Overconfidence and Generosity: An Online Experiment on Covid-19

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Abstract. Under the backdrop of the pandemic of COVID-19, people have different predictions of the future condition and understanding of the current status. In this paper, findings from an online experiment show how overconfidence can play an important role in terms of decision-making of the pandemic: among the main findings from data analysis, self overconfidence significantly increases donations. Also, with the growth of age, people tend to donate more while as they advance the education level, people prefer to donate less. The results of this research can further inform policymakers on individuals' behaviors during a negative economic shock.

1 Introduction

1.1 Research on the background of generosity

During the COVID-19 pandemic, many companies, organizations, and individuals donated large amounts of materials and money to the severely affected areas. There are many instances in history that show how generosity can flourish in difficult times, which is strong evidence that social preferences exist. According to De Waal (2008), these mechanisms date back as far as 60 million years and are most likely associated with feelings of empathy when seeing others in trouble. This behaviour may also be related to the so-called "warm-glow" effect (Andreoni, 1990) and its sense of reward and fairness, and justice when helping others.

1.2 Research on the background of overconfidence

Gervaris, Heaton, and Odean(2002) defined overconfidence as a belief that the accuracy of one's own knowledge is higher than the fact, that is, one gives more weight to one's information than the fact. Studies on subjective probability measure also find that there is indeed an overestimation of the accuracy of one's own knowledge.

There is a study found that an increase in a person's expertise does not reduce their level of overconfidence. When events are difficult to predict and grasp, experts tend to be more overconfident than ordinary people. They usually exaggerate their knowledge and ability and tend to project the possibility of things happening in the direction of their own will. It is a clear lack of objective evaluation of things. Because of our limited ability to notice, remember and process information, it is impossible to process all the information presented to us.

Information with "salient experience" is information that attracts people's attention or makes them think about it. The psychological phenomenon of focusing only on "salient experiences" and habitual things can lead to the "halo effect", which is focusing on things that have similar features or are related to familiar things.

1.3 Aims of the paper

During the pandemic of COVID-19, many people are struggling about getting proper protection. Therefore this essay uses a dictator game and other basic information questions to find out if the overconfidence in COVID-19 pandemic could affect people's behavior on whether to donate. Based on the research findings of former scholars, this essay draws a research hypothesis that overconfidence is positively related to generosity. The importance of this research is that the explore of the link between overconfidence and over generosity is still quite new in the related area. There have been many remarkable findings in each separate area but not in the intersection. This paper makes a useful attempt in this respect. Therefore, this paper expands and enriches the study of behavioral economics.

2 Methodology

2.1 Research design

392 subjects were recruited on Wenjuanxing, an online questionnaire maker website, to fill out an online questionnaire to evaluate their level of generosity and confidence alongside their basic information. The participants were first asked to participate in a dictator game, answering how much will they be willing to donate out of CNY 5000 to people who struggled in...
getting basic protection during the COVID-19 pandemic. This indicates how generous people are. We ruled out 23 invalid results by the first question and have 369 final feedback. The second and third question was designed to indicate participants’ valuation of population’s and themselves knowledge about COVID-19. The fourth question measured the scale of concerns regarding COVID-19. In the next part, I set up 10 knowledge questions to reveal if the participants’ valuation about the knowledge is consistent with their actual scores in the knowledge quiz. The rest of the questionnaire is basic information questions including gender, age group, education level, current address, current occupation, etc. Other than that, the questionnaire also asked whether participants work in medicine and frozen food, and cold-chain transportation-related fields. And making enquires about whether getting infected by coronavirus tried to test if there is a link between past related experience and generosity.

2.2 Equation setting and variable definition

To evaluate whether citizens’ overconfidence in the coronavirus epidemic affected their generosity, the equations to be estimated are as follows:

\[ \text{Donation} = \alpha + \beta_1 \text{Self}_\text{Overconfidence} + \beta_2 \text{Other}_\text{Overconfidence} + \beta_3 \text{Concerns} + \beta_4 \text{Gender} + \beta_5 \text{Age} + \beta_6 \text{Education} + \gamma \]

The explained variable in the equation is Donation. I examined the relationship between the indicators and over generosity. A large body of research on behavioral economics shows that people often choose a reference standard as a reference when making an analysis and judgment. People tend not to pay too much attention to the characteristics of their environment but are more sensitive to the differences between their current situation and their reference level. The "reference dependence" also exists in the overconfident person's own overconfidence level. Therefore, when people are in a group, their level of overconfidence depends not only on their confidence in their own abilities but also on their judgments of the abilities and levels of overconfidence of others. That is why I generate Self_Overconfidence and Other_Overconfidence.

Self_Overconfidence is a binary variable that is defined as one when Self_Reported Knowledge is greater than Actual_Score.

Other_Overconfidence is also a binary variable that equals one when Actual_Score is greater than the mean of Actual_Score while at the meantime Self_Reported Knowledge is greater than or equal to Pop_Knowledge.

Self_Reported Knowledge is the quantification of citizens’ knowledge of their knowledge of coronavirus that is been asked in the questionnaire.

Pop_Knowledge is defined as the quantification of the public's knowledge of their knowledge of coronavirus that is been asked in the questionnaire as well.

Actual_Score is the real mark the participants score in the ten knowledge quiz in the questionnaire indicating their true grasp of the knowledge of coronavirus.

Concerns is another variable that I want to include in the equation. Concerns indicate the levels of concerns citizens have for the COVID-19 pandemic asked in the questionnaire. Concerns are processed into a binary variable that is equal to 1 when the participants’ Concerns level is greater than 5 and is equal to 0 when their Concerns level is equal to or smaller than 5. When Concerns is 1, this essay sees the participants are more concerned about the COVID-19 pandemic. And when equals to 0, participants with this answer are considered as not concerned so much.

Gender, Age, Education, Occupation might play a part in the evaluation of Donation likewise. Gender is a variable defined as 1 when the participants are men and 2 when are women.

Table 1. Descriptive Statistic

| Variable          | N  | Mean  | p50  | sd   | min  | max  |
|-------------------|----|-------|------|------|------|------|
| Donation          | 369| 3294.81| 4900 | 1943.836| 0    | 5000 |
| Self_Overconfidence | 369| 0.531165 | 1    | 0.499705| 0    | 1    |
| Other_Overconfidence | 369| 0.466125 | 0    | 0.499529| 0    | 1    |
| Age               | 369| 3.95122 | 4    | 1.390107| 1    | 7    |
| Gender            | 369| 1.550136 | 2    | 0.498156| 1    | 2    |
| Education         | 369| 1.888889 | 2    | 0.63083 | 1    | 4    |
| City_classes      | 369| 7.813008 | 9    | 2.654005| 1    | 15   |
| Occupation        | 369| 2.880759 | 3    | 0.879651| 1    | 5    |
| Frozen_Related    | 369| 0.00542 | 0    | 0.073521| 0    | 1    |
| Medical_Related   | 369| 0.054201 | 0    | 0.22672 | 0    | 1    |
| Infection         | 369| 1.99729 | 2    | 0.090249| 1    | 3    |
Age is divided into 7 groups, which is below 18 years old, 18 to 25, 26 to 30, 31 to 40, 41 to 50, 51 to 60, and people above 60 years old, corresponding to 1 to 7 in STATA results.

Education is divided into 4 groups, corresponding with 1 to 4, which are K12 education, college education, post-graduate education, and Ph.D. education.

There are other variables I want to include in the evaluation, however, the number of participants is not enough to draw distinctive results, for example, Frozen_Related/ Medical Related (if they work experiences related to medicine or cold chain transportation) and Infection (whether the participants have been or at the meantime is infected by coronavirus). Medical Related is processed as a binary variable, is defined as zero when the participants do not have medical relevant experiences and as one when having related experiences. Frozen_Related is also a binary variable that equals zero when participants are not working in the frozen food and cold chain transportation industries and equals to one when they are. As a result, these variables are not included in the evaluation.

2.3 Results

2.3.1 Descriptive statistics

The feedback gathered from 16 provinces all over China, mainly from Hebei province suggesting that people are willing to donate to people in need of aid in Covid-19 protection. Table 1 shows the basic information of the variables in the survey, including the total amount of the feedback, mean, median, standard deviation, minimum and maximum of the variables.

Table 2, including only 196 data, shows the same sets of variables under the condition that people were overconfident. The mean of Donation is higher when people are overconfident. The mean of Other_Overconfidence is slightly higher compared to the overall participants. It also indicates that people are more matured in an age when they are overconfident.

2.3.2 Inferential statistics

Table 3 suggests that the correlation between Donation, Self_Overconfidence, and Other_Overconfidence are all positive.

Table 4 indicates the results of logit on the probability of donating the full amount. Based on the previous results of this research, Other_Overconfidence is not significant with Donation. However, it shows that being self-confident could make the probability of donating to the full amount increased to 1.77 times of the original. Being a woman will lower the odds to 0.89. From the overall view, people would increase the probability of donating to a large amount as the age grows. However, unlike the
trend of age, people tend not to donate to full amount with the improvement of education level. People who have a bachelor's degree would donate to the full amount decrease to 0.8 times while people who hold a Ph.D. degree would decrease to 0.2 times.

Table 4. Logit Analysis on Probability of Donating Full Amount

| maxDonation | Odds Ratio | Std. Err. | z   | P>|z| | [95% Conf. Interval] |
|-------------|------------|-----------|-----|------|----------------------------|
| Self_Overconfidence | 1.770126   | 0.390008  | 2.59| 0.01 | 1.149373 2.726136 |
| 2. Gender | 0.8888847  | 0.197119  | -0.53| 0.595 | 0.575551 1.3728 |
| Age | | | | | |
| 2 | 1.018989  | 0.784367  | 0.02 | 0.981 | 0.225402 4.606614 |
| 3 | 1.429479  | 1.10502   | 0.46 | 0.644 | 0.314181 6.503929 |
| 4 | 1.538305  | 1.144073  | 0.58 | 0.563 | 0.358083 6.60847 |
| 5 | 1.085475  | 0.793748  | 0.11 | 0.911 | 0.25893 4.550472 |
| 6 | 2.754591  | 2.148815  | 1.3 | 0.194 | 0.597101 12.70769 |
| 7 | 1 (empty) | | | ||
| Education | | | | | |
| 2 | 0.8659169 | 0.239874 | -0.52 | 0.603 | 0.503129 1.490299 |
| 3 | 0.5285803 | 0.223246 | -1.51 | 0.131 | 0.230997 1.20953 |
| 4 | 0.2669658 | 0.319544 | -1.1 | 0.27 | 0.025563 2.788037 |
| _cons | 0.6597257 | 0.459063 | -0.6 | 0.55 | 0.16868 2.580255 |

| dy/dx | Std. Err. | z   | P>|z| | [95% Conf. Interval] |
|-------|-----------|-----|------|----------------------------|
| Self_Overconfidence | 0.13458 | 0.05004 | 2.69 | 0.007 | 0.036503 0.232657 |
| 2. Gender | -0.027753 | 0.052184 | -0.53 | 0.595 | -0.13003 0.074527 |
| Age | | | | | |
| 2 | 0.0044336 | 0.181222 | 0.02 | 0.98 | -0.35076 0.359622 |
| 3 | 0.0856517 | 0.182483 | 0.47 | 0.639 | -0.27201 0.443311 |
| 4 | 0.1033821 | 0.175348 | 0.59 | 0.555 | -0.24029 0.447058 |
| 5 | 0.0194173 | 0.172218 | 0.11 | 0.91 | -0.31812 0.356958 |
| 6 | 0.239044 | 0.181166 | 1.32 | 0.187 | -0.11603 0.594123 |
| 7 | (not estimable) | | | ||
| Education | | | | | |
| 2 | -0.034412 | 0.066183 | -0.52 | 0.603 | -0.16413 0.095304 |
| 3 | -0.150066 | 0.097475 | -1.54 | 0.124 | -0.34105 0.041041 |
| 4 | -0.288425 | 0.2141 | -1.35 | 0.178 | -0.70805 0.131203 |

3 Conclusion

With the research into whether people are willing to donate to people under the situation of the COVID-19 pandemic, the results show people who are overconfident are more likely to donate to people in need and with a large amount. With the limitation of the number of feedbacks, as well as the nonuniform distribution of questionnaire results, the results of the essay might have their limitations. Also since there is no real payment involved in the experiment, this conclusion is only a hypothetical one. But I do find the results might aid the government to positively lead its people into fighting the COVID-19 pandemic. For example, increasing the confidence level of citizens might encourage them to feel involved in rescue in severe conditions, which would guide them not only to donate but also to strengthen the people's cohesive force.

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