

## Contingent assessment of the COVID-19 vaccine

Leidy Y. García\*, Arcadio A. Cerda

Faculty of Economics & Business, Universidad de Talca, 1 Poniente 1141, Talca, Chile



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### ABSTRACT

The COVID-19 pandemic has not only had a negative impact on people's health and life behavior, but also on economies around the world. At the same time, laboratories and institutions are working hard to obtain a COVID-19 vaccine, which we hope will be available soon. However, there has been no assessment of whether an individual and society value a vaccine monetarily, and what factors determine this value. Therefore, the objective of this research was to estimate the individual's willingness to pay (WTP) for a hypothetical COVID-19 vaccine and, at the same time, find the main factors that determine this valuation. For this, we used the contingent valuation approach, in its single and double-bounded dichotomous choice format, which was based on a hypothetical market for a vaccine. The sample used was obtained through an online survey of  $n = 566$  individuals from Chile. The main results showed that the WTP depends on the preexistence of chronic disease ( $p \leq 0.05$ ), knowledge of COVID-19 ( $p \leq 0.05$ ), being sick with COVID-19 ( $p \leq 0.05$ ), perception of government performance ( $p \leq 0.01$ ), employment status ( $p \leq 0.01$ ), income ( $p \leq 0.01$ ), health care ( $p \leq 0.05$ ), adaptation to quarantine with children at home ( $p \leq 0.01$ ) and whether the person has recovered from COVID-19 ( $p \leq 0.10$ ). According to our discrete choice model in double-bounded dichotomous format, it was concluded that the individuals' WTP is US\$184.72 (CI: 165.52–203.92;  $p < 0.01$ ). This implies a social valuation of approximately US\$2232 million, corresponding to 1.09% of the GNP per capita.

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### 1. Introduction

The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) as a pandemic coronavirus disease 2019 (COVID-19) has had a negative impact on people's health and life and on economies around the world. For this reason, laboratories and institutions are working hard to obtain a COVID-19 vaccine, which should be available in the future [1]. Such a vaccine is important in reducing mortality and the health costs of treating the disease. The vaccine is expected to be available free of charge to at least the poorest people with financing from the governments of each country, while the richest people could voluntarily seek vaccines in private clinics. However, the question arises of how much society and the individual value this vaccine.

Therefore, considering the adverse effects and high costs of the global pandemic generated by this syndrome, the aim of this research is to provide more information about the individual and social assessment of the vaccine. This assessment is important because it would yield useful information for the implementation of public policies aimed at improving health services. Specifically,

in terms of public health, governments should be designing potential vaccination campaigns against COVID-19; however, due to logistical aspects and costs, in a first stage vaccination could target high-risk, socioeconomically vulnerable individuals, while other groups could be paid for their vaccines. Additionally, the individual and social assessment of the vaccine that we conduct in this paper, would help corporate research and development (R&D) laboratories to have an approximation of the expected benefits if they manage to develop the vaccine. Furthermore, the acceptance rate of payment for a possible vaccine illustrates people's willingness to be vaccinated, so our findings would provide elements for discussion about the anti-vaccine movement.

For this, it is important to understand the factors or variables that affect consumer demand and the decision to pay for a vaccine. This is addressed in this article through the estimation of a probabilistic model of the willingness to pay (WTP) for the vaccine. Therefore, the objective of this research is to estimate an individual's WTP for a COVID-19 vaccine and, at the same time, find the main factors that affect this valuation. The method used to estimate the WTP is the contingent valuation approach (CVA), in its single and double-bounded dichotomous choice format. The double-bounded dichotomous choice format presents greater statistical efficiency by better estimating the variance and allows

\* Corresponding author.

E-mail addresses: [lgarcia@utalca.cl](mailto:lgarcia@utalca.cl) (L.Y. García), [acerda@utalca.cl](mailto:acerda@utalca.cl) (A.A. Cerda).

obtaining more precise confidence intervals for the mean of the WTP [2]. CVA is widely used in medical and health literature, which is based on a hypothetical market for a vaccine. Specifically, WTP has been estimated for vaccines against diseases such as Ebola [3], Hepatitis B [4], Chikungunya fever [5], Dengue [6] and diseases caused by Meningococcus B [7] and Human Papillomavirus [8,9]. There are no studies yet for COVID-19.

The importance of the WTP for the vaccine is related to the model of provision and reliability of medical care. This study considers the Chilean case, where individuals assume a significant part of the cost of preventive health care, including vaccines. Specifically, Chile has a mixed health system made up of public health insurance with groups according to health care coverage (ranging from 80% to 100%) and a private system where members pay according to the contracted plan and the type of hospital or clinic they wish to access. All workers must contribute to the health system with the equivalent of 7% of their taxable income and can choose to pay it to the public or private system. The indigent have free care in the public system. Regarding vaccination, there is currently a national vaccination plan in Chile that covers some vaccines for high-risk groups, while the rest of the population pays 100% of them. In the future, this could be replicated for COVID-19, due to the high costs that mass vaccination plans usually entail.

## 2. Materials and methods

### 2.1. Survey

The information was collected through a self-applied online questionnaire. We used a mixed sampling process (snowball and convenience sampling), but under an active recruitment system that allows access according to the demographic characteristics required to search for population representativeness. The target population were people 18 years of age or older, with a medium and higher income level, who according to their health insurance would eventually have to finance the prevention costs of COVID-19, both in the public and private health systems (this target group corresponds to 62.8% of the Chilean population). People with lower incomes were not considered because they receive state aid. The survey was answered by 566 individuals between April 18 and May 5, 2020. It is worth mentioning that Chile is a high-income country according to the World Bank [10] because the it has a Gross National Income (GNI) per capita of US\$23,550, where 87.4% of the population has internet access [11] and 71% uses social networks [12].

The theory indicates that the WTP depends on individual preferences, income, attitude and perception towards the vaccine (as “good”), and the sociodemographic characteristics of the individual and their family [2]. Therefore, the questionnaire was structured in three sections that allowed capturing these aspects. In the first section, we asked about perception and individual context, previous chronic diseases, self-perception of the risk of contagion, and the general context of the pandemic, among others (14 items). In the second section, the potential attributes of the vaccine and the context of contagion risk were presented; that is, we described the contingent market and asked about the WTP and the protest responses of individuals who are not willing to pay due to economic or moral reasons (15 items). In the third section, the respondents were socio-demographically characterized according to age, gender, educational level, income, household composition, employment status, and health system (7 items). The statistical validation of the instrument was performed with the traditional reliability indicators of the qualitative scales used. The Cronbach’s alpha indicator was 0.7, indicating that there was internal consistency of the items of the perception scale (qualitative).

### 2.2. Statistical analysis

The WTP measures the change in well-being as a result of the hypothetical acquisition of the COVID-19 vaccine, and is expressed mathematically as follows:  $WTP = X^{\hat{\alpha}}\beta + \mu$ , where  $X_w$  is a matrix of variables or characteristics of the individual observable under the hypothetical scenario with vaccine,  $X_{wo}$  is composed of the covariates in the scenario without vaccine (current scenario), such that:  $X = X_w - X_{wo}$ ;  $\beta$  is the vector of parameters that indicates the dependence of the WTP on the exogenous variables ( $X$ ); and  $\mu$  is the difference of the random components in both scenarios:  $\mu = \mu_w - \mu_{wo}$  which has a normal distribution,  $\mu N(0, \sigma^2)$ .

We used the relationship between WTP and its determining variables ( $X$ ) to predict the probability of payment for the vaccine. This was obtained by comparing a given initial value with others that were above or below. These values were defined by the payment vector, such that:

$$P(BID_l < WTP \leq BID_u) = P(X^{\hat{\alpha}}\beta + \mu \leq \varepsilon_u) - P(X^{\hat{\alpha}}\beta + \mu < \varepsilon_l) \quad (1)$$

where  $BID_l$  and  $BID_u$  are the upper ( $u$ ) and lower ( $l$ ) limits of the WTP, and epsilon ( $\varepsilon$ ) is the threshold of change between these that define the range of the WTP.

It should be noted that WTP values were obtained from an open-format pre-survey of 100 individuals. With these values, the distribution model of the payment ranges with equal selection areas was applied, assuming a normal distribution [2]. This is an iterative technique that allowed us to find the minimum mean square error of the design of the payment vector, which in our case was limited to four initial values. With these values, the upper and lower payment vector of each of them were obtained at the same time, as the average of the contiguous values, which are presented in Table 1 and are used in Eq. (1).

The estimation of the WTP was made through a probabilistic model in which the dependent variable ( $WTP^{\hat{\alpha}}$ ) is a dummy that takes the value of 1 if the individual is willing to pay and 0 otherwise, depending on the value of the assigned payment vector and the covariates that allow controlling for factors that may affect the WTP. Thus, the probability of paying is:  $P(WTP = w) = \Phi(\varepsilon_w - X^{\hat{\alpha}}\beta) - \Phi(\varepsilon_{w-1} - X^{\hat{\alpha}}\beta)$ , where  $w$  is a finite category selected by the individual under the hypothetical scenario,  $\varepsilon_w$  is a specific threshold for that category,  $P$  is the probability of paying, and  $\Phi(\cdot)$  represents the standard normal density function, that is, we defined a probit model.

The estimations were made with the maximum likelihood method under the assumption that the errors distribute normally. Through the analysis of the marginal effects we could identify the covariates or predictors of WTP for the COVID-19 vaccine, which are determined as:

$$\frac{\partial P(WTP_i = w)}{\partial X_{ij}} = \left[ \Phi^{\hat{\alpha}}(\varepsilon_w - X_i^{\hat{\alpha}}\beta) - \Phi^{\hat{\alpha}}(\varepsilon_{w-1} - X_i^{\hat{\alpha}}\beta) \right] \beta_j$$

these are the derivatives of the probability of paying a fixed value, given a change in a continuous explanatory variable ( $X_{ij}$ ). Subsequently, with the estimation of the vector ( $\beta$ ), the average value of the WTP per individual was obtained.

**Table 1**  
Payment vector (US\$).

Bid	Lb	Ub
8.93	4.47	13.40
70.23	35.11	105.34
123.02	61.51	184.54
184.32	92.16	276.48

The previous dichotomous method was applied to estimate two types of different formats: simple and double [2,13]. The simple format only considered the first response of the individual on whether (“yes” or “no”) a given amount of money is paid that represents the value of the good. With this format, lower rejection rates are obtained, and the possibilities of guessing the response, the starting point bias and the induction of responses are reduced. However, this format has the disadvantage that it is a discrete indicator of the actual WTP and that the selection of the functional form can affect the results [2,13]. The double format solves this problem as the individuals are first asked whether they would pay a given amount, and according to the answer, they are offered a lower or higher value alternative. Thus, the WTP is found in four types of possible intervals (“yes-yes”, “yes-no”, “no-no”, and “no-yes”).

With the average value of the individual WTP, we calculated the social evaluation of the vaccine, for which the individual results were extrapolated to the population. It should be noted that all statistical analyzes were performed with STATA 16 (StataCorp. 2019. Stata Statistical Software: Release 16. College Station, TX: StataCorp LLC.) using the command routines of [14].

### 3. Results

#### 3.1. Perceptions and characterization of individuals

Of the total of participants, 62.8% had medium-high income, with an average income of US\$1534.6. 76.8% were adults up to 49 years of age, with an average age of 42 years, 58.1% were women. 80.7% had university studies, 69.2% lived with children and 83.6% declared to be risk averse. 58.1% belonged to the private health system, 27.8% had chronic diseases and 81.3% had relatives with chronic diseases (Table A1).

Regarding the individual circumstances and perceptions of the COVID-19 pandemic, most individuals considered that they were well informed about the disease caused by SARS-CoV-2 (99.1%), most of them would be willing to pay for a vaccine (90.6%), they believed that they will get sick (92.4%), and only 4.6% have or have had COVID-19. Most individuals were quarantined at home (59.9%), although most would prefer to work outside the home (79.4%), which could be explained by the fact that they believed that it is “impossible to work with children” (54.6%).

Regarding the context (Table A2), only 41.8% of individuals perceived that the government’s performance in facing the pandemic has been good or very good. The measures adopted by the Chilean government have been: communicative prevention campaign (hand washing, social distance and use of a face mask), preventive quarantines, mandatory quarantines in areas with the highest density of infected people, closure of shopping centers and educational establishments, curfews, increase in intensive care beds by 13%, delivery of monetary and in-kind subsidies (food) to 60% of the most vulnerable population and provision of sanitary residences for people who need a safer quarantine.

#### 3.2. Estimations of willingness to pay

##### 3.2.1. Determinants of willingness to pay

The estimates of the models of discrete choice were made with two different groups of covariates. Model 1 contained the most relevant explanatory variables to predict the WTP for the COVID-19 vaccine and model 2 included the same variables as model 1 plus the characteristics of the individual, which in conventional literature tend to be significant [4,6,15]. This was done to avoid the statistical problem of omitted relevant variables [16].

Considering the bid vector estimates presented in Table 1, the main precursor factors that positively affected the WTP were: pre-existence of chronic diseases (the probability increases ( $\Delta^+$ ) by 38.9%,  $p - value = p \leq 0.05$ ), perception of government performance ( $\Delta^+14.5\%$ ,  $p \leq 0.01$ ), employment status ( $\Delta^+24.4\%$ ,  $p \leq 0.01$ ), income ( $\Delta^+24.3\%$ ,  $p \leq 0.01$ ), knowledge of COVID-19 ( $\Delta^+11.4\%$ ,  $p \leq 0.05$ ), and having COVID-19 ( $\Delta^+160\%$ ,  $p \leq 0.05$ ). Thus, considering both models, all these variables were statistically significant with at least 95% confidence ( $p \leq 0.05$ ) (see Table 2).

On the other hand, the variables that negatively influenced the WTP for the COVID-19 vaccine were health care ( $\Delta^-15.6\%$ ,  $p \leq 0.05$ ), inability to work from home with children ( $\Delta^-21.6\%$ ,  $p \leq 0.01$ ) and COVID-19 recovery ( $\Delta^-160\%$ ,  $p \leq 0.10$ ). The first variable indicated that having a private health system that costs health expenses reduces the WTP for prevention measures by 15.6% ( $p \leq 0.05$ ). The second variable showed that the negative perception of working from home with children, due to preventive or mandatory quarantine, could make the person less exposed to contagion; therefore, the WTP for a vaccine will be less ( $\Delta^-21.6\%$ ,  $p \leq 0.01$ ). Finally, the third variable indicated that those who have had COVID-19 and recovered, believe they have obtained greater immunity to the disease and that their risk of dying or worsening is less, so they would be less willing to pay for a vaccine ( $\Delta^-100\%$ ,  $p \leq 0.1$ ).

It should be noted that both models have a good statistical fit. The goodness-of-fit, measured as the ability of the estimates to adequately predict the observed data, was high, as the probability

**Table 2**  
Models of discrete choice: marginal effects.

	Model 1	Model 2
Bid	-0.0106*** (0.0013)	-0.0104*** (0.0013)
Chronic disease	0.3891** (0.1810)	0.3717** (0.1817)
Perception of Government performance	0.1459*** (0.0541)	0.1100** (0.0555)
Health care	-0.1559** (0.0746)	-0.1237* (0.0760)
Income	0.2437*** (0.0585)	0.2906*** (0.0623)
Employment status	0.2438*** (0.0935)	0.2367** (0.0927)
Teenagers	-0.1935* (0.1113)	-0.1928* (0.1082)
Knowledge about COVID-19	0.1145** (0.0525)	0.0609 (0.0519)
Inability to work from home with children	-0.2163*** (0.0580)	
COVID-19 recovery		-1.0012* (0.5835)
COVID-19		1.6057** (0.7968)
Live with older adult		-0.1535 (0.1521)
Gender		0.1371 (0.1393)
Age		0.0599 (0.0615)
Education		-0.2868* (0.1931)
Sample	511	511
Pseudo R <sup>2</sup>	0.218	0.208
Predictions predicted	0.7977	0.7945
log-likelihood	-229.097	-232.075
Chi <sup>2</sup> test	110.769	104.674
Valor-P (Pr > Chi <sup>2</sup> )	0.000	0.000

Standard errors in parentheses = \*  $p < 0.20$ , \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Two observations from the sample ( $n = 566$ ) were dropped in the estimation process and 53 were not considered because they were rejection responses.

predicted by the models was more than 79% (Table 1). The Chi2 test indicated that the variables were significant together, that is, it allowed us to reject the null hypothesis that the regression parameters are zero, with a confidence level of 100% ( $p = 0.00$ ).

Of the sample, 53 individuals (9.4%) indicated that they were not willing to pay for a COVID-19 vaccine (Table A3). The self-declared reasons why they would not pay are presented in Fig. 1. This shows that the main reasons for not paying are because they believe that the government should finance the cost of the vaccine (38.8%) or they do not have the resources available to do so (25.0%). The latter are individuals who may have a positive evaluation of the vaccine, but their budget constraint does not allow them to pay for it.

### 3.2.2. Valuation and willingness to pay

In general, people would be willing to pay for a COVID-19 vaccine, as 90.6% of the individuals answered “yes” to the initial question of whether they would pay. However, this question is ambiguous because there could be people in that group who would only pay a penny. To solve this, the questionnaire had a double dichotomous design, which randomly presents values of the payment vector and reveals the true preferences of the individual. Of the sample, 55% individuals answered that they would pay the initial value and that they would also pay a second value, higher than the first; whereas 12% answered “yes” to the first value, but “no” to the second higher value. Table 3 shows the estimated average WTP for the model in its single dichotomous and double dichotomous choice format. The results showed an average WTP per individual of US\$169.92 (99.9% CI: 149.87–189.96) for model 1 (restricted to fewer covariates) and of US\$184.72 for the double format model (99.9% CI: 165.52–203.92).

However, the double format model is considered more appropriate in the technique because it is more efficient in estimating the variance of the parameter, therefore, its confidence interval is also more efficient [2,13]. This was evidenced through the difference between the upper and lower confidence interval values, which was smaller for the double dichotomous model (99.9%, 38.4, Table 3).

Additionally, when extrapolating these results to the population of legal age (over 18 years), approximately 13 million, and discounting the percentage of responses rejecting payment for the vaccine (9.6%), it leaves a population of slightly more than 12 million people. This value was multiplied by the estimated WTP that reached \$ 184.72 per individual, which gives us the social assessment of US\$2223 million for the COVID-19 vaccine, which repre-

sents 0.76% and 1.09% of Chile's gross domestic product (GDP) and GDP per capita, respectively.

## 4. Discussion

The individual and social assessment of the COVID-19 vaccine is key to defining prevention strategies, and allows visualizing the perceived benefit of the investment that research laboratories could have if they develop a vaccine, which is important considering the current global R&D activity focused on creating one [1]. This study shows that there is a high individual WTP, with an average of US\$184.72 under the most accurate estimation technique and with a reliability level of 99.9%. These results are similar in magnitude to those found by [7] for the meningococcal B vaccine (US\$189.24 = AU295) in Australia. However, the values are higher than those found in other studies conducted with other serious diseases with risk of death [3,4,6]. Specifically, the evaluation of the COVID-19 vaccine was far superior to that of the Hepatitis B vaccine in Malaysia (US\$73 [4]), Zika in Brazil (US\$ 31.34 [17]), Dengue in Malaysia (US\$28.36 [6]) and Ebola in Indonesia (US\$2.08 [3]). This are upper/middle-income economies, except for Malaysia, which is a low/middle-income country [10]- Thus, the high economic valuation of the COVID-19 vaccine could be explained because SARS-CoV-2 has had a higher contagion rate, has spread more rapidly and has affected all countries in the world [18]. The country's high per capita income is also a contributing factor.

In fact, we found a relatively high vaccine acceptance rate (90.6%), considering that other studies have found acceptance ranges that go from 37.5% to 88.4% [3,4,6]. On the one hand, there could be a tendency in individuals to accept a payment or to say “yes” when they have less-formed preferences, which according to [19] tends to occur with health-related goods and services. This could also explain the high approval rate with the payment vector thresholds presented. On the other hand, it could also be that individuals foresee a high risk of getting sick (99.1%) and therefore would be more willing to pay, which has already been pointed out by other studies [6]. This, especially considering that COVID-19 could be perceived as “catastrophic” due to the health costs and the increased risk of death of vulnerable people (older adults and people with pre-existing chronic diseases), according to the results of [20,21]; in addition to the high social and economic cost of this disease [1]. Furthermore, we precisely demonstrated that one of the main variables that determine the WTP is the pre-existence of chronic diseases, the level of knowledge of COVID-19 and having COVID-19.

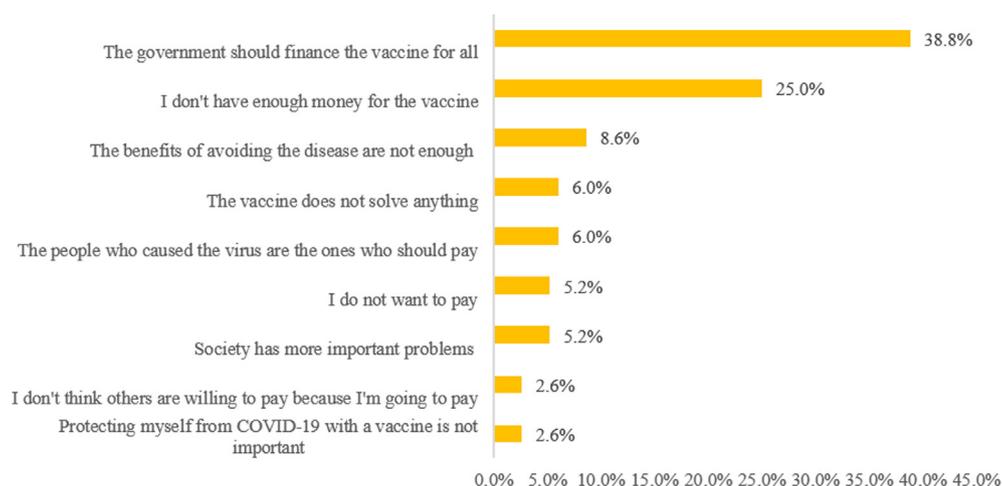


Fig. 1. Reasons for rejection of willingness to pay for a COVID-19 vaccine (n = 53), up to three selections per individual.

**Table 3**  
Willingness to pay (WTP).

	WTP	SE	z	Value-p	Confidence Interval <sup>1</sup>	Diff.
Simple Model 1	169.92	10.23	16.61	0.00	149.87	189.96
Simple Model 2	220.28	36.75	5.99	0.00	148.26	292.30
Double	184.72	9.80	18.86	0.00	165.52	203.92

SE: standard errors, z = normal test estimated, Diff. = Difference between the confidence interval bands. <sup>1</sup> Assuming 95% confidence.

Thus, both the high approval rate for the vaccine (90.1%) and the belief that one will eventually get sick (99.1%) demonstrate a positive intention of individuals towards it, even without knowing the details of its real effects on health. This is an important argument against the so-called “vacillation” which, according to [22], becomes a rejection of vaccination. In other words, our results indicate that there are fewer people against vaccination in the case of COVID-19.

Additionally, we found that perception of government performance in managing the pandemic also influences the WTP. This variable had not been considered in previous studies related to vaccine evaluation, such as those carried out by [3,4,7]. This is an important variable because the information provided by the government on the negative effects of COVID-19 and the strategies applied to mitigate the pandemic (such as restriction on mobility or quarantine), are key to educating the population and affect the WTP for the vaccine. In fact, there are studies that indicate that education, information and communication can improve the willingness to vaccinate against respiratory viruses [23]. Therefore, it is important that the government executes credible measures, informs and educates clearly about the impact that SARS-CoV-2 contagion generates.

It should be noted that the results of this study would be important to consider if the vaccine were to be introduced in a different country in the future, as they provide information to target available economic resources and many countries have budgetary constraints to deal with the SARS-CoV-2 health emergency. The results are applicable to countries that have mixed health systems (public and private provision) and that are based on copayments, such as some countries in North America and Europe.

In addition, considering that income is one of the important factors for the WTP for a vaccine, it is proposed that the government or the authorities in charge of public health carry out free COVID-19 vaccination campaigns, especially for people with lower incomes, leaving private provision to households with higher incomes. This last strategy is endorsed by the literature [24].

## 5. Conclusions

In this study, we found a high social and individual valuation for a COVID-19 vaccine. The average value to pay per individual was US\$184.72, considering a discrete choice model in double dichotomous format, which implied a social valuation of approximately US \$2223 million. The variables that positively impacted the WTP were the pre-existence of chronic diseases, knowledge of COVID-19, being sick with COVID-19, perception of government performance, employment status, and income. The variables that negatively affected the WTP were belonging to a private health system, non-adaptation to working from home with children (due to quarantine) and having recovered from COVID-19. These latter variables could be used to define strategies for public health policy intervention to confront the COVID-19 pandemic. Additionally, if the vaccine will become a “public good” globally, there would still be costs associated with production and distribution, and the laboratory that develops it should be financially compensated. Therefore, the WTP results from this study can serve as a compensation benchmark for vaccine developers.

## Contributions

Conceptualization, AC; methodology, formal analysis investigation, resources, writing—original draft preparation, AC. and LG; writing—review and editing, LG. All authors attest they meet the ICMJE criteria for authorship.

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## Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## Appendix A

See Tables A1–A3.

**Table A1**  
Characterization and individual context: Frequency and percentage of responses.

Personal context characterization	N (percentage)
I am informed of the implications of the COVID-19 pandemic	
Yes	561(99.1%)
No	5 (0.9%)
I think I'm not going to get sick from COVID-19	
Yes	43 (7.6%)
No	523 (92.4%)
I have a chronic disease (hypertension, diabetes, cancer, autoimmune disease, EPOC, among others).	
Yes	155 (27.4%)
No	411 (72.6%)
There are COVID-19 patients in my family	
Yes	14 (2.5%)
No	552 (97.5%)
There are recovered COVID-19 patients in my family	
Yes	15 (2.7%)
No	551 (97.3%)
What is your health system?	
Public health system	213 (37.6%)
Private health system	328 (58.0%)
Police or military health system	8 (1.4%)
Does not have	16 (2.8%)
What is your current employment status?	
Employee or businessman working in person (without quarantine)	163 (28.8%)
Employee or businessman working remotely (quarantine)	288 (50.9%)
Unemployed	115 (20.3%)
What is your gender?	
Female	329 (58.1%)
Male	237 (41.9%)
Other	0 (0.0%)
What age range are you in?	
18 years–29 years	93 (16.4%)
30 years–39 years	151 (26.7%)
40 years–49 years	191 (33.7%)
50 years–59 years	80 (14.1%)
60 years–69 years	39 (6.9%)
70 years–79 years	12 (2.1%)
80 years or more	0 (0.0%)
Education	
Basic or technical education	109 (19.3%)
University education	457 (80.7%)

**Table A2**  
Perceptions.

Item	Strongly disagree	Disagree	Indifferent	Agree	Strongly agree
In general, the Government has acted appropriately during this pandemic	123 (21.7%)	206 (36.4%)	47 (8.3%)	144 (25.4%)	46 (8.1%)
I am a person who loves risk	275 (48.6%)	198 (35.9%)	56 (9.9%)	27 (4.8%)	10 (1.8%)
Remote work is impossible with children around, so I cannot adapt to quarantine.	102 (18.0%)	207 (36.6%)	100 (17.7%)	106 (18.7%)	51 (9.0%)

**Table A3**

Frequency and percentage of responses to the payments vector of the willingness to pay.

Item	Yes	No
Today, would you be willing to pay for a vaccine that protects you against COVID-19?	513 (90.6%)	53 (9.4%)
Would you be willing to pay US\$184.5?	387 (68.4%)	124 (21.9%)
Would you be willing to pay US\$105.3?	51 (9.0%)	75 (13.3%)
Would you be willing to pay US\$276.5?	311 (54.9%)	75 (13.3%)

## References

- [1] Le TT et al. The COVID-19 vaccine development landscape. *Nat Rev Drug Discov* 2020.
- [2] Boyle KJ. Contingent valuation in practice. In: *A primer on nonmarket valuation*. Springer; 2017. p. 83–131.
- [3] Mudatsir M et al. Willingness-to-pay for a hypothetical Ebola vaccine in Indonesia: a cross-sectional study in Aceh. *F1000Res* 2019;8(1441):1441. <https://doi.org/10.12688/f1000research.20144.1>.
- [4] Rajamoorthy Y et al. Willingness to pay for hepatitis B vaccination in Selangor, Malaysia: a cross-sectional household survey. *PLoS ONE* 2019;14(4):e0215125. <https://doi.org/10.1371/journal.pone.0215125>.
- [5] Sarmento TTR et al., Consumer Willingness to pay for a hypothetical chikungunya vaccine in Brazil and the implications. *Expert Review of Pharmacoeconomics & Outcomes Research* 2020,(just-accepted)doi.
- [6] Yeo HY, Shafie AA. The acceptance and willingness to pay (WTP) for hypothetical dengue vaccine in Penang, Malaysia: a contingent valuation study. *Cost Effect Res Allocat* 2018;16(1):60.
- [7] Marshall H et al. Adolescent, parent and societal preferences and willingness to pay for meningococcal B vaccine: a discrete choice experiment. *Vaccine* 2016;34(5):671–7.
- [8] Cerda AA, García LY, Alborno DV. Parents willingness to pay for a human papillomavirus vaccine to protect their adolescent daughters. *Maule Region, Chile. Salud publica de Mexico* 2014;56(1):48–55.
- [9] Wong CK et al. Mothers' preferences and willingness to pay for human papillomavirus vaccination for their daughters: a discrete choice experiment in Hong Kong. *Value Health* 2018;21(5):622–9.
- [10] WorldBank. World Bank Country and Lending Groups; 2020. Available from: <https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-group>.
- [11] OCDE. OECD economic surveys: Chile; 2018; Available from: [https://doi.org/10.1787/eco\\_surveys-chl-2018-en](https://doi.org/10.1787/eco_surveys-chl-2018-en).
- [12] SUBTEL. Subsecretaría de Telecomunicaciones de Chile [Undersecretariat of Telecommunications of Chile]; 2020; Available from: <https://www.subtel.gob.cl/estudios-y-estadisticas/internet/>.
- [13] Cuccia T. Contingent valuation. In: *Handbook of cultural economics*, third ed. Edward Elgar Publishing; 2020.
- [14] Lopez-Feldman A. Introduction to contingent valuation using Stata; 2012.
- [15] Nosratnejad S, Rashidian A, Dror DM. Systematic review of willingness to pay for health insurance in low and middle income countries. *PLoS ONE* 2016;11(6):e0157470. <https://doi.org/10.1371/journal.pone.0157470>.
- [16] Jang S, Rasouli S, Timmermans H. Error by omitted variables in regret-based choice models: formal and empirical comparison with utility-based models using orthogonal design data. *Transportmetrica A: Transport Sci* 2020;16(3):892–909.
- [17] Muniz Júnior RL et al. Consumer willingness to pay for a hypothetical Zika vaccine in Brazil and the implications. *Expert Rev Pharmacoecon Outcomes Res* 2019;19(4):473–82. <https://doi.org/10.1080/14737167.2019.1552136>.
- [18] Acter T et al. Evolution of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) as coronavirus disease 2019 (COVID-19) pandemic: a global health emergency. *Sci Total Environ* 2020.
- [19] Ryan M, Scott DA, Donaldson C. Valuing health care using willingness to pay: a comparison of the payment card and dichotomous choice methods. *J Health Econ* 2004;23(2):237–58.
- [20] Jordan RE, Adab P, Cheng K. Covid-19: risk factors for severe disease and death. *British Medical Journal Publishing Group*; 2020.
- [21] Zhang J et al. Risk factors for disease severity, unimprovement, and mortality in COVID-19 patients in Wuhan, China. *Clin Microbiol Infect* 2020. <https://doi.org/10.1016/j.cmi.2020.04.012>.
- [22] Yaqub O et al. Attitudes to vaccination: a critical review. *Soc Sci Med* 2014;112:1–11.
- [23] Ren X et al. Knowledge, attitudes, and behaviors (KAB) of influenza vaccination in China: a cross-sectional study in 2017/2018. *Vaccines* 2020;8(1):7.
- [24] Levin A et al. Scope and magnitude of private sector financing and provision of immunization in Benin, Malawi and Georgia. *Vaccine* 2019;37(27):3568–75.