


RESEARCH ARTICLE

# Beyond COVID-19 vaccine acceptance: survey evidence from Taiwan

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## Abstract

Unlike many other industrial societies, the partisan fights on the vaccination against COVID-19 in Taiwan centred on its brand choice rather than acceptance. Did the incumbent DPP supporters adhere to their party line of Medigen to vaccinate against COVID-19 during the pandemic? We argue that individual COVID-19 vaccine brand choices as gradually updated judgements during the pandemic were not solely determined by the party line, but jointly shaped by the strength of party affiliation and the level of government trust to facilitate decision-making in the highly uncertain information environment at the early stage of the pandemic. More specifically, when choosing COVID-19 vaccine brand, the incumbent DPP supporters, particularly weak ones, were more likely to adhere to their party line of Medigen as they trusted government more; however, this was only for the highly uncertain first shot, due to the absence of reliable information for making informed judgements about COVID vaccine brand choice at the early stage of the pandemic, not for the informationally rich booster shot. We report empirical findings consistent with our argument from statistical analyses of original data from a survey of 1642 Taiwanese adult respondents conducted in the fall of 2022.

**Keywords:** party affiliation and strength; trust in government; vaccine brand choice

## 1. Introduction

In May 2021, in response to the first large-scale community outbreak of COVID-19, Taiwan President Tsai Ing-Wen urged the government led by her Democratic Progression Party (DPP) to assist Taiwanese pharmaceutical companies in accelerating the development of domestic COVID vaccines (Office of the Republic of China, 2021b). However, such announcement was criticized by the main opposition party, the Kuomintang (KMT). In spite of the refutation by Ministry of Health Affairs (Ministry of Health and Welfare, 2022), KMT accused the Tsai administration intentionally delaying the procurement of foreign imported COVID vaccines, such as the internationally well-known one manufactured by Pfizer-BioNTech, in protection of the commercial interest of the domestic pharmaceutical firm, Medigen, politically connected to the incumbent DPP government; KMT also questioned the quality and safety of Medigen vaccine for it was certified by Taiwan's ministry of health and welfare without undergoing Phase III clinical trial (Kuomintang, 2021b). Unlike many other industrial societies, the partisan fights on the COVID-19 vaccine in Taiwan centred on its *brand choice* rather than *acceptance* (Kuo and Yu, 2024). Given the unique politicization of the COVID-19 vaccine brand choice in Taiwan, did the incumbent DPP supporters adhere to their party line of Medigen to vaccinate against COVID-19 during the pandemic?

This paper argues that individual COVID-19 vaccine brand choices as gradually updated judgements during the pandemic were *not* solely determined by the party line, as often portrayed by the

Taiwanese local media in the case of Medigen vaccine, but jointly shaped by the *strength of party affiliation* and the level of *government trust* to facilitate decision-making in the highly uncertain information environment at the early stage of the pandemic. More specifically, when choosing COVID-19 vaccine brand, the incumbent DPP supporters, particularly *weak* ones, were more likely to adhere to their party line of Medigen as they trusted government more; yet, this was only for the highly uncertain *first* shot, due to the absence of reliable information for making informed judgements about COVID vaccine brand choice at the early stage of the pandemic, not for the informationally rich *booster* shot.

Using original individual-level data from an online survey of 1,642 adult Taiwanese respondents conducted in the fall of 2022, we test the hypothesized conditional positive effect of DPP strength on the Medigen vaccine choice by the level of government trust. Through a series of statistical analyses across different model specifications, we demonstrate that the average predicted probability that DPP supporters, particularly weak ones, would choose the Medigen vaccine as the first shots significantly increased as the level of government trust went up; we also show no such conditional effect of DPP strength by the level of government trust on whether Taiwanese adult respondents chose the Medigen vaccine as their booster shots. Besides what we do find to affect the booster shot choice of the Medigen vaccine in our survey data is the interaction between prior personal exposure to Medigen vaccine as the first shot and the level of government trust. That is, all else equal, Taiwanese adult respondents who could learn about Medigen vaccine from their personal experiences of it were more likely to have it again as the booster shots when they trust government more. In other words, as Taiwanese adult respondents became updated about the Medigen vaccine through direct vaccination experiences during the pandemic, they no longer relied upon party cue to make informed judgements about the booster shot choices. Overall, these empirical findings are consistent with our argument of individual COVID-19 vaccine brand choices as gradually updated judgements to explain the conditional effect of DPP strength by government trust on the choice of the Medigen vaccine as the first shot rather than the booster.

This paper makes three contributions to the growing body of literature on the politicization of the COVID-19 vaccine. First and foremost, with the country study of Taiwan, it reminds readers again that the cleavage of the COVID-19 vaccine needs not to fall on its uptake intention (Ward *et al.*, 2020; Fridman *et al.*, 2021; Khubchandani *et al.*, 2021; Jones and McDermott, 2022; Klymak and Vlandas, 2022; Motta, 2023), but relatively unnoticed vaccine brand choice (Lo and Huang, 2022; Kuo and Yu, 2024). Second, it examines how party strength and government trust interact to influence vaccine brand choice, complementing existing studies that treated these political factors as determinants that work independently (Baumgaertner *et al.*, 2018; Krupenkin, 2021; Dal and Tokdemir, 2022). Third, and most importantly, this study theorizes vaccine brand choices as gradually updated judgements to arrive at conditions under which the incumbent DPP supporters would *not* adhere to the party line of Medigen to vaccinate against COVID-19 during the pandemic. This leads us to learn about two novel facts that deviated from the dynamic picture of partisan fights over Medigen vaccine in Taiwan: weak DPP supporters would not adhere to the party line of getting Medigen vaccine as their *first* shot unless they had sufficiently high levels of government trust; nor would they adhere to the party line of getting Medigen vaccine as their *booster* shot even if they had sufficiently high levels of government trust. In other words, our theory and evidence jointly suggest that political determinants of individual vaccine brand choice as gradually updated judgements may change or even evolve over time. This complements the existing literature on the static relationships between partisanship, government trust, and vaccine uptake intentions before and during the pandemic (Baumgaertner *et al.*, 2018; Krupenkin, 2021; Dal and Tokdemir, 2022; Kuo and Yu, 2024).

The rest of the paper proceeds as follows. Section 2 describes the background of COVID-19 vaccine controversy in Taiwan and the reason why Medigen COVID-19 vaccine is chosen for our study. Section 3 reviews the literature relevant to vaccine politicization. Section 4 introduces its empirical strategy. Section 5 presents the results and section 6 is the discussion.

## 2. The background of controversies over COVID-19 vaccines in Taiwan

Taiwan's COVID-19 vaccine programme began in March 2021, when AstraZeneca became the first available option, followed by Moderna in June, the domestic Medigen vaccine in August, and finally Pfizer-BioNTech in September. Before the domestic outbreak in May 2021, vaccine demand remained low out of Taiwan's successful containment of the coronavirus and public concerns about blood clot risks associated with the AstraZeneca vaccine (BBC News Chinese, 2021). During this early stage, the government prioritized and rationed the available vaccines, primarily AstraZeneca with limited supplies of Moderna, to medical personnel, elderly citizens, and individuals with high-risk medical conditions. However, when confirmed cases skyrocketed after the domestic outbreak in May 2021, the government's inability to meet the sudden surge in vaccination demand led to intense public criticism, particularly from the opposition party led by the KMT (BBC News Chinese, 2021). It was not until early October 2021 that the government made all four vaccine brands available to the adult populations.

Nevertheless, the criticism of vaccine shortage soon evolved into partisan debates over the government's support of the domestic Medigen vaccine. At first, to address the problem of vaccine shortage and to provide Taiwanese citizens with more vaccine options, the major opposition party, KMT, proposed the initiative of allowing the local governments and private firms to procure vaccines independently (CNA, 2021b). However, as Terry Gou, founder of Foxconn, encountered difficulties in his attempts to procure the Pfizer-BioNTech both domestically and internationally (CNA, 2021a), KMT and other opposition parties accused the DPP government of deliberately blocking the imports of foreign vaccine to protect the commercial interests of the domestic Medigen (Kuomintang, 2021a). The opposition party even alleged that DPP intentionally blocked the Pfizer-BioNTech procurement in order to benefit from the Medigen's stock (China Times, 2021).

The controversy escalated further as then-President Tsai Ing-Wen publicly endorsed the domestic vaccine. Unlike other available COVID-19 vaccines at the time, Medigen was granted Emergency Use Authorization (EUA) by the Ministry of Health and Welfare without completing Phase III clinical trials. This sparked intense partisan debates, with KMT and other opposition parties questioning the vaccine's safety and the legitimacy of overruling the standard procedure of vaccine certification. (Kuomintang, 2021a). In response, the former Minister of Health and Welfare, Chen Shih-Chung, and other DPP officials strongly refuted these accusations. They contended that the approval process of Medigen's EUA was rigorous, and its efficacy matched that of foreign vaccines (Taiwan Center for Disease Control, 2021; Democratic Progressive Party, 2021). To demonstrate their confidence, several DPP political figures at all levels, from the president to local legislators, chose Medigen as their first shot of COVID-19 vaccine (Office of the President Republic of China, 2021a). Such endorsement effect was phenomenal. It was even documented that some Taiwanese citizens or political figures preferred to wait for their desired brand (Liberty Times, 2021; Kuo and Yu, 2024).

As a result, these controversies regarding Medigen made it an ideal case study for examining the relationship between politics and vaccine brand choice in Taiwan. Unlike AstraZeneca, Moderna and Pfizer-BioNTech, which only sparked limited discussion on the supply and availability, Medigen became the limelight of intense partisan conflict between the DPP government and the opposition parties. Therefore, the unique example of Medigen vaccine enables us to investigate how party identification and government trust influenced individuals' vaccine behaviour during the pandemic.

## 3. Trust in government, partisanship, vaccine acceptance, and vaccine choice

### 3.1 Trust in government and vaccine acceptance

Trust in government has been long recognized as a primary 'political' determinant of vaccine acceptance and hesitancy in public health research. Grounded in the '3Cs Model', McDonald and Sage Working Group on Vaccine Hesitancy (2015) contended that vaccine hesitancy is dependent on individual's confidence in the 'system that delivers the vaccines' and the 'motivation of policymakers',

which essentially highlighted the factor of trust in government (and its officials). A substantial of studies have further shown empirical evidence for this argument in both industrialized societies prior COVID-19 pandemic (van der Weerd *et al.*, 2011; Chuang *et al.*, 2015; Mesch and Schwirian, 2015; Lee *et al.*, 2016). For example, in the United States, research found that parents who had a lower trust in government would be likely to seek alternative medicine rather than vaccine for protection against influenza for their children (Lee *et al.*, 2016). Likewise, Chuang *et al.* (2015) found that individuals' intentions to get vaccinated were influenced more by their 'general trust' in the government by investigating the influenza endemic in Taiwan.

Studies on the effect of government trust on vaccine acceptance proliferated amid the COVID-19 pandemic. Lazarus *et al.* (2021) demonstrated that countries with higher levels of government trust, especially in Asia, exhibited greater vaccine acceptance among their populations. This link between trust in government and vaccine acceptance has been supported by further studies. By surveying respondents from major cities across the United States, the United Kingdom and Australia, Trent *et al.* (2022) established that a positive relationship existed between vaccine acceptance and the level of 'confidence' citizens had in their government. Jennings *et al.* (2023) also reported such a similar empirical association between trust in government and the rate of vaccine intention by examining cross-national data. Moreover, through a qualitative analysis involving open-ended survey questions, Latkin *et al.* (2021) further showed that vaccine hesitancy was strongly influenced by a lack of trust in government. While these studies emphasized the role of government trust in explaining the variation in vaccine acceptance across individuals, another strand of literature focused on partisan affiliations of citizens.

### 3.2 Partisanship and vaccine acceptance

Borrowing insights from the socio-psychological theories of voting (Campbell *et al.*, 1960; Bartels, 2002; Achen and Bartels, 2017), studies on partisanship as a 'political determinant' of vaccine acceptance have proliferated over the past decade. Prior to the global pandemic of COVID-19, there had been empirical evidence showing that the Republican supporters were more likely to believe and 'endorse' the misinformation of MMR vaccine could cause childhood autism in the United States (Joslyn and Sylvester, 2019; Motta, 2021). With further evidence from survey experiments conducted in the United States, Jones-Jang and Noland (2020) showed that, in a scenario involving MMR vaccination, Republican supporters were more inclined to heed vaccine cues from Donald Trump instead of relying on scientific sources. After the outbreak of the COVID-19 pandemic, scholars had provided a new set of evidence showing that with the Republican politicians' attitude to the COVID vaccines leaning toward anti-vaccination in the States, public trust in vaccines, vaccination intention and uptakes have significantly decreased among Republican supporters (Fridman *et al.*, 2021; Khubchandani *et al.*, 2021; Jones and McDermott, 2022). Furthermore, it was also well-documented that the vaccination endorsement from political figures could boost the vaccination uptake among their supporters (Bokemper *et al.*, 2021; Pink *et al.*, 2021; Robertson *et al.*, 2021).

A related body of literature on partisan cleavage of vaccine acceptance attributes the variation in vaccination intention across individuals to partisan polarization (Iyengar *et al.*, 2012; Iyengar *et al.*, 2019). The line of research argued that individual's vaccination intention is dependent on the position of one's opposing party. In the early stage of the COVID-19 pandemic, Druckman *et al.* (2021) showed that Republicans' animosity toward Democrats resulted in lower compliance with disease prevention guidelines. With vaccination playing a vital role in disease prevention, this implied that vaccine hesitancy would increase as parties became polarized. The effect of affective polarization is more clearly demonstrated through experiments that utilized the endorsement of vaccine policy from politicians of a particular party. Multiple studies have all pointed out that one's vaccine acceptance would decrease if politicians from opposing parties supported vaccination programmes or policies (Ward *et al.*, 2020; Motta, 2023).

The more recent literature brings back government trust to study partisan cleavage of vaccination intention. It posits that party identification can not only directly affect vaccine acceptance but also indirectly does so through the causal pathway of government trust. For instance, Krupenkin (2021) analysed the perceived safety of the MMR and H1N1 vaccines among U.S. respondents and discovered that trust in government mediated about one-third of the partisan effect on perceived vaccine safety for H1N1, and remarkably, nearly 70 per cent for the MMR vaccine. Similarly, Baumgaertner *et al.* (2018) demonstrated that, compared to trust of family health experts, trust of health experts in the government significantly mediated the effect between political ideology and vaccine belief. Likewise, during the COVID-19 pandemic in Turkey, Dal and Tokdemir (2022) discovered that ‘institutional trust’ served as a significant mediator between vaccine acceptance and Kurdish party identification through a two-step modelling approach. In other words, government trust has emerged as a robust mediator between partisanship and vaccine acceptance.

### 3.3 Beyond acceptance: Partisan cleavage of vaccine brand choice in Taiwan

The partisan cleavage of vaccine acceptance during the COVID-19 pandemic has been well-documented beyond the States. Klymak and Vlandas (2022), for instance, showed that the vaccination rate against COVID-19 was different between supporters of the Labours and Conservative Party but in the United Kingdom despite that such partisan effect was less substantial than that of the United States after the socio-demographics variables were taken into consideration. However, vaccine politicization took a different form of *brand choice* in Taiwan from that of *acceptance* in other industrialized societies around the world (Lo and Huang, 2022; Kuo and Yu, 2024).

Given the unique form of vaccine politicization in Taiwan, several pioneering studies have started to investigate how partisanship influences vaccine brand choice during the COVID-19 pandemic. For example, though written in Mandarin Chinese, Lo and Huang (2022) highlighted the sharp descriptive difference in Medigen’s acceptance between the DPP and non-DPP supporters in a survey conducted *before* the launch of the government-funded COVID vaccine programme. Lo and Huang (2022) further reported such partisan division in acceptance for the Medigen vaccine was notably more pronounced than that for the Sinovac vaccine designed and produced by China, indicating that the partisan cleavage, in this case of Medigen’s acceptance, overshadowed many other considerations of the COVID-19 vaccine attribute (Argote *et al.*, 2021; Chiang *et al.*, 2022; Algara and Simmons, 2023). Yet, it remains unclear whether this partisan cleavage of COVID-19 vaccine brand choice that Lo and Huang (2022) found persists *after* the commencement of the COVID vaccine programme in Taiwan.

Kuo and Yu (2024) advanced this line of research using publicly available longitudinal data surveyed during the COVID-19 pandemic. By investigating the preference and the actual uptake of different COVID-19 vaccine brands among people in Taiwan, they uncovered that those who identified themselves as ‘Taiwanese’ were more likely to choose the foreign-produced Oxford-AstraZeneca and domestic-manufactured Medigen COVID-19 vaccine (Kuo and Yu, 2024). Although national identity is widely recognized as a good proxy for party identification in the context of Taiwanese politics, party identification was not directly measured to show its effects on vaccine brand choice and vaccine quality perception. In short, whether party identification with the incumbent DPP would boost, or identification with the opposition KMT would decrease, the uptake of the Medigen vaccine remains unexplored.

While the aforementioned studies have examined the relationship between political factors and vaccine brand choice, several theoretical gaps remained to be addressed. First, despite the fact that existing literature has documented that party affiliation significantly affected individuals’ vaccination behaviour, few studies had distinguished between strong and weak partisanship, thereby overlooking how the strength of different party affiliation might influence vaccine brand choice. Second, in attempts to examine how partisanship and trust in government jointly shaped vaccination behaviour, previous studies, such as Krupenkin (2021) and Dal and Tokdemir (2022), treated these two variables as separate



concepts in their mediation frameworks. However, party affiliation and government trust were, in fact, endogenous.<sup>1</sup> That is, party affiliation could shape individuals' trust in government, as government performance could simultaneously affect partisanship (Clarke and Stewart, 1998). Therefore, such intertwining relationship between party affiliation and government trust suggests the need to examine how they interact to influence individual COVID-19 vaccine brand choices. Third, and most importantly, while existing studies have extensively explored how political factors shape individuals' vaccination behaviour, they have not explored whether such influences persist, change, or even evolve over time, particularly as citizens obtained vaccination experience.

We argue that individual COVID-19 vaccine brand choices as *gradually updated judgements* during the pandemic were jointly shaped by the *strength of party affiliation* and the level of *government trust* to facilitate decision-making in the highly uncertain information environment at the early stage of the pandemic. This leads us to four testable hypotheses related to the ruling DPP government publicly endorsing the Medigen vaccine as we elaborated above. First, given the fact that Taiwanese citizens had limited knowledge about COVID-19 vaccines and the intense domestic partisan debate surrounding the Medigen vaccine at the early stage of the pandemic, individuals were more likely to rely on party cue when choosing Medigen for their first shots. Therefore, if partisanship did matter in shaping individual COVID-19 vaccine brand choices in a joint venture with government trust, we hypothesize that DPP supporters were more inclined to select Medigen as their first shot when they had higher levels of government trust at the early stage of the COVID-19 pandemic (hypothesis 1). In addition, if we took into account the strength of party affiliation to unpack the interdependent relationship between party affiliation and government trust, we would expect that weak DPP supporters were less inclined to adhere to the party line unless they had high enough level of trust in government at the early stage of the COVID-19 pandemic. Thus, we hypothesize that *weak DPP supporters were more likely to select Medigen as the first shot when they had higher levels of government trust* (hypothesis 2). Third, as Taiwanese citizens had accumulated substantial information about COVID-19 vaccines and already gained first-hand vaccination experiences over time by the time they were about to receive booster shots, we expect that their vaccine brand choices of the booster shots would be mainly shaped by personal vaccination experiences rather than political considerations. Therefore, we hypothesize *a positive conditional effect of prior Medigen vaccination experience by the strength of government trust on the selection of Medigen as the booster shot* (hypothesis 3); relatedly, we can also hypothesize *no positive conditional effect of DPP affiliation regardless of its strength by government trust on the selection of Medigen as the booster shot* (hypothesis 4).

## 4. Research design and method

### 4.1 Data collection

Our empirical data came from an original online survey conducted between September 26 and October 12, 2022. Approved by the University's Social and Behavioral Research Ethics Committee in charge, the survey recruited 1,642 Taiwanese respondents from the opt-in panel maintained by a well-known local marketing research company. The method of quota sampling was used to approximate the distribution of the adult population aged between 20 and 55, including both genders and residing in the four major regions of the island of Taiwan. We exclude elderly adults whose vaccination choices were significantly affected by health emergencies at the initial stage of vaccination from the sample. To assess the quality of our sample, we compare key demographic characteristics with official government statistics. As shown in Table 1, our sample matches the population distribution across key demographic characteristics (age, gender, and geographic region), which is further supported by the results of the chi-square test.

Moreover, according to the official data published by the Taiwan Center of Disease Control on September 26, 2022, merely 13 months after the launch of the COVID vaccine programme, 93.6% of

<sup>1</sup>The authors thank the anonymous reviewer for pointing this out.

**Table 1.** Demographic difference between the sample and the population

Variables	Categories	% of sample	% of population	Chi-statistics	P-Val.
Age	20 ~ 29	24.30	23.31	1.2301	0.7458
	30 ~ 39	26.98	26.90		
	40 ~ 49	31.24	32.27		
	50 ~ 55	17.48	17.52		
Gender	Male	49.82	49.44	0.0921	0.7616
	Female	50.18	50.56		
Region	North	46.71	46.02	0.6638	0.8817
	Central	24.42	24.97		
	South	26.37	26.69		
	East	2.50	2.32		

Note 1: Source of the population data: Department of Household Registration (2024): ‘Population of counties and cities by gender and age (2022/10).’

Note 2: The north region: Taipei City, New Taipei City, Keelung City, Taoyuan City, Hsinchu County, Hsinchu City Yilan County. The central region: Miaoli County, Taichung City, Changhua County, Nantou County, Yunlin County. The south region: Chiayi County, Chiayi City, Tainan City, Kaohsiung City, Pingtung County. The east region: Hualien County, Taitung County.

Taiwan’s population had received their first dose of the COVID-19 vaccine, among them approximately 73.1% having received the booster shot as well (Taiwan Centers for Disease Control, 2022a). Consequently, at the time of the survey, a significant majority of Taiwanese had already obtained their booster shot of the COVID vaccine. This modestly mitigated the issue of missing data on booster shots for most respondents in our models of statistical estimation.

## 4.2 Measurements and methods

### 4.2.1 Dependent variables

We measure whether individuals chose Medigen COVID vaccine as their first (booster) shot based on their responses to the following question in the survey: ‘Which of the following brands did you choose as your first [booster] shot of COVID-19 vaccine?’ Respondents were subsequently presented with a list of available or upcoming COVID vaccine brands in Taiwan, including ‘Oxford–AstraZeneca (AZ)’, ‘Moderna’, ‘Pfizer–BioNTech (BNT)’, ‘Medigen’, and an option for those who had not yet received their first (booster) vaccine. We then assigned the value of one to any response choosing ‘Medigen’ from the list, and zero otherwise. Hence, our two outcome variables, *Medigen First* and *Medigen Booster*, are binary.

### 4.2.2 Independent variables

To test our hypotheses, we construct three set of independent variables that measure the party affiliation, its strength, and previous experience of receiving Medigen. For our first and second set of independent variables, we utilize a series of indirect questions from the survey to assess respondents’ affiliation with the incumbent DPP, major opposition KMT and other parties. Respondents were first asked: ‘Among the political parties in Taiwan, is there any particular party that you support?’ If they answered ‘Yes’, they were prompted: ‘Can you specify which party it is?’ Then, respondents were provided with a list of major political parties in Taiwan, including ‘Kuomintang’, ‘Democratic Progressive Party’, ‘Taiwan People’s Party’, ‘New Power Party’, ‘Taiwan State-building Party’, and ‘Others’ to choose from. By contrast, if respondents answered ‘No’ to the initial question, they were asked a follow-up: ‘Relatively speaking, is there a political party you lean slightly towards?’ Then, if they answer to this was ‘Yes’, they were again asked to specify the party from the aforementioned list. If they answered ‘No’ again, the party affiliation questioning ended.

Based upon responses to the aforementioned questions, we constructed three dummy variables to measure whether a respondent's party affiliation was DPP, KMT or other political parties. More specifically, we assigned a value of one to *DPP* if respondents chose DPP from the list, *KMT* if they selected KMT, and *Other Parties* if they chose any other political parties. Respondents who answered 'No' to both questions about party support were coded as zero for all three variables, indicating no party affiliation.

As for the strength of party affiliation, we leveraged the sequential questioning approach as shown in the preceding paragraph to distinguish between strong and weak partisans. More precisely, respondents who directly indicated their party support in the first question were coded as strong partisans, while those who expressed their party leaning in the follow-up question were coded as weak partisans. Therefore, we were able to construct a series of binary variable for each party affiliation by its strength. Specifically, *Strong DPP* was coded as one if a respondent immediately expressed supporting party and chose DPP from the aforementioned list, while *Weak DPP* was coded as one for those who expressed slightly leaning toward a political party and chose DPP from the list. We applied the similar coding method to the variables of *Strong KMT/Weak KMT* and *Strong Other Parties/Weak Other Parties*. Last, respondents who expressed neither supporting nor slightly leaning toward a party in the two questions were coded as zero across all six dummy variables for no party affiliation.

Our third independent variable measured respondents' prior experiences with Medigen vaccine. We constructed a binary variable, *Medigen Before*, to measure whether respondents had received Medigen as their first or second shot of COVID-19 vaccine. More specifically, the variable was coded as one if respondents selected Medigen as their first or second vaccine shot and zero if they did not receive Medigen.

#### 4.2.3 Moderating variable

Our moderating variable, *Gov Trust*, was measured by adopting the standard question of political trust in government. More specifically, it was based on responses to the following: 'How often do you believe that the central government is doing the right things?' Respondents could answer by choosing one of the following four ordinal categories, from 'Never', to 'Sometimes', to 'Often', and to 'Always'. We recoded these responses with the value of one for 'Never', two for 'Sometimes', three for 'Often' and four for 'Always'. As a result, our mediating variable, *Gov Trust*, is ordinal. About 10 % of respondents never trusted the central government, 55% sometimes, 31% often, and 4% always. The distribution of this variable is plotted in the appendix of the paper.

#### 4.2.4 Control variables

To take into account each respondent's personal health status along with socio-demographic backgrounds and political attributes, we constructed an extensive set of control variables. The set of variables encompasses measures not only for the health habit of getting a seasonal flu shot (*Flu Vaccine*), COVID vaccination history (*NoShot1*, *NoShot3*), education (*Education*), monthly family income (*Family Income*), gender (*Male*), age (*Age*), and county of residence (*County*) but also populist attitudes (*Populism*) and policy attitudes towards Taiwan's unification with China (*Unification*), the single most politically salient policy issue in Taiwan.

Table 2 shows the summary statistics of our dependent, independent, moderating, and control variables that were included in the models of the following empirical results. We provide details about the operationalization of each variable in the appendix at the end of the paper.

#### 4.2.5 Estimation methods

We adopted the method of ordinary least square (OLS) with Huber-White robust standard errors to test our four hypotheses. Since our dependent variables, *Medigen First* and *Medigen Booster*, were binary, we would obtain linear probability (LPM) estimates. Despite the fact that LPM does not fit



**Table 2.** Summary statistics

Variables	Obs.	Mean	Std.	Min.	Max.
<b>Dependent Variables</b>					
<i>Medigen First</i>	1642	0.076	0.264	0	1
<i>Medigen Booster</i>	1642	0.062	0.241	0	1
<b>Moderator</b>					
<i>Gov Trust</i>	1642	2.290	0.711	1	4
<b>Independent Variables</b>					
<i>DPP</i>	1642	0.219	0.413	0	1
<i>KMT</i>	1642	0.114	0.319	0	1
<i>Other Parties</i>	1642	0.137	0.344	0	1
<i>Strong DPP</i>	1642	0.122	0.327	0	1
<i>Weak DPP</i>	1642	0.097	0.296	0	1
<i>Strong KMT</i>	1642	0.069	0.253	0	1
<i>Weak KMT</i>	1642	0.046	0.209	0	1
<i>Strong Other Parties</i>	1642	0.058	0.234	0	1
<i>Weak Other Parties</i>	1642	0.079	0.270	0	1
<i>Medigen Before</i>	1642	0.081	0.273	0	1
<b>Control Variables</b>					
<i>Populism</i>	1642	3.859	0.622	0	1
<i>Unification</i>	1642	2.236	1.083	1	5
<i>Flu Vaccine</i>	1642	0.548	0.498	0	1
<i>NoShot1</i>	1642	0.040	0.196	0	1
<i>NoShot2</i>	1642	0.051	0.219	0	1
<i>NoShot3</i>	1642	0.135	0.341	0	1
<i>Education</i>	1642	4.968	0.695	2	7
<i>Family Income</i>	1642	6.960	2.362	1	14
<i>Male</i>	1642	0.502	0.500	0	1
<i>Age</i>	1642	38.283	9.690	20	55
<b>County Fixed Effects</b>					
<i>Taipei City (1, baseline)</i>	1642	0.107	0.309	0	1
<i>New Taipei City (2)</i>	1642	0.213	0.409	0	1
<i>Keelung City (3)</i>	1642	0.012	0.107	0	1
<i>Taoyuan City (4)</i>	1642	0.089	0.285	0	1
<i>Hsinchu County (5)</i>	1642	0.013	0.112	0	1
<i>Hsinchu City (6)</i>	1642	0.026	0.160	0	1
<i>Miaoli County (7)</i>	1642	0.014	0.118	0	1
<i>Taichung City (8)</i>	1642	0.146	0.353	0	1
<i>Changhua County (9)</i>	1642	0.051	0.220	0	1
<i>Nantou County (10)</i>	1642	0.007	0.082	0	1
<i>Yunlin County (11)</i>	1642	0.026	0.160	0	1
<i>Chiayi City (12)</i>	1642	0.014	0.118	0	1
<i>Chiayi County (13)</i>	1642	0.009	0.095	0	1
<i>Tainan City (14)</i>	1642	0.084	0.278	0	1
<i>Kaohsiung City (15)</i>	1642	0.137	0.344	0	1
<i>Pingtung County (16)</i>	1642	0.019	0.138	0	1
<i>Yilan County (17)</i>	1642	0.008	0.089	0	1
<i>Hualien County (18)</i>	1642	0.017	0.130	0	1
<i>Taitung County (19)</i>	1642	0.008	0.089	0	1

discrete choice data ideally, its notable advantage lies in the direct interpretation of coefficients as average marginal effects (AME) (Wooldridge, 2010, p. 563). Econometricians show that LPM coefficient estimates are consistent and close to the AMEs derived from probit or logit model in a large sample (Angrist and Pischke, 2009, pp. 47–48; Wooldridge, 2010, p. 563).

We fitted our data with four model specifications both with and without an extensive set of control variables to account for the heterogeneity across different social demographic characteristics of our respondents. More specifically, we first made *Gov Trust* separately interact with different party affiliation dummies, i.e. *DPP*, *KMT*, and *Other Parties*, to obtain LPM coefficient estimates for the conditional effect of party affiliation dummies by *Gov Trust* on *Medigen First*. According to our first hypothesis, the estimated coefficient of *DPP \* Gov Trust* on *Medigen First* was expected to be positive. Then, *Gov Trust* was separately interacted with different party strength dummies, i.e. *Strong DPP*, *Weak DPP*, *Strong KMT*, *Weak KMT*, *Strong Other Parties*, and *Weak Other Parties*, to estimate LPM coefficient for the conditional effect of party strength dummies by *Gov Trust* on *Medigen First*. According to our second hypothesis, we would expect the estimated coefficient of *Weak DPP \* Gov Trust* on *Medigen First* be positive as well. Third, we further incorporated the interaction of *Gov Trust* and *Medigen Before* into the model specialization to study political determinants of *Medigen Booster*, while maintaining the respective interactions between *Gov Trust* and party affiliation as well as party strength dummies mentioned above. According to our third hypothesis, we would expect that the estimated coefficient of *Medigen Before \* Gov Trust* on *Medigen Booster* be positive. Meanwhile, according to our fourth and last hypothesis, we could expect estimated coefficients of *DPP \* Gov Trust* and *Weak DPP \* Gov Trust* on *Medigen Booster* indistinguishable from zero, respectively. Following the methodological advices from Brambor, Clark and Golder (2006), we also plot substantively meaningful marginal effects and the uncertainty with which they are estimated.

## 5. Empirical results

Results in Table 3 support our first two hypotheses. Columns (1) and (3) of Table 3 report the LPM coefficient estimates for average changes in the predicted probability of choosing Medigen as the first vaccine shot without control variables, while columns (2) and (4) report the estimates with our full set of control variables. First, as shown in columns (1) and (2) of Table 3, the coefficient of the interaction term between DPP affiliation and government trust, *DPP \* Gov Trust*, is significantly positive regardless of the extensive set of control variables. Substantively speaking, all else equal, with one unit increase in government trust, DPP supporters were more likely to choose Medigen as their first shots by about 6 per cent points. In contrast, the interaction terms between government trust and other political affiliations (KMT and other parties) show no statistically substantial effect on the choice of Medigen as the first shot. The substantive average marginal effects of *DPP* on *Medigen First* conditioned by *Gov Trust* are plotted with 95% confidence intervals in Figure 1. Specially, all else equal, a DPP supporter would be more likely to receive the Medigen vaccine as the first shot by 10.9 and 17.1 per cent points respectively when he or she ‘often’ and ‘always’ trusted the central government; yet, when he or she ‘never’ and ‘sometimes’ trusted the central government, being affiliated with the DPP made no statistically significant difference in the likelihood of receiving the Medigen vaccine as the first shot. These results are in line with our first hypothesis.

Our second hypothesis also obtains empirical support from columns (3) and (4) of Table 3. As expected, the estimated coefficients of *Weak DPP \* Gov Trust* on *Medigen First* are significantly positive regardless of the extensive set of control variables. Substantively speaking, all else equal, with one unit increase in government trust, weak DPP supporters were more likely to choose Medigen as their first shot by 10.4 percentage points. In contrast, the interactions between government trust and other party strength variables, such as *Strong DPP \* Gov Trust*, show no statistically significant effect on the choice of Medigen as the first shot. More interestingly, the estimated coefficient of the *Weak DPP* dummy variable is negative in column (3) and significantly negative in column (4) of Table 3. This, when interpreting the interaction term concurrently, suggests that weak DPP supporters who expressed

**Table 3.** LPM estimates for political determinants of Medigen first

	<i>Medigen first</i>			
	(1)	(2)	(3)	(4)
<i>DPP * Gov Trust</i>	0.056* (0.031)	0.061** (0.030)		
<i>KMT * Gov Trust</i>	-0.014 (0.019)	-0.015 (0.019)		
<i>Other Parties * Gov Trust</i>	0.017 (0.031)	0.017 (0.032)		
<i>Strong DPP * Gov Trust</i>			0.027 (0.039)	0.031 (0.039)
<i>Weak DPP * Gov Trust</i>			0.097** (0.049)	0.104** (0.048)
<i>Strong KMT * Gov Trust</i>			-0.015 (0.012)	-0.020 (0.013)
<i>Weak KMT * Gov Trust</i>			-0.010 (0.065)	0.003 (0.063)
<i>Strong Other Parties * Gov Trust</i>			0.056 (0.042)	0.061 (0.042)
<i>Weak Other Parties * Gov Trust</i>			-0.041 (0.036)	-0.048 (0.037)
<i>DPP</i>	-0.048 (0.080)	-0.074 (0.078)		
<i>KMT</i>	-0.003 (0.040)	0.013 (0.040)		
<i>Other Party</i>	-0.002 (0.067)	-0.009 (0.070)		
<i>Strong DPP</i>			0.048 (0.109)	0.024 (0.107)
<i>Weak DPP</i>			-0.170 (0.119)	-0.199* (0.119)
<i>Strong KMT</i>			-0.008 (0.026)	0.017 (0.030)
<i>Weak KMT</i>			0.000 (0.127)	-0.009 (0.124)
<i>Strong Other Parties</i>			-0.075 (0.086)	-0.096 (0.089)
<i>Weak Other Parties</i>			0.108 (0.084)	0.118 (0.089)
<i>Gov Trust</i>	0.015 (0.011)	0.007 (0.012)	0.015 (0.011)	0.007 (0.012)
Controls	No	Yes	No	Yes
Observations	1642	1642	1642	1642
Adjusted R <sup>2</sup>	0.040	0.051	0.041	0.053

Note: Robust standard errors in parenthesis (HC1). \*P < 0.1; \*\*P < 0.05; \*\*\*P < 0.01. Refer to Table B1 for the full results.

lower trust in the government were more less likely to receive the Medigen vaccination compared to independents. It provides the mirror image of evidence, lending strong support to our second hypothesis.<sup>2</sup> We plot the substantive average marginal effects of *Weak DPP* on *Medigen First*

<sup>2</sup>We thank the reviewer for this important insight.

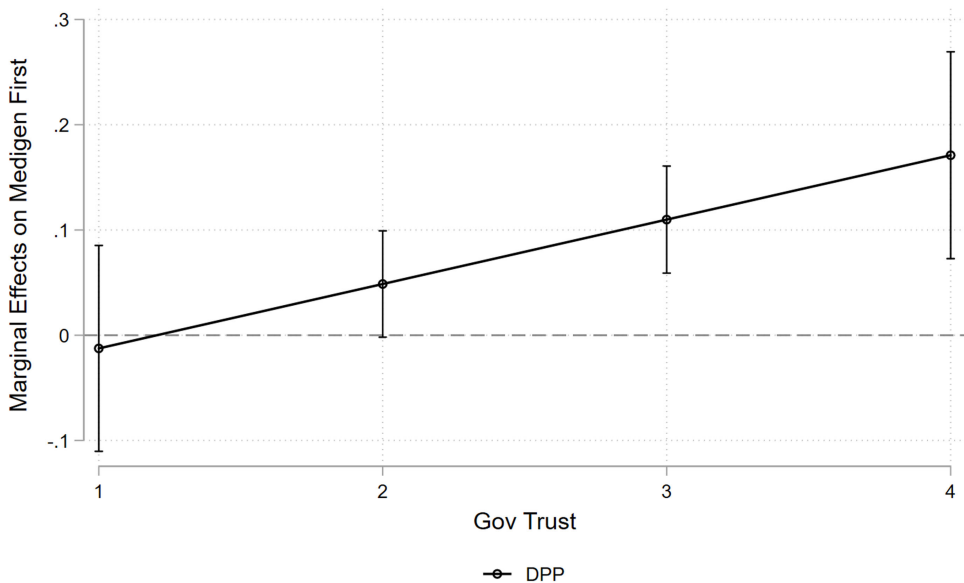


Figure 1. Marginal effects of **DPP** on **Medigen First** by **Gov Trust** (95% CI).

conditioned by *Gov Trust* with 95% confidence intervals in Figure 2. Substantively speaking, all else equal, a weak DPP supporter would be more likely to receive the Medigen vaccine as the first shot by 11.1 and 21.5 per cent points respectively when he or she ‘often’ and ‘always’ trusted the central government; however, when he or she ‘never’ and ‘sometimes’ trusted the central government, being weakly affiliated with the DPP made no statistically significant difference in the likelihood of receiving the Medigen vaccine as the first shot.

Table 4 further presents evidence for political determinants of Medigen booster shot choices. Again, columns (1) and (3) of Table 4 report LPM estimates without control variables, and columns (2) and (4) include the extensive set of control variables. Consistent with our third hypothesis, the interaction between previous Medigen experience and government trust shows a weakly significant ( $P < 0.1$ ) and positive conditional effect of *Medigen Before* by *Gov Trust* on *Medigen Booster*. More substantively, all else equal, with one unit increase in government trust, individuals who had experienced Medigen for full vaccination against COVID-19 were more likely to choose Medigen again as their booster shot by 11.1 to 11.4 percentage points across all columns in Table 4, though such effects were marginally significant. In contrast, the interactions between government trust and party affiliation dummies all show no statistically significant effect on the choice of Medigen as the booster shot, as presented in columns (1) and (2) of Table 4; such pattern still holds by taking into account the strength of party affiliation, as shown in columns (3) and (4).

Substantive effects of *DPP \* Gov Trust* and *Weak DPP \* Gov Trust* on *Medigen Booster* are respectively plotted with 95% confidence intervals in the upper and lower panel of Figure 3 for the accurate interpretation of the nuanced conditional effects of party affiliation and partisan strength by prior personal exposure to the Medigen vaccine. As shown in the upper panel, all else equal, a DPP supporter would be more likely to receive the Medigen vaccine as a booster shot by 7 and 9.7 per cent points respectively when he or she ‘often’ and ‘always’ trusted the central government; nonetheless, when he or she ‘never’ and ‘sometimes’ trusted the central government, being affiliated with the DPP made no statistically significant difference in the likelihood of receiving the Medigen vaccine as a booster shot. In contrast, other things being equal, a respondent fully vaccinated with the Medigen was more likely to have it as the booster shot again unless he or she ‘never’ trusted the central government.

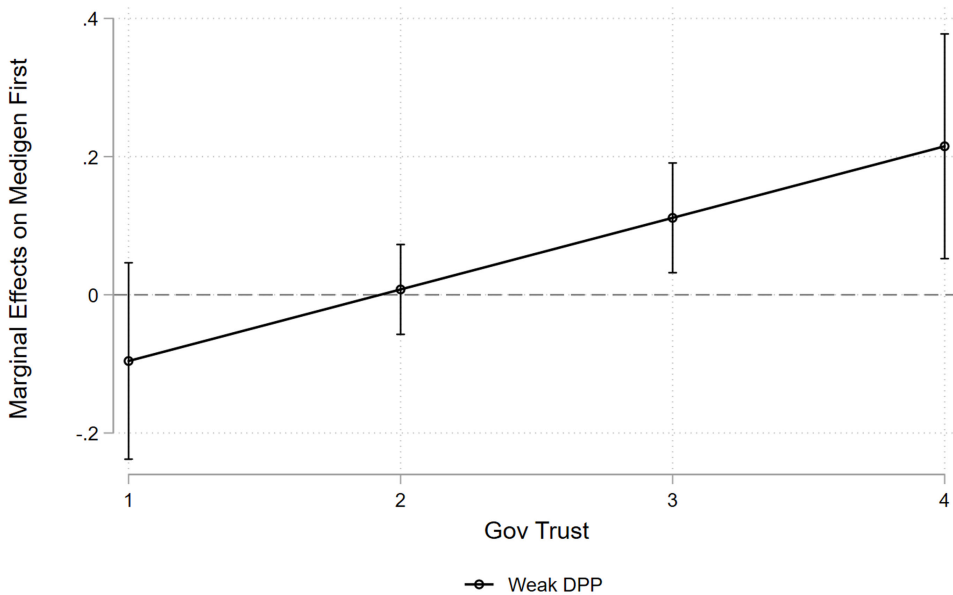


Figure 2. Marginal effects of **Weak DPP** on **Medigen First** by **Gov Trust** (95% CI).

More precisely, when a respondent fully vaccinated with the Medigen vaccine ‘sometimes’, ‘often’, and ‘always’ trusted government, he or she would be more likely to choose the Medigen as the booster shot by 25.8, 36.8, and 47.9 per cent points, respectively. Likewise, as revealed in the lower panel, when a respondent fully vaccinated with the Medigen ‘sometimes’, ‘often’, and ‘always’ trusted the central government, he or she would be more likely to choose the Medigen as the booster shot by 25.8, 36.9 and 48.1 per cent points, respectively. However, being weakly affiliated with the DPP no longer made any statistically significant difference in the likelihood of receiving the Medigen vaccine regardless of the level of trust in the central government an individual respondent had. These results jointly point to no additional effect of party affiliation and strength on the booster choice of the Medigen vaccine.

As for the estimated significantly negative coefficients of *Weak Other Parties* on *Medigen Booster* in columns (3) and (4) of Table 4, they suggest that weak supporters of small parties in absence of higher level of trust in the government were less likely to get the Medigen vaccine as their booster shots than independents. This set of evidence indirectly support our third hypothesis. As non-DPP supporters (including weak supporters of small parties) were less likely to receive the Medigen vaccines as their first shots already, they were less likely to update their beliefs about the Medigen for booster shots through personal experience of it.<sup>3</sup>

Taken together, these findings clearly suggest that incumbent DPP supporters, especially the weak ones, would be more likely to adhere to the party line of choosing Medigen vaccine for the highly uncertain and poorly informed first shot as long as they had sufficiently high level of trust in the central government. However, it would no longer be the case when citizens were gradually informed about the informationally rich *booster* shot through direct personal exposures to Medigen as time went by. This also suggests that such partisan determinants of vaccine brand choice, including both party affiliation and strength, would yield no additional effect on the booster choice of the Medigen vaccine.<sup>4</sup>

<sup>3</sup>We thank the editor for reminding us of making inferences from the coefficient estimates.

<sup>4</sup>We thank the editor and reviewer for pointing out this nuanced interpretation.

**Table 4.** LPM estimates for political determinants of Medigen booster

	<i>Medigen booster</i>			
	(1)	(2)	(3)	(4)
<i>Medigen Before</i> * <i>Gov Trust</i>	0.113* (0.061)	0.111* (0.061)	0.114* (0.061)	0.112* (0.061)
<i>DPP</i> * <i>Gov Trust</i>	0.029 (0.028)	0.027 (0.028)		
<i>KMT</i> * <i>Gov Trust</i>	0.013 (0.017)	0.005 (0.017)		
<i>Other Parties</i> * <i>Gov Trust</i>	0.027 (0.021)	0.029 (0.021)		
<i>Strong DPP</i> * <i>Gov Trust</i>			0.029 (0.036)	0.028 (0.036)
<i>Weak DPP</i> * <i>Gov Trust</i>			0.002 (0.040)	0.000 (0.041)
<i>Strong KMT</i> * <i>Gov Trust</i>			0.008 (0.018)	0.001 (0.018)
<i>Weak KMT</i> * <i>Gov Trust</i>			0.030 (0.032)	0.018 (0.032)
<i>Strong Other Parties</i> * <i>Gov Trust</i>			0.012 (0.025)	0.007 (0.025)
<i>Weak Other Parties</i> * <i>Gov Trust</i>			0.037 (0.033)	0.048 (0.034)
<i>DPP</i>	-0.010 (0.073)	-0.010 (0.073)		
<i>KMT</i>	-0.041 (0.029)	-0.035 (0.031)		
<i>Other Party</i>	-0.069* (0.041)	-0.070 (0.043)		
<i>Strong DPP</i>			0.018 (0.100)	0.009 (0.099)
<i>Weak DPP</i>			0.027 (0.101)	0.031 (0.103)
<i>Strong KMT</i>			-0.031 (0.029)	-0.031 (0.031)
<i>Weak KMT</i>			-0.073 (0.056)	-0.054 (0.057)
<i>Strong Other Parties</i>			-0.014 (0.055)	0.001 (0.058)
<i>Weak Other Parties</i>			-0.106* (0.061)	-0.125* (0.064)
<i>Medigen Before</i>	0.034 (0.163)	0.037 (0.161)	0.031 (0.163)	0.034 (0.161)
<i>Gov Trust</i>	0.007 (0.010)	0.002 (0.010)	0.006 (0.010)	0.002 (0.010)
Controls	No	Yes	No	Yes
Observations	1642	1642	1642	1642
Adjusted R <sup>2</sup>	0.196	0.208	0.198	0.209

Note: Robust standard errors in parenthesis (HC1). \*P < 0.1; \*\*P < 0.05; \*\*\*P < 0.01. Refer to Table B2 for the full results.



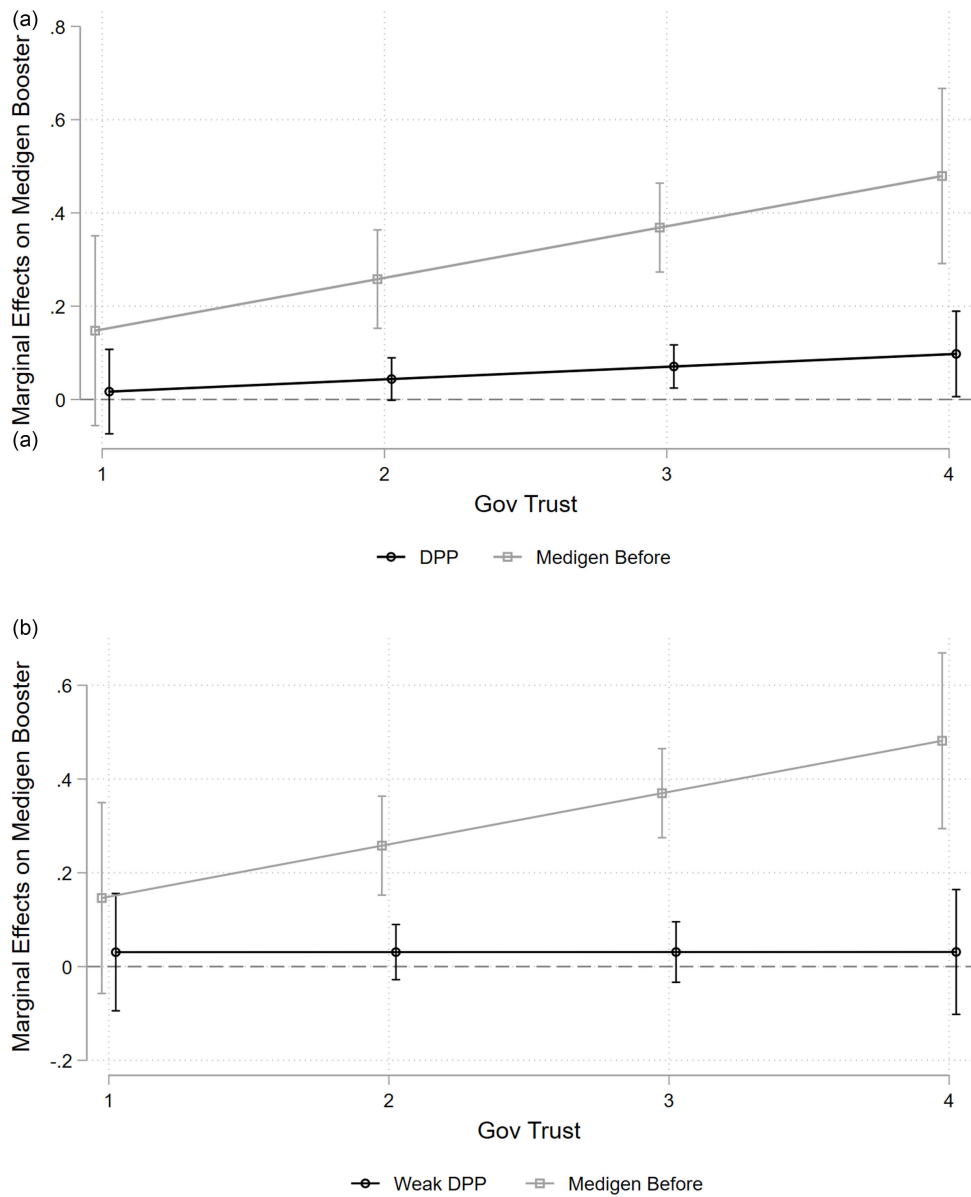


Figure 3. (a) Marginal effects of **Medigen Before** and **DPP** on **Medigen Booster** by **Gov Trust** (95% CI); (b) Marginal effects of **Medigen Before** and **Weak DPP** on **Medigen Booster** by **Gov Trust** (95% CI).

## 6. Discussion

### 6.1 Conclusion

This study examines how party affiliation and government trust jointly shaped individual vaccine brand choices during the COVID-19 pandemic in Taiwan, and how such political determinants could evolve over time. When choosing COVID-19 vaccine brand, the incumbent DPP supporters, particularly weak ones, were more likely to adhere to their party line of Medigen as they trusted government more; yet, this was only for the highly uncertain *first* shot, due to the absence of reliable information for making informed judgements about COVID vaccine brand choice at the early stage of

the pandemic, not for the informationally rich *booster* shot later. Our findings suggest that if there is a next global public health emergency, the ruling party of a country could make the best use of party cue and government trust to encourage citizens to get their first shots when launching nation-wide vaccination programme. This would complement the existing approach of incentivizing citizens to get vaccinated by lotteries (Fuller *et al.*, 2022).

Our findings made three contributions to the growing literature on vaccine politicization. First, our study highlighted unexplored aspects of vaccine politicization in the existing literature: brand choice. In the countries where the average intention to be vaccinated is strong among people, such as Taiwan, vaccine politicization would express itself in the form of brand choice rather than the intention to be vaccinated itself. Our study is distinct from proliferated empirical studies on vaccine uptake intentions in many industrial societies other than Taiwan (Ward *et al.*, 2020; Fridman *et al.*, 2021; Khubchandani *et al.*, 2021; Jones and McDermott, 2022; Klymak and Vlandas, 2022; Motta, 2023).

Second, our study contributed to the understanding of how party affiliation, partisan strength, and government trust jointly shaped vaccine choices, complementing existing research that presumed such political variables as party affiliation, national identity, and government trust work *independently* rather than *interactively* (Baumgaertner *et al.*, 2018; Krupenkin, 2021; Dal and Tokdemir, 2022; Kuo and Yu, 2024). In particular, our study shows that higher level of trust in government can make weak partisans committed to the party line under highly uncertain information environment.

Third, this study theorizes vaccine brand choices as gradually updated judgements to arrive at conditions under which the incumbent DPP supporters would *not* adhere to the party line of Medigen to vaccinate against COVID-19 during the pandemic. For one thing, weak DPP supporters would not adhere to the party line of getting Medigen vaccine as their *first* shots unless they had sufficiently high levels of government trust. For another, even if weak DPP supporters had sufficiently high levels of government trust, they would no longer adhere to the party line of getting Medigen vaccine as their *booster* shots. In other words, our theory and evidence jointly suggest that political determinants of individual vaccine brand choice as gradually updated judgements may change or even evolve over time. This complements the existing literature on the static relationships between partisanship, government trust, and vaccine uptake intentions before and during the pandemic (Baumgaertner *et al.*, 2018; Krupenkin, 2021; Dal and Tokdemir, 2022; Kuo and Yu, 2024).

Despite these contributions, we would like to end with a cautionary note against vaccine politicization. By the end of October 2022, according to an investigation conducted by Taiwan's CDC to Legislative Yuan, about 1.2 million out of the 5 million doses of the Medigen vaccine, initially procured by the Taiwanese government, had expired and were scheduled to be destroyed (Taiwan Centers for Disease Control, 2022b). The same investigation also showed that Medigen was selected by about 4.9% of the vaccinated population only (Taiwan Centers for Disease Control, 2022b). These facts suggest the effectiveness of the incumbent DPP endorsement in soliciting widespread public support for the Medigen vaccine was limited. In other words, the party cue matters for vaccine brand choice only by a margin, not by a magnitude.

## 6.2 Limitations for future extension

Three limitations of our study should be noted. First and foremost, considering the fact that our results are correlational, we are unable to unpack the underlying causal mechanisms between party affiliation, government trust and vaccine brand choice. One possible solution to address the problem is to employ the experiment design similar to Jong-Jang and Noland's (2020) study. In other words, researchers could randomly provide respondents with the vaccine endorsements from different political figures and examine whether respondents with varying levels of government trust would significantly prefer the vaccine brand endorsed by their supporting party. This experimental approach would allow us to better understand how party identification and government trust jointly influence vaccine brand preferences.

Second, as our sample was restricted to adults aged between 20 and 55, we were not able to generalize our findings to elderly populations, a demographic group that public health literature has put an emphasis on regarding the topic of vaccination. To improve the generalizability of our study, future researchers could collect the sample from elderly populations and examine whether our findings are consistent across all age group. Yet, our sample could be a research design merit by excluding elderly adults whose vaccination choices were significantly affected by health emergencies with no vaccine band choice at the initial stage of vaccination.<sup>5</sup>

Last, given that we only conducted a single cross-sectional survey, we are unable to examine whether our findings would hold in different periods of Taiwan's vaccination programme. A potential way to improve our study would be to collect and analyse data from different stages (early, middle, and final) of Taiwan's vaccination programme to strengthen our findings. We would keep these limitations in mind and prove them in the follow-up studies in the near future.

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**Competing interests.** The authors have no competing interests to declare.

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<sup>5</sup>We thank the reviewer for this important insight.

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## Appendix A. The Operationalization of Variables

**Medigen First:** A binary indicator that is assigned into one if a respondent chose Medigen upon receiving the first shot of COVID-19 vaccine. Scale: 0, 1.

**Medigen Booster:** A binary indicator that is assigned into 1 if a respondent chose Medigen upon receiving the booster shot of COVID-19 vaccine. Scale: 0, 1.

**DPP:** A binary indicator that is assigned into one if a respondent supports Democratic Progress Party (DPP). Scale: 0, 1.

**KMT:** A binary indicator that is assigned into one if a respondent supports Kuomintang (KMT). Scale: 0, 1.

**Other Party:** A binary indicator that is assigned into one if a respondent supports other political parties in Taiwan (Other Party). Scale: 0, 1.

**Strong DPP:** A binary indicator that is assigned into one if a respondent strongly supports Democratic Progress Party (DPP). Scale: 0, 1.

**Weak DPP:** A binary indicator that is assigned into one if a respondent slightly leaning toward Democratic Progress Party (DPP). Scale: 0, 1.

**Strong KMT:** A binary indicator that is assigned into one if a respondent strongly supports Kuomintang (KMT). Scale: 0, 1.

**Weak KMT:** A binary indicator that is assigned into one if a respondent slightly leaning toward Kuomintang (KMT). Scale: 0, 1.



**Strong Other Party:** A binary indicator that is assigned into one if a respondent strongly supports other political parties in Taiwan (Other Party). Scale: 0, 1.

**Weak Other Party:** A binary indicator that is assigned into one if a respondent slightly leaning toward other political parties in Taiwan (Other Party). Scale: 0, 1.

**Medigen Before:** A binary indicator that is assigned into one if a respondent has ever received Medigen vaccine in their first or second shot of COVID vaccine. Scale: 0, 1.

**Gov Trust:** An ordinal variable that measures respondents' trust in government. The variable is derived from the response of the question as follows: 'How often do you believe that the central government is doing the right things?' The variable scales from 1 (Never), 2 (Sometimes), 3 (Often), 4 (Always).

**Populism:** A continuous index that measures a respondent's populist attitudes. The index is averaged from the responded score (ranged from 1 [Strongly Disagree], 2 [Disagree], 3 [Neutral], 4 [Agree], 5 [Strongly Agree]) from the following questions: (1) 'Politicians in the legislature must obey the will of the people'; (2) 'Our most important policies should be decided by the people, not by politicians'; (3) 'The difference in political positions between the people and the elites is greater than that among the people themselves'; (4) 'I would rather be represented by ordinary citizens than by experienced politicians'; (5) 'Elected politicians said a lot, but actually do very little'; (6) 'The so-called political compromises are just betraying one's principles'; (7) 'The specific interests of the political elite will harm the welfare of the people'; (8) 'Politicians always end up reaching agreements when it comes to protecting their privileges'. Consequently, by averaging the score of the responded scores above, the populism index ranges from one (weakest) to five (strongest). Scale: 1–5.

**Unification:** An ordinal variable that measures respondent's degree of support of Taiwan unifies with Mainland China. The variable is derived from a series of indirect questions that measures respondents' position on the cross-strait issue. Specifically, the respondents were first asked 'The issue of unification and independence between Taiwan and China is a frequently discussed topic in the society. What is your position on the issue of Taiwan's unification and independence?' Subsequently, the respondents were provided with the choice as follows: (1) 'Taiwan should become independent'; (2) 'Taiwan should unify with Mainland China'; (3) 'Taiwan should maintain status quo'. If the respondents select 'Taiwan should maintain status quo', they would be prompted again by a follow-up question which states: 'Regarding the issue of Taiwan's independence and unification, which of the following position do you slightly prefer?' And the respondents again were prompted with the following three choices, which read: (1) 'Taiwan should maintain the status quo now, but should seek independence in the future'; (2) 'Taiwan should maintain the status quo now, but should unify with Mainland China in the future'; (3) 'Taiwan should maintain status quo forever'. Therefore, we recode the responses of 'Taiwan should become independent' to the value of one (most disagree [to unification]); the response of 'Taiwan should maintain the status quo now, but should seek independence in the future' to the value of two (disagree [to unification]); the response of 'Taiwan should maintain status quo forever' to the value of three (neutral [to unification]); the response of 'Taiwan should maintain the status quo now, but should unify with Mainland China in the future' to the value of four (agree [to unification]), and the response of 'Taiwan should unify with Mainland China' to the value of five (most agree [to unification]). Therefore, the ordinal variable measures the respondent's degree of support of Taiwan unifies with Mainland China from one (most disagree/support independence the most) to five (most agree/support unification the most). Scale: 1, ..., 5.

**Flu Vaccine:** A binary indicator that is assigned into one if a respondent has the habit of regularly receiving seasonal flu vaccine. Scale: 0, 1.

**NoShot 1:** A binary indicator that is assigned into one if a respondent has yet to receive the first shot of COVID vaccine. Scale: 0, 1.

**NoShot 3:** A binary indicator that is assigned into one if a respondent has yet to receive the booster shot of COVID vaccine. Scale: 0, 1.

**Education:** An ordinal variable represents the highest education level of respondents. It scales from 1(Never receive education), 2 (Elementary school; *Baseline*), 3 (Junior high school), 4 (Senior high school or vocational school), 5 (College), 6 (master's degree), 7 (Doctoral degree).

**Family Income:** An ordinal variable represents the range of respondent family's monthly income. It ranges from 1 (No income, i.e. 0), 1 (1~10,000), 2 (10,001~20,000), 3 (20,001~30,000), 4 (30,001~40,000), 5 (40,001~60,000), 7 (60,001~80,000), 8 (80,000~10,000), 9 (100,001~150,000), 10 (150,001~200,000), 11 (200,001~300,000), 12 (300,001~400,000), 13 (400,001~500,000), 14 (Above 500,000). The currency unit is in New Taiwan Dollar (NTD).

**Male:** A binary indicator that is assigned into one if a respondent's gender is male, zero otherwise. Scale: 0, 1.

**Age:** An integer that represents a respondent's age. Scale: 20–55.

**County FE:** A series of dummy variables (Fixed Effects) that represent respondent's place of residence. The original coding before we transform them into dummy variables is as follows: 1 (Taipei City; *Baseline*), 2 (New Taipei City), 3 (Keelung City), 4 (Taoyuan City), 5 (Hsinchu County), 6 (Hsinchu City), 7 (Miaoli County), 8 (Taichung City), 9 (Changhua County), 10 (Nantou County), 11 (Yunlin County), 12 (Chiayi City), 13 (Chiayi County), 14 (Tainan City), 15 (Kaohsiung City), 16 (Pingtung County), 17 (Yilan County), 18 (Hualian County), 19 (Taitung County).



## Appendix B. Full Results of the LPM Estimates

Table B1. LPM estimates of Medigen first (full results)

	Medigen first			
	(1)	(2)	(3)	(4)
<i>DPP * Gov Trust</i>	0.056*	0.061**		
	(0.031)	(0.030)		
<i>KMT * Gov Trust</i>	-0.014	-0.015		
	(0.019)	(0.019)		
<i>Other Parties * Gov Trust</i>	0.017	0.017		
	(0.031)	(0.032)		
<i>Strong DPP * Gov Trust</i>			0.027	0.031
			(0.039)	(0.039)
<i>Weak DPP * Gov Trust</i>			0.097**	0.104**
			(0.049)	(0.048)
<i>Strong KMT * Gov Trust</i>			-0.015	-0.020
			(0.012)	(0.013)
<i>Weak KMT * Gov Trust</i>			-0.010	0.003
			(0.065)	(0.063)
<i>Strong Other Parties * Gov Trust</i>			0.056	0.061
			(0.042)	(0.042)
<i>Weak Other Parties * Gov Trust</i>			-0.041	-0.048
			(0.036)	(0.037)
<i>DPP</i>	-0.048	-0.074		
	(0.080)	(0.078)		
<i>KMT</i>	-0.003	0.013		
	(0.040)	(0.040)		
<i>Other Party</i>	-0.002	-0.009		
	(0.067)	(0.070)		
<i>Strong DPP</i>			0.048	0.024
			(0.109)	(0.107)
<i>Weak DPP</i>			-0.170	-0.199*
			(0.119)	(0.119)
<i>Strong KMT</i>			-0.008	0.017
			(0.026)	(0.030)
<i>Weak KMT</i>			0.000	-0.009
			(0.127)	(0.124)
<i>Strong Other Parties</i>			-0.075	-0.096
			(0.086)	(0.089)
<i>Weak Other Parties</i>			0.108	0.118
			(0.084)	(0.089)
<i>Gov Trust</i>	0.015	0.007	0.015	0.007
	(0.011)	(0.012)	(0.011)	(0.012)
<i>Unification</i>		-0.021***		-0.022***
		(0.006)		(0.006)
<i>Populism</i>		-0.013		-0.012
		(0.011)		(0.011)
<i>Flu Vaccine</i>		-0.010		-0.010
		(0.013)		(0.014)

(Continued)

**Table B1.** (Continued)

	Medigen first			
	(1)	(2)	(3)	(4)
<i>NoShot1</i>		-0.088*** (0.014)		-0.089*** (0.014)
<i>Male</i>		0.011 (0.013)		0.008 (0.013)
<i>Age</i>		-0.002** (0.001)		-0.002** (0.001)
<i>Education</i>		-0.013 (0.010)		-0.013 (0.010)
<i>Family Income</i>		-0.006** (0.003)		-0.006** (0.003)
Intercept	0.017 (0.025)	0.293*** (0.076)	0.017 (0.025)	0.286*** (0.075)
County FE	No	Yes	No	Yes
Observations	1642	1642	1642	1642
Adjusted R <sup>2</sup>	0.040	0.051	0.041	0.053

Note: Robust standard errors in parenthesis (HC1). \*P < 0.1; \*\*P < 0.05; \*\*\*P < 0.01.

**Table B2.** LPM estimates of Medigen booster (full results)

	Medigen booster			
	(1)	(2)	(3)	(4)
<i>Medigen Before * Gov Trust</i>	0.113* (0.061)	0.111* (0.061)	0.114* (0.061)	0.112* (0.061)
<i>DPP * Gov Trust</i>	0.029 (0.028)	0.027 (0.028)		
<i>KMT * Gov Trust</i>	0.013 (0.017)	0.005 (0.017)		
<i>Other Parties * Gov Trust</i>	0.027 (0.021)	0.029 (0.021)		
<i>Strong DPP * Gov Trust</i>			0.029 (0.036)	0.028 (0.036)
<i>Weak DPP * Gov Trust</i>			0.002 (0.040)	0.000 (0.041)
<i>Strong KMT * Gov Trust</i>			0.008 (0.018)	0.001 (0.018)
<i>Weak KMT * Gov Trust</i>			0.030 (0.032)	0.018 (0.032)
<i>Strong Other Parties * Gov Trust</i>			0.012 (0.025)	0.007 (0.025)
<i>Weak Other Parties * Gov Trust</i>			0.037 (0.033)	0.048 (0.034)
<i>DPP</i>	-0.010 (0.073)	-0.010 (0.073)		
<i>KMT</i>	-0.041 (0.029)	-0.035 (0.031)		

(Continued)

Table B2. (Continued)

	Medigen booster			
	(1)	(2)	(3)	(4)
<i>Other Party</i>	-0.069*	-0.070		
	(0.041)	(0.043)		
<i>Strong DPP</i>			0.018	0.009
			(0.100)	(0.099)
<i>Weak DPP</i>			0.027	0.031
			(0.101)	(0.103)
<i>Strong KMT</i>			-0.031	-0.031
			(0.029)	(0.031)
<i>Weak KMT</i>			-0.073	-0.054
			(0.056)	(0.057)
<i>Strong Other Party</i>			-0.014	0.001
			(0.055)	(0.058)
<i>Weak Other Party</i>			-0.106*	-0.125*
			(0.061)	(0.064)
<i>Medigen Before</i>	0.034	0.037	0.031	0.034
	(0.163)	(0.161)	(0.163)	(0.161)
<i>Gov Trust</i>	0.007	0.002	0.006	0.002
	(0.010)	(0.010)	(0.010)	(0.010)
<i>Unification</i>		-0.008		-0.007
		(0.006)		(0.006)
<i>Populism</i>		-0.012		-0.012
		(0.009)		(0.009)
<i>Flu Vaccine</i>		-0.002		-0.001
		(0.011)		(0.011)
<i>NoShot3</i>		-0.049***		-0.048***
		(0.008)		(0.008)
<i>Male</i>		0.015		0.013
		(0.011)		(0.011)
<i>Age</i>		0.002***		0.001***
		(0.001)		(0.001)
<i>Education</i>		-0.005		-0.005
		(0.008)		(0.008)
<i>Family Income</i>		-0.001		-0.001
		(0.002)		(0.002)
<i>Intercept</i>	0.008	0.097	0.008	0.097
	(0.020)	(0.069)	(0.020)	(0.069)
<i>County FE</i>	No	Yes	No	Yes
<i>Observations</i>	1642	1642	1642	1642
<i>Adjusted R<sup>2</sup></i>	0.196	0.208	0.198	0.209

Note: Robust standard errors in parenthesis (HC1). \*P < 0.1; \*\*P < 0.05; \*\*\*P < 0.01.

Appendix C. The Distribution of Gov Trust.

