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WHO GETS A COVID-19 VACCINE? A CROSS SECTIONAL STUDY[37] [38]

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Abstract: We use data from the European Values Study 2017 and from Eurobarometer to examine the attitudes and values that explain the differences in vaccination rate among selected European countries. We run a number of single variable regressions and multiple regressions. Vaccination rates turn out negatively correlated with trust in government and positively related with interpersonal trust and confidence in the healthcare system. The latter appears to be the most important predictor in our regression models.

Keywords: vaccination, COVID-19, vaccination rates, trust, confidence, healthcare system, interpersonal trust
JEL Codes: A13, I12, I18

INTRODUCTION

The Coronavirus has impacted economic development in two ways - through the loss of human capital and redistribution of monetary flows towards the healthcare sector and, additionally, through the countermeasures, imposed by governments to help prevent the spread of the disease (e.g. - "soft" and "hard" lockdowns; workplace closure; stay-at-home orders and other human mobility limitations). Determining the global cost of the disease on a macro-scale is a challenging task. The general scientific consensus forecasts a potential loss of somewhere in between 4-5% of the global GDP (e.g. Maliszewska et. al, 2020). Most research that focuses on impact evaluation properly outlines particular economic areas of effect, where both the disease and the prevention measures might cause the biggest shocks - hospitality sectors, travel and tourism, import and export transportation prices, mass activities (public transport, concerts, sports events, etc.) and many others.

From an economic standpoint it should be underlined that the so-called NPI (non-pharmaceutical interventions), in the category of which are the aforementioned measures, can only be effective in lessening the economic impact of the pandemic provided that the opportunity costs do not outweigh the long-term benefits from their imposal. Thus, a lot of people have espoused concerns regarding the efficacy and economic sense of said measures. In such a conundrum, the level of trust between people and confidence that individuals hold for the institutions responsible for managing the pandemic, becomes a fulcrum upon which the very outcome of the measures themselves might depend.

Restricting the spread of the disease and thus - preventing further economic loss - is constituted by a series of factors (social distancing, hygiene, etc.), with the main one being the mass-inoculation of the population. The different European societies have partially accepted the process of vaccination against COVID-19 as the main tool towards economic normalcy, but up to

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this day vaccination rates vary among countries. This could be due to supply constraints, but in the case of European countries the differences are mostly due to varying attitudes towards vaccination. In this context the question why people don't get vaccinated is not merely a matter of theoretical curiosity, but also one that has consequences for both public health and economic development. In that line of thought, the levels of confidence in the governmental institutions, healthcare providers, other people and the vaccination process are hypothesized to play a very important role for the attitudes towards the COVID-19 inoculation and thus predetermine, up to a degree, the percentage of vaccinated individuals within a society.

The goal of this paper is to address the supposed relationship between different aspects of trust and vaccination rates among select European countries. In terms of instrumentarium we employ single- and multi-variable regressions, layered on top of Eurobarometer data concerning confidence and social trust levels.

In order to achieve said goal, the following tasks are expanded upon in the exposition:
- measure the general attitudes towards vaccination pre- and post-COVID-19 pandemic;
- establish the statistical connections between trust, social values and vaccination rates;
- draw conclusions regarding the relations.

EXPOSITION

Attitudes toward vaccination and the actual vaccination rates

While there are many countries in which vaccines are in insufficient quantity due to lack of finances by the government, lack of access to production facilities, low priority in the delivery queue or poor health care infrastructure and administrative capacity, these are generally not a problem for the majority of the European countries, especially for members of the European Union. Therefore, the differences in the vaccination rates in this region should come from the demand side. We first compare attitudes towards vaccination in principle before the COVID-19 pandemics (using data from Eurobarometer 488) with attitudes towards the COVID-19 vaccine specifically (Eurobarometer 94.2). There is weak correlation between concerns for the side effects of vaccines in principle (Eurobarometer 488, QC7.1) and specifically for COVID-19 (Eurobarometer 94.2, Q4_4), which is more strongly pronounced when using the group of respondents, who totally agree with the statement (0,29 vs. 0,12). We get similar correlation coefficients for before/after attitudes for concerns whether vaccines are tested rigorously before being authorised (questions QC7.4 and Q4_3). On average concerns with the COVID-19 vaccines are higher, judging by the responses from these two questions.

Regarding the correlation between actual Covid vaccination rates (as of 10 October 2021, based on data from Mathieu et. al (2021)) we do see that the scepticism of the responses from Eurobarometer 94.2 in 2020 has been reflected in the vaccination rates in the autumn of 2021 for the 25 overlapping countries from the two databases.

Table 1. Correlation between vaccination rates and responses to questions from Eurobarometer 94.2

Question	Response	Correlation coefficient	p-value
Q1 When would you like to get vaccinated against COVID-19 (coronavirus)?	never	-0.93	<0.01
Q4_1 All in all, benefits of COVID-19 vaccines outweigh possible risks	"Tend to disagree" + "Totally disagree"	-0.88	<0.01
Q4_5 A vaccine is the only way to end the pandemic	"Tend to disagree" + "Totally disagree"	-0.84	<0.01

As can be seen in Fig. 1, countries from Eastern Europe tend to be clustered in the lower right corner, with relatively high scepticism towards the vaccines and low vaccination rates. The differences between the countries in their attitude towards vaccination were not as sharply

pronounced before the pandemic, which leads to the conclusion that some governments might have been better at dealing with the concerns of their citizens regarding the vaccination process and its effects.
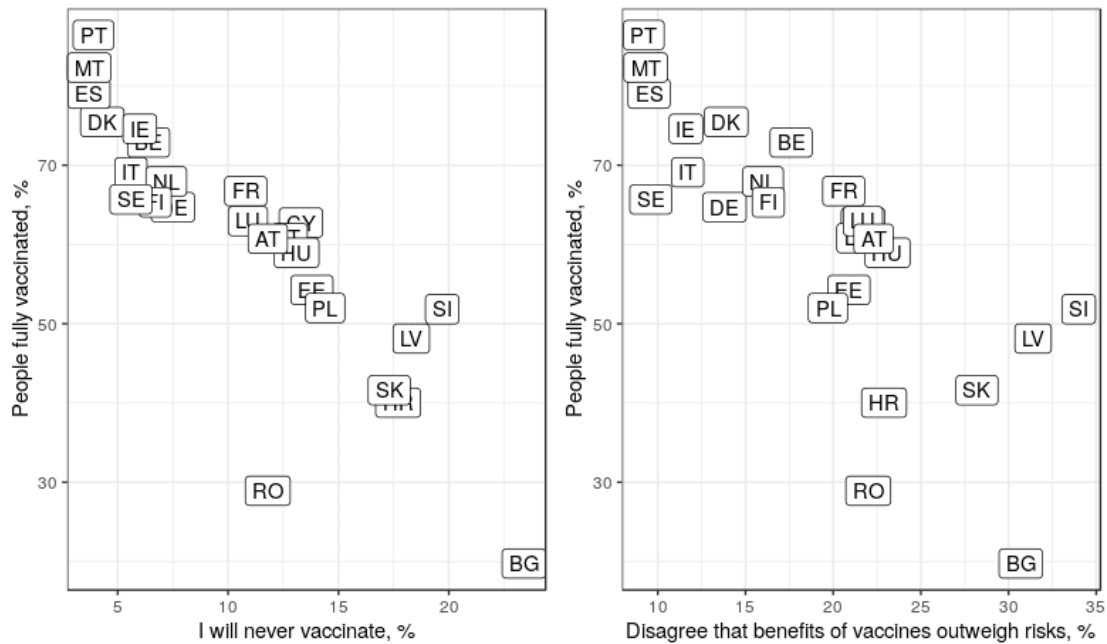

Fig. 1. The relationship between vaccination rates and selected responses from Eurobarometer 94.2

This observation takes us to the more general issue of trust and values and their role in the demand for vaccines in a pandemic situation.

Trust, values and vaccination rates

Previous research has focused on trust in science as a predictor of confidence in vaccines (Sturgis et al., 2021). Salali et al. (2021) use an online survey, conducted in the UK, USA and Turkey and conclude that the positive effects of trust in science on vaccine acceptance can be offset by beliefs in conspiracy theories. Another paper (Jennings et al., 2021), based on a UK survey, reveals that COVID-19 vaccine hesitancy is related to distrust in government and in health institutions. Vaccine hesitancy also depends on the usage of social media and general conspiratorial beliefs, with people getting information mostly from social media being less likely to get a COVID-19 vaccine.

Our paper builds on the ideas of previous research and expands it into a cross-cultural setting, using a number of attitudes and social values as predictors of vaccination rates in Europe. We use data from the 2017 wave of the European Values Study (EVS). Table 2 presents the responses from these questions as regressors in simple linear regressions, where the dependent variable is the percentage of fully vaccinated people.

Table 2. Selected attitudes from EVS (wave 2017) as regressors on vaccination rates

Question	Response	Coef.	Adj. R^2	p-value
v31 Generally speaking, would you say that most people can be trusted or that you can't be too careful in dealing with people?	most people can be trusted	0.63*	0.35	<0.01
v35 [Whether you trust] People you meet for the first time	"Trust completely" + "Trust somewhat"	0.68*	0.41	<0.01
v117 [How much confidence you have in] The education system	"a great deal" + "quite a lot"	0.77*	0.20	<0.01
v126 [How much confidence you have	"a great deal" + "quite a lot"	0.74*	0.35	<0.01

in] Health care system				
v131 [How much confidence you have in] Government	"a great deal" + "quite a lot"	0.23	0.31	<0.01
v132 [How much confidence you have in] Social media	"a great deal" + "quite a lot"	-1.27*	0.19	<0.01
v62 Which of these statements comes closest to your beliefs?	[% of respondents who don't] think there is any sort of spirit, God or life force	1.76*	0.41	<0.01
v38 [How much] freedom of choice and control you feel you have over the way your life turns out?	[mean of all responses] on a scale of "1 - none at all" to "10 - a great deal" [of control]	16.3+	0.09	<0.05
v90 [list of qualities which children can be encouraged to learn at home] Tolerance and respect for other people	[% of respondents who] mentioned	0.86*	0.35	<0.01

*Coefficients with an asterisk are statistically significant at 0.01.

+Coefficients with a plus sign are statistically significant at 0.05.

The only exception from this is question v131, but if we remove Azerbaijan, which is an outlier with exceptionally high confidence in government (at almost 90%), as well as Russia and Belarus (with relatively high values of 52% and 50%), the coefficient of the regressors increases to 0.69 and becomes statistically significant, although the adjusted R^2 falls to 0.17.

We confirm that the level of confidence in social media is negatively related to vaccination rates.
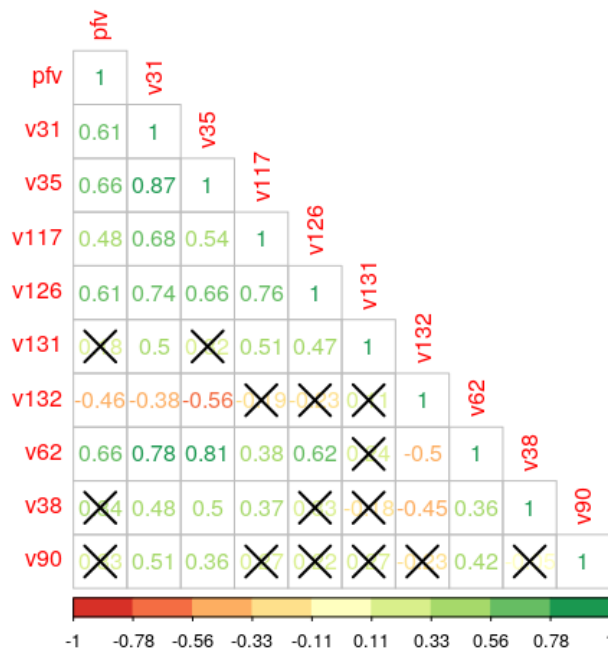

Fig. 2. Correlation matrix of the regression variables (X indicates no significance at 0.05)

Where pfv (percentage of the people who are fully vaccinated) and the other variables are values of responses from EVS 2017, shown in Table 2.

We also run a number of linear multiple regressions, using a regression with all the variables as base (where none of the variables is statistically significant and R^2 is 0.37) and remove each variable in turn in subsequent regressions to see how the removal of the respective variable will affect R^2. If its removal is accompanied by a fall in R^2, we consider it as a regressor in further regressions. As we discard some of the variables, two of them stand out, showing statistically significant coefficients in various regression combinations - v35 and v126. There is also sound

reason for their inclusion, as interpersonal trust (towards strangers) and trust in health care can influence attitude toward vaccines. We also keep v131, because confidence in government is a predictor of vaccine acceptance in other studies. Unlike them we find a negative relation between confidence in government and vaccination rates, but the coefficient is not statistically significant, so we can discard the result. From Table 3 we can conclude that approximately 2% increase in interpersonal trust is associated with an increase in vaccination rates by 1% and we could expect a similar change, caused by trust in the healthcare system.

Table 3. Regression table

		pfv	
Predictors	*Estimates*	*CI*	*p*
(Intercept)	12.13	-8.39 – 32.66	0.256
v 35	0.47	0.11 – 0.83	**0.016**
v 126	0.46	0.01 – 0.91	0.056
v 131	-0.18	-0.55 – 0.20	0.360
Observations	32		
R^2 / adjusted R^2	0.502 / 0.449		

CONCLUSION

Population inoculation remains the main way that governments across the world are combating the pandemic. Our models demonstrate that trust and social values may help, but in certain cases - may also hinder the process. Decent predictors of the vaccination rate prove to be whether people trust strangers and whether they are confident in the healthcare system. Counterintuitively, the data suggests that trust in government is counterproductive to inoculation at best, but generally not a significant predictor of vaccination rates - the reasons for such findings should be rigorously explored in further studies.

REFERENCES

European Commission and European Parliament, Brussels (2019). *Special Eurobarometer 488: Europeans' attitudes towards vaccination*, http://data.europa.eu/euodp/en/data/dataset/S2223_91_2_488_ENG.

European Commission and European Parliament, Brussels (2021). Eurobarometer 94.2 (2020). *GESIS Datenarchiv, Köln. ZA7750 Datenfile Version 1.0.0*, https://doi.org/10.4232/1.13722.

EVS (2020). European Values Study 2017: Integrated Dataset (EVS 2017). *GESIS Data Archive, Cologne. ZA7500 Data file Version 4.0.0*, https://doi.org/10.4232/1.13560 .

Jennings, W., Stoker, G., Bunting, H., Valgarðsson, V. O., Gaskell, J., Devine, D., McKay, L., & Mills, M. C. (2021). *Lack of Trust, Conspiracy Beliefs, and Social Media Use Predict COVID-19 Vaccine Hesitancy.* Vaccines, 9(6), 593. https://doi.org/10.3390/vaccines9060593

Mathieu, E., Ritchie, H., Ortiz-Ospina, E., Roser, M., Hasell, J., Appel, C., Giattino, C., & Rodés-Guirao, L. (2021). *A global database of COVID-19 vaccinations*. Nature Human Behaviour, 5(7), 947–953. https://doi.org/10.1038/s41562-021-01122-8.

Maliszewska, M., Mattoo, A., Mensbrugghe, D., (2020) *The Potential Impact of COVID-19 on GDP and Trade,* World Bank Group. http://hdl.handle.net/10986/33605

Salali, G. D., & Uysal, M. S. (2021). *Why Some Hesitate More: Cross-cultural Variation in Conspiracy Beliefs, Belief in Science, and Vaccine Attitudes*. Cold Spring Harbor Laboratory. https://doi.org/10.1101/2021.07.09.21260228.

Sturgis, P., Brunton-Smith, I., & Jackson, J. (2021). *Trust in science, social consensus and vaccine confidence*. Nature Human Behaviour. https://doi.org/10.1038/s41562-021-01115-7.