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The Effect of Vaccine Provision on Foreign Policy Public Opinion

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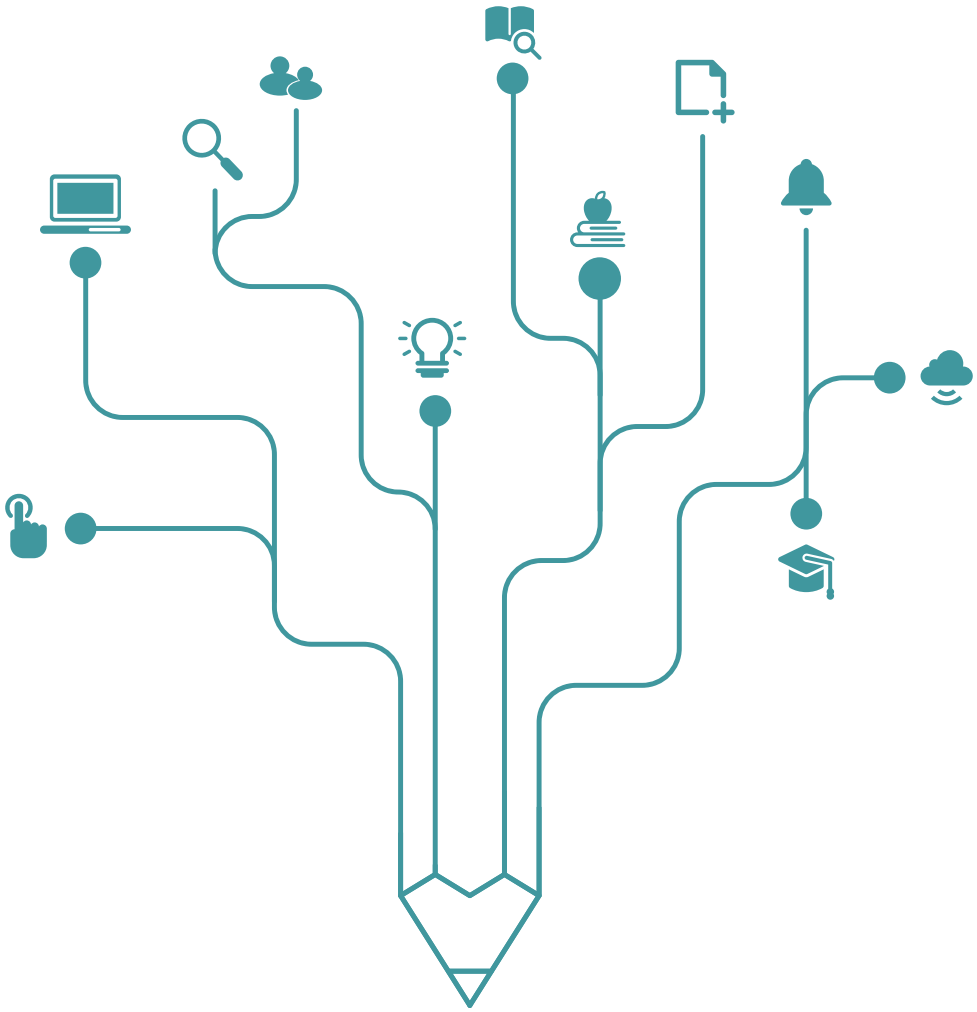

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Abstract: What effect does the provision of American vaccines abroad have on views of the US? How does being vaccinated influence opinions regarding foreign aid policy? Does the example of the US providing aid lead to higher support for giving aid in other nations? This paper seeks to answer these questions utilizing original panel data from a two-wave survey fielded in South Korea in 2021 and 2022. It finds that respondents vaccinated with American vaccines, regardless of whether they were donated or procured, did not hold more positive views of the US. However, vaccinated citizens were more likely to support South Korean vaccine aid to other countries, in particular if they received donated shots. Information that the US was supplying aid to developing countries also made it even more likely that vaccinated South Koreans would support their own government giving foreign vaccine aid. While vaccine aid does not improve the donor's image, this study finds second-order effects that can benefit American interests and facilitate the timely distribution of vaccines across the globe. The results highlight the need to study the indirect effects of vaccine aid and call for broader criteria when evaluating its net effect.

Keywords: Aid, Foreign Policy, Covid-19, Public Opinion

1. Introduction

Samantha Power, Administrator of the United States Agency for International Development, has argued that "vaccines in arms" are the way to restore the American prestige and leadership damaged during the Trump years. "U.S. provision of lifesaving aid," she claims, would "have a significant positive effect on American standing internationally." With shots scarce in much of the developing world but plentiful in the US, American vaccine aid would not only be the right thing to do, it could also be a powerful tool of statecraft (Power 2021).

There are at least three different ways the foreign provision of vaccines can serve American interests. First, as Power contends, American ingenuity in developing vaccines coupled with the generosity behind their free provision can improve the image of the US and bolster its status among nations and peoples that receive shots. It follows that aid to enough countries would enhance Washington's global standing and influence.

Vaccines can further US interests via alternative paths. By providing protection against the virus, shots can temper "vaccine nationalism" in a receiving country and increase public support for vaccine aid to other nations. The aid or export of vaccines from these countries to another set of countries, in turn, can further facilitate the global supply of vaccines. Thus, supplying jabs to a country could shift mass opinion and positively influence the trajectory of a pandemic via a "vaccine cascade." This mechanism, importantly, does not necessarily rely on the free provision of vaccines to have the hypothesized impact: those inoculated with vaccines procured through the market could also favor providing shots to other countries.

Lastly, the example that America sets as a provider of aid to the developing world can improve opinions of the US or galvanize support for the provision of aid among the public in third-party nations. By positioning itself as a model nation, the US can exert a normative pull on the peoples of other nations, with the public becoming more supportive of aid in general - and possibly more favorable of the US - because of this "example effect." This impact can be at work even when a particular country does not receive aid from the US.

The three pathways through which American vaccines can further US foreign policy goals are not mutually exclusive. It is an empirical question which, if any, are relevant for American aid in general and in the context of Washington's response to the COVID-19 pandemic. What effect does the provision of American vaccines abroad have on views of the US? How does being vaccinated influence opinions regarding foreign aid policy? Does the example of the US providing aid lead to higher support for assistance in other nations?

This paper seeks to answer these questions utilizing original panel data from a two-wave survey fielded in South Korea. The surveys were conducted in August-September of 2021, when vaccines were still relatively scarce in South Korea (as well as most of the world), and in January of 2022, when virtually everyone that wanted one in Korea had been inoculated. Survey experiments were embedded in the second round of questions to better understand the mechanisms behind vaccine provision's effect on mass opinion.

Analysis of the data reveals that the free provision of vaccines had no discernible effect on opinions of the US for Koreans that received it. At the same time, shots procured independently by the South Korean government from American vaccine producers also did not influence views of the US on the part of those that were inoculated. Thus, the surveys indicate that neither American competence in developing vaccines nor the compassion behind its free provision had an impact on opinions of the US.

Vaccines did, however, bring about a significant change in the views of those immunized. Respondents that had received shots provided via American aid were more likely to support South Korean vaccine aid to other developing countries. Even though shots provided directly to South Korea did not improve America's standing among the Korean public, those that benefitted from American aid were willing to "pay if forward" by supporting vaccine aid for other countries in need.

Moreover, support for foreign aid among respondents increased further when survey respondents were presented with information that the US was providing vaccine aid to developing countries. The example of the US giving vaccine aid to third parties bolstered support for South Korea giving aid abroad. This "example effect" was particularly salient among political moderates, which number about half the respondents in the survey.

This paper contributes to the scholarly literature by theorizing about, and competitively testing, the various pathways through which vaccines can influence mass opinion. Despite a growing number of studies, the link between foreign aid and American standing abroad remains unclear (Mahmud, Winters 2017; Goldsmith, Horiuchi, and Wood 2014). Studies of the impact of vaccine aid on opinion remain in the early stages)Sharun and Dhama 2021; Lee 2021). While prior studies have primarily focused aid's influence on the image of the donating country, foreign aid could have significant secondary effects that matter for the national interest of the donor country. The provision of vaccines, as this study finds, may not raise the standing of the US in the eyes of those that receive American jabs. However, it can nevertheless boost support for vaccine aid on the part of the vaccinated and third parties aware of the aid.

The findings matter for policy as well. If improving affinity for the US is a goal of American foreign policy, this study adds to the evidence that key assumptions behind aid policy require scrutiny. At the same time, the findings call for broadening the criteria for evaluating how aid can

further US interests abroad. Although donating or selling vaccines can't win over the hearts and minds of those that receive the shots, the vaccinated become more favorable to their own country sending vaccines abroad. Nations receiving vaccine aid becoming more likely to donate to other countries raises the possibility of an "aid cascade," where countries receiving vaccine aid become more likely to provide vaccine aid, which subsequently raises the chances that the second group of recipients also supports further aid.

Moreover, communications about the US donating shots to other developing countries can temper "vaccine nationalism" and expedite the supply of vaccines across the globe. While awareness of the example the US sets in providing aid does not improve the image of the US, it does spur individuals to become more supportive of their own country providing aid. Thus, by facilitating the timely and effective distribution of shots in the face of a global pandemic, vaccine aid can contribute to the American national interest without improving its image on the part of those that receive the aid. These findings will contribute to the debate regarding how and where to allocate vaccines and the most effective content of political communications accompanying aid provision. They also point to the need to consider the secondary effects of vaccine aid in policy for the more efficient and effective rollout of vaccines across the globe.

2. Context: Why South Korea?

South Korea meets several key conditions for assessing the effect of vaccine provision on mass opinion. First, while Washington targeted the developing world for covid-19 vaccine aid, an exception was made for South Korea ahead of the summit meeting between the leader of the two nations in the summer of 2021. Seoul subsequently received about 1.4 million doses of the Johnson & Johnson (J&J) vaccine from the United States from June through August of 2021.

Second, South Korea had a diversified vaccine procurement strategy, buying vaccines from Pfizer, Moderna, and AstraZeneca while also being party to the COVAX initiative. Thus, it is possible to estimate the effect that vaccine aid had on the opinions of those who received it relative to those not vaccinated. Moreover, it is also possible to compare the effect of vaccines from bilateral aid to the influence of shots bought by Seoul in the international market.

Third, an elite consensus on the efficacy and need for vaccines has held in South Korea throughout the pandemic. Partisan divisions on vaccines have plagued many countries as political leaders and parties have openly questioned the need for them and their efficacy. Many have encouraged outright rejection of them, leading to widespread skepticism of the vaccine and fear of its adverse effects. However, in South Korea, none of the parties represented in the National Assembly have

expressed serious doubt about the safety or effectiveness of the vaccines. Rather, the primary point of contention in politics have been over whether the government's vaccine procurement had brought enough vaccines to the Korean public in a timely manner. As a consequence, Korea can be considered a most-likely case for a positive effect of vaccine aid on the image and standing of the provider nation.

A. COVID-19 Vaccines in South Korea

South Korea's first documented case of COVID-19 was in January of 2020. Seoul's subsequent response to the virus was lauded both domestically and internationally. The country was largely able to contain its spread with a program of extensive testing, contact tracing, and isolation for those contracting the virus or exposed to it (Choi 2020). As a result, it maintained one of the lowest per capita infection rates and fatalities for the first two years of the pandemic. Moreover, the country was able to do so without a national lockdown or long-term bans on international travel. The hit on the economy, although substantial, was less severe than many comparable nations.

Scholarship has highlighted various factors behind the effective initial response, including recent experience with viral diseases, robust private-public partnership, adaptive health care system, strong collective social ties or norms, and high internet penetration facilitating monitoring of those infected and their close contacts (Park, Choi, and Ko 2020; You 2020; Park and Chung 2021). South Korea's government was keen on capitalizing politically from the positive attention the nation's response to the pandemic received, trumpeting the low case count and death rate compared to peer countries. Such credit taking likely contributed to the governing party's electoral success in the 2020 general elections. Independent observers have credited the success of the first stage of the virus containment strategy for the ruling party's win in that contest - despite voting in midterms traditionally favoring the opposition party.

B. Vaccine Procurement and US Aid

In contrast to its record in containing the initial spread of the virus, South Korea was less successful in procuring protection against it. Partially because of its early success in responding to COVID-19, Seoul fell behind others in gaining access to newly developed vaccines. Further tempering the urgency for mass vaccinations, the administration had pinned hopes on development of a domestic treatment for infection from the coronavirus. Several Korean firms were also attempting to produce vaccines, with some getting to the randomized trial stage in the first year of the pandemic.

However, none of the domestically developed vaccines could significantly reduce infection in early

trials. The treatment drug developed by a domestic biomedical company was more successful, eventually receiving approval from Korean regulatory authorities. However, when initial tests of the Pfizer, Moderna, and J&J vaccines came back with strong positive results earlier than many had expected, the South Korean government found itself having to explain why it did not have contracts in place for these vaccines when many other countries did. With infection-preventing measures being mass produced, interest in treatment for infection faded quickly. Prime minister Jung Se-Kyun later publicly admitted that the government's effectiveness in containing the virus in the early stages of the pandemic response had resulted in a slow start on procuring vaccines.

With public pressure for mass inoculation mounting, Seoul dispatched officials to the headquarters of the successful vaccine developers. Eventually enough vaccines were put under contract to announce the first stage of South Korea's vaccination program in early 2021. The elderly, immuno-compromised, and essential medical personnel received the first shots in late April, about 4 to 5 months later than the earliest recipients in the US and Israel. During the summer of the same year, inoculations slowly expanded, with priority assigned primarily based on age. Vaccine availability lagged demand, however; as late as the first week of June in 2021, those younger than 65 remained ineligible for vaccines. Most of the adult population were unaware when, and if, they would be able to receive protection from the virus.

With most of the population still waiting for its turn, vaccine procurement became the main subject of opposition criticism against the government. However, unlike many other countries, skepticism about the vaccine was never behind the partisan divisions over vaccines. Rather, the opposition charged the government for not having better prepared to supply the population with shots. None of the parties in the National Assembly (South Korea's legislative branch) opposed the government-led provision of vaccines nor called for delaying the mass inoculation program. Refusal of vaccines were mainly limited to the online and religious fringes.

Amidst rising frustration among the public and partisan bickering over the lack of progress with vaccines during the early months of 2021, Seoul and Washington had a summit meeting scheduled on May 21st. The US was at that point in the sixth month of its vaccination program and had begun administering second shots of the Pfizer and Moderna vaccines. The US decision to extend vaccine aid to South Korea was announced ahead of Trump's arrival in Seoul. Although the original announcement was for about 500,000 vaccines, the number later increased to just over 1 million. J&J was the brand of the vaccine to be provided.

By agreement between the two countries, the jabs were set aside for South Koreans working in fields related to national defense. Active-duty military members were already being immunized with other vaccines in line with previously announced government plans. The Korean authorities had also

decided that J&J shots would not be allowed for those younger than 30 due to concerns about side effects, including blood clots. This meant eligibility for the J&J vaccines was limited to mostly men in their 30s and 40s, either serving in the armed forces reserves (numbering about 538,000) or subject to civil defense duties (about 3 million). A smaller number of civilians working in national defense or foreign affairs (about 137,000) were also eligible.

Those eligible could receive the vaccine by registering at a government website on a first-come-first-served basis. The authorities announced eligibility criteria and how the vaccines would be allocated on the 30th of May. Registration was initially scheduled take place from the 1st of June through the 11th. Reflecting high demand for the vaccine, however, online reservations for the vaccines were filled by 6 PM the first day (June 1st), just 18 hours after registration had opened. Afterwards, shots were administered from the 10th to the 20th of the same month.

At the time of registration for the J&J vaccine, only about 1.3 million residents of South Korea had received the vaccine via Seoul's vaccination program. The vaccines in the government program included those independently secured from AstraZeneca, the first batches that had arrived from orders placed with Moderna and Fizer, and AstraZeneca vaccines supplied by the COVAX initiative. Seoul's program gave eligibility first to the elderly (starting with the above-75 group) and prioritized groups such as medical personnel and those with pre-existing conditions. Since those in their 30s and 40s would be near the end of the line for vaccines, they could reasonably project that it would be months before their turn would come from the Korean government's vaccination plan.

The high salience of the vaccine procurement debate among political leaders, the scarcity of vaccines in South Korea for the younger generations, the high level of public interest over the summit meeting with the leader of South Korea's most important ally, and the surprise announcement on vaccine aid just before the summit meeting all contributed to intense media coverage of the vaccine aid decision and high awareness among the public about the American aid program. Early closure of registration for the J&J vaccine due to excess demand reflected the high level of interest.

3. Survey Data

A panel survey was conducted by *Embrain*, an online research and polling firm, to investigate the effects of vaccination. The surveys sought to secure variation on vaccination status across people to estimate the causal effects of vaccination via before-and-after differences. A total of 3,459 responses were collected in the first wave, 2,006 of which participated in the second wave.

The first survey was conducted in the middle of August 2021, when vaccines were still relatively scarce in South Korea. According to data released by the Korean government, about 40.8 of the entire

population received at least one dose as of August 6. Table 1 shows that our survey data is representative of the population in terms of vaccination rates.

<Table 1 here>

Due to the government's prioritization of the elderly in the early stages of the vaccine program, there were considerable differences in the vaccination rate across age groups. The rate ranged from 87.3% for those 60 years and older to about 30% for 40 years and younger. Around this time, the government's vaccination effort also prioritized medical and health workers, school and daycare center teachers, workers in critical industries such as semiconductors, motor vehicles, and steel, and those with preexisting conditions. As a result, most vaccinated people under 50 in the first survey fell under one of these criteria.

Leftover vaccine utilization was the only way for young Koreans that did not fall into one of the prioritized groups to get vaccinated. The government allowed the use of "leftover" vaccine doses on a first-come, first-served basis. Major internet portals helped unvaccinated citizens assess the exact locations of vaccines that had been unclaimed – whether because of appointment cancellations or because vials opened for pre-registered citizens were not used up before the vaccination sites closed (and hence would have to be thrown away if unused). Our data confirm that about 25-30% of vaccinated people under 60 used the leftover vaccine program. In contrast, only 13.5% of those 60 and over got vaccinated utilizing the program.

The second-wave survey was conducted in early January 2022, when about 85% of the Korean people, so most adults, were *fully* vaccinated. This indicates that close to everyone that wanted one had received a jab. Since those who refused to be vaccinated are likely to have traits correlated with views about the US and vaccine aid policy, we compare the shifts in opinions between those vaccinated in both surveys and those vaccinated between the first and second-wave surveys.

We also utilize cross-section analysis with the first-wave data, when most of the population was still unvaccinated, to cross-check results from the difference-in-difference design. We conduct robustness checks through various specifications, considering possible self-selection into vaccination status. As we show below, the results are consistent across these specifications.

Our second survey also includes an experiment to better understand the mechanisms behind the effects of vaccination status. We randomly assigned information regarding the aid policy of the US to the respondents and observed the difference between the treatment and comparison groups.

4. The Effect of Vaccination on Foreign Policy Opinion

A. Vaccination and Views of the U.S.

We first examine whether vaccination improved opinions of the U.S. Our analysis is motivated by the fact that most vaccines procured by the Korean government were made by American companies, Pfizer, Moderna, and Johnson & Johnson (J&J). However, the AstraZeneca (AZ) jab, developed in the United Kingdom, took up a substantial proportion of early vaccinations. At the time of the first survey in August of 2021, AZ accounted for about 37.8% of all shots. However, as American vaccines later became the norm in the vaccination program, AZ's share dropped to about 21.8% by the second-wave survey.

Because our goal is to estimate the causal effect of vaccination, an ideal research setting would have as the treatment group those who were randomly vaccinated between the two waves. The control group would be those that remain unvaccinated in the second wave, independent of their willingness to get a shot. However, due to the accelerated pace of vaccination, about 85% of the Korean people were *fully* vaccinated when the second survey was conducted in early January 2022. This left a relatively small control group. Within this group, a substantial proportion were likely to be opposed to vaccination or unable to get vaccinated for health reasons.

We take a different approach to this identification problem by setting the control group as those vaccinated in both waves. The treatment group is those that received the vaccine between the first and second surveys. Therefore, we limit the scope of analysis to those fully vaccinated in the second wave. We consider the following first-difference regression specification for regression analysis:

$$\Delta y_{it} = \beta_0 + \beta_1 \Delta \text{Vaccine}_{\text{it}} + \Delta \epsilon_{it}$$

where y_i denotes the dependent variable, a Lickert-scale indicator of how much respondent i is favorable toward the U.S. (1: very unfavorable to the U.S., 10: very favorable U.S.). β_1 is the coefficient of our interest. $\Delta\text{Vaccine}_{\text{i}}$ is the change in vaccination status. It is equal to 1 if the individual was not vaccinated in the first survey and fully vaccinated in the second survey. In the regression analysis, we also add demographic controls, such as gender, age, educational attainment levels, and political orientation. Table 2 reports the descriptive statistics.

Table 3 reports the results. We first conduct a cross-sectional analysis with measures of attitudes

toward the U.S. and vaccine status collected during the two surveys. We believe that the cross-sectional study provides valuable comparisons between vaccinated and unvaccinated because government policy tightly regulated eligibility for the virus (primarily by age group). Thus, self-selection into vaccination status by demographic characteristics for the young was limited. By the first survey, those 60 years and older mainly had received their shots due to the Korean government giving them a priority, as seen in Table 1. Thus, we also report the results where the sample is limited to those under 60 in Columns 3 and 4. Second-wave results are reported in Columns 5 and 6.

The even-numbered columns show the results that differentiate the general vaccine effect (all vaccines including AZ) and the American vaccine effect (all vaccines excluding AZ). With the exception for Column 4 (at the p=0.10 level), we find little additional effect of the American vaccines. The innovation and competence behind the development of potentially life-saving shots was not boosting the standing of the country where they originated.

<Table 3 here>

Our primary analysis results using both waves are reported in Columns 7 and 8. The estimates for the coefficient of "vaccinated after first wave" are not statistically significant, suggesting that vaccination had no causal impact on the views toward the U.S.

B. Vaccination and the Support of Vaccine Aid

Although the provision of American vaccines does not have a positive effect on views of the U.S., is it possible that it has other effects that are relevant for American foreign policy goals? In this section, we test the hypothesis that vaccine recipients are more supportive of *Korean* vaccine aid abroad. When still waiting for shots, citizens are not likely to support vaccines that could be used domestically going to another country. After gaining immunity, however, the vaccinated will be more likely to turn their attention to those that do not yet have the means to protect themselves from the virus, including those in need of foreign vaccine aid.

To measure the respondents' views on the Korean government giving vaccine aid, our survey asked them whether they agree that Korea should provide vaccine aid to developing countries for humanitarian purposes?" The responses were recorded on a 7-point Lickert scale (1: never agree, 7: fully agree). We adopt the same regression specification as the previous subsection.

In this analysis, we also introduce an experimental element for better understanding of the mechanisms behind the effects found in regressions. We randomly embedded information in the second-wave survey that presented respondents with information that the U.S. was providing vaccine aid to developing countries. Then we observe the difference between the treatment and comparison groups. Scholarship has stressed the influence that normative considerations have on the public, including on matters related to foreign affairs. Information about the example of the US donating aid to the developing world could exert this normative pull on the citizens of other nations and make them more likely to support aid from their own country – independently from their vaccine status. This experimental design makes it possible to compare the "example effect" of Americans providing aid and the "interest-based effect" of protection from vaccines on the likelihood of support for donating vaccines to the developing world.

We first report the cross-sectional results are reported in Table 4. We find that vaccination is associated with more positive views of vaccine aid to developing countries in the first wave, though this effect disappears in the second wave (in Columns 5 and 6), as noted above about 95% of the respondents were vaccinated at this point, leaving a small percentage of the respondents that were likely unable or unwilling to receive the vaccine as the comparison group.

We also find that giving an information cue that the U.S. is giving vaccine aid to developing countries does not make the respondents more supportive of South Korean aid (Columns 5 & 6). The coefficient for the dummy variable indicates the information cue is not statistically significant.

The cross-sectional analysis in Columns 1 to 6 also show, somewhat surprisingly, that women are generally less favorable about donating vaccines to developing countries. This stands in contrast to a body of research that has shown women express more support for humanitarian aid. In line with prior studies, more liberal/progressive people are more supportive of vaccine aid. Education levels do not seem to influence support for foreign aid while generational differences exist.

<Table 4 here>

Table 5 reports the first-difference estimation results. In other words, it examines the effect of *new* vaccinations on *changes* in views of vaccine aid. We again find that receiving U.S. vaccine shots does not lead to a more positive view of vaccine aid, regardless of adding demographic controls. It also shows that the information cue does not affect the support for vaccine aid. This rejects the presence of an "example effect" where knowledge that the U.S. is giving vaccine aid to the developing world boosts support for vaccine aid by the Korean government.

<Table 5 here>

C. Heterogeneity by Political Orientation

While we were not able to find supporting evidence that vaccination leads to a better image of the U.S. or a more support for vaccine aid, it represents the average effect and may mask differential effects across different political orientation. To examine potential heterogeneity, we repeat the same analysis with interaction terms between vaccination and political orientation. The results are reported in Panel A of Table 6. We also test the differential effect of the US information cue by political orientation and report in Panel B. Only relevant coefficients are reported and most control variables are omitted from the table.

<Table 6 here>

Panel A shows that political orientation does not affect the null effect of vaccines on the view of the U.S. or support for foreign aid. None of the estimated coefficients are significant. Panel B suggests that the US information cue has a positive effect on the centrists' views of vaccine aid, though this effect is annulled for conservatives and progressives.[1] This finding goes against the common belief that conservatives would be more sensitive to US messages and actions because they put more weight on them. Thus, there exists an "example effect" of American leadership in vaccine aid possibly spurring further aid from third-party countries. However, this effect is contingent on the political ideology of those receiving information about this aid.

5. American Vaccine Aid: Was It Different?

We have provided some evidence that vaccine provision by the U.S. can strengthen support for vaccine aid, particularly when coupled with information about US donation of shots to the developing

[1] Centrists according to the coding scheme used in this model number slightly more than half of the respondents in the surveys.

world. These results motivate further analysis – would the effect be greater for American vaccines donated to Korea by Washington (compared to US vaccines bought by the Korean government)? As described in Section 2, the American government donated the J&J vaccines when Korea faced a shortage of vaccines during the early summer of 2021. In this section, we try to answer this question by focusing more on the effect of the vaccines donated by the U.S.

Because J&J is a one-shot vaccine and was donated and given to recipients before our first survey most J&J recipients were already vaccinated by the first wave survey. This hinders us from employing the same first-difference specification. Our solution to this is to utilize only the first wave and the discontinuity in the eligibility for J&J vaccines by age. We utilize the fact that only 30 years and older were allowed to receive the J&J vaccine because of the blood clot risk associated with all vaccines using adenovirus vectors, including AstraZeneca. Although the J&J vaccines were donated for active military personnel, this health risk caused the Korean Center for Disease Control and Prevention Agency to limit its use to solely those aged 30 and above. This decision allows us to use a discontinuity design with the cutoff at the age of 30.

To take advantage of the discontinuity setting, we limit the sample to those who are between 27 and 32 years old. Table 7 shows our analysis results. In all columns, we limit the scope to males. In Columns 1 and 4, we use the eligibility for the J&J vaccine so that it is equal to 1 if the individual is 30 years or older. In Columns 2 and 5, we use actual vaccination of both J&J and other vaccines. In Columns 3 and 6, we instrument J&J vaccination by eligibility for the vaccine.

< Table 7 here >

Columns 1 to 3 in Table 7 show that neither eligibility for J&J vaccination nor instrumented J&J vaccination has a positive impact on the view of the U.S. None of the coefficients in either specification is statistically significant. Consistent with the findings of the previous analysis, American generosity in donating vaccines did not result in a higher favorability toward it.

In contrast, Columns 4 to 6 show that the donated vaccines did bring about an important change in the attitude of those that received them; they became more likely to support South Korean vaccine aid to other countries. Comparing the coefficients in the second and third row show that J&J's effect is larger than that of other vaccines.

Columns 1 to 4 show that both J&J and other vaccines are associated with a more positive view of vaccine aid, consistent with the results of the previous section. Columns 2 and 4, using instrumented

J&J vaccination using eligibility, show that the U.S.- donated vaccine had a much more significant effect than other vaccines. These results on J&J vaccine aid contrasts with that the analysis of panel data from the previous sections, indicating a crucial difference between commercially procured vaccines and donated vaccines. Those on the receiving end of American generosity were willing to pay if forward, in other words, even when it did not improve their image of the US. In contrast, those that were inoculated via American vaccines bought on the market needed information about US aid to the developing world to get behind Korea sending vaccines abroad.

6. Conclusion

Utilizing original two wave panel data fielded during 2021 and 2022 with a survey experiment embedded in the latter, this paper found no evidence for a positive impact of vaccine provision on the image of the US. Even when there is elite political consensus on the efficacy and the need for vaccines, as in South Korea, vaccine relief from the US (whether sold or donated) in general left the public no more favorable toward America. This is consistent with a body of scholarship that has shown weak evidence for the winning-hearts-and-minds effect of foreign aid.

This does not mean, however, that aid had no positive effects. Direct US vaccine aid had a significant positive influence on support for the Korean government donating vaccines abroad to those in need. Recipients of aid were more willing to pass on the generosity to others. Information about US vaccine aid to the developing world also increased support for South Korean aid to other countries among political moderates via an "example effect."

While an approach that guarantees a more equitable distribution of vaccines across the world may be the more desirable and effective way to combat pandemics, calls for a multilateral approach to ensure such distribution fail to address how to overcome the instinct of many governments to prioritize their own people and hoard vaccines. Vaccines provided via aid, this paper indicates, can mitigate such "vaccine nationalism" and shore up support for the provision of vaccines abroad. Once afforded the protection that donated jabs provide, citizens become more supportive of sending vaccine aid abroad. Information that the US is providing aid to the developing world, we also showed, also increased support for donating vaccines abroad amongst political moderates.

These findings have policy implications. In the face of a global pandemic, vaccine aid needs to take into consideration a country's vaccine production infrastructure as well as its ability to procure vaccines independently. Provision of shots can temper "vaccine nationalism" in the destination countries and by targeting aid to nations that have mass vaccine production facilities or have the capacity to deliver future aid themselves, a cooperative approach to the global vaccine drive via a cascading effect of vaccine aid

becomes a possibility.

Further research could address whether there are additive effects to information about aid provision. For example, if more countries donate, does it make it more likely for a respondent to support aid from one's own country? Which types of countries have a bigger effect when they set an example by sending aid abroad? Relatedly, the reason that information of the US giving aid to the developing world does not have an effect on the opinions of citizens on the right and left, and whether increasing polarization across the world has implications for the potential magnitude of the "example effect" may also be a worthy avenue of research.

References

Choi, Jun Young,"COVID-19 in South Korea," *Postgraduate Medical Journal,* Vol. 96, 2020.

Dietrich, Simone, Minhaj Mahmud, and Matthew S. Winters, "Foreign Aid, Foreign Policy, and Domestic Government Legitimacy: Experimental Evidence from Bangladesh," *Journal of Politics,* Vol. 80, No. 1, 2017.

Goldsmith, Benjamin, Yusaku Horiuchi, and Terence Wood, "Doing Well by Doing Good: The Impact of Foreign Aid on Foreign Public Opinion," *Quarterly Journal of Political Science,* Vol. 9, 2014.

Lee, Seow Ting, "Vaccine Diplomacy: Nation Branding and China's COVID-19 soft power play," *Place Branding and Public Diplomacy,* 2021.

Park, Choi, and Ko, "Information Technology–Based Tracing Strategy in Response to COVID-19 in South Korea—Privacy Controversies," *JAMA.* 323(21), 2020.

Power, Samantha , "The Can-Do Power: America's Advantage and Biden's Chance," *Foreign Affairs,* Jan/Feb 2021.

Park, Jun, and Chung Eunbin, "Learning from past pandemic governance: Early response and Public-Private Partnerships in testing of COVID-19 in South Korea," *World Development,* Vol. 137, 2021.

Sharun, Kahn, and Kuldeep Dhama, "India's role in COVID-19 Vaccine Diplomacy," Journal of Travel Medicine, Vol. 28, No. 7, 2021.

You, Jongeun, "Lessons from South Korea's Covid-19 Policy Response," *The American Review of Public Administration*, *50*(6–7), 2020.

Tables and Figures

Table 1. Vaccination Rates, Official Announcement and Our Data

	% 1st dose in Aug 2021			% Full vaccination in Jan 2022	
	Official stat (Aug 6 2021)	Our data	Our data-J&J	Official stat (Jan 6 2021)	Our data
20s	26.0	28.8	0.0	94.6	94.4
30s	30.3	39.4	15.7	91.2	93.0
40s	25.6	33.8	4.0	92.8	94.2
50s	39.4	43.1	1.3	96.2	95.1
60s and older	87.3	84.7	1.9	94.7	92.7

Table 2. Descriptive Statistics (for those who responded in both waves)

Variable	# Observations First Wave	Mean	Std. Dev
Vaccinated in the first wave (both partial and full)	2,006	0.444	0.497
Fully vaccinated in the second wave	2,006	0.940	0.237
Vaccinated after 1st wave	2,006	0.504	0.500
Vaccinated after 1st wave with a US-made one	2,006	0.498	0.500
Female	2,006	0.439	0.496
Age	2,006	44.7	12.3
Political Orientation (1-7)	2,006	4.126	1.097
Change in the View of the U.S. (0-10)	2,006	-0.022	1.002
Change in the Support for Vaccine Aid (1-7)	482	0.670	1.528

Table 3. US Vaccine Aid and Attitude toward US: Cross-section analysis

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable:	View of US (1-11)						△ View of US	
Data:	1st wave				2nd wave		Both	Both
Sample:	All	All	under 60	under 60	All	All	All	All
Vaccinated	0.007	-0.045	0.015	-0.089	-0.177	-0.126		
	(0.042)	(0.066)	(0.043)	(0.075)	(0.108)	(0.134)		
Vaccinated		0.074		0.136*		-0.073		
v US vaccine		(0.072)		(0.081)		(0.104)		
Vaccinated							-0.040	-0.036
after 1st wave							(0.046	(0.050)
Female	-0.347***	-0.345***	-0.367***	-0.362***	-0.368***	-0.367***		-0.036
	(0.039)	(0.039)	(0.041)	(0.042)	(0.054)	(0.054)		(0.047)
Age								
20s	-0.110*	-0.107*	-0.120*	-0.113*	-0.039	-0.037		0.048
	(0.062)	(0.062)	(0.062)	(0.062)	(0.089)	(0.089)		(0.081)
30s	-0.407***	-0.401***	-0.417***	-0.406***	-0.361***	-0.359***		0.055
	(0.060)	(0.060)	(0.060)	(0.060)	(0.088)	(0.088)		(0.076)
40s	-0.314***	-0.312***	-0.320***	-0.315***	-0.373***	-0.375***		-0.023
	(0.058)	(0.058)	(0.058)	(0.058)	(0.084)	(0.084)		(0.074)
50s	-0.020	0.020			0.077	0.040		0.015
	(0.075)	(0.085)			(0.098)	(0.111)		(0.093)
Education								
Some College	0.033	0.033	0.085	0.085	-0.063	-0.064		-0.107*
	(0.048)	(0.048)	(0.053)	(0.053)	(0.071)	(0.071)		(0.062)
Postgraduate	0.099	0.098	0.149*	0.147*	0.055	0.053		-0.045
	(0.077)	(0.077)	(0.084)	(0.084)	(0.102)	(0.102)		(0.089)
Political Orientation								
Conservative	0.598***	0.599***	0.558***	0.558***	0.746***	0.746***		0.118*
	(0.056)	(0.056)	(0.063)	(0.063)	(0.077)	(0.077)		(0.061)
Progressive	-0.048	-0.047	-0.040	-0.039	0.021	0.022		0.052
	(0.044)	(0.044)	(0.046)	(0.046)	(0.061)	(0.061)		(0.054)
Constant	4.530***	4.524***	4.507***	4.499***	4.658***	4.678***	-0.002	0.033
	(0.062)	(0.062)	(0.064)	(0.064)	(0.135)	(0.138)	(0.034)	(0.091)
Observations	3459	3459	2988	2988	2006	2006	1886	1886
R-squared	0.093	0.094	0.088	0.089	0.112	0.112	0.000	0.005

*, **, and *** indicate statistical significance at 10%, 5%, and 1%, respectively. Robust standard errors are in parentheses.

Table 4. Vaccination and Opinion on Vaccine Aid: Cross-section analysis

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable:	Support for vaccine aid (1-7)					
Data:	1st wave				2nd wave	
Sample:	All	All	under 60	under 60	All	All
Vaccinated	0.299***	0.204	0.309***	0.180	0.037	0.178
	(0.080)	(0.129)	(0.083)	(0.148)	(0.167)	(0.186)
Vaccinated		0.132		0.168		-0.220
x US vaccine		(0.138)		(0.157)		(0.138)
Information Cue					0.103	0.103
about US vaccine aid					(0.079)	(0.079)
Female	-0.318***	-0.316***	-0.349***	-0.345***	-0.184**	-0.182**
	(0.074)	(0.074)	(0.080)	(0.080)	(0.081)	(0.081)
Age						
20s	0.066	0.073	0.073	0.082	0.272*	0.276*
	(0.124)	(0.124)	(0.124)	(0.124)	(0.151)	(0.151)
30s	0.594***	0.605***	0.598***	0.612***	0.659***	0.663***
	(0.114)	(0.115)	(0.115)	(0.115)	(0.134)	(0.134)
40s	0.638***	0.644***	0.643***	0.652***	0.902***	0.900***
	(0.114)	(0.114)	(0.114)	(0.114)	(0.133)	(0.133)
50s	0.749***	0.826***			0.871***	0.756***
	(0.139)	(0.165)			(0.145)	(0.165)
Education						
Some College	0.073	0.074	0.065	0.066	0.080	0.077
	(0.088)	(0.088)	(0.098)	(0.098)	(0.106)	(0.106)
Postgraduate	0.234	0.234	0.219	0.221	0.204	0.202
	(0.148)	(0.148)	(0.167)	(0.167)	(0.143)	(0.143)
Political Orientation						
Conservative	-0.655***	-0.656***	-0.761***	-0.764***	-0.151	-0.151
	(0.109)	(0.109)	(0.121)	(0.121)	(0.113)	(0.113)
Progressive	0.361***	0.362***	0.370***	0.371***	0.442***	0.443***
	(0.084)	(0.084)	(0.090)	(0.090)	(0.089)	(0.089)
Constant	3.609***	3.599***	3.638***	3.627***	3.986***	4.057***
	(0.116)	(0.116)	(0.120)	(0.120)	(0.220)	(0.225)
Observations	1733	1733	1500	1500	1006	1006
R-squared	0.102	0.102	0.105	0.106	0.111	0.113

*, **, and *** indicate statistical significance at 10%, 5%, and 1%, respectively. Robust standard errors are in parentheses.

Table 5. Vaccination and Opinion on Vaccine Aid: First-Difference

	(1)	(2)
Dependent Variable:	△ Support for Vaccine Aid	
	All	
Vaccinated after 1st wave	0.143	0.194
	(0.141)	(0.147)
Information Cue	0.090	0.063
about US vaccine aid	(0.141)	(0.145)
Demographic Controls	No	Yes
Observations	452	452
R-squared	0.003	0.027

*, **, and *** indicate statistical significance at 10%, 5%, and 1%, respectively. Robust standard errors are in parentheses.

Table 6. Heterogeneity by Political Orientation

A. Vaccine Effect

	(1)	(2)	(3)	(4)
Dependent Variable:	△ View of US		△ Support for Vaccine Aid	
Vaccinated	-0.028	-0.030	0.236	0.254
	(0.066)	(0.070)	(0.185)	(0.188)
Conservative	0.136	0.126	0.672***	0.722***
	(0.084)	(0.086)	(0.255)	(0.267)
Progressive	0.054	0.058	0.175	0.165
	(0.079)	(0.080)	(0.254)	(0.258)
Vaccinated x conservative	-0.023	-0.015	-0.335	-0.358
	(0.118)	(0.119)	(0.391)	(0.401)
Vaccinated x progressive	-0.016	-0.012	0.029	0.043
	(0.108)	(0.108)	(0.341)	(0.343)
Demographic Controls	No	Yes	No	Yes
Observations	1886	1886	452	452
R-squared	0.003	0.005	0.023	0.030

B. Information Cue Effect (Second Wave)

	(5)	(6)	(7)	(8)
Dependent Variable:	View of US		Support for Vaccine Aid	
Conservative	0.764***	0.764***	0.065	0.065
	(0.155)	(0.155)	(0.166)	(0.167)
Progressive	0.110	0.109	0.674***	0.676***
	(0.127)	(0.128)	(0.126)	(0.126)
"US giving aid" statement	-0.189*	-0.188*	0.322***	0.322***
	(0.098)	(0.098)	(0.109)	(0.109)
"US giving aid" statement	0.162	0.162	-0.434*	-0.433*
X conservative	(0.210)	(0.210)	(0.222)	(0.222)
"US giving aid" statement	0.009	0.010	-0.465***	-0.467***
X progressive	(0.172)	(0.173)	(0.174)	(0.174)
Observations	1006	1006	1006	1006
R-squared	0.129	0.118	0.119	0.121

*, **, and *** indicate statistical significance at 10%, 5%, and 1%, respectively. Robust standard errors are in parentheses.

Table 7. Donated Vaccines and the View of the U.S.: Discontinuity Analysis

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable:	View of US			Support for Vaccine aid		
J&J eligibility	-0.023			0.552*		
	(0.140)			(0.285)		
J&J vaccination\instrumented		-0.005	-0.247		1.047**	3.190**
		(0.231)	(0.583)		(0.496)	(1.442)
Other vaccines		-0.290*	-0.319*		0.781**	1.008***
		(0.163)	(0.174)		(0.318)	(0.361)
Observations	251	251	251	127	127	127
R-squared	0.106	0.117	0.113	0.154	0.189	0.063

*, **, and *** indicate statistical significance at 10%, 5%, and 1%, respectively. Robust standard errors are in parentheses.