

CONSUMER RESPONSE
TO THE 1994 TAX CUT: EVALUATING JAPAN'S
FIRST TAX CUT IN THE 1990S*

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Abstract

This paper explores the reaction of Japanese consumers to the 1994 tax cut, the first administered by the Japanese government in the 1990s. Microlevel data from the Family Income and Expenditure Survey (FIES) is used to evaluate the effect of the 1994 tax cut on consumption. The estimates weakly suggest that tax cuts undertaken to stimulate the weak economy in 1994 had some effect on consumption of non-durables or semi-durables. An MPC of 0.1 - 0.2 is estimated right after implementation, but the positive effect was substituted immediately in subsequent months. In other words, consumers reacted to the temporary tax cut, but its effect was small and transitory.

Key words: Tax cut, Family Income and Expenditure Survey, Euler equation, Marginal propensity to consume.

JEL classification codes: D12.

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I. *Introduction*

The purpose of this paper is to evaluate Japanese consumer reactions to the 1994 tax cut, which was the first among a number of tax reductions undertaken by the Japanese government in the 1990s. The 1994 tax cut was called a “special tax cut,” implying that the tax cut was to be temporary. If consumers behave according to the canonical permanent income hypothesis, a temporary tax cut would not affect current consumption, since it does not alter permanent income. If consumers are “excessively sensitive” to changes in current income, however, they might respond to temporary tax cuts. Therefore, temporary tax cuts offer nice “natural experiments” to test the permanent income hypothesis.

The 1994 tax cut is uniquely suited to this type of analysis. First, the tax cut was the first administered by the Japanese government in the 1990s. Because there were no tax reductions between the late 1980s and 1993, no one was concerned that the effects of previous tax cuts undertaken before the 1994 tax cut might overlap. Second, the 1994 tax cut consists of only a temporary tax cut. The 1995, 1996, and 1999 tax cut consists of both permanent (institutional) and temporary cuts. Third, many characteristics of the 1994 tax cut are similar to the 1998 tax cut and the 1999 shopping coupons program, which were also temporary. These two episodes have been already analyzed by past research and it is possible to compare the 1994 tax cut with those other events.

Quantitative assessment of tax reductions is an important topic for policymakers and academic researchers. Nonetheless, it is surprising that few studies have quantitatively evaluated Japan’s tax cut incidences. There is no empirical research on these tax cuts using micro-level consumer data except Hori and Shimizutani (2002), which dealt with the 1998 tax cut, and Hori, Hsieh, Murata and Shimizutani (2002), which analyzed the shopping coupon program in 1999. Like those two papers, this study utilizes micro-level data of consumers available from the Family Income and Expenditure Survey (henceforth, FIES), monthly consumption data compiled by the Japanese government.

This paper is organized as follows. The next section gives a survey of related literature. Section 3 describes the 1994 tax cut policy, and Section 4 provides a description of the data and calculation of tax reduction. Section 5, the main part of this paper, evaluates the effects of the 1994 tax cut on consumption. The last section concludes.

II. *Literature Survey*

Despite recent and widespread understanding of the importance of policy evaluation, little empirical research that quantitatively assesses the effectiveness of Japanese tax cuts in the 1990s has been carried out. Watanabe et al. (2001) tackled the empirical assessment of Japanese tax cuts after the mid 1970s, distinguishing temporary and permanent as well as anticipated and unanticipated tax changes. They found that the impact of temporary tax reductions is significantly smaller than that of permanent cuts, and that 80 percent of Japanese consumers respond to tax changes at their implementation, not at their announcement.

The other quantitative work on tax reduction in Japan is Carroll (2000). Based on the theory of habit formation behaviors, he argued that the immediate marginal propensity to

consume out of permanent shocks should be much less than one. "The immediate MPC out of permanent tax cuts maybe as low as 30 percent, suggesting that calls for permanent income tax cuts as a quick means of stimulating aggregate demand in Japan may be misguided," he writes.

These findings are not fully convincing, partly because the analyses lacked micro-level observations. The impact of tax reductions on consumption is plausibly different across households with different characteristics or different liquidity constraints, and it is critically important to consider the heterogeneity of consumers in evaluating the tax change effect. Hori, Hsieh, Murata, and Shimizutani (2002) analyzed the effect of the 1999 Japanese shopping coupon program on consumption using micro-level data and concluded that the MPC out of the coupons was 0.3-0.4 in the first month the coupons were distributed, and only 0.1 over subsequent months. Hori and Shimizutani (2002) used the same data set to compare the impact of the 1999 shopping coupons program with the impact of the 1998 tax cut. They demonstrated that while the effects on consumption are roughly comparable, the 1998 tax cut and the 1999 coupon program affected consumption of different types of goods.

In the United States, Blinder (1981) and Poterba (1988) used aggregate consumption data and to find that a temporary income tax cut in 1975 had significant effects on consumption. Shapiro and Slemrod (1995) utilized survey data to evaluate the effect of the reduction in standard rates of tax withholding on consumption in 1992. They concluded that 43 percent of the sample planned to spend most of the extra take-home pay. However, using the same survey method for the same sample, Shapiro and Slemrod (2003) showed that only 22 percent of households that received a tax rebate expected to spend it in 2001.

The large tax cuts in Japan in the 1990s serve as nice "quasi-natural experiments" to test the permanent income hypothesis (PIH), as tested in Shea (1995), Souleles (1999), Parker (1999), Browning and Collado (2001) and Hsieh (2003). Investigating institutional changes in tax payment such as income tax refunds and changes in payroll tax rates, some studies concluded that consumption is excessively sensitive to anticipated changes in temporary income (Shea (1995), Souleles (1999), Parker (1999)) while other studies (Browning and Collado (2001), Hsieh (2003)) concluded that consumers do not respond to anticipated changes in tax payment, which is consistent with the implications of the canonical permanent income hypothesis.

III. *The 1994 Tax Cut*

The 1994 tax reduction was announced on February 10, 1994 and implemented in June and December of 1994.¹ This was the first of Japan's tax cuts in the 1990s, implemented with the aim of stimulating the weak economy after the collapse of the "bubble economy." It was also administered in anticipation of an increase in the consumption tax rate planned for 1997. This tax reduction was thought to be temporary and was to be ended in the following year. The total amount was 5.5 trillion yen. As Ishi (2001) writes, "a temporary reduction of 5,500

¹ Following Watanabe, et.al. (2001), the date of anticipation in this study was the day when the Liberal Democratic Party (LDP) tax committee submitted the "Outline of Tax Reform," which provided consumers with a significant amount of information on future tax reform. The other candidates for anticipation dates are the date of (1) the tax advisory commission of the Prime Minister making a policy recommendation, (2) the Cabinet approving the proposal, (3) the Diet approving the bill. See note 7 in Watanabe, et.al. (2001).

billion (sic) yen in individual income taxes was actually enforced in 1994, which it had been planned to terminate in the following year. Thus, the 1994 tax reduction was originally thought of as a single-year cut on an *ad hoc* basis.”²

Under this tax reduction program, in principle, 20 percent of total income tax paid between January and June was refunded in June (the upper limit was one million yen) and 20 percent of income tax paid between July and December was refunded in December 1994. The limitation to be refunded was two million yen as a whole. In addition, the local inhabitants' tax was reduced. The inhabitants' tax payment was suspended in June and July; between August 1994 and May 1995, the upper limit of 200,000 yen was reduced by 20 percent.³

As discussed below, this research focuses on investigating the response of worker's households whose tax payment is withheld at source. In Japan, monthly national income tax withholding is determined through the “withholding table” based on the number of dependants and taxable income of a household. Local inhabitant taxes are a fixed amount per month between June and May, based upon the previous year's annual income. Both tax payments are withheld by salary payers, and thus the amounts are exogenously determined.

IV. *Data Description and Tax Cut Calculation*

The data used in this study is the micro-level data from the Family Income and Expenditure Survey (FIES), conducted by the Ministry of Internal Affairs and Communications. This survey provides detailed information on income and expenditures for individual households as well as on characteristics of these households. The monthly consumption data is compiled from a diary. The survey covers approximately 8,000 households, which are representative at the national level. Approximately, 1,300-1,400 households enter the sample and the comparable number of households gets out of the sample. Single households and households employed in the agriculture or fishery industries are not surveyed.⁴ The sample consists of two broad categories: worker's households and other households.⁵ This study uses only worker's household information, which comprises more than half of the sample, because monthly information on receipts is only available for worker's households and the monthly pattern of income for worker's households is very different than that of other households due to the bonus system. Each month, the sample size of worker's households is over 5,000 out of a total of 8,000.

² Ishi (2001) continues: “[h]owever, as time passed, the original idea had been amended in view of the necessity of continued expansionary measures Against earlier expectation, it was decided that a part of the tax reduction (i.e. 3500 billion yen)(sic) should continue as a permanent measure in 1995. . . . The remaining portion of the original tax cut (2000 billion yen)(sic) was used as a temporary instrument and was postponed until 1996.”

³ Note that the inhabitants' tax payment is based upon the previous year's annual income (January to December). Inhabitants' tax from employment income is collected monthly in equal payments. Inhabitants' tax payment based on other sources of income (business income, rent, etc.) is in principal collected four times each year, in most cases, June, August, October and January, depending on the local government.

⁴ The FIES began to cover agriculture and fishery households in July 1999.

⁵ Worker's households in which the head of the household is employed as a clerk or wage earner in a public or private enterprise and a sub-sample of “other households,” referring to the self-employed and retired. The “other households” include individual proprietor's households, households which are part of other households, households whose heads are merchants, artisans, and administrators of unincorporated enterprises.

TABLE 1. SUMMARY STATISTICS

	Mean	S. D.
<i>March-August Panel (N=3,090)</i>		
Consumption (exc. Transfer or gift)	278,753	208,074
Durables	19,498	110,637
Semi-durables	36,370	49,676
Non-durables	113,648	42,859
Services	109,237	131,330
National Income Tax Cut Benefit ¹	30,432	37,933
Local Inhabitant Tax Cut Benefit ¹	22,756	76,974
Bonus	95,860	294,656
Bonus (June)	290,153	494,867
Monthly income ²	587,439	263,310
Age (household head)	44.3	10.1
Number of family members	3.7	1.2
<i>April-September Panel (N=2,908)</i>		
Consumption (exc. Transfer or gift)	273,167	230,544
Durables	18,924	130,304
Semi-durables	34,456	63,100
Non-durables	111,418	41,980
Services	108,369	134,827
National Income Tax Cut Benefit ¹	31,950	41,572
Local Inhabitant Tax Cut Benefit ¹	23,651	66,526
Bonus	92,007	293,118
Bonus (June)	322,036	500,252
Monthly income ²	584,132	259,281
Age (household head)	44.6	10.3
Number of family members	3.6	1.2

¹ The number represents June for the national tax cut and June or July for the local inhabitant tax cut.

² Pretax annual income/12.

Note: Unit of observation is a household. Consumption refers to average monthly consumption in yen, currently.

Each household is surveyed for six months, and one-sixth of the households are replaced by new households every month, making it possible to construct six-month panels. To improve the reliability of our estimates, a household is excluded if (1) the reported age of the household head decreases or increases by more than one year during the six months, or (2) the household's tenancy status changes from owner to renter (or vice-versa), because these changes are likely to be due to large shocks that may also have large effects on the household's consumption.⁶ Moreover, a household is excluded if the number of family members is greater than 10 because the consumption patterns of such large households should be different from that of smaller households.⁷

Moreover, we aggregate the different consumption items into four categories: durables, semi-durables, non-durables, and services. The summary statistics of the panels used in this paper can be seen in Table 1.

⁶ Hayashi (1986, 1997) also excludes a household if (3) total expenditure or disposable income increases or decreases by ten-fold or (4) for each of the four expenditure groups excluding durables, the amount exceeds one million yen. Hayashi reports that there was no observation meeting these criteria in his FY 1981 dataset.

⁷ The number of household by this criterion is very small.

The national income tax cut amounts for individual households are calculated as follows.

$$(A1) \text{ Tax cut amount} = \text{Tax6}^* - \text{Tax6} = 0.2 * (\text{Tax1} + \text{Tax2} + \text{Tax3} + \text{Tax4} + \text{Tax5} + \text{Tax6}^*)$$

where Tax1-Tax5 are tax payments each month between January and May, and Tax6* is tax payment in June without tax reduction, which is not available in the FIES.

Rearranging (A1), we obtain

$$(A2) \text{ Tax cut amount} = (0.2 * (\text{Tax1} + \text{Tax2} + \text{Tax3} + \text{Tax4} + \text{Tax5}) + \text{Tax6}) / 0.8 - \text{Tax6}$$

where all variables in the right hand side are available. If the calculated tax cut amount is greater than one million yen, it is set at one million yen.

In addition to calculating national income tax cuts, it is necessary to estimate the tax cuts of local inhabitants. The inhabitant's tax base is annual salary in the previous year and is effective from June. That is, the inhabitant's tax payment from January to May in year t is based on the annual salary in year $t-2$; after June is based on the annual salary in year $t-1$. Apparently, the FIES collected at year t lacks information in year $t-2$, so that inhabitant's tax cut amount had to be determined by information beyond that available in the FIES. We used the growth rate of annual wage data from the basic survey of wage structure⁸ by industry, age, sex, and firm size, matching with the head of the individual household.

In the following sections, we will use the panels of March to August and April to September to evaluate the effect of the 1994 tax cut. The panels used in this paper should cover June and July because the national income tax cut benefit was refunded in June and the local inhabitant tax benefit was implemented in June and July. Moreover, the panels should include August or September to evaluate the total effect of the tax cut because previous studies on Japanese tax cuts such as Hori, Hsieh, Murata and Shimizutani (2002), and Hori and Shimizutani (2002) demonstrate that the effect on impact is cancelled out in subsequent months.⁹ Since national income tax cut amounts are based on the total tax payment between January and June, the panels beginning in February or March lack data on tax payment in January and/or February. We calculated tax payments in these months as the average of tax payment in months with no bonus payment.

V. *Impact of the 1994 Tax Cut on Consumption*

We begin by using the six-month panels from the FIES to estimate whether consumption changes when consumers receive tax cuts. We will compare whether consumption of families with a larger tax cut amount increases by more than families with a smaller tax cut amount, controlling for the cross-sectional differences between similar families in other years.

The basic empirical specification employed to evaluate the effect of temporary tax cuts on consumption is the following linear Euler equation:

⁸ The Basic Survey of Wage Structure is compiled by the Ministry of Welfare and Labor.

⁹ The 1995 tax cut was announced in September 1994, but Hori, Hsieh, Murata and Shimizutani (2002) and Hori and Shimizutani (2002) demonstrated that consumers did not respond to the 1998 tax cut or the 1999 shopping coupons program when they were anticipated. However, this result might differ in the case of permanent cuts.

TABLE 2. IMPACT OF THE 1994 TAX CUTS ON TOTAL CONSUMPTION

Column	(1)	(2)	(3)	(4)
Panel	Mar.-Aug	Mar.-Aug.	Apr.-Sep.	Apr.-Sep.
Specification	(1)	(2)	(1)	(2)
$\frac{Taxcut_{h,t+1}}{Monthly\ Income_h}$	0.10 (0.17)	-0.09 (0.17)	0.11 (0.19)	-0.01 (0.19)
$\frac{Taxcut_{h,t}}{Monthly\ Income_h}$	-0.09 (0.20)	0.07 (0.20)	0.37* (0.21)	0.43** (0.22)
$\frac{Taxcut_{h,t-1}}{Monthly\ Income_h}$	-0.38* (0.22)	-0.29 (0.22)	-0.74** (0.23)	-0.77** (0.23)
$\frac{Taxcut_{h,t-2}}{Monthly\ Income_h}$			0.01 (0.25)	-0.07 (0.25)
Sum of the Coefficients on tax cut	-0.37 (0.24)	-0.30 (0.24)	-0.26 (0.28)	-0.41 (0.29)
Bonus (current, lagged)	No	Yes	No	Yes
Lags of Current Income	No	Yes	No	Yes
F test (Prob. > F)	2.01 (0.11)	0.66 (0.57)	4.60 (0.00)	4.91 (0.00)
R squared (adjusted)	0.03	0.02	0.03	0.05
s.e.e.	0.35	0.35	0.35	0.35
Number of Observation	15,133	15,133	14,238	14,238

Notes: Standard errors in parentheses. The dependent variable is change in the log of monthly total consumption except durables. The estimated elasticity to the tax cuts is the coefficient on tax cuts relative to monthly pre-tax income in the previous year. All regressions also include a quadratic in the age of the household head, number of family members, change in number of family members and month dummies. The sample period is 1990-1994. The null hypothesis for F test is all coefficients on tax cut relative to monthly income are zero.

$$\ln\left(\frac{C_{h,t+1}}{C_{h,t}}\right) = \sum_{n=0}^2 a_{1n} \cdot \left(\frac{Taxcut_{h,t+1-n}}{Monthly\ Income_{h,\tau-1}}\right) + Z_{h,t}' \cdot a_2 + Month_t' \cdot a_3 + \varepsilon_t \quad (1)$$

where h indexes households and t refers to the month. The dependent variable is the log of the ratio of monthly consumption in household h in month t . The main independent variable is

$\frac{TaxcutN_{h,t+1-n}}{Monthly\ Income_{h,\tau-1}}$, which is the value of sum of national income tax cuts in June or July

received by a household relative to the household's monthly income. $Monthly\ Income_{h,\tau-1}$ is calculated as the previous year's pretax income divided by 12. We include lags of both main independent variables to allow for the possibility that a household does not spend the tax cut benefit immediately. The monthly amount of tax cut is assumed to be exogenous and is calculated as described in the previous section. For years in which there was no tax cut, the

value of $\frac{TaxcutN_{h,t+1-n}}{Monthly\ Income_{h,\tau-1}}$ is zero. The coefficient on the main independent variable measures the elasticity of consumption to income due to the tax cuts. $Z_{h,t}$ is a vector of

TABLE 3-1. IMPACT OF THE 1994 TAX CUTS ON CONSUMPTION BY TYPE OF GOODS
(Specification (1))

Column	(1)	(2)	(3)	(4)	(5)	(6)
Panel	Mar.-Aug	Mar.-Aug	Mar.-Aug	Apr.-Sep	Apr.-Sep	Apr.-Sep
Dependent var.	Semi-durables	Non-durables	Services	Semi-durables	Non-durables	Services
$\frac{Taxcut_{h,t+1}}{Monthly\ Income_h}$	0.20 (0.58)	-0.09 (0.12)	0.14 (0.33)	0.22 (0.62)	-0.05 (0.13)	0.54 (0.35)
$\frac{Taxcut_{h,t}}{Monthly\ Income_h}$	-0.45 (0.68)	0.00 (0.14)	0.00 (0.39)	0.90 (0.71)	0.29 ** (0.15)	-0.23 (0.40)
$\frac{Taxcut_{h,t-1}}{Monthly\ Income_h}$	-0.60 (0.75)	-0.11 (0.15)	-0.50 (0.43)	-1.65 ** (0.76)	-0.33 ** (0.16)	-0.09 (0.43)
$\frac{Taxcut_{h,t-2}}{Monthly\ Income_h}$				0.51 (0.84)	-0.02 (0.17)	-0.52 (0.47)
Sum of the coefficients on tax cut	-0.86 (0.80)	-0.19 (0.16)	-0.36 (0.46)	-0.03 (0.94)	-0.11 (0.20)	-0.32 (0.53)
F test (Prob. > F)	0.83 (0.48)	0.48 (0.69)	0.74 (0.53)	1.67 (0.15)	2.17 (0.07)	1.28 (0.28)
R squared (adjusted)	0.02	0.02	0.01	0.02	0.03	0.01
s.e.e.	1.18	0.24	0.68	1.17	0.24	0.66
Number of Observation	14,574	15,216	15,089	13,770	14,324	14,203

Notes: Standard errors in parentheses. The dependent variable is change in the log of monthly consumption by type of goods. The estimated elasticity to the tax cuts is the coefficient on tax cuts relative to monthly pre-tax income in the previous year. All regressions also include a quadratic in the age of the household head, number of family members, change in number of family members, and month dummies, as well as bonus and current income relative to monthly income in the previous year. All regressions include control years. The sample period is 1990-1994.**indicates 5% level significance; *indicates 10% level. The null hypothesis for F test is all coefficients on tax cut relative to monthly income are zero.

household characteristics (a quadratic in the age of the household head, the number of family members and change in the number of family members). $Month_t$ is a vector of indicator variables for each month in each year. We excluded observations if the absolute change in monthly consumption exceeds the mean by more than three standard deviations.

As long as the main independent variables are orthogonal to other income shocks, the estimated a_{1n} are not affected. To address the possibility that omission of other income shocks as independent variables affected the estimates of a_{1n} , we also employed the following alternative specification.

$$\ln\left(\frac{C_{h,t+1}}{C_{h,t}}\right) = \sum_{n=0}^2 a_{1n} \cdot \left(\frac{Taxcut_{h,t+1-n}}{Monthly\ Income_{\tau-1}}\right) + a_2 \cdot \left(\frac{Bonus_{h,t+1}}{Monthly\ Income_{\tau-1}}\right) + \sum_{m=0}^3 a_{3m} \cdot \left(\frac{AdjIncome_{h,t-m}}{Monthly\ Income_{\tau-1}}\right) + Z_{h,t}' \cdot a_4 + Month_t' \cdot a_5 + \varepsilon_t \quad (2)$$

TABLE 3-2. IMPACT OF THE 1994 TAX CUTS ON CONSUMPTION BY TYPE OF GOODS
(Specification (2))

Column	(1)	(2)	(3)	(4)	(5)	(6)
Panel	Mar.-Aug	Mar.-Aug	Mar.-Aug	Apr.-Sep	Apr.-Sep	Apr.-Sep
Dependent var.	Semi-durables	Non-durables	Services	Semi-durables	Non-durables	Services
$\frac{Taxcut_{h,t+1}}{Monthly\ Income_h}$	-0.10 (0.59)	-0.14 (0.12)	-0.09 (0.33)	-0.10 (0.63)	-0.07 (0.13)	0.34 (0.35)
$\frac{Taxcut_{h,t}}{Monthly\ Income_h}$	-0.09 (0.68)	0.03 (0.14)	0.20 (0.39)	1.21 * (0.72)	0.32 ** (0.15)	-0.04 (0.41)
$\frac{Taxcut_{h,t-1}}{Monthly\ Income_h}$	-0.37 (0.76)	-0.03 (0.15)	-0.41 (0.43)	-1.71 ** (0.77)	-0.35 ** (0.16)	-0.24 (0.43)
$\frac{Taxcut_{h,t-2}}{Monthly\ Income_h}$				0.44 (0.86)	-0.04 (0.18)	-0.49 (0.48)
Sum of the coefficients on tax cut	-0.56 (0.81)	-0.14 (0.16)	-0.30 (0.46)	-0.16 (0.96)	-0.13 (0.20)	-0.43 (0.54)
F test (Prob. > F)	0.19 (0.91)	0.52 (0.67)	0.30 (0.82)	1.70 (0.15)	2.45 (0.04)	1.10 (0.36)
R squared (adjusted)	0.03	0.03	0.03	0.02	0.03	0.03
s.e.e.	1.17	0.24	0.68	1.17	0.24	0.65
Number of Observation	14,574	15,216	15,089	13,770	14,324	14,203

Notes: Standard errors in parentheses. The dependent variable is change in the log of monthly consumption by type of goods. The estimated elasticity to the tax cuts is the coefficient on tax cuts relative to monthly pre-tax income in the previous year. All regressions also include a quadratic in the age of the household head, number of family members, change in number of family members, and month dummies as well as bonus and current income relative to monthly income in the previous year. All regressions include control years. The sample period is 1990-1994.**indicates 5% level significance; *indicates 10% level. The null hypothesis for F test is all coefficients on tax cut relative to monthly income are zero.

where $\frac{Bonus_{h,t+1}}{Monthly\ Income_{h,\tau-1}}$ is the value of bonus received by a household relative to the household's monthly income. In Japan, summer bonuses are usually received in June.

$\frac{AdjIncome_{h,t-m}}{Monthly\ Income_{h,\tau-1}}$ is other income in each month, adjusted for any tax cuts and bonuses.

Lags are included to control for cyclical income movements other than tax cuts.¹⁰

We use specifications (1) and (2) to assess the 1994 tax cut as discussed above. The households in the sample between 1990 and 1993 are used as the control years to detect whether some specific shocks in 1994 are driving the results.

Table 2 reports the results of specifications (1) and (2). Focusing on the results based on the April-September panel, the coefficients are positive and significant for the one-month lag, but coefficients on the two-month lagged variables are negative and significant. These results

¹⁰ To avoid the simultaneity bias, we use one-month lagged $AdjIncome_{h,t-m}$ as an instrument variable. Since the value of a bonus is in general considered to reflect on the past business conditions of firms, there is no need to instrument for $bonus_{h,t+l}$.

TABLE 4-1. IMPACT OF THE 1994 TAX CUTS BY INCOME LEVELS (Specification (1))

Column	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel	Apr.-Sep	Apr.-Sep	Apr.-Sep	Apr.-Sep	Apr.-Sep	Apr.-Sep	Apr.-Sep	Apr.-Sep
INCOME	Above	Below	Above	Below	Above	Below	Above	Below
Dependent var.	Total	Total	Semi-durables	Semi-durables	Non-durables	Non-durables	Services	Services
$\frac{Taxcut_{h,t+1}}{Monthly\ Income_h}$	-0.00 (0.24)	0.24 (0.40)	-0.07 (0.74)	1.54 (1.42)	0.03 (0.15)	-0.54 * (0.30)	0.54 (0.43)	0.97 (0.76)
$\frac{Taxcut_{h,t}}{Monthly\ Income_h}$	0.48 * (0.27)	0.41 (0.45)	0.83 (0.86)	0.84 (1.59)	0.33 * (0.18)	0.74 ** (0.33)	-0.18 (0.50)	-0.75 (0.86)
$\frac{Taxcut_{h,t-1}}{Monthly\ Income_h}$	-0.97 ** (0.29)	-0.42 (0.48)	-1.58 * (0.92)	-2.97 * (1.69)	-0.40 ** (0.19)	-0.39 (0.35)	-0.49 (0.54)	1.17 (0.91)
$\frac{Taxcut_{h,t-2}}{Monthly\ Income_h}$	0.29 (0.33)	-0.51 (0.53)	0.86 (1.03)	2.18 (1.87)	-0.04 (0.21)	-0.05 (0.39)	-0.28 (0.61)	-1.53 (1.00)
Sum of the coefficients on tax cut	-0.20 (0.36)	-0.29 (0.63)	0.04 (1.12)	1.59 (2.20)	-0.08 (0.23)	-0.23 (0.46)	-0.41 (0.66)	-0.15 (1.19)
F test (Prob. > F)	3.53 (0.01)	1.26 (0.29)	0.81 (0.52)	1.38 (0.24)	2.54 (0.04)	1.62 (0.17)	1.26 (0.28)	0.92 (0.45)
R squared (adjusted)	0.03	0.03	0.02	0.01	0.02	0.03	0.01	0.02
s.e.e.	0.38	0.33	1.18	1.16	0.25	0.24	0.70	0.63
Number of Observation	5,958	8,280	5,846	7,924	6,022	8,302	5,955	8,248

Notes: Standard errors in parentheses. The panel from March to August is used. The dependent variable is change in the log of monthly consumption by type of goods. The estimated elasticity to the tax cuts is the coefficient on tax cuts relative to monthly pre-tax income in the previous year. All regressions also include a quadratic in the age of the household head, number of family members, change in number of family members, and month dummies, as well as bonus and current income relative to monthly income in the previous year. All regressions include control years. The sample period is 1990-1994. ** indicates 5% level significance; * indicates 10% level. The null hypothesis for F test is all coefficients on tax cut relative to monthly income are zero.

suggest that the 1994 tax cut stimulated consumption temporarily, but that the effect did not last for some months. These coefficients in columns (3) and (4) indicate that the estimated MPC on impact is 0.2.¹¹

To investigate the possibility that the tax cut did stimulate some specific type of goods and services, Tables 3-1 and 3-2 report the results by types of consumption. Table 3-1 shows the results of specification (1) on consumption disaggregated by type of goods and services and Table 3-2 reports those of specification (2). Both tables indicate that the coefficients for the one-month lag in non-durables are positive and significant, and that for the two-month lag is negative and comparable with the one-month lag. Since consumption of non-durables occupies 19 percent of monthly pre-tax income, the estimated coefficient reported in column (5) implies a marginal propensity to consume (MPC) is estimated to be 0.1 on impact, but it declines in subsequent months. Moreover, the coefficient in semi-durables for the one-month lag is

¹¹ Table 1 indicates that consumption occupies roughly 50 percent of pretax-monthly income.

TABLE 4-2. IMPACT OF THE 1994 TAX CUTS BY INCOME LEVELS (Specification (2))

Column	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel	Apr.-Sep	Apr.-Sep	Apr.-Sep	Apr.-Sep	Apr.-Sep	Apr.-Sep	Apr.-Sep	Apr.-Sep
INCOME	Above	Below	Above	Below	Above	Below	Above	Below
Dependent var.	Total	Total	Semi-durables	Semi-durables	Non-durables	Non-durables	Services	Services
$\frac{\text{Taxcut}_{h,t+1}}{\text{Monthly Income}_h}$	-0.06 (0.24)	-0.10 (0.40)	0.11 (0.77)	0.46 (1.41)	0.07 (0.16)	-0.65 ** (0.30)	0.29 (0.45)	0.64 (0.76)
$\frac{\text{Taxcut}_{h,t}}{\text{Monthly Income}_h}$	0.56 ** (0.28)	0.58 (0.45)	0.61 (0.89)	1.74 (1.60)	0.34 * (0.18)	0.82 ** (0.33)	0.25 (0.52)	-0.75 (0.86)
$\frac{\text{Taxcut}_{h,t-1}}{\text{Monthly Income}_h}$	-1.07 ** (0.31)	-0.32 (0.48)	-1.69 * (0.96)	-2.80 * (1.70)	-0.47 ** (0.20)	-0.34 (0.35)	-0.83 (0.57)	1.51 (0.90)
$\frac{\text{Taxcut}_{h,t-2}}{\text{Monthly Income}_h}$	0.26 (0.34)	-0.56 (0.53)	0.85 (1.06)	1.71 (1.89)	-0.05 (0.22)	-0.03 (0.39)	-0.15 (0.63)	-1.41 (1.01)
Sum of the coefficients on tax cut	-0.31 (0.37)	-0.39 (0.63)	-0.12 (1.17)	1.12 (2.22)	-0.11 (0.24)	-0.19 (0.46)	-0.44 (0.69)	-0.02 (1.19)
F test (Prob. > F)	4.02 (0.00)	1.09 (0.36)	0.90 (0.47)	0.92 (0.45)	3.26 (0.01)	1.99 (0.09)	1.33 (0.26)	0.86 (0.49)
R squared (adjusted)	0.04	0.05	0.02	0.02	0.02	0.04	0.03	0.04
s.e.e.	0.38	0.33	1.18	1.16	0.25	0.24	0.69	0.62
Number of Observation	5,958	8,280	5,846	7,924	6,022	8,302	5,955	8,248

Notes: Standard errors in parentheses. The panel from March to August is used. The dependent variable is change in the log of monthly consumption by type of goods. The estimated elasticity to the tax cuts is the coefficient on tax cuts relative to monthly pre-tax income in the previous year. All regressions also include a quadratic in the age of the household head, number of family members, change in number of family members, and month dummies, as well as bonus and current income relative to monthly income in the previous year. All regressions include control years. The sample period is 1990-1994. ** indicates 5% level significance; * indicates 10% level. The null hypothesis for F test is all coefficients on tax cut relative to monthly income are zero.

significantly positive in Table 3-2, though that is not significant in Table 3-1.¹² The coefficients in semi-durables for the two-month lag are negative and significant in both tables. As in the non-durable consumption, the effect on impact is substituted quickly.

Finally, we examine the impact of the 1994 tax cut by income levels to examine the working of liquidity constraints. We use the panel from April to September to cover the period after the implementation as long as possible. We divide the sample by the average of annual pre-tax income in the previous year. Tables 4-1 and 4-2 report that there is no clear tendency for households with lower income, which are likely to be liquidity constrained, and to have larger or more significant coefficients.

¹² Table 1 indicates that consumption of semi-durables occupies as small as 3 percent of pretax-monthly income.

In sum, our empirical findings indicate the 1994 tax cut stimulated services consumption with an MPC of 0.1-0.2, but that the effect was substituted immediately in subsequent months.¹³ These findings are roughly consistent with past studies on Japanese tax cuts in the 1990s. Hori, Hsieh, Murata and Shimizutani (2002) demonstrate that the 1999 shopping coupon program stimulated consumption of semi-durables with an MPC of 0.3-0.4 in the first month, but that the MPC falls to 0.1 over the next three or four months. Hori and Shimizutani (2002) demonstrate that the 1998 tax cut stimulated consumption of services with a comparable MPC and that it was substituted in the subsequent months.

VI. Conclusion

This paper explores the reaction of Japanese consumers to the 1994 tax cut, which was the first tax cut administered by the Japanese government in the 1990s. Micro-level data from the Family Income and Expenditure Survey (FIES) is used to evaluate the effect of the 1994 tax cut on consumption. Our estimates weakly suggest that tax cuts undertaken to stimulate the weak economy in 1994 had some effect on consumption of services or semi-durables. An MPC of 0.1-0.2 is estimated right after implementation, but the positive effect was substituted immediately in subsequent months. In other words, consumers reacted to the temporary tax cut but the effect was small and transitory. These findings are roughly consistent with the effect of the 1998 tax cut and the 1999 shopping coupon program.

An important topic for further research would be to evaluate the effect of permanent tax cuts, which were implemented in 1995 and 1999. Especially, a comparison with the 1994 and 1995 tax cut would be interesting because the total tax cut benefits for individual households were similar, but more than half of the 1995 tax cut was permanent. An empirical investigation on the effect of permanent tax cuts compared with temporary tax cuts will have strong implications for both policymakers and academic researchers.

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¹³ So far, we have analyzed the effect of the tax cut at implementation, not at anticipation. The tax cut was publicized in advance for all cases and a forward-looking household may have already adjusted its consumption in February as stipulated by the canonical model of consumption. The model implies that consumption should only change upon news of unexpected income changes and should not react to anticipated income changes. Hori, Hsieh, Murata and Shimizutani (2002) and Hori and Shimizutani (2002) demonstrate that consumers did not respond when the 1998 tax cut or the 1999 shopping coupons program was anticipated. It is difficult to apply the methodology adopted in these papers to the 1994 tax cut because the amount of that cut depended on actual tax payment, and it is difficult to estimate eligible amount for individual households when it was anticipated in February 1994. In the 1998 tax cut or 1999 shopping coupons program, the eligible amount was determined by demographic factors such as number of children under 15 (1999 coupon program) or family size (1998 tax cut).

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