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Although the effectiveness of Covid-19 vaccines has been verified in numerous studies globally, many countries have experienced low vaccination coverage due to the reluctance of people to be vaccinated. While the determinants of vaccine hesitancy are complex, we examine the effect of trust in the government on regional Covid-19 vaccination rates in Indonesia. Indonesia started its Covid-19 vaccination program earlier than other countries in Southeast Asia. However, the proportion of Indonesia's population that is fully vaccinated is lower than in most of its neighboring countries. To examine how trust in the government affects vaccine coverage, we conduct a cross-section analysis that shows that the 2019 election vote margin of incumbent President Joko Widodo and the share of households with children who had participated in the government's routine childhood immunization program as of 2019 have positive and statistically significant correlations with rates of full Covid-19 vaccination from September 2021 until March 2022. The results suggest that hesitancy to the Covid-19 vaccine associated with low trust in the government under Joko Widodo may have significantly delayed vaccination.

Keywords: vote margin, routine childhood immunization, 2019 Presidential election, Joko Widodo, measles and rubella (MR) vaccination

JEL classification: D72, I12, I18

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Although the effectiveness of Covid-19 vaccines has been verified in numerous studies globally, many countries have experienced low vaccination coverage due to the reluctance of people to be vaccinated. While the determinants of vaccine hesitancy are complex, we examine the effect of trust in the government on regional Covid-19 vaccination rates in Indonesia. Indonesia started its Covid-19 vaccination program earlier than other countries in Southeast Asia. However, the proportion of Indonesia's population that is fully vaccinated is lower than in most of its neighboring countries. To examine how trust in the government affects vaccine coverage, we conduct a cross-section analysis that shows that the 2019 election vote margin of incumbent President Joko Widodo and the share of households with children who had participated in the government's routine childhood immunization program as of 2019 have positive and statistically significant correlations with rates of full Covid-19 vaccination from September 2021 until March 2022. The results suggest that hesitancy to the Covid-19 vaccine associated with low trust in the government under Joko Widodo may have significantly delayed vaccination.

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1 Introduction

As of the end of December 2022, the World Health Organization (WHO) reported that more than 5 billion people worldwide had completed at least two doses of the Covid-19 (coronavirus disease 2019) vaccine.[1] The vaccination is recognized to have saved many people from the severe illness and death caused by Covid-19 infection. For example, Watson et al. (2022) estimate that the Covid-19 vaccinations prevented 14.4 million deaths in the one year beginning December 8, 2020. However, despite its medically proven efficacy, many countries have faced stagnant uptake of the Covid-19 vaccine. Indonesia is one such country. Indonesia was one of the first countries in Southeast Asia to introduce the vaccine, yet its vaccination coverage remains low compared to neighboring countries. This paper uses Indonesia as a case study on the reasons for the low vaccination coverage, with a focus on the role of trust in government.

In Indonesia, Covid-19 infection was first confirmed in March 2020. Subsequently, the infection spread throughout the country. By the end of 2020, just before Covid-19 vaccines were introduced in Indonesia, the cumulative number of deaths was reported to have reached 523 per million people. At that time, the ratio was the second highest in Southeast Asia after Malaysia.[2] In an effort to deal with the situation, the Indonesian government launched a national vaccination campaign. After the Indonesian Food and Drug Authority (BPOM) issued an emergency use permit for the CoronaVac vaccine made by Sinovac Life Science Co. Ltd, President Joko Widodo received the first jab on January 13, 2021, as the first person to get vaccinated in its free national vaccination program. The program was scheduled to start vaccinating healthcare workers first, followed by the elderly and public service officials.

The start of vaccination in Indonesia was earlier than other Southeast Asian countries except for Singapore, which launched its Covid-19 vaccination program on December 30, 2020, two weeks earlier than Indonesia. Meanwhile, the rate of the fully vaccinated population, those who received at least two doses of the coronavirus vaccine, at the end of 2021 was 41%, which was lower than other countries in Southeast Asia except Timor-Leste and Myanmar. As of November 2022, there has been no significant change in the relatively low immunization coverage among Southeast Asian countries (Figure 1).

What are the reasons for the slow progress of Covid-19 vaccination in Indonesia? After the vaccination program began, several obstacles to vaccination were identified in Indonesia, such as an inadequate global supply of the Covid-19 vaccines, its vast geographical area with around 17,000 islands, the fourth largest population in the world,

[1] WHO Coronavirus (COVID-19) Dashboard (https://covid19.who.int/?mapFilter=vaccinations), accessed on January 3, 2023.

[2] Our World in Data (https://github.com/owid/covid-19-data/tree/master/public/data), accessed on November 10, 2022.

a smaller number of healthcare workers, poor healthcare infrastructure for supporting the distribution of vaccines, as well as people's reluctance to be vaccinated.[3] Initially, the supply-side constraints seemed to hamper the smooth delivery of the vaccines and contribute to delays in vaccination. However, the fact that the vaccination rate has not increased nearly two years after the start of the vaccination campaign suggests that the demand side, that is, vaccine hesitancy, rather than supply-side constraints, seems to be the major cause of the low vaccine coverage.

Concerns about Indonesian people's reluctance to receive the Covid-19 vaccination were found in a survey conducted in September 2020, before the start of vaccination. Ministry of Health et al. (2020) revealed that around 35% of the respondents expressed their hesitance to take Covid-19 vaccines provided by the government. The reasons for not being willing to accept the vaccines cited by respondents included anxieties about vaccine safety and effectiveness, as well as worries about whether the vaccines are *halal*, that is, permissible under Islam. In order to overcome the Covid-19 vaccine hesitancy and convince Indonesians of its safety and efficacy, President Joko Widodo received the first dose of the vaccination in the country. In addition, just before the start of the vaccine campaign, Indonesia's highest body of Islamic scholars, the Indonesian Ulema Council (MUI), announced that the Sinovac vaccine is *halal* through a legal opinion (*fatwa*) issued on January 11, 2021. However, as noted before, Covid-19 vaccine coverage in Indonesia has remained consistently low, suggesting that people's reluctance to vaccinate is quite persistent.

Vaccine hesitancy has been a serious problem not only in Indonesia but around the world. In 2019, when the WHO listed ten threats to global health, vaccine hesitancy was chosen as one of them.[4] As an example, the WHO indicated that a recent resurgence of measle cases seemed to be partly due to vaccine hesitancy. The mechanism of vaccine hesitancy is quite complex and it is suggested that a number of factors combine to cause vaccine hesitancy. The WHO proposes some frameworks for understanding vaccine hesitancy, which it defines as a delay in acceptance or refusal of vaccines despite the availability of vaccine services (SAGE Working Group on Vaccine Hesitancy 2014).

The Complacency, Convenience, and Confidence (3Cs) model is one of the useful frameworks for analyzing vaccine hesitancy. According to SAGE Working Group on Vaccine Hesitancy (2014), vaccine complacency exists where the perceived risks of

[3] Kiki Siregar, "COVID-19: Hurdles ahead for Indonesia as it aims to vaccinate 180 million people in 15 months," *CNA*, January 22, 2021, https://www.channelnewsasia.com/asia/big-population-islands-indonesia-covid-19-vaccination-challenges-426196.; Edna Tarigan and Victoria Milko, "Indonesia caught between COVID-19 surge and slow vaccine rollout," *CTV News*, July 3, 2021, https://www.ctvnews.ca/health/coronavirus/indonesia-caught-between-covid-19-surge-and-slow-vaccine-rollout-1.5495337.

[4] WHO, "Ten threats to global health in 2019," https://www.who.int/news-room/spotlight/ten-threats-to-global-health-in-2019.

vaccine-preventable diseases are low, and vaccination is not deemed a necessary preventive action. Vaccine convenience relates to physical availability, affordability, willingness to pay, geographical accessibility, ability to understand (language and health literacy), and a belief and satisfaction in services. Lastly, vaccine confidence is defined as trust in the effectiveness and safety of vaccines, trust in the system that delivers them, including the reliability and competence of the health services and health professionals, and trust in the motivations of the policymakers who decide on the needed vaccines.

As explained in the 3Cs model, trust in the government and health authorities can be an important factor that affects willingness to get vaccinated against Covid-19. To address the Covid-19 pandemic, most countries adopted emergency use permits for rapid implementation of those newly developed vaccines. The extent of trust in the government implementing these unusual procedures likely affected peoples' attitudes toward vaccination. In addition, after issuing emergency use permits, aggressive vaccination campaigns were conducted in many countries. These campaigns, often under government leadership, also may have influenced vaccination decisions in different ways depending on how much people trust the government or governmental organization leading the campaign.

In Indonesia, the government set a goal of 235 million vaccinations, or around 86% of the population.[5] We found reports where interviewees were concerned about the appropriateness of the unusual measures taken by the government and about the safety of the vaccine (Najmah, Davies and Kusnan 2021). This background, along with the deep commitment of the government to the Covid-19 vaccination program, likely affected the attitude of the Indonesian people to take vaccines. The paper examines the relationship between trust in the central government and Covid-19 vaccine hesitancy using regional information in Indonesia.

The literature has suggested a correlation between Covid-19 vaccine hesitancy, or vaccine confidence, and trust in the government using individual-level or aggregated information. In the United States, it was noted from an early stage that supporters of the Republican Party or the party's former president, Donald Trump, were less likely to get the Covid-19 vaccines.[6] Trump was known for his anti-vaccination attitudes, such as linking the measles, mumps, and rubella (MMR) vaccination to autism, which raised concerns about vaccines among his supporters (Hornsey et al. 2020). The studies using individual-level information have confirmed that Trump or Republican supporters tend not to opt for vaccination against coronavirus, as well as not to follow prevention

[5] Vaksin Dashboard (https://vaksin.kemkes.go.id/#/vaccines), accessed on January 4, 2023. When the campaign started in Indonesia, the government set the target of 181.5 million vaccinations by March 2022 as children under the age of 18 were not yet covered.

[6] Danielle Ivory, Lauren Leatherby, and Robert Gebeloff, "Least vaccinated U.S. counties have something in common: Trump voters," *New York Times*, April 17, 2021, https://www.nytimes.com/interactive/2021/04/17/us/vaccine-hesitancy-politics.html.

guidelines like mandatory mask-wearing (Frankel and Kotti 2021; Fridman, Gershon and Gneezy 2021).

In Austria and Ireland, the literature also suggests a correlation between Covid-19 vaccine hesitancy and distrust in authorities in the form of voting for opposition parties or abstention from voting (Murphy et al. 2021; Schernhammer et al. 2022). Kennedy (2019), while not an analysis of the Covid-19 vaccine hesitancy, shows a positive correlation between the voting share for populist parties and the rate of people who were skeptical about the importance and effectiveness of vaccines in general through an analysis using 14 parliamentary elections in Western Europe.

Unfortunately, most studies have been conducted in high-income countries and few studies have analyzed the relationship between trust in the government and Covid-19 vaccination in low- and middle-income countries (Eberwein et al. 2022; Solis Arce et al. 2021). Furthermore, as the analyses are usually based on one-time data, they do not provide information on whether those correlations are temporary. It is also not clear how long, if temporary, any statistically significant correlation between trust in the government and vaccine hesitancy would be observed.

Similar to our motivation, Eberwein et al. (2022) test the correlation between Covid-19 vaccine hesitancy and the extent of trust in government among their several estimation specifications to check the level and trend of Covid-19 vaccine hesitancy based on phone surveys in 53 low- and middle-income countries. Although they report no statistically significant relationship between the two, this may be due to the use of dummy variables for the trust information based on tercile categories from the World Value Survey. In addition, they used unwillingness to be vaccinated, rather than actual vaccination, as the variable for vaccine hesitancy, which may have led to biased estimation results.[7]

In this paper, we use regional cross-sectional data in Indonesia to shed light on the relationship between the Covid-19 vaccine hesitancy and public trust toward the government, measured by the incumbent President Joko Widodo's vote margin and the share of households with children that had participated in the government's program of routine childhood immunization as of 2019. Our baseline analysis using OLS estimation revealed that an increase in the vote margin coincided with larger Covid-19 vaccine coverage from September 2021 to March 2022.

We also found that routine childhood immunization coverage as of 2019 correlated with Covid-19 vaccine coverage, though the effects of a one standard deviation change on the Covid-19 vaccine coverages are smaller than that of the vote margin. This finding suggests that trust in Joko Widodo's government was significantly associated

[7] For example, as shown in Figure 1, the actual vaccination rates are higher in Malaysia and Thailand than in Indonesia, though the survey data Eberwein et al. (2022) used show that the share of households hesitant to be vaccinated is lower in Indonesia than in Malaysia and Thailand. This difference is presumably due to social desirability bias, as is often observed in surveys about electoral turnout.

with Covid-19 vaccine hesitancy, which may have delayed vaccinations in Indonesia.

The rest of the paper is organized as follows. We begin with a brief introduction to the political and social background of Indonesia. Then, we show our methodology in Section 3, followed by a data description. After presenting our estimation results in Section 5, we examine our assumption of whether the routine immunization coverage as of 2019 reflects trust in the government in Section 6. Finally, we conclude the paper.

2 Background

Indonesia held a presidential election in April 2019, almost one year before the first Covid-19 infection was reported in Indonesia. Since 1999, Indonesia has seen a series of peaceful changes of government through elections every five years, and the country has been highly regarded internationally for its well-established democracy (Hicken 2020). However, in recent years, as in the United States, concern about deepening social cleavages has been growing.

In the 2019 presidential election, then-incumbent President Joko Widodo, known as Jokowi, once again ran against Prabowo Subianto, in a rematch of the 2014 election. The literature on voting behavior in Indonesia suggests a social cleavage between Islamic conservatives who supported Prabowo and secularists with ethnic or religious minorities who supported Jokowi in the election (Kawamura and Higashikata 2020). The studies on the 2019 presidential election campaign show that both camps actively used social networking services (SNS) to engage in defamatory and libelous activities (Temby 2019). For example, the Prabowo camp was involved with Islamic conservatives, which once heavily attacked Basuki Tjahaja Purnama, who belongs to the minority Christian-Chinese group, on the Internet during the 2017 Jakarta gubernatorial election.[8] The Prabowo camp targeted messages to Muslim voters, mainly Islamic conservatives, in 2019 to spur support for their candidate (Okamoto and Kameda 2022).[9]

Given the political background in Indonesia, it is expected that the differences in political preferences observed in the 2019 presidential election have influenced people's subsequent choices regarding vaccinations promoted by the government, as shown in previous studies. The assumption here is that people living in regions where the share of Prabowo supporters was larger in 2019 were psychologically distant from the Jokowi administration in 2021, and will be more likely to accept information that emphasizes

[8] Basuki Tjahaja Purnama (also known as Ahok), Jakarta Governor at the time, was heavily criticized by Islamic conservatives for allegedly blaspheming Islam in his statement, which led to a massive demonstration. As a result, he not only lost the election but was also imprisoned for blasphemy (Hadiz 2017).

[9] The behavior of Prabowo's supporters in May 2019, when the voting results were announced, was also very similar to that of Trump supporters observed in the 2020 US presidential election. The Prabowo supporters claimed that the vote-counting process was cheated and staged massive protests, some of which led to riots in Jakarta.

the negative aspects of its policies.

Surveys on people's attitudes toward the Covid-19 vaccine in Indonesia suggest that people's trust in the government plays a certain role. Indikator (2021), which summarized the results of a February 2021 poll, found that respondents who voted for Jokowi in the 2019 presidential election were more likely to trust the Covid-19 vaccine than those who supported Prabowo Subianto. According to the survey, about 60% of Jokowi supporters trusted the effectiveness of the vaccine, compared to only 45.4% of Prabowo supporters.

Zaini and Hoang (2021), using media articles and poll results to examine Covid-19 vaccine hesitancy in six Southeast Asian countries, noted a possible lack of trust in the public immunization system of Indonesia. The Indonesian government launched a new program of measles and rubella (MR) vaccination for children in 2017, using vaccines imported from India. The following year, however, the Indonesian Ulema Council issued a *fatwa* against the Indian-produced vaccine, saying that the MR vaccine was not certified as *halal*, that is, the vaccine was not permissible in Islam. This *fatwa* was issued to allow the use of the Indian-made vaccine for Muslims in Indonesia because no other effective MR vaccine was available for the time being, even if its status was not *halal*. Meanwhile, it appears that the Indonesian Ulema Council not certifying the MR vaccine distributed in a nationwide campaign by the Health Ministry had a significant impact on Muslims' attitudes toward the MR vaccine, leading to a decrease in immunization coverage in some regions (de Figueiredo et al. 2020). Zaini and Hoang (2021) suggests that the damage to the national immunization system from the MR vaccination campaign may have affected attitudes toward Covid-19 vaccination.

Najmah, Davies and Kusnan (2021) conducted interviews with 50 Indonesian women in the first few months of 2021 just after the start of the Covid-19 vaccine campaign. They reported four main concerns behind the Covid-19 vaccine hesitancy. The first one is that the imported Sinovac vaccine, used as the main Covid-19 vaccine in Indonesia, may be not *halal*, as was the case for the MR vaccine imported from India.

Secondly, some interviewees expressed uneasiness stemming from a general distrust of China, from which Indonesia imported the Sinovac vaccine. The interview also pointed out that the vaccine hesitancy in Indonesia may be due to distrust of the Indonesian government, which appears to be close to the Chinese government. Further, respondents showed anxieties about the fact that the Sinovac vaccine had only received an emergency use permit, rather than full approval, from the Indonesian Food and Drug Authority. Interestingly, according to Indikator (2021), the percentage of respondents who said they trust Sinovac vaccines was low (32.3%), though the percentage of respondents who trusted other vaccines, such as those made by AstraZeneca, Pfizer-BioNTech, and Moderna, was even lower. From the survey, we can confirm that, in general, people's confidence in vaccines was not high at the time of this survey, and that around 40% of the respondents were unable to determine or answer whether the vaccines were

reliable or not.

Thirdly, respondents express that they felt coerced into taking the vaccine. The government of Indonesia announced that anyone who refused to take Covid-19 vaccines could be fined, or denied social assistance (Presidential Decree Number 14 of 2021). Najmah, Davies and Kusnan (2021) reports a case in which forced vaccinations led many Indonesians to distrust the government and refrain from future vaccination. The fourth and final reason cited in this study was fear of the side effects of the vaccine and the belief in alternative ways such as hand-washing and taking vitamins were effective in preventing Covid-19 (complacency). These studies suggest that trust in the government influenced attitudes toward the Covid-19 vaccination.

3 Methodology

We first conduct a simple cross-sectional analysis using Ordinary Least Squares (OLS) with the share of people who have received a second dose of the Covid-19 vaccine as dependent variable. Then, we test the robustness of OLS estimation results through grouped probit regression as the dependent variable is aggregated binary data.[10]

The two main independent variables we use are the vote margin of then President Joko Widodo in the 2019 presidential election and the rate of households with children having routine immunization as of 2019. In addition, to control for differences in regional characteristics, we also use variables such as population, area, distance from the capital, average distance to the nearest hospital or community health clinic, vote margin of Islamic parties in 2019 parliamentary election, share of Muslim population, share of the population with higher education, share of the urban population, poverty rate, share of healthcare workers, share of the elderly, share of public service officials, priority region dummy, and province dummy.

4 Data Description

(a) Unit of analysis

In 2021, when the Covid-19 vaccination program started, Indonesia had 34 provinces, and 514 districts/cities (*kabupaten*/*kota*) under the provinces.[11] We utilize district- and city-level information as the basis for our analysis, though with modifications based on the characteristics of our Covid-19 vaccination coverage data.

[10] We used STATA's *glm* command.

[11] As of year-end 2022, Indonesia has 38 provinces. In November and December 2022, the Indonesian government formally recognized the formation of four new provinces that previously belonged to the provinces of Papua and West Papua.

For each district or city, the number of vaccinated people is reported by the Indonesian Ministry of Health, though we find that, in some cities, the reported number of people who are fully vaccinated, that is, those who have received a second dose of Covid-19 vaccine, exceeds the number of residents. This is because a good number of people in districts seemed to have been vaccinated in neighboring cities.[12] In order to control for border-crossing vaccination, a city and its surrounding districts are merged and viewed as one region for our analysis. For example, Yogyakarta city, where the reported vaccination rate exceeds 140%, is merged with its neighboring districts such as Sleman and Bantul, and regarded as one region.[13] As a result, we have 345 regions in our analysis instead of 514, consisting of single districts or cities with surrounding districts.

(b) Regional Covid-19 Vaccination in Indonesia

Next, we move on to the trends in regional Covid-19 vaccination in Indonesia. To calculate the regional Covid-19 vaccination ratio, we use the district/city-level number of fully vaccinated people, as reported by the Indonesian Ministry of Health.[14] Then, we employ district/city-level population data as of 2021, which we calculated using the poverty rate and the number of the poor, as estimated by Statistics Indonesia (BPS).[15]

Figure 2 shows the trend in the proportion of fully vaccinated people in Indonesia by region from January 2021 to November 2022. The red line shows the trend in the national vaccination rate, and the grey lines depict vaccination rates at the regional level, which indicates significant differences in vaccination coverage by region. We find that some regions have achieved over 80% vaccination coverage, the same level as neighboring countries with relatively high vaccination coverage, such as Cambodia, Malaysia, and Vietnam (Figure 1), while many other regions have not even reached 40%.

In Figure 3, we can check the locations of those regions with a higher ratio of vaccination on the map by comparing four points in time. As of September 1, 2021, we

[12] For example, Tribunnews reported that people who worked in Jakarta received Covid-19 vaccines there, even though they did not have residential ID cards (KTP) with Jakarta as their place of residence (Galuh Widya Wardani, "Kemenkes Sebut Vaksinasi Penduduk Jakarta Capai 120 Persen, Bali dan Riau Hampir 100 Persen," *Tribunnews*, September 1, 2021, https://www.tribunnews.com/nasional/2021/09/01/kemenkes-sebut-vaksinasi-penduduk-jakarta-capai-120-persen-bali-dan-riau-hampir-100-persen.).

[13] If a city is contiguous to other cities, we merged those cities and their surrounding districts. Meanwhile, if a district shares a common boundary with more than one city, those cities and their surrounding districts were also merged and considered one region. Figure A-1 shows the cities and their surrounding districts.

[14] Downloaded from the Ministry of Health website (https://vaksin.kemkes.go.id/#/vaccines) on November 10, 2022.

[15] Downloaded from Statistics Indonesia website (https://www.bps.go.id/) on June 15, 2022.

notice that the map is mostly blue, indicating that vaccination rates were low across the country. Three months later, we find that the vaccination rates were still low in many areas, though, in some regions included in provinces such as Bali, Yogyakarta, Central Java, East Java, and North Sumatera, the vaccination coverage exceeded 50%, indicated in yellow or red. Then, we confirm that many regions became yellow or red on the map as of March and June 2022, though some areas especially in Papua and West Papua provinces were still in blue.

(c) Results of Presidential Election in 2019

In this subsection, we briefly look back at the 2019 presidential election in Indonesia. Indonesia holds a direct presidential election every five years by voters aged 17 years or older. In 2019, 79% of eligible voters cast their ballot on April 17 for either then-incumbent Joko Widodo (alias Jokowi) and his vice president candidate Ma'ruf Amin or Prabowo Subianto and his vice president candidate Sandiaga Uno. One month later, the General Elections Commission (KPU) made an official announcement that Jokowi and Ma'ruf won with 55.5% of the valid votes. Figure 4 shows regional vote margin of Jokowi ($\frac{\text{Votes for Jokowi - Votes for Prabowo}}{\text{Eligible voters}}$) in the presidential election. For the calculation, we used district/city-level voting data which comes from the General Elections Commission.[16]

Figure 5 shows scatter plots of the relationship between the vote margin of Jokowi and vaccination coverage, where, the relationship is examined at four points in time as in Figure 3. From the figure, we find that it appears that if Jokowi's vote margin was larger, the vaccination rates were also higher. This suggests that there is a positive relationship between Jokowi's vote margin and Covid-19 vaccination rates, especially in December 2021 and March 2022.

In addition, we also find there are outliers in the figure, which is thought to be caused by the practice of *noken*. In some areas of Papua and West Papua provinces, tribal chiefs cast all votes of tribal members for a particular candidate, ostensibly after achieving a consensus in the community (Korwa 2019). This practice indicates that we should exclude those provinces from the analysis because voting behavior under the *noken* system does not reflect the true attitude of individual residents towards the central government, and correspondingly, their level of trust in the government.

(d) Routine childhood immunization as of 2019

Another variable that is expected to reflect the level of trust in the government is the rate of routine childhood immunization as of 2019. In 2018, the Indonesian Ulema Coun-

[16] Based on "Sertifikat Rekapitulasi Hasil Penghitungan Perolehan Suara Pasangan Calon Presiden dan Wakil Presiden dari Setiap Kabupaten/Kota dalam Wilayah Provinsi" [Certificate on Recapitulation of Vote Counting Results for Presidential and Vice Presidential Candidates from Each District/City in Province] for all provinces from the General Elections Commission on August 2, 2019.

cil did not certify the Indian-produced MR vaccine as *halal*. Following this judgment, the MR vaccine was discouraged in Indonesia, where around 90% of the population is Muslim. The literature suggests that the incident increased skepticism toward governmental vaccination programs (de Figueiredo et al. 2020; Zaini and Hoang 2021). Additionally, this variable may also reflect the residents' accessibility to the Covid-19 vaccine, such as public health facilities used as vaccination sites.

According to Indonesia's immunization schedule, children are required to receive routine childhood immunization against infectious diseases such as tuberculosis, polio, diphtheria, tetanus, pertussis, hepatitis B, measles, and rubella, within 11 months after birth. Using National Socio-Economic Survey (Susenas) conducted in March 2019 by Statistics Indonesia, we calculated the ratio of households with children aged between the ages of 12 months and 59 months who had received at least one dose of routine childhood vaccine in each region. Figure 6 and Figure 7 show the rate of regional routine childhood immunization and that of immunization with MR as of 2019, respectively.

The relationships between these immunization variables and the Covid-19 vaccination rate are shown in Figure 8 and Figure 9. Although the scatter plots are skewed to the right, the immunization coverages are positively correlated with the Covid-19 vaccination rate.

(e) Other Variables

To control for regional characteristics that may affect the Covid-19 vaccination, we include variables that are expected to have significant effects based on the literature and the context of implementing the Covid-19 vaccine in Indonesia. Specifically, we use variables on population, area, distance from the capital, average distance to the nearest hospital or community health clinic, vote margin of Islamic parties in 2019 parliamentary election, share of Muslim population, share of the population with higher education, share of the urban population, poverty rate, share of healthcare workers, share of the elderly, share of public service officials, priority region dummy, and province dummy.

We expect that a larger population size and area could have negative effects on the regional vaccination rate due to increased delivery costs. Population data comes from poverty information estimated by Statistics Indonesia as explained above. For regional area data, we utilized data from the Ministry of Home Affairs.[17]

The distance from the capital and the average distance to the nearest hospital or community health clinic (Puskesmas) within a region are included to account for the

[17] Peraturan Menteri Dalam Negeri Nomor 72 Tahun 2019 tentang Perubahan atas Peraturan Menteri Dalam Negeri Nomor 137 Tahun 2017 tentang Kode dan Data Wilayah Administrasi Pemerintahan [Regulation of the Minister of Home Affairs Number 72 of 2019 on Amendments to Regulation of the Minister of Home Affairs Number 137 of 2017 on Government Administration Area Code and Data].

difficulty of distributing the Covid-19 vaccines for the government and the travel cost of vaccination for residents. For the former, the distance from Jakarta to each district and city was computed using median points taken from latitude and longitude data. The latter information was obtained from village/town (desa/kelurahan) level census data (Potensi Desa: Podes) collected by Statistics Indonesia in 2021. We calculated the average distance from a village/town to the nearest hospital or community health clinic in each region using the share of households as a weight.

Variables such as the vote margin of Islamic parties in 2019, share of Muslim population, share of population with higher education, share of the urban population, and poverty rate are used to control for the difference in social and economic circumstances in each region. We calculated the vote margin of Islamic parties in the 2019 parliamentary election, using data from General Elections Commission (KPU).[18] Indonesia held a parliamentary election in April 2019 on the same day as the presidential election. Following Kawamura and Higashikata (2020), we identified the Islamic parties and the secular parties to calculate the marginal vote for Islamic parties. The regional share of Muslims comes from the population census in 2010 collected by Statistics Indonesia. As reported in Najmah, Davies and Kusnan (2021), some Muslims in Indonesia had concerns that the Chinese-made Sinovac vaccine, which was the main vaccine in Indonesia, was not *halal* because the Chinese company refused to disclose if the vaccine contained pork products. This suggests that regions with a large vote margin for Islamic parties and a high share of Muslims may have a negative effect on the Covid-19 vaccination.

The share of people with higher education and the share of the urban population comes from Susenas in 2019. The share of people with higher education may have a positive effect on Covid-19 vaccination because those people with higher education are expected to have better access to knowledge of Covid-19 vaccination. The larger share of the population living in urban areas is also expected to lead to a higher ratio of Covid-19 vaccination. Because the disease has infected more people in densely populated urban areas, the demand for Covid-19 vaccines may be higher in those areas. Along with these two variables, the poverty rate is included to capture the difference in regional income levels. In the literature on vaccine hesitancy/confidence, it is suggested that higher education and income level are associated with higher confidence in vaccines (Eberwein et al. 2022; Frankel and Kotti 2021; Murphy et al. 2021).

The number of healthcare workers, elderly, and public service officials was obtained from a website managed by the Ministry of Health,[19] which was then used to

[18] Based on "Sertifikat Rekapitulasi Hasil Penghitungan Perolehan Suara Calon Anggota Dewan Perwakilan Rakyat dari Setiap Kabupaten/Kota di Daerah Pemilihan Secara Nasional Pemilihan Umum Tahun 2019" [Certificate on Recapitulation of Vote Counting Results for National Parliament Candidates from Each District/City in Regional General National Parliamentary Election of 2019].

[19] Vaksin Dashboad (https://vaksin.kemkes.go.id/#/vaccines), accessed on November 10, 2022.

calculate the population ratios. The government of Indonesia decided to provide the Covid-19 vaccines to healthcare workers first, then the elderly and persons employed in public service such as teachers, market traders, religious leaders, lawmakers, government officials, police, military, workers in public transportation, and so on. So, these variables are expected to have a positive correlation with the vaccination rate.

Finally, two dummy variables were included in the analysis. One is a province dummy, which controls for common characteristics across regions within the same province. Another is a priority region dummy. This dummy variable takes one if a region falls under any provincial capital or city included in the Jakarta metropolitan area because the central government decided to prioritize the supply of Covid-19 vaccine to those areas.[20]

(f) Summary statistics

Table 1 shows summary statistics. As we exclude regions belonging to Papua and West Papua provinces where they have a unique voting system of *noken*, we use 306 regions in our estimation. For the share of people who fully received Covid-19 vaccines, we summarized four points in times as in Figure 3 and Figure 5.

The mean ratio of households with children who had received routine immunization as of 2019 is 93.9%. Compared to that of 2017, the mean is slightly higher but the minimum is lower, indicating that people in some regions were likely reluctant to have their children receive routine childhood vaccines, following the judgment of the Indonesian Ulema Council in 2018 on the measles and rubella (MR) vaccine. If we check the rate of routine immunization with MR in 2019, we confirm that the rate is on average 1% point lower than in 2017, with a larger standard deviation. Given the possibility that routine childhood immunization rates do not reflect the effect of this drop in confidence as observed for the MR vaccine coverage, in Section 6, we verify whether estimated results change if the rate of immunization with MR is included instead.

5 Results

Table 2 reports OLS estimation results for the four points in time as in Figure 5 and Figure 8 (See Table A-1 for full estimation results). First, we find that the coefficients of Jokowi's vote margin are positive and statistically significant in columns (1), (2), and (3), suggesting that trust in the government seems to have some statistically significant correlation with the Covid-19 vaccination, at least at those three time points. It also appears that the effects seem to grow until March 2022. In addition, according to the

[20] Based on "Surat Edaran Kemenkes Nomor SR.02.06111/80/2021 tentang Distribusi Vaksin dan Rencana Pelaksanaan Vaksinasi COVID-19" [Circular Letter of the Ministry of Health concerning Vaccine Distribution and COVID-19 Vaccination Implementation Plan] on January 8, 2021.

result in column (2), a one standard deviation increase in the vote margin is associated with the increase of the Covid-19 vaccination rate by 3.5% points (35.6% points × 0.099). These results indicate that trust in the government in the form of voting behavior may have contributed to the people's confidence in Covid-19 vaccines; however, the effect likely caused delays in vaccination in regions where trust in government was lower but did not result in outright vaccine refusal.

Second, the coefficients of the rate of households with children having routine immunization are positive and statistically significant in all columns. Column (2) shows that an increase in the rate of routine childhood immunization by one standard deviation coincides with the increase of the Covid-19 vaccination rate by 1.6% points (5.2% points × 0.313), indicating the magnitude of the effects is smaller than that of the vote margin. These estimated results suggest that the people's trust in vaccine administration prior to the Covid-19 pandemic is significantly associated with their hesitancy to receive the Covid-19 vaccines. Meanwhile, this variable may partially reflect regional differences in public health systems that facilitate easier access to Covid-19 vaccination for residents.

Next, we estimate a series of daily Covid-19 vaccination rates from January 2021 to November 2022 as the dependent variable, and examine when statistically significant positive values are first identified and how long such results persist. Figure 10 summarizes the estimation results. The lines indicate the point estimations, and grey zones depict the 95% confidence intervals.

In Figure 10 (a), the 95% confidence interval is above zero from mid-September 2021 to the end of March 2022, while the point estimate reaches its highest value around mid-February 2022. This indicates regions with higher vote margins reached near the ceiling of vaccination coverage around mid-February 2022 first, then regions with lower vote margins were slowly catching up to increase the vaccination rate. In Figure 10 (b), from August 2021 to mid-February 2022, the 95% confidence intervals remain positive, with the coefficient of 2019 routine immunization coverage reaching its highest value around the end of December 2022.

Finally, we check the robustness of the OLS analysis using probit estimation. In Table 3, we confirm that the results are similar to those of the OLS estimation (Table 2), except for the row for routine childhood immunization rate in column (4), where the coefficient is positive but not statistically significant (Full results are reported in Table A-2). A similarity is observed when comparing the effect size of a one standard deviation increase in vote margin and that of an increase in routine immunization rates, with the former tending to be larger if calculated using the average marginal effects.

Furthermore, Figure 11 confirms that the trend is the same as in Figure 10, although there is a difference in that Panel (a) shows a statistically not significant period from mid-October to the end of November. This may be due to a surge in vaccination by residents in regions with large populations and negative vote margins, such as

Purwakarta and Karawang surrounding the Jakarta metropolitan area, where the use of the official Covid-19 contact tracing application (*PeduliLindungi*) certifying Covid-19 vaccination had been mandatory since September 14, 2021. We confirm that probit estimations without Purwakarta and Karawang return statistically significant coefficients on the vote margin even for the period from mid-October to the end of November.

6 Discussion

The previous section interpreted the results of the analysis by assuming that routine immunization coverage as of 2019 reflects trust in government vaccine administration in each region. In this section, we examine the validity of the assumption.

As suggested in de Figueiredo et al. (2020), Najmah, Davies and Kusnan (2021), and Zaini and Hoang (2021), we assumed that the population's trust in vaccine administration, specifically among Muslims, declined in 2019 following the *fatwa* issued by the Indonesian Ulema Council in 2018 in relation to the government's newly introduced MR vaccination program in 2017. Under the assumption, we tested how the decline in routine childhood immunization was associated with the rate of Covid-19 vaccination.

To check whether the 2019 routine childhood immunization coverage reflects trust in the government, we instead include the 2017 routine childhood immunization coverage and make estimations under the same models used in the previous section. In columns (2) to (4) of Table 4, we summarize the results of the probit estimations using the Covid-19 vaccination rate as of March 1, 2022 as the dependent variable to examine the differences in selecting the 2017 routine childhood immunization rate as the independent variable.

First, we find that the coefficient of Jokowi's vote margin is larger in column (3) than that in column (2), which corresponds to column (3) of Table 3. This suggests that the vote margin correlates relatively more strongly with the routine immunization coverage of 2019 than it does with that of 2017.

Next, we also notice that the coefficient of routine childhood immunization coverage in 2017 is positive but not statistically significant in column (3). In column (4), which contains both 2019 and 2017 routine immunization coverage, we confirm that the coefficient on the vote margin is almost the same as in column (2), and that only the 2019 routine immunization coverage has a positive and statistically significant coefficient. The robustness check using the Covid-19 vaccination coverage data from January 2021 to November 2022 illustrates that the coefficients and 95% confidence intervals for the 2017 routine immunization coverage are smaller than in Figure 11 (b) when using the same model as in column (3) of Table 4 (Figure A-2 (a)). Based on these results, we assess that the 2019 routine childhood immunization rate is significantly associated with trust in the government.

Thirdly, let us check results using the rate of immunization with MR only, not

all routine childhood vaccines. It remains possible that the Muslims simply did not trust the MR vaccination program after the *fatwa* in 2018, and allowed their children to receive the other basic childhood vaccines as they used to. In this case, estimates based on the information on routine childhood immunization coverage may understate the effect of trust in vaccine administration.

Columns (5) through (7) in Table 4 summarize results using both 2019 and 2017 MR immunization rates as independent variables. The difference in coefficients suggests that the vote margin is more strongly correlated with the 2019 MR immunization coverage than with the 2019 routine childhood immunization coverage. However, in general, the results of the analysis using the 2019 MR vaccine are not substantially different from those using routine childhood immunization coverage in 2019.

When estimated under the model in column (5) of Table 4 for all periods from January 2021 to November 2022, we confirm that the coefficients and 95% confidence intervals for the vote margin are almost identical to the results in the previous section (Figure A-2 (b)). The estimation under the same model also verifies that the coefficients for MR immunization coverage in 2019 follow essentially the same trend as the effect of 2019 routine immunization coverage on Covid-19 immunization (Figure A-2 (c)). Additionally, we check that the calculated magnitude of the effect brought about by a one standard deviation increase in 2019 MR vaccination coverage is also less than that of the vote margin. In short, we confirm that both the 2019 coverage of the basic routine immunization and the MR vaccine appear to reflect trust in government vaccine administration in this section.

7 Conclusion

In this paper, we used daily regional Covid-19 vaccination information for Indonesia to confirm the relationship between vaccination coverage and trust in the government under President Joko Widodo. First, we investigated the relationship between vaccine coverage and voting behavior by region, suggesting that delay in vaccination was typically observed in regions where trust in the government was considered lower in terms of the vote margin of then-incumbent President Joko Widodo.

Secondly, we found positive correlations between Covid-19 vaccination coverage and the share of households with children who had received at least one dose of basic childhood immunization in 2019. The 2019 basic routine childhood immunization coverage is thought to reflect not only the accessibility of the vaccines, such as proximity to public health facilities, but also trust in vaccine administration. Our estimation results showed statistically significant relationships between Covid-19 vaccination coverage and the share of households with children who had received routine immunization.

Interestingly, when the share of households with routine childhood vaccination

as of 2017 was used for estimation, we found that the coefficients on the variable were smaller and less statistically significant than those for 2019. We suggested that the routine childhood immunization rate in 2019 strongly reflected the regional differences in the level of trust in the government brought about by the *fatwa* that claimed the MR vaccine was not *halal* in 2018.

Taken together, these findings imply that a good number of people in Indonesia were hesitant to receive the Covid-19 vaccines due to their low level of trust in the government under President Joko Widodo, resulting in a significant delay in vaccination. Although the framework of our analysis did not allow us to identify the causal relationship, policies that allocate more resources, such as more immunization sites, to areas indicating signals of low trust in the government, may accelerate vaccination because, as shown in Table A-1, we find negative correlations between the Covid-19 vaccination coverage and the average distance to the nearest hospital or community health clinic. Meanwhile, if the allocation of resources significantly focuses on some specific regions, it may create another problem in terms of equity and lead to lower trust in the government in other areas.

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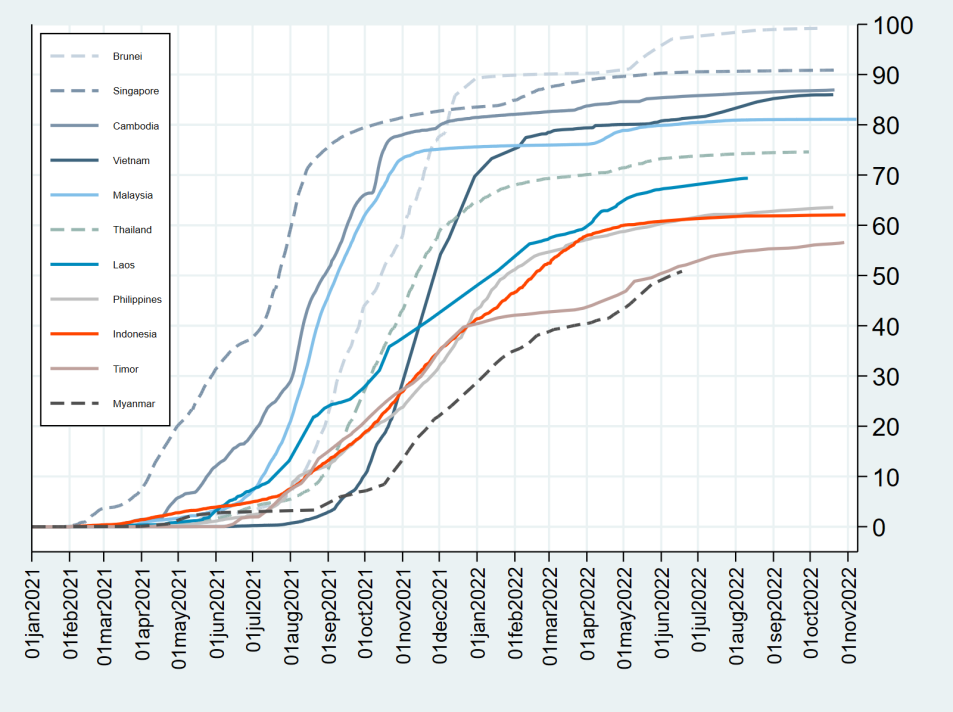
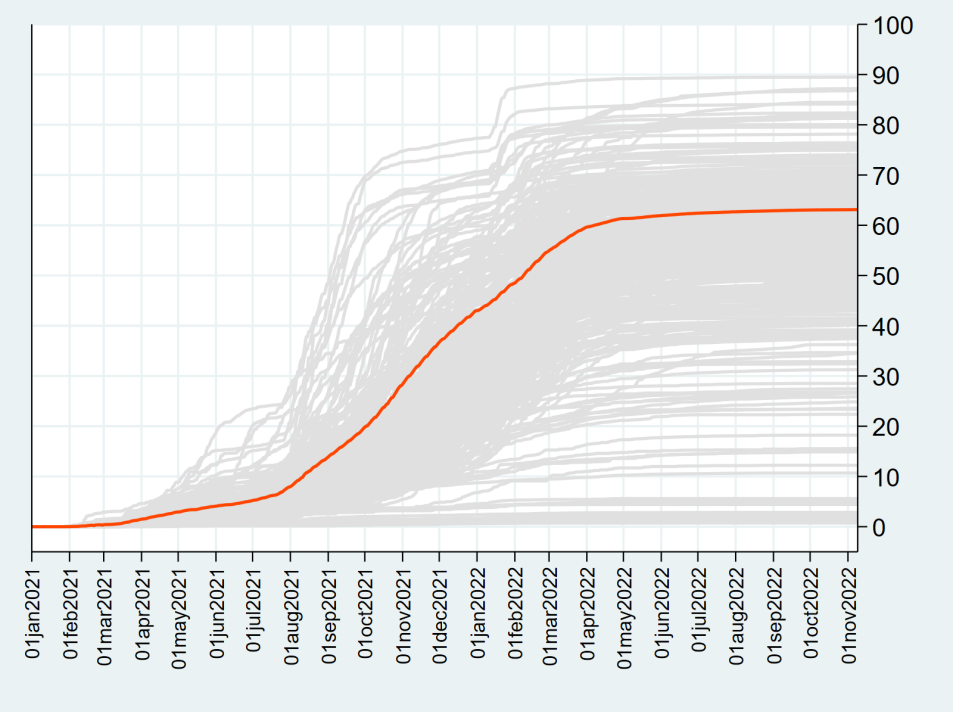
Fig. 1: Proportion of fully vaccinated people in Southeast Asia (%)



Source: Our World in Data.
Notes: Total number of people who received all doses prescribed by the initial vaccination protocol per 100 people in the total population.

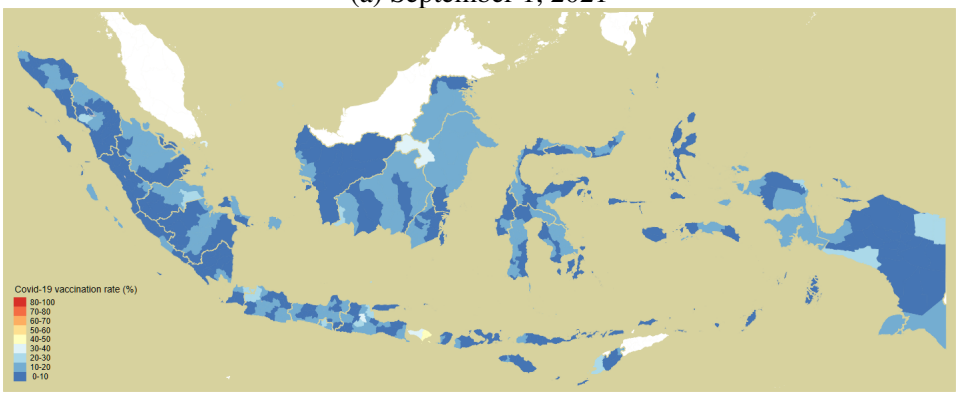
Fig. 2: Regional trend of fully vaccinated people in Indonesia (%)



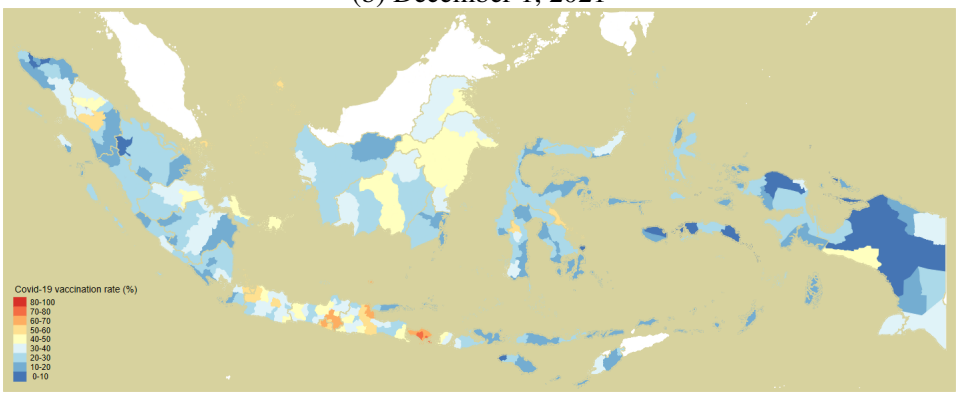
Source: Ministry of Health.
Notes: The red line shows the trend in Covid-19 vaccination rate at the national level.

Fig. 3: Regional rates of Covid-19 vaccination

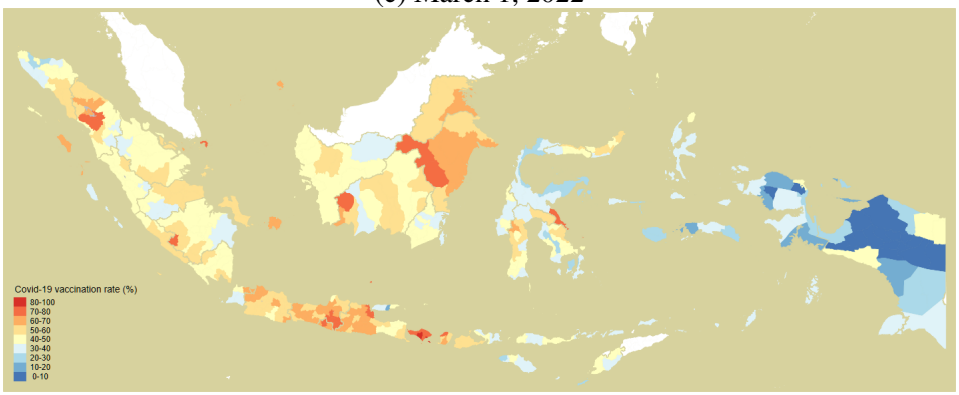
(a) September 1, 2021



(b) December 1, 2021



(c) March 1, 2022



(d) June 1, 2022

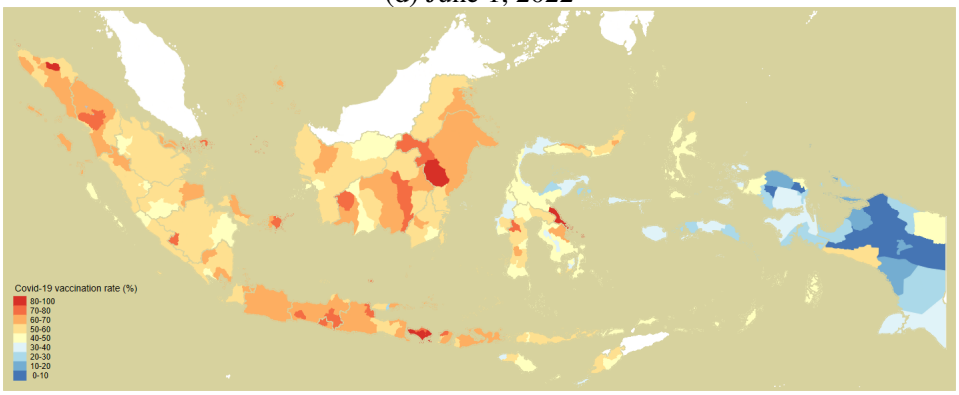


Fig. 4: Jokowi's vote margin in the 2019 presidential election (% point)

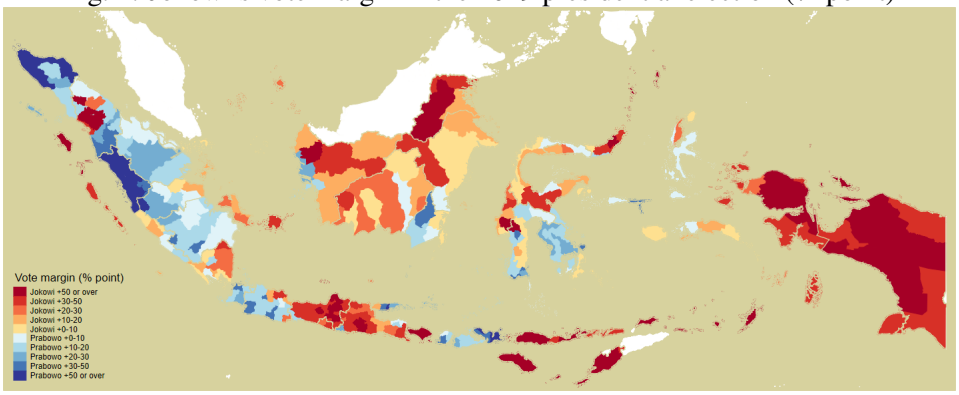


Fig. 5: Covid-19 vaccination rate and Jokowi's vote margin in the 2019 election

Source: Ministry of Health and General Elections Commission.
Notes: The size of circles is proportional to the number of residents.

Fig. 6: Rate of routine childhood immunization in 2019 (%)

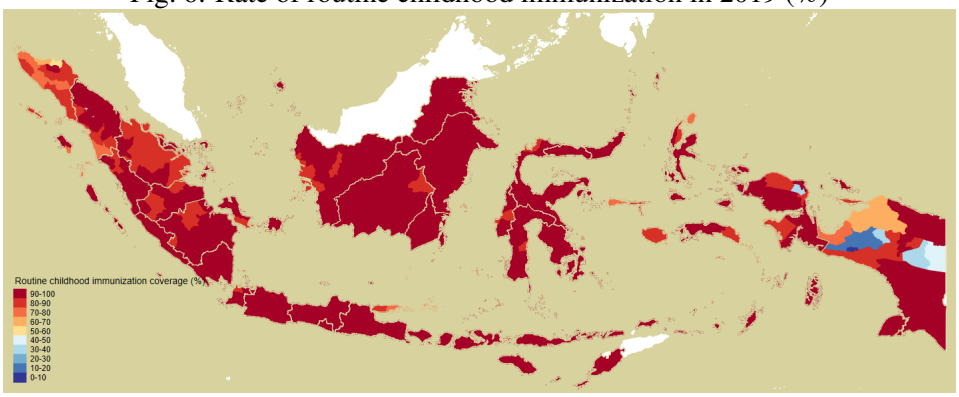


Fig. 7: Rate of routine immunization with MR in 2019 (%)

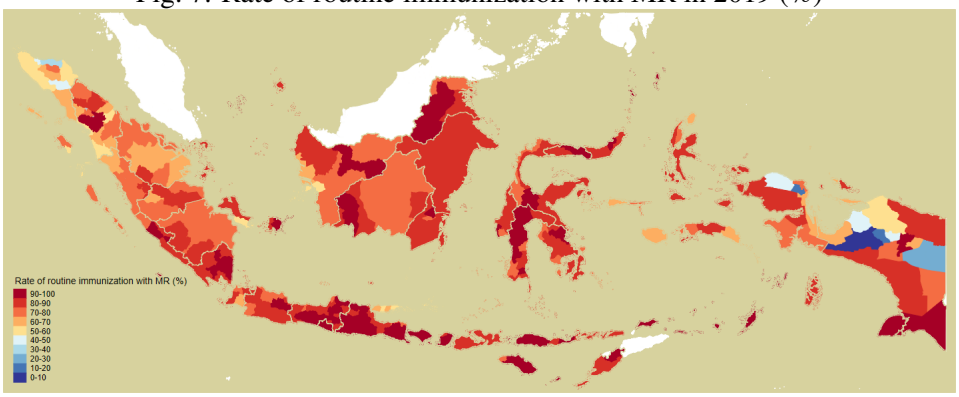
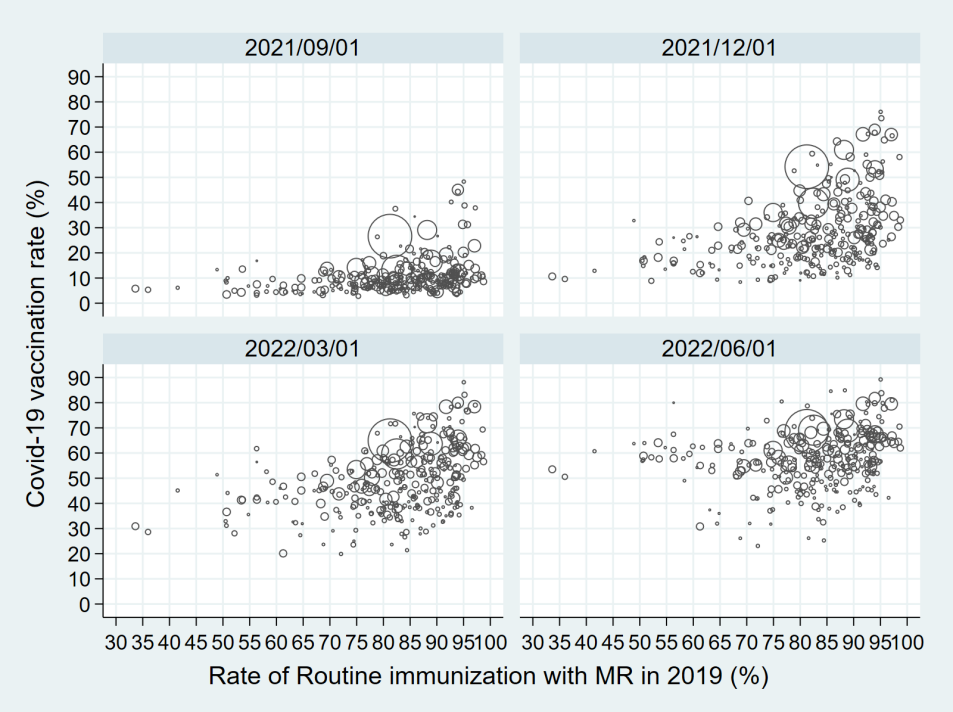


Fig. 8: Covid-19 vaccination rate and routine childhood immunization in 2019

Notes: Samples from Papua and West Papua are excluded. The size of circles is proportional to the number of residents.

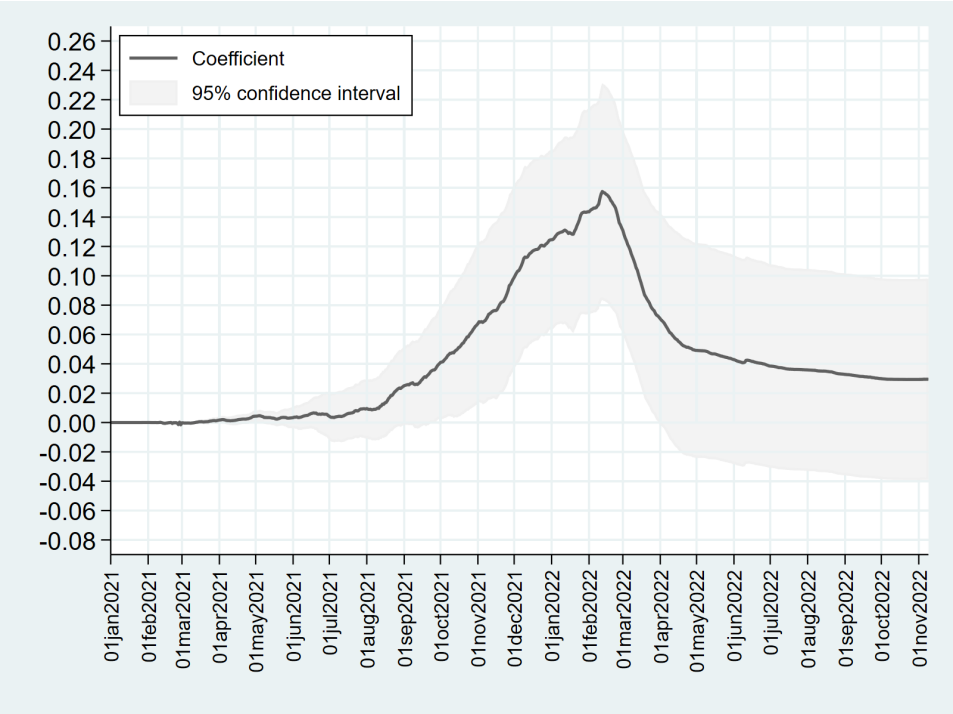
Fig. 9: Covid-19 vaccination rate and rate of routine immunization with MR in 2019



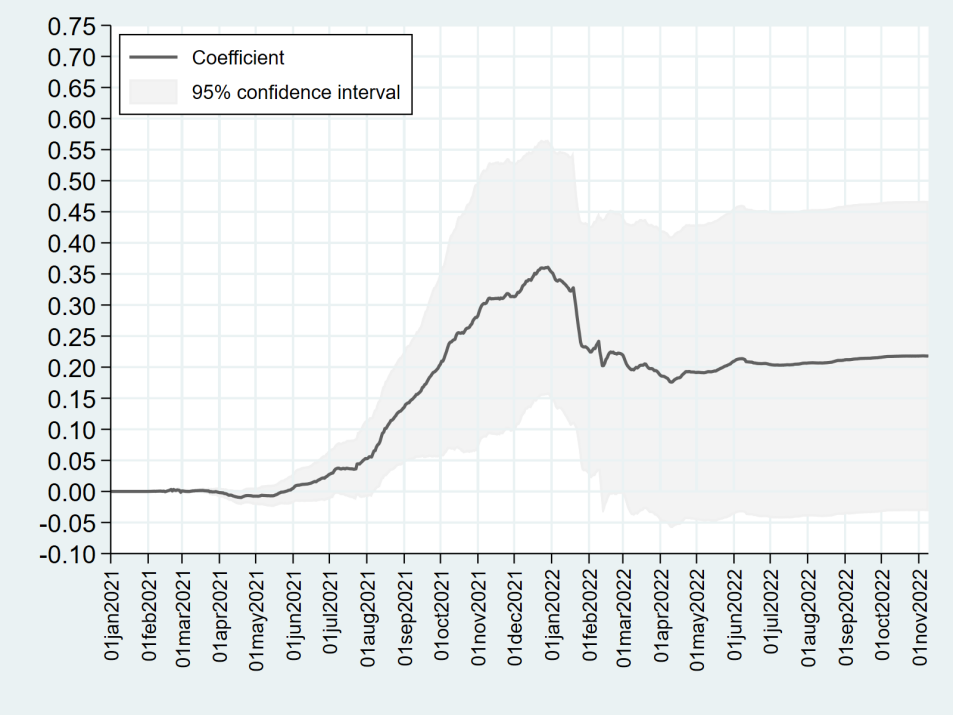
Notes: Samples from Papua and West Papua are excluded. The size of circles is proportional to the number of residents.

Fig. 10: Estimated results from January 2021 to November 2022: OLS

(a) Jokowi's vote margin



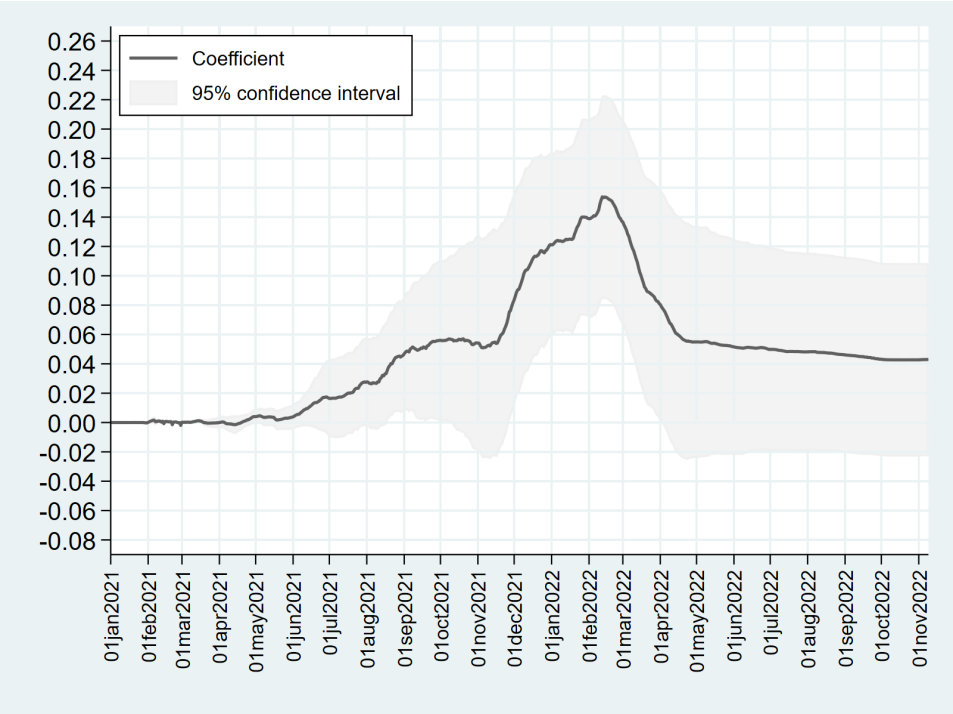
(b) Rate of routine immunization (2019)



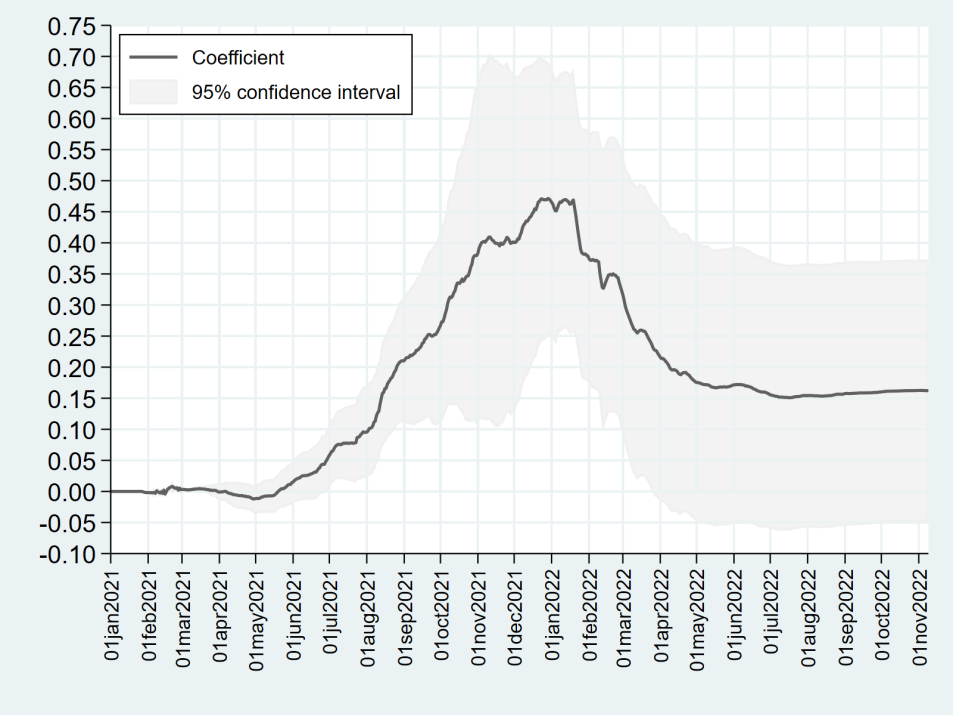
Source: Author's calculation.

Fig. 11: Estimated results from January 2021 to November 2022: Probit estimation (Average marginal effect)

(a) Jokowi's vote margin



(b) Rate of routine immunization (2019)



Source: Author's calculation.

Table 1: Summary statistics

Variable	Mean	Std. Dev.	Min.	Max.	N
Covid-19 vaccination rate					
as of Sep. 1, 2021	0.105	0.070	0.028	0.484	306
as of Dec. 1, 2021	0.285	0.137	0.085	0.761	306
as of Mar. 1, 2022	0.490	0.130	0.199	0.882	306
as of Jun. 1, 2022	0.574	0.114	0.231	0.893	306
Jokowi's vote margin	0.091	0.356	-0.670	0.767	306
Rate of routine childhood immunization (2019)	0.939	0.063	0.586	1	306
Rate of routine childhood immunization (2017)	0.934	0.060	0.643	1	306
Rate of routine immunization with MR (2019)	0.821	0.117	0.336	0.987	306
Rate of routine immunization with MR (2017)	0.831	0.104	0.395	0.991	306
Population	873,020	2,376,673	26,723	34,999,324	306
Area (km^2)	4,885	6,867	153	64,399	306
Distance from Jakarta (km)	1112	627	9	3066	306
Average distance to the nearest hospital (km)	4.4	2.4	0.7	18	306
Share of healthcare workers	0.007	0.003	0.002	0.033	306
Share of the elderly	0.078	0.027	0.019	0.175	306
Share of public service officials	0.067	0.016	0.025	0.132	306
Vote margin of Islamic parties	-0.335	0.181	-0.777	0.138	306
Share of Muslim population	0.779	0.322	0.008	1	306
Share of urban population	0.341	0.202	0	0.994	306
Share of population with higher education	0.061	0.023	0.015	0.161	306
Poverty rate	0.120	0.057	0.027	0.343	306

Source: Author's calculation.
Notes: Samples from Papua and West Papua provinces are excluded.

Table 2: Main results: OLS estimation

	(1) Sep 1, 2021	(2) Dec 1, 2021	(3) Mar 1, 2022	(4) Jun 1, 2022
Jokowi's vote margin	0.025^{+}	0.099**	0.131***	0.043
	(0.013)	(0.032)	(0.035)	(0.036)
Rate of routine immunization (2019)	0.135**	0.313**	0.220^{+}	0.209^{+}
	(0.046)	(0.109)	(0.114)	(0.125)
Regional characteristics	*Yes*	*Yes*	*Yes*	*Yes*
Province dummy	*Yes*	*Yes*	*Yes*	*Yes*
Observations	306	306	306	306
Adjusted R^2	0.829	0.759	0.735	0.688

Notes: Robust standard errors are presented in parentheses. $^{+}$ significant at 10%, * significant at 5%, ** significant at 1%, and *** significant at 0.1%.

Table 3: Main results: Probit estimation

	(1) Sep 1, 2021		(2) Dec 1, 2021		(3) Mar 1, 2022		(4) Jun 1, 2022	
		Marginal effect		Marginal effect		Marginal effect		Marginal effect
Jokowi's vote margin	0.202*	0.047	0.213*	0.084	0.324***	0.137	0.126	0.052
	(0.085)		(0.095)		(0.085)		(0.092)	
Rate of routine immunization (2019)	0.906***	0.210	1.022**	0.401	0.750**	0.317	0.417	0.171
	(0.222)		(0.352)		(0.271)		(0.277)	
Regional characteristics	*Yes*		*Yes*		*Yes*		*Yes*	
Province dummy	*Yes*		*Yes*		*Yes*		*Yes*	
Observations	306		306		306		306	

Notes: For calculation of average marginal effect, we use STATA command of *margins*. Robust standard errors are presented in parentheses. $^{+}$ significant at 10%, * significant at 5%, ** significant at 1%, and *** significant at 0.1%.

Table 4: Probit estimation results: as of March 1, 2022

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Jokowi's vote margin	0.399***	0.324***	0.375***	0.326***	0.313***	0.376***	0.314***
	(0.089)	(0.085)	(0.090)	(0.085)	(0.091)	(0.088)	(0.090)
Rate of routine immunization (2019)		0.750**		0.828*			
		(0.271)		(0.326)			
Rate of routine immunization (2017)			0.307	−0.129			
			(0.264)	(0.310)			
Rate of routine immunization with MR (2019)					0.489**		0.627**
					(0.167)		(0.208)
Rate of routine immunization with MR (2017)						0.184	−0.207
						(0.142)	(0.179)
Regional characteristics	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Province dummy	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Observations	306	306	306	306	306	306	306

Notes: Robust standard errors are presented in parentheses. $^{+}$ significant at 10%, * significant at 5%, ** significant at 1%, and *** significant at 0.1%.

Fig. A-1: Cities (*kota*) and their surrounding districts (*kabupaten*)

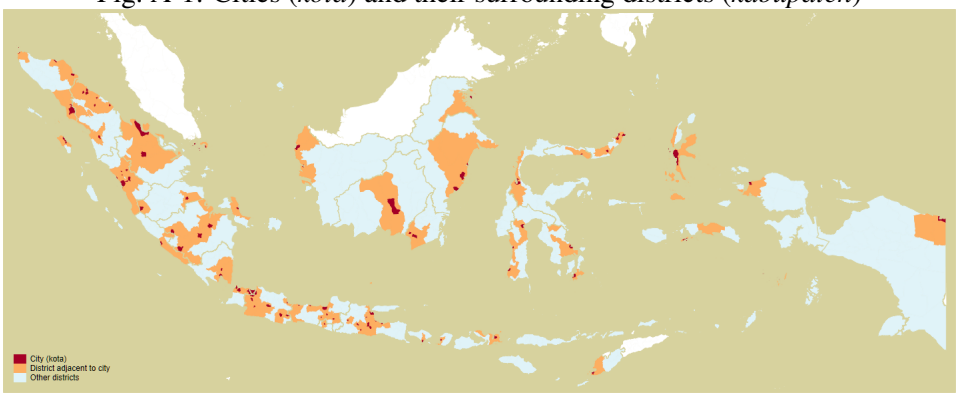
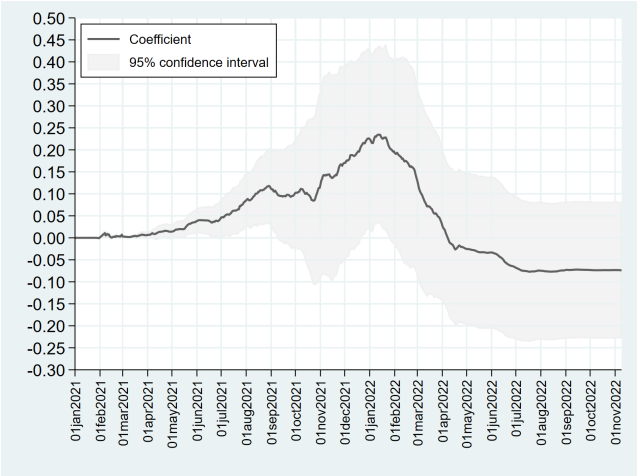
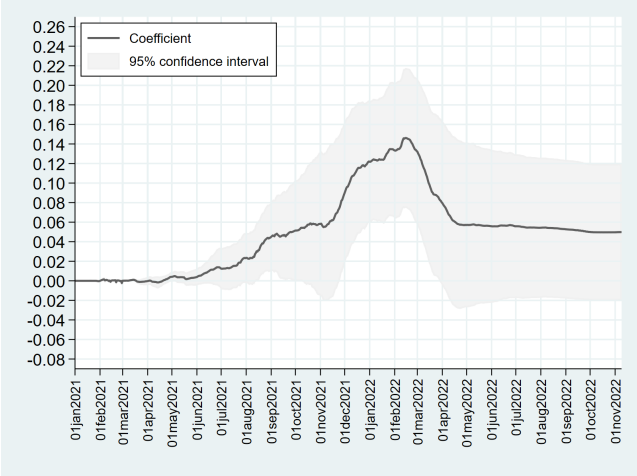


Fig. A-2: Probit estimation for robustness check (Average marginal effect)

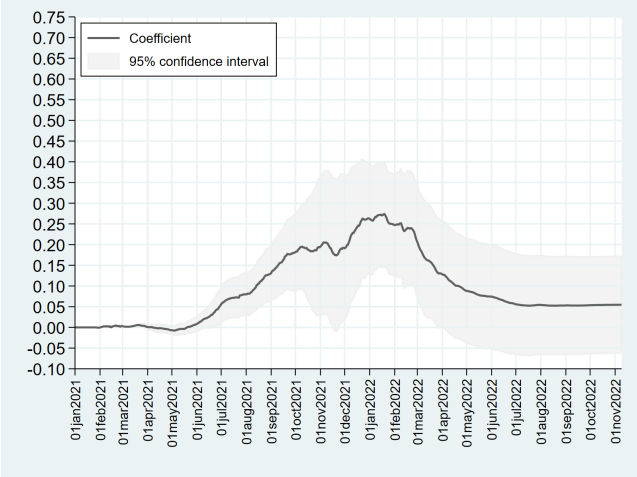
(a) Rate of routine immunization (2017)



(b) Jokowi's vote margin



(c) Rate of routine immunization with MR (2019)



Notes: In panel (a), estimated results using model in column (3) of Table 4 is illustrated. In panel (b) and panel (c), results using model in column (5) of Table 4 are shown.

Table A-1: OLS estimation results at four points in time

	Sep 1, 2021				Dec 1, 2021				Mar 1, 2022				Jun 1, 2022			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Jokowi's vote margin	0.060***	0.043***	0.060***	0.025+	0.171***	0.129***	0.162***	0.099**	0.179***	0.143***	0.171***	0.131***	0.108***	0.079**	0.099***	0.043
	(0.011)	(0.011)	(0.011)	(0.013)	(0.028)	(0.029)	(0.029)	(0.032)	(0.029)	(0.031)	(0.030)	(0.035)	(0.028)	(0.029)	(0.029)	(0.036)
Rate of routine immunization (2019)		0.207***	0.147**	0.135**		0.520***	0.402***	0.313**		0.454***	0.330**	0.220+		0.366**	0.279*	0.209*
		(0.048)	(0.049)	(0.046)		(0.108)	(0.114)	(0.109)		(0.119)	(0.119)	(0.114)		(0.124)	(0.129)	(0.125)
Population (in log)			−0.023***	−0.017***			−0.026**	−0.020+			−0.032***	−0.024*			−0.024***	−0.011
			(0.005)	(0.005)			(0.008)	(0.012)			(0.008)	(0.012)			(0.007)	(0.011)
Area (in log)			0.007+	0.007+			0.012+	0.017+			0.010	0.012			0.006	0.008
			(0.004)	(0.004)			(0.007)	(0.009)			(0.008)	(0.009)			(0.008)	(0.009)
Distance from Jakarta (in log)			−0.008	−0.012			−0.032	−0.054*			−0.061*	−0.086***			−0.011	−0.032
			(0.011)	(0.010)			(0.031)	(0.026)			(0.026)	(0.022)			(0.024)	(0.022)
Average distance to the nearest hospital (in log)			−0.034***	−0.018*			−0.068***	−0.037*			−0.078***	−0.056**			−0.061**	−0.048*
			(0.008)	(0.008)			(0.015)	(0.016)			(0.018)	(0.019)			(0.018)	(0.019)
Priority region dummy			0.080***	0.042***			0.100***	0.042+			0.056***	0.023			0.035*	0.006
			(0.010)	(0.010)			(0.018)	(0.024)			(0.016)	(0.020)			(0.015)	(0.019)
Share of healthcare workers				5.146***				3.465				1.393				3.659
				(1.333)				(2.613)				(2.771)				(3.146)
Share of the elderly				−0.091				0.811*				1.220***				1.236***
				(0.114)				(0.333)				(0.270)				(0.259)
Share of public service officials				0.009				−1.305*				−0.340				−0.108
				(0.297)				(0.591)				(0.564)				(0.459)
Vote margin of Islamic parties				−0.013				−0.074+				−0.057				−0.015
				(0.016)				(0.040)				(0.044)				(0.039)
Share of Muslim population				−0.033*				−0.037				−0.009				−0.048
				(0.015)				(0.040)				(0.039)				(0.042)
Share of urban population				0.053**				0.090*				0.009				−0.004
				(0.020)				(0.040)				(0.038)				(0.036)
Share of population with higher education				0.209				0.851*				0.840*				0.456
				(0.146)				(0.339)				(0.324)				(0.316)
Poverty rate				−0.123*				−0.187				−0.176				−0.031
				(0.048)				(0.117)				(0.127)				(0.113)
Province dummy	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Observations	306	306	306	306	306	306	306	306	306	306	306	306	306	306	306	306
Adjusted R^2	0.664	0.678	0.788	0.829	0.633	0.658	0.725	0.759	0.632	0.652	0.698	0.735	0.603	0.620	0.648	0.688

Notes: Robust standard errors are presented in parentheses. + significant at 10%, * significant at 5%, ** significant at 1%, and *** significant at 0.1%.

Table A-2: Probit estimation results at four points in time

	Sep 1, 2021				Dec 1, 2021				Mar 1, 2022				Jun 1, 2022			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Jokowi's vote margin	0.291**	0.108	0.366***	0.202*	0.500***	0.278*	0.501***	0.213*	0.534***	0.368***	0.471***	0.324***	0.290***	0.195**	0.251***	0.126
	(0.103)	(0.094)	(0.071)	(0.085)	(0.120)	(0.112)	(0.096)	(0.095)	(0.091)	(0.082)	(0.076)	(0.085)	(0.082)	(0.067)	(0.068)	(0.092)
Rate of routine immunization (2019)		1.849***	0.982***	0.906***		2.224***	1.232**	1.022**		1.572***	0.955**	0.750**		0.873*	0.499	0.417
		(0.445)	(0.283)	(0.222)		(0.422)	(0.424)	(0.352)		(0.341)	(0.339)	(0.271)		(0.344)	(0.345)	(0.277)
Population (in log)			−0.087***	−0.091**			−0.021	0.039			−0.055*	0.016			−0.038+	0.025
			(0.023)	(0.029)			(0.042)	(0.042)			(0.028)	(0.028)			(0.021)	(0.022)
Area (in log)			0.042*	0.044*			0.054+	0.022			0.058*	0.016			0.047*	0.017
			(0.022)	(0.018)			(0.031)	(0.030)			(0.023)	(0.022)			(0.020)	(0.019)
Distance from Jakarta (in log)			−0.066	−0.071			−0.160	−0.193*			−0.180*	−0.218***			−0.043	−0.077+
			(0.067)	(0.044)			(0.119)	(0.082)			(0.070)	(0.050)			(0.058)	(0.045)
Average distance to the nearest hospital (in log)			−0.303***	−0.084+			−0.293***	−0.031			−0.226***	−0.092*			−0.139**	−0.042
			(0.056)	(0.048)			(0.081)	(0.054)			(0.057)	(0.045)			(0.049)	(0.042)
Priority region dummy			0.338***	0.228***			0.187+	−0.018			0.094	−0.048			0.051	−0.073+
			(0.060)	(0.056)			(0.105)	(0.083)			(0.063)	(0.047)			(0.048)	(0.039)
Share of healthcare workers				26.865***				29.697*				17.928*				21.495**
				(7.330)				(11.890)				(8.383)				(7.174)
Share of the elderly				0.357				3.223**				2.836***				2.229***
				(0.648)				(0.993)				(0.667)				(0.602)
Share of public service officials				−0.959				−3.101				−0.359				−0.442
				(1.841)				(2.010)				(1.307)				(1.036)
Vote margin of Islamic parties				−0.030				−0.341*				−0.196+				−0.073
				(0.128)				(0.135)				(0.109)				(0.091)
Share of Muslim population				−0.180*				−0.274*				−0.105				−0.138
				(0.103)				(0.140)				(0.112)				(0.116)
Share of urban population				0.360*				0.315*				−0.087				−0.076
				(0.160)				(0.155)				(0.119)				(0.092)
Share of population with higher education				1.199				3.972**				4.150***				3.189***
				(0.996)				(1.397)				(1.041)				(0.861)
Poverty rate				−0.919**				−0.676				−0.413				0.142
				(0.328)				(0.463)				(0.360)				(0.314)
Province dummy	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Observations	306	306	306	306	306	306	306	306	306	306	306	306	306	306	306	306

Notes: Robust standard errors are presented in parentheses. + significant at 10%, * significant at 5%, ** significant at 1%, and *** significant at 0.1%.