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The COVID-19 pandemic reduces trust behavior

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\textbf{A B S T R A C T}

We conduct an online experiment before and after the outbreak of COVID-19 pandemic in China with four sampling waves and test the effect of COVID-19 pandemic on trust behavior. We find that COVID-19 pandemic reduces trust behavior. Belief in others’ trustworthiness is one potential mechanism underlying the effect of COVID-19 pandemic on trust behavior.

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1. Introduction

Trust plays a crucial role in human relationships. Trust behavior is sticky, but not immovable (Uslaner, 2002). There is some evidence that trust behavior varies across different age groups (Bellemare and Kröger, 2007; Sutter and Kocher, 2007). In addition, emergency event can change an individual’s trust behavior. For example, several studies have demonstrated that external shocks, such as civil war (Gilligan et al., 2014) and tsunami (Cassar et al., 2017), can affect trust behavior.

This paper experimentally tests the effect of COVID-19 pandemic on trust behavior. Trust is a key factor in the willingness of health professionals to work during the COVID-19 outbreak. Thus, it is relevant to investigate whether and how COVID-19 pandemic affects trust behavior.

There is no doubt that COVID-19 pandemic has severely affected the daily lives of most of humanity. To avoid physical contact with others, most economic and social activities have come to a standstill. Schools and factories are forced to close, and people have experienced one of the biggest lockdowns. The consequences of the COVID-19 pandemic are thus not only financial (e.g., redundancy, financial insecurity), but also psychological (e.g., fear, anxiety) (Torales et al., 2020).

People with high levels of fear and anxiety tend to have negative expectations, such as negative belief in another people's trustworthiness (Olivera-La Rosa et al., 2020). Belief in others' trustworthiness is a prominent motivation of trust behavior. Several studies have confirmed that there is a positive relationship between belief in others’ trustworthiness and trust behavior (Buchan et al., 2008; Fehr, 2009). Therefore, we argue that the outbreak of COVID-19 pandemic may lead to a decline in belief in others’ trustworthiness, which in turn will reduce the trust behavior.\textsuperscript{1}

2. Experimental design

We recruited 1160 participants (mean age = 22.32 years, 778 female) from the student pools of Shandong University by circulating a link of the experiment webpage to the WeChat.\textsuperscript{2} 869 participants were randomly assigned as trustors (mean age = 22.4 years, 587 female), and 290 participants were randomly assigned as trustees (mean age = 22.1 years, 191 female). All subjects participated in the experiment only once.

There were four samples in our experiment.\textsuperscript{3} Our baseline sample (labeled Wave 1), was collected from December 8 to December 11, 2019. After the outbreak of COVID-19 pandemic, \textsuperscript{4}

\begin{footnotesize}
\textsuperscript{1} We also test whether COVID-19 pandemic indeed reduces trustworthiness.
\textsuperscript{2} The link of experiment webpage is generated via a professional platform called “Wenjuanxing”, which provides functions equivalent to Amazon Turk.
\textsuperscript{3} In Wave 3, one participant acted as trustor was excluded from data analysis due to incomplete information.
\textsuperscript{4} The last columns in Table A1 and Table A2 in Appendix A showed that the background characteristics of trustors and trustees were evenly balanced across waves.
\end{footnotesize}
we collected the second sample (labeled Wave 2) in February 2020, third sample (labeled Wave 3) in June 2020, and fourth sample (labeled Wave 4) in November 2020 (see Table 1). The four samples allow us to test whether trust behavior differs in Wave 1 (before the outbreak of COVID-19 pandemic), Wave 2 (at the peak of COVID-19 pandemic), Wave 3 (about five months later after the outbreak of COVID-19 pandemic) and Wave 4 (about nine months later after the outbreak of COVID-19 pandemic).\footnote{The original aim of our experiment was to study the effect of one-child policy on trust behavior. We implemented the first sampling wave from Dec. 8 to Dec. 11, 2019. In Jan. 20, 2020, person-to-person transmission of COVID-19 was publicly confirmed in China. In Jan. 23, 2020, the central government of China imposed a strict lockdown in Wuhan, quickly followed by lockdowns in other cities of Hubei province. After the outbreak of COVID-19 pandemic, we changed the aim of our experiment and tried to test the effect of COVID-19 pandemic on trust behavior.}

We also test the effect of COVID-19 pandemic on trustworthiness by comparing the behavior of trustees in Wave 1 and Wave 4.\footnote{One anonymous reviewer asked that whether trustworthiness reacted to the COVID-19 pandemic. To answer this question, we conducted the fourth sampling wave, i.e., Wave 4. We thank the anonymous reviewer for the constructive suggestions.}

Our experiment started with a trust game, which was a slightly modified version of Berg et al. (1995). In the game, the trustee (neutrally labeled “Player A”) was endowed with 10 experimental currency units (ECU) (the exchange ratio was 1 ECU = 0.5 RMB). The trustee decided how much to send, \( x \in [0, 10] \), to a trustee (labeled “Player B”). Any amount sent is multiplied by 3. The trustee decided how much to return, \( y \in [0, 3x] \), to the trustee. Thus, the trustee’s payoff was \( 10 - x + y \), and the trustee’s payoff was \( 3x - y \).

The trustees were asked to make two decisions: (i) how much of their initial endowment of 10 ECU they wanted to send to trustees; (ii) how much they expected trustees would return to them for the amount they sent. The two questions allowed us to measure the trust behavior and belief in others’ trustworthiness. For the decisions of trustees, we used the strategy method. The trustees had to decide on a contingent action for every possible amount the trustee sent (without knowing trustees’ decisions). For each possible amount the trustee sent, \( x \in [0, 10] \), we calculated the proportion returned by the trustee, i.e., \( y/(3x) \). The trustworthiness was measured by the average proportion returned by the trustees.

Trustors and trustees were randomly matched at a ratio of 3:1 to calculate their payments. The trustees recruited in December 2019 were matched with the trustors in Wave 1, Wave 2, and Wave 3; and trustees recruited in November 2020 were matched with trustors in Wave 4. The trustee was paid based on his or her own decision as well as the decision made by the matched trustee. One of the three trustees matched with the trustee was randomly chosen, and we paid the trustee based on the decision of the chosen trustee. The average earnings of trustors and trustees were 5.14 RMB and 4.31 RMB, paid via WeChat or Alipay. At the end of the experiment, subjects were asked to complete a post-experiment questionnaire, including gender, age, political identity, one-child, and family average monthly income.

3. Results

Table 2 reports the descriptive statistics of trust and belief in others’ trustworthiness. Trust behavior is the amount sent by trustor. We find that subjects’ trust behavior in Wave 1 is significantly higher than any other sampling wave (Mean\(_{Wave1} = 5.61\), Mean\(_{Wave2} = 4.932\), Mean\(_{Wave3} = 4.834\), Mean\(_{Wave4} = 4.905\), two-sided Mann Whitney tests, all \( p < 0.05 \) in any pairwise comparison). This result shows that COVID-19 pandemic significantly reduces trust behavior. After the outbreak of COVID-19 pandemic, we do not find subjects’ trust behavior varies in the latter three waves, i.e., the differences of trust behavior between Wave 2, Wave 3 and Wave 4 are statistically insignificant (Kruskal–Wallis test, \( p = 0.7317 \)).

We further confirm our results by running OLS regressions. Table 3 presents the results of regression analyses. In Column (1), the trust behavior is regressed on dummy variables for the Wave 2, Wave 3 and Wave 4. Consistent with the preceding nonparametric test, we find that the effects of Wave 2, Wave 3 and Wave 4 on trust behavior are significantly negative. In Column (2), we add the demographic controls, and the coefficients of Wave 2, Wave 3 and Wave 4 are still negative in Column (1) and significant. Overall, these results confirm that COVID-19 pandemic significantly reduces trust behavior.

We further test the effect of COVID-19 pandemic on trustees’ belief in others’ trustworthiness, which is measured by the proportion between the expected return and three times the amount trustor sent. We find that the COVID-19 pandemic significantly affects the belief in others’ trustworthiness. On average, subjects’ belief in others’ trustworthiness in Wave 1 is 0.551, which is significantly higher than that in Wave 2, Wave 3 and Wave 4 (Mean\(_{Wave2} = 0.497\), Mean\(_{Wave3} = 0.485\), Mean\(_{Wave4} = 0.458\), two-sided Mann Whitney test, \( p < 0.001 \) in any pairwise comparison). However, in the latter three waves, no significant difference of belief in others’ trustworthiness is found (Kruskal–Wallis test, \( p = 0.3519 \)).

Belief in others’ trustworthiness may be one of the potential mechanisms underlying the effect of COVID-19 pandemic on trust behavior. To test this hypothesis, we run several regressions in Table 3. In Column (2), the coefficients of Wave 2, Wave 3 and Wave 4 are significantly negative. Column (3) shows that the effect of COVID-19 pandemic on belief in others’ trustworthiness is significantly negative. Compared with Column (2), Column (4) shows that the coefficients of Wave 2, Wave 3 become small but still significant, and the coefficient of Wave 4 becomes insignificant when we include belief in others’ trustworthiness. Thus, belief in others’ trustworthiness is one potential mechanism underlying the effect of COVID-19 pandemic on trust behavior.

At last, we test the effect of COVID-19 pandemic on trustworthiness. Consistent with the trustees’ beliefs, we find that COVID-19 pandemic significantly reduces trustworthiness. In Wave 1, the average trustworthiness is 0.484 (SD = 0.183). In Wave 4, the average trustworthiness is 0.361 (SD = 0.160). The difference of trustworthiness between Wave 1 and Wave 4 is statistically significant (two-sided Mann Whitney test, \( p < 0.001 \)).

4. Conclusions

We conduct an online experiment before and after the outbreak of COVID-19 pandemic in China with four sampling waves and explore the impact of COVID-19 on trust behavior. We find that COVID-19 pandemic reduces trust behavior. Belief in others’ trustworthiness is one potential mechanism underlying the effect of COVID-19 pandemic on trust behavior. In addition, we find that trustworthiness indeed goes down after the COVID-19 pandemic, as trustees expect. These results allow us to gain a deeper and more comprehensive understanding of the impact of COVID-19 pandemic, indicating that attention should be paid to repair of trust damage caused by this epidemic.

According to our experimental results, COVID-19 pandemic still has a negative effect on trust behavior about nine months later after the outbreak of COVID-19 pandemic. This raises a new question: How long will the effect last? We believe that new shocks in the future, such as the launch of the COVID-19 vaccine (the most promising solution to mitigate new viral strains), could
Table 1
Sample information.

| Sampling wave | Sample Time          | Trustor | Trustee |
|---------------|----------------------|---------|---------|
| Wave 1        | Dec. 8 to Dec. 11, 2019 | 213     | 220     |
| Wave 2        | Feb. 20 to Feb. 24, 2020 | 235     |         |
| Wave 3        | Jun. 11 to Jun. 14, 2020 | 211     |         |
| Wave 4        | Nov. 10 to Nov. 14, 2020 | 210     | 70      |

Table 2
Descriptive statistics (means). Trust behavior is the amount sent by trustor. Belief in others’ trustworthiness is the proportion between the expected return and three times the amount trustor sent. Standard deviations appear in parentheses.

| Sampling wave | All          | Wave 1          | Wave 2          | Wave 3          | Wave 4          |
|---------------|--------------|-----------------|-----------------|-----------------|-----------------|
| Trust behavior| 5.068(2.674) | 5.61(2.539)     | 4.932(2.318)    | 4.834(2.811)    | 4.905(2.967)    |
| Belief in others’ trustworthiness | 0.498(0.227) | 0.551(0.203)    | 0.497(0.191)    | 0.485(0.257)    | 0.458(0.245)    |
| N             | 869          | 213             | 235             | 211             | 210             |

Table 3
OLS regressions of trust behavior. Trust is the amount sent by trustor. Wave 2 is a dummy for the second sample. Wave 3 is a dummy for the third sample. Wave 4 is a dummy for the fourth sample. Belief in others’ trustworthiness is the proportion between the expected return and three times the amount trustor sent. Demographic controls include gender, age, political identity, one-child, and family average monthly income. Standard errors in parentheses. ***p < 0.01, **p < 0.05, *p < 0.1.

| Dependent variable | Trust (1) | Trust (2) | Belief in others’ trustworthiness (3) | Trust (4) |
|--------------------|-----------|-----------|---------------------------------------|-----------|
|Wave 2              | −0.678***(0.252) | −0.697***(0.252) | −0.048***(0.021) | −0.459***(0.228) |
|Wave 3              | −0.776***(0.258) | −0.791***(0.258) | −0.058***(0.022) | −0.497***(0.235) |
|Wave 4              | −0.706***(0.259) | −0.703***(0.278) | −0.088***(0.022) | −0.259(0.236)    |
|Belief in others’ trustworthiness | 5.038***(0.363) | No        | Yes                                   | Yes       |
|Demographic controls |Constant   | 5.610****(0.182) | 4.733****(0.938) | 0.730****(0.080) |
|                    | adj. R²   | 0.010      | 0.026                                  | 0.023     |

be opportunities to promote the restoration of trust. However, the problem of fair distribution caused by vaccines may also exacerbate the decline in trust. Only future research would be able to tell.

Appendix A. Supplementary data

Supplementary material related to this article can be found online at https://doi.org/10.1016/j.econlet.2020.109700.

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