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Chapter I:
Bonus Payments and the Seasonality of Consumption in Japan[1]

Abstract:

This paper exploits a notable institutional feature of salary payments in Japan, the bonus system, to examine whether households smooth consumption under large and regular income changes. Using household-level data, our statistical tests show that the consumption seasonality of bonus receiving households is significantly affected by the bonus payments. Although our estimate of the marginal propensity to consume from bonus income is much smaller than that from smaller and less predictable end-of-year tax refunds, it is positive and significantly different from zero, which contrasts to earlier studies on large and regular income changes.

Key words: consumption smoothing, life-cycle/permanent income hypothesis, bonus.
JEL Classification Codes: E21

[1] This chapter is prepared by Masahiro Hori and Satoshi Shimizutani.

1. Introduction

The life cycle/permanent-income hypothesis (LC/PIH) predicts that there should be no relation between the anticipated pattern of an individual's income and the pattern of his or her expenditure. In other words, an individual optimizing his/her consumption path dynamically over his/her life-time responds to a predicted change in income at the time he/she becomes aware of the change, not when it materializes.

However, there are nevertheless many empirical studies that report that consumers do respond to predicted income changes at the time they occur.[2] Among previous studies using household-level data, Shea (1995) showed that the consumption pattern of wage-earner households covered by long-term union contracts deviates greatly from the random walk prediction. In addition, examining households' consumption response to predictable income movements resulting from changes in government policy, Shapiro and Slemrod (1995, 2003), Parker (1999), Souleles (1999), Stephens (2003), Johnson, Parker and Souleles (2006) and Hsieh, Shimizutani and Hori (2009) all found "excess sensitivity," meaning that predictable income changes caused substantial changes in consumption.[3]

However, this "excess sensitivity" disappears when the predictable movements in income are large and regular. Paxson (1993), Browning and Collado (2001), and Hsieh (2003) examined predictable income changes that are often 10 percent or more of a

[2] Strictly speaking, the LC/PIH predicts that households will smooth their marginal utility, but not necessarily smooth consumption. Smoothing marginal utility translates to smoothing consumption in the certainty-equivalent version of the LC/PIH in which the expected variance of consumption is constant (Hsieh [2003]). Among the earlier works, Campbell and Mankiw (1989) and Wilcox (1989) presented evidence based on aggregate data showing that consumption responds to predictable income changes. However, their test of the random walk hypothesis suffers from several shortcomings, such as the small number of observations, the difficulty of finding variables with sufficient predictive power for income changes, and data aggregation problems.

[3] The reasons for excess sensitivity include liquidity constraint, myopic behavior, and buffer stock saving. Another possible explanation of excess sensitivity is sociological interpretation of the role of social norms in consumption; people think they *should* consume and the norms depend on the individual's situation and who she thinks she is (Akerlof (2007)).

family's annual income. Paxson, for example, considered seasonal income fluctuations of Thai rice farmers, while Browning and Collado examined income movements stemming from bonus payments to Spanish households. Hsieh analyzed income movements resulting from the state of Alaska's annual payments to its residents from its oil royalties. In all three studies on anticipated income changes that are large and predictable, the LC/PIH appears to describe consumption behavior quite well. Browning and Collado and Hsieh reconcile their results with earlier studies by the bounded rationality argument: households will not bother to adjust optimally to small income changes since the utility gain is small, while they behave as the LC/PIH predicts when the cost of calculating the income change is low and the utility gain from consumption smoothing is large.

Using an institutional feature of wage payments in Japan as a natural experiment, this paper provides new evidence on consumption smoothing under predictable large income changes based on Japanese household-level data. Japan has a well-established bonus system under which the majority of employees receives a large lump-sum extra payment as part of their compensation. The ratio of bonuses to total income is exceptionally high in Japan – nearly twice as high as that in other countries with a bonus system, including Spain. Moreover, as the system is highly institutionalized, there is virtually no short-run uncertainty (within a year) regarding the amount and timing of the bonus payments. Hence, the Japanese bonus system provides a good opportunity to scrutinize the LC/PIH under large and predictable income changes.

Empirical investigation of this paper is empowered by household level data from the Japanese *Family Income and Expenditure Survey* (FIES). One advantage of FIES is its large number of households in the sample, which generates estimates that are more

precise compared to earlier studies. Furthermore, spending and bonus payment data collected by FIES are expected to be of high quality and reliable, as they are based on a daily diary that is collected twice a month.

To examine the relationship between the anticipated paths of income and expenditures, we employ two empirical strategies in this paper. First, we employ Browning and Collado's graphical analysis, which exploits the difference in income seasonality between workers who are in a bonus scheme and those who are not. To capture the impact of the large regular income changes on consumption, we compare the seasonality in consumption of households that receive a bonus and those that do not. In contrast with the results obtained by Browning and Collado (2001), our results indicate that the predictable income changes that originate from bonus payments had statistically significant effects on the seasonal pattern of consumption, despite the fact that the bonus payments in Japan are large and fairly predictable.

Second, we estimate the size of consumption reaction to bonuses using both monthly and quarterly data. In our analysis using the monthly data, we compare the effect of bonuses and end-of-year tax adjustments on household consumption. In contrast to bonuses, end-of-year tax refunds are small and generally perceived as an unpredictable windfall. Our results indicate that the instantaneous marginal propensity to consume (MPC) from bonus payment is positive and statistically significant, though it is much smaller than that from the smaller but less predictable end-of-year tax refunds. Similar regression using the quarterly data, which is converted from the monthly data to compare our estimates with those by Hsieh (2003), confirms our positive and significant consumption reaction.

The remainder of the paper is organized as follows. The next section describes our dataset and provides an overview of the seasonality of income caused by bonus payments. Section 3 presents the results from the graphical test following Browning and Collado, which examines the differences in seasonality of household consumption across groups categorized by the patterns of bonus receipts. Section 4 performs complementary regressions to estimate the size of consumption response to bonus payments and end-of-year tax adjustments. Section 5 concludes.

2. Data Source and the Japanese Bonus System

Our micro-data observations come from a representative rolling monthly panel drawn from the Japanese population, the *Family Income and Expenditure Survey* (FIES) from 1990 to 1999.[4] The FIES is the Japanese Government's main source of information on aggregate consumption. The survey provides detailed information on income and expenditure for individual households as well as on the characteristics of those households. The monthly consumption data is compiled from a daily diary, which is collected twice a month. The survey covers approximately 8,000 households that are representative at the national level.[5] Each household stays in the panel for six months. To improve the reliability of our estimates, we cleaned the samples in our dataset with several criteria[6] and ended up with a sample of roughly 1,800 households in each survey

[4] The FIES has been used in a number of studies, including Hayashi's (1986) pioneering work.

[5] Single households and households employed in agriculture or fisheries were not surveyed. The FIES began covering households engaged in agriculture or fisheries in July 1999 and singles in January 2002, adding a further 1,000 households to the sample for a current sample size of 9,000 households.

[6] First, we restrict our analysis to households with wage earners, which account for roughly half of all surveyed households, because monthly information on income is available only for wage-earner households. Second, we also removed households if the reported age of the head of household decreases or increases by more than one year during the six months or if the household's tenancy status changed from owner to renter or vice versa, because these are likely to reflect major changes in household circumstances that potentially cause large shocks to consumption. Third, we excluded households in which family members other than the head of household are employed. Finally, we dropped any

month.

We stress the following three advantages of the FIES in performing our analyses. First, the sample size is relatively large, increasing the precision of our parameter estimates. Our main result is based on about 4,400 households, a larger number than those in the earlier studies, i.e. roughly 800 households in Hsieh (2003) and 2,300 households in Browning and Collado (2003).[7] Second, we emphasize that our spending data is reliable and of high quality, which is particularly important for the first-difference specification analyses. In the FIES, Japanese households are asked to keep a spending diary that is collected twice a month. Thus, it is likely that the measurement errors in FIES spending data would be considerably lower than those in datasets used in earlier studies, such as CEX which asks households to recall their spending over the previous three months. Third, the FIES asks households to include the bonus amount in the daily diary, reducing the likelihood of misidentification of the bonus classification, which contrasts to Browning and Collado (2001) in which bonus receipts are inferred from the income pattern. The correctly recorded large amount of bonus payments enhances the reliability of our analyses.

The power of our test relies on the institutional nature of Japanese wage payments. In our sample, most workers are paid monthly. Firms usually pay their workers a regular salary each month of the year and pay out more in the pre-scheduled "bonus" months, typically in summer (June or July) and in winter (mid-December). Therefore, in the bonus months, workers receive a bonus payment in addition to their regular salary.

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households which received bonus payments in months other than the pre-scheduled "bonus months" of March, June, July and December. The results are basically unaffected by these selection criteria.

[7] Cited figures are the number of household basis, not the number of observation basis (households times month/quarter). The number of households in our sample decreases to about 1,500 households in the estimation using quarterly data.

Although amounts vary by job, industry, and firm, the bonuses paid out in the summer and winter bonus months each roughly equal two monthly salaries. Some workers, including government employees, in addition receive a smaller third bonus in spring (March).[8] While the term "bonus" may give the impression that it has a performance-related aspect, bonuses in Japan have become largely institutionalized and are an integral and anticipated component of workers' compensation. Thus, there is virtually no uncertainty (especially in the short run within a year) as to whether or not a bonus will be paid or when it is paid, and the amount is fairly predictable for each individual worker (see a description of Japanese bonus payment in the chapter 3 of Aoki [1988])).[9]

In the following analyses, we focus only on the effects of the winter and spring bonuses. Among bonus recipients, the average ratio of the bonus to the household head's monthly regular income is very high (more than twice the amount) in Japan, making our test using the Japanese bonus scheme very powerful. We note that roughly three-quarters of households receive bonus payments in December, but the share varies substantially across job and firm types.[10] In addition, there are large differences in average monthly

[8] The March bonus for government employees was abolished after FY2003.

[9] We ran simple regression models to estimate the variations of bonuses using a panel that begins in July and ends in December. The amount of the December bonus is well explained by the bonus amount received in July, regular income in November, annual income of the household in the previous year, firm size of head of household (three categories) and the interaction terms between the former three variables and the last one (Adjusted-R squared of 0.82). To check the effect of macroeconomic conditions on the bonus payment, we additionally include year dummies in the regression and found that the macroeconomic effects are very limited (Adjusted R squared increases to 0.83 only by 0.01).

[10] The share is larger for white-collar workers (76.0 percent) than other workers (61.2 percent). In terms of firm type, the share for governments is the largest (87.5 percent), followed by large private firms (76.4 percent) and small private firms (59.9 percent). The average ratio of the bonus to the household head's monthly regular income among bonus recipients is the largest for government workers (2.34), and the smallest for smaller private firms (1.67), a much larger amount than the amount of the Alaska fund payment examined by Hsieh (2003), which increases monthly income by 70 percent. See Appendix Table 1 for the detailed numbers. The fact that the share of government employee bonus recipients is not 100 percent may indicate the presence of reporting errors in the survey, as all government employees are, in principle, entitled to a bonus in March, June, and December. To correct for the possibility of incorrect entries, we also employed an alternative classification, dropping all public-sector service households from the non-bonus group and all private-sector households from the December & March-bonus group. However, the change in the classification did not qualitatively affect our results.

income levels across job and firm types. Given the heterogeneity observed above and possibility that the sample selection across groups under different bonus scheme may not be random, we confine the data for our regression analyses to the samples of white-collar workers who are employed by large private firms or government.[11] In addition, we restrict our sample to those who are aged less than 65 since the income and consumption pattern may be very different for the households beyond the normal retirement age.

From all available observations from 1990 to 1999, we pull out different sets of panels to perform our two empirical analyses: Browning and Collado's graphical analysis and estimation of the size of consumption reaction to bonus incomes. For the graphical analysis, which compares the seasonality in consumption of households that receive a bonus and those do not, we further divided the sample households into three groups: non-bonus households, December-bonus households, and December and March-bonus households, based upon their bonus receipt entries in the FIES. To sort households into these three categories, we utilize the panels that cover both December and March. Among the twelve panels, only three, i.e., October–March, November–April, and December–May panels, can meet this requirement. Summary statistics for those panels and that for each bonus group are reported in Table 1. Reported sample statistics endorse that three groups look generally homogeneous except for the bonus related attributes. While regular monthly income and monthly consumption are slightly smaller for non-bonus group households, the reported statistics (except for the bonus payments) are about equal across the groups. Average family size and head of household age are comparable, and the levels of monthly average income are indistinguishable. In contrast to the homogeneity in other

[11] We decide to use the smaller sample, though it means that we could be sacrificing some power, as it is crutially important to limit the unobserved heterogeneity. Results using larger samples with less stringent sample selection is available in the older version of our paper (Hori and Shimizutani, 2003).

aspects, the differences in the bonus income are striking. An average household in the bonus groups receives a bonus of more than a million yen in December. December and March bonus group households receive March bonus of more than 200 thousand yen on average, while households in other groups receive nothing. It is clear that the difference in bonus payments across the three groups is dominant over other differences.

For our monthly-based regressions to estimate the size of consumption reaction to bonus incomes in December, we use all the panels whose information on monthly spending growth is available in November–December, December–January, or January–February. As explained in Section 4, our regression specification allows for two month lags of bonus receipt and we use the panels beginning between July and December, i.e., July–December, August–January, September–February, October–March, November–April, and December–May panels. The summary statistics for these panels are reported in the last column of Table 1.

3. Comparison of Seasonality in Income and Consumption across Groups

By employing the graphical analysis presented by Browning and Collado (2001), this section examines the observed differences in seasonality of household head income and consumption among the different bonus groups.

Figure 1 depicts the average monthly changes in log nominal income for the three groups. We observe that the income of households in a bonus scheme displays a strong seasonal pattern, while the income of those not in a bonus scheme is smooth. The December-bonus group exhibits a strong positive swing in December and a negative swing in January, after which the average monthly change converges to the same path as

that of the non-bonus group. The line for the December & March-bonus group follows the same pattern as that for the December-bonus group up until February, but then exhibits a smaller up and down cycle in March and April.

The next step is to see whether the consumption patterns for each of the three groups display the same patterns as observed in the income patterns. Consumption may display seasonality due to other exogenous factors such as demand variations caused by the New Year holiday, by Christmas, or by the start of the fiscal year.[12] To control for those bonus-unrelated seasonality, we run regressions with the following specification:

$$\begin{aligned}\ln(C_{i,t}/C_{i,t-1}) = & \sum_{m=November}^{May} a_m \times MonthDummy(m) \\ & + \sum_{m=November}^{May} b_m \times MonthDummy(m) \times DecemberBonusDummy \\ & + \sum_{m=November}^{Mayl} c_m \times MonthDummy(m) \times December\ \&\ MarchBonusDummy \\ & + \beta Z_t + \varepsilon_{i,t}\end{aligned} \tag{1}$$

The dependent variable is the log difference of monthly real consumption (total consumption excluding durables and three categories of consumption: semi-durable goods, non-durable goods, and services). As our control variables (Z_t), we include nominal interest rate, age and age-squared of household head, and the number of family members in our regressions.[13] We then examined the month dummy coefficients for each of the three groups of households. If consumers behave as predicted by the standard LC/PIH model, we would not detect any significant difference among the month dummy coefficients for the three groups. If we find stronger December consumption for the two bonus groups and stronger March consumption for the December & March group, this

[12] The Japanese fiscal year runs from April to March.

[13] Browning and Collado controlled the change in the number of family members in their regressions while we controlled for the change in the number of family members.

would contradict the standard LC/PIH model.

Figure 2 plots the estimated consumption seasonality for the three groups ($a_m, a_m + b_m$, and $a_m + c_m$; m=11,12,1,2,3,4) from the total consumption regression (excluding durables) and from the regressions with the three categories of consumption, i.e., semi-durables, non-durables, and services. In the case of all three groups, there are seasonal surges in all categories of consumption in December and March. Moreover, as expected, the estimated seasonal variations are smaller for non-durables and services and larger for semi-durables, which probably contain some durable components . However, what matters for us here is whether the seasonality differs for the different bonus groups, and in contrast with earlier studies on large and regular income changes, there appear to be differences in the consumption seasonality of the three groups.[14]

While we can observe differences in all types of consumption, the pattern is most clearly seen in the case of services and total consumption excluding durables. Consumption in December is substantially higher for the two bonus groups and that in March is higher only for the December & March-bonus group. If consumption of the two bonus groups were higher only in December, we might not be able to rule out the possibility that the consumption surge resulted from an unobserved *other* factor correlated with bonus receipts, since our sample selection may not be strictly random. However, since we additionally observe that March consumption is higher only for the December & March bonus group, it is highly unlikely that yet another unobserved *other* shock is working again to generate consumption seasonality. Furthermore, the difference

[14] Formal statistical results are reported in Appendix Table 2. The coefficients on the December dummies are all positive and statistically significant for both of the two bonus groups though that on non-durable consumption for the December-bonus group is not significant. And for the December & March bonus group, coefficients on the March dummies are also positive and mostly significant. F-statistics to test for the equality of seasonality among the three groups reject the null-hypothesis except the case of non-durables for the December-bonus group, indicating a deviation from the prediction of the LC/PIH model.

between the December bonus group and the December and March bonus group appeared to be very small as illustrated in Table 1. Therefore, we can reasonably expect that the observed differences in the consumption seasonality between the bonus groups result not from the non-random sample selection but from some responses of consumption to the anticipated bonus payments.

4. Response of Consumption to Bonus Payments

Having found a statistically significant deviation from the LC/PIH, our interest now turns to the size of the deviation. To complement our graphical analysis and evaluate the economic significance of our findings, we run the following simple regression to estimate elasticity of consumption with respect to bonus income and marginal propensity to consume (MPC) out of bonus receipt.

$$\ln\left(\frac{C_{h,t}}{C_{h,t-1}}\right)=\sum_{n=0}^{2}\alpha_n\left(\frac{Bonus_{h,t-n}}{MonthlyIncome_{h,\tau-1}}\right)+Z_{h,t}'\cdot\gamma+Month_t'\cdot\omega+\varepsilon_t \quad (2)$$

The dependent variable is the log difference in monthly real consumption (total consumption and three categories of consumption goods) by household *h* in a given month *t* relative to the real consumption in the previous month. The main independent variables are $\frac{Bonus_{h,t-n}}{MonthlyIncome_{h,\tau-1}}$, i.e., the amount of the bonus payment expressed as a fraction of household's average monthly income in the previous year. $MonthlyIncome_{h,\tau-1}$ is calculated as the previous year's pretax income divided by 12. Since the length of the panel is six months, and we allowed for lagged terms up to two months, there are at most three observations of the dependent variable for each household. $Z_{h,t}$ is a vector of control variables (nominal interest rate, age and age-squared of the household head, and

number of family members). $Month_t$ is a vector of dummy variables for each month. The coefficients of interest are the α_n s, which measure the percent change in consumption that is associated with a one percent boost to monthly income from a bonus payment, that is ,the elasticity of consumption with respect to bonus income. The marginal propensity to consume can be calculated as MPC= α_n x (C/Y).

We run the regressions using the observations in the panels beginning between July and December, which contain data on spending growth in November–December, December–January, or January–February. We estimate the specification above for the three categories of consumption and total consumption excluding durables. The results are presented in the left half of Table 2 (Model I). The standard errors are clustered at the household and robust to heteroskedasticity. The coefficients on the contemporaneous bonus variable are significantly positive for all categories, consistently with our finding that Japanese consumers react to bonus receipt. However, the estimated coefficients appear to be generally small. For example, the elasticity coefficient of 0.047 for total consumption excluding durables implies that the short-run MPC out of contemporaneous bonus income is only about 0.02 (=0.047 x 0.5), as an average household typically consume roughly half of its monthly income (see Table 1).

The right half of Table 2 reports the estimates from our following extended model (Model II).

$$\ln\left(\frac{C_{h,t}}{C_{h,t-1}}\right)=\sum_{n=0}^{2}\alpha_n\left(\frac{Bonus_{h,t-n}}{MonthlyIncome_{h,\tau-1}}\right)+\sum_{n=0}^{2}\beta_n\left(\frac{Y.E.Adjustment_{h,t-n}}{MonthlyIncome_{h,\tau-1}}\right)+Z_{h,t}'\cdot\gamma+Month_t'\cdot\omega+\varepsilon_t \quad (2')$$

The newly added $\frac{Y.E.Adjustment_{h,t-n}}{MonthlyIncome_{h,\tau-1}}$ are the values of the year-end tax adjustments received by household *h* relative to the household's average monthly income in the

previous year. The year-end tax adjustment refunded to each household can be estimated from the FIES.[15] Table 1 shows that the adjustment amount is relatively small in comparison with the bonus payments and the year-end tax refund is generally perceived as an unpredictable windfall.[16] Therefore, the comparison between the bonus payments and the end-of-year income adjustments constitute a comparison between large and regular income changes and small and unpredictable income changes. An advantage of our analysis is that we use the same household observations to examine consumer reactions to income shocks of different types.

The coefficients on the bonus terms are generally unchanged after the inclusion of the end-of-year tax adjustment terms, as the amount of bonus receipts and the end-of-year tax adjustments are nearly orthogonal. As for the coefficients on the end-of-year tax adjustments, they are economically larger, though insignificantly estimated in the statistical sense.[17] Although the impact of the yearend adjustments on lifetime income is negligible, such adjustments are surprises to which, according to the LC/PIH, consumers should react. The sizes of the MPC estimates for contemporaneous end-of-year tax adjustments are three or four times larger than those for the bonus for the total consumption (excluding durables) and service consumption. The difference in the size of

[15] In the FIES, non-current income consists of two sub-categories: "gifts" and "other." The "other" entry includes irregular income such as royalties, compensation for damages, income from gambling, retirement allowances, and, as typically the biggest item, the year-end tax adjustment. The importance of the year-end adjustment is shown by the fact that the "other" entry in the December survey is nearly four times as large as that in the surveys for other months on average. We estimated the amount of the year-end tax adjustment for household *h* as:
$YearEndAdj_{h,\ December} = other_{h,\ December} - median(other_{h,\ other\ Months})$.

[16] To compare the predictability of the two components of income, we ran simple regression models to estimate the variations of end-of-year tax adjustments using a panel that begins in July and ends in December for the regressions. The end-of-year tax adjustment is only minimally explained by regular income in November, the amount of the July bonus, annual income of the household in the previous year, firm size (three categories), and the interaction terms between the former three variables and the last (Adjusted-R2 of 0.05, which is much smaller than that in the case of the December bonus payment, i.e., 0.82). Moreover, the minimal predictability of end-of-year adjustments is endorsed by our conversation with an official of the National Tax Agency.

[17] This lack of significance is probably due to the small value of the adjustments.

the coefficients on the bonus and the yearend adjustment indicates that the same households respond more strongly to unanticipated income changes than to anticipated ones.

We further examined whether the reactions of consumers to the bonus income differ between the rich and the poor, as reported in Table 3. The LC/PIH assumes that people can allocate their assets freely during their lifetime but this may not be always the case (see Stephens (2006)) especially for Japan where consumer credit was less easily available until the 1990s. To examine the difference in consumption reaction to bonuses between the rich and the poor, we run the equation regressions with different levels of assets.[18] While the FIES does not collect information on assets, the *Family Savings Survey* (FSS) every year collects financial assets data as of December 31 from the households that were in the FIES sample in August, September and October.[19] We can therefore create a matched dataset from the FIES and FSS. Since we need data covering both December and March, the only panel we can use is the October–March panel.

The first two columns show the estimates on households with an asset-income ratio above and below the median, and the last two columns estimates on households with a ratio above and below the twenty-fifth percentile.[20] Estimated coefficients indicate that the contemporaneous impact of bonus income on consumption is smaller for rich households than for poor households, while the estimates are still positive and significant even for the rich. One interpretation is that while the lack of a more developed consumer credit market in Japan or other factors separating the poor from the rich may have amplified the reaction of consumption to the bonus payments, such factors do not fully

[18] Zeldes (1989) used a similar procedure to identify families which were potentially liquidity constrained.
[19] The FSS collects data on savings deposits, life insurance, trusts and securities, but not on land or housing assets.
[20] The asset/income ratio is defined as the ratio of total gross financial assets to annual pre-tax income.

account for the observed reactions.

So far, we utilized monthly data from FIES to examine consumer reaction to bonus payments. Our finding that the consumption seasonality of households in the bonus scheme is significantly affected by the bonus payments seems to contradict the findings by earlier studies on large and regular income changes. While the difference could simply be an issue of precision, it is possible that differences in the model specification, including the different data frequency, i.e., monthly vs. quarterly, are playing a role. To explore the possibility, we converted our FIES monthly data into quarterly periods and used a regression specification which resembles that of Hsieh as closely as possible. Since our focus is again on the December bonus, we use the September–February panel and created two quarterly (September–November and December–February) datasets to compute quarterly consumption growth.[21]

Table 4 reports the results. First, we find that the coefficient on the ratio of bonus payment to monthly income is still positive and statistically significant when using all the households in the sample (Column (1)). The estimated elasticity of is approximately 0.10, implying a MPC of 0.05, which is larger than that reported by Hsieh and smaller than those reported in many studies on smaller and predictable income changes. Second, to compare our results with Hsieh more closely, we ran the same specification using only the households which are bonus recipients (column (2))[22], and obtained the results that the size of the elasticity is smaller and only marginally significant. We obtained almost the same elasticity estimate by including a non-bonus dummy variable in the all sample regression (column (3)), while the negative coefficient on the non-bonus dummy was not

[21] We omit the presentation of the summary statistics since those resembles to those in Table 1.
[22] All the households receive the benefits in the case of the Alaska permanent fund examine by Hsieh (2003).

statistically significant. Third, we further split the bonus recipients into those with a small bonus and those with a large bonus (relative to their annual income in the previous year) at the median, and estimated the elasticities for the two parties separately (column (4)). We observe that the estimated elasticity is larger for the households with a smaller bonus amount, while the estimate is statistically insifnificant. For the households with a larger bonus amount, the estimated elasticity is slightly smaller and marginally significant.

In summary, we find that the consumption response to the anticipated large bonus is still positive and significant either using the monthly or quarterly based data, which contrasts to Hsieh (2003). While the deviation from the LC/PIH appears to be less significant among the bonus recipients, the estimated elasticities are consistently positive and the point estimates are qualitatively stable.

5. Conclusion

In this study, we exploited a notable institutional feature of salary payments in Japan, the bonus system, to examine whether households in Japan react to fairly predictable and large changes in household income within a year. Using a large household-level dataset from the FIES, we find statistically significant evidence that bonus-induced changes in income affect the seasonal pattern of consumption in Japan, despite the fact that Japanese bonus payments are large and fairly predictable.

Our findings may at first sight appear to contradict earlier studies on large and regular income changes, particularly Browning and Collado (2001) and Hsieh (2003), since the consumption seasonality of households in the bonus scheme is significantly affected by the bonus payments and the estimate of the marginal propensity to consume

from bonus income is positive and significantly different from zero. However, the economic significance of the deviation from the LC/PIH, i.e., the estimated instantaneous MPC of 0.02, is very small, indicating that households facing large and predictable income changes have engaged in consumption smoothing even though this smoothing is not complete. The finding that the same households respond more to a small and unpredicted income change is also consistent with the LC/PIH and findings of earlier studies.

Therefore, while we find nominal deviations from what the standard LC/PIH model predicts, we would like to emphasize that the deviations could be detected only by a very powerful statistical test, such as that provided in this paper with a large sample and precisely measured income and spending.

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Table 1. Summary Statistics

	October-March, November-April, and December-May Panels (Used for Browning and Collardo graphical analysis)				July-December, August-January, September-February, October-March, November-April, and December-May Panels
	All	Non-Bonus Group	December Bonus Group	December & March Bonus Group	
Number of Households x Months	26,322	4716	14,654	6,952	36,215
Number of Households	4,398	788	2,447	1,163	9,094
Monthly Average Income	626,396	622,693	629,337	622,710	628,778
(in the previous year)	(231,794)	(260,167)	(236,196)	(199,731)	(235,268)
Household Head					
Regular Monthly Income	425,992	368,443	434,272	447,578	430,042
	(182,526)	(241,131)	(173,673)	(142,386)	(185,636)
Bonus Income (December)	868,868	0	1,064,979	1,045,317	874,592
	(615,076)	(0)	(569,273)	(353,273)	(624,882)
Bonus Income (March)	59,724	0	0	226,105	N.A.
	(116,348)	(0)	(0)	(116,744)	(N.A.)
End-of-Year Adjustment (December)	18,202	16,222	18,713	18,440	20,286
	(47,092)	(47,184)	(48,159)	(44,700)	(43,886)
Consumption					
Total Monthly Consumption	304,768	273,375	305,574	324,364	304,061
	(230,900)	(213,601)	(230,225)	(241,141)	(233,962)
Durables	22,872	14,774	22,497	29,156	22,195
	(140,176)	(99,808)	(143,279)	(155,845)	(139,322)
Semi-durables	42,573	36,278	42,326	47,361	43,206
	(52,104)	(47,466)	(52,794)	(53,163)	(52,167)
Non-durables	118,896	113,767	118,188	123,867	119,421
	(46,136)	(49,041)	(44,623)	(46,769)	(48,079)
Services	120,427	108,555	122,563	123,980	119,239
	(131,371)	(139,578)	(129,652)	(128,775)	(136,122)
Household Head Age	41.86	43.57	41.21	42.08	41.92
	(8.91)	(9.48)	(8.64)	(8.91)	(8.96)
Family Size	3.63	3.51	3.68	3.61	3.60
	(1.10)	(1.12)	(1.09)	(1.10)	(1.10)

Note: Bonus income is paid in addition to regular monthly income in both December and March.
Monthly Average Income is a household level variable, while Regular Monthly Income is a worker-level variable for the head of a household.
Reported numbers are sample averages and standard errors are in parentheses.
Numbers in the last column are those for the observations from October to February, which were used in the analysis reported in Table 2.

Table 2. Response of Consumption to December Bonus Income and End-of-Year Tax Adjustments

	Model I				Model II			
	Total excluding Durables	Semi-Durable Consumption	Non-Durable Consumption	Service Consumption	Total excluding Durables	Semi-Durable Consumption	Non-Durable Consumption	Service Consumption
Ratio of Bonus Income to Monthly Average Income								
α_0								
Contemporaneous	0.047 ***	0.074 ***	0.020 ***	0.062 ***	0.048 ***	0.078 ***	0.019 ***	0.057 ***
(Std. Error)	(0.006)	(0.019)	(0.005)	(0.010)	(0.006)	(0.020)	(0.005)	(0.011)
α_1								
Once Lagged	-0.037 ***	-0.057 ***	-0.008	-0.047 ***	-0.038 ***	-0.057 ***	-0.006	-0.051 ***
(Std. Error)	(0.006)	(0.020)	(0.005)	(0.012)	(0.007)	(0.021)	(0.005)	(0.012)
α_2								
Twice Lagged	-0.008	-0.033	-0.011 ***	0.009	-0.004	-0.038	-0.006	0.015
(Std. Error)	(0.006)	(0.022)	(0.004)	(0.012)	(0.006)	(0.024)	(0.005)	(0.012)
Ratio of End-of-Year Adjustments to Monthly Average Income								
β_0								
Contemporaneous					0.091	0.087	0.010	0.191 *
(Std. Error)					(0.065)	(0.190)	(0.053)	(0.114)
β_1								
Once Lagged					-0.053	-0.076	0.000	-0.177
(Std. Error)					(0.076)	(0.235)	(0.058)	(0.125)
β_2								
Twice Lagged					-0.090	-0.081	-0.088 *	0.045
(Std. Error)					(0.071)	(0.261)	(0.048)	(0.117)
Number of observations	18,044	17,691	18,044	18,033	17030	16,701	17,030	17,021
R-squared	0.263	0.129	0.439	0.042	0.267	0.129	0.443	0.044
Root MSE	0.399	1.274	0.294	0.704	0.397	1.275	0.292	0.696

Notes: The sample include all available spending growth observations in Nov.-Dec., Dec.-Jan., and Jan.-Feb. (white-collar, large firm or government employees, and less than 65 household head observations only) from 1990 to 1999. The dependent variables are log(Ct/Ct-1), and all Cs are in real terms. All regressions were conducted using OLS and include short-term interest rate, the age and the squared age of the household head, changes in the number of family members, and month dummies. Numbers in the parentheses below coefficients are robust standard errors.

***, **, and * that are attached to the estimated coefficients or F-statistics indicate estimates are statistically significant at the 1 percent level, 5 percent level, and 10 percent level, respectively.

Table 3. Response of Consumption (excluding Durables) to December Bonus Income by Asset Levels

	Asset/Income > Median	Asset/Income <= Median	Asset / Income > 25th centile	Asset / Income <= 25th centile
α_0				
Coef. On Bonus/Income(t)	0.030 ***	0.063 ***	0.038 ***	0.062 ***
Std. Error	(0.011)	(0.012)	(0.009)	(0.017)
α_1				
Coef. On Bonus/Income(t-1)	-0.022 **	-0.051 ***	-0.027 ***	-0.057 ***
Std. Error	(0.011)	(0.013)	(0.009)	(0.019)
α_2				
Coef. On Bonus/Income(t-2)	-0.004	0.000	-0.007	0.012
Std. Error	(0.013)	(0.016)	(0.011)	(0.021)
F-stat: $\Sigma\alpha_j=0$ (j=0,1,2)	0.080	0.570	0.130	0.670
Number of observations	4,327	4,328	6,494	2,161
R-squared	0.264	0.284	0.275	0.264
Root MSE	0.426	0.380	0.411	0.380

Notes: The sample consists of the August-January and September-February panels of the FIES and FSS from 1990 to 1999. Asset/Income is the ratio of gross assets to annual pre-tax income. Regression specification is the same as that of Model I in Table 2. Numbers in parentheses are robust standard errors. ***, **, and * attached to the coefficients indicate that coefficients are statistically significant at the 1 percent level, 5 percent level, and 10 percent level, respectively. The number of observations in this table is smaller than that used in Table 2, as the asset data is not always available.

Table 4. Quarterly Response of Consumption to December Bonus, 1990-1999

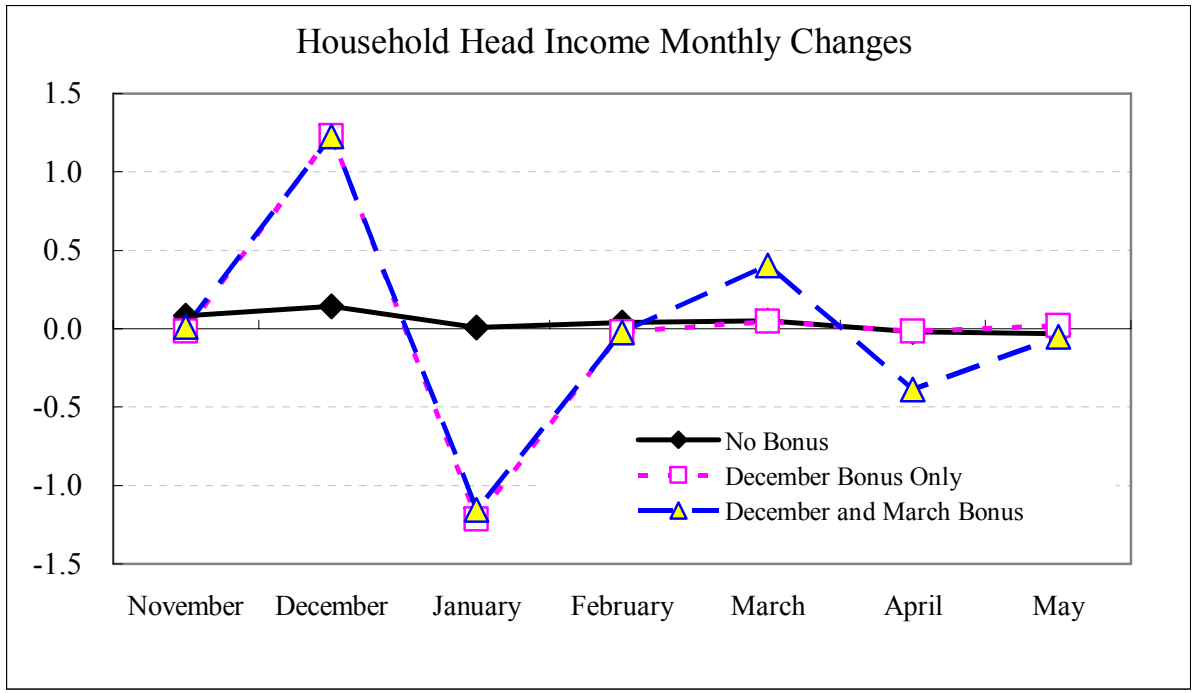
	dlog(Consumption excluding Durables)			
	All Observations	With Bonus Observations Only	All Observations with Dummy Variables	
	(1)	(2)	(3)	(4)
December Bonus / Quarterly Income Ratio	0.107 ***	0.073 *	0.076 *	
	(0.025)	(0.037)	(0.045)	
Small Bonus Dummy interacted with the December Bonus / Quarterly				0.144
				(0.096)
Large Bonus Dummy interacted with the December Bonus / Quarterly				0.098 *
				(0.053)
No Bonus Receipt Dummy			-0.0273	-0.010
			(0.032)	(0.038)
Number of observations	1,528	1,238	1,528	1,528

Notes: Dependent variable is quarterly growth of consumption (excluding durables) from the sum of September, October, and November to that of December, January, and February.

All regressions are ordinary least squares (OLS) and include a quadratic in age, changes in the number of family members, and year dummies. Numbers in parentheses are robust standard errors.

*** and * indicate statistically significant at the 1 percent level and 10 percent level, respectively.

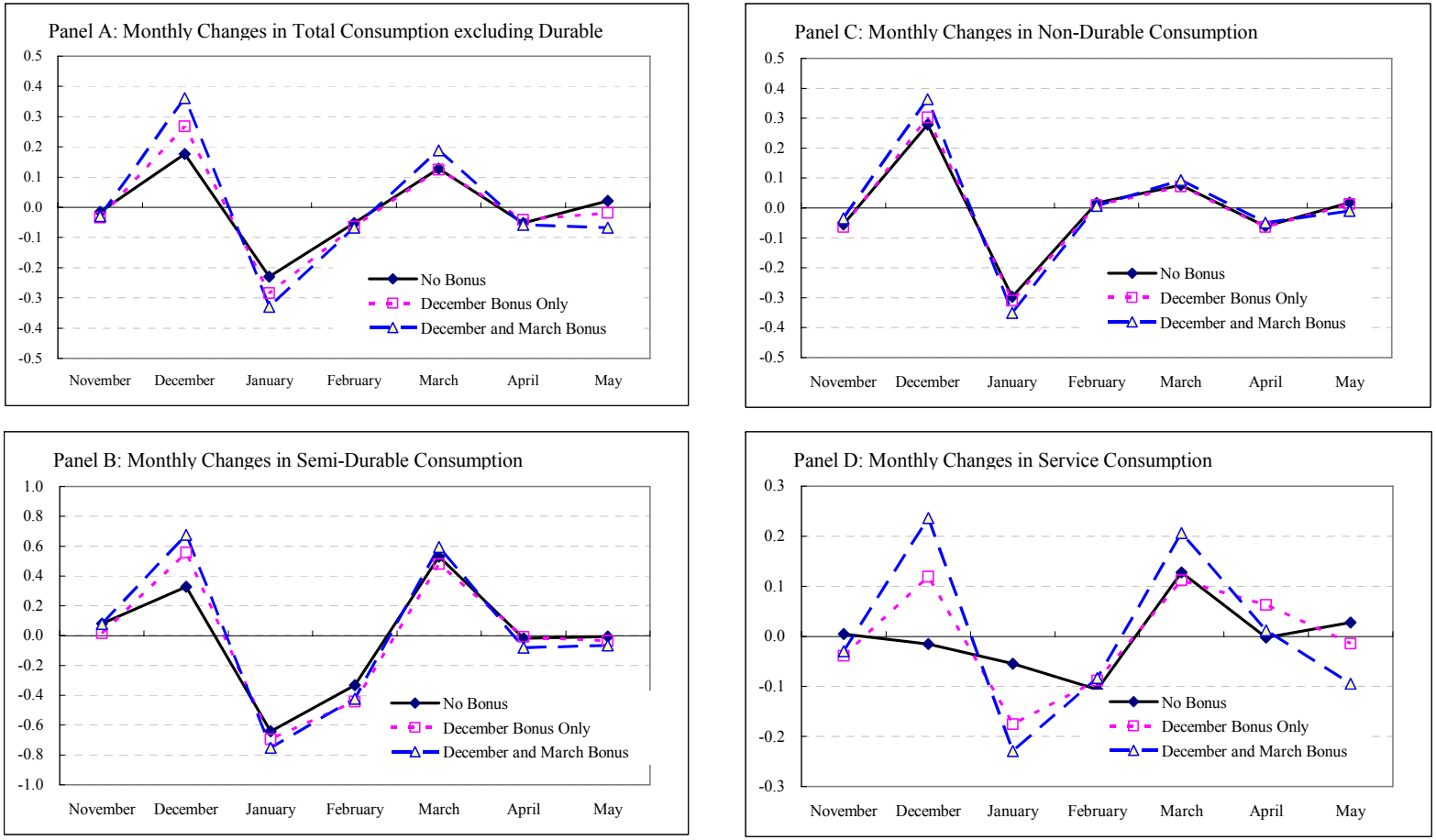
Figure 1. Seasonal Pattern of Household Head Monthly Income by Group



Source: Authors' calculation based on the FIES data from 1990 to 1999.

Notes: Average monthly changes in log nominal income for the three groups: No-Bonus, December Bonus, and December & March Bonus. The number of observations for each group is reported in Table 1.

Figure 2. Seasonal Pattern of Monthly Consumption by Group



Notes: See Appendix Table 2 for data, specification and the detailed results.

Appendix: Categories of spending items

The classification of spending categories in this study follows that used by the Ministry of Internal Affairs and Communications in the published tabulations of this survey ("Annual report on the Family Income and Expenditure Survey"). Durables include household durables, automobiles, communication equipment, and recreational durable goods. Semi-durables include clothing, footwear, sporting goods, video games, computer hardware and software, and books. Non-durables include food (except eating out), fuel, light, and water charges, medicines, films, plants and gardening goods, and tobacco. Services include eating out, rents for housing, medical expenses, public transportation, communication (except communication equipment), education (except school textbooks and reference books), recreational services and personal care services.

Appendix Table 1. Share of Bonus Receivers, Average Ratio of Bonus Receipts to Monthly Regular Income, and Average Monthly Income by Type of Workers

		December Observations (from 1990 to 1999)				March Observations (from 1990 to 1999)			
		Private Firms with fewer than 100 workers	Private Firms with 100 workers or more	Governments	Total	Private Firms with fewer than 100 workers	Private Firms with 100 workers or more	Governments	Total
White-collar workers	Number of Observations	3,944	6,154	3,083	13,181	4,058	6,393	3,223	13,674
	Share of Bonus Receivers (%)	64.3	77.5	87.9	76.0	6.5	6.1	67.9	20.8
	Ratio of Bonus to Regular Income	1.88	2.36	2.34	2.23	0.74	0.72	0.48	0.54
	Monthly Income (in yen)	524,160	637,630	613,648	598,069	519,705	631,964	616,182	594,929
Blue-collar workers & service industry workers	Number of Observations	2,677	1,717	115	4,509	2,797	1,856	122	4,775
	Share of Bonus Receivers (%)	53.4	72.4	76.5	61.2	1.6	2.4	46.7	3.1
	Ratio of Bonus to Regular Income	1.30	1.89	2.32	1.60	0.55	0.61	0.50	0.55
	Monthly Income (in yen)	379,374	458,603	461,681	411,643	375,952	451,334	448,443	407,105
Total	Number of Observations	6,621	7,871	3,198	17,690	6,855	8,249	3,345	18,449
	Share of Bonus Receivers (%)	59.9	76.4	87.5	72.2	4.5	5.2	67.1	16.2
	Ratio of Bonus to Regular Income	1.67	2.26	2.34	2.09	0.71	0.71	0.48	0.54
	Monthly Income (in yen)	465,620	598,577	608,183	550,551	461,050	591,322	610,064	546,316

Notes: The numbers for "December Observations" are calculated using the panels that cover December observations (i.e., from July-December panel to December-May panel).
The numbers for "March Observations" are calculated using the panels that cover March observations (i.e., from October-March panel to March-August panel).
The average ratio of bonus to regular income refers to the average among the bonus recievers (not among the total workers including those without bonus).

Appendix Table 2. Effects of the Bonus Payments on the Seasonal Pattern of Consumption

			Total Consumption excluding Durable Goods		Semi-Durable Consumption		Non-Durable Consumption		Service Consumption	
			Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
December Bonus Dummy	November	b_{11}	-0.018	(0.032)	-0.065	(0.093)	-0.009	(0.018)	-0.044	(0.056)
	December	b_{12}	0.091 ***	(0.021)	0.227 ***	(0.064)	0.024	(0.016)	0.134 ***	(0.039)
	January	b_1	-0.055 ***	(0.016)	-0.053	(0.053)	-0.013	(0.014)	-0.121 ***	(0.032)
	February	b_2	-0.012	(0.017)	-0.110 *	(0.060)	-0.008	(0.012)	0.018	(0.032)
	March	b_3	-0.003	(0.017)	-0.050	(0.058)	-0.006	(0.010)	-0.016	(0.032)
	April	b_4	0.011	(0.020)	0.011	(0.063)	-0.002	(0.012)	0.065 *	(0.039)
	May	b_5	-0.040	(0.028)	-0.028	(0.087)	-0.005	(0.018)	-0.043	(0.055)
December & March Bonus Dummy	November	c_{11}	-0.014	(0.035)	-0.004	(0.104)	0.021	(0.021)	-0.034	(0.060)
	December	c_{12}	0.185 ***	(0.023)	0.347 ***	(0.070)	0.085 ***	(0.018)	0.251 ***	(0.042)
	January	c_1	-0.100 ***	(0.019)	-0.110 *	(0.058)	-0.054 ***	(0.015)	-0.175 ***	(0.035)
	February	c_2	-0.016	(0.019)	-0.091	(0.066)	-0.010	(0.013)	0.023	(0.035)
	March	c_3	0.061 ***	(0.019)	0.065	(0.065)	0.016	(0.012)	0.078 **	(0.035)
	April	c_4	-0.005	(0.023)	-0.062	(0.071)	0.012	(0.014)	0.014	(0.043)
	May	c_5	-0.088 ***	(0.031)	-0.061	(0.097)	-0.028	(0.020)	-0.122 **	(0.061)
F-statistics										
(a) All December Dummies (b_s)=0			4.54 ***		3.92 ***		0.98		3.32 ***	
(b) All Dec. & March Dummies (c_s)=0			13.10 ***		4.55 ***		5.07 ***		8.04 ***	
(a)+(b) All b_s and c_s are zero.			8.17 ***		3.53 ***		4.22 ***		5.39 ***	
(c) All Dec. Dummies (b_s)= All Dec. & March Dummies (c_s)			8.73 ***		2.61 **		6.75 ***		5.81 ***	
Number of observations			21,928		21,465		21,928		21,910	
R-squared			0.174		0.093		0.333		0.031	
Root MSE			0.401		1.286		0.272		0.721	

Notes: October-March, November-April, and December-May panels are pooled. The dependent variable is log(Ct/Ct-1), and all Cs are in nominal terms. All regressions were conducted using OLS and include monthly dummies, nominal interest rate, change in the price of consumption goods, and change in the number of family members as additional regressors. Numbers in parentheses are robust standard errors. ***, **, and * attached to the estimated coefficients and F-statistics indicate those are statistically significant at 1 percent level, 5 percent level, and 10 percent level, respectively.

Chapter II:

Did Japan's Shopping Coupon Program Increase Spending?[*]

Abstract

In March 1999, 31 million "shopping coupons" worth 20,000 yen each were distributed to Japanese families with children and to the elderly. The coupons expired after six months and could only be used within the recipient's local community. We use variation in the number of children across families and in the number of recipients across prefectures to measure the effect of the coupons on spending. We find that coupons had a positive effect on spending on semi-durables, but no effect on spending on nondurables or services. The marginal propensity to consume on semi-durables was 0.3-0.4 when the coupons were distributed in March. There is no evidence of a reversal in spending after the coupons had been used.

[*] This chapter is prepared by Chang-Tai Hsieh, Satoshi Shimizutani, and Masahiro Hori.

1. Introduction

In the spring of 1999 the Japanese government distributed shopping coupons worth 20,000 yen (about 200 dollars) to families with children under the age of 15 and to more than half of the elderly population. In total, 620 billion yen (about 6 billion dollars) worth of coupons were distributed to 31 million people. The coupons had to be spent in the recipient's local community and expired within six months.

The Japanese government's rationale for the "use-it-or-lose-it" nature of the coupons was that this unusual feature would stimulate more spending than a conventional tax cut. The shopping coupon program is widely viewed in Japan as having been modestly successful in stimulating spending. Japan is currently (in March 2009) implementing a similar program, this time providing coupons worth 12,000 yen to every citizen (regardless of age or income), with an additional 8,000 yen for individuals under 18 or over 65. Other countries appear to have drawn similar conclusions from Japan's earlier experience with shopping coupons. Taiwan, for example, distributed coupons worth about 120 US dollars to every citizen in February 2009.

However, it is not clear whether the effect of a "use it or lose it" coupon on spending would be different from that of a tax cut. The fact that the coupons expired may have prompted households to stock on storable goods, and thus may have had a large effect on spending on storable goods in the short run and a smaller effect on services or nondurables. However, this would imply that spending on storable goods would fall in the future, and the long run effect of the coupons on spending would depend on the effect of the coupons on the households' lifetime wealth. Therefore, while the effect of the coupons on spending on storable goods might differ from that of a tax cut in the short run,

the effect of the coupons on spending in the long run should be the same as that of a tax cut. Accordingly, the evidence on the effect of the Japanese shopping coupon program on expenditure should add to the evidence on the effect of tax cuts, such as the 2001 and 2008 tax rebates in the US, and should provide guidance on the potential impact of tax cuts such as the cuts in the 2009 U.S. fiscal stimulus bill.[23]

Our goal in this paper is to measure the effect of the 1999 shopping coupon program on spending. We use two features of the shopping coupons to do this. First, among the non-elderly population, the number of coupons received by a family was entirely determined by the number of children under the age of 15. Using this fact, we measure the effect of the coupons on spending with household level data from Japan's *Family Income and Expenditure Survey* (FIES). We use this data to measure whether families with more children increased their spending when the coupons were distributed by more than families with a smaller number of children. We control for "normal" differences in the change in consumption between families with different numbers of children by using the seasonal patterns from 1990 through 1998 before the coupons were distributed.

Second, we exploit the fact that the coupons had to be spent within each household's local community. This rule implies that if the coupons had a net effect on household spending, sales in retail stores should have increased by more in the communities where a larger number of people received the coupons. We use data on aggregate monthly retail sales in each prefecture from Japan's *Current Survey of*

[23] For studies on the effect of tax cuts on spending, see Souleles (2002), Shapiro and Slemrod (1995,2003), Johnson, Parker, and Souleles (2006), and Agarwal, Liu and Souleles (2007). See also Deaton (1992), Browning and Lusardi (1996), Browning and Collado (2001), Browning and Crossley (2001), Hsieh (2003), Stephens (2003) and Hori and Shimizutani (2007) for evidence on the effect of income changes on expenditure.

Commerce to measure whether retail sales increased by more in the spring of 1999 in prefectures where a larger share of households received the coupons. As in the household analysis, we control for "normal" differences in seasonal consumption changes across prefectures using the seasonal changes in the years prior to 1999. Although we are limited to the variation across prefectures, a benefit of using prefectural level sales data is that it captures the effect of the coupons on spending of the elderly population as well as that of families with children.

We find that the coupons had a positive effect on expenditures on semi-durables in the month the coupons were distributed, but little effect on spending on non-durables or services. Estimates using the household level data (that only measure coupons distributed to families with children) suggest that the marginal propensity to consume (MPC) on semi-durables was 0.3 when the coupons were distributed in March but zero in subsequent months. We find larger estimates of the MPC when we measure aggregate retail sales in a prefecture: the MPC using aggregate retail sales is 0.35 in March and 0.14 in July. Both datasets also provide no evidence that spending declined after the coupons had been redeemed.

The remainder of this paper is organized as follows. The next section briefly outlines the shopping coupon program, while Section 3 describes the data used in the analysis. Section 4 then turns to the estimation of the effect of the program, comparing families with different numbers of children, while Section 5 uses regional sales data to analyze the impact of the program across prefectures. Section 6 concludes.

2. The "Shopping Coupon" Program

In the spring of 1999, the Japanese government distributed shopping coupons worth 20,000 yen per eligible person to roughly 31 million people. The coupon program was proposed by the *Komeito* (one of the three parties in the coalition government) on October 6th, 1998, without specifying a precise amount or who would be eligible. According to the *Nikkei* newspaper, the *Komeito* reached an agreement with the Liberal Democratic Party, the leading party in the coalition, on the coupon program on November 9th, 1998.

The final agreement between *Komeito* and the Liberal Democratic Party was that the coupons would be distributed to families with children and to the elderly. Specifically, families with children received a coupon for every child under the age of 15, without regard to the family's income. In contrast, coupons for the elderly were means tested, but 56 percent of the elderly over the age of 65 were estimated to qualify under the means-testing criteria used.[24] The Ministry of Home Affairs (the main administrator of the coupon program) estimates that 32 million people (roughly 25 percent of Japan's population) qualified for the coupons, of which 11.6 million were over the age of 65.

The shopping coupons were distributed by local governments. They had to be spent in the recipient's local community (city, town, or village). Local governments had the authority to allow the coupons to be spent outside the local community, and a small number of local governments in rural areas chose to do this (Ministry of Home Affairs (1998)). The coupons were not transferable and change was not provided for purchases smaller than 1,000 yen. The coupons could be spent on most consumption goods and

[24] Specifically, the elderly poor were defined as: 1) recipients of old-age welfare pensions, basic disability pensions, basic bereaved pensions, mother and baby pensions, bereaved child pensions, child family allowances, disabled child welfare allowances, welfare aid, or residents in social welfare institutions; or 2) over the age of 65 and having no tax liabilities in 1997 and 1998.

services and expired in September 1999 if they had not been redeemed by then.[25]

The majority of local governments began to distribute the coupons in early March, 1999. The coupons were automatically distributed to families with children based on the data from household registration records maintained by Japanese local governments. The elderly, however, had to file an application with local governments to prove their eligibility. The administrative data provided by the Ministry of Home Affairs indicates that 31 million coupons had been distributed by the end of June 1999; 31 million is 97 percent of the 32 million people estimated to be eligible for the coupons. The administrative data also indicates that almost 40 percent of the coupons had been redeemed by April 20th, increasing to 79.5 percent by June 30th, 1999. By the time the coupons were set to expire (September 30, 1999), 99.6 percent of the outstanding coupons had already been spent.

A survey in July 1999 of 9,000 coupon recipients provides additional information on when families received and spent the coupons (Economic Planning Agency (1999)). Figure 1 presents the data from this survey. Panel A shows that 80 percent of households with children received their coupons in March and another 20 percent in April. Panel B shows that more than 90 percent of the eligible elderly population received their coupons by the end of April. Figure 1 also shows that almost 30 percent of households with children redeemed the coupons by March, and 70 percent had done so by April.

In short, virtually all of the intended beneficiaries received and used the coupons, and most of the coupons were redeemed in March and April 1999. The question then is whether the coupons represent a net increase in spending, or whether they were spent on

[25] The coupons could not be used for lottery tickets, stamps, taxes, utilities, or debt payments.

items that households would have purchased in the absence of the coupons. We turn to this next.

3. Data

Our first source of data is the household level data from the *Family Income and Expenditure Survey* (FIES) from 1990 to 1999. The FIES provides detailed information on the demographic characteristics, income, and expenditures for a nationally representative sample of 8,000 households each month. The FIES is the Japanese Government's main source of information on aggregate consumption and Hayashi (1986) utilized micro-level data. The monthly consumption data is compiled from a diary collected twice a month. Single-person households and households employed in the agriculture or fishery were not surveyed before July 1999. Each household is surveyed for six months before being replaced. Since one in six households is replaced each month, we can follow a panel of 1,300 households over six months.

To improve the reliability of our estimates, we excluded the following households from our sample. First, we dropped households with self-employed household heads because we do not have monthly income information for these households. Second, we dropped households where the reported age of the household head changed by more than one year during the six–month period; where the household's tenancy status changed from owner to renter or vice-versa; or where there was a change in family size between successive months. Third, because the FIES does not allow us to reliably identify elderly people who received a coupon, we exclude all households with a person over the

age of 65.[26] Fourth, a household was excluded if the number of family members was greater than ten because the consumption patterns of large extended households are likely to be significantly different from those of smaller households that are the norm in Japan, though the number of the large households in the sample is very small. Fifth, we confined our sample to households that did not attrite before the sixth interview. Finally, we excluded a household if the change in consumption (in absolute value) between successive months exceeded the average consumption change in our sample by more than three standard deviations. After these adjustments, the size of each six month panel drops from 1,300 to 600 households.

We focus on the five panels spanning March through July because most of the coupon recipients received and spent their coupons in March, April, or May of 1999. Specifically, these are the households we observe from October to March, November to April, December to May, January to June, and February to July in each year. We focus on total spending on nondurables and three categories of nondurables: semi-durables, strictly non-durables, and services.[27] The summary statistics are shown in Appendix Table 1.

Our second data source is the *Current Survey of Commerce*, a monthly survey of wholesale and retail establishments.[28] We use aggregate monthly sales by large-scale retailers with 50 o more employees in each of the 47 prefectures in Japan from 1990 to

[26] There is no explicit data on the amount of coupons a household received in the FIES micro-data.

[27] Semi-durables include clothing, footwear, sporting goods, video games, computer hardware and software, and books. Strictly non-durables include food (except eating out), fuel, light, and water charges, medicines, films, plants and gardening goods, and tobacco. Services include eating out, rent for housing, medical expenses, public transportation, communication (except communication equipment), education (except school textbooks and reference books), recreational services and personal care services (Ministry of Internal Affairs and Communications (various years)).

[28] We used the sales by large-scale retailers in the *Current Survey of Commerce*, which is a census of large-scale retail establishments with 50 or more employees. According to the June 1999 *Census of Commerce* (which covers all retail stores) conducted in June 1999, store with more than 50 employees accounted for 15.8 percent of total retail sales.

1999 from the published tabulation of this survey. Finally, we obtained the number of coupons distributed in each prefecture from the Ministry of Home Affairs. The summary statistics of this second dataset can be seen in Appendix Table 2.

4. Impact of Coupons on the Consumption of Families with Children

We begin by using the six-month panels from the FIES to estimate the impact of the shopping coupons on household consumption. Each family received one coupon for every child under the age of 15. The coupon program thus increased the income of families with a large number of children by more than that of families with a smaller number of children. This is the variation we exploit.

We estimate the following model on our main sample (the five overlapping panels from 1990 through 1999).

(1)

$$\log\left(\frac{C_{h,t}}{C_{h,\,february}}\right) = a_1 \cdot \left(\frac{20{,}000 \cdot Children_h \cdot I_{1999}}{Income_h}\right) + Z_h^{/} \cdot a_2 + Year_h^{/} \cdot a_3 + \varepsilon_{h,t}$$

Here, *h* indexes households and *t* indexes the month. The dependent variable is the log of consumption in month t relative to consumption in February. The key independent variable is the ratio of the value of the coupons to the household's monthly income in the previous year $(Income_h)$, where the value of the coupons is measured as the product of 20,000 yen, the number of children under the age of 15 $(Children_h)$, and an indicator variable for observations in 1999 (I_{1999}). The other independent variables are a vector of controls at the household level denoted by Z_t (number of children under the age of 15, number of other family members, and a quadratic in the age of the household head)

and indicator variables for year (denoted by $Year_h$).

For the household we observe in 1999, the variation in the key independent variable is driven by variation in the number of children relative to income. For households from 1990 to 1998, the value of the coupons is set to zero. Since we include controls for year and the number of children, the coefficient on $\frac{20,000 \cdot Children_h \cdot I_{1999}}{Income_h}$ measures whether families with a high children to income ratio increased their spending by more than families with a lower children to income ratio in the year the coupons were distributed (1999) relative to previous years (1990-1989).

Table 1 presents estimates of a_1. Panel A presents the estimates using all five overlapping panels. Each column measures the change in consumption in each month starting in March relative to February. We note that the sample becomes smaller as we measure the response over additional months; we estimate the change in consumption in March from all five panels, but we drop households that are interviewed in October through March when we estimate the change in consumption in April. At the extreme, the change in consumption in July is based only on the February-July panel.

Table 1 provides little evidence that the coupons led to increased spending on non-durables or on services, nor does it provide evidence of an effect on total spending (first row). There is, however, evidence that the coupons did increase spending on semi-durables in March (when the coupons were initially distributed). The estimate indicates that a one percent increase in monthly income due to the coupons is associated with a marginally significant 1.3 percent increase in spending on semi-durables in March. The estimated effect of the coupons on consumption in subsequent months are less

precise because the samples get smaller, but there is generally little evidence that the coupons had a long lasting effect on spending. For example, a one percent increase in income due to the coupons is associated with a statistically insignificant 0.23 percent *decline* in July.

The estimated consumption response in March and April 1999 to the coupons is likely to be downward biased because not all the households received and spent their coupons during these months. We can use information on the percentage of coupons distributed in each month to adjust for this bias. For example, we know that 27 percent of households with children spent their coupons in March and another 45 percent in April (Figure 1, Panel A). The "attenuation-corrected" marginal propensity to consume (MPC) on semi-durables in March can be calculated as a_1 x (C/Y) x (1/0.27)=0.26.[29] Taking the point estimates of a_1 for subsequent months, we get an "attenuation-corrected" MPC of 0.09 for April, -0.02 for May, -0.03 for June, and -0.01 for July.

Panel B restricts the sample to the panel that we follow over all five months (February through July). The standard errors are now larger, but the point estimates in the first three columns are also larger. The estimates of α_1 imply an attenuation-corrected MPC for March of 0.52 (roughly twice as large as the MPC estimated from all five panels), 0.24 in April, and 0.09 in May.

These estimates based on the February-July panel suggest that the coupons might have had a positive effect on spending even after the coupons were spent (most of the coupons were redeemed in March and April). We now directly measure the total change in spending beginning in March. Table 2 shows the coefficient on coupon

[29] Appendix Table 1 indicates that semi-durable consumption/monthly income averages 5.5 percent, so MPC=1.29 x 0.055 x (1/0.27) = 0.26. Souleles (1999) uses a similar method to adjust estimates of the MPC for attenuation bias.

income from equation (1) where we use the log of *average* monthly consumption between March and the corresponding month (relative to consumption in February) as the dependent variable. Here, there is evidence of a sizable response. For example, average spending on semi-durables in March through July increased by 1.49 percent for one percent increase in income. Since most of the coupons had already been spent by July, this implies the MPC on semi-durables over the five month period from March through July was 0.41.[30] This estimate thus suggests that there was no reversal in spending in June and July after the coupons had been used.

We now probe the sensitivity of our estimates. First, the variation in coupon income we use in Tables 1 and 2 is driven by the variation in the number of children (under 15) relative to monthly income. Table 3 presents estimates where the key independent variable is now the product of an indicator variable for 1999 and the number of children under 15 (but otherwise everything is the same as in equation (1). The variation is now entirely driven by the number of children and not by variation in (non-coupon) income. In Panel A, the estimated effect on spending on semi-durables in March and April are generally positive, but drops to zero in subsequent months. In Panel B, where we once again restrict the sample to the February-July panel, the effect on spending on semi-durables is positive in March, April, and May and drops to zero in June and July.

Second, our identifying assumption is that the coupon program is the only shock in 1999 that had a differential effect on families with more or less children under the age of 15. However, it is possible that there were other shocks that also had a heterogeneous

[30] MPC of total consumption over the five month period from March to July=1.49 x 0.055 x 5=0.41 (0.055 is the semi durable consumption/income ratio and we multiply by 5 to account for the fact that the dependent variable is average monthly consumption).

effect on families depending on the number of children. If this were the case, we would mistakenly attribute the heterogeneous response of consumption in 1999 to the coupons (Mariger and Shaw, 1993). We cannot completely rule out this possibility, but we can test whether the consumption of households with family members greater than 15 changes by more than that of households with a smaller number of members greater than 15. The idea is that household members greater than 15 did not qualify for the coupons, so we would not expect to see a response if the coupon program was the only shock in 1999. This appears to be what we find. Specifically, when we include a variable for the hypothetical coupon income for household members greater than 15 in equation (1), the point estimates of the coefficient on the hypothetical coupon income are always zero.[31]

Table 4 probes for evidence of heterogeneity in the response to the coupons across poor and rich families. We classify families into poor and rich using information on financial assets of individual households. The FIES does not collect information on assets, but the *Family Savings Survey* (henceforth, FSS) collects data on financial assets on December 31 in every year from the same households surveyed in the FIES who entered the sample in August, September, or October. We can therefore create a matched data set from the FIES and the FSS to measure the impact of the coupons across families with different levels of financial assets. Since we need data covering the period before and after March, the only panel we can use is the October-March panel. We can thus only measure the effect of the coupons on spending in March.

Table 4 presents the estimated impact of the coupons on spending in March using two

[31] We introduced $\frac{20{,}000 \cdot Family\ Members_h > 15 \cdot I_{1999}}{Income_h}$ as an additional independent variable in equation (1).

classifications of rich and poor. Panel A classifies families based on their asset-income ratios, and Panel B classifies families based on their asset-consumption ratios.[32] For each sample, we then estimated the response of consumption in March using the specification in equation (1). In every case, we find that the effect of coupon income on spending is always higher that have less assets relative to their income or to their consumption. However, the standard errors with these limited samples are such that we can generally not reject the null hypothesis of equal coefficients.

Finally, since the program was widely anticipated by the time the coupons were distributed in March, a forward-looking household may have already adjusted its spending even before the coupons were distributed in March. News reports indicate that the program was first proposed in early October 1998 with no information on the amount of the coupons or who was to qualify. The final agreement was announced and widely publicized in early November. Although an argument can be made that the program was already anticipated in October 1998, we think that November 1998 is a more plausible date for when the public was informed of the program. We will therefore measure the change in consumption starting in November when the program was announced, but before households began to receive the coupons in March 1999. The specification we estimate is the same as in equation (1), with the only difference being that the dependent variable is now the change in consumption relative to October. The results, presented in Table 5, provide no evidence that consumption responded to news of the coupon program: all the estimated coefficients are small and statistically insignificant.

[32] Specifically, we followed a referee's suggestion and used (assets + monthly income)/monthly consumption.

In sum, the shopping coupons program appears to have had a positive effect on the consumption of semi-durables when the coupons were distributed. We find no evidence of a reversal in spending after the coupons were used. We also find a larger effect among families that were poor and more likely to be liquidity constrained.

5. Impact on Spending across Prefectures

This section examines whether consumption increased by more in prefectures where a larger share of the population received shopping coupons. The coupons could be used only within the recipient's local region (city, village, or town). Since prefectures with more children and elderly received more coupons, one way to measure the effect of the coupon program is to compare the change in consumption in a prefecture with a large number of children and elderly people (relative to the population in the prefecture) to a prefecture with fewer children and elderly. Since the seasonal pattern of consumption in a prefecture with a larger number of children and elderly people may differ from that in a prefecture with a smaller number of people eligible for the coupons, it is important to control for this "normal" seasonal pattern. We use the seasonal patterns of consumption across prefectures in previous years (1990-1998) to control for these "normal" seasonal expenditure changes.

Our dependent variable is the monthly retail sales in a prefecture.[33] We combine the data on monthly retail sales in a prefecture with the administrative data on the total number of coupons distributed in each prefecture. The main advantage of this data is that we are now capturing the consumption response to the distribution of coupons to the

[33] We compiled this data from the published tabulations of the *Current Survey of Commerce* (METI, various years).

elderly as well as to households with children. We work with two measures of retail sales: total retail sales and sales of apparel and clothing. We compile data from 1990 to 1999, so we have nine years of data to control for seasonal patterns of consumption across prefectures.

The basic specification we estimate is similar to equation (1):

$$\log\left(\frac{S_{i,t}}{S_{i,\,february}}\right) = b_1 \cdot \left(\frac{Coupon_{i,t}}{Monthly\quad Income_{i,t}}\right) + Z_i' \cdot b_2 + Year_t' \cdot b_3 + \varepsilon_{i,t} \tag{2}$$

where i indexes prefectures (47 prefectures in total), t refers to the year, Z_i represents a vector of indicator variables for each prefecture, and $Year_t$ is a vector of indicator variables for each year. The main dependent variable is now the retail sales in a prefecture in a month starting in March, and the main independent variable is the total coupon income in a prefecture (computed as the total value of coupons distributed in a prefecture) relative to the average aggregate monthly GDP in the prefecture in the previous year.[34] For observations prior to 1999, $Coupon_{i,t}$ is set to zero. The coefficient on $\frac{Coupon_{i,t}}{Monthly\quad Income_{i,t}}$ measures whether aggregate retail sales increased by more in 1999 in prefectures where the coupons represented a larger increase in aggregate income relative to previous years (1990-1998).

Table 6 presents estimates of b_1 from equation (2). The first row in Table 6 presents estimates of b_1 in equation (2) over successive months after February. The estimated income elasticity of retail sales is 1.5 for March, 1.8 for April, 1.9 for May, 2.9 for June, and 2.7 for July, and are generally marginally significant. As before, we can

[34] From the "Annual Report on Prefectural Accounts" published by the Cabinet Office.

estimate the "attenuation-corrected" marginal propensity to consume using the aggregate data on the fraction of coupons spent in each month. A survey of coupon recipients by the Economic Planning Agency in July 1998 (we presented some of the data from this survey in Figure 1) indicates that 21 percent of the coupons were redeemed in March, 44 percent in April, 24 percent in May, 8 percent in June, and 3 percent in July. Using this information, the "attenuation-corrected" MPC for March is 0.35 (1.47 x 0.05 x 1/0.21), that for April 0.14, that for May 0.11, that for June 0.15, and that for July 0.14. These estimates are generally larger than the MPC obtained by using the differential impact of the coupon program across families with children (Tables 1 and 2). In addition, perhaps because the sample size does not decline when we measure the longer run response to the coupons, we also find more consistent evidence that the coupons had a positive effect on spending in the longer run.

Finally, the second row of Table 6 presents estimates of the effect of the coupon program on retail sales of clothing and apparel. The estimated effect on spending are generally positive, but the estimates are less precise.

6. Conclusion

This paper investigated the effects of an experiment in fiscal policy undertaken by the Japanese Government in the spring of 1999. Under the shopping coupon program, the Japanese government handed out shopping coupons worth 20,000 yen (about 200 dollars) to the parents of families with children under the age of 15 and to roughly half of the elderly population. The coupons had to be used in the recipient's local community and expired if they were not used. The central question with regard to this program is the

extent to which coupon spending substituted for other spending or substituted for spending in the succeeding months.

We use two sources of data to answer this question. The results using household level data demonstrate that the program stimulated consumption of semi-durables when the coupons were distributed. The MPC on semi-durables is 0.3 in March, with little evidence of a reversal in spending after the coupons were used. The results using regional variation in the impact of the program suggest that the MPC in March was of a similar magnitude, and provides stronger evidence that spending did not fall after the coupons had been redeemed.

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Table 1:
Did families with more children spend more than families with less children?

Independent Variable: Coupon Income/Annual Income

	Dependent Variable: log Consumption (relative to February)				
	March	April	May	June	July
A: Overlapping panels					
Total	0.12	0.11	-0.05	-0.35	-0.24
(except durables)	(0.15)	(0.17)	(0.19)	(0.24)	(0.36)
N	25,422	20,555	15,700	10,850	5,471
Semi-durables	1.29	1.13	-0.33	-0.57	-0.23
	(0.59)	(0.66)	(0.74)	(0.91)	(1.36)
N	24,362	19,679	15,063	10,428	5,232
Non-durables	0.19	0.01	-0.06	-0.21	0.12
	(0.10)	(0.11)	(0.13)	(0.17)	(0.26)
N	25,583	20,663	15,780	10,887	5,497
Services	-0.20	-0.01	-0.16	-0.14	-0.31
	(0.29)	(0.32)	(0.36)	(0.44)	(0.67)
N	25,415	20,522	15,682	10,813	5,457
B: February-July panel					
Total	0.18	0.27	0.23	-0.11	-0.24
(except durables)	(0.35)	(0.35)	(0.32)	(0.34)	(0.36)
N	5,466	5,458	5,460	5,458	5,471
Semi-Durables	2.53	3.13	1.62	0.10	-0.23
	(1.33)	(1.30)	(1.28)	(1.28)	(1.36)
N	5,232	5,232	5,232	5,247	5,232

Notes: Dependent variable is the log of consumption in a month starting in March relative to consumption in February. Estimates are coefficients on Coupon/Income. Other independent variables are a quadratic in the age of the household head, the number of children under the age of 15, the number of other family members, and indicator variables for year. The data in Panel A are the FIES panels from 1990 through 1999 covering October–March, November–April, December–May, January–June, and February–July. The data in Panel B (February–July panel) are FIES panels from 1990 through 1999 covering February–July. The implied MPC for semi-durables (after correcting for attenuation bias) are 0.26 (0.12) in March and 0.09 (0.05) in April in panel A. For Panel B, the implied attenuation corrected MPCs are 0.52 (0.27) in March and 0.24 (0.10) in April (standard errors in parentheses).

Table 2:
Did families with more children spend more in the long run?

Independent Variable: Coupon Income/Annual Income

	Dependent Variable: log Consumption (relative to February)				
	March	March-April	March-May	March-June	March-July
Total	0.18	0.27	0.35	0.23	0.09
(except durables)	(0.35)	(0.31)	(0.29)	(0.28)	(0.28)
N	5,466	5,465	5,468	5,461	5,472
Semi-Durables	2.53	2.71	2.47	1.90	1.49
	(1.33)	(1.17)	(1.11)	(1.08)	(1.07)
N	5,232	5,296	5,311	5,313	5,317
Non-durables	0.21	0.22	0.20	0.13	0.12
	(0.23)	(0.19)	(0.19)	(0.19)	(0.19)
N	5,480	5,477	5,478	5,475	5,485
Services	0.11	-0.19	0.02	0.26	-0.10
	(0.65)	(0.58)	(0.56)	(0.54)	(0.53)
N	5,457	5,458	5,464	5,453	5,459

Notes: Dependent variable is the log of *average* consumption starting in March relative to consumption in February. Estimates are coefficients on Coupon/Income. Other independent variables are a quadratic in the age of the household head, the number of children under the age of 15, the number of other family members, and indicator variables for year. The data are FIES panels from 1990 through 1999 covering February–July.

Table 3:
Did families with more children spend more than families with less children?

Independent Variable: # Children < 15

	Dependent Variable: log Consumption (relative to February)				
	March	April	May	June	July
A: Overlapping panels					
Total	0.01	0.003	-0.003	-0.02	0.01
(except durables)	(0.01)	(0.008)	(0.009)	(0.01)	(0.02)
N	25,422	20,555	15,700	10,850	5,471
Semi-durables	0.05	0.04	-0.01	-0.03	0.01
	(0.03)	(0.03)	(0.03)	(0.04)	(0.06)
N	24,362	19,679	15,063	10,428	5,232
Non-durables	0.006	-0.0005	-0.01	-0.02	-0.001
	(0.005)	(0.005)	(0.01)	(0.01)	(0.01)
N	25,583	20,663	15,780	10,887	5,497
Services	0.01	-0.001	-0.01	-0.01	0.02
	(0.01)	(0.02)	(0.02)	(0.02)	(0.03)
N	25,415	20,522	15,682	10,813	5,457
B: February-July panel					
Total	0.01	0.01	0.01	-0.01	0.01
(except durables)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
N	5,466	5,458	5,460	5,458	5,471
Semi-Durables	0.09	0.12	0.06	-0.001	0.01
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
N	5,253	5,230	5,232	5,247	5,232

Notes: Dependent variable is the log of consumption in a month starting in March relative to consumption in February. Estimates are coefficients on product of number of children under age 15 and an indicator variable for 1999. Other independent variables are a quadratic in the age of the household head, number of children under the age of 15, the number of other family members, and indicator variables for year. The data in Panel A are the FIES panels from 1990 through 1999 covering October–March, November–April, December–May, January–June, and February–July. The data in Panel B (February–July panel) are FIES panels from 1990 through 1999 covering February–July.

Table 4: Did the coupons have a larger effect in poor families?

Independent Variable: Coupon Income/Annual Income

A: Assets/Income

	> =mean	< mean	>= 1	< 1	> =1/2	< 1/2
Semi-durables	2.11	2.73	1.38	3.10	1.60	3.45
	(2.25)	(1.60)	(2.26)	(1.60)	(1.97)	(1.75)
N	1,644	2,981	1,674	2.951	2,610	2,015

B: (Assets + Income)/Consumption

	>= mean	< mean	> =50	< 50	> =80	< 80
Semi-durables	-0.51	2.85	-1.39	2.70	-6.36	2.88
	(2.91)	(1.48)	(4.91)	(1.37)	(8.08)	(1.32)
N	1,502	3,123	739	3,886	349	4,276

Note: Dependent variable is log of spending on semi-durables in March relative to February. Entries are coefficients on Coupons/Income. Other independent variables are a quadratic in the age of the household head, the number of children under the age of 15, the number of other family members, and indicator variables for each year. Assets are defined as gross financial assets, income is average monthly income in previous year, and consumption is average consumption (over the six months). The sample is the matched panel of the FIES and FSS from 1990 to 1999. Standard errors in parentheses.

Table 5:
Did larger families spend more when the coupon program was announced?

Independent Variable: Coupon Income/Annual Income

	Dependent variable: log Consumption (relative to October)			
	Nov.	Nov.-Dec.	Nov.-Jan.	Nov.-Feb.
Semi-durables	0.08	-0.82	0.47	-0.74
	(0.54)	(0.56)	(0.69)	(0.87)
N	27,159	21,872	14,603	9,582

Note: Dependent variable is the log of consumption in a month starting in November relative to consumption in October. Entries are coefficients on Coupons/Income. Other independent variables are a quadratic in the age of the household head, the number of children under the age of 15, the number of other family members, and indicator variables for each year. The sample are FIES panels from 1990 through 1999 covering June–November, July–December, August–January, and September–February. Standard errors in parentheses.

Table 6:
Did retail sales increase in prefectures where more people received coupons?

Independent Variable: Coupons in Prefecture x 20,000 Yen/Prefecture GDP

	Dependent variable: log retail sales (relative to February)				
	March	April	May	June	July
Retail sales **1.**	1.47	1.80	1.92	2.88	2.73
	(0.98)	(0.98)	(1.14)	(1.11)	(1.32)
2. Clothing and Apparel	1.99	1.43	0.49	4.10	1.44
	(1.19)	(1.19)	(1.32)	(1.26)	(1.38)

Notes: The unit of observation is a prefecture (47 prefectures in total). The dependent variable is the log of the ratio of retail sale in a prefecture in a month starting in March to retail sales in February. Entries are coefficients on ratio of the product of the number of coupon recipients and 20,000 yen in the prefecture to average monthly regional GDP in the previous year (standard errors in parentheses). Regressions also include indicator variables for prefecture and year. The MPC corrected for the timing of coupons distribution is 0.35 (0.23) in March, 0.14 (0.08) in April, 0.11 (0.07) in May, 0.15 (0.06) in June, and 0.14 (0.07) in July (standard errors in parentheses).

Appendix Table 1:

Household consumption, income and demographics (FIES Panels, 1990-1999)

	February	March	April	May	June	July
Consumption:						
Semi-durables	28,602	40,470	33,817	31,386	31,812	37,084
	(47,420)	(55,716)	(44,745)	(41,787)	(43,000)	(48,000)
Non-durables	104,153	113,281	106,589	108,015	103,709	109,718
	(39,932)	(41,321)	(39,000)	(36,681)	(38,842)	(40,721)
Services	104,644	123,304	123,835	112,165	108,802	121,220
	(120,681)	(153,373)	(154,225)	(124,803)	(137,233)	(132,211)
Total (Except durables)	236,494	275,768	262,885	250,662	243,283	266,552
	(144,565)	(183,130)	(178,244)	(148,649)	(156,774)	(161,759)
Monthly income	611,668	611,033	610,986	612,889	612,384	607,468
	(266,351)	(266,090)	(267,149)	(268,994)	(269.068)	(267,803)
Age (household head)	43.78	43.78	43.77	43.78	43.83	43.88
	(10.00)	(10.00)	(10.02)	(9.99)	(10.00)	(10.03)
Number of children under 15	0.99	0.99	0.99	0.99	0.99	0.99
	(1.04)	(1.04)	(1.04)	(1.04)	(1.04)	(1.04)
Number of other family members	2.50	2.50	2.49	2.50	2.49	2.51
	(0.76)	(0.76)	(0.76)	(0.76)	(0.75)	(0.77)
Number of observations	25,827	25,827	20,899	15,950	11,002	5,546

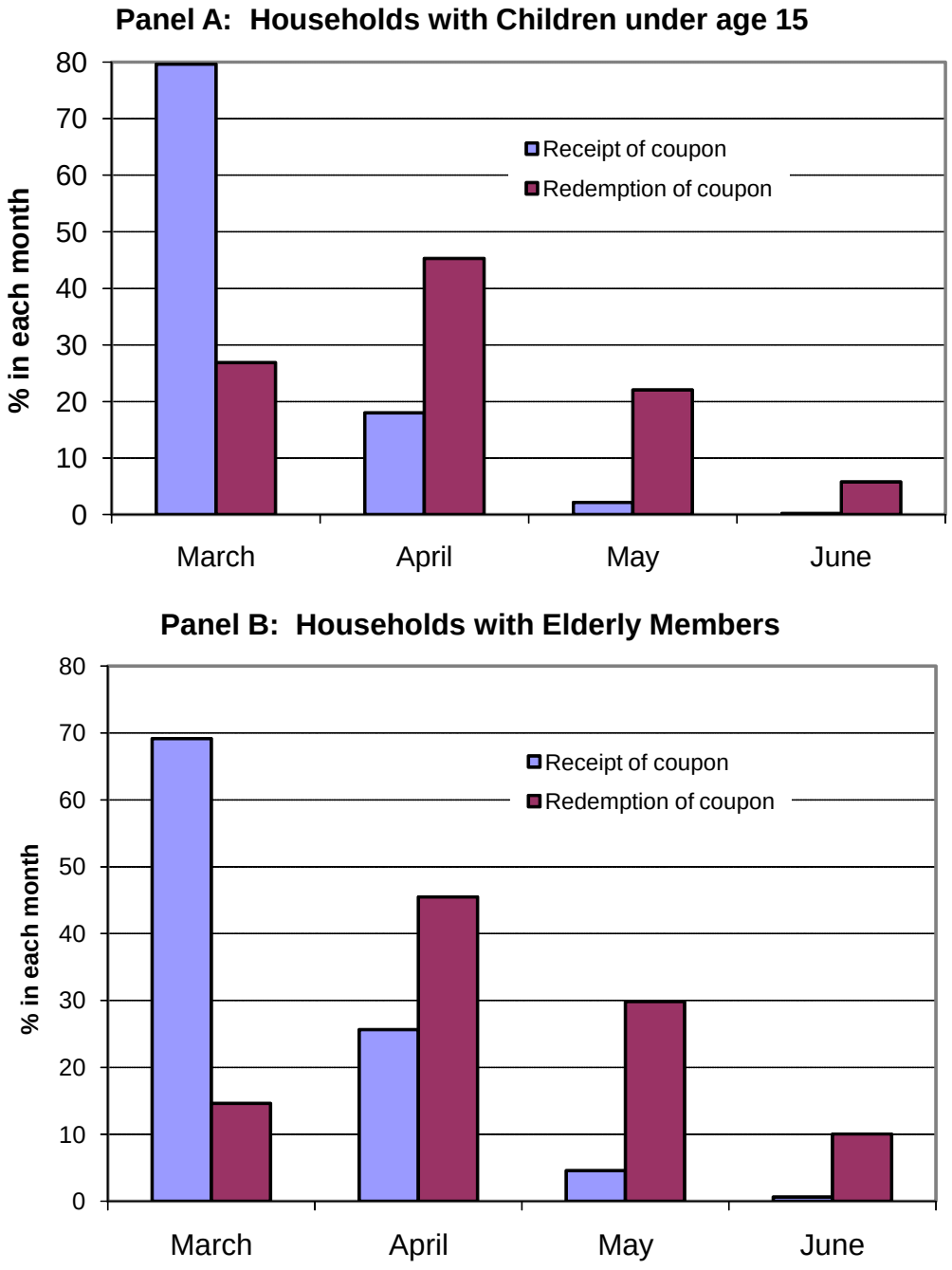
Notes: The unit of observation is a household. Consumption and income are in yen at 2000 prices. Monthly income is pretax annual income divided by 12.

Appendix Table 2: Aggregate sales in prefectures (*Survey of Commerce*: 1990-1999)

	Retail Sales	***Clothing Sales***
October	38,516	16,476
	(59,258)	(26,751)
November	38,388	15,892
	(59,633)	(25,299)
December	57,749	20,945
	(89,460)	(32,653)
January	39,186	16,901
	(55,086)	(24,733)
February	32,132	11,665
	(47,781)	(17,804)
March	40,467	16,724
	(62,178)	(26,592)
April	37,577	15,031
	(56,109)	(23,539)
May	37,617	15,180
	(56,516)	(23,910)
June	37,175	14,593
	(57,453)	(23,065)
July	45,787	16,793
	(70,766)	(26,483)
Item:		
Average monthly income	688,630	
	(778,073)	
Total coupons/Monthly income (%)	2.25	
	(0.51)	
Retail sales/Monthly income (%)	5.10	
	(1.31)	

Note: Unit of observation is a prefecture. Monthly income and retail sales are in million yen. Total coupon income is product of the number of coupons distributed in a prefecture and 20,000 yen. Monthly income is average of annual prefectural GDP from 1990 through 1999 divided by 12.

Figure 1: Timing of Receipt and Expenditure of Coupon (EPA Survey)



Source: Economic Planning Agency (1999)