Contextual determinants of Covid-19 vaccination in Romania

Gabriel Badescu

Romania started the vaccination campaign on December 27 2020[1]. One year later, Romania had the second-lowest vaccination rate in the European Union (41% of the total population with completed vaccination). Moreover, the vaccination trend has been descendent over the last two months (Figure 1).

Figure 1. Covid-19 vaccination trend in Romania.

Source: https://covidvax.live/location/rou

It is worth noticing the large disparity between the 42 counties of the country: at one extreme, Suceava county, with 26% of the eligible population vaccinated on November 4, 2021 (29% at the end of December), and the capital city, Bucharest, at the other, with 62% on November 4 (66% at the end of 2021) (Figure 2).

Figure 2. Distribution of vaccination rates at county level on November 4, 2021.
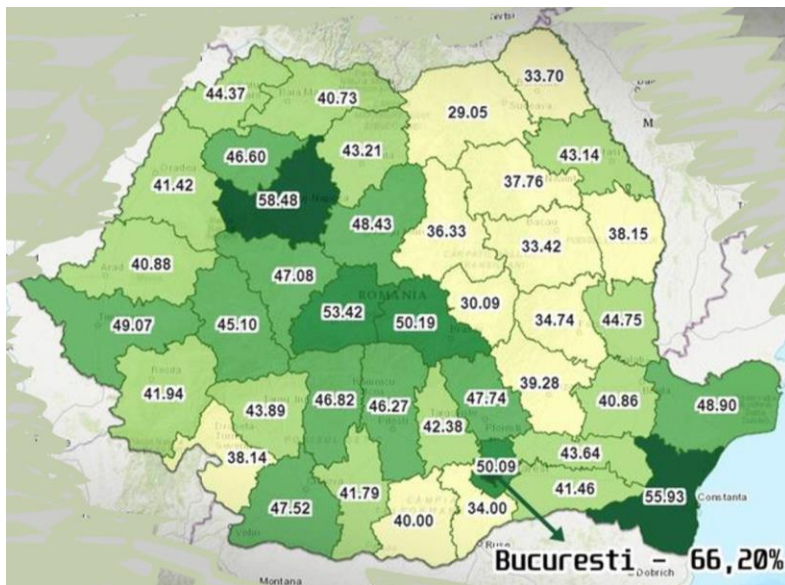

---

[1] "Situația vaccinării în România". vaccinare-covid.gov.ro. https://vaccinare-covid.gov.ro/situatia-vaccinarii-in-romania/

Figure 2. Map of the vaccination coverage by county, December 5, 2021.
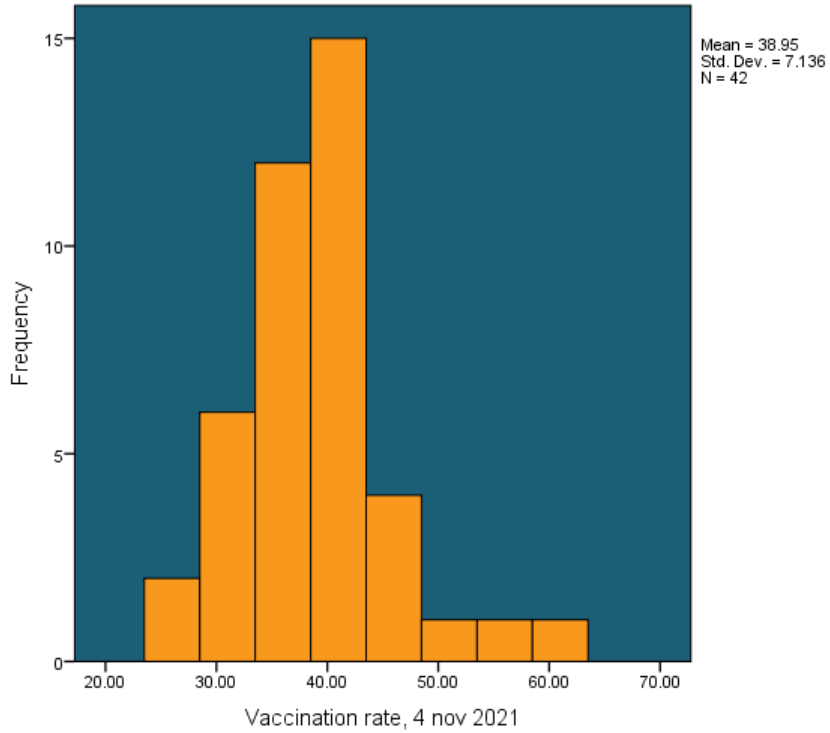
Spatial distribution of the vaccination rates at county level is represented in Figure 3.

Figure 3. Spatial distribution of the vaccination rates at county level on December 5 2021.

Source: https://www.hotnews.ro/stiri-coronavirus-25239160-harta-vaccinarii-anti-covid-romania-doar-cinci-judete-rata-vaccinare-peste-50-orasul-cel-mai-mic-procent-vaccinare-topul-localitatilor.htm

What are the determinants of Covid-19 vaccination in Romania?

County level data allow us to evaluate the effects of several categories of factors:

1. Level of development in 2017. It is measured as an index of life expectancy, income/capita and GDP/capital. Counties are more developed are expected to have higher vaccination rates for several reasons: people tend to be more educated and, as a result, to have a better understanding of the benefits of vaccination; more developed counties tend to have more mobile citizens, which have a higher incentive to get vaccinated; localities that are more developed are more likely to have higher incidence of Covid-19 as a result of more active social and economic life; more developed counties tend to provide better access to vaccination sites, and tend to have higher proportion of population that get tested (which result is higher awareness of the Covid-19 prevalence at the local level).

2. Level of education. It is assessed by the proportion of high school graduates who passed the Baccalaureate exam in 2017.

3. Legacy effects. It is measured as an index that takes into account literacy rate in 1930, ratio between literacy among men and women in 1930, and ethnic diversity in 1930.

4. (De)mobilization linked to religious networks. It is assessed by the turnout at the *2018 Referendum for the family*. The referendum asked voters whether or not they approve a change to the family's definition, as provided by Article 48 of the Constitution, to prohibit same-sex marriage[2]. Since the beginning of the Covid-19 pandemic, the Greek Orthodox church, to which more than 80% of the Romanian citizens belong, has been reluctant to recommend vaccination to the population. The chief of the Romanian Orthodox Church, Patriarch Daniel, declared that he got vaccinated only at the end of November 2021[3]. Despite this, several other key leaders of the Romanian Orthodox Church continue to speak against vaccination.

5. Ethnic composition. It is measured by the proportion of ethnic Hungarians in each county.

The correlations between vaccination rates in December 2021 and several variables that have explanatory potential are represented in Table 1. The level of development and urbanization rates have by far the strongest correlations with vaccination rates.

Table 1. Correlations between vaccination rates on December 5, 2021, and several variables at the county level.

[2] https://www.reuters.com/article/us-romania-gaymarriage-idUSKCN1002KW
[3] https://www.hotnews.ro/stiri-cultura-25202643-patriarhul-daniel-vaccinat-banescu-purtator-cuvant-pozitia-favorabila-bor-fata-vaccinarea-sine-act-medical-profilactic-benevol-este-deja-foarte-bine-cunoscuta.htm

	r
Vaccination rate, November 4, 2021	.994[**]
Index of development, 2017	.738[**]
Urban population (%)	.674**
Baccalaureate rate, 2017	.143
Legacy 1930 index	.294
Transylvania	.139
Referendum for family turnout	-.355[*]
Hungarian (%)	-.139

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

A multivariate linear model that excludes two counties, Harghita and Covasna, explains almost two thirds of the total variance of the vaccination rate across counties: Adj. R^2 = 0.64 (Table 2).

Table 2. Regression coefficients explaining vaccination rates on December 20, 2021, at county level (with Covasna and Harghita excluded)

	B	Beta	p
Index of development, 2017	2.01	0.26	0.037
Urban population (%)	0.21	0.38	0.009
Referendum for family turnout	-0.61	-0.38	0.003

The two excluded counties present unusually low vaccination rates when controlling for other factors. They have in common large majorities of population that is ethnically Hungarian (70% in Covasna, 85% in Harghita), a fact that is likely to be linked to several distinct causal mechanisms of vaccination: media exposure is mainly different, with a focus on mass media from Hungary; also, religious denomination is different than that of the rest of the population (ethnically Hungarian from Romania are about equally split between Catholic and Reformed, whereas more that 90% of ethnically Romanian are Greek Orthodox).

In conclusion, the level of development is a strong positive predictor of the vaccination rate. This is not unexpected, given the results of similar analyses conducted across regions of other countries. The same for the negative effect of the religious networks, although its strong intensity is somewhat surprising.