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Effects of tourism promotion on COVID-19 spread: The case of the “Go To Travel” campaign in Japan

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ABSTRACT

Introduction: On July 22, 2020, the Japanese government launched the “Go to Travel” campaign that subsidizes 50% of personal travel expenditure to support the tourism industry under the COVID-19 pandemic. This policy was controversial from the viewpoint of infection spread and was temporarily cancelled in December 2020, though there was no statistical evidence.

Methods: This is the first study that measures the extent to which this campaign increased COVID-19 cases. This study regards the campaign as a natural experiment: although Tokyo and its commuting areas experienced the same time-series trends of COVID-19 cases before the “Go To Travel” campaign, this campaign was implemented in areas outside Tokyo, but not in Tokyo. Then, the comparison (difference-in-differences) yields the campaign’s effect.

Results: The estimation shows that the “Go To Travel” campaign significantly raised the increment rate of cases by 23.7%–34.4% during July 30—August 4. There is no significant effect after August 5. In addition, our simulation identified the number of campaign-related cases in each city.

Conclusions: Although the campaign significantly spread COVID-19, the effect was not continuous to permanently change the time-series trend.

1. Introduction

The Japanese government implemented the “Go To Travel” campaign as a tourism promotion policy from July 22 to December 28, 2020. Travelers were given 50% of their travel expenditures, including transportation fees and hotel charges (35% of travel expenditure plus 15% of vouchers to be used at the destinations). This policy supported the tourism industry that saw a decrease in sales because of COVID-19 (Kitamura et al. (2020) in Japan, and Bakar and Rosbi (2020) and Qiu et al. (2020) in other countries). The number of campaign applicants constantly grew (by about 15 million people in a month) after its launch (Japan Tourism Agency, 2020). However, Japan’s COVID-19 cases rapidly increased in November. Although, the campaign was supposed to continue until January 31, 2021, it was temporarily cancelled on December 28, 2020.

There is controversy regarding whether or not the campaign increased the cases, to what extent the campaign contributed to increasing cases, and whether its relaunch is acceptable. Japanese Prime Minister Yoshihide Suga stated, “there is no evidence supporting that the “Go To Travel” campaign is the major reason for infection spread.” The Japan Medical Association’s President Toshio
Fig. 1. Time-series Trend of the Cases by City, June–September 2020.

Note: The thick line indicates selected samples, and the thin line indicates excluded samples in model 2. The selected sample cities: Chiyoda-ku, Minato-ku, Taito-ku, Sumida-ku, Koto-ku, Shinagawa-ku, Setagaya-ku, Shibuya-ku, Suginami-ku, Arakawa-ku, Itabashi-ku, Nerima-ku, Edogawa-ku, Yokohama, Kawasaki, Sagamihara, Kamakura, Fujisawa, Chigasaki, Zushi, Yamato, Ebina, Zama, Kawaguchi, Wako, Saitama, Toda, Tokorozawa, Kawagoe, Niza, Fujimi, Fujimino, Itzum, Ageo Chiba, Ichikawa, Matsudo, Funabashi, Kashiwa, Urayasu, and Nagareyama.
Nakagawa also claimed that the “Go To Travel” campaign is certainly the trigger, though it is ambiguous whether it directly increases the number of COVID-19 cases. Thus, this policy is controversial because it may have directly or indirectly (through reducing daily self-restraint) increased the number of cases, although there is no statistical evidence. This study thus directly measures the extent to which this campaign increased COVID-19 cases using generalized difference-in-differences (DID). This study is regarded as one of the evidence regarding the effects of travel restriction and subsidization policies including Chinazzi et al. (2020), Petzer (2020), Fowler et al. (2020), Gargoum and Gargoum (2021), Linka et al. (2020), and Noland (2021).

2. Methods

We apply generalized DID approach to analyze the policy effects. During the pandemic, the commuting areas of Tokyo (i.e., many cities in Tokyo, Kanagawa, Saitama, and Chiba prefectures) had similar time-series trends of COVID-19 cases. However, the “Go To Travel” campaign was implemented in all prefectures except Tokyo. Then, comparing Tokyo’s cities with cities in other prefectures yields the campaign’s treatment effect—the “Go To Travel” campaign is the treatment, cities just outside Tokyo are the treatment group, and cities within Tokyo are the control group.

Our panel data include each city’s number of COVID-19 cases on each day of commuting to Tokyo. Since this number changed exponentially, we take the log difference (adding 1 for the log to be well-defined) of the number of COVID-19 cases over 2 weeks as the dependent variable:

$$\Delta y_{it} \equiv \ln \left( \sum_{j \in \{0, 1\}} y_{i,j+1} + 1 \right) - \ln \left( \sum_{j \in \{-1, -1\}} y_{i,j+1} + 1 \right)$$

(1)

where \(y_{i,j}\) is the number of patients of city \(i\) on date \(t\). As seen in the range of \(j\), we do not take daily log difference, but take two-week log difference for three reasons. First, the time from infection to announcement depends on patient and city. Second, rural cities often report zero case on a daily basis. Third, this specification is in line with the previous literature (Fetzer 2020). We also estimate the alternative scenario in which the two-week log difference is replaced by one-week log difference. Our estimation equation is as follows (which is based on Autor (2003)):

$$\Delta y_{it} = \gamma_i + \lambda_{it} + \sum_{j=37}^{47} \beta_j T_j d_{j,14} + \epsilon_{it}$$

(2)

where \(\gamma_i\) is the fixed effect of each city, \(\lambda_{it}\) is the fixed effect of each date, \(T_j\) is the dummy variable that takes 1 when a sample is in the treatment group, \(d_{j,14}\) is the dummy variable that takes 1 when a sample is on the date after July 22, \(\beta_j\) is the coefficient for it, and \(\epsilon_{it}\) is the error variable for city \(i\) on date \(t\). Because our sample period is June 1—September 20, we can estimate \(\beta_{j=37} - \beta_{j=47}\), therefore, \(j\) is from −37 to 47.

Thus, the generalized DID approach captures the effect for not only the designated (treatment) date (\(\beta_{j=37}\)) but also many dates (\(\beta_j\) for all \(j > 0\)). We adopt this specification because, first, it is ambiguous how long it takes for the policy effect to appear in the data. Although the treatment time is known (campaign start date: July 22), the time from infection to the government’s announcement is unknown and depends on the patient’s situation. Then, we need to investigate the effect not on one date but many dates. Second, as is discussed in the section below, the campaign might have not only short-run effects, but also long-run effects like reducing daily self-restraint. Then, we also need to investigate long-run effects of the campaign. In short, we check the parallel trend assumption (whether \(\beta_j\) is insignificant for all \(j < 0\)). DID estimation requires that the treatment and control groups have the same trends before treatment. We select samples by visual judgment of the time-series graph. This test is essential to justify this selection.

Fig. 1 lists the selected sample cities, which are Chiyoda-ku, Minato-ku, Taito-ku, Sumida-ku, Koto-ku, Shinagawa-ku, Setagaya-ku, Shibuya-ku, Suginami-ku, Kita-ku, Arakawa-ku, Itabashi-ku, Nerima-ku, Edogawa-ku, Yokohama, Kawasaki, Sagamihara, Kamakura, Fujisawa, Chigasaki, Zushi, Yamato, Ebina, Zama, Kagawuchi, Wako, Saitama, Toda, Tokorozawa, Kawagoe, Niiza, Fujimi, Fujimino, Iruma, Ageo, Chiba, Ichikawa, Matsudo, Funabashi, Kashiwa, Urayasu, and Nagareyama. Most are large cities with population over 200,000. In the sensitivity analysis, we also add some borderline cities (parallel trend). In addition, we examine if all cities are included in the sample without sample selection.

3. Data

For panel data creation, we collect each city’s daily number of COVID-19 cases in Tokyo’s commuting area, including Tokyo, Kanagawa, Saitama, and Chiba (the definition of Tokyo’s commuting area is from Ministry of Internal Affairs and Communications, 2010). Because of their small number of cases, we exclude segments of towns and villages from our sample. The daily COVID-19 cases comprise public data taken from the prefecture website (for Tokyo) and each city’s website (for other prefectures). The sample period is June 1—September 20, 2020. We select sample cities with similar time-series trends of \(\Delta y_{it}\) during June 15—July 21, 2020, before the “Go To Travel” campaign (see Fig. 1). The sample selection’s validity is tested in estimation (2) by considering whether \(\beta_j\) is insignificant for all \(j < 0\).

Very few cities report all dates for each case regarding onset, polymerase chain reaction test, positive confirmation, and govern-
ment announcement; many report only the confirmation or announcement date, which we regard it as the date of the case. Moreover, the time from infection to announcement depends on patient and city. To consider this time lag, \( \Delta y_t \) is calculated over a long period, every two weeks, as in equation (1).

4. Results

Table 1 presents the results. Column 1 is the baseline model, and we also conduct a sensitivity analysis. Column 2 is the model with some added borderline cities. Column 3 is the model with the same samples as the baseline model, but the two-week log difference is replaced by one-week log difference. Column 4 is the model with all commuting cities. Table 1 shows that the “Go To Travel” campaign significantly raised the increment rate by 23.7%–34.4% during July 30—August 4. There is no significant effect after August 5. Thus, the campaign’s effect is large, not continually but temporarily. In other models, a similar effect is observed. In most models of other sample selections, some of \( \beta_{\text{June15}} \cdots \beta_{\text{July22}} \) are significant, and the models do not satisfy the DID analysis’s parallel trend assumption.

Accordingly, Figs. 2 and 3 simulate the number of cases in two scenarios: (1) actual cases, and (2) counterfactual cases with (or without) a “Go To Travel” campaign for each city. In Tokyo’s cities, these scenarios occur when the campaign is not applied and would be applied, respectively. In cities outside Tokyo, these scenarios occur when the campaign is applied and would not be applied, respectively. The assumptions of these simulation are in Figs. 2 and 3.

5. Discussion

The “Go To Travel” campaign began on July 22, 2020 and continued after the sample period. This is the first study that measures the extent to which this campaign increased COVID-19 cases. Our estimation shows that it significantly increased the increment rate of cases only during July 30—August 4, but not afterwards. In addition, our simulation identified the number of campaign-related cases in each city.

In Japan, Anzai and Nishiura (2021) count the number of COVID-19 cases with travel history through descriptive statistics and find that the cases increased during “Go To Travel” campaign. Their method indicates that the campaign increased COVID-19 cases to some extent. However, it does not measure the extent to which this campaign increased COVID-19 cases for the following reasons: first, cases with travel history are just one part of the policy effect. Infections can spread to those who have not traveled, which do not appear as cases with travel history. This study captures both cases with and without travel history, thus measuring the whole policy effect. Second, as is introduced above, some people claim that, besides tourism, the campaign brought about other behavioral changes. Some people replaced going downtown by long-distance travel. Other people lowered self-restraint motivation. Our analysis captures these effects.

One of our important findings is that although the campaign significantly spread COVID-19, the effect was not continuous to permanently change the time-series trend. It implies that, contrary to what is said, the “Go To Travel” campaign did not change the motivation of self-restraint behavior in daily lives. The reason why the effect is not continuous to permanently change the trend of cases is still open question. This problem is left for future research.

Author statements

This manuscript has not been published or presented elsewhere in part or in entirety and is not under consideration by another
Fig. 2. Simulation with & without the “Go to travel” campaign, by cities in Tokyo, July 31–August 14.

Presumption: To estimate the with scenario, we calculate the fitted value of equation (2) when D takes 1 for cities in Tokyo after the campaign (when the estimator is significant if p < 0.05), and the change of the number of the cases occurs after the significant estimator first appears.
Fig. 3. Simulation with & without the “Go to travel” campaign, by cities outside Tokyo, July 31– August 14.
Data availability

The data underlying this article will be shared on reasonable request to the corresponding author.

Declaration of competing interest

The authors have declared no conflicts of interest.

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