its mitigation was politicized in the highly charged environment of the Trump presidency.

One of the foundational cleavages in Southeastern Europe is centered on the protection and cultivation of a national identity based on ethnic membership, separating cosmopolitans from nationalists (Massey et al. 2003). We believe the tenets of nationalism should make believers more hesitant to accept vaccines. In the United States, Christian nationalism has been found to correlate positively with vaccination hesitancy (Corcoran et al. 2021). The explanation for this is that Christian nationalists see faith as their ultimate source of moral authority, overruling other sources such as science (Baker et al. 2020). Their faith is perceived to lend them a certain divine protection, making them, in a way, privileged and even superior to others (DiGregorio et al. 2022). In other words, as long as they uphold their identity as devout Christians, no vaccine is needed. Similarly, in the European context, adherents to culturally more closed attitudes have also been found to be more vaccination-hesitant (Stoeckel et al. 2022).

This belief in the superiority of the in-group is what more generally links nationalism to vaccination hesitancy. An important component of nationalism is the idealization of the in-group (Federico et al. 2023). Such conviction in the in-group's preeminence may result in a belief that group is invulnerable, therefore having no need of vaccines to survive and thrive (Cislak et al. 2021). Admitting that the group needs outside help may tarnish that image. A related tendency is that nationalism results in a high need to push back against those who are perceived to exert external pressure on the group, like health experts, pharmaceutical companies, and health organizations such as the WHO (Sternisko et al. 2023). Again, this taps into an aversion toward the thought that the in-group needs guidance or help and is unable to cope on its own. In summary, vaccination hesitancy is expected to be positively

correlated with nationalism, due to the threat vaccination represents to the idealized image of the nation. This is our third hypothesis.

To summarize our three empirical propositions, we believe that people's openness to vaccination should be positively related to their level of trust in the political class—independently, or rather in addition to, their trust in national scientists or experts (H1). Vaccination production, procurement, and administration are parts of the process that has been decisively impacted by politicians. Whether voters agree to partake in that process should be dependent on whether they trust politicians. Second, we believe that openness to vaccination should be positively related to the level of commitment to political populism (H2). Populism cuts across the traditional left–right divide and proposes a vision of politics that pits the common people against the elites. It is a worldview that is seemingly tailor-made for vaccination hesitancy, which is likely the reason virtually all populist parties and leaders in democratic societies have embraced skeptical, and at times even hostile, attitudes toward public-health authorities and the vaccination drives during the pandemic. We believe Southeastern Europe fits perfectly into this larger pattern. Finally, we believe that openness to vaccination should be negatively related to the level of commitment to rightwing-nationalist political ideology (H3). In proposing that, we are largely guided by the findings in the US context, as well as by the understanding of the basic tenets of rightwing-nationalist political ideology. Much of rightwing politics in Southeastern Europe is dominated by nationalism, which may instill an idealized image of the nation that health crises, and any notion of needing vaccines, threatens to undermine.

Data and Method

Our analysis relies on two sources of information: a) individual-level data from a representative survey of respondents in Bosnia-Herzegovina, Croatia, and Serbia; and b) aggregate-level public-health, sociodemographic, economic, and political data across 556 relatively small municipalities in Croatia. We conducted our survey online in March 2021, recruiting respondents with Facebook's Marketing API and using quota sampling.² According to publicly available figures, roughly half the population of these three countries had a Facebook account at the time the survey was

² For a full survey description, codebook, and data, see Lesschaeve, Christophe, Glaurdić, Josip, and Michal Mochtak. 2022. *2021 ELWar Covid-19 Public Opinion Survey*. Data File Version 1.0.0. Mannheim, Cologne: SowiDataNet Datorium. GESIS–Leibniz Institute for the Social Sciences. <https://doi.org/10.7802/2398>. We include a complete description of our survey process—including sampling design, survey weights, screening procedures, and data quality management—in the Online Appendix Table A4.

administered, giving us access to a massive pool of respondents who could be reached by fine-tuning advertisements to target specific demographic groups and subpopulations (Zhang et al. 2020).³ Using demographic information from the official bureaus of statistics of the three countries, we identified a large number of strata in each of the three countries according to gender, education, age, and region, leading to a full sample of 6400 respondents. We applied survey weights (Ansolabehere and Rivers 2013), which were calculated using iterative proportional fitting, also known as “raking,” thus making our samples representative of the populations within each of these three countries, as well as of their total population. The highest weight we applied was 2.65 (with a mean of 1), making our survey comparable to the norms of the field (for example, the European Social Survey has the upper weight limit of 4). Figure 1 shows how the three countries were affected by the Covid-19 pandemic and how their governments responded to it using the Stringency Index metric that

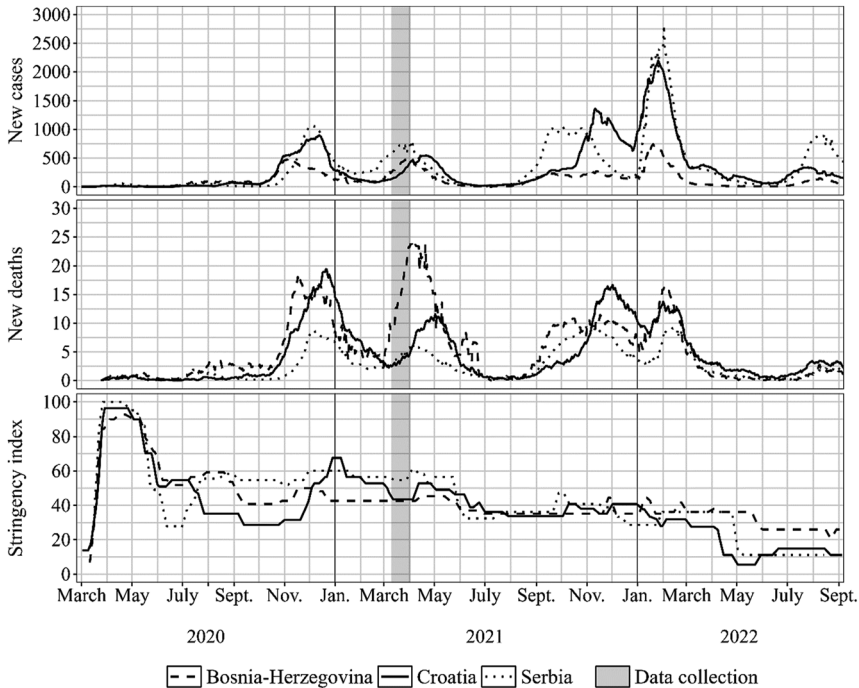


Figure 1: The Covid-19 pandemic and government response. Source: Authors’ construction.

³ Since the completion of our survey, Facebook limited access to researchers, making this method no longer tenable—at least not until a change in the company’s policy.

measures the strictness of the pandemic mitigation measures employed by the national governments (i.e., higher values mean stricter measures).⁴ It also marks the survey collection period at the onset of the second wave of Covid-19 deaths and the vaccination campaign, when the negative consequences of the pandemic should have been commonly understood by everyone.

The principal dependent variable of interest in our survey analysis is *Vaccination status*. It is a simple binary variable, taking the value of 1 for respondents who have either been vaccinated or are willing to be vaccinated. Interestingly, 52 % of respondents in our sample were either vaccinated or were willing to be vaccinated, with little difference among the three countries (Bosnia-Herzegovina 54.5 %, Croatia 51.8 %, and Serbia 51.6 %). These figures ended up roughly corresponding to the eventual figures for fully vaccinated adults in Croatia (56 %) and Serbia (48 %), though not in Bosnia-Herzegovina (26 %) where the vaccination drive has been particularly unsuccessful. Since *Vaccination status* is a binary variable, we explore its determinants by using logistic regression models.

Our principal explanatory variables are *Trust in national politicians*, *Populism*, and *Nationalism*. The first is taken directly from a survey question, in which respondents were asked to indicate how much they trusted national politicians on a 5-point scale (Stein et al. 2021). Both *Populism* and *Nationalism* are modeled as respondents' average answers on a Likert scale to a set of policy statements, following the norms of the field (Akkerman et al. 2014; Dyrstad 2012). All statements are listed in the Online Appendix Table A1. The statements on populism all revolve around an anti-elitist sentiment, and those on nationalism capture the cleavage between the nationalist and cosmopolitan conceptions of society.

The analyses account for a number of control variables. We include views on the role of the government in the economy and wealth redistribution, measured also as respondents' average answers to a set of policy statements (see Table A1). The cleavage between the nationalist and cosmopolitan conceptions of society, and that between the socialist and liberal conceptions of economy, have their foundations in the traumas associated with the wars that ended the former Yugoslavia and its socialist system (Glaurdić, Lesschaeve, and Mochtak 2021). We believe they represent a more complex view of the left–right divide in the region and capture respondents' ideological commitments more accurately than left–right self-placement would—something that has already been demonstrated in prior studies (Cislak et al. 2021). The populist dimension of politics in the region, on the other hand, is arguably more recent—though Southeastern Europe obviously has a decades-long tradition of political populism (Grdešić 2019).

4 Mathieu et al. 2020. “Coronavirus Pandemic (Covid-19).”

Furthermore, we control for respondents' level of trust in national scientists and experts. We include this covariate as we are interested in the role played by populism and mistrust in politicians, separate from and in addition to the effect of mistrust in scientists and experts. We also gathered information on respondents' experiences of the pandemic with a string of binary variables capturing whether they had been personally infected with Covid-19, whether they knew someone who had been infected, and whether they knew someone who had died due to Covid-19. Further, the models control for the extent respondents followed the Covid-19 pandemic on a 0–10 scale. The expectation here was obviously that respondents who were more personally affected by the pandemic would be more receptive to being vaccinated. Additionally, the models contain a standard battery of socio-demographic variables, including the respondents' gender, age, education, income (national deciles), employment, and ethnic minority status. Although the record of sociodemographic variables in explaining vaccine hesitancy has been mixed (Larson et al. 2014), we include them because we wish to properly control for the effects of our main explanatory variables of interest, and because recent research on the Covid-19 pandemic in a variety of geographic contexts has found them to have a significant impact on people's views on vaccination (e.g. Khubchandani et al. 2021; Moore et al. 2021; Neumann-Böhme et al. 2020; Reiter et al. 2020). Finally, we account for country differences by including country dummies in all our models.⁵ We present the descriptives of all individual-level variables collected in the survey in Table 1.

We supplement our analysis of individual-level survey data with the analysis of public-health, sociodemographic, economic, and obviously political data across 556 relatively small municipalities in Croatia. We were forced to limit our analysis to Croatia because of its superior availability of a wealth of data on the municipal level, in comparison to Bosnia-Herzegovina and Serbia.⁶ The dependent variable of interest for us is the vaccination rate, which is reported by the Croatian Institute of Public Health (*Hrvatski zavod za javno zdravstvo*, HZJZ). The HZJZ reports the number of people in a municipality vaccinated with the first and the second dose of any of the approved Covid-19 vaccines. Our variable *Vaccination rate* is thus the proportion of the municipal population vaccinated with at least one dose of the Covid-19 vaccine, though—as a robustness check—we conducted our analyses with this variable conceptualized as the proportion of the municipal population

⁵ Here we should note that the three countries generally had similar vaccination mandate policies, with the notable difference being Croatia, which required vaccination or a valid recent test for its health and social services workers between October 2021 and June 2022, i.e., after our survey data collection (Hale et al. 2021).

⁶ Ideally, we would have liked to combine our municipal data with the survey data in a multi-level model, but the lack of municipal IDs for the survey respondents precluded us from doing that.

Table 1: Descriptive statistics of survey data.

Variable	Mean	SD	Min.	Max.
Vaccination status	0.52	0.5	0	1
Trust in national politicians	2.18	1.12	1	5
Populism	3.84	0.57	1	5
Nationalism	2.91	0.86	1	5
Socialism	3.83	0.58	1	5
Trust in national scientists/experts	3.48	1.06	1	5
Being diagnosed with Covid-19	0.16	0.37	0	1
Knowing someone diagnosed with Covid-19	0.69	0.46	0	1
Knowing someone who died due to Covid-19	0.25	0.43	0	1
Women	1.51	0.5	1	2
Age	46.3	13.94	18	79
Lower education	0.34	0.47	0	1
Middle education	0.5	0.5	0	1
Higher education	0.16	0.36	0	1
Income (deciles)	5.29	2.72	1	10
Full-time employed	0.48	0.5	0	1
Part-time employed	0.06	0.24	0	1
Unemployed	0.15	0.35	0	1
Retired, pensioner	0.1	0.3	0	1
Stay-at-home spouse	0.06	0.24	0	1
Pupil, student	0.05	0.21	0	1
Sick, disabled	0.01	0.12	0	1
Self-employed	0.09	0.29	0	1
Ethnic minority	0.12	0.33	0	1
Bosnia-Herzegovina	0.23	0.42	0	1
Croatia	0.29	0.45	0	1
Serbia	0.49	0.5	0	1

Source: Authors' construction.

vaccinated with two doses of the vaccine and reached essentially the same results. Since our dependent variable is a proportion, i.e., it is bounded between 0 and 1, we use a string of fractional logit models (Papke and Wooldridge 1996).

Our principal explanatory variables of interest come from the Croatian parliamentary elections of 2020. These elections took place in the summer lull after the first wave of the pandemic. They pitted the government run by the center-right Croatian Democratic Union (*Hrvatska demokratska zajednica*, HDZ) against its main competitors on the center-left, the Social Democrats (*Socijaldemokratska partija Hrvatske*, SDP), as well as a host of other players of all ideological persuasions. Two sets of actors here are particularly deserving of attention. First, the new leftist challengers in the form of the electoral platform of green and socialist parties

We can! (*Možemo!*), which rose to prominence through its activism in the capital city of Zagreb (Bajruši 2021). And second, the rising number of (mostly rightwing) populist parties, which very vocally opposed the stringent pandemic measures of the government. Although the HDZ, on the heels of its generous economic policies for the mitigation of the negative pandemic effects and thanks to a very low turnout that favored its comparatively superior ground organization, did very well and won the elections with 37.3 % of the vote, these new actors managed to significantly shake up the HDZ/SDP duopoly. We tabulated the 2020 electoral results on the municipal level and split the Croatian electorate into eight groups, based on electoral participation figures and the ideological orientation of each party/coalition after close reading of their electoral platforms: 1) voters for the center-right incumbent government (which became the reference category in our models); 2) non-voters; 3) voters who cast invalid votes; 4) voters of rightwing parties; 5) voters of centrist parties; 6) voters of center-left parties; 7) voters of leftist parties; and 8) voters of populist parties. For the last group, we relied on the data and guiding principles provided by the expert assessments in the *PopuList*.⁷ We believe it is important to consider the whole electorate, rather than just the voters who cast valid ballots, because not turning out to vote or casting invalid ballots can be seen as a form of a political statement as well (Glaurdić and Vuković 2015). In each municipality, the proportions of these eight segments of the electorate thus always sum to 100 %.

Our models also include a broad set of sociodemographic and economic variables. We collected the 2020 figures for municipal unemployment and average per capita monthly income in Croatian kunas (ln-transformed) that we acquired from the Croatian Employment Service (*Hrvatski zavod za zapošljavanje*, HZZ) and the Tax Authority (*Porezna uprava*). We also collected a number of variables from the last fully reported census of 2011: rate of economic activity (*Activity*); average years of education of adult population (*Education*); proportion of municipal population that is retired (*Retirees*); *Average age*; proportion of the municipal population that belongs to the ethnic majority (*Croats*); and the average weighted size of municipal settlements (ln-transformed) to capture the urban/rural divide (*Settlement size (ln)*). All these variables could conceivably be hypothesized to have an effect on vaccination rates. The general expectation would be that vaccinations would be higher in economically propulsive areas with better educated populations that were perhaps older (due to the age-related nature of the threat of Covid-19).

7 Rooduijn, Matthijs, Stijn van Kessel, Caterina Froio, Andrea L.P. Pirro, Sarah L. de Lange, Daphne Halikiopoulou, Paul Lewis, Cas Mudde, and Paul Taggart. 2019. "The PopuList: An Overview of Populist, Far Right, Far Left and Eurosceptic Parties in Europe." Dataset, version 1.0. *Popu-list Org*. www.popu-list.org. (accessed 11 February 2019).

Three more variables here, however, deserve particular attention. Due to the extraordinarily negative impact of the Catholic Church, particularly at the local level, in respecting the mitigation measures and in promoting the vaccination efforts, we tried to capture the religious orientation of the municipal population with two variables. The first variable, *Non-believers*, captures the proportion of atheists and agnostics in the municipal population in the 2011 census. Since this variable does not really capture the commitment of the local population to the traditionalist vision of society promoted by the Catholic clergy, we also included the variable capturing the “Yes” vote (as a proportion of the total electorate) in Croatia’s 2013 referendum on the constitutional definition of marriage as a union between a man and a woman. This referendum marked the culmination of the organizing efforts of the Catholic conservative movement in Croatia (Glaurdić and Vuković 2016), which is why we believe our variable *Marriage referendum “Yes” vote* can help us capture the depth of commitment of the local population to religious traditionalism that we hypothesize had a negative impact on vaccination rates.

Finally, in addition to the binary variables for Croatia’s historical regions, we include the variable capturing the exposure of the municipal population to the violence of Croatia’s 1991–1995 War of Independence. We model the exposure to violence with the proportion of the municipal population that is disabled due to the war. As demonstrated in a string of previous studies, this variable is an excellent proxy for the pattern of violence, as it closely corresponds to the evolution of the battle fronts (Glaurdić, Lesschaeve, and Mochtak 2018). It is also one of the strongest predictors of the pattern of political allegiance since the turn of the century on both the national and local level (Glaurdić and Vuković 2016, 2018). Here we include it in order to test whether the legacy of war had any impact on contemporary provision of public-health. There is a number of reasons to believe that it has had a decidedly negative effect, whether due to the weaker provision of public services in war-affected areas, or due to the lower trust of the war-affected population in public and government authorities. We present the descriptives of all our municipality-level variables in Table 2.

Results

The aim of our analysis of survey data was to identify the political correlates of respondents’ vaccination status. Here our focus has been on two aspects of respondents’ political attitudes: their trust in the political class in general, and their ideological orientation. We present the findings of our analysis in Table 3, where each of the three models is a logistic regression with *Vaccination status* as the

Table 2: Descriptive statistics of municipality-level data.

Variable	Mean	St. dev.	Min	Max
Vaccination rate	0.548	0.086	0.248	0.804
Non-voters	0.554	0.081	0.299	0.967
Invalid votes	0.012	0.004	0.002	0.039
Government vote	0.184	0.077	0	0.509
Right vote	0.004	0.003	0	0.026
Center vote	0.032	0.034	0	0.304
Center left vote	0.111	0.060	0.006	0.323
Left vote	0.014	0.013	0	0.101
Populist vote	0.089	0.041	0.003	0.309
Unemployment	0.097	0.065	0.015	0.398
Income (ln)	7.857	0.213	6.804	8.462
Activity	0.385	0.063	0.100	0.592
Education	9.849	0.872	5.925	12.132
Retirees	0.259	0.053	0.131	0.502
Average age	42.622	3.323	33.100	63.300
Croats	0.889	0.171	0.018	1.000
Non-believers	0.035	0.037	0	0.232
Marriage referendum “Yes” vote	0.248	0.098	0.008	0.716
Settlement size (ln)	6.923	1.250	3.810	13.310
War disabled	15.376	12.544	0	103.080
Dalmatia	0.236	0.425	0	1
Slavonia	0.228	0.420	0	1
Istria	0.074	0.262	0	1

Source: Authors' construction.

dependent variable (odds ratios are presented in Table A2 in the Appendix). Model 1 focuses on the political variables; Model 2 expands on Model 1 by including variables capturing respondents' personal experiences of the pandemic; and Model 3 expands things further by including a string of sociodemographic and economic variables. In each of the three models, we include dummies for respondents' countries, and we control for their level of trust in national scientists and experts, in order to distinguish between the respondents' views of the political class and their views of scientific/expert authorities.

Our three hypotheses suggested that respondents' vaccination status was positively related to their level of trust in the political class, and negatively related to their commitment to a populist view of politics, as well as their rightwing ideological orientation. Table 3 reports the coefficients of our models, and Figure 2 shows the findings graphically. The results show that there is ample evidence to support all three hypotheses. *Vaccination status*, i.e. whether the respondent had been already

Table 3: Determinants of individual-level vaccination status.

	Model 1			Model 2			Model 3		
	B	S.E.	Sig.	B	S.E.	Sig.	B	S.E.	Sig.
Trust in national politicians	0.18	0.03	**	0.09	0.03	**	0.11	0.03	***
Populism	-0.26	0.04	***	-0.37	0.06	***	-0.39	0.06	***
Nationalism	-0.21	0.04	***	-0.25	0.04	***	-0.22	0.04	***
Socialism				0.01	0.05		-0.02	0.06	
Trust in national scientists/experts				0.47	0.03	***	0.47	0.03	***
Being diagnosed with Covid-19				0.15	0.09		0.13	0.09	
Knowing someone diagnosed with Covid-19				0.37	0.07	***	0.42	0.07	***
Knowing someone who died due to Covid-19				0.38	0.08	***	0.35	0.08	***
Women							-0.15	0.06	*
Age							0.03	0	***
Lower education (ref. cat.)									
Middle education							-0.03	0.07	
Higher education							0.31	0.08	***
Income							-0.01	0.01	
Full-time employed (ref. cat.)									
Part-time employed							-0.05	0.13	
Unemployed							0.03	0.11	
Retired, pensioner							-0.2	0.12	
Stay-at-home spouse							-0.16	0.14	
Pupil, student							-0.18	0.15	
Sick, disabled							-0.27	0.29	
Self-employed							0.05	0.11	
Ethnic minority							0.02	0.1	
Bosnia-Herzegovina (ref. cat.)									
Croatia	-0.20	0.07	***	-0.17	0.08	*	-0.17	0.08	*
Serbia	-0.32	0.07	***	-0.34	0.08	***	-0.38	0.08	***
Intercept	1.63	0.23	***	0.21	0.33		-0.76	0.38	*
n		6514			6514			6514	
Pseudo R^2		1.89 %			7.37 %			9.67 %	

Source: Authors' construction. Notes: Logistic regression throughout. DV = Vaccination status (vaccinated or willing to be vaccinated). *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$.

vaccinated or was willing to be vaccinated, was strongly positively related to *Trust in national politicians* (top panel in Figure 2), as well as *Trust in national scientists/experts*, suggesting trust is a crucial factor in explaining vaccine hesitancy in Southeastern Europe, a finding resonating with similar findings from the region (Bagić, Šuljok, and Ančić 2022; Musa et al. 2022; Popa et al. 2022). One standard deviation (SD) increase in *Trust in national politicians* (SD = 1.12) increases the

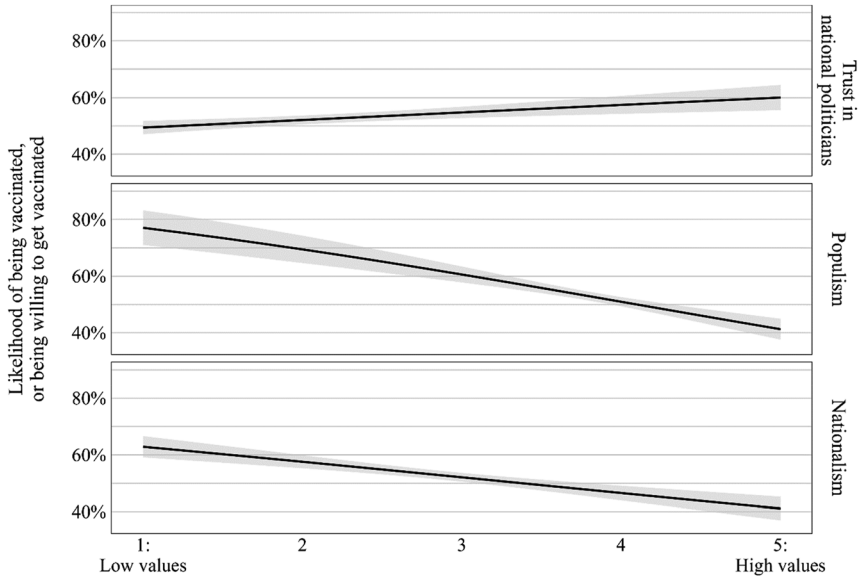


Figure 2: Political determinants of vaccination status. Source: Authors' construction.

likelihood of wanting or having taken the vaccine by 2.9 percentage points. Our findings also show *Vaccination status* to be strongly negatively related to *Populism* and *Nationalism* (middle and bottom panels in Figure 2). Our findings contribute to previous studies on the link between worldviews and vaccination rates and fit Southeastern Europe into the larger narrative of politically charged and determined resistance, not only to vaccination but to scientific progress in general. One standard deviation increase in *Populism* ($SD = 0.75$) decreases the likelihood of being open to vaccination by 5.3 percentage points, and one standard deviation increase in *Nationalism* ($SD = 0.86$) decreases this likelihood by 5.0 percentage points. Given the strong link between nationalism and recent conflicts in the region, this is one more piece of evidence of how the region continues to be weighed down by its legacy of war (Glaurđić, Lesschaeve, and Mochtak 2022). All of these results were stable across the three models, i.e., respondents' political views had a strong influence on their vaccination status, regardless of their experiences of the pandemic or their socio-demographic and economic status.⁸

⁸ Here we should note that, as a robustness check, we also tested the full Model 3 separately for each of the three countries and we report those findings in the Online Appendix Table A3. These findings correspond well to those in the full sample, except in the case of Bosnia-Herzegovina, where the only political variable that was statistically significant was *Socialism* and it had a positive relationship with *Vaccination status*.

When it comes to the control variables that we include in Models 2 and 3, our findings resonate with the findings in the literature on vaccination hesitancy in general and Covid-19 vaccination hesitancy in particular. Here it should be noted that broad reviews of the literature have found the impact of sociodemographic and economic variables on vaccination rates prior to the Covid-19 pandemic to be highly context-specific (Larson et al. 2014). When we look at the control variables, we see that the variable *Socialism* interestingly had no effect on *Vaccination status*, suggesting that the dominant aspect of respondents' left–right political orientation in this sphere is centered on the nationalism/cosmopolitanism axis. We also find that respondents' exposure to the virus in their immediate circle of family, friends, and acquaintances makes them more likely to get vaccinated—a finding similar to the United States in the early stages of the pandemic (Reiter et al. 2020). Being diagnosed with Covid-19 themselves does not have a similar effect, though it is in the expected direction, likely due to those who were infected with Covid-19 having acquired immunity and thus perceiving more limited utility from added vaccination. Model 3 furthermore shows that women are less likely to be willing to be vaccinated—in line with similar findings in the United States, Western Europe, and China, as well as Croatia (Bagić, Šuljok, and Ančić 2022; Khubchandani et al. 2021; Neumann-Böhme et al. 2020; Wang et al. 2020; Wynen et al. 2022). The model also shows a strong positive relationship between *Vaccination status* and *Age* and *Higher education*. Older respondents, likely due to the disproportionately negative effects of the virus on them, reported higher rates of vaccination willingness—again in line with the literature (Fojnica et al. 2022; Moore et al. 2021; Wynen et al. 2022). Similarly, higher educated respondents were more willing to be vaccinated than those with lower levels of education—in line with more recent research on the relationship between education and Covid-19 vaccination hesitancy (Albrecht 2022; Bagić, Šuljok, and Ančić 2022; Fojnica et al. 2022; Khubchandani et al. 2021; Wynen et al. 2022), but in contrast to some earlier works that have found higher education to be a potential correlate of vaccination hesitancy, particularly in developed countries (e.g., Bocquier et al. 2018). Economic variables of income and (un)employment, as well as respondents' ethnic minority status, had no effect on *Vaccination status* in our analyses—in contrast to other individual-level studies that found these variables to be significant (e.g., Khubchandani et al. 2021; Reiter et al. 2020; Viswanath et al. 2021), with the less affluent members of ethnic and racial minorities being less willing to accept vaccination.

People, however, do not make their vaccination choices independently of their immediate environment. In many ways, their decisions on whether to get vaccinated or not are socially determined. This is why we supplement our analysis of individual-level survey data with the analysis of vaccination rates using data available on the level of 556 relatively small (median population of 2708

inhabitants) municipalities in Croatia. We limit ourselves to Croatia due to the availability of its Covid-19 vaccination data on the municipal level, as well as due to the quality of a number of other political, sociodemographic, and economic variables. As noted above, our dependent variable *Vaccination rate* represents the proportion of the municipal population vaccinated with at least one dose of the Covid-19 vaccine. Since it is bounded between 0 and 1, which makes OLS not ideal, we run a string of fractional logit models (Papke and Wooldridge 1996), with the results presented in Table 4. The first model tests the impact of political variables, which have been derived from the 2020 parliamentary election returns. These variables are of our primary interest. Model 2, on the other hand, focuses on the sociodemographic and economic variables, whereas Model 3 combines the two sets of variables.

Table 4: Determinants of municipality-level vaccination rate in Croatia.

	Model 1			Model 2			Model 3		
	dy/dx	S.E.	Sig.	dy/dx	S.E.	Sig.	dy/dx	S.E.	Sig.
Government vote (ref. cat.)									
Non-voters	-0.120	0.062					-0.159	0.057	**
Invalid votes	-2.366	0.828	**				-1.601	0.614	**
Right vote	-0.737	1.366					2.297	1.297	
Center vote	0.239	0.097	*				0.139	0.088	
Center left vote	0.378	0.078	***				0.167	0.076	*
Left vote	0.649	0.239	**				-0.716	0.250	**
Populist vote	-0.410	0.135	**				-0.312	0.087	***
Unemployment				0.015	0.061		0.038	0.063	
Income (ln)				0.137	0.025	***	0.150	0.025	***
Activity				-0.059	0.063		-0.108	0.062	
Education				0.034	0.006	***	0.035	0.005	***
Retirees				0.154	0.099		0.069	0.103	
Average age				0.006	0.002	***	0.006	0.002	***
Croats				0.094	0.023	***	0.041	0.027	
Non-believers				0.222	0.111	*	0.217	0.111	*
Marriage referendum “Yes” vote				-0.232	0.039	***	-0.174	0.043	***
Settlement size (ln)				-0.011	0.002	***	-0.009	0.002	***
War disabled				-0.001	0.000	**	-0.001	0.000	*
Dalmatia				-0.052	0.009	***	-0.039	0.010	***
Slavonia				0.083	0.008	***	0.096	0.009	***
Istria				-0.060	0.012	***	-0.053	0.013	***
N		556			556			556	
Log pseudolikelihood		-251.67			-248.33			-248.05	
R ²		0.232			0.628			0.662	

Source: Authors’ construction. Notes: Fractional logit throughout. *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$.

Once again, our three hypotheses proposed that vaccination status was positively related to the level of trust in the political class, and negatively related to the level of support for a populist view of politics and rightwing ideological orientation. We consider the variables *Non-voters* and *Invalid votes* as useful proxies for the level of the local electorate's trust in the political class. Not turning out to vote or casting an invalid ballot can happen for a variety of reasons. Nonetheless, generally speaking, it is also a sign of apathy or discontent with the way mainstream politics operates. In addition to non-voters and invalid votes, we split the Croatian electorate into six ideological groupings ranging from right, through center-right, center, and the center-left, to left, with the populists standing outside of that classical distribution. Two things should be noted here about our approach: 1) the vote for the center-right government of the Croatian Democratic Union (HDZ) is the reference category; and 2) we consider the populists as separate, though most of them—like the Bridge (*Most*) or the Homeland Movement (*Domovinski pokret*, DP)—could be considered as belonging to the right wing of the political spectrum. As the results of our analysis, shown in Table 4, demonstrate, there is ample support for all three of our hypotheses.

In the pared down Model 1, *Vaccination rate* is strongly negatively affected by the *Invalid votes* and the *Populist vote*. It is also positively affected by the votes for centrist, center-left, and left parties. In other words, vaccination rates are higher in areas where voters support the center to left end of the political spectrum, as opposed to the center-right government. They are also lower in areas where voters support the populist parties or where voters decide to cast invalid ballots, as opposed to voting for the center-right government. In the full Model 3, after the inclusion of an extensive battery of sociodemographic and economic variables, findings remain largely the same, apart from two important changes. First, the variable *Non-voters* becomes strongly significant and in the expected direction, suggesting that vaccination rates are lower in areas with lower electoral turnout, as well as with higher proportions of invalid ballots. This strengthens the support for our first hypothesis. The variable *Left vote*, however, remains statistically significant at the 1% level, but turns negative. This means that, once we control for the sociodemographic and economic variables, higher votes for the leftist parties (consisting largely of those supporting the new platform *Možemo!*) suggest lower vaccination rates. Considering the novelty and protest nature of *Možemo!*, this is perhaps not so surprising. What is beyond dispute, however, is that the level of support for the (largely rightwing) populist parties is a strong predictor of vaccination rates: higher support for the populists is strongly correlated with low vaccination rates. Our aggregate-level findings resonate rather well with the findings in the US context (e.g. Albrecht 2022; Hill, Gonzalez, and Davis 2020), which suggested that the level of support for the rightwing Republicans or for the rightwing populist president Donald Trump were

solid predictors of risk-taking behavior during the pandemic, as well as of lower vaccination rates, though they contradict the findings in the European context where national-level support for populist parties did not necessarily imply higher rates of vaccination hesitancy (Stoeckel et al. 2022).

Our set of sociodemographic and economic variables also offers important contributions to the understanding of popular support for vaccination during the Covid-19 pandemic. Higher vaccination rates are associated with higher income and education levels, as well as with higher proportions of ethnic majority population (though the latter finding disappears in the full model). These findings confirm similar findings in the US context (Albrecht 2022). Similar to individual-level findings, higher vaccination rates are also strongly positively related to higher average age of the population—likely a function of the disproportionate impact of the virus on older populations. Vaccination rates are also higher in municipalities with smaller average settlements, indicating perhaps the stronger sense of community and responsibility in more rural areas. Three further variables here are, however, particularly interesting in the Croatian context. Individual-level research prior to the Covid-19 pandemic has found religiosity to be virtually the only sociodemographic variable that consistently predicts higher levels of vaccination hesitancy (Larson et al. 2014). Research on the level of US states, on the other hand, has found religiosity to be a strong predictor of risk-taking behavior during the Covid-19 pandemic (Hill, Gonzalez, and Burdette 2020). We model religious identity with our variable *Non-believers* and the commitment of the municipal population to religious traditionalism/conservatism with the variable *Marriage referendum “Yes” vote*, which represents the proportion of the municipal electorate that voted “yes” on the 2013 referendum for the constitutional definition of marriage as a union between a man and a woman. As noted above, this referendum was organized and promoted by the Catholic conservative movement in Croatia, which is why we believe this variable can be a good proxy for the depth of commitment of the local population to religious traditionalism/conservatism. Both *Non-believers* and *Marriage referendum “Yes” vote* are statistically significant and in the expected directions in Models 2 and 3. A higher proportion of the municipal population identifying themselves as atheists or agnostics implies a higher vaccination rate. A higher level of support for the traditionalist definition of marriage, on the other hand, implies a lower vaccination rate. Just as in the United States, religiosity is a strong predictor of vaccination. Finally, the variable *War disabled*, which we use as a proxy for the exposure of the municipal population to the violence in Croatia’s War of Independence, suggests that war-affected areas exhibited lower rates of vaccination. We suggested above that there was a number of reasons to believe that war exposure would have a negative effect, whether due to the weaker provision of public services in war-affected areas, or due to the lower trust of the war-affected

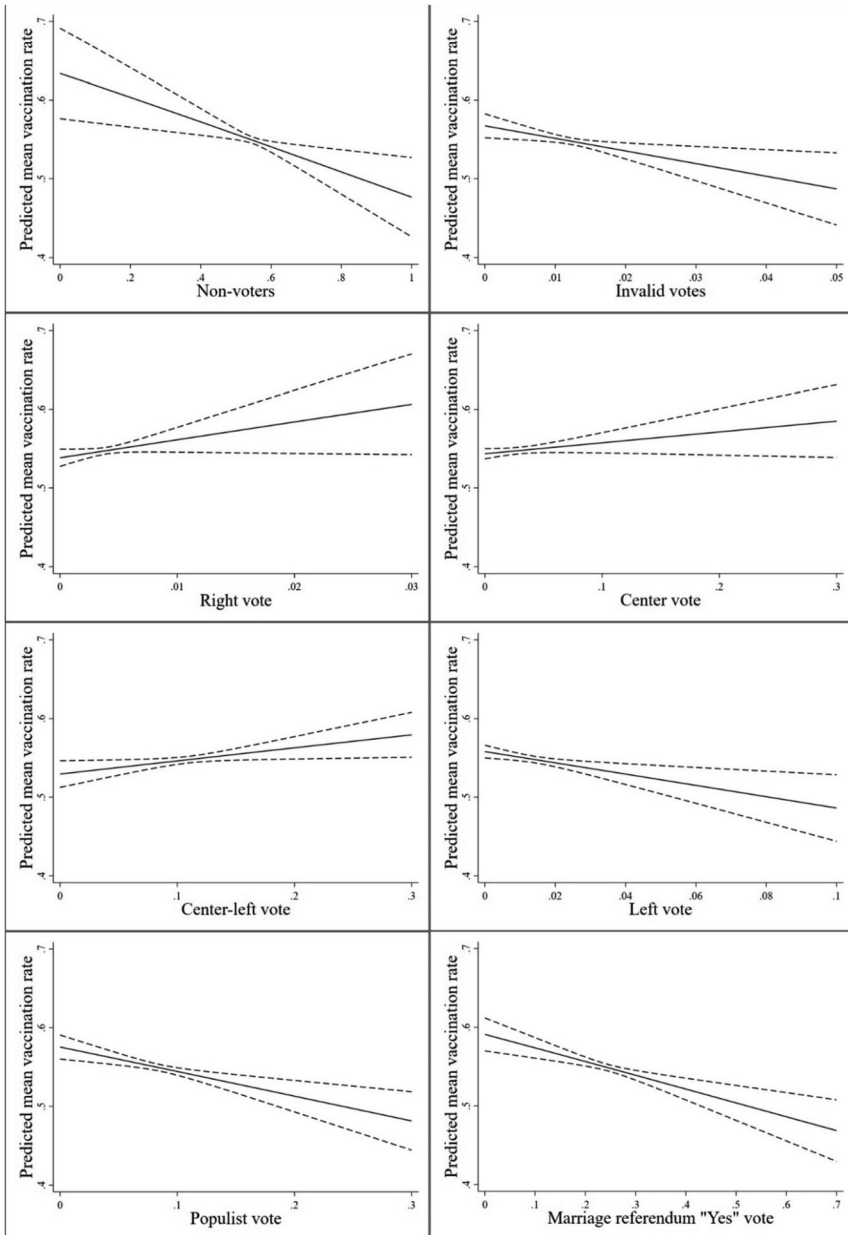


Figure 3: Vaccination rates in Croatian municipalities determined by political variables. Source: Authors' construction.

population in public and government authorities. That seems to have been the case. Other researchers have also shown the psychological stresses of the pandemic to have been more acute among those suffering from trauma related to the wars of the 1990s (Jeftić et al. 2021). Exposure to war violence—even two-and-a-half decades after the war had ended—continues to exert tremendously negative consequences on public health of the local population.

Our Figure 3 presents the predicted vaccination rates depending on the political variables of our primary interest, as well as depending on the variable *Marriage referendum “Yes” vote*, all based on the results of the full Model 3. The x-axes in all graphs always represent the full range of relevant political variables, suggesting that the substantive magnitude of effects is particularly high for the variables *Non-voters*, *Populist vote*, and *Marriage referendum “Yes” vote*. Lack of trust in the political class, support for (rightwing) populists, and commitment to religious traditionalism/conservatism appear to have had a particularly strong effect on vaccination rates in Croatia.

Conclusions

The Covid-19 pandemic was a colossal challenge, not only for our public-health systems and government authorities. It also put our societies to the test. It challenged our notions of what constitutes socially responsible behavior, and where we believe is the right balance between individual rights and obligations. Many European societies failed that test, arguably nowhere more so than in Southeastern Europe. The results are patently obvious on the global lists of Covid-19 mortality rates. The reasons for that failure are certainly complex. Our analysis, however, suggests that they are likely rooted in the disconnect between the political class and the general population. The lack of popular trust in government and public-health institutions, and the consequent shift toward populist conceptions of politics—in addition to the deeply entrenched support for rightwing conceptions of society—seem to be strongly correlated with patterns of vaccination hesitancy on both the individual and aggregate levels. These ideas, and this lack of trust, come at a steep price, paid in actual lives—arguably not for the first time in the recent history of the region.

Our analysis is obviously limited by its methodological approach, which is in turn determined by the very nature of the problem we aimed to explain. Its cross-sectional design does not allow us to make causal arguments. Moreover, its findings arguably pose as many questions as they answer. In the context of Southeastern Europe, which is still struggling with the multitude of legacies of the conflicts of the 1990s (Glaurdić, Lesschaeve, and Mochtak 2022), we consider the finding on the

strong positive correlation between the pattern of war violence and the pattern of vaccination hesitancy on the aggregate level to be particularly relevant. More research is needed to uncover the true reasons for this finding, i.e., whether it is rooted in the quality of healthcare provision in war-affected areas, or in a heightened sense of grievance and lack of trust in governmental authorities that is not captured by the variables we used, or in something altogether different. Whatever the case may be, our analysis suggests yet another harmful and long-lasting legacy of the wars of the 1990s. More research is also needed to identify the public-health, educational, and political strategies initially to mitigate the negative consequences of this state of affairs and ultimately to overturn it. The problem is obviously deeply entrenched and challenging. The consequences of inaction, however, could be disastrous.

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Bionotes

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