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Impact of Cash Transfers on Consumption during the COVID-19 Pandemic: Evidence from Japanese Special Cash Payments*

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Abstract

We estimate the marginal propensity to consume (MPC) out of the Special Cash Payment conducted in Japan during the COVID-19 pandemic. The MPC is identified by exploiting differences in the timing of the payment among cities using publicly available data from the Family Income and Expenditure Survey. The estimated MPC is approximately 10 percent, which does not differ from those estimated in previous studies conducted during the non-pandemic period. We also estimate the different MPCs by consumption subcategories defined based on the infection risk, finding that households did not increase spending on "face-to-face services" while "goods/services purchased at home" and "goods/services purchased at stores" increased.

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Keywords: COVID-19, Special Cash Payment, Marginal Propensity to Consume (MPC)
JEL classification: D15, E21, E62, H31, R31

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1. Introduction

This paper estimates the marginal propensity to consume (MPC) out of large cash transfers called "Special Cash Payment (SCP)" in Japan during the COVID-19 pandemic. Although the government did not clearly explain the purpose of the policy, we focus on the impact on household consumption to evaluate the SCP. The impact of SCP on household consumption was unclear in advance. On one hand, households might not increase their consumption out of fear of COVID-19. On the other hand, if many households are liquidity-constrained due to the pandemic, they could significantly increase their consumption. In addition, if households increase consumption, it might cause the spread of infections, depending on the goods consumed. Accordingly, understanding how the total consumption and the types of consumption were affected by the SCP would help assess the cash transfer programs overall.

To estimate the MPC, we examine the consumption responses at the time of receipt. While all residents in Japan were eligible to receive the SCP, they did so at different times. Although this variation could be a source of identification (Kaneda, Kubota, and Tanaka 2021; Kubota, Onishi, and Toyama 2020), there might be an endogeneity problem we need to adress since the SCP was paid upon the application made by households. For example, when COVID-19 is prevalent, households are likely to stay home and have more time to fill out the application forms, while their consumption level is low. In such a case, the consumption responses upon the SCP receipt underestimate the MPC.

To address this endogeneity problem, we exploit the difference in the starting dates for accepting applications across cities. The application process for distributing the SCP was executed by local governments; the starting date varies across municipalities. The starting date was determined based on its administrative capacity, which would not correlate with the consumption trend. Furthermore, households could receive the SCP only after cities started accepting applications; thus, the starting date affects when households can receive the SCP. Using the start-accepting application date as an instrument, we can identify the causal impacts on consumption at the time of receipt.

In the estimation, we use publicly available data from the Family Income and Expenditure Survey (FIES). The FIES is a national representative monthly survey and is regarded as the most reliable household-level expenditure data. Among the publicly available cross-tabulation tables, we use the "District and City with Prefectural Government" table to analyze differences across municipalities. In the FIES, the SCP is recorded as "special income" along with other temporary incomes, such as gift money and compensatory payment. Therefore, the SCP is measured with "errors" within the FIES. However, since the instrument of the start-

accepting-application date would also be exogenous to other temporary income, this error-in-variable problem is not relevant.

The estimated MPC is 11% at baseline, and its values are stable even when specifications or estimation periods are changed. The estimated MPC is comparable in magnitude to the estimates in previous studies. For example, Hsieh, Shimizutani, and Hori (2010) focus on the "Shopping Coupon Program" in 1999, finding the MPC between 10% and 20%. The Cabinet Office (2012) studies the "Cash Payments" in 2009, reporting an estimated MPC of 8% in the month of receipt. The similarity of the estimated MPCs suggests that even during the COVID-19 pandemic, the impact of cash transfers on household consumption did not differ from that during the non-pandemic period.

Several studies have investigated the impact of SCP on household consumption. Kaneda, Kubota, and Tanaka (2021) estimate MPC by using data from the Money Forward ME, an app for maintaining household income and expenses, operated by Money Forward, Inc. They find that the MPC ranges from 6% to 27% depending on the definition of consumption, which is broadly consistent with our result. Kubota, Onishi, and Toyama (2020) estimated the MPC using information on deposits and withdrawals from the Mizuho Bank deposit accounts, reporting approximately 50% MPC. However, they treat ATM cash withdrawals and account transfers as consumption variables, and it is difficult to make a strict comparison with our study.

The estimated MPC indicates that the aggregate consumption increased by 1.32 trillion yen since the total amount of the SCP is approximately 12 trillion yen. This increase in aggregate consumption may have caused the spread of infections. To explore this possibility, we classify consumption based on the COVID-19 infection risk before separately estimating the MPC by those subcategories. Specifically, the four subcategories include spending on "face-to-face services," such as traveling and eating out, which carry a relatively higher risk, spending on "goods/services purchased at home," such as utilities and internet services, having the lowest risk, spending on "transfer payments," including gifts and remittances, and spending on other "goods/services purchased at stores."

We find that consumption of "goods/services purchased at stores" increases by about 8%, and consumption of "goods/services purchased at home" and "transfer payments" both increase by around 2%. In contrast, we do not find a statistically significant change in "face-to-face service" consumption. These results suggest that households consider the risk of infection when deciding what they consume using the SCP. In turn, SCP does not seem to contribute to the spread of infections.

The remainder of this paper is organized as follows: Section 2 outlines the SCP and data. Section 3 discusses the empirical strategy. Section 4 presents the estimation results. Finally, Section 5 concludes.

2. Special Cash Payment and Family Income and Expenditure Survey

2.1 Special Cash Payment System

In the "Emergency Economic Measures to Cope with COVID-19" (approved by the Cabinet on April 20, 2020), the government decided to provide 100,000 yen per person to all residents. The procedure for the benefit was as follows: each municipality would start accepting applications, the eligible individuals would apply to the municipality, the municipality would confirm eligibility, and then the benefit would be provided.

The starting dates for accepting applications largely vary across municipalities. The first city to start accepting applications was Ichikawa City in the Chiba Prefecture, on April 27, merely one week after the Cabinet's decision. Although it is difficult to make an accurate comparison because some municipalities changed their timing, depending on online or mail applications, the late group of municipalities started accepting applications in mid-June.

Once the municipalities start accepting applications, it is up to the households to decide when they want to receive the SPC. As a rule, municipalities transfer the SPC into a bank account about two weeks after receiving the application.

2.2 Family Income and Expenditure Survey

This study uses publicly available data from the Japanese Family Income and Expenditure Survey (FIES) compiled by the Statistics Bureau of Japan. The FIES is a nationally representative monthly survey of household income and expenditure. Approximately 9,000 randomly selected households report detailed information about expenditures and income. In another version of this study, Unayama, Komura, and Hattori (2021) describe the details of the household survey and confirm the reliability of the FIES as consumption data by comparing it with the national account data.

The FIES, designated as an important statistics compiled by the government (Fundamental Statistics) based on the Statistics Law, is the most reliable source of household income and expenditure. Accordingly, it is used in various government activities, such as providing information for weights of consumer price indexes, and is also widely used in academic research (Hsieh, Shimizutani, and Hori, 2010; Stephens and Unayama, 2011, 2012, 2015, 2019; Hori and Shimizutani, 2012; Cashin and Unayama, 2016).

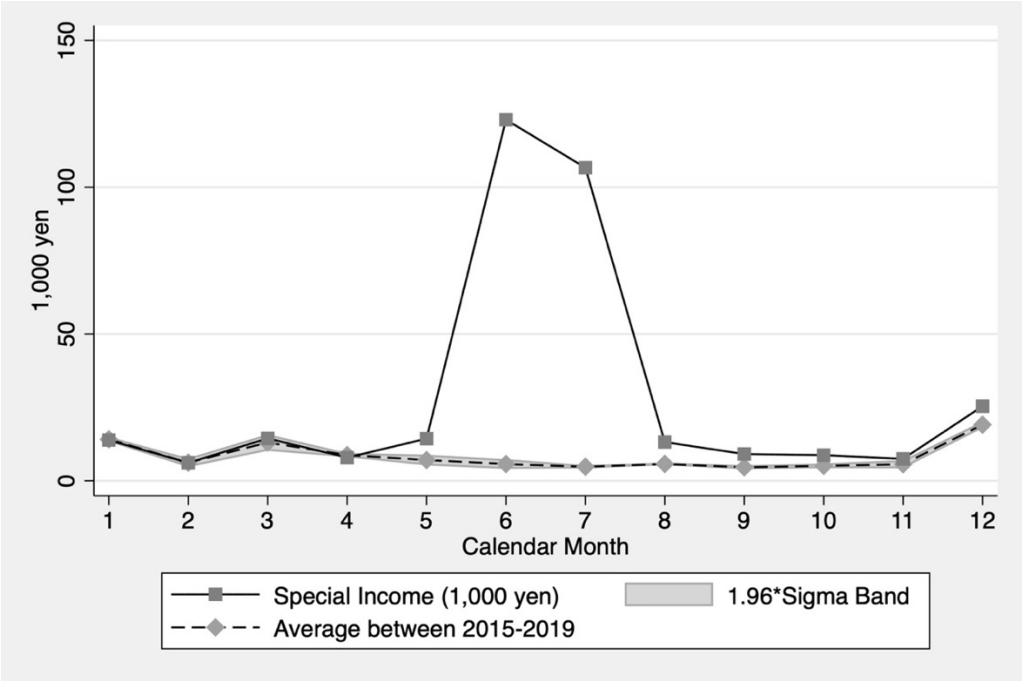
In addition to reliability, there is another advantage of using FIES. Since it classifies consumption into approximately 500 items, researchers can re-categorize expenditures according to their purpose, which is useful to show the impact of the SCP regarding the infection risk associated with COVID-19. The infection risk depends on consumption activity involving personal contact. For example, restaurant meals would be riskier

than expenditure on the subscription of Internet services. The detailed categorization of FIES allows us to separate the different consumption types. This issue is discussed in Section 4.3.

The SCP is classified as a part of the "Special Income" variable in the FIES. The category includes income receipts, such as money gifts and compensatory payments. The 100,000 yen per person SCP is so salient that we can identify its receipt accurately by comparing Special Income in 2020 with its usual level. Figure 1 shows the time series of Special Income. The horizontal axis represents the calendar month, and the vertical axis represents the amount of special income. To identify the SCP receipt, we compare the special income of 2020 with the average during 2015–2019 with a 95% confidence interval. Since the other entries in the special income categories are relatively small and stable, the difference between the special income of 2020 and that of the average during 2015–2019 is considered as the receipt of the SCP. The figure shows that the SCP was mostly received by households in June and July.

Despite this salience, it is still possible that Special Income contains "errors" as the measure of SCP due to its other sources. Since other sources of special income would be independent of SCP receipt, the MPC estimated with this Special Income variable is biased toward zero by attenuation due to the classical error-in-variable problem. However, as demonstrated below, we use the instrumental variable (IV) technique to address another endogeneity issue where the instrument is not correlated with the "error," meaning that our results are unbiased.

Figure 1. Special Cash Payment in FIES: Special Income

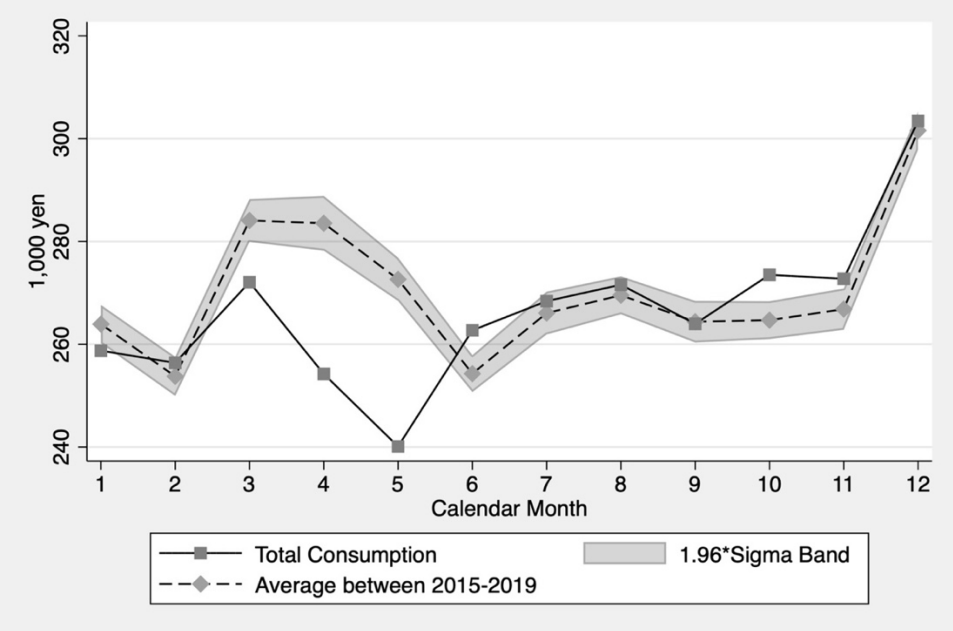


2.3 Consumption Trends in 2020

Based on the movement of special income, if the SCP increases consumption, a significant change in consumption should be visible in June and July. Therefore, we first check the MPC from the time series data of the FIES.

Figure 2 shows the average household monthly consumption (2015–2019) and the consumption in 2020. Since the consumption tax rate increased in October 2019, large rush demand and reactionary declined before and after the tax hike appeared. Therefore, we do not compare consumption with that of the same month in 2019; instead, we compare it with the average consumption in 2015-2019. In addition, since consumption has strong seasonality, we have to compare it for each month; if consumption in 2020 is within the confidence interval around the average of 2015-2019, then consumption in that month should be "about the same" as in the previous years.

Figure 2. Overall consumption trends



This figure shows that consumption in 2020 was significantly lower than usual from March to May, especially in April and May when the state of emergency was declared. It then recovered sharply to a slightly higher level than usual in June and has remained at the same level as usual since July. The pattern of seasonality is also as usual, except for April, May, and October.

We are especially interested in the level of consumption in June and July when most of the households received the SCP. In June, it was out of the confidence interval and slightly higher than usual.

However, consumption in July, when the households also received the large portion of the SCP, was about the same as usual. Thus, the SCP seemed to increase consumption, but the extent of this effect depended on the interpretation of the fluctuations from May to June. Therefore, we cannot evaluate this effect based only on the time series of consumption trends.

3. Identification of the Effect of Special Cash Payment

3.1 Model and Endogeneity

Since the SCP was transferred to all residents, it is impossible to compare the consumption of households that have received the SCP with those that have not. Instead, since households received the SCP following an application, the timing of receipt differs between households. Therefore, by comparing the consumption of households that received the benefits at different times, we can measure the "MPC at the time of receipt" of the SCP.

To estimate the MPC, we use publicly available data from the FIES at the municipal level. We utilize monthly data to capture the different timings of payments in each municipality. The FIES includes data of prefectural capitals and ordinance-designated cities. In this study, we use data from 53 cities, including 47 prefectural capitals and 6 other ordinance-designated cities. In addition, the monthly FIES data are available only for households with two or more individuals; therefore, our analysis excludes single-person households.

Using city-level data from the FIES, we measure the MPC at the time of receipt, similar to an overreaction test based on the Euler equation. Specifically, we estimate the following regression model:

$$\Delta Consumption_{i,t} = \alpha + \beta \cdot CashTransfer_{i,t} + Controls_{i,t} \cdot \delta + \epsilon_{i,t}, \quad (1)$$

where $\Delta Consumption_{i,t}$ is the difference between household consumption in city i in month t of 2020 and the average household consumption in city i in month t from 2015 to 2019. $CashTransfer_{i,t}$ is the difference between household's special income in city i in month t of 2020 and that from 2015 to 2019. This variable is a proxy variable for the amount of SCP received, as explained in Section 2.2. $Controls_{i,t}$ is a vector of variables that control household attributes, such as the change in the number of household members and the owner-occupied households rate, and city fixed effects. If a city suffers more seriously from COVID-19, which deteriorates its consumption throughout 2020, the city fixed effectsabsorb this impact.

As shown in Figure 2, consumption in April and May significantly deviated from the usual trend due

to a state of emergency, while a large portion of the SCP was received in June and July. If we use the change from the previous month as the explanatory variable, the standard error of estimates would be larger. Therefore, we define the change in consumption as the deviation from 2015–2019 household consumption by city and month so that the impact of the emergency declaration does not affect the estimation of June's consumption.

The coefficient β of $CashTransfer_{i,t}$ represents the MPC. Theoretically, β could be either zero or strictly positive. If we assume the SCP as an "expected income change," we can consider this estimation as an overreaction test. In a standard life cycle theory, consumption should not respond to the expected income change; β should be zero. In contrast, according to the extended life cycle theory, β should be strictly positive. In particular, the literature emphasizes on the households with liquidity constraint, and in this care, β, which is interpreted as a "macro MPC," represents the "proportion of liquidity-constrained households" (See Kaplan and Violante, 2014).

The explanatory variable $CashTransfer_{i,t}$ could be endogenous for two reasons. First, $CashTransfer_{i,t}$ contains "measurement error" because the FIES does not directly record the SCP as an independent item, as explained in Section 2.2. Suppose a special income other than the SCP is randomly generated. In that case, it should be considered as a classical measurement error, and β by ordinary least squares (OLS) has an attenuation bias (bias approaching zero in absolute value). If other special income accruals and consumption coincide (e.g., when a wedding gift is received, the total consumption during the wedding is large); conversely, β is overestimated.

Second, the timing of receiving the SCP is determined by the household through the application. For example, during the phase when the coronavirus infection is spreading, individuals may be more likely to be at home with more time to fill out the application form, while consumption is likely to be suppressed. This means that households could receive SPC during periods of low consumption. In this case, the OLS estimate of β was underestimated.

3.2 Timing of Special Cash Payment Receipt and Start of Accepting Application

To address this endogeneity, we conduct an IV estimation. We use the start date of the application acceptance for each municipality as the instrument for the following reasons. On the one hand, as discussed in Section 2.1, the municipalities transfer the SCP roughly two weeks after the household submits the application. If we suppose that most households apply shortly after the start of the application process, the start date of the application process in each municipality and the timing of the actual payment will be highly correlated. On the other hand, the start date is exogenous for households, as this timing depends on the administrative capacity

of each municipality.

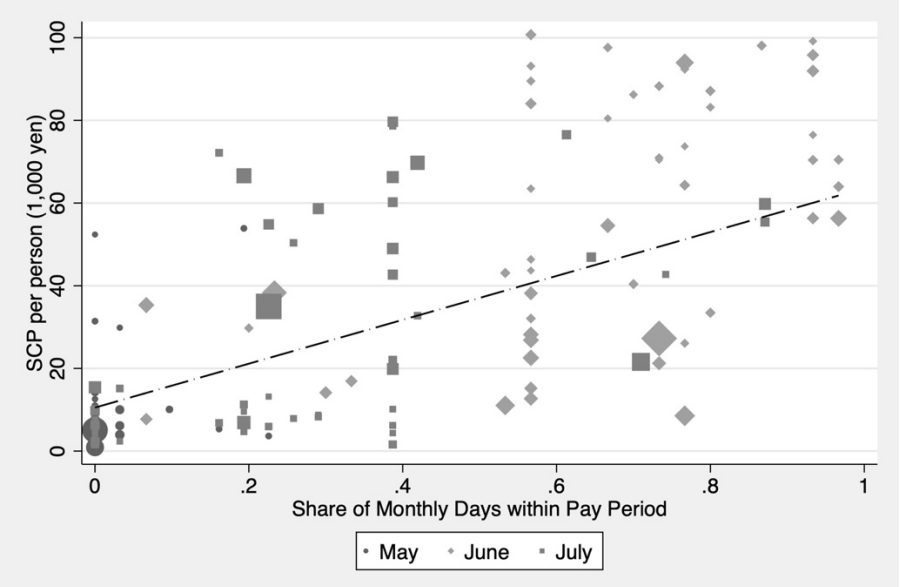
Since special income in the FIES is a monthly variable, it is necessary to convert the start date of application acceptance, which is daily data, into a monthly variable. To do so, we first define the 28 days from two to six weeks after the start date of application acceptance as the "receiving period," during which households that apply shortly after the start of the application process would receive the SCP. Then, we calculate the number of days included in the receiving period ($\boldsymbol{RecieveDays}$) in each calendar month ($\boldsymbol{t}$) by city ($\boldsymbol{i}$) and defined the variable indicating the ratio between the number of days in the receiving period ($\boldsymbol{RecieveDays}$) in each calendar month ($\boldsymbol{t}$) and the total number of days ($\boldsymbol{TotalDays}$) in the calendar month ($\boldsymbol{t}$). For example, if the application process starts on May 7 in city $\boldsymbol{i}$, $\boldsymbol{RecieveDays}$ will be between May 21, two weeks later, and June 17, six weeks later, and $\boldsymbol{RecieveDays}$ will be 11 days in May and 17 days in June. Of course, $\boldsymbol{TotalDays}$ is 31 days in May and 30 days in June.

Using this variable $\boldsymbol{(RecieveDays/TotalDays)_{i,t}}$ as the instrument, we regress the change in special income of the instrument as the first-stage regression.

$$CashTransfer_{i,t} = a + b\left(\frac{RecieveDays}{TotalDays}\right)_{i,t} + Controls_{i,t} \cdot \delta + e_{i,t}, \tag{2}$$

To check the relevance of $\boldsymbol{(RecieveDays/TotalDays)_{i,t}}$, the instrument, Figure 3 plots $\boldsymbol{(RecieveDays/TotalDays)_{i,t}}$ against the special income (per person and city) for May, June, and July.

Figure 3. $\boldsymbol{RecieveDays/TotalDays}$ and special income



This figure shows a strong positive correlation between $(RecieveDays/TotalDays)_{i,t}$ and the actual amount of the special income received. In addition, the special income per capita is less than but close to 100,000 yen when $(RecieveDays/TotalDays)_{i,t}$ is closer to 1. As we predicted, most SCPs are received during the "receiving period," from two to six weeks after the start date of application acceptance. This indicates that $(RecieveDays/TotalDays)_{i,t}$ satisfies the relevance of the instrument for $CashTransfer_{i,t}$.

4. The Estimation

4.1 Graphical Evidence

Before reporting the results of estimating (1) and (2), we show graphical evidence on the impact of the SCP. To do so, we divide the cities into two groups: those that started accepting applications for the SCP relatively early (cities starting to accept applications before May 25) and those that started relatively late. We call these two groups as "early group" and "latter group." The number of cities in the two groups was approximately the same. The attributes of the cities were also similar, with the Tokyo and Kansai metropolitan areas separated into the two groups.

Figure 4. Application start date and consumption

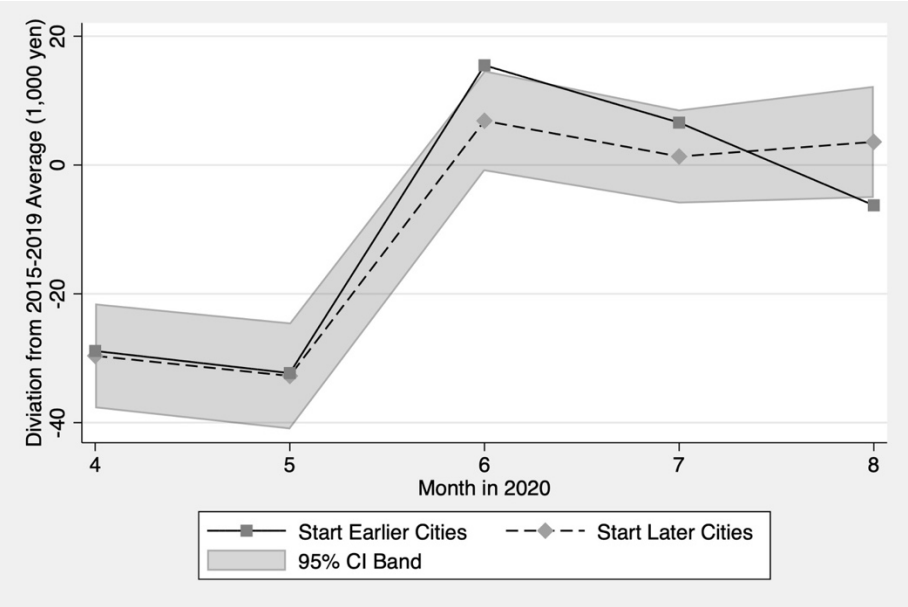


Figure 4 illustrates trends of consumption in both groups in 2020, expressed as deviations from the average between 2015-2019. It shows that the consumption in the early group increases more in June than that in the latter group, followed by a gradual decline. For the latter group, the consumption continues to be at

a similar level from June to August. These seem to be consistent with the prediction that the SCP increases household consumption. Furthermore, this comparison allows us to roughly estimate the MPC as follows. In June, the early group had a special income of 210,000 yen (more than the average from 2015-2019), whereas that of the latter group was 106,000 yen; the difference in the SCP received between two groups was 104,000 yen. The difference in household consumption between the two groups in June is 9,000 yen. The MPC is the ratio of the two, approximately 10% (8.7% = 9,000/104,000).

This estimate also indicates that the rapid recovery in consumption from May to June, also seen in Figure 2, was mostly caused by lifting the state of emergency. Consider the latter group. The special income increased by 94,000 yen from May to June. The estimated MPC indicates that the increase in consumption in that period through the SCP is about 8,000 yen (94,000 yen × 8.7%). In turn, the consumption in May was 33,000 yen lower than usual while the consumption in June was 7,000 yen higher than usual, resulting in a 40,000 yen increase in consumption from May to June. This suggests that the lifting of the state of emergency could push back the consumption to its usual level, whereas the SCP had the effect of raising the level slightly above normal.

4.2 Estimation Result

Table 1 shows the first-stage estimation results based on equation (2). Column (1) presents the estimation results after regressing the special income on $Controls_{i,t}$ and $(RecieveDays/TotalDays)_{i,t}$, using data from January to December 2020. The coefficient is 188.25, indicating that households received 188,000 yen from the SCP in the four-week period between two and six weeks after the start date of application acceptance.

Columns (2) and (3) show the estimation results with the lag of $(RecieveDays/TotalDays)_{i,t}$ as the control variable. The coefficient of the first-order lag variable is about 50, indicating that approximately 230,000 yen was received about 10 weeks from the start date of application receipt. Since the number of household members is 2.9, approximately 70% of the SCPs were transferred in the receiving period. Column (4) presents the estimation results when we control for the monthly dummies. As the dummy absorbs some of the SCP effects, the coefficient of $(RecieveDays/TotalDays)_{i,t}$ is smaller. Column (5) shows the results when restricting the data from June to August, the period when the state of emergency was lifted and most of the SCPs were transferred. The results do not differ from those in columns (1) to (3).

Table 1. Special Cash Payment and Pay Period: First Stage Regression

	(1)	(2)	(3)	(4)	(5)
Pay Period	188.25***	180.43***	178.81***	123.80***	186.91***
	(17.856)	(19.636)	(20.410)	(47.021)	(22.262)
L.Pay Period		52.32***	53.87***	11.84	60.06*
		(17.277)	(18.193)	(16.737)	(30.950)
L2.Pay Period			-8.85		
			(6.162)		
D.Num of Member	9.54	9.48	11.25	6.27	136.02
	(18.034)	(15.807)	(16.287)	(15.578)	(144.026)
D.Home Owner	0.40	0.26	0.31	0.23	-0.30
	(0.387)	(0.352)	(0.345)	(0.324)	(2.260)
Sample Period	Jan-Dec	Jan-Dec	Jan-Dec	Jan-Dec	Jun-Aug
Observations	624	624	624	624	156

b coefficients; Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 2. MPC out of Special Cash Payment

	(1)	(2)	(3)	(4)	(5)
SPC	0.076***	0.114***	0.112***	0.091	0.076**
	(0.017)	(0.025)	(0.027)	(0.100)	(0.037)
L.SPC			0.004		
			(0.037)		
D.Num of Member	70.319***	69.407***	69.364***	50.611***	121.689***
	(23.427)	(23.514)	(23.461)	(16.962)	(46.098)
D.Home Owner	0.807	0.755	0.754	0.800	1.704
	(0.791)	(0.795)	(0.796)	(0.650)	(1.056)
Estimation	OLS	IV	IV	IV	IV
Weak IV F-stat		111.3	19.5	3.7	22.3
Sample Period	Jan-Dec	Jan-Dec	Jan-Dec	Jan-Dec	Jun-Aug
Observations	624	624	624	624	156

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 2 shows the second-stage estimation results based on equation (1). Column (1) presents the OLS results. The coefficient of the SPC is 0.076, meaning that the MPC is 7.6%. Column (2) displays the results for IV, where the MPC is 11.4%, slightly higher than in the OLS result. These results indicate the estimate by OLS suffers downward bias, possibly owing to the measurement error of the SCP variable and/or endogeneity from the household's decision on the timing of application as discussed in Section 3.1.

Column (3) shows the results when the first-order lag of the SPC is included as an explanatory variable. The estimated MPC in the month of receipt was approximately 11%. The estimate of the first-order lag, that is, the coefficient in the month following the month of receipt, is very small and statistically insignificant. In other words, the impact of the SCP on consumption seems to be concentrated in the month of receipt.

Column (4) presents the results when monthly dummies are added as the control variable. The coefficient is roughly the same as the results in columns (2) and (3), confirming that the MPC is approximately 10%. We also confirm that the time effect would be relatively small, while the standard errors are large. With monthly dummies, the identification of MPC relies on the variations in the received timing of the SCP across cities within each month. As seen in Figure 6, most of the variation is concentrated in June and July; larger variations would have been needed to obtain estimates with smaller standard errors.

So far, we use data from January to December 2020. Column (5) shows the estimation results with the data from June to August 2020, when the state of emergency was not declared, and most of the households received the SCP. In this case, the MPC was 7.6%, lower than the other results. This difference may be caused by the exclusion of May, when the state of emergency was declared and the receipt of the SCP had already started.

Based on these results, we conclude that the MPC of the SCP is approximately 10%, although the exact values of MPCs slightly vary depending on specification or estimation periods. Hsieh, Shimizutani, and Hori (2010) investigate Japan's shopping coupon program distributed in 1999, finding an MPC between 10% and 20%. In addition, the Cabinet Office (2012) analyzes cash transfer by the Japanese government in 2009 and found that MPC was 8%, while the cumulative MPC for all other months combined was 25%. The Cabinet Office (2012) conducts OLS using household-level data from the FIES. In this study, the SCP during 2009 was recorded as an independent item because of the special treatment in the FIES. Furthermore, Kaneda, Kubota, and Tanaka (2021) estimate the MPC for the SCP in 2020 using household income and expenditure recorded in the Money Forward ME. They conclude that the MPC ranges from 6% to 27%, depending on the definition of consumption. Unlike the FIES, these data may have potential problems. For example, the data of the Money Forward ME are not randomly selected and do not directly ask households about their consumption. Obviously,

the data of the Money Forward ME have some advantages, such as weekly data and a large sample size of 230,000 accounts. The consistency of their results with ours, in spite of using different data sources, further indicate the validity of our results. Overall, the similarity of the estimated MPCs both in pandemic (Kaneda, Kubota, and Tanaka 2021) and non-pandemic cases (Hsieh, Shimizutani, and Hori 2010; Cabinet Office 2012) suggests that it is a stable feature for Japanese household to consume 10%-20% out of one-time cash transfers.

The magnitude of the estimated MPC also indicates that the observed consumption responses to the SCP is mainly driven by households with liquidity constraints. The existing literature discusses that liquidity constraints and limited rationality can explain why consumers respond to one-time cash transfers. If liquidity constraints cause consumption responses, the macro MPC can also be interpreted as the share of households facing liquidity constraints (Kaplan and Violante, 2014). According to Hara, Unayama, and Weidner (2016), who estimate the percentage of households facing liquidity constraints in Japan, the ratio is approximately 13%, which is very close to the MPC in our study. If factors other than liquidity constraints also increase consumption, the MPC should be larger than this ratio. In fact, using micro data, Hsieh, Shimizutani, and Hori (2010), Cabinet Office (2012), and Kaneda, Kubota, and Tanaka (2021) all show that households with liquidity constraints respond more strongly to cash transfers. If the objective of cash transfers is to stimulate consumption, targeting only households with liquidity constraints could produce the same stimulus effect as a uniform benefit for the entire population.

4.3 MPC by the Infection Risks

According to the baseline estimation results, households consumed approximately 10% of the SCP in the first month after receipt. This additional consumption could increase economic activity, potentially causing the spread of the COVID-19 infection. To evaluate this risk, we investigate what kinds of goods the household consumed following the SCP. We classify consumption into goods and services in line with the risk of infection. Then, we conduct IV estimation by following this classification.

We classify the consumption into four categories: (1) face-to-face services, (2) transfer payment, (3) goods/services purchased at home, and (4) goods/services purchased at stores. Face-to-face service is the type of consumption where contact with people is inevitable, such as eating out, travel, and nursing care services, and is considered to have the highest risk of infection. The FIES also has an official goods and services classification, but some of the items classified as services do not require close contact. Some of the items classified as services include those not requiring close contact, such as Internet connection fees and

land rent. These services plus the consumption of goods, such as utilities and water, are labeled "goods/services purchased at home." The risk of infection in this category is the lowest. Excluding these two categories and "transfer payment," which is income transfers between households, such as gifts and remittances that are not classified as consumption in the SNA, is "goods/services purchased at stores." This consumption requires a minimum amount of close contact when purchasing in a store, but the FIES does not classify by purchase method and thus includes online purchases.

Table 3 shows the estimated MPC results for each consumption breakdown. Columns (1) through (4) show the results when using the goods/services purchased at stores, goods/services purchased at home, face-to-face services, and transfer payments as independent variables. We use the January–December sample and control for household size and owner-occupancy rate. As the estimation is linear, the sum of the MPCs for each category is equal to the MPC of the total consumption.

Column (1) shows that the MPC of goods/services purchased at stores is 8.3%, which explains the increase in overall consumption. The MPC of goods/services purchased at home is 2.4%, with the sum of these two categories alone accounting for 10.7%. Transfer payment consumption also shows a positive and statistically significant increase, although with small MPC of 1.7%. Unlike these categories, face-to-face service consumption was not statistically significant, and the point estimate was negative. This result suggests that households use SCP based on infection risk.

Table 3: MPC out of SCP by Item Types

	(1) store purchase	(2) home purchase	(3) face-to-face service	(4) transfer payment
SCP	0.083***	0.022***	-0.022	0.017***
	(0.029)	(0.005)	(0.019)	(0.005)
Weak IV F-stat	111.3	111.3	111.3	111.3
Sample Period	Jan-Dec	Jan-Dec	Jan-Dec	Jan-Dec
Observations	624	624	624	624

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Kaneda, Kubota, and Tanaka (2021) also categorize the breakdown of consumption. Their results show that the consumption of face-to-face services increased. Since their definition of the face-to-face services are unclear, it is difficult to tell why their results show that the consumption of face-to-face services increased, in contrast to our study. Using publicly available data from the FIES, we explicitly show the list of

items for each category (Appendix A), including face-to-face services we define, which would be helpful to facilitate discussion about consumption and infection.

5. Conclusion

In this study, we estimate the MPC out of the SCP by using the publicly available FIES data. Our identification relies on the fact that households received SCP at different times due to the administrative capacities of municipalities. We find that MPC is approximately 10%. The value of this estimate is consistent with previous studies on cash transfer in Japan. This suggests that the impact of cash transfers on household consumption is not different from that under non-pandemics, even during an infectious disease epidemic.

Our estimates suggest that the consumption responses to the SCP we find were mainly driven by households with liquidity constraints, since the estimated MPC, about 10%, is almost equal to the fraction of households with liquidity constraints, which is about 13% estimated by Hara, Unayama, and Weidner (2016). If so, cash transfers could have increased consumption by the same magnitude, even if targeting only households with liquidity constraints. The purpose of the SCP seems not necessary to stimulate consumption, but our results suggest that unconditional cash transfers (cash transfers to citizens) cannot be justified to stimulate consumption.

We also investigated whether the increased consumption by the SCP caused the spread of infections by classifying the consumption based on COVID-19 infection risk. Our results show that “face-to-face service,” considered to have a relatively high risk of infection, did not increase, whereas “goods/services purchased at home” and “goods/services purchased at stores” increased. This suggests that households increased their consumption by carefully considering the risk of infection from consumption. In this respect, SCP did not significantly increase the risk of the COVID-19 spread.

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Appendix A： Breakdown of consumption categories

Face-to-face service consumption	Eating out, Tatami mat replacement, water supply and drainage-related construction costs, exterior wall and fence construction costs, planting and garden maintenance costs, other construction costs, housekeeping services, laundry costs, other clothing-related services, health and medical services, transportation, other parking lot rental fees, car rental and car sharing fees, other automobile related services, other parking lot rental fees, tuition, etc., supplementary education, animal hospital fees, other pet-related services, repair fees for educational and recreational goods, accommodation fees, packaged travel expenses, monthly fees, golf-playing fees, sports viewing fees, sports club fees, admission fees for movies and plays, admission fees for cultural facilities, other admission game fees, amusement park admission rides, membership fees, educational and recreational rents, other educational and recreational services, hairdressing and beauty services, personal effects-related services, religious ritual expenses, nursing care services, childcare expenses, wedding-related expenses, funeral-related expenses, socializing expenses
Transfer payment consumption	Donations, religious and ritual expenses, unaccounted for spending money, gifts, and money sent home
Home purchase consumption	Rent, ground rent, utilities, fire and earthquake insurance premiums, compulsory automobile liability insurance (CALI), automobile insurance premiums voluntary, telecommunications, newspapers, broadcast subscriptions, cable TV broadcast subscriptions, other broadcast subscriptions, Internet connection fees, medical insurance premiums, other non-savings insurance premiums, housing-related expenses, other expenses
Store purchase consumption	All other than above