

Using Survey Experiments to Understand Vaccine Choice and Vaccination Time Preference¹

Although Hong Kong is one of the few places in the world where WHO-approved COVID-19 vaccine is free and available to the majority of its population, the city's vaccination scheme is still facing a slow uptake. The scheme began in February and many businesses in Hong Kong are now offering a slew of incentives and prize draws ranging from cash, staycation packages, cruise vacations, gold bars, cars, watches and even an opportunity to win an apartment worth HK\$10M to vaccinated residents. Yet, many citizens are still hesitant to get the jab.

A recent study examines the factors that shape Hong Kong citizens' preference toward COVID-19 vaccines and their time preference to be vaccinated. Results suggest people are most concerned about the efficacy of the vaccines and the possible severe side-effects they could have, and that cash incentives are not useful in enhancing vaccine appeal. People working in high-risk professions and people with higher trust in the government or friends prefer earlier timing for vaccination. Compulsory testing around the outbreak area may delay vaccination decision.

Research Questions

1. What attributes determine people's decision for COVID-19 vaccinations?
2. What attributes determine people's time preferences on receiving COVID-19 vaccines?

Key Findings

¹This report is adapted from the paper "When to be vaccinated? What to consider? Modelling decision-making and time preference for COVID-19 vaccine through a conjoint experiment approach" (doi: <https://doi.org/10.1101/2021.06.05.21258416>) by Samson W.H. Yuen, Ricci P.H. Yue, Bobo H.B. Lau, Cecilia L. W. Chan and Siu-Man Ng.

- People are most concerned about the efficacy of the vaccines and the possible severe side-effects when choosing COVID-19 vaccines.
- Cash incentives are not useful in enhancing the appeal of the vaccines.
- Time preference of vaccination is shaped by respondent characteristics more than vaccine attributes.
- Higher trust in friends and compulsory COVID-19 testing might delay an individual's decision to get vaccinated.

Data and Methods

- A large-N cross-sectional online survey was conducted in Hong Kong between 22 January 2021 and 28 January 2021. The conjoint model is adopted in this experiment which stimulates the decision-making process of Hong Kong citizens in receiving COVID-19 vaccinations.
- Respondents were presented with two vaccine profiles, characterized by six attributes: 1) vaccine cost/subsidy, 2) vaccine efficacy, 3) protection scheme to compensate for severe side-effects, 4) likelihood of mild side-effects (e.g. swelling, fever, chills and/or tiredness), 5) likelihood of severe side-effects (e.g. severe allergic reaction or other life-threatening reactions), and 6) queuing time after registering for the injection, and asked to indicate their choice of the preferred vaccine and to state their time preference to be vaccinated for the choice that they made. Demographic information of the respondents were also collected.
- The research generates an estimation of the relative causal influence of each attribute level on the resulting choice in terms of the preferred vaccine and timing for vaccination.

Results

Vaccine Preference

- **Vaccine cost/subsidy**

Making people pay for vaccines will reduce their likelihood of choosing them. A vaccine that costs HKD700 and HKD400 respectively are 1.1% and 1.8% less likely to be chosen than a free vaccine.

Subsidizing vaccines also reduces the desirability of vaccines. A vaccine that comes with a subsidy of HKD400 and HKD700 are 8.4% and 7.3% less likely to be chosen than a free vaccine. This means that the more subsidy the government provides, the less desirable a vaccine becomes.

- **Vaccine efficacy**

Vaccines with a 50% efficacy and those with a 70% efficacy are 30.7% and 16.9% less likely to be chosen than the baseline vaccine with a 95% efficacy.

- **Protection scheme to compensate for severe side-effects**

Providing medical insurance against severe side-effects will make a vaccine 10.9% more likely to be chosen than providing no such insurance.

Interestingly, providing an extra living subsidy *does not* make vaccines more desirable than simply by providing medical insurance.

- **Likelihood of side-effects**

The likelihood of causing severe side-effects is a powerful contributor to preference for a vaccine. However, the results indicate that a vaccine with unknown probability of causing adverse side-effects is 8.1% less likely to be chosen than a vaccine with 0.01% chance of causing adverse effect.

- **Queuing time after registering for the injection**

A wait of 7 and 14 days respectively is neither increasing nor decreasing the desirability of a vaccine as compared with no waiting time. However, a wait of 30 days will make a vaccine 2.0% less likely to be chosen than the baseline. Interestingly, if the wait prolongs to 60 days, the negative effect becomes negligible again.

Vaccination Time Preference

In comparison, respondent characteristics matter more than vaccine attributes.

- **Demographic variables**

Male, older, less educated, and higher income respondents prefer to be vaccinated earlier. Respondents with high-risk occupations, including medical workers, service workers, janitors and frequent travellers, prefer to be vaccinated earlier. Meanwhile, respondents with higher stress levels are more likely to prefer being vaccinated earlier. However, having chronic illnesses, and residing with vulnerable persons (infants, chronic patients, pregnant women and elderly) do not matter in determining vaccination time preference.

- **Intention to be vaccinated**

Respondents with higher intention to be vaccinated contribute to earlier time preferences.

- **Confidence in the vaccines**

Respondents with higher confidence in the vaccines are more likely to be vaccinated earlier.

- **Trust**

Respondents who have higher trust in the government are more likely to prefer to be vaccinated earlier. Meanwhile, there is no statistical relationship between trust in medical workers and vaccination time preference. Respondents who trust their friends more tend to delay their vaccination.

- **COVID-19 tests**

Generally, respondents who have been recently COVID-tested are more likely to prefer later vaccination.

- **Vaccine attributes**

Only severe side-effects (two of its levels, as compared to the smallest probability) and the provision of medical insurance contribute to earlier time preferences.

Implications

1. Subsidy is a double-edged sword

The study suggests that subsidy is a double-edged sword because people want their vaccine to be subsidized, but they will develop hesitancy if too much subsidy is offered. Results from the conjoint analysis indicate that subsidized vaccines are more preferable to a vaccine that will cost money. However, respondents are more likely to choose a free vaccine over a subsidized vaccine. One explanation is that subsidies may generate a negative signalling effect that guides people to think about the negative consequences of receiving the vaccine. As the valuation of vaccine changes, people who place a higher value on reducing the risk generated by vaccination will be less likely to receive vaccination (Cook et al., 2009). Furthermore, receiving benefits from vaccination is not common in other vaccination programmes. The deviation from the established practice may invoke unnecessary risk perception. This explanation may be applied to indemnity programmes and other healthcare plans related to COVID-19 vaccination.

2. People adopt a wait-and-see attitude to play safe

Although up to 61% of respondents indicated a lack of intention to join the vaccine programme, the findings show that their decision may change if they are presented with their preferred vaccine. It is suggested that while vaccination intention appears to correlate positively with time preference, there are more subtleties in the relationship. On the one hand, respondents with the intention to be vaccinated may delay their time preference given a specific vaccine. On the other hand, although the majority of those who indicate no intention to get vaccinated prefer to be vaccinated last regardless of the choice being presented, a significant proportion has chosen earlier time preferences. This implies that respondents who indicate no intention to be vaccinated may simply delay their timing. One possibility is that they are adopting a wait-and-see attitude to see whether the vaccines are safe enough. Another possibility is that rational people may want to avoid the potential cost of vaccination but benefit from herd immunity as public goods (Bauch et al., 2003; Bauch & Earn, 2004).

3. Citizens with certain backgrounds should be targeted

The time preference regression model suggests that demographic attributes are crucial predictors in vaccination time preference. Therefore, for instance, identifying volunteers to join the early phase of vaccination programmes can help ensure their smooth rollout and wider

acceptance. Vaccination programmes should target citizens with higher willingness to receive early vaccination too as the priority in the promotion of vaccination campaigns.

4. People tend to rely on civil-society-led interventions

From the results, people who trust the government more tend to receive vaccination earlier, while people who trust their friends tend to delay it. Similar research has shown that individuals' distrust or low trust in the government is a significant predictor of vaccination hesitancy in other diseases (Quinn et al., 2013; Larson et al., 2018; Jamison et al., 2019). However, it remains largely unknown to us why individuals with higher trust in friends develop delay-vaccination sentiments. Extant literature shows that strong "bonding social capital" (e.g., trust among friends) is associated positively with the increase in vaccination intention and protective behaviour, which help create "public goods" (e.g., herd immunity) under the pandemic (Nagaoka et al., 2012; Rönnerstrand, 2013; Chuang et al., 2015). However, the results do not align with this finding. One possible explanation is that the distrust in the Hong Kong government undermines the benefits of state-led vaccination programmes, leading to vaccination hesitancy and strong reliance on civil-society-led non-pharmaceutical interventions (Yuen et al., 2021). Another possibility is that people having better friendship networks may have some sorts of safety net to weather the uncertainties posed by the pandemic.

5. Compulsory testing should be adjusted in accordance with changing situations

The time preference analysis suggests that compulsory testing around the outbreak area may delay vaccination time preference, possibly owing to the fact that people may feel "safer" after being tested and thus reduce the urgency to take the vaccine. Many governments are relying on compulsory testing and quarantine to contain the risk of an outbreak. However, previous studies have identified that the majority of COVID-19 infection is attributable to presymptomatic and asymptomatic infection, making compulsory testing inadequate to interrupt a COVID-19 outbreak unless contact tracing is made rapid and thorough (Moghadas et al., 2020). In addition, stringent public health policy may not entail policy compliance with COVID-19 related measures (Yue et al., 2021). Thus, the stringency, scale and timing of compulsory testing should be scaled up or down, depending on the severity of the outbreak and planning of the vaccine programme.

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