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ISSUE BRIEF

Determinants of Covid-19 Vaccinations in Florida

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Introduction

On December 11, 2020 the United States Food and Drug Administration (FDA) approved the Pfizer vaccine for emergency use in individuals 16 and older to combat the Covid-19 virus. The first dose of the coronavirus vaccine was given on Monday, December 14, three days after the authorization was given. Because supply was limited, the vaccine was initially reserved for at-risk segments of the population, which included the elderly, frontline workers, and those with pre-existing conditions. On March 25, 2021, Governor Ron DeSantis signed an executive order, making all individuals over the age of 18 eligible to receive the vaccine. As of June 1, 2021 about 8.32 million people (39 percent of the population in the state) have been fully vaccinated with either the Pfizer, Moderna, or the Johnson and Johnson vaccine. This does not include individuals from out of state that traveled to receive their vaccines in Florida. Since the vaccine rollout, some people have waited months to take it while others have opted out. This can likely impact the number of people getting the vaccine, and therefore, its impact on the trajectory of the pandemic. Similarly, factors like age or political preference can have an effect on the number of people getting the vaccine in a particular area.

Numerous newspaper articles have attempted to explain why, or why not, people living in Florida have decided to get the Covid-19 vaccine. One article featured in News-Press indicated that political preferences may have played a role in this decision.[1] The authors point to county statistics that indicate that those counties whose voter preference during the 2020 election leaned more toward Trump had a smaller portion of their population vaccinated. For example, the counties where Trump won the majority of the votes, the overall vaccination rate was 41.5 percent, while in counties where Biden won the vaccination rate was 45.5 percent. The 4-percentage point difference accounts for 1.87 million more people being vaccinated. Another newspaper article by the Miami Herald points to disparities in the vaccine rollout, which led to lower vaccination rates for low-income segments of communities, particularly for Black individuals. Their analysis found that vaccinations rates in the Miami-Dade area were 30 percent lower in zip codes where over a quarter of the residents live in poverty. The article states that lack of equity in vaccine campaigns and distribution to different communities has contributed to the low vaccination rates in predominately Black communities.[2]

This issue brief will discuss the correlation between the share of people vaccinated (as of May 31, 2021) and some potential contributors to vaccinations per capita in the state of Florida. To make this analysis, we regress the percentage of people vaccinated in each of the 67 counties in the state on a number sociodemographic variables, along with other factors such as political preference, access to vaccines, and access to internet.[3] The data for this brief was collected from the U.S. Census Bureau, Bureau of Labor Statistics, the Florida Department of State, and the Florida Division of Emergency Management. The explanatory variables being used have been standardized so that they represent a one standard deviation change, and the dependent variable (the percentage of people

[1] https://www.news-press.com/in-depth/news/coronavirus/2021/05/20/covid-19-vaccine-rates-florida-lower-trump-counties-2020-election/5053048001/
[2] https://www.miamiherald.com/news/coronavirus/article250841644.html
[3] We use number of supermarkets and pharmacy establishments as a proxy for access to vaccines.

vaccinated) will represent a change in percentage points. The same variables will be examined against cumulative vaccination rates during the first day of each month from January 1, 2021 through May 1, 2021, to assess the evolution of the impact on vaccinations per capita.

Determinants of Vaccination Rates as of May 31st, 2021

Variables	Mean	SD	Demographics	Politics	Access
Median age	43.761	6.528	0.085***	0.052***	0.051***
			(0.009)	(0.006)	(0.006
Median Income	51,291.57	10,298.28	0.051***	0.021*	0.018*
			(0.010)	(0.010)	(0.011)
Race/Ethnicity					
% Black alone	0.145	0.095	-0.022	0.037	0.037
			(0.035)	(0.031)	(0.030)
% White alone	0.789	0.098	-0.058*	0.067*	0.068*
			(0.034)	(0.039)	(0.037)
% Hispanic	0.144	0.131	0.045***	0.018*	0.019*
			(0.011)	(0.008)	(0.010)
% votes for Trump	0.634	0.136		-0.086***	-0.085***
				(0.017)	(0.019)
Supermarkets	0.165	0.084			-0.004
					(0.004)
Pharmacies	0.192	0.069			0.004
					(0.005)
% with internet	0.781	0.09			0.000
					(0.013)
R-squared			0.666	0.818	0.820

*Note: Numbers in parentheses indicate robust standard errors for the regression analysis. * p < 0.1, ** p < 0.05, *** p < 0.01*

Main Results

The results from the main regression analyses are shown in the table above. Column one has all the explanatory variables, column two and three show the variables' mean and standard deviation, respectively; and columns three to five show the regression analysis. The first specification has demographic variables only, the second specification adds political preferences, and the last specification adds proxies of access to vaccines.

First, we look at the specification with demographic characteristics alone. Median age, as expected, is statistically significant, and a one standard deviation increase is associated with an 8.5 percentage point increase in the vaccinations rates. This result follows logically because older adults were among the first to be eligible for the vaccine. Additionally, older adults were particularly vulnerable to contracting the coronavirus, thus creating extra motivation to receive the vaccine. Median income is also statistically significant, and one standard deviation increase correlated with 5.1 percentage point increase in the vaccination rate. Wealthier individuals are expected to have an easier time getting vaccinated, as they can access different channels such as internet/phone scheduling, driving across the county, etc. However, an Insider article from January provides another possible explanation. In the news article, the authors find inconsistencies in the pace of the vaccination distribution between wealthier areas and low-income communities.[4]

With regards to race and ethnicity, a one standard deviation increase in the percentage of the population that is Hispanic correlates to a 4.5 percentage point increase in the vaccination rate. The effect is statistically significant. An article from the Miami Herald can help shed some light on this result. The article reports on the Hispanic population in Miami, who do want to get the vaccine but are

[4] https://www.insider.com/covid-19-vaccine-miami-florida-zip-codes-2021-1

running into obstacles such as missing workdays and facing language barriers.[5] Information campaigns, such as one featured in a Tampa Bay Times article, have helped many people in the Hispanic community to work around these barriers. For example, Iglesias Tampa Bay and other nonprofits worked together to launch outreach efforts to help Hispanics to get the vaccine through information seminars and vaccination hubs. [6] In contrast to the Hispanic variable, a one standard deviation increases in the percentage of people who are white correlates with a reduction in the vaccination rate by 5.8 percentage points. While puzzling at first, this can be picking up other factors other than the race itself such as political preference, education level, among others.

Now we turn our attention to the second specification in which we account for political preference measured by the percentage votes for Trump in the 2020 election. First, we note that median age (5.2 p.p.), median income (2.1 p.p.), and Hispanic population (1.8 p.p.) remain statistically significant, with the same direction of correlation, but with lower magnitude. Once we take into account political preferences white population share continues statistically significant but changes direction and increases magnitude, that is, a one standard deviation increase in white population share is associated with a 6.7 percentage point increase in the vaccination rate. This result is more in line with anecdotal evidence, since white population have on average higher income, higher education, and means of access to information and vaccine.

The results for the percentage of votes for Trump variable is interesting and supports the article listed earlier that analyzed the impact of political preferences on vaccination rates. In fact, one standard deviation increase in the percentage of votes for Trump is associated with a statistically significant decrease of an 8.6 percentage point in vaccination rates. Although during his Presidency, Trump helped push the promulgation of the vaccine, his rhetoric towards Covid-19 and the vaccine in general may have affected the perception among his voters.

Lastly, adding proxy variables for access to Covid-19 vaccines has little effect on the values of the outcome variables and no effect on the statistical significance. Additionally, the variables themselves – percentage of supermarkets per 1,000 people, percentage of pharmacies per 1,000 people, and percentage of population with access to internet - had no statistically significant effect on vaccination rates. One possible explanation for this is that the effect of these variables could already be captured by some of the other variables such as median income. Typically, a lower income level is associated with less internet access and less availability of facilities, like pharmacies, per capita. According to an article from NBC2, lower-income communities in the state of Florida were struggling to get access to the vaccine as a result of lack of internet access among other barriers.[7] This article illustrates the connection between income and access variables, which could likely impact that effect of these variables.

[5] https://www.miamiherald.com/news/coronavirus/article250594469.html
[6] https://www.tampabay.com/news/health/2021/04/23/massive-outreach-effort-brings-reluctant-hispanics-into-covid-clinics/
[7] https://nbc-2.com/news/2021/01/25/floridas-lower-income-residents-struggling-to-access-covid-19-vaccine/

Determinants of Vaccination Rates by Month					
Variables	**January 1st**	**February 1st**	**March 1st**	**April 1st**	**May 1st**
Median age	-0.002**	0.007	0.026***	0.057***	0.051***
	(0.001)	(0.005)	(0.007)	(0.016)	(0.011)
Median income	-0.001	0.005	0.014**	0.015	0.018*
	(0.001)	(0.004)	(0.007)	(0.009)	(0.010)
Race/Ethnicity					
% Black alone	0.001	0.026***	0.048***	0.019	0.037
	(0.002)	(0.008)	(0.017)	(0.022)	(0.030)
% White alone	-0.002*	-0.006	-0.005	0.000	0.019*
	(0.001)	(0.004)	(0.006)	(0.009)	(0.010)
% Hispanic	0.004	0.020**	0.039**	0.023	0.068*
	(0.002)	(0.010)	(0.017)	(0.027)	(0.037)
% votes for Trump	-0.005**	-0.005	-0.011	-0.037**	-0.085***
	(0.002)	(0.006)	(0.010)	(0.015)	(0.019)
Supermarkets	0.000	-0.004*	-0.006	-0.004	0.004
	(0.000)	(0.002)	(0.004)	(0.006)	(0.005)
Pharmacies	0.000	0.004	0.005	0.001	-0.004
	(0.001)	(0.003)	(0.004)	(0.005)	(0.004)
% with internet	0.002	0.007	0.010	0.016	0.000
	(0.001)	(0.004)	(0.007)	(0.012)	(0.013)
R-squared	0.428	0.507	0.672	0.835	0.820

*Note: Numbers in parentheses indicate robust standard errors for the regression analysis. * p < 0.1, ** p < 0.05, *** p < 0.01*

Vaccination over time

In addition to the initial analyses, we also analyzed the vaccinations rates in the beginning of each month from January to May to assess the evolution of the impacts as we capture the increase vaccination rate occurred in the previous month. For this analysis we used the specification with all explanatory variables. Before we delve into the results it is important to remind ourselves of the vaccination timeline. In brief:

- January/February: Primarily health care workers and residents in nursing homes are provided the vaccine.
- March: Eligibility of vaccine expanded, with age cut-offs relaxed over time.
- April/May: Removal of age eligibility to adults, and add teenagers as eligible groups.

In January, median age, white population and Trump voting are only statistically significant variables, all negatively associated with vaccination rate. This can partially be explained by the demographic composition of the health care workforce. The Trump vote variable plays a role on vaccination rates and increases in magnitude over time, always negatively associated. As age eligibility becomes a factor (March) in the access to vaccines, as expected, increases median age become positively associated with vaccination rate, but in what seem to be an inverted U shape curve. Hispanic population is positive and statistically significant for February, March and May with increasing magnitude, which is in accordance with our previous discussion. Black population is only (positive) statistically significant in February and March which can be associated with the restrictions in place for vaccine access. Lastly, median income is statistically significant when access becomes less restricted to particular occupations and has its magnitude increasing over time.

Conclusion

This issue brief has been motivated by the numerous newspaper articles and op-ed written on the potential drivers of vaccinations. While there has been speculation as to what has driven the vaccination rates, to the best of our knowledge, little formal statistical analysis had been done so far to address this issue. Our results from indicate that political preferences are the main contributor. Other demographics, such as median age and percentage of Hispanic population, play an important role as well, for several reasons such as access to education and information, workforce occupation, and need/desire of vaccines.

Political preferences, that is Trump share votes, negatively impacted vaccination rates with statistical significance from January to May. This result provides additional evidence on the effect of leadership rhetoric and campaign on the willingness and confidence in vaccines during a health crisis. Median income has a positive and slight statistically significant effect which indicates higher vaccination rates associated with higher levels of income. While this can be evidence of access to information, education, and means to access vaccines, the hypothesis about of discriminatory distribution of vaccinations cannot be discarded with this analysis and further studies are necessary.