

Fear of COVID-19 Contagion: The Idiosyncratic Effects of an Aggregate Pandemic Shock*

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Abstract

Using a survey on consumer expenditure in Japan, this study examines how the fear of COVID-19 contagion influences consumer expenditure patterns. We show that the consumption expenditure responses to the spread of the COVID-19 pandemic are significantly heterogeneous across generations. We find that the elderly spend less than the younger generation by at least 5% as COVID-19 spread. In fact, those aged above 60 significantly decreased their spending even on food and drink products by 13%. We also find that the elderly forgo shopping in favor of the younger generation. These heterogeneous responses are likely to be due to the fear of the COVID-19 infection. The finding suggests that heterogeneous perceptions regarding the fear of health-related consequences transforms an aggregate shock into an idiosyncratic one for any novel infectious disease.

JEL Classification: D12; E21

Keywords: COVID-19; consumption gap across generations; expenditure; fear; spending behavior

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1 Introduction

How does the COVID-19 pandemic influence consumption expenditure? We show that the response to the spread of COVID-19 has been significantly heterogeneous across generations in Japan. We find that the consumption expenditure of the elderly is negatively associated with the number of new COVID-19 cases: the elderly spend less than the younger generation by at least by 5% as COVID-19 spread throughout the country.

Looking at consumption expenditure, there are four mechanisms to explain the responses of consumption expenditure to the COVID-19 pandemic (1) the suspension of many production and commercial activities on the supply side; (2) a negative income shock, which is not covered by compensated by government transfers; (3) increased precautionary savings due to increased uncertainty about future earnings, current and future employment status, credit conditions, and uncertainty about the length of the pandemic; and (4) an infection-concern motive, that is, the response to the risk of contracting the virus. Mechanisms (1)(3) can be interpreted as aggregate shocks, while (4) can be classified as an idiosyncratic shock. The COVID-19 pandemic obviously works as an aggregate shock.

As for (4) an infection-concern motive, the growing literature suggests that the fear of the COVID-19 pandemic plays an important role in explaining the effects of lockdown orders or voluntary lockdowns on personal mobility and interactions. While the literature suggests the overall relationship between the fear of infection and consumer choices, the fear of the infection has potentially heterogeneous effects on expenditure among generations in terms of in-person shopping, eating out, and traveling.

This study fills this research gap. The infection-concern motive corresponds to the risk of contracting the virus. It is well known that the probability to become severely ill by COVID-19 infection increases with age. Therefore, fear of contagion must be heterogeneous across generations and work as an idiosyncratic shock. Based on a granular data source, this study provides a detailed analysis and determines how the fear of the COVID-19 pandemic as an idiosyncratic shock affects consumer expenditure. In fact, the elderly significantly decrease expenditure and forgo shopping to the younger generation due to fear of COVID-19 contagion. This suggests that the heterogeneous perceptions about the fear of infection transform an aggregate shock into an idiosyncratic one for any novel infectious disease.

2 Data

2.1 Data about the consumption expenditure

We use panel data (SCI-personal) on consumption expenditure collected by a marketing company, Intage. Specifically, we use day-to-day shopping information collected on an ongoing basis from consumers aged 15–79 all over Japan. The Family Income and Expenditure Survey (FIES) conducted by the Statistics Bureau of Japan records the consumption expenditure of approximately 6,000 households based on household heads, while the panel data we use records individual expenditure for more than 50,000 consumers. The data capture the profile of these consumers in detail, including aspects such as income, education, and financial assets. Specifically, we can determine who bought what, when, where, how many, and at what price. These data cover items that households purchase frequently, such as food (except for fresh food, prepared food, and lunch boxes), beverages, daily miscellaneous goods, cosmetics, pharmaceutical products, and cigarettes.¹ We use the data to test whether the elderly decreased their expenditure due to the fear of COVID-19 compared to the younger generation.

2.2 Survey on the effects of COVID-19 pandemic on daily life

Intage Inc. surveys the effects of the COVID-19 pandemic on daily life from October 23 to November 4, 2020. A total of 35,389 respondents out of 83,501 completed the online-survey. The response rate is 42.4%.

¹Because our scanner data cover daily necessities, they do not cover housing, utilities, durables, clothing, and services.

The survey contributes to identifying how the fear of COVID-19 influences consumption expenditure across generations. First, the survey can be matched with the survey on household expenditure. In fact, more than half of those who took the survey are also respondents to the survey on household expenditure in Subsection 2.1. We successfully match the two survey data for 29,864 respondents. The matched data allow us to examine the heterogeneous responses of consumption expenditure during the COVID-19 pandemic. Second, the survey allows us to identify who idiosyncratic shocks due to the COVID-19 pandemic. It requires respondents to provide information about changes in their daily lives. To focus on the heterogeneous effects of consumption expenditure to the fear of COVID-19, the identified shocks are vital for controlling idiosyncratic shocks such as unemployment and income shocks. Third, the survey identifies how respondents live during the COVID-19 pandemic. Respondents are required to provide information about how they respond to COVID-19. Furthermore, the survey asks respondents to provide information about how their family members who live with them change their lives in response to COVID-19. Therefore, we can use information on not only the respondents but also their family members as a set of comprehensive covariates to control for the endogenous reactions to shocks and the policies that may influence the consumption level.

3 Household expenditure before and after the COVID-19 pandemic

Figure 1 shows the chronological development of expenditure before and during the COVID-19 pandemic. There are two spikes in expenditure from 2019 to 2020. First, there is a peak and a trough before and after the consumption tax hike in October 2019.² The expenditures increase by approximately 15% in September 2019 compared to the previous month and then fell sharply by more than 5%. This reflects the typical responses of household expenditure to the consumption tax hike, as was also case for the tax hike in April 2014. Second, the expenditure increased by more than 5% in February 2020. The responses to the policy interventions seem to induce households to forgo going out and eating out and to subsequently *increase* expenditure for cooking at home, as reflected in Figure 1.

However, Figure 2 suggests that the development of the expenditure by generation changed drastically after April 2020. First, the expenditure diverges in April 2020, when the nationwide state of emergency was declared. The expenditure levels increased by approximately 7% in February and March 2020 compared to January 2020 for all generations. The difference reaches 18% at most. Second, the increase and decrease in the expenditure gaps repeat three times with the increase in the number new COVID-19 cases. Figures 2 suggests that the change in the expenditure gaps and the new COVID-19 cases comove. In fact, while the gap decreases after lifting the nationwide state of emergency in late May, an increase in the number of new COVID-19 cases in late July seems to widen the expenditure gap. The evidence that the divergence of expenditures between generations is associated with the new COVID-19 cases may support the view that fear of contagion are heterogeneous across generations and work as an idiosyncratic shock.

4 Estimation strategy

This section formally tests whether the elderly decreased their expenditure due to the fear of COVID-19 compared to the younger generation. To this end, we estimate the following equation based on a dynamic difference-in-differences (DDID) approach:

$$\ln \frac{Cons_{i,t}}{Cons_{i,t-12}} = \alpha \times D^{Elderly} + \sum_j \beta_j \times D^{Month_j} + \sum_j \gamma_j \times D^{Month_j} \times D^{Elderly} + \mathbf{X}\delta_{\mathbf{x}} + \mathbf{Y}\delta_{\mathbf{y}} + \varepsilon_{i,t}, \quad (1)$$

²In Japan, the consumption tax rates increased from 8% to 10% on October 1, 2019. Tax reduction rates apply to food and other daily necessities. Therefore, the tax on services and products other than food and other daily necessities increased.

where $Cons_{i,t}$ is the (nominal) consumption expenditure of individual i in month t . $D^{Elderly}$ is a dummy variable that takes 1 when individual i is 60 or above, and 0 otherwise. D^{Month_j} and \mathbf{X} are a calendar (month) dummy variable and control variables such as fixed effects, gender, income, educational attainments, and family size. Our interest is in the coefficient γ on the cross-term between D^{Month} and $D^{Elderly}$. A positive γ suggests that the elderly spend more than the young, and vice versa a negative γ .

We use 16 (eight by two) dummy variables and one categorical variable from the respondent and the family members who live with the respondent, respectively. The dummy variables for the respondent and the family members are $D_t^{Unemployment}$, $D_t^{GettingJob}$, $D_t^{SchoolClose}$, $D_t^{SchoolReopne}$, $D_t^{IncreaseEatout}$, $D_t^{DecreaseEatout}$, $D_t^{IncomeUp}$, and $D_t^{IncomeDown}$. These variables allow us to control for the potential effects on the consumption expenditure of school closure, change in employment status, positive and negative income shocks, and the frequency of eating out. Therefore, estimating Equation (1) identifies the elderly’s fear effect on consumption expenditure.

5 Results

First, we show the results for all products. Figure 3 shows the developments of the γ coefficient using January 2020 as 0. The figure shows that the monthly expenditure of the elderly in 2020 is negatively correlated to the number of new COVID-19 cases. The expenditure of the elderly does not differ from that of consumers below 60 up to March 2020. However, they spent less by approximately 5% compared to those aged below 60 during April and May, when the government declared the state of emergency. Once the government lifted the state of emergency, in June, the expenditure of the elderly recovered. However, the cycle repeats after June. That is, the expenditure of the elderly fell again by 5% in August and bounced back in October.

We also estimate Equation (1) using a subsample from food and drink products and products other than food and drink. The working paper version of this study (Kikuchi et al., 2021) supports the view that the elderly spend less than those aged less than 60. The estimation result presents that the coefficients using the subsample of food and drink products and the others, respectively; the expenditure of the elderly of more than 10% significantly decreases in April, May, and August, compared to January.³ The impact is at most 13%; those aged above 60 significantly decreased their spending even on food and drink products by 13% in May, compared to January. This is also the case in the bottom panel using a subsample of products other than food and drink. While the decrease in the expenditure of the elderly is insignificant, the bottom panel shows that their expenditure decreases in April and August compared to January.

6 Conclusions

This study examines how the spread of COVID-19 influences the consumption expenditure of Japanese households. Using large-scale monthly panel data collected from more than 50,000 Japanese households, we examine how consumption expenditure changes from before and to after the onset of COVID-19. We show that the response to the spread of COVID-19 is significantly heterogeneous across generations. We also find that, during the state of nationwide emergency, the consumption expenditure of the elderly significantly decreased compared to before and to that of the younger generations. The evidence suggests the heterogeneous perceptions of the fear of health-related consequences transform an aggregate pandemic shock into an idiosyncratic one for any a novel infectious disease.

³These results are not reported to save space.

References

- Alfaro, Laura, Ester Faia, Nora Lamersdorf, and Farzad Saidi. (2020). “Social Interactions in Pandemics: Fear, Altruism, and Reciprocity.” NBER Working Papers, 27134.
- Goolsbee, Austan, and Chad Syverson. (2021). “Fear, Lockdown, and Diversion: Comparing Drivers of Pandemic Economic Decline 2020.” *Journal of Public Economics* 193(104311), 1–8.
- International Monetary Fund. (2021). “World Economic Outlook Update.” *World Economic Outlook Reports* January 2021.
- Immordino, Giovanni, Tullio Jappelli, Tommaso Oliviero and Alberto Zazzaro “Fear of COVID-19 Contagion and Consumption: Evidence from a Survey of Italian Households.” *CSEF Working Paper Series* No.601.
- Kubota, So, Koichiro Onishi, and Yuta Toyama. (2021). “Consumption Responses to COVID-19 Payments: Evidence from a Natural Experiment and Bank Account Data.” *Journal of Economic Behavior & Organization* 188, 1–17.
- Watanabe, Tsutomu, and Tomoyoshi Yabu. (2021). “Japan’s Voluntary Lockdown: Further Evidence Based on Age-Specific Mobile Location Data,” *Japanese Economic Review* forthcoming.

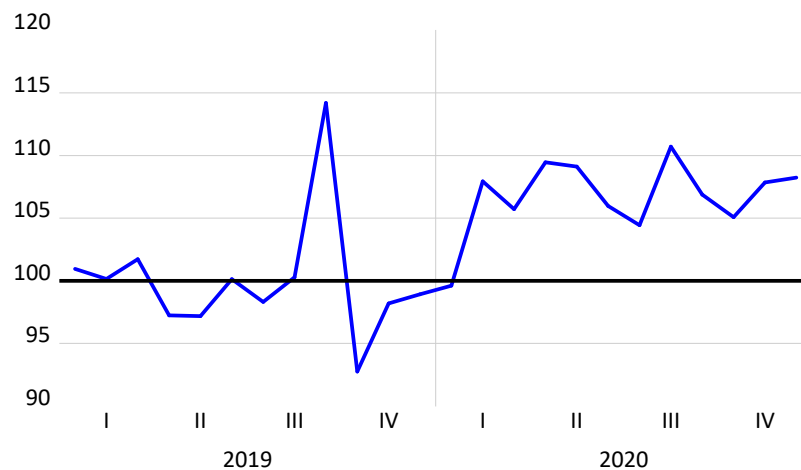


Figure 1: Development of expenditure from January 2019 to December 2020. The series are seasonally adjusted and standardized using the average expenditure from January 2019 to December 2019 as 100.

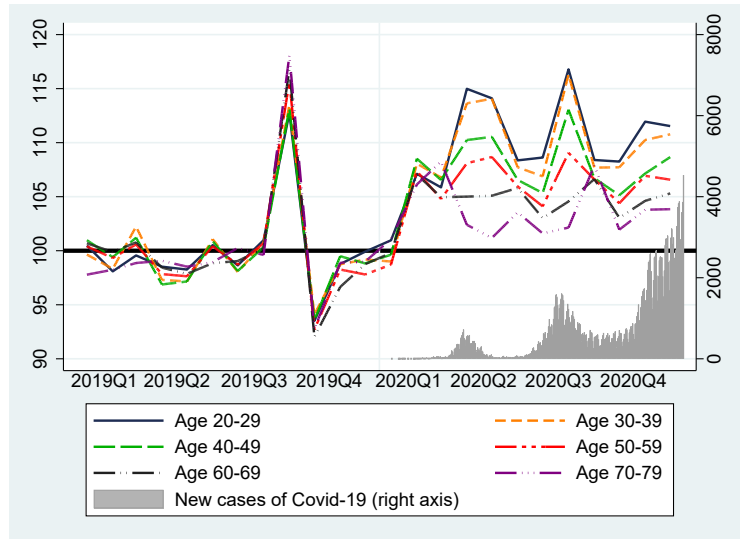


Figure 2: Development of expenditure by ages (left axis) and new cases of COVID-19 (right axis) from January 2019 to December 2020. The series of expenditure are seasonally adjusted and standardized using the average expenditure from January 2019 to December 2019 as 100.

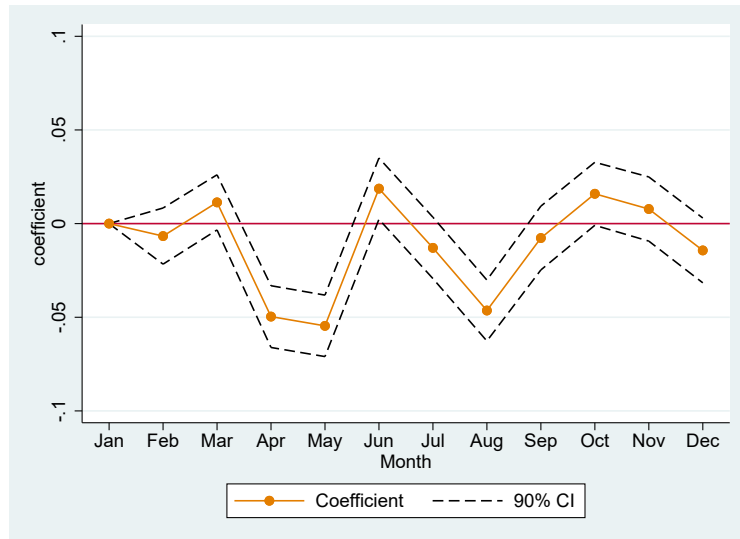


Figure 3: The figure reports the γ coefficients on the interaction terms between the month dummies and $D^{Elderly}$ from estimating Equation (1) using all products. The dotted lines represent the 90% confidence interval bands.