The COVID-19 Curtain: Can Past Communist Regimes Explain the Vaccination Divide in Europe?*

Elizaveta Pronkina[1] Inés Berniell[2] Yarine Fawaz[3] Anne Laferrère[4]
Pedro Mira[5]

December 17, 2021

Abstract

As of December 2021, all former Communist countries from Central and Eastern Europe were still lagging behind in terms of COVID-19 vaccination rates in Europe. Can institutional inheritance explain, at least in part, this heterogeneity in vaccination decisions across Europe? To study this question we exploit novel data from the second wave of the SHARE (Survey of Health, Ageing and Retirement in Europe) Covid-19 Survey fielded in Summer 2021 that covers older individuals in 27 European countries. First, we document lower Covid-19 vaccine take-up amongst those who were born under Communism in Europe. Next, we turn to reunified Germany to get closer to a causal effect of exposure to Iron curtain regimes. We find that exposure to the Communist regime in East Germany decreases one's probability to get vaccinated against Covid-19 by 8 percentage points, increases that of refusing the vaccine by 4 percentage points. Both effects are large and statistically significant, and they hold when controlling for individual socio-economic and demographic characteristics. We identify low social capital -measured as voluntary work, political engagement, trust in people- as a plausible channel through which past Communist regimes would still affect individuals' preferences for Covid-19 vaccination.

JEL Classification: I15, I12, P36, Z18

Keywords: Communism, vaccination, SHARELIFE, Covid-19

*We highly appreciate feedback from Andreas Backhaus, Roberto Galbiati, Jorge García Hombrados, Anthony Lepinteur, and Olga Popova. We also would like to thank feedback from seminar participants at the Pontificia Universidad Javeriana and DIAL at Université Paris-Dauphine. This publication is based on preliminary SHARE wave 9 COVID-19 Survey 2 release 0 data. Therefore, the analyses, conclusions and results are preliminary. Research in this article is a part of the H2020 SHARE-COVID19 project (Grant agreement No. 101015924). For the full SHARE data use acknowledgments, see Appendix.

[1]Université Paris-Dauphine; E-mail: elizaveta.pronkina@dauphine.psl.eu; Corresponding author.
[2]CEDLAS-IIE-Universidad Nacional de La Plata
[3]CEMFI
[4]Université Paris-Dauphine
[5]CEMFI

1 Introduction

As of December 2021, the vaccine against Covid-19 is the most efficient way to protect oneself from the Coronavirus, and vaccine hesitancy the main barrier to achieving the sought-after herd immunization.[1] Already in pre-Covid-19 time, reluctance to take vaccines was listed as one of the Top Threats to Global Health by the World Health Organization.[2] Although the Covid-19 vaccine has become available in all European Union (EU) countries at no cost for residents, some countries have been lagging in vaccination rates, e.g. in Romania and Bulgaria 29 and 21% of the 50+ population had received their first jab by mid-July (see Fig. 1). To this day, all former Communist countries from Central and Eastern Europe (CEE) exhibit lower vaccination rates than Western European countries, occupying the last ten positions in terms of vaccination rates (all ages) in Europe (ECDC Vaccine Tracker on December 10th, 2021)[3]. What are the determinants of these cross-country differences? Can institutions shape individuals' preferences for (non-) vaccination and explain some individuals' decision of not inoculating themselves with a vaccine many had been longing for? Can institutional inheritance explain, at least in part, the heterogeneity in vaccination decisions across Europe?

We use novel data from wave 2 Covid-19 of the Survey of Health, Ageing and Retirement in Europe (SHARE) that was conducted in Summer 2021 across 27 European countries, along with other features of the SHARE data (including retrospective life histories and early-life circumstances) to answer this question. Next, we combine individual vaccination uptake data collected during the Covid-19 Survey, with residential history and early-life circumstances retrieved from SHARELIFE -conducted in 2007 or 2017- and education, health status, socio-demographic characteristics taken from the latest pre-pandemic longitudinal SHARE wave in which individuals participated.

To our knowledge, this is the first paper to uncover a causal relationship between exposure to past Communist regimes and vaccination against Covid-19 (instead of intentions or attitudes towards vaccination, which might differ from real decisions, as put forward by Dai et al., 2021). Assessing causality is a challenge, as Central and Eastern European and Western European countries differed before they were separated by the Iron curtain after the end of the Second

[1] Refer to https://www.who.int/news-room/questions-and-answers/item/herd-immunity-lockdowns-and-covid-19

[2] Refer to https://www.who.int/news-room/spotlight/ten-threats-to-global-health-in-2019

[3] Refer to https://vaccinetracker.ecdc.europa.eu/public/extensions/COVID-19/vaccine-tracker.html#uptake-tab

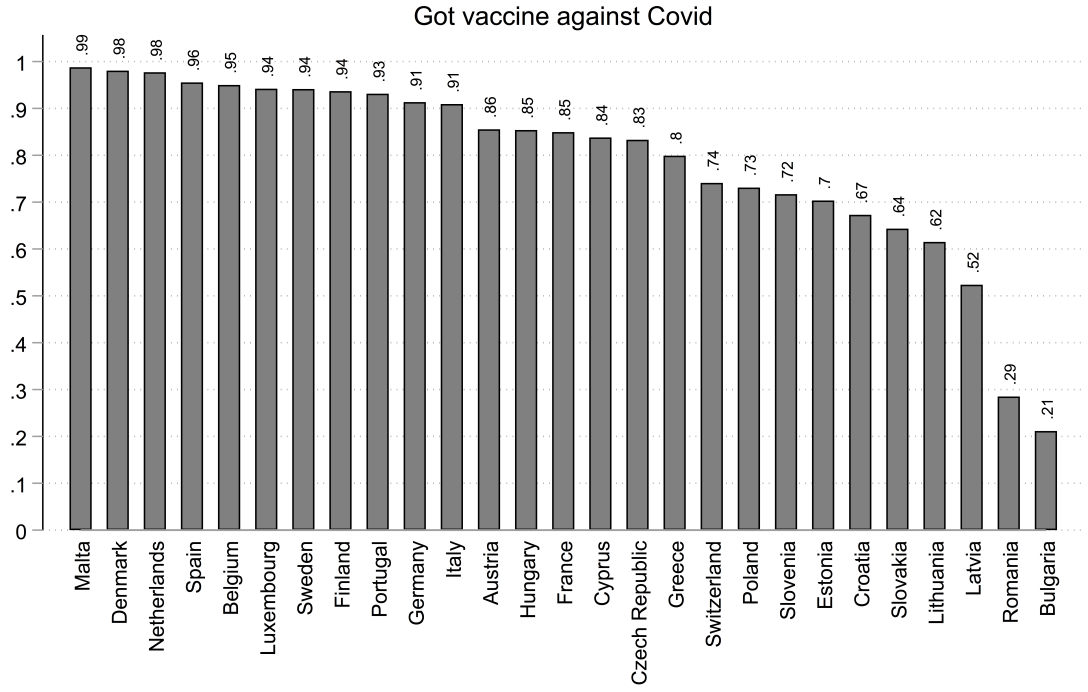

Fig. 1. Uptake of vaccine against Covid-19 across countries among 50+ in Summer 2021

Note: Second SHARE Corona Survey. Authors' own calculations based on survey weights and the country of residence.

World War (WWII). Exploiting the richness of our data, we can discard many potential drivers of vaccine (non-) uptake, such as lower education, better (or worse) health, lower socioeconomic status (SES), or unfavorable early-life conditions. To help us overcome the causality challenge, we exploit the quasi-natural experiment provided by the separation and later reunification of East and West Germany.

Under the assumption that any systematic difference between vaccination preferences across the old East-West divide are related to differential political institutions, we are able to measure how 45 years of Communism (and the transition period that followed) impacted individuals' decision to get vaccinated in pandemic times. How could the Communist era affect vaccination in East Germany compared with West Germany? On the one hand, one could expect individuals who experienced a collectivist culture, which put greater emphasis on common goals than on individual pursuits, to prioritize the health and survival of others, over potential personal safety concerns related to the new vaccine. Communist regimes also implemented a longstanding tradition of mandatory vaccination, which could lead East Germans to accept vaccination more easily, as they were used to it. On the other hand, there could be a backlash effect of the past

Communist regime on individuals' preferences in favor of not getting the Covid-19 vaccine, as those who were exposed to an authoritarian government might be more averse to any kind of State control or public recommendations that might remind some of past regime propaganda, including national and supranational injunctions to get vaccinated.

We find strong evidence in favor of the latter hypothesis. In fact, we find lower Covid-19 vaccine take-up amongst individuals born under a Communist regime in Europe, which holds after controlling for individual pre-pandemic health, socioeconomic characteristics, and current country of residence.[4] In the reunified Germany setting, we consistently find that individuals who were born in East Germany are less likely to get vaccinated against Covid-19 and more likely to refuse the vaccine compared to their Western counterparts. Likewise, when looking at other preventive measures such as social distancing, we also document that Eastern Germans comply less than Western Germans. The backlash effect is not total though: when it comes to the vaccine against influenza, which has been routinely inoculated to Germans for decades, prevalence is higher in East Germany.

Through which channel do past institutions make the elderly reject a vaccine against a potentially deadly virus in pandemic times? Using external data sources about vaccination campaigns and the day of the interview of the SHARE Corona Survey, we are able to discard vaccines supply as a potential driver of our results. After ruling out several other mechanisms such as a differential impact of the pandemic or general vaccine skepticism, in East compared to West Germany, we show that East Germans exhibit lower levels of social capital, measured as voluntary or charity work, political engagement, and trust in people (following Putnam, 1993; Glaeser, Laibson, Scheinkman, & Soutter, 2000; Conzo & Salustri, 2019). We find that some aspects of social capital, in turn, are positively associated with Covid-19 vaccination.

Our results are subject to the following caveat regarding their interpretation: when finding significant differences between East and West Germany, we cannot distinguish whether they are the result of individuals' exposure to decades of a Communist regime, or of individuals' exposure to the fall of Communism, which led to one of the most severe crises in modern history for those people undergoing the transition. As a result, when referring to "exposure to Communism" or to "past Communist institutions", we put together the Communist and transition periods, and explore the consequences of both the rise and fall of Communism, on individuals' vaccination

[4]Due to a small sample of movers from East Germany to West Germany in our data, we cannot control for the current region of residence in the German setting. That is for Germany, "born in East/West Germany" almost fully coincides with a dummy "lives in East/West Germany in 2017".

outcomes.

We then assess the robustness of our results. The findings are not driven by treatment misassignment due to individual movements during life and are robust to controls for socio-demographic and early-life characteristics. The permutation test also supports the actual division of German regions.

Our paper is related to a large literature about the long-lasting causal impact of institutions on individuals' preferences and choices. In particular, we relate to a strand of the literature about the role of past Communist institutions on individuals' preferences. Starting with a seminal paper by Alesina and Fuchs-Schündeln (2007), many looked at the German division as a natural experiment (see Becker, Mergele, and Woessmann (2020) for a review of that literature). However, Becker et al. (2020) recently argue that the comparison between East and West Germany should not always be interpreted as a natural experiment because of differences which predate Communism, in terms of political preferences, women's labor force participation, and religion. Still, we believe that the nature of our research question (focused on vaccination outcomes) and the richness of our set of covariates allow us to alleviate these concerns. We contribute to this literature by investigating the long-lasting impact of the past Communist regime on health-related decision-making.

To our knowledge, two studies in the Covid-19 context used the East-West German divide: Bluhm and Pinkovskiy (2021) exploit differential spells of Bacillus Calmette-Guerin (BCG) mandatory vaccination across the German divide before reunification to show the (in)effectiveness of BCG vaccine for the Covid-19 disease; and Schmelz, Ziegelmeyer, et al. (2020) use an online survey that took place in Fall 2020 in Germany to show that a vaccine mandate could lead to differential responses between East and West Germany due to differential preferences for State control.

Our paper is closer -in terms of the research question- to Costa-Font, Garcia-Hombrados, and Nicińska (2021), who study the association between Communism and vaccination. Using a pre-Covid-19 Survey from 2018, they show that individuals from post-Communist countries have lower vaccination trust primarily due to lower governmental trust (rather than interpersonal trust). We build on this paper by going beyond associations: after providing suggestive evidence supporting a role of the Communist regimes in lower vaccination take-up in Post-Communist countries, we dive into the German setting to get closer to causality in estimating the impact of the exposure to Communism on Covid-19 vaccination. Moreover, the richness of our data

allows us to rule out the role of socio-demographic factors.

As for other determinants of Covid-19 vaccination that are not limited to institutions, using the same SHARE Corona Survey, Bergmann, Hannemann, Bethmann, and Schumacher (2021) show the role of socio-demographic variables for vaccine uptake among the elderly, while the other studies we know of explore *attitudes* about vaccines (see Galasso et al., 2020; Lazarus et al., 2021; Karlsson et al., 2021). We add to this literature by looking at vaccine uptake instead of vaccination attitudes, i.e. at revealed rather than stated preferences, which might differ for Covid-19 vaccination Dai et al. (2021). Besides, we are able to look separately at two different yet commonly confounded concepts -vaccine hesitancy and vaccine refusal- which are of particular importance for policy makers to design vaccination campaigns. Finally, we compare individuals' vaccination decisions between the newly existing Covid-19 vaccine and other long-standing vaccines such as against influenza or pneumonia, which most studies cannot do.

Last, to the extent that vaccination against Covid-19 is part of the set of tools to curb the propagation of the Covid-19 virus, our paper is part of a series of studies on to what extent individuals adopt "good practice" behavior to protect each other from the virus, or comply with the set of preventive measures imposed upon them by public health authorities. Durante, Guiso, and Gulino (2021) in Italy, Bargain and Aminjonov (2020) in Europe, Barrios, Benmelech, Hochberg, Sapienza, and Zingales (2021) in the US, find that places with higher social capital are more likely to voluntary comply with social distancing measures. We contribute to the literature on social capital by showing its role as a driver for Covid-19 vaccination as one driver of more compliance with protective measures against the Covid-19 virus, in our case using individual data on the most efficient barrier against the virus, i.e. the Covid-19 vaccine.

The draft proceeds as follows. Section 2 describes the context behind Covid-19 vaccination in Europe. Section 3 details the dataset and discusses the identification strategy. Sections 4 and 5 show the main findings and discussion. Section 6 concludes. External statistics and robustness checks are in the Appendix.

2 Covid-19 vaccine

This Section presents contextual background on the Covid-19 vaccine in Europe: first, was it available in all countries when our data was collected, and were there enough doses in all countries, or did some countries suffer shortages that may explain lower vaccination rates?

Were older individuals (our target population) eligible to being administered a first dose in all countries at that time? Second, on top of availability and eligibility, did countries differ in other ways in terms of vaccination policies, e.g., types of vaccine, vaccine mandates, and others. We end this Section with a discussion about the vaccination campaign in Germany.

2.1 Availability and eligibility

As stated by the European Center for Disease Control, *"By January 2021, all 30 EU/EEA countries had started COVID-19 vaccination campaigns, and different COVID19 vaccine products have been gradually introduced as they became available through the EU Vaccines Strategy."*[5] Due to the limited supply of vaccine doses at the start of the campaign, countries opted to prioritise those who were most at risk of severe disease, such as the elderly, those with comorbidities, or healthcare workers. Each country established its own calendar, defining phases, from 2 to 16 phases, in order to ultimately reach the full coverage of the adult population. By June 2021, vaccines had been made widely available so that there were very few eligibility restrictions left.

To further check the availability of Covid-19 vaccines, we exploit the Oxford Covid-19 Government Response Tracker (OxCGRT).[6] Fig. A.1 shows several countries did not have universal vaccination coverage by mid-June. This is mostly due to age restrictions, which were the last ones to be lifted. Universal coverage of adult above age 50 had been reached for all countries over study by July 1st.[7]

Appendix B, Fig. B.1 shows the distribution of interview dates of the second SHARE Corona survey by country. Although most interviews took place during July 2021 (the totality for Germany) and the beginning of August, some countries also ran interviews during the last two weeks of June. We address this potential source of cross-country heterogeneity in three ways: first, in all our specifications, we control for vaccine availability (as defined by the OxCGRT), which varies with individuals' dates of interview and country of residence; second, we check that our results are robust including the number of days the vaccine was available in a country for each respondent depending on her age and country of residence; finally, we repeat our analysis

[5] Refer to https://www.ecdc.europa.eu/sites/default/files/documents/Overview-of-the-implementation-of-COVID-19-vaccination-strategies-and-deployment-plans-23-Sep-2021.pdf

[6] The OxCGRT contains daily information about the vaccination policies across countries. It takes values from zero to five, where five means universal availability. We match this vaccination availability index with the day and month of the interview for each respondent. Appendix A provides further details on the OxCGRT.

[7] Portugal and Spain, two countries with particularly high vaccination rates, had not opened yet to the less than 50, scoring 4 out of 5 on the Oxford tracker. Greece had similar age restrictions. However, our target sample includes adults, all of whom were eligible for their first jab across all the EU at that date.

restricting to respondents who completed the survey after July 1, 2021.[8]

2.2 One common strategy

The EU adopted a common vaccines strategy with a view to securing supplies and facilitating their distribution. Through advance agreements with individual vaccine manufacturers, the EU Commission secured the right to buy a specified number of vaccine doses in a given timeframe and at a given price. Part of the objectives of the EU vaccines strategy was to ensure *equitable and affordable* access for all to an affordable vaccine as early as possible. As a result, all EU residents have been offered the right to a free vaccine, with no co-payment of any sort.

2.3 Not mandatory at the time of the interview

At the time of the survey, vaccination was not mandatory in any country, except in some cases for healthcare workers. Vaccine mandates such as the French "pass sanitaire" or the Italian "green pass" were not implemented until August 2021.[9] Moreover, we expect that for the elderly the vaccination requirements play less of a role as an incentive for vaccination relative to younger individuals.

For all these reasons, because the Covid-19 vaccine was available to our target population, in sufficient supply, free, and not mandatory, we discard the supply channel as a potential driver of cross-country heterogeneity in vaccine uptake, and treat vaccination outcomes as individuals' decisions in the remainder of the paper.

2.4 Vaccination campaign in Germany

Since in this study we focus in more details on Germany, we end this Section with a brief overview of the Covid-19 vaccination campaign there. Vaccination has officially started on December 27, 2020. During the first months, federal government was responsible for financing and distribution of vaccines to the vaccination centers. In turn, state governments (at the Länder level) ensured storage and distribution of doses in vaccination centers and mobile vaccination teams associated with vaccination centers.[10] The supply of vaccines was proportional to population in each

[8] The results of these exercises are available upon request.

[9] In some cases, for example, in France the proof of vaccination or the negative test was needed already in June to attend events in specific venues. However, it extended coverage only since August 9, 2021, refer to https://www.gouvernement.fr/info-coronavirus/pass-sanitaire.

[10] Refer to https://ltccovid.org/2021/02/09/roll-out-of-sars-cov-2-vaccination-in-germany-how-it-started-how-it-is-going/amp/, https://www.zusammengegencorona.de/impfen/basiswissen-zum-impfen/die-nationale-impfstrategie/

state.[11]

In Germany, the federal vaccination strategy consisted of three phases depending on the targeted population. During the first phase, vulnerable individuals, elderly above 80 or health workers, were eligible to get COVID-19 vaccine. The process of making appointments was organized at the state level. In particular, individuals needed to make an appointment online or by phone (in Baden-Wurttemberg, Bavaria, Brandenburg, Hesse, North Rhine-Westphalia, Rhineland-Palatinate, Saarland, Saxony, Saxony-Anhalt, Schleswig-Holstein, Thuringia) or were contacted directly with an invitation for vaccination by a letter (in Berlin, Mecklenburg Wester-Pomerania, Lower Saxony). Logistics problems and overwhelmed hotlines at the beginning of the campaign were present in the country but not in a systematically different way across East and West Germany in the first phase.[12]

Since April 6, 2021, medical practices were involved in the vaccination campaign, and starting on June 7th, vaccination priority was lifted in Germany.[13] Even if supply and access to Covid-19 vaccine were not systematically different across Eastern and Western regions, vaccines were inoculated by medical workers, whose attitudes towards the Covid-19 vaccine might differ between East and West Germany, as an imprint from the past Communist institutions. In this case, differences in vaccination rates among East and West Germans would result from differential intrinsic preferences both on behalf of those who might receive the vaccine and of those who might inject it. Hence, our estimate of the impact of exposure to Communism on the probability of getting the vaccine would reflect both effects.

Finally, we end this Section discussing the representativeness of the data used in this study across German regions. The share of vaccinated respondents in our data is, on average, higher than the one available in the official statistics on vaccination rates among adult individuals in Germany. However, these differences are not systematically different across Eastern and Western German regions. If anything, vaccination rates are slightly more overestimated in East Germany in our survey data compared with official statistics (see Appendix C, Table C.1).

[11] Refer to https://www.zusammengegencorona.de/impfen/basiswissen-zum-impfen/die-nationale-impfstrategie/

[12] Refer to https://www.zusammengegencorona.de/impfen/basiswissen-zum-impfen/die-nationale-impfstrategie/

[13] Refer to https://www.zusammengegencorona.de/impfen/basiswissen-zum-impfen/die-nationale-impfstrategie/

3 Data and empirical strategy

In this Section, first, we describe the SHARE data used in the study. Next, we discuss the identification strategy.

3.1 SHARE data

We use longitudinal data from the Survey of Health, Ageing, and Retirement in Europe (SHARE), SHARELIFE, and the SHARE Corona Survey. SHARE is a multidisciplinary and cross-national panel database about individuals aged 50 or older.[14] Below we explain how we define the key variables in the study.

3.1.1 SHARE Corona Survey

Since the beginning of the Covid-19 pandemic, two special SHARE Corona Surveys have been conducted: the first between June and August 2020; and the second between June and August 2021. Each respondent in the second Corona Survey was asked *"Have you been vaccinated against Covid-19?"*.[15],[16] Among those who did not get vaccinated the survey asks if they have already made an appointment, which allows grouping them together with the ones who already got vaccinated.[17] Finally, we can distinguish between respondents who do not want to get vaccinated or are undecided.

Additionally, the data includes vaccination choices about the flu and pneumonia vaccines. We use the flu vaccine in 2021 as an additional outcome in the main analysis to study the determinants of vaccination decisions. Results about the flu vaccine before the pandemic and about the pneumonia vaccine are similar and can be found in Appendix M.[18]

Age, gender, an employment dummy, and the day-month-year of the interview are taken from the second SHARE Corona Survey.

[14]This publication is based on preliminary SHARE wave 9 COVID-19 Survey 2 release 0 data. For the full SHARE data use acknowledgments, see the Appendix.

[15]The natural interpretation of the question implies getting at least one shot against Covid-19 rather than completing the full vaccine cycle when two shots are necessary. Yet, the SHARE does not ask about these cases separately.

[16]The refusal rate to answer this question is lower than 0.11 percent.

[17]Our results are robust to focusing only on those who already got vaccinated.

[18]The distribution of pneumonia vaccines varies markedly across countries and reflect differences in vaccination campaigns rather than the decision to get vaccinated.

3.1.2 Retrospective information

We retrieve early-life information from the SHARELIFE survey conducted in wave 3 (2007) and in wave 7 (2017). SHARELIFE collects information from birth to the moment of the survey, which allows us to build individuals' residential history and to identify the region of residence each year. In the target sample of the second Corona Survey, 20 percent of respondents answered SHARELIFE in 2007 and 80 percent in 2017. Accordingly, the latest information on region of residence will be taken from 2007.

First, we create an indicator for being born in a post-communist country. It is equal to one for all respondents born in the Czech Republic, Poland, Hungary, Slovenia, Estonia, Croatia, Lithuania, Bulgaria, Latvia, Romania, and Slovakia.[19] It is coded as 0 for Sweden, the Netherlands, Denmark, Finland, Belgium, Austria, France, Switzerland, Luxembourg, Israel, Spain, Italy, Greece, Portugal, Cyprus, and Malta. We leave out Germany in this exercise to make sure it does not drive our results.[20]

In the case of Germany, due to the country separation for almost 40 years, we consider a regional variable to define exposure to Communism. The *"East Germany"* indicator takes value one for all individuals born in Brandenburg, Mecklenburg-Western Pomerania, Saarland, Saxonia, Saxonia-Anhalt, and Thuringia. It is equal to zero if respondents were born in Baden-Wuerttemberg, Bavaria, Bremen, Hamburg, Hesse, Lower Saxony, North Rhine-Westphalia, Rhineland-Palatinate, and Schleswig-Holstein. Using the region of birth can potentially lead to a treatment misassignment problem; for example, the *"East Germany"* dummy is equal to one for a respondent who was born in Saxonia in 1939 and then moved in 1942 to Bavaria. However, in our sample, few respondents moved between the East-West border from the moment of birth to 1950, the date Germany was divided. Yet, as a robustness check, we re-estimate the model defining an *"East Germany"* dummy based on the region of residence in 1950, 1989 or 2007. The results remain unchanged. We leave out Berlin as we do not know if a respondent lived in the Eastern or Western part of the city. We also check that defining an *"East Germany"* dummy from the special module of SHARE data for the German sample about the region of residence in 1989 does not change the results.

Next, we construct proxies for early-life socioeconomic status (SES): being vaccinated at

[19] The name of the country relates to its current name in case of change.

[20] We restrict to respondents who were born in Europe to alleviate potential differences in the profile of individuals currently residing in Europe. Anyways, the sample of those born outside and currently residing in Europe is small.

age 16; being born in a rural area; a dummy for having more than 25 books in the house at age 10; and the number of services (e.g., hot running water supply, having a toilet inside the house and others).[21]

3.1.3 Longitudinal information

Finally, we match individuals from the second SHARE Corona Survey with their answers in previous SHARE waves, over 8 waves from 2004 to 2019, to create a set of underlined characteristics. First, we define seven educational ISCED-1997 categories, income and wealth quartiles at the country level before the pandemic. Regarding predetermined health, we include four categories for self-perceived health, the EURO-D depression scale (the sum of 12 symptoms of depression) and the number of chronic diseases (out of 13). To control for fertility and marriage history, we include two indicators: having a child and living with a partner. We also control for living in an urban area.

In total, our final sample includes 35,610 respondents who were born between 1916 and 1964 when we pool all European countries.[22] When restricting to Germany, we study 1,524 respondents. Table D.1 in Appendix D reports descriptive statistics of the variables used in the analysis of East versus West Germany.

3.2 Empirical strategy

In the paper, we run two analyses. The sample of countries and individuals differ, but the main model is similar:

$$y_i = \alpha East_i + \beta X_i + \varepsilon_i \quad [1]$$

where y_i captures the vaccination decisions of an individual i. Baseline controls, X_i, include constant, age, a female dummy, and the week of interview. In the models with additional controls, we add to X_i a set of *current and early-life characteristics*: seven educational ISCED-1997 categories, an employment dummy, income and wealth quartiles, four categories of self-perceived health, the EURO-D depression scale, the number of chronic diseases, having a child,

[21] Regarding the quality of recalled data, previous studies based on SHARELIFE (wave 3), such as Kesternich, Siflinger, Smith, and Winter (2014), Havari and Mazzonna (2015), and Havari and Peracchi (2017), argue that the data is unlikely affected by misreporting that would be due to respondents' age at the moment of the survey.

[22] The analysis restricts to respondents who are above 57 years old when we include wealth and income quartiles, because to derive them, we can use survey waves only up to wave 6 (2015) as it is the latest wave that includes wealth generated variables. Anyways, our results hold for the 50+, because the group between 50 and 57 does not significantly change our sample size.

living with a partner, an urban area dummy, being vaccinated at age 16, being born in a rural area, a dummy for having more than 25 books and the number of services in the house at age 10.

We two-way cluster standard errors at age and region of residence level.[23] To account for the relatively small number of clusters, we additionally calculate p-values based on the wild-cluster bootstrap-t procedure, based on 1000 replications. Wild bootstrapped p-values appear in squared brackets in the regression tables. Although the two-way wild bootstrap p-values are more conservative than the standard two-way clustering procedure, our conclusions hold.[24]

In the analysis based on several countries leaving out Germany, $East_i$ is equal to one if an individual was born in one of the 12 post-communist countries regardless of the current place of residence, and 0 in the remaining 15 countries. The set of controls, X_i, additionally includes current country of residence specific characteristics: GDP per capita in 2019, population in January 2020, number of hospital beds per capita in 2019, voluntary and out-of-pocket health expenditure as a share of GDP in 2019, cumulative number of Covid-19 infections by June 1, 2020 and by January 1, 2021, and vaccination policy at the moment of the interview from the OxCGRT Tracker.[25]

In the analysis based on Germany, $East_i$ is equal to one if an individual was born in one out of five East German regions regardless of current region of residence, and 0 in the remaining 10 regions in West Germany.When stated, we include additional controls at the regional level: GDP per capita in 2019, population in January 2020, number of hospital beds per capita in 2019, and cumulative number of Covid-19 infections by June 1, 2020 and by January 1, 2021.

When we broadly compare differences across countries, the estimate α captures associations between exposure to Communist institutions and the transition on the one hand, and vaccination decisions in 2021 on the other hand. We use these results as first suggestive evidence about the long-run impact of institutions, being cautious that these countries already differed along cultural and economic lines before the Communism era. Accordingly, we next focus on Germany.

To get closer to a causal impact of Communism -or of the fall of Communism- on vaccination choices, we assume that East and West Germany were similar before the separation according

[23]We derive this information from residential history from wave 3 and wave 7 (SHARELIFE). We exploit information about region of residence in 2007 as it is the last available for all survey participants. Region of residence mainly corresponds to NUTS 2. Nevertheless, the coding is different in a few countries, for example in Finland it corresponds to NUTS 3. In those cases we cluster errors at the corresponding level.

[24]The results also hold using robust standard errors, and when using survey weights.

[25]We also check that our results are robust when replacing vaccination availability at the time of the interview with the number of days the vaccine had been available in a country for each age before te interview.

to the relevant outcomes in this study. This setting and identification strategy have been widely used by scholars starting with Alesina and Fuchs-Schündeln (2007).[26] In our case, the coefficient, α, captures the effect of exposure to the Communist regime and to the later reunification on the take-up of vaccines. A recent study by Becker et al. (2020) revisits the key identifying assumption in the East-West Germany comparison, and suggests a careful interpretation of results because of a potential bias depending on the outcome due to differences in the pre-communist era between the newly assigned country borders. They show no pre-separation differences between East and West in income, GDP per capita, employment in health or domestic sectors. Nevertheless, East and West Germany differed in terms of political preferences (toward Communism), women's labor force participation, and protestantism. Even tough the nature of our research question -studying vaccination outcomes- makes those concerns less pressing than in the case of labor market or gender-related outcomes. Still, we would like to acknowledge that there could be some factors, such as church attendance, which differed between East and West Germany before Communism, and might be correlated with vaccination outcomes, leading to a bias in our estimates. In this case, our estimate is more likely to be a lower bound of the true effect, as religiosity has been shown to be associated with Covid-19 vaccine refusal (Callaghan et al., 2021), and church attendance was lower in East than in West Germany. In any case, as robustness checks, we also include controls for the frequency of praying and political preferences, and our findings remain unchanged.

In Appendix F, we present an alternative specification by replacing the *"East Germany"* indicator with the number of years a respondent has lived in East Germany between 1949 and 1990.

4 Results

In this Section we present our main results, first about all post-Communist countries and then looking at the East-West Germany comparison. In Column 1 (Tables 1 and 2), the dependent variable is equal to one for the ones who got Covid-19 vaccine or made an appointment. Those who say they want to be vaccinated (without having made any appointment), or those who do not want to be vaccinated or are hesitant about it, are then part of the reference group. We group these individuals together in order to focus on *revealed* preferences rather than *stated*

[26] We refer to Alesina & Fuchs-Schündeln, 2007; Lippmann & Senik, 2018; Lippmann, Georgieff, & Senik, 2020 for evidence about the similarity between East and West Germany before separation in 1945.

preferences. Then in Columns 2 and 3 we focus on the "do not want" and the "undecided" categories. Finally, in Column 4, we analyse the determinants of getting the flu vaccine.

4.1 Evidence from Europe

We first look into how post-Communist institutions are related to vaccination outcomes in all European countries excluding Germany. Table 1 shows that the probability of getting the Covid-19 vaccine drops by 16 percentage points (20 percent) for those born in a country that had Communism in the 20^{th} century (Column 1). The magnitude of this estimate decreases but remains large and statistically significant, when controlling for individual socio-demographic and early-life characteristics and the evolution of the pandemic in a country (see *Panel II*). This dramatic drop in the vaccination rate goes together with an increase in vaccine refusal and hesitancy (Columns 2 and 3).[27]

The flu vaccine is an interesting outcome to look at, as it has been routinely given for decades, and therefore is subject to less skepticism among the population, in both Eastern and Western countries. We find again that respondents born in post-communist countries are less likely to get the vaccine against flu than their counterparts from non-post-Communist countries. However, since the access to flu vaccine is not homogeneous across countries under analysis, the estimate might capture supply effects: national vaccination campaigns, economic situation, climate conditions; we run two additional specifications. First, when we control for country of residence, meaning that the estimates are identified thanks to the sample of migrants from/to post-Communist countries, then the negative coefficient on the flu vaccine disappears (see *Panel a*, Table E.1, Appendix E). When we further restrict the sample to non-post Communist countries (still including country-of-residence fixed effects), meaning that the estimates are identified only due to movers from post-Communist countries to non post-Communist countries, the negative coefficient on the flu vaccine also disappears.[28] In contrast, the negative estimate on the Covid-19 vaccine remains significant in the two specifications (see *Panel b*, Table E.1, Appendix E). Although correlational, these results lend support to Communism affecting the uptake of Covid vaccine but not of the flu vaccine, as these specifications allow us to rule out

[27] These results hold when restricting to interviews conducted after July 1, 2021. The results are available upon request.

[28] In the main analysis, we control for GDP per capita in 2019, population in January 2020, the number of hospital bets per capita in 2019, voluntary and out-of-pocket health expenditure as a share of GDP in 2019, the cumulative number of Covid-19 infections by June 1, 2020 and by January 1, 2021, and vaccination policy at the moment of the interview. The results remain the same when we replace the vaccination policy with the number of days a respondent had access to vaccine.

Table 1: Impact of post-Communist institutions on vaccination decisions

	COVID			Other
	Got	Do not want	Undecided	Flu
	(1)	(2)	(3)	(4)
Mean dep. var.	.823	.084	.063	.386
SD dep. var.	.382	.277	.243	.487
Panel I: main controls				
Post-communist countries	-0.164***	0.0850***	0.0644***	-0.441***
	(0.0000220)	(0.000148)	(0.000261)	(3.08e-16)
	[0.00000]	[0.00100]	[0.00400]	[0.00000]
R2	0.110	0.0507	0.0435	0.170
N	35610	35610	35610	35559
Panel II: controlling for current and early-life characteristics				
Post-communist countries	-0.123***	0.0817***	0.0407***	-0.381***
	(0.00000714)	(3.36e-09)	(0.00496)	(1.95e-12)
	[0.00000]	[0.00000]	[0.0170]	[0.00000]
R2	0.0737	0.0319	0.0335	0.167
N	25831	25831	25831	25792

Note: All specifications control for a constant, age, a female dummy, week of interview, GDP per capita in 2019, population in January 2020, the number of hospital bets per capita in 2019, voluntary and out-of-pocket health expenditure as a share of GDP in 2019, the cumulative number of Covid-19 infections by June 1, 2020 and by January 1, 2021, and vaccination policy at the moment of the interview. In *Panel II*, controls for current and early-life characteristics are seven educational ISCED-1997 categories; employment dummy; income and wealth quartiles; four categories for self-perceived health; the EURO-D depression scale; the number of chronic diseases; having a child; living with a partner; an urban area dummy; being vaccinated at age 16; being born in a rural area; a dummy for having more than 25 books and the number of services in the house at age 10. P-values of two-way cluster standard errors by the age and the region of residence are in parentheses. In square brackets, we report wild cluster bootstrap p-values. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

potential unobserved country-of-residence supply factors.

Even though we control for a rich set of individual characteristics, we cannot plausibly interpret our findings as a causal impact of exposure to Communism because of economical, cultural, and other pre-existing differences between those countries, before the Iron Curtain fell on Europe. Accordingly, We now turn to a more causal framework as we investigate how the German divide and the later reunification have impacted vaccination against Covid-19.

4.2 Evidence from Germany

When estimating Equation 1 in Germany, it appears the legacy of Communist institutions decreases the probability of getting the Covid-19 vaccine by 8 percentage points for those born

there (Column 1 in Table 2). This is actually more than the difference in vaccination rates between East and West Germany (88% in East Germany, 93% in West Germany in our data), as we compare individuals who are more similar in terms of observable characteristics. The point estimate of this effect barely decreases when including more confounders like socio-demographic and early-life determinants. Moreover, when we add controls for the regional characteristics before the outbreak of Corona and for the intensity of the pandemic, our findings hold (Appendix J, Table J.1). We comment more on this in Section 5.2. We also find that exposure to Communism in Germany increases the probability of refusing the Covid-19 vaccination.

Table 2: Impact of post-Communist institutions on vaccination decisions in Germany

	COVID			Other
	Got	Do not want	Undecided	Flu
	(1)	(2)	(3)	(4)
Mean dep. var.	.928	.039	.012	.557
SD dep. var.	.259	.195	.111	.497
Panel I: main controls				
East Germany	-0.0820**	0.0402*	0.0104	0.105**
	(0.0148)	(0.0525)	(0.155)	(0.0112)
	[0.0432]	[0.102]	[0.246]	[0.0509]
R2	0.0404	0.0151	0.0104	0.0347
N	1524	1524	1524	1521
Panel II: controlling for current and early-life characteristics				
East Germany	-0.0765**	0.0369*	0.00414	0.120***
	(0.0183)	(0.0656)	(0.610)	(0.00866)
	[0.0544]	[0.110]	[0.574]	[0.0317]
R2	0.103	0.0625	0.0319	0.0760
N	1524	1524	1524	1521

Note: All specifications control for a constant, age, a female dummy, week of interview. In *Panel II*, controls for current and early-life characteristics are seven educational ISCED-1997 categories; employment dummy; income and wealth quartiles; four categories for self-perceived health; the EURO-D depression scale; the number of chronic diseases; having a child; living with a partner; an urban area dummy; being vaccinated at age 16; being born in a rural area; a dummy for having more than 25 books and the number of services in the house at age 10. P-values of two-way cluster standard errors by the age and the region of residence are in parentheses. In square brackets, we report wild cluster bootstrap p-values. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

When looking at the other vaccines, whether flu or pneumonia, we find that East Germans are more likely to take it. This result is at odds with the broader cross-country comparison, and likely related to the compulsory vaccination campaigns in the past. We comment further

on it in Section 5.3.

Next, we replace *"East Germany"* with years of exposure to Communism in Appendix F. Specifically, we create a variable that sums the years a respondent has lived in East Germany between 1949 and 1990.Table F.1 suggests that the impact on vaccination increases with years of exposure to Communism, but this effect is actually driven by being born in East Germany. Since by definition differences in years of exposure across individuals can only be due to year of birth and migration in or out of East Germany, which were an extremely rare event over the whole period, years of exposure and the "East" dummy share a 92% correlation.

Last but not least, following Lippmann and Senik (2018) and Lippmann et al. (2020), we perform a permutation test by simulating the other possible divisions of the country by randomly assigning regions across East and West Germany. Our results are confirmed and the best model fit corresponds to when we assign regions correctly (see Table H.1 in Appendix H).

Finally, when we ignore the potential difference between revealed and stated preferences for vaccination, and regroup respondents who say that they "want to get vaccinated" (1 percent) with individuals who already got vaccinated or have scheduled an appointment, the gap in the vaccination rate remains, see Table G.1 Appendix G.

5 Exploration of channels and alternative interpretations

In this Section, we first discuss potential confounders, and then describe plausible underlying mechanism behind our main findings.

5.1 Is lower Covid-19 vaccination in East Germany driven by predetermined health or other factors?

Decades of communism and the transition toward capitalism could have impacted individuals' health, in any of the two directions, as Communism came with a more equal but also impoverished society, and the transition was an important mortality shock (see (Brainerd, 2001)). A healthier population in East Germany might feel less at risk of severe illness due to Covid-19, and offer more resistance to vaccination; a less healthy population could be more scared of the vaccine potentially unknown side effects. We find (see Table I.1 in Appendix I) that older East and West Germans do not differ significantly in terms of objective measures of health, whether mental (EURO-D depression score), or physical (number of chronic diseases). There is a dif-

ference in subjective health, with those born in East Germany less likely to say their health is excellent, and more likely to say it is "fair". In any case, our findings hold controlling for all pre-pandemic health variables, even self-assessed health status.

5.2 Are results affected by the differential impact of the Covid-19 pandemic?

A potential concern is that the low vaccination rate in East Germany can be related to a less severe impact of the pandemic there compared to West Germany.[29] We address this concern in two different ways: first, we use external information from the Robert Koch Institute (RKI) about Covid-19 cases in each region in June 2020, after the first wave of the pandemic, and in January 2021, by the beginning of the vaccination campaign.[30] In line with Bluhm and Pinkovskiy (2021), we document that initially the Covid-19 pandemic had hit West Germany more severely than East Germany. Six months later though, the cumulative number of cases was higher in East than in West (see Table D.1, Appendix D). Moreover, Bluhm and Pinkovskiy (2021) further argue that state policies during the Covid-19 pandemic and access to medical services were similar across the country. To rule out that East Germans take up less Covid-19 vaccines because of fewer cases of Covid-19 during the first wave of the pandemic regardless of the later evolution of the pandemic, we repeat our main analysis adding controls for the number of Covid-19 at the region-of-residence level. Our main findings remain unchanged (see Table J.1, Appendix J).

Next, we perform a validation exercise, by exploiting additional questions in the SHARE Corona survey: the probability of knowing someone who had Covid-19 symptoms or tested positive after the first wave of the pandemic and later by Summer 2021 (see Table J.2, Appendix J). Using self-reported information, we find evidence that East Germans were less likely to have been exposed to the virus by Summer 2020, but more likely so by Summer 2021, consistently with official statistics about Covid-19 cases in Germany. Again, our findings hold when we add these variables as controls.

[29] Already before the Covid-19 outbreak, Ahituv, Hotz, and Philipson (1996) found an increase in preventive behavior related to AIDS in places with a higher AIDS prevalence in the US.

[30] Refer to `https://www.rki.de/DE/Content/InfAZ/N/Neuartiges_Coronavirus/Situationsberichte/Jan_2021/2021-01-02-en.pdf?__blob=publicationFile` for on January 2, 2021, and `https://www.rki.de/DE/Content/InfAZ/N/Neuartiges_Coronavirus/Situationsberichte/2020-06-01-en.pdf?__blob=publicationFil` for June 1, 2020.

5.3 Do East Germans have a lower general exposure to vaccines?

Our results on East Germany getting less vaccinated against Covid than West Germany do not extend to more traditional vaccines such as the long-known vaccine against influenza, which was created in the 1940s.[31] When we replace the vaccine against flu in 2021 with -vaccine against pneumonia or vaccine against flu before pandemic- we still systematically find a positive effect of being born in East Germany on vaccination (Columns 4-6 in Table M.1, Appendix M).

This result is not that surprising as East Germany has a long tradition of mandatory vaccination, as put forward by Bluhm and Pinkovskiy (2021), whose identification strategy is based on the differential BCG vaccination campaigns between East and West, with East Germany having continued mandatory vaccination for decades while West Germany had discontinued it in 1975. Given that our cohorts of individuals have all known mandatory vaccination, at least for diphtheria, tuberculosis, and smallpox (those who refused faced a fine), it is not an exaggeration to think that they would get more easily vaccinated against classical diseases as they were more used to do so. When we replace the vaccine against flu with the other long-known vaccine - against pneumonia - we still systematically find a positive effect of being born in East Germany on vaccination (Columns 4-6 in Table M.1, Appendix M).

5.4 Social capital is lower in East Germany

The success of any vaccination strategy relies on the share of individuals getting the vaccine. As such, vaccines -together with other strategies of contagion avoidance- create a positive externality, and can be seen as a public good.

Social capital, as the set of beliefs that promote cooperation and help to overcome the free-rider problem (Guiso, 2010), participates positively in the provision of public goods (e.g. Putnam, 1993; Herrmann, Thöni, & Gächter, 2008). We therefore investigate here whether lower social capital might be a channel through which past Communist institutions lead to lower Covid-19 vaccination.

Social capital is usually proxied in data by measures that involve some prosocial behavior, such as generalized trust (or some more specific measures of trust, towards government, authorities, and others), the number of blood donations, newspaper readership (Durante et al., 2021), Google searches linked to prosocial behaviors, among others "charitable foundation" (Guriev & Melnikov, 2016). We follow closely Conzo and Salustri (2019) and look at three measures

[31] Refer to https://www.cdc.gov/flu/pandemic-resources/pandemic-timeline-1930-and-beyond.htm

related to social capital in the SHARE data: voluntary work, political participation, and generalized trust. All three measures are taken from the latest pre-pandemic wave, as we do not want them to be impacted by the Covid-19 context (Bargain & Aminjonov, 2020). Voluntary work -defined as whether an individual has taken part in the last 12 months into voluntary or charity work- has been commonly used in the literature as a proxy for other-regarding preferences and social capital (e.g. Putnam, 1993; Glaeser et al., 2000). Political participation is defined as whether an individual has taken part in the last 12 months to a political or community-related organization. Last, trust is measured as a linear variable from 0 to 10, recording how much "most people can be trusted or that one should be careful in dealing with people". We extract the first principal component (the only one with an eigenvalue greater than 1) out of these three measures and use it as the social capital index. The first principal component explains 54 percent of the variation in the three variables, with the following scoring coefficients: 0.79 for voluntary work, 1.21 for political participation, and 0.38 for trust.

First, applying the same identification strategy as presented in Equation 1, we find that the past Communist regime and the transition period have eroded individuals' social capital (Table 3), consistently with findings from the 2006 EBRD Life in Transition Survey, which used 1,000 face-to-face interviews in each of the 28 post-communist countries, finding that the share of respondents who believed that most people could be trusted fell from 66 per cent before 1989 (measured retrospectively), to only about a third 17 years later. This result was consistent across all regions and countries, with most respondents across all age groups and income categories agreeing that people were generally "more trustworthy" under communism. East Germans do less voluntary work, are less trusting of each other, and participate less in political organizations, than West Germans (see Table K.1 in Appendix K), but the effect is stronger (when compared to the mean of the dependent variable) and more robust for voluntary work.

Going further, Table 4 shows that higher social capital in Germany is indeed associated with a higher probability to have taken the Covid-19 vaccine, and a lower probability to be against it,which is in line with Martinez-Bravo and Stegmann (2021), who find -in a different context- that a negative shock on trust led to decreased immunization rates. Conversely, social capital does not seem to be related to the flu vaccine take-up, probably due to the fact that there is less a personal decision for a vaccine that has been existing for decades, especially in East Germany where our cohorts of individuals have all known mandatory vaccination., at least for

Table 3: Impact of post-Communist institutions on social capital in Germany

	(1)	(2)
Dep. var.: first principal component of social capital		
Mean dep. var.	-.004	-.004
SD dep. var.	.82	.82
East Germany	-0.256***	-0.256***
	(0.00000652)	(0.00000652)
	[0.00101]	[0.00404]
Current characteristics	No	Yes
Early-life characteristics	No	Yes
R2	0.0226	0.0226
N	1522	1522

Note: All specifications control for constant, age, female, and the week of interview. Controls for current and early-life characteristics are seven educational ISCED-1997 categories; employment dummy; income and wealth quartiles; four categories for self-perceived health; the EURO-D depression scale; the number of chronic diseases; having a child; living with a partner; an urban area dummy; being vaccinated at age 16; being born in a rural area; a dummy for having more than 25 books and the number of services in the house at age 10. P-values of two-way cluster standard errors by the age and the region of residence are in parentheses. In square brackets, we report wild cluster bootstrap p-values. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

diphtheria, tuberculosis, and smallpox.Looking separately at each of the social capital items, voluntary work is the one that seems more correlated with vaccination outcomes (see Table K.2 in Appendix K, which makes sense as it is also the one variable that has the strongest East-West gradient when looking at cross-country correlations, and the one that was more impacted by being born in East Germany in Table K.2, confirming a negative association between past Communism and the share of individuals doing voluntary work.

How important is the social capital channel to explain the German vaccination divide? A one-standard-deviation increase in the social capital factor is associated with up to a 4 percentage points increase in the probability of getting the vaccine (=0.82 × (0.0216+0.0244)), which is relevant enough to consider lower social capital as one of the channels through which exposure to Communism leads to lower Covid-19 vaccination. Last, we believe our social capital index does not capture all dimensions of social capital that are relevant to explain vaccination. Our measure of trust for instance, is a measure of generalized trust, or trust in others, which does not necessarily reflect the confidence in public State institutions that are those "imposing" the

vaccine in the Covid-19 context. As shown by Costa-Font et al. (2021), who use cross-country aggregate data on attitudes towards vaccines and several dimensions of trust, exposure to Communism is associated with a drop in government trust that is twice that in interpersonal trust. We believe including this dimension of trust would have led to higher magnitude estimates.

Table 4: Impact of social capital on vaccination decisions in Germany

	COVID			Other
	Got	Do not want	Undecided	Flu
	(1)	(2)	(3)	(4)
Panel I: main controls				
Social capital	0.0216**	-0.0116*	-0.00251	0.0237**
	(0.0244)	(0.0856)	(0.432)	(0.0437)
	[0.0272]	[0.112]	[0.461]	[0.0796]
R2	0.0450	0.0174	0.0107	0.0362
N	1522	1522	1522	1519
Panel II: controlling for current and early-life characteristics				
Social capital	0.0162*	-0.00904	-0.00293	0.0181
	(0.0788)	(0.179)	(0.288)	(0.365)
	[0.0392]	[0.122]	[0.232]	[0.209]
R2	0.106	0.0641	0.0324	0.0771
N	1522	1522	1522	1519

Note: All specifications control for constant, age, female, week of interview, and being born in East Germany. In *Panel II*, controls for current and early-life characteristics are seven educational ISCED-1997 categories; employment dummy; income and wealth quartiles; four categories for self-perceived health; the EURO-D depression scale; the number of chronic diseases; having a child; living with a partner; an urban area dummy; being vaccinated at age 16; being born in a rural area; a dummy for having more than 25 books and the number of services in the house at age 10. P-values of two-way cluster standard errors by the age and the region of residence are in parentheses. In square brackets, we report wild cluster bootstrap p-values. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

5.5 East Germans are less willing to comply with Covid-19 measures

Covid-19 vaccination being the most important measure advocated for by public authorities in order to curb contagion, it is likely that individuals who were reluctant to maintain social distancing or to comply with other preventive measures would also be more willing to take a vaccine.

We explore this hypothesis by looking at preventive behaviors in the first and the second waves of the SHARE Corona Survey. For the first wave, we use the five preventive measure

variables that do not involve the company of others, i.e. social distancing, cough covering, hands washing, sanitizer use and mask wearing. We follow Bertoni, Celidoni, Dal Bianco, and Weber (2021) and run a principal component analysis instead of looking separately at each type of preventive behavior, avoiding potential multiple hypothesis testing issues. We obtain two components with an eigenvalue above 1 that explain 71 percent of the total variance. For the second wave, we exploit the only two available variables that do not involve the company of others: social distancing and cough covering. As expected, East Germans comply less with preventive measures, but the only significant result has to do with social distancing in 2021 (see Table L.1, Appendix L). In light of the recent study by Andersson, Campos-Mercade, Meier, and Wengström (2021), the estimates in Summer 2021 can be interpreted as the lower bound of the true parameter because vaccination decreases the adoption of other protective measures. Nevertheless, our models do not consistently show a positive relationship between social capital and preventive measures (see Table L.2, Appendix L). Because other studies have shown such a link (see for instance Durante et al., 2021; Bargain & Aminjonov, 2020; and Egorov, Enikolopov, Makarin, & Petrova, 2021), we believe our measure of social capital does not cover enough of the trust spectrum, to yield significant results here. Still, we find coefficient that are either extremely close to 0, or exhibit a positive sign, as we shall expect.

5.6 Further discussion on other potential channels and alternative interpretations

In this study we have shown suggestive evidence that being born in a country that had a Communist regime was associated with a lower probability of getting the Covid-19 vaccine; and causal evidence that being born in Eastern Germany affected negatively Covid-19 vaccination. Could it be that our estimate of the impact of being born in a former Communist regime capture something else than exposure to Communism?

First, as mentioned in the introduction, our estimate is a mixture of the effect of exposure to Communism and to the transition out of Communism, which has been shown to be a particularly hard period in terms of financial hardship, life satisfaction, particularly for the elderly (e.g., Guriev & Zhuravskaya, 2009; Easterlin, 2009), in terms of health, and more generally speaking human losses (Brainerd, 2001). While this has sometimes been ignored in studies that use the East-West German divide to identify the role of past Communist institutions on a certain outcome, we believe we should make it clear that the peculiar situation of the former Communist

countries in Europe cannot be understood, 30 years after the fall of the Berlin Wall, as being only the result of the Communism period.

Second, the early years of the transition have seen a massive spread of the corruption that already existed during Communism. In 2007, according to the World Bank, only eight of the 34 transitional countries scored above the world average of the Control of Corruption Index, and most of the remaining 26 countries scored much below (Iwasaki and Suzuki (2012)). Since corruption is more pervasive in the former European Communist countries, our main estimate results from exposure to corruption, the transition period, and the Communist institutions. While this is a concern for the cross-country comparison, it is not in the analysis that focuses on Germany, as there is no systematic evidence of differential corruption levels between East and West Germany.

Third, we have uncovered evidence that individuals are more skeptical towards the Covid-19 vaccine in East Germany compared to West Germany. If this is the case on the receiving end of the vaccine, there is no reason why it would not be the case on the dispensing end. This applies to all kind of medical workers, who are supposed to incentivize their patients to get vaccinated: if physicians, nurses, and other medical care workers instead share their concerns regarding the Covid-19 vaccine, and do so systematically more in East Germany then in West Germany, patients who are still hesitant about the vaccine might well decide to refuse it. Even those who had decided to get the vaccine could change their mind if people who know more about health than they do warn them against the vaccine. Likewise, if the public discourse, for instance from local politicians, or local media (local newspapers, TV channel, or even social media, as one's social networks online is mostly made of geographically close people), tends to relay more anti Covid-vaccine opinions in East than in West Germany, then there is a kind of feedback effect, as individuals who are more inclined to refuse the vaccine are more exposed to similar anti-Covid-19-vaccine ideas. The media have been shown to influence compliance with social distancing during the Covid crisis (Simonov, Sacher, Dubé, and Biswas (2020) about Fox News in the US), or the spread of "anti-vax" ideas (Chiou & Tucker, 2018) about fake news on social media and the anti-vaccination movement) before the Covid-19 crisis. These effects are amplified by "filter bubbles", or "ideological frames", resulting from website algorithms that offers to the user information they would like to see based on their online history. As a result, users become locked down within their information bubble, separated from other points of view.

Whether through medical care workers, local politicians, newspapers, or social networks,

this would lead to the propagation of more anti-vaccination stories, and eventually produce an amplification of the negative effect of exposure to the past Communist regime on individuals' decision to get vaccinated.

6 Conclusion

All European countries succeeded in guaranteeing universal availability of the Covid-19 vaccine to their citizens. Yet, the vaccination rate against Covid-19 varies significantly between Central and European countries, and Western countries. In order to achieve herd immunity to return fast to a new normal, it is crucial to understand the determinants of vaccination decisions. Accordingly, is the divide between European countries in vaccination an imprint from former Communist institutions?

We exploit novel data from the second Covid-19 SHARE wave, which covers 27 European countries, to answer this research question. First, we show that post-Communist countries have a lower Covid-19 vaccination rate even after controlling for potential confounders. Next, to get closer to a causal estimate we switch to the quasi-natural experiment provided by the separation and later reunification of Germany. Regardless of the higher prevalence of the flu vaccination, we document the lower Covid-19 vaccination among older East Germans. We show that one plausible mechanism behind the lower compliance with the Covid-19 vaccine, and more precisely behind refusal rather than just being undecided, is lower social capital in East Germany.

Our findings are relevant for policymakers to understand better reasons for non-compliance with Covid-19 policies and, as a result, to tailor vaccination campaigns depending on targeted groups or targeted places.

References

Ahituv, A., Hotz, V. J., & Philipson, T. (1996). The responsiveness of the demand for condoms to the local prevalence of AIDS. *Journal of Human Resources*, 869–897.

Alesina, A., & Fuchs-Schündeln, N. (2007). Good-bye Lenin (or not?): The effect of communism on people's preferences. *American Economic Review*, *97*(4), 1507–1528.

Andersson, O., Campos-Mercade, P., Meier, A. N., & Wengström, E. (2021). Anticipation of COVID-19 vaccines reduces willingness to socially distance. *Journal of Health Economics*, *80*, 102530.

Bargain, O., & Aminjonov, U. (2020). Trust and compliance to public health policies in times of COVID-19. *Journal of Public Economics*, *192*, 104316.

Barrios, J. M., Benmelech, E., Hochberg, Y. V., Sapienza, P., & Zingales, L. (2021). Civic capital and social distancing during the Covid-19 pandemic. *Journal of Public Economics*, *193*, 104310.

Becker, S. O., Mergele, L., & Woessmann, L. (2020). The separation and reunification of Germany: Rethinking a natural experiment interpretation of the enduring effects of communism. *Journal of Economic Perspectives*, *34*(2), 143–71.

Bergmann, M., Hannemann, T.-V., Bethmann, A., & Schumacher, A. (2021). Determinants of SARS-CoV-2 Vaccinations in the 50+ Population. *MEA Discussion Paper*.

Bertoni, M., Celidoni, M., Dal Bianco, C., & Weber, G. (2021). How did European retirees respond to the COVID-19 pandemic? *Economics Letters*, *203*, 109853.

Bluhm, R., & Pinkovskiy, M. (2021). The spread of COVID-19 and the BCG vaccine: A natural experiment in reunified germany. *The Econometrics Journal*, *24*(3), 353–376.

Börsch-Supan, A. (2020a). Survey of Health, Ageing and Retirement in Europe (SHARE) Wave 1. Release version: 7.1.0. SHARE-ERIC. Data set.
doi:10.6103/SHARE.w1.710

Börsch-Supan, A. (2020b). Survey of Health, Ageing and Retirement in Europe (SHARE) Wave 2. Release version: 7.1.0. SHARE-ERIC. Data set.
doi:10.6103/SHARE.w2.710

Börsch-Supan, A. (2020c). Survey of Health, Ageing and Retirement in Europe (SHARE) Wave 3 - SHARELIFE. Release version: 7.1.0. SHARE-ERIC. Data set.
doi:10.6103/SHARE.w3.710

Börsch-Supan, A. (2020d). Survey of Health, Ageing and Retirement in Europe (SHARE) Wave 4. Release version: 7.1.0. SHARE-ERIC. Data set. doi:10.6103/SHARE.w4.710

Börsch-Supan, A. (2020e). Survey of Health, Ageing and Retirement in Europe (SHARE) Wave 5. Release version: 7.1.0. SHARE-ERIC. Data set. doi:10.6103/SHARE.w5.710

Börsch-Supan, A. (2020f). Survey of Health, Ageing and Retirement in Europe (SHARE) Wave 6. Release version: 7.1.0. SHARE-ERIC. Data set. doi:10.6103/SHARE.w6.710

Börsch-Supan, A. (2020g). Survey of Health, Ageing and Retirement in Europe (SHARE) Wave 7. Release version: 7.1.1. SHARE-ERIC. Data set. doi:10.6103/SHARE.w7.711

Börsch-Supan, A. (2020h). Survey of Health, Ageing and Retirement in Europe (SHARE) Wave 8. COVID-19 Survey 1 Interview Date. Release version: 1.0.0. SHARE-ERIC. Data set. doi:10.6103/SHARE.w8caintd.100

Börsch-Supan, A. (2020i). Survey of Health, Ageing and Retirement in Europe (SHARE) Wave 8. COVID-19 Survey 1. Release version: 1.0.0. SHARE-ERIC. Data set. doi:10.6103/SHARE.w8ca.100

Börsch-Supan, A. (2021a). Survey of Health, Ageing and Retirement in Europe (SHARE) Wave 8. Release version: 1.0.0. SHARE-ERIC. Data set. doi:10.6103/SHARE.w8.100

Börsch-Supan, A. (2021b). Survey of Health, Ageing and Retirement in Europe (SHARE) Wave 9. COVID-19 Survey 2 Interview Date. Release version: 0. SHARE-ERIC. Preliminary data set.

Börsch-Supan, A. (2021c). Survey of Health, Ageing and Retirement in Europe (SHARE) Wave 9. COVID-19 Survey 2. Release version: 0 SHARE-ERIC. Preliminary data set.

Börsch-Supan, A., Brandt, M., Hunkler, C., Kneip, T., Korbmacher, J., Malter, F., ... Zuber, S. (2013). Data resource profile: the Survey of Health, Ageing and Retirement in Europe (SHARE). *International journal of epidemiology*, *42*(4), 992–1001. doi:10.1093/ije/dyt088

Brainerd, E. (2001). Economic reform and mortality in the former soviet union: a study of the suicide epidemic in the 1990s. *European Economic Review*, *45*(4-6), 1007–1019.

Callaghan, T., Moghtaderi, A., Lueck, J. A., Hotez, P., Strych, U., Dor, A., ... Motta, M. (2021). Correlates and disparities of intention to vaccinate against covid-19. *Social Science & Medicine (1982)*.

Chiou, L., & Tucker, C. (2018). *Fake news and advertising on social media: A study of the anti-vaccination movement* (Tech. Rep.). National Bureau of Economic Research.

Conzo, P., & Salustri, F. (2019). A war is forever: The long-run effects of early exposure to World War II on trust. *European Economic Review*, *120*, 103313.

Costa-Font, J., Garcia-Hombrados, J., & Nicińska, A. (2021). The Institutional Origins of Vaccines Distrust: Evidence from Former-Communist Countries.

Dai, H., Saccardo, S., Han, M. A., Roh, L., Raja, N., Vangala, S., ... Croymans, D. M. (2021). Behavioural nudges increase COVID-19 vaccinations. *Nature*, *597*(7876), 404–409.

Durante, R., Guiso, L., & Gulino, G. (2021). Asocial capital: Civic culture and social distancing during COVID-19. *Journal of Public Economics*, *194*, 104342.

Easterlin, R. A. (2009). Lost in transition: Life satisfaction on the road to capitalism. *Journal of economic behavior & organization*, *71*(2), 130–145.

Egorov, G., Enikolopov, R., Makarin, A., & Petrova, M. (2021). Divided we stay home: Social distancing and ethnic diversity. *Journal of Public Economics*, *194*, 104328.

Galasso, V., Pons, V., Profeta, P., Becher, M., Brouard, S., & Foucault, M. (2020). Gender differences in COVID-19 attitudes and behavior: Panel evidence from eight countries. *Proceedings of the National Academy of Sciences*, *117*(44), 27285–27291.

Glaeser, E. L., Laibson, D. I., Scheinkman, J. A., & Soutter, C. L. (2000). Measuring trust. *The Quarterly Journal of Economics*, *115*(3), 811–846.

Guiso, L. (2010). A Trust-Driven Financial Crisis. Implications for the Future of Financial Markets.

Guriev, S., & Melnikov, N. (2016). War, inflation, and social capital. *American Economic Review*, *106*(5), 230–35.

Guriev, S., & Zhuravskaya, E. (2009). (un) happiness in transition. *Journal of economic perspectives*, *23*(2), 143–68.

Havari, E., & Mazzonna, F. (2015). Can we trust older people's statements on their childhood circumstances? Evidence from SHARELIFE. *European Journal of Population*, *31*(3), 233–257.

Havari, E., & Peracchi, F. (2017). Growing up in wartime: Evidence from the era of two world

wars. *Economics & Human Biology*, *25*, 9–32.

Herrmann, B., Thöni, C., & Gächter, S. (2008). Antisocial punishment across societies. *Science*, *319*(5868), 1362–1367.

Iwasaki, I., & Suzuki, T. (2012). The determinants of corruption in transition economies. *Economics Letters*, *114*(1), 54–60.

Karlsson, L. C., Soveri, A., Lewandowsky, S., Karlsson, L., Karlsson, H., Nolvi, S., ... Antfolk, J. (2021). Fearing the disease or the vaccine: The case of COVID-19. *Personality and individual differences*, *172*, 110590.

Kesternich, I., Siflinger, B., Smith, J. P., & Winter, J. K. (2014). The effects of World War ii on economic and health outcomes across Europe. *Review of Economics and Statistics*, *96*(1), 103–118.

Lazarus, J. V., Ratzan, S. C., Palayew, A., Gostin, L. O., Larson, H. J., Rabin, K., ... El-Mohandes, A. (2021). A global survey of potential acceptance of a COVID-19 vaccine. *Nature medicine*, *27*(2), 225–228.

Lippmann, Q., Georgieff, A., & Senik, C. (2020). Undoing gender with institutions: Lessons from the German division and reunification. *The Economic Journal*, *130*(629), 1445–1470.

Lippmann, Q., & Senik, C. (2018). Math, girls and socialism. *Journal of Comparative Economics*, *46*(3), 874–888.

Martinez-Bravo, M., & Stegmann, A. (2021). In vaccines we trust? The effects of the CIA's vaccine ruse on immunization in Pakistan. *Journal of the European Economic Association*.

Putnam, R. (1993). The prosperous community: Social capital and public life. *The American Prospect*, *13*(Spring), Vol. 4. Available online: http://www. prospect. org/print/vol/13 (accessed 7 April 2003).

Scherpenzeel, A., Axt, K., Bergmann, M., Douhou, S., Oepen, A., Sand, G., ... Börsch-Supan, A. (2020). Collecting survey data among the 50+ population during the COVID-19 pandemic: The Survey of Health, Ageing and Retirement in Europe (SHARE). *Survey Research Methods*, 217-221. doi:10.18148/srm/2020.v14i2.7738

Schmelz, K., Ziegelmeyer, A., et al. (2020). *State coercion and control aversion: Evidence from an internet study in East and West Germany*. TWI, Thurgau Institute of Economics at the University of Konstanz.

Simonov, A., Sacher, S. K., Dubé, J.-P. H., & Biswas, S. (2020). *The persuasive effect of fox news: non-compliance with social distancing during the covid-19 pandemic* (Tech. Rep.). National Bureau of Economic Research.

Appendix "The COVID-19 Curtain: Can Past Communist Regimes Explain the Vaccination Divide in Europe?"

Acknowledgements

This paper uses data from SHARE Waves 1, 2, 3, 4, 5, 6, 7 and 8 (DOIs: 10.6103/SHARE.w1.710, 10.6103/SHARE.w2.710, 10.6103/SHARE.w3.710, 10.6103/SHARE.w4.710, 10.6103/SHARE.w5.710, 10.6103/SHARE.w6.710, 10.6103/SHARE.w7.711, 10.6103/SHARE.w8.100, 10.6103/SHARE.w8ca.100, 10.6103/SHARE.w8caintd.100) and Börsch-Supan (2021c) and Börsch-Supan (2021b), see Börsch-Supan et al. (2013) and Scherpenzeel et al. (2020) for methodological details. The SHARE data collection has been funded by the European Commission through FP5 (QLK6-CT-2001-00360), FP6 (SHARE-I3: RII-CT-2006-062193, COMPARE: CIT5-CT-2005-028857, SHARE-LIFE: CIT4-CT-2006-028812), FP7 (SHARE-PREP: GA N°211909, SHARE-LEAP: GA N°227822, SHARE M4: GA N°261982, DASISH: GA N°283646) and Horizon 2020 (SHARE-DEV3: GA N°676536, SHARE-COHESION: GA N°870628, SERISS: GA N°654221, SSHOC: GA N°823782) and by DG Employment, Social Affairs & Inclusion. Additional funding from the German Ministry of Education and Research, the Max Planck Society for the Advancement of Science, the U.S. National Institute on Aging (U01_AG09740-13S2, P01_AG005842, P01_AG08291, P30_AG12815, R21_AG025169, Y1-AG-4553-01, IAG_BSR06-11, OGHA_04-064, HHSN271201300071C) and from various national funding sources is gratefully acknowledged (see `www.share-project.org`). The datasets are Börsch-Supan, 2020a; Börsch-Supan, 2020b; Börsch-Supan, 2020c; Börsch-Supan, 2020d; Börsch-Supan, 2020e; Börsch-Supan, 2020f; Börsch-Supan, 2020g; Börsch-Supan, 2021a; Börsch-Supan, 2020a; Börsch-Supan (2020i); Börsch-Supan, 2020h.

A External statistics about vaccination

The Oxford Covid-19 Government Response Tracker (OxCGRT)[32] contains daily information about the vaccination policies across countries. We exploit variable h7 provided by the organizers. The h7 variable takes six potential values. If no vaccine was available, then it is equal to 0. To make the cross-country comparable value, the OxCGRT defines further three groups of individuals: key workers, clinically vulnerable groups and elderly, and depending on the number of groups the vaccine was available to, the vaccination policy is equal to 1, 2 or 3. For example, vaccination policy is equal to 1 if the vaccine is available to one group only, and 3 means it is available for all the listed categories. Next, it is equal to 4 if some further broad ages got the vaccine. And, finally, 5 means universal availability. Fig. A.1 shows changes in vaccination policies during Summer 2021.

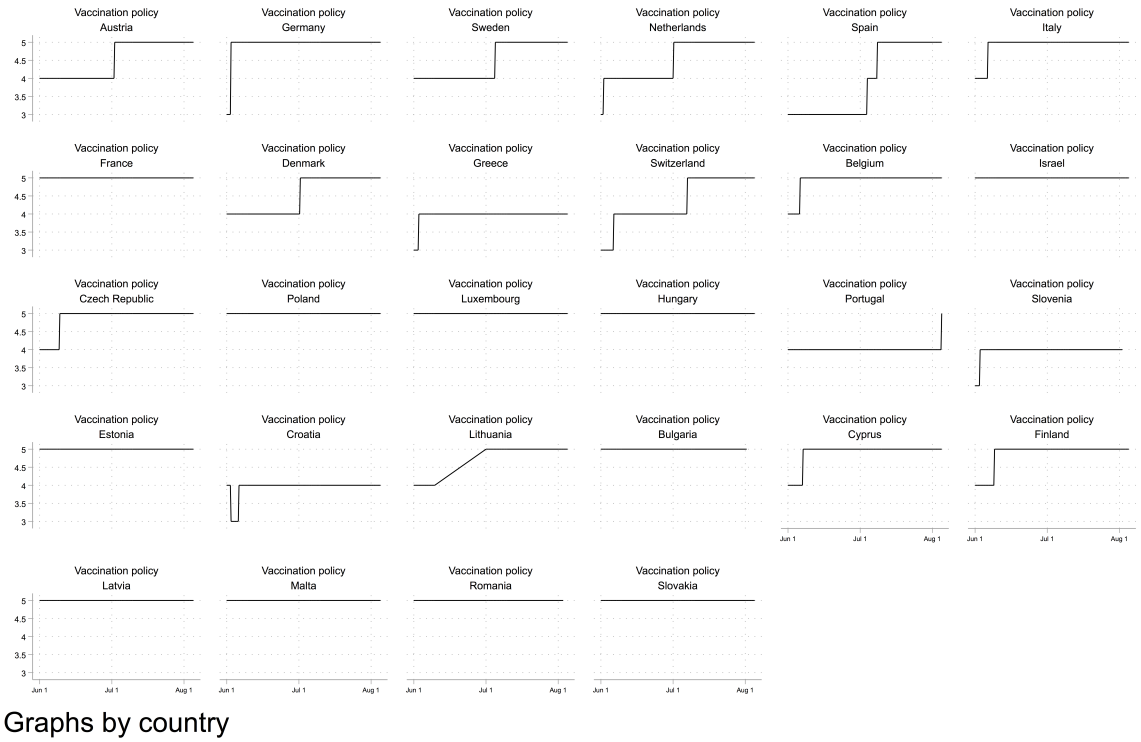

Fig. A.1. Eligibility to vaccine across countries between June 2021 and August 2021

Source: The Oxford Covid-19 Government Response Tracker (OxCGRT). The vaccine availability is coded as 3 if vaccine is available to key workers, clinically vulnerable groups and elderly; 4 if some further broad ages had includes; and 5 means universal availability.

[32]Refer to https://github.com/OxCGRT/covid-policy-tracker/blob/master/documentation/codebook.md

B Interview date in the second SHARE Corona Survey

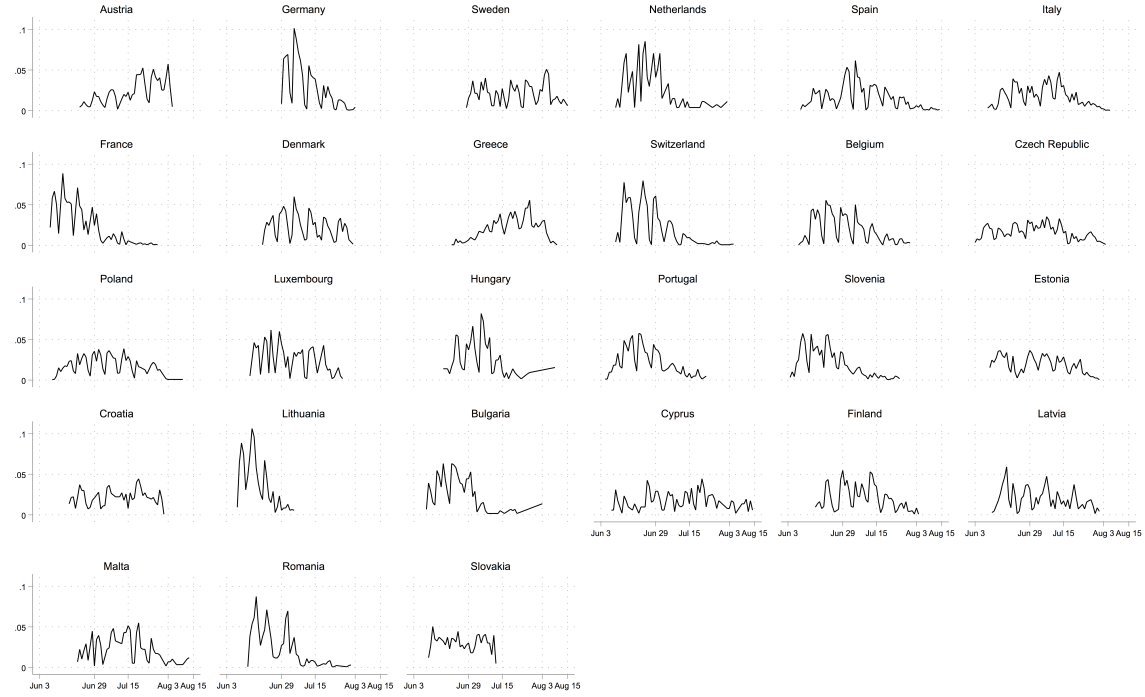

Fig. B.1. The interview date in the second SHARE Corona Survey

C SHARE data and official statistics in Germany

Table C.1: Vaccination rate across German regions excluding Berlin in the SHARE data and official statistics

	SHARE	Official 60+		East Germany
	(1)	(2)	(2)-(1)	Indicator
Baden-Wuerttemberg	0.958	0.860	-0.098	0
Bavaria	0.939	0.852	-0.087	0
Brandenburg	0.895	0.810	-0.085	1
Bremen	1.000	0.946	-0.054	0
Hamburg	0.917	0.887	-0.030	0
Hesse	0.927	0.873	-0.054	0
Mecklenburg-Western Pomeran	0.953	0.861	-0.093	1
Lower Saxony	0.946	0.904	-0.042	0
North Rhine-Westphalia	0.972	0.905	-0.067	0
Rhineland-Palatinate	0.894	0.898	0.003	0
Saarland	0.846	0.904	0.058	0
Saxonia	0.830	0.789	-0.041	1
Saxonia-Anhalt	0.955	0.831	-0.124	1
Schleswig-Holstein	0.967	0.902	-0.065	0
Thuringia	0.776	0.820	0.044	1
Average across regions				
West Germany	0.937	0.893	-0.044	
East Germany	0.882	0.822	-0.060	

Source: Column 2 shows the vaccination rate on November 29, 2021 by federal German states among individuals over 60 years old. Refer to https://www.rki.de/DE/Content/InfAZ/N/Neuartiges_Coronavirus/Daten/Impfquotenmonitoring.html;jsessionid=BFC673F67040358ED8BD2795805619B6.internet111?nn=13490888

D Descriptive statistics East and West Germany

Table D.1: Descriptive statistics among individuals born in East and West Germany

	West Germany	East Germany	Difference	(p-value)
	(1)	(2)	(3)	(4)
Outcome variables:				
Covid-19 vaccine:				
Got or scheduled	0.95	0.87	0.08	0.00
Do not want	0.03	0.07	-0.04	0.00
Undecided	0.01	0.02	-0.01	0.13
Other vaccines:				
Got flu vaccination	0.53	0.63	-0.11	0.00
Got pneumonia vaccine	0.31	0.38	-0.08	0.01
Got flu vaccine before Covid	0.37	0.56	-0.19	0.00
Potential mechanism:				
PCA of social capital	0.06	-0.19	0.26	0.00
Voluntary work	0.32	0.18	0.14	0.00
Trust in others	5.62	5.26	0.36	0.01
Political engagement	0.08	0.05	0.04	0.02
Control variables:				
Age	70.73	70.61	0.12	0.80
Female	0.53	0.55	-0.01	0.71
Controls for current characteristics:				
Education:				
ISCED-97 code 1	0.00	0.00	-0.00	0.10
ISCED-97 code 2	0.10	0.02	0.08	0.00
ISCED-97 code 3	0.54	0.52	0.02	0.39
ISCED-97 code 4	0.05	0.03	0.02	0.07
ISCED-97 code 5	0.30	0.43	-0.13	0.00
ISCED-97 code 6	0.01	0.00	0.01	0.20
Employed or self-employed	0.21	0.19	0.02	0.47
Having a child	0.84	0.92	-0.08	0.00
Living with a partner	0.76	0.71	0.05	0.07
Rural area	0.69	0.67	0.03	0.35
Income:				
2nd income quartile	0.21	0.33	-0.12	0.00
3rd income quartile	0.27	0.27	-0.00	0.98
4th income quartile	0.36	0.17	0.18	0.00
Wealth:				
2nd wealth quartile	0.23	0.36	-0.13	0.00
3rd wealth quartile	0.29	0.29	-0.00	0.90
4th wealth quartile	0.38	0.13	0.25	0.00
Self-perceived health before pandemic:				
Good	0.42	0.46	-0.04	0.14
Fair	0.22	0.27	-0.05	0.04
Poor	0.05	0.06	-0.01	0.47
Depression scale EURO-D	1.99	2.05	-0.06	0.59
Number of chronic diseases	1.63	1.66	-0.03	0.75
Controls for early-life characteristics:				
Vaccinated during childhood	0.99	1.00	-0.00	0.35
Born in a rural area	0.46	0.45	0.01	0.81
House with 25+ books	0.50	0.46	0.04	0.15
1 service at dwelling at age 10	0.18	0.29	-0.12	0.00
>1 services at dwelling at age 10	0.77	0.59	0.18	0.00
COVID-related information:				
log(GDP in 2019)	12.88	11.54	1.34	0.00
Population in Jan 1, 2020[a]	11.06	4.16	6.90	0.00
Hospital beds in 2019[a]	77.87	80.61	-2.74	0.00
Cases by Jun 1, 2020[a]	24.21	13.47	10.75	0.00
Cases by Jan 1, 2021[a]	210.29	231.90	-21.61	0.00
Observations	1117	407		

[a] per 1.000.000

E All Europe excluding Germany

Table E.1: Impact of post-Communist institutions on vaccination decisions controlling for country of residence

	COVID			Other
	Got	Do not want	Undecided	Flu
	(1)	(2)	(3)	(4)
***Panel a*: All European countries now**:				
Mean dep. var.	.823	.084	.063	.386
SD dep. var.	.382	.277	.243	.487
Panel Ia: main controls				
Post-communist countries	-0.0998**	0.0440*	0.0663***	-0.0309
	(0.0305)	(0.0911)	(0.00112)	(0.489)
	[0.0640]	[0.0930]	[0.00300]	[0.505]
R2	0.173	0.0882	0.0721	0.187
N	35610	35610	35610	35559
Panel IIa: controlling for current and early-life characteristics				
Post-communist countries	-0.0980**	0.0458*	0.0558***	-0.0395
	(0.0352)	(0.0961)	(0.00296)	(0.445)
	[0.0660]	[0.103]	[0.0110]	[0.466]
R2	0.0831	0.0341	0.0408	0.182
N	25831	25831	25831	25792
***Panel b*: Restricting to not post-Communist countries now**:				
Mean dep. var.	.915	.04	.028	.533
SD dep. var.	.279	.196	.164	.499
Panel Ib: main controls				
Post-communist countries	-0.125**	0.0580*	0.0603**	-0.0436
	(0.0219)	(0.0553)	(0.0242)	(0.444)
	[0.0440]	[0.0650]	[0.0600]	[0.452]
R2	0.0482	0.0184	0.0287	0.101
N	20325	20325	20325	20287
Panel IIb: controlling for current and early-life characteristics				
Post-communist countries	-0.124**	0.0691**	0.0469*	-0.0561
	(0.0156)	(0.0217)	(0.0563)	(0.360)
	[0.0440]	[0.0410]	[0.0930]	[0.384]
R2	0.0614	0.0281	0.0330	0.138
N	17077	17077	17077	17051

Note: All specifications control for constant, age, female, week of interview, country of residence fixed effects and vaccination policy at the moment of the interview. In *Panel Ib* and *Panel IIb*, controls for current and early-life characteristics are seven educational ISCED-1997 categories; employment dummy; income and wealth quartiles; four categories for self-perceived health; the EURO-D depression scale; the number of chronic diseases; having a child; living with a partner; an urban area dummy; being vaccinated at age 16; being born in a rural area; a dummy for having more than 25 books and the number of services in the house at age 10. P-values of two-way cluster standard errors by the age and the region of residence are in parentheses. In square brackets, we report wild cluster bootstrap p-values. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

F The length of exposure to Communism in East Germany

Table F.1: The length of exposure to Communism in Germany

	COVID			Other
	Got	Do not want	Undecided	Flu
	(1)	(2)	(3)	(4)
Mean dep. var.	.928	.039	.012	.557
SD dep. var.	.259	.195	.111	.497
Panel I: main controls				
Years under Communism	-0.00224***	0.00106*	0.000271	0.00364***
	(0.00814)	(0.0672)	(0.134)	(0.00410)
	[0.0394]	[0.119]	[0.232]	[0.0359]
R2	0.0397	0.0142	0.0102	0.0395
N	1524	1524	1524	1521
Panel II: controlling for current and early-life characteristics				
Years under Communism	-0.00214**	0.000979	0.000102	0.00417***
	(0.0238)	(0.121)	(0.682)	(0.00854)
	[0.0471]	[0.112]	[0.550]	[0.0324]
R2	0.103	0.0619	0.0319	0.0808
N	1524	1524	1524	1521

Note: All specifications control for constant, age, female, week of interview. In *Panel II*, controls for current and early-life characteristics are seven educational ISCED-1997 categories; employment dummy; income and wealth quartiles; four categories for self-perceived health; the EURO-D depression scale; the number of chronic diseases; having a child; living with a partner; an urban area dummy; being vaccinated at age 16; being born in a rural area; a dummy for having more than 25 books and the number of services in the house at age 10. P-values of two-way cluster standard errors by the age and the region of residence are in parentheses. In square brackets, we report wild cluster bootstrap p-values. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

G Got COVID-19 vaccine

Table G.1: Impact of post-Communist institutions on vaccine against COVID

	All Europe excluding Germany		Germany	
	(1)	(2)	(3)	(4))
Dep. var.: Got or scheduled or want COVID-19 vaccine:				
Mean dep. var.	.852		.947	
SD dep. var.	.355		.224	
Post-communist countries	-0.130***	-0.120***		
	(0.000104)	(0.000000202)		
	[0.00200]	[0.00200]		
East Germany			-0.0522*	-0.0434*
			(0.0539)	(0.0883)
			[0.151]	[0.129]
Main controls	yes	yes	yes	yes
Current characteristics	no	yes	no	yes
Early-life characteristics	no	yes	no	yes
R2	0.0980	0.0621	0.0253	0.0755
N	35610	25831	1524	1524

Note: Main controls include constant, age, female, week of interview. Current and early-life characteristics are seven educational ISCED-1997 categories; employment dummy; income and wealth quartiles; four categories for self-perceived health; the EURO-D depression scale; the number of chronic diseases; having a child; living with a partner; an urban area dummy; being vaccinated at age 16; being born in a rural area; a dummy for having more than 25 books and the number of services in the house at age 10. Columns 1-2 control for GDP per capita in 2019, population in January 2020, the number of hospital bets per capita in 2019, voluntary and out-of-pocket health expenditure as a share of GDP in 2019, the cumulative number of Covid-19 infections by June 1, 2020 and by January 1, 2021, and vaccination policy at the moment of the interview. P-values of two-way cluster standard errors by the age and the region of residence are in parentheses. In square brackets, we report wild cluster bootstrap p-values. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

H Random assignment

Table H.1: Random assignment using the specification in Panel I (controls: age, gender and week on the interview)

	Got COVID-19 vaccine		
	10 %	5%	1%
	(1)	(2)	(3)
1 East regions in Group 1	0.544***	0.435***	0.267***
	(0.0167)	(0.0165)	(0.0147)
2 East regions in Group 1	0.514***	0.399***	0.221***
	(0.0156)	(0.0154)	(0.0137)
3 East regions in Group 1	0.689***	0.596***	0.418***
	(0.0255)	(0.0252)	(0.0224)
4 East regions in Group 1	0.940***	0.880***	0.740***
	(0.0764)	(0.0756)	(0.0671)
5 East regions in Group 1	1*	1*	1**
	(0.540)	(0.535)	(0.475)
R2	0.503	0.407	0.262
N	3003	3003	3003

Note: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. This table tests all of the possible divisions of the 15 regions (10 in West Germany and 5 in East Germany) into two groups of respectively 5 (Group 1) and 10 (Group 2) regions. We derive the East German estimate changing the composition of regions in Group 1 and Group 2. Then, we define a dummy that equals 1 if the coefficient associated with "East Germany" is statistically significant at the relevant thresholds. We regress this dummy on the number of East German regions in Group 1 as an independent variable using Ordinary Least Squares. The omitted category is 0 East German regions in Group 1. Column 1 displays the probability that the coefficients of interest are significant at the 10% level, column 2 at the 5% level, and column 3 at the 1% level. For instance, the cell in the 2nd column and 3rd row shows that with 3 East German regions in Group 1 rather than zero, the probability that the coefficients of interest are statistically significant at the 5% level increases by 59.6 percentage points.

I Do health variables differ between East and West Germans?

Table I.1: Impact of post-Communist institutions on health before pandemic in Germany

		Self-reported health				
	Vaccinated during	Reference: Excellent			Depression scale	N. of chronic
	childhood	Good	Fair	Poor	EURO-D	diseases
	(1)	(2)	(3)	(4)	(5)	(6)
Mean dep. var.	.991	.433	.235	.055	2.009	1.636
SD dep. var.	.092	.496	.424	.227	1.907	1.515
East Germany	0.00478	0.0435*	0.0522**	0.00847	0.0512	0.0267
	(0.456)	(0.0809)	(0.0261)	(0.536)	(0.667)	(0.227)
	[0.463]	[0.102]	[0.0543]	[0.567]	[0.652]	[0.206]
R2	0.00201	0.00407	0.00870	0.00152	0.0348	0.0454
N	1524	1524	1524	1524	1524	1524

Note: All specifications control for constant, age, female, and the week of interview. P-values of two-way cluster standard errors by the age and the region of residence are in parentheses. In square brackets, we report wild cluster bootstrap p-values. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

J Were East Germans less affected by the pandemic?

Table J.1: Impact of post-Communist institutions on vaccination decisions in Germany controlling for the number of cases

	(1)	(2)	(3)	(4)
Dep.var.: Got COVID-19 vaccine				
Eastern Germany	-0.0820**	-0.0792**	-0.0779***	-0.0542*
	(0.0148)	(0.0110)	(0.00777)	(0.0819)
	[0.0432]	[0.0430]	[0.0453]	[0.134]
log(GDP in 2019)		-0.0404***	-0.0401***	-0.0300**
		(0.00804)	(0.00991)	(0.0390)
		[0.0577]	[0.0522]	[0.119]
Population in Jan 1, 2020		0.00831***	0.00806***	0.00804***
		(0.0000230)	(0.0000794)	(0.0000975)
		[0.0149]	[0.0127]	[0.0365]
Hospital beds in 2019			-0.000919	-0.000871
			(0.229)	(0.119)
			[0.439]	[0.350]
Cases by Jun 1, 2020				0.000194
				(0.845)
				[0.855]
Cases by Jan 1, 2021				-0.000369**
				(0.0306)
				[0.119]
R2	0.0404	0.0467	0.0500	0.0553
N	1524	1524	1524	1524

Note: All specifications control for constant, age, female, week of interview, and current and early-life characteristics: seven educational ISCED-1997 categories; employment dummy; income and wealth quartiles; four categories for self-perceived health; the EURO-D depression scale; the number of chronic diseases; having a child; living with a partner; an urban area dummy; being vaccinated at age 16; being born in a rural area; a dummy for having more than 25 books and the number of services in the house at age 10. Hospital beds and Covid-19 cases are per 1.000.000. P-values of two-way cluster standard errors by the age and the region of residence are in parentheses. In square brackets, we report wild cluster bootstrap p-values. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table J.2: Impact of post-Communist institutions on knowing someone who had Covid-19 by Summer 2021 in Germany

	Anyone ... in Summer 2021			Anyone ... in Summer 2020		
	had symptoms	tested positive	hospitalized	had symptoms	tested positive	hospitalized
	(1)	(2)	(3)	(4)	(5)	(6)
Mean dep. var.	.282	.284	.094	.109	.081	.03
SD dep. var.	.45	.451	.292	.312	.272	.17
Panel I: main controls						
East Germany	0.0801***	0.0857**	0.0128	-0.0396**	-0.0430**	-0.00287
	(0.00474)	(0.0227)	(0.278)	(0.0437)	(0.0257)	(0.795)
	[0.0375]	[0.0809]	[0.333]	[0.0984]	[0.0485]	[0.833]
R2	0.0192	0.0178	0.00318	0.0154	0.00890	0.00195
N	1522	1522	1521	1516	1514	1513
Panel II: controlling for current and early-life characteristics						
East Germany	0.0918**	0.115**	0.0283	-0.0422**	-0.0375	0.00834
	(0.0302)	(0.0159)	(0.145)	(0.0310)	(0.116)	(0.523)
	[0.0640]	[0.0423]	[0.129]	[0.0364]	[0.136]	[0.533]
R2	0.0437	0.0396	0.0178	0.0341	0.0213	0.0172
N	1522	1522	1521	1516	1514	1513

Note: All specifications control for constant, age, female, week of interview. In *Panel II*, controls for current and early-life characteristics are seven educational ISCED-1997 categories; employment dummy; income and wealth quartiles; four categories for self-perceived health; the EURO-D depression scale; the number of chronic diseases; having a child; living with a partner; an urban area dummy; being vaccinated at age 16; being born in a rural area; a dummy for having more than 25 books and the number of services in the house at age 10. "Had symptoms' in Columns 1 and 4 refers to Covid-19 symptoms. P-values of two-way cluster standard errors by the age and the region of residence are in parentheses. In square brackets, we report wild cluster bootstrap p-values. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

K Social capital and vaccination

Table K.1: Impact of post-Communist institutions on social capital in Germany

	Voluntary work (1)	Trust in others (2)	Political engagement (3)
Mean dep. var.	.283	5.522	.073
SD dep. var.	.451	2.354	.26
Panel I: main controls			
East Germany	-0.135***	-0.370**	-0.0359**
	(0.00000776)	(0.0434)	(0.0153)
	[0.00100]	[0.0975]	[0.0354]
R2	0.0200	0.00597	0.0104
N	1522	1522	1522
Panel II: controlling for current and early-life characteristics			
East Germany	-0.122***	-0.361	-0.0343*
	(0.000511)	(0.101)	(0.0979)
	[0.00403]	[0.120]	[0.0724]
R2	0.0540	0.106	0.0432
N	1522	1522	1522

Note: All specifications control for constant, age, female, and the week of interview. In *Panel II*, controls for current and early-life characteristics are seven educational ISCED-1997 categories; employment dummy; income and wealth quartiles; four categories for self-perceived health; the EURO-D depression scale; the number of chronic diseases; having a child; living with a partner; an urban area dummy; being vaccinated at age 16; being born in a rural area; a dummy for having more than 25 books and the number of services in the house at age 10. P-values of two-way cluster standard errors by the age and the region of residence are in parentheses. In square brackets, we report wild cluster bootstrap p-values. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table K.2: Impact of social capital on vaccination decisions in Germany

	COVID			Other
	Got	Do not want	Undecided	Flu
	(1)	(2)	(3)	(4)
Reference group: Voluntary work				
Voluntary work	0.0367***	-0.0215**	-0.00387	0.0402
	(0.000819)	(0.0332)	(0.439)	(0.248)
	[0.00606]	[0.0466]	[0.467]	[0.297]
R2	0.0444	0.0176	0.0107	0.0360
N	1522	1522	1522	1519
Variable: Trust in people from 0 to 10				
Trust in others	0.00433	-0.00224	0.000352	-0.000510
	(0.259)	(0.419)	(0.831)	(0.857)
	[0.312]	[0.453]	[0.846]	[0.823]
R2	0.0420	0.0158	0.0105	0.0347
N	1524	1524	1524	1521
Reference group: No political engagement				
Political engagement	0.0267	-0.0104	-0.0127***	0.0836***
	(0.243)	(0.506)	(0.000686)	(0.0000144)
	[0.270]	[0.589]	[0.0142]	[0.0000]
R2	0.0411	0.0153	0.0113	0.0366
N	1522	1522	1522	1519

Note: All specifications control for constant, age, female, the week of interview, and being born in East Germany. P-values of two-way cluster standard errors by the age and the region of residence are in parentheses. In square brackets, we report wild cluster bootstrap p-values. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

L Do East and West Germans adopt differently preventive measures?

Table L.1: Impact of post-Communist institutions on preventive behavior in Germany

	Preventive in Summer 2021		PCA of preventive in Summer 2020	
	Social distance	Cover cough	Component 1	Component 2
	(1)	(2)	(3)	(4)
Mean dep. var.	.937	.886	.017	-.021
SD dep. var.	.243	.318	.906	.748
Panel I: main controls				
East Germany	-0.0462***	-0.0304	-0.109	-0.0316
	(0.00226)	(0.190)	(0.102)	(0.573)
	[0.0215]	[0.257]	[0.161]	[0.625]
R2	0.0176	0.00669	0.00883	0.00132
N	1483	1505	1512	1512
Panel II: controlling for current and early-life characteristics				
East Germany	-0.0534***	-0.0355	-0.110	-0.0206
	(0.00545)	(0.158)	(0.156)	(0.727)
	[0.0122]	[0.164]	[0.129]	[0.731]
R2	0.0364	0.0286	0.0471	0.0288
N	1483	1505	1512	1512

Note: All specifications control for constant, age, female, week of interview. In *Panel II*, controls for current and early-life characteristics are seven educational ISCED-1997 categories; employment dummy; income and wealth quartiles; four categories for self-perceived health; the EURO-D depression scale; the number of chronic diseases; having a child; living with a partner; an urban area dummy; being vaccinated at age 16; being born in a rural area; a dummy for having more than 25 books and the number of services in the house at age 10. Social distance is an indicator that a respondent maintains distance always or often. Cover cough is an indicator that a respondent pays more attention in covering cough between the first and second SHARE Corona Survey. PCA preventive in Summer 2020 is based on the frequency of mask wearing, keeping distance, wash hands, usage of sanitizer, and cough covering. First two components explain the 71% of variation. P-values of two-way cluster standard errors by the age and the region of residence are in parentheses. In square brackets, we report wild cluster bootstrap p-values. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table L.2: Impact of trust on preventive behavior in Germany

	Preventive in Summer 2021		PCA of preventive in Summer 2020	
	Social distance	Cover cough	Component 1	Component 2
	(1)	(2)	(3)	(4)
Mean dep. var.	.937	.886	.018	-.022
SD dep. var.	.243	.318	.905	.745
Panel I: main controls				
Social capital	0.00257	0.0113	0.0817**	0.00118
	(0.789)	(0.394)	(0.0219)	(0.946)
	[0.795]	[0.386]	[0.0503]	[0.955]
R2	0.0176	0.00752	0.0140	0.00158
N	1481	1503	1510	1510
Panel II: controlling for current and early-life characteristics				
Social capital	-0.000178	0.0119	0.0731*	-0.00530
	(0.988)	(0.394)	(0.0829)	(0.834)
	[0.988]	[0.359]	[0.0817]	[0.798]
R2	0.0363	0.0295	0.0505	0.0288
N	1481	1503	1510	1510

Note: All specifications control for constant, age, female, week of interview, and being born in East Germany. In *Panel II*, controls for current and early-life characteristics are seven educational ISCED-1997 categories; employment dummy; income and wealth quartiles; four categories for self-perceived health; the EURO-D depression scale; the number of chronic diseases; having a child; living with a partner; an urban area dummy; being vaccinated at age 16; being born in a rural area; a dummy for having more than 25 books and the number of services in the house at age 10. Social distance is an indicator that a respondent maintains distance always or often. Cover cough is an indicator that a respondent pays more attention in covering cough between the first and second SHARE Corona Survey. P-values of two-way cluster standard errors by the age and the region of residence are in parentheses. In square brackets, we report wild cluster bootstrap p-values. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

M Is flu vaccine in 2021 different from other long-known vaccines?

Table M.1: Impact of post-Communist institutions on vaccine against pneumonia and against flu before pandemic

	All Europe excluding Germany		Germany	
	(1)	(2)	(3)	(4))
Panel I: Got vaccine against pneumonia:				
Mean dep. var.	.117		.327	
SD dep. var.	.321		.469	
Post-communist countries	-0.262***	-0.336***		
	(5.42e-13)	(6.36e-15)		
	[0.00100]	[0.00000]		
East Germany			0.0741***	0.0654**
			(0.00328)	(0.0339)
			[0.0321]	[0.0312]
Main controls	yes	yes	yes	yes
Current characteristics	no	yes	no	yes
Early-life characteristics	no	yes	no	yes
R2	0.0930	0.109	0.0252	0.0633
N	35377	25655	1506	1506
Panel II: Got vaccine against flu before pandemic:				
Mean dep. var.	.331		.42	
SD dep. var.	.471		.494	
Post-communist countries	-0.397***	-0.378***		
	(5.97e-14)	(1.93e-10)		
	[0.00000]	[0.00100]		
East Germany			0.193***	0.171***
			(0.000528)	(0.00685)
			[0.0266]	[0.0348]
Main controls	yes	yes	yes	yes
Current characteristics	no	yes	no	yes
Early-life characteristics	no	yes	no	yes
R2	0.139	0.143	0.0661	0.104
N	24195	17892	1375	1375

Note: Main controls include constant, age, female, week of interview. Current and early-life characteristics are seven educational ISCED-1997 categories; employment dummy; income and wealth quartiles; four categories for self-perceived health; the EURO-D depression scale; the number of chronic diseases; having a child; living with a partner; an urban area dummy; being vaccinated at age 16; being born in a rural area; a dummy for having more than 25 books and the number of services in the house at age 10. Columns 1-2 control for GDP per capita, population in January 2020, the cumulative number of Covid-19 infections and deaths due to Covid-19by January 1, 2021, and vaccination policy at the moment of the interview. P-values of two-way cluster standard errors by the age and the region of residence are in parentheses. In square brackets, we report wild cluster bootstrap p-values. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.