Child Allowance Policy and Household Consumption Behavior in Japan

Huihui LI
Minae NIKI

May 2021

Discussion Paper No. 2114

GRADUATE SCHOOL OF ECONOMICS

KOBE UNIVERSITY

ROKKO, KOBE, JAPAN

Child Allowance Policy and Household Consumption Behavior in Japan

Huihui LI[1]

E-mail address: li@econ.kobe-u.ac.jp;

Graduate School of Economics, Kobe University 2-1, Rokkodai, Nada-Ku, Kobe 657-8501, Japan

Minae NIKI

E-mail address: minae.niki@people.kobe-u.ac.jp;

Graduate School of Economics, Kobe University 2-1, Rokkodai, Nada-Ku, Kobe 657-8501, Japan

[1] Corresponding author.

Abstract

We examine the labeling hypothesis of the child allowance system (CAS) on household expenditure in Japan in difference–in–difference approach. In 2010–2012, the CAS was extended to junior high school students and the amount increased for all ages. This allowed us to use a quasi-experimental research design to identify the impact of policy reform by eliminating confounding variations common to all families. Specifically, we clarify the effect of children's allowance on household consumption expenditure. The results show that (1) the treatment effect on expenditure for both child- and adult-related consumption on average is not significant, and (2) there are heterogeneous treatment effects: the CAS reform has a positive effect on supplements and recreational goods related to children's goods in the lowest quintile group of the income distribution. We conclude that the child allowance in Japan as a labeled transfer greatly increases the welfare of children, especially those from relatively low-income families.

Keywords: child allowance system, household expenditure, quasi-experimental research, labeling hypothesis, Japan

JEL: D13

1 Introduction

About one in seven children in Japan is living in poverty,[2] and alleviating child poverty is an essential issue. One meaningful remedy is government cash transfers targeting children or other household members. Among the Japanese government's cash transfer policies, the child allowance system (CAS; "Jidou Teate" in Japanese) drew significant attention from researchers. To improve children's welfare, the CAS was revised in 2010 to include junior high school students as eligible children for the first time since 1986. Indeed, the exogenously increased household income may change the distribution of household income, which in turn affects household consumption expenditure. Household consumption expenditure for a child's development is an essential component of human capital investment (Behrman & Knowles, 1976; Becker & Tomes, 1999). The rising inequality of household expenditure on children may largely contribute to the difference in children's physical development and educational outcomes (Chi & Qian, 2016; Gustafsson & Li, 2004), and subsequently, the associated rise in children's poverty and a generational cycle of poverty. Therefore, to clarify the efficiency of the revised CAS, this study explores whether the expansion of cash transfer targets impacts household consumption allocation.

Many countries implemented child subsidy policies to improve child welfare (Benhassine et al., 2015; Black et al., 2014), and there is extensive literature on the effect of cash transfer reform targeted at child development (Naoi et al., 2021; Fernald & Hidrobo, 2011; Ponce & Bedi 2010), maternal employment (Bessho, 2018; Havnes & Mogstad, 2011; Milligan & Stabile, 2009), parents' mental health (Takaku, 2015), child and family well-being

[2] *Summary Report of Comprehensive Survey of Living Conditions 2019* reports that the child poverty rate (child aged 17 and under) was 13.5% in 2018. (URL: https://www.mhlw.go.jp/english/database/db-hss/dl/report_gaikyo_2019.pdf)

(Baker et al., 2008), and birth rate (Milligan, 2005). However, the most direct impact of the cash transfer policy of child allowance is that it affects the source of household income. Therefore, before analyzing the above issues, it is crucial to study how cash transfers affect household income resource distribution.

Three hypotheses explain its nature: pooling (Becker, 1991), labeling (Edmonds, 2002; Hener, 2017; Kooreman, 2000), and flypaper (Jacoby, 2002; Sahn & Gerstle, 2004). The pooling hypothesis is a standard theory that explains the homogeneity between child allowance and other types of household income. Recipients of child allowance tend to confuse it with family income from other sources and maximize household utility under the budget constraint of the total family income, including the child allowance. In contrast, the labeling hypothesis states that the type of income affects its use, contradicting the principle of income fungibility (Barberis et al., 2006; Rabin & Weizsäcker, 2009). The flypaper hypothesis is similar to the labeling hypothesis; it transfers the "stick" to the child. Depending on which hypothesis is valid, the impact of child allowance on expenditures for children's development may differ.

As a labeled transfer, researchers verified the labeling effect of the child allowance. Sahn and Gerstle (2004) show that in Romania, child benefits increase child-related education and toy expenditure. For Germany, Hener (2017) estimated the impact of child benefits on child-assignable savings and concluded that child allowances affect housing savings plans by up to 6.6 percentage points and increase child-assignable education and toy expenditure, but have no effect on adult-assignable consumption. Kobayashi (2011) examined the effect of CAS on consumption patterns in Japan and concluded that child allowance benefits increase the demand for children's goods and nourishment while decreasing the demand for adult goods. However, for the UK, Blow et al. (2012) point out that the child benefit is spent on adult-assignable goods, with half of the child benefit marginal dollar being spent on alcohol expenditure. Unayama (2011) and Stephens and Unayama (2015) showed that most child allowances in Japan are not spent, but saved. The empirical literature on the effect of child allowance on consumption expenditure produced ambiguous results.

Our study differs from previous studies in two ways. First, it focuses on the impact of cash transfers on junior high school students' consumption expenditures, a group that rarely received attention in previous studies. Second, it presents new evidence that supports the labeling effects, specifically in Japan, as literature on labeling effects in Japan is lacking. In particular, we focus on the CAS reform from 2010 to 2012, which included junior high school students as children eligible to receive the child allowance, and provide new evidence on the effects of child allowance policy reforms on different expenditure patterns by distinguishing between child- and adult-related consumption expenditures. In the analysis, we use microdata from the 2009 and 2014 Japan National Survey of Family Income and Expenditure (NSFIE), a nationally representative and large-sized survey for household consumption in Japan. This allows us to use a quasi-experimental research design to identify the impact of policy reform by eliminating confounding variations common to all families.

We exploit the cross-eligible group variation in the rollout of the CAS reform and apply a difference-in-differences (DID) strategy to identify the causal effects of the CAS reform. The major findings from the analysis

are as follows. First, the treatment effect on expenditure for both child- and adult-related consumption on average is not significant. Second, there are heterogeneous treatment effects such that the CAS reform has a positive effect on supplements and recreational goods related to children's goods in the lowest quintile group of the income distribution. The results are robust to several tests. Thus, we conclude that the child allowance in Japan as a labeled transfer greatly increases the welfare of children, especially those from relatively low-income families.

2 Child Allowance Policy Reform

This section presents a brief history and overview of Japan's CAS, a cash subsidy policy aimed at children. The allowance is paid to the person who takes care of the eligible child. Under normal circumstances, the recipient is the eligible child's parent who earns a higher wage. The policy was reformed over time in terms of its purpose, restrictions on policy payment features including the child's age, the number of children, the amount of child allowance, and the recipient's income.

Japan's CAS began in 1971. Families with at least three children were eligible for the benefits. If the third and subsequent children were under 15 years of age, the family could receive benefits. In the 1970s, as a result of policy reform, the payment amount increased from 3,000 yen to 5,000 yen per month. At this stage, the goal was a redistribution policy that subsidized low-income families with many children.

In 1986, the CAS was amended again. The age limit was changed from 15 to 6 years. Moreover, in addition to the third and subsequent children, the second child also became eligible to receive the benefit at 2,500 yen per child per month. In 1992, eligibility was extended to all children in the family. However, the age of the children was limited to below three years. The first and second children received 5,000 yen per month, while the third and subsequent children received 10,000 yen per month. Although the age limit for eligible children continued to reduce the beneficiaries of the CAS, it expanded to cover more younger parents. Therefore, at this stage, the CAS was considered a means of income redistribution between generations.

Since 2000, the CAS was reformed several more times to address the falling birth rate and ease the economic burden of childcare. From 2000 to 2007, the CAS was reformed four times, and the age limit for eligible children was relaxed from 3 to 12 years, covering all children from birth to graduation from elementary school. In 2007, children below 12 years from all families were eligible for the benefits. The first and second children could receive 5,000 yen per month,[3] and the third and subsequent children 10,000 yen per month. Income limitations also gradually relaxed.

From 2010 to 2012, the CAS was reformed twice. During this period, the Democratic Party of Japan came to power and the CAS was renamed "Kodomo Teate" in Japanese.[4] The first reform in this period was in 2010, which increased the age limit to 15 years (junior high school graduates), increased the benefit to 13,000 yen per month for all children meeting the age limit, and removed the income limitation. The second revision was in 2012.

[3] If the first and second children are aged 0–3 years, they could receive 10,000 yen per month.
[4] On April 1, 2012, the policy was changed back to its original name, "Japan Child Allowance."

At this stage, the CAS aimed to support the healthy growth of children. The recipient receives the annual child benefit in three installments: February, June, and October. The allowance amount was revised to 15,000 yen per month for children below three years, 10,000 yen per month for children aged 3–12 years (elementary school graduates), 15,000 yen per month for children aged 3–12 years (if they were the third-born or later), and 10,000 yen per month for junior high school students. Additionally, the Liberal Democratic Party (see Appendix 1) reintroduced the income cap. The benefit was 5,000 yen per month per child for households with income above the upper limit (called "Special Interim Allowances").

The change between 2010 and 2012 allows us to conduct a quasi-experiment to test whether CAS supports the labeling hypothesis. Fig. 1 shows the total amount of child benefit received by eligible children under 15 years of age in 2009 and 2014 (Figs. 1a and 1b show the total amount received by the first/second child and the third child, respectively at the two time points). As shown in Fig. 1, the new CAS in 2014, after the reform, offered substantially higher benefits than the old CAS in 2009 before the reform. The most significant increases in benefits were for junior high school students aged 13–15 years: compared with the CAS amount in 2009, in 2014, the allowances of 13-, 14-, and 15-year-old first- and second-born junior high school students were increased by 576, 816, and 1,056 thousand yen, respectively; for third-born children, the allowances were increased by 696, 1,116, and 1,536 thousand yen, respectively. Increase in child allowance generally leads to an exogenous increase in household income. To determine whether the pattern of expenditure changed, we focus on the child- and adult-related spending categories within the family.

Fig. 1a Total amount of child allowance: first/second child

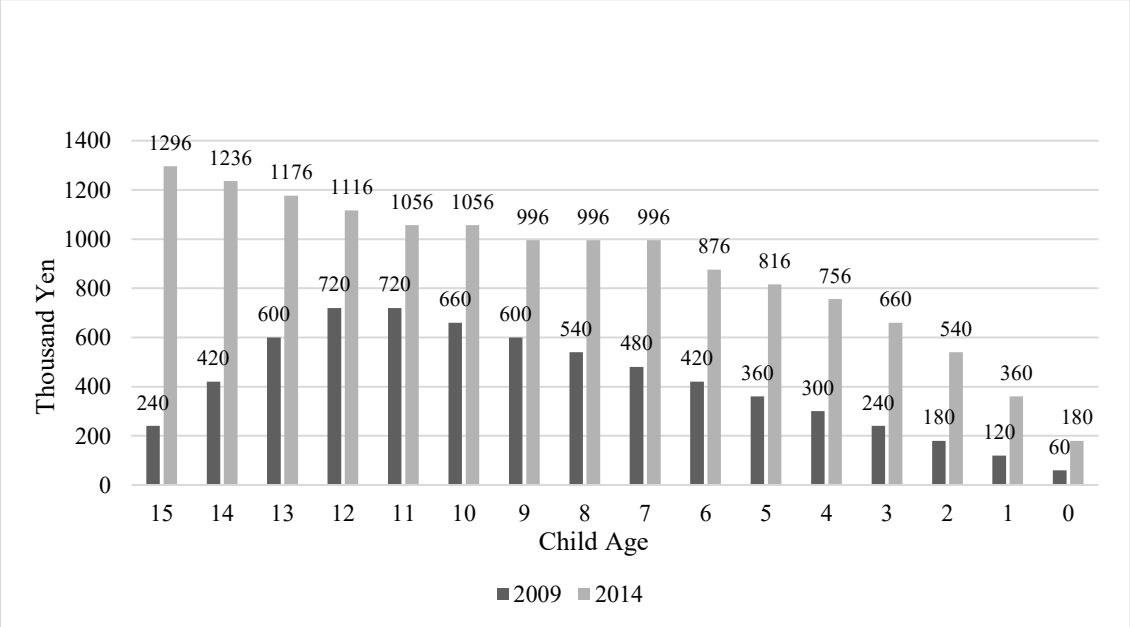
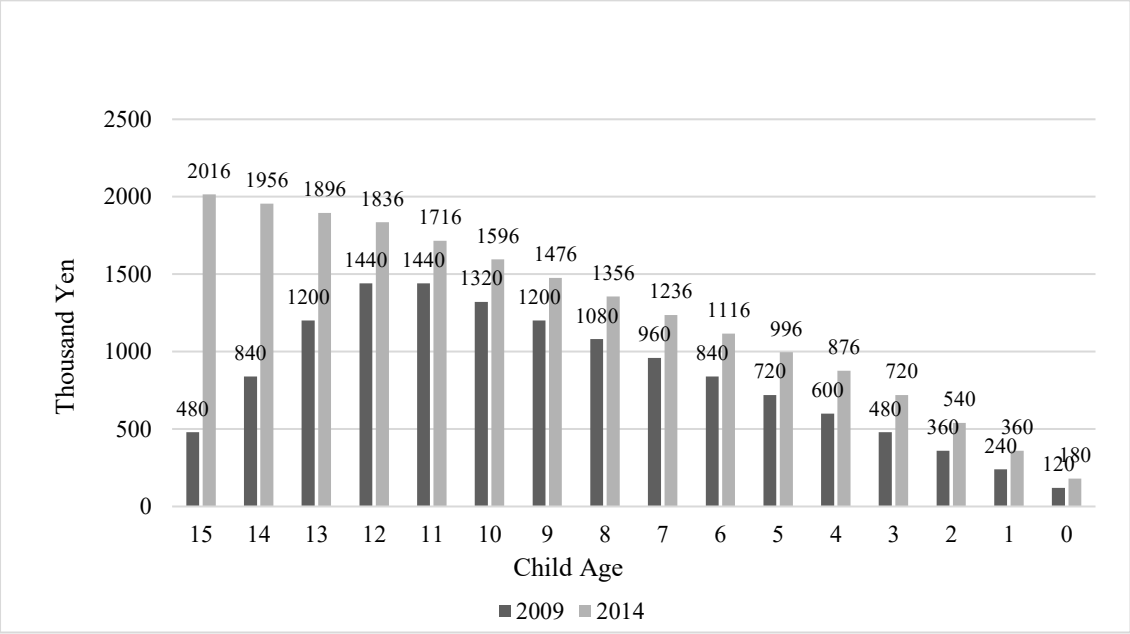


Fig. 1b Total amount of child allowance: third child



3 Estimation Approach and Data

3.1 Estimation Strategy

The CAS policy changed greatly since its introduction. Nevertheless, allowances are still paid to recipients (e.g., parents) of eligible children. Before evaluating whether the CAS achieved its policy objectives, we must assess whether the child allowance has a labeling effect.

The CAS reform implemented between 2010 and 2012 expanded the beneficiary group to junior high school students. According to the Survey on the Use of Child Allowance in 2012, 1.8% of the recipients used child allowance for "adult and entertainment expenses," while most spent it on "children's education (including the "Intended use" answer)" (44.2%), which shows that it reduced the relative cost of childcare to some extent by increasing the disposable income of eligible households. Therefore, the labeling effect is tested by evaluating the impact on household consumption expenditure for households with junior high school students. We identify the causal effect of child labeling on expenditures by comparing treated and controlled families, as described below. The treatment group included children from families with only junior high school students. The control group consisted of children from families with only children under elementary school (including elementary school students). In a DID model (Hener, 2017), the control group depicts a counterfactual indicating how the treatment group would evolve in the absence of a treatment.

We consider a DID framework in which the effect of a treatment is calculated by depicting the average difference over time between the treatment and control groups. The effect of treatment on the outcome can be considered δ in Equation (1).

$$\delta = \{E(Exp_{it}|Treated_i = 1, After_t = 1) - E(Exp_{it}|Treated_i = 0, After_t = 1)\} - \{E(Exp_{it}|Treated_i = 1, After_t = 0) - E(Exp_{it}|Treated_i = 0, After_t = 0)\}, \quad (1)$$

where Exp_{it} is the outcome variable (child- and adult-related consumption expenditures) of family *i* in period *t*, and $E(\cdot)$ is the expected conditional average value of Exp_{it}. Let $Treated_i$ be a treatment indicator that takes the value "one" for families with only junior high school students (treatment group) and "zero" for families in which school-age children are below junior high school (control group). The period before the reform refers to 2009 ($After_t = 0$), and the period after the reform refers to 2014 ($After_t = 1$).

3.2 Data[5] and Sample Restrictions

The data used in this study were adopted from the NSFIE, conducted every five years since 1959 by the Statistics Bureau of Japan, the Ministry of Internal Affairs and Communication. The NSFIE has detailed information on income, consumption, and assets at the household level for multiple regions. Its data include family income and expenditure, dwelling house and land owned, status of major durable goods, and total amount of savings and liabilities. The surveyed households are divided into two-or-more-person households and one-person households. The survey period is three months (September–November) for two-or-more-person households and two months (October–November) for one-person households. The NSFIE is designed to sample approximately 57,000 households (including 4,400 one-person households).

As the CAS reform period is 2010–2012, we use the NSFIE period 2009 (the 11th survey) for two-or-more-person households[6], representing the pre-reform period, and 2014 (the 12th survey) for two-or-more-person households, representing the post-reform period. From this large-scale survey, we obtain a large sample of household average spending, including parents' and children's expenditure information. The only shortcoming of the NSFIE is that it collects household expenditure information instead of individual household expenditure information.

We restrict our sample to families with at least one child below 15 years old and those with no children over 16 years old to ensure that all children are eligible to receive child allowance during the policy evaluation. To make the families in the sample more comparable, we exclude households with high school students. The quasi-experimental research framework is designed based on the inclusion of junior high school students aged 13–15 years in the eligibility criterion, so we exclude families with elementary students aged 13 years or junior high school students aged 16 years. As shown in Appendix 1, we exclude samples with parents earning incomes more

[5] The results of this study are from the original analysis conducted by the authors based on data from the *Japan National Survey of Family Income and Expenditure*, and are different from the statistical data information created and released by the Statistics Bureau of the Ministry of Internal Affairs and Communications.

[6] In cleaning up the data for the analysis, we refer to the Kobe University Workshop on Anonymous Data Use. See NIKI (2014), URL: http://www.econ.kobe-u.ac.jp/kuma/satellite/pdf/308.pdf

than the income cap. Additionally, we limit the sample to households with married couples to minimize heterogeneity in household expenditure decisions. The sample is also restricted to fathers aged 18–59 years and working fathers. We only analyze samples from nuclear families that do not include grandparents. Finally, we exclude families that suffered from natural disasters in the past five years because such events are more likely to cause family deficits.

3.3 Empirical Model

Equation (2) is an empirical model based on the identification strategy of Equation 1.

$$Exp_{it} = \alpha + \delta(Treated_i \times After_t) + \partial Treated_i + \gamma After_t + \boldsymbol{X_{it}\eta} + \varepsilon_{it}, \quad (2)$$

where Exp_{it} denotes monthly expenditures by household *i* in year *t*. Table 1 describes the expenditure categories in the NSFIE. The outcome variable, Exp_{it}, refers to three child-related and three adult-related consumption expenditures. The labeling hypothesis predicts that as junior high school students begin receiving child allowances after the CAS reform, children's consumption expenditures increase, but adults' consumption expenditures do not increase; therefore, we focus on expenditures related to children. Child-related consumption expenditures include "supplements" (e.g., school textbooks and reference books for studying and tutorial fees; Kubota, 2016), "lesson fees" (e.g., other educational, cultural, sporting, language, music, and private lesson fees), and "recreational goods" (e.g., musical instruments[7], desks and chairs for students and office workers, and durable and non-durable stationery). However, because the data on expenditure are at the household level (not at the individual level), there may be an upward bias when interpreting the impact on children's expenditures. Adult-related consumption expenditures include "alcohol and tobacco," "social expenses" (e.g., monetary gifts and other social expenses), and "luxury goods" (e.g., accessories, wristwatches, other personal effects, services related to personal effects, religious contributions, family altar and gravestones, wedding expenses, funeral expenses, and other ceremonial expenses; Hener, 2017). We also analyze the effect on the child- and adult-related expenditures combined. We also estimate the impact of the CAS reforms on household food expenditure (Kubota, 2016) and fuel, light, and water expenditures, which we use as a placebo outcome. α is the outcome of the pre-reform expenditure for each category. δ is the coefficient of the interaction term of $Treated_i$ and $After_t$, which indicates the average treatment effect on the treated. ∂ denotes the difference between the treatment and control groups, and γ is the common time trend.

Although the DID framework can eliminate common confounding variations between families with and without children in junior high school, changes in household characteristics over time would affect the control and treatment groups. Other variables related to each expenditure category also vary between the pre- and post-

[7] The expenditure on musical instruments does not seem to be a child-related expense, but Hener (2017) argued that the educational value of musical instruments could benefit children.

Table 1 Classifications of expenditures in the NSIE

Variables	*Classification: "The NSIE classification name" [code]*	*Including*
Total of child-assignable expenses	Supplement [780; 790−792]	School textbooks and reference books for study; tutorial fees
	Lesson fees [870−872; 874−876; 879]	Lesson fees (other educational, other cultural, sporting, language, music); other private lesson fees
	Recreation goods [806, 807, 820, 821]	Musical Instruments, desks and chairs for students and office workers, stationery durables, stationery non-durables
Total of adult-assignable expenses	Alcohol and tobacco [3X1~3X9, 3XX, 940]	"Sake"; "shochu", distilled spirits; beer; whiskey; wine; low-malt beer and beer-flavored alcoholic beverages; "chu-hi", liquor with soda and fruit, cocktail; other alcoholic beverages; tobacco
	Social expenses [970-973]	Money gifts; other social expenses
	Luxury goods [928, 930, 932, 935, 950, 955~958]	Accessories; wrist watches; other personal effects; related services to personal effects; religious contribution; family altar and gravestones; wedding expenses; funeral expenses; other ceremonials
Food	Food [102～398, 39X, 39Y]	Cereals; fish and shellfish; meat; dairy products and eggs; vegetables and seaweeds; fruits; oils, fats and condiments; cakes and candies; cooked food; beverages; alcoholic beverages; eating out; school lunch; charges for board

reform periods. Therefore, we control for the observable household characteristics of household *i* in year *t* using $\boldsymbol{X_{it}}$. $\boldsymbol{X_{it}}$, which includes the husband's age, wife's age, the dummy for the homeowner, the dummy for household debt, gender of the household head, and number of children for each age interval. We control for the husband's and wife's ages to minimize the heterogeneity of parents' ages on consumption patterns over the life cycle (Hener, 2017). We also control for family size, dummy for house ownership, dummy for household debt, and gender of the household head because they may be related to household consumption patterns. Additionally, we control the number of children in each age group, namely, 3-year-olds and below, 3–5 years old, 6–12 years old, and 13–15 years old. The dummy for the breadwinner(s) fixed effect is a control variable. ε_{it} is an independent and identically distributed error term.

3.5 Descriptive Statistics

The summary statistics of the baseline results on the means of the variables are provided in Table 2. Columns (1)–(3) and (4)–(6) present the means of the variables before and after the CAS reform, respectively. Columns (1) and (4) are the treatment groups, and Columns (2) and (5) are the control groups. Column (7) shows the means of DID, obtained by subtracting the means in Column (3) from the means in Column (6).

Table 2 shows that total child-related expenditure for households with only junior high school students was 20,305 yen in 2009 (Column 1), which was 10,915 yen more than that for households without junior high school students (Column 3). For the child-related expenditure, supplement expenses were larger for households only with junior high school students than for those without junior high school students in 2009 and 2014, while the difference between before and after the CAS reform was a negative value (-1,183 yen). Lesson expenses were lower for households with only junior high school students than for those without junior high school students in 2009 and 2014; the difference between before and after the CAS reform was negative (-169 yen). Recreation goods expense showed the same result as lesson expenses, but the average value of the difference was -36 yen. The difference in supplement expenses, which is the largest among the three categories of child-related expenses, requires special attention. Table 2 also reports the means of adult-related expenses for each category, which shows that alcohol and tobacco expenses decreased after the reform, from 4,328 to 3,969 yen in the treatment group, whereas it decreased from 3,648 to 3,393 yen in the control group, suggesting a negative treatment effect (-105 yen). Results for social and luxury expenses also indicate a negative treatment effect by the CAS reform (-1,727 for social expenses and -213 for luxury expenses). The summary statistics for food as a placebo outcome in Table 2 indicate that food expenditure increased in the treatment group from 74,367 to 75,181 yen, whereas it increased from 62,083 to 66,010 yen in the control group, suggesting a negative treatment effect (-3,112 yen).

Table 2 Descriptive statistics: Baseline results

	2009 (Before)			2014 (After)			
	Treatment group (1)	Control group (2)	(1)–(2) (3)	Treatment group (4)	Control group (5)	(4)–(5) (6)	(6)–(3) (7)
Observation size	465	7312		486	6236		
Food	74367.100	62083.140	12283.960	75181.150	66009.640	9171.510	-3112.450
	(24678.900)	(23353.320)		(26506.930)	(24644.000)		
Child-assignable consumption expenditures							
Supplement	16410.590	2421.156	13989.434	14987.510	2180.901	12806.609	-1182.825
	(21047.690)	(8367.481)		(20342.590)	(7548.697)		
Lesson	3186.183	5954.992	-2768.809	3124.992	6062.975	-2937.983	-169.174
	(7126.291)	(8981.827)		(6165.500)	(9054.481)		
Recreation goods	708.484	1013.829	-305.345	832.024	1173.148	-341.125	-35.779
	(1014.293)	(3488.336)		(1158.744)	(4712.963)		
Adult-assignable consumption expenditures							
Alcohol and tobacco	4328.468	3648.193	680.275	3968.596	3393.133	575.463	-104.812
	(5683.371)	(5161.577)		(6898.102)	(5226.437)		
Social	11067.270	9820.357	1246.913	8195.253	8675.656	-480.403	-1727.316
	(13148.710)	(23078.120)		(12318.530)	(11518.220)		
Luxury goods	1350.747	1669.796	-319.049	1060.957	1593.317	-532.360	-213.311
	(4896.838)	(22677.440)		(2842.988)	(13333.390)		

Table 2 shows the use of the simplest DID analysis, which calculates the difference between the mean value of the treatment group and that of the control group, and concludes that the mean value of the treatment effect in each category was negative. However, the average value does not reflect the causal effects of policy reform. Therefore, we use econometric analysis by controlling for other variables to verify the average treatment effect of the CAS reform.

4 Results

This section reports the baseline results and verifies their robustness. The reported values of child- and adult-related consumption expenditures are nonnegative, with a substantial number of observations massed at zero. To obtain unbiased and consistent estimates, this study uses Tobit models instead of ordinary least squares estimation to estimate equations with censored dependent variables (Tobin, 1958). We report the coefficients and marginal effects on the expected value of the censored outcome. The reported values of food consumption expenditures do not have the above situation, so we use an ordinary least squares estimation for its empirical equation.

4.1 Baseline Results

Table 3 reports the baseline results of the DID estimations on child- and adult-related expenditures. The coefficient estimates, bootstrapped standard errors (parenthesized values), and average marginal effect (italics) of the Tobit models are reported in Table 3. Columns (1)–(3) and Columns (4)–(9) list the results for the effect of the CAS reform on child- and adult-related consumption expenditures, respectively. All estimations include control variables of household characteristics.

The main parameter of interest is the coefficient of the treatment effect (δ). The results in Table 3 show that the 2010–2012 CAS reform has a positive effect on each child-assignable consumption expenditure category (supplement expenditures, lesson expenditures, and recreational goods expenditures). Although the results are not statistically significant, they show that the reforms increase each category's consumption expenditure. For adult-related expenditures, we find that treatment effects are statistically significant only in adults' luxury goods expenditures. The marginal effect of the treatment effects on adults' luxury goods expenditures is -718.918, signifying that the expenditure on supplements decreased by an average of 719 yen per month after the CAS reform.

The baseline results suggest that the 2010–2012 CAS reform positively affected the supplement, lesson, and recreational goods consumption expenditure for children but was not statistically significant. This finding is consistent with González (2013), who used a regression discontinuity design to confirm that Spanish families eligible for universal child benefit (one- time subsidy) did not change their consumption pattern. Moreover, Stephens and Unayama (2015) pointed out that most child allowances are saved from the perspective of household wealth accumulation, but such research is beyond the scope of our study.

However, considering that each family faces different liquidity constraints that result in different consumer responses to the CAS reform, we discuss this in Section 4.3.

4.2 Robustness checks: Validity of the DID Strategy

The DID identification strategy assumes that no other shocks affected the consumption expenditures that occurred simultaneously with the CAS reform. Therefore, similar to previous studies using the DID model, we perform placebo tests to support our baseline results (Kubota, 2016). Considering the stability of daily food consumption expenditures, we use a placebo test on "food" expenditures to test the robustness of the DID estimation results (Kubota, 2016). Again, "food" refers to the total expenditure on drinking and eating. Column (7) of Tables 3–5 reports the results of the treatment effect on food consumption expenditure. Similar to Kubota (2016), we find that the result for food expenditure is not statistically significant, suggesting that the reform did not affect food consumption expenditure, as expected. In addition, we performed a placebo test on the fuel, light, and water expenditure, and the results, similar to food expenditure, are not statistically significant[8].

Because our empirical strategy uses only external factors of policy changes, we also focus on several dimensions (i.e., regional confounding factors and household income) to perform a robustness check (Hener, 2017; Tang et al., 2016). We rerun the baseline model of the DID estimates, considering the impact of simultaneous shocks that may confound the results. The CAS is implemented nationwide based on the law, but, in addition, local governments provide various allowances for childcare, and benefits vary greatly by municipality. For example, Fukushima City implements the "childcare household support allowance," which provides parents with children registered as residents of Fukushima city 10,000 yen per child per year until the child graduates from junior high school. If the local government introduced its own childcare subsidies around the time of the CAS reform, estimators might be biased without controlled confounding factors in our estimation of the treatment effect. Unmeasured factors may also influence the consumption expenditures of children and adults. Therefore, we further add controls for the prefecture of residence-fixed effects (reference: Hokkaido) and the city group of residence-fixed effects (reference: major cities) in Equation (2), and re-estimate the empirical model in our regressions. Table 4 reports the results when controlling the regional fixed effect. Coefficients are mostly the same as in Table 3, but the result for luxury goods expenditures loses its significance. Table 4 shows that the baseline results are robust.

Then, we test the robustness related to household income. The increase in child allowances increases household income (inclusive of child allowances), thereby triggering the income effect and reducing labor supply (González 2013). Thus, the implementation of the 2010–2012 CAS reform may

[8] The detailed coefficient estimates are available upon request.

Table 3 Baseline results: Effects of the reform on household expenditures

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Child-assignable consumption expenditures			Adult-assignable consumption expenditures			
	Supplement	Lesson	Recreation goods	Alcohol and tobacco	Social	Luxury goods	Food
Effect	693.168	601.839	138.773	-97.577	-1,271.153	-1,767.382*	-1,388.637
	(1,733.067)	(985.442)	(131.646)	(475.573)	(1,109.255)	(1,048.947)	(1,659.627)
	181.293	*312.071*	*79.659*	*-66.847*	*-812.983*	*-718.918**	
Treatment	7,332.222***	-9,628.684***	-560.854***	872.878	-84.536	424.471	1,361.741
	(1,991.758)	(1,088.865)	(154.982)	(623.911)	(1,355.618)	(1,136.472)	(2,011.072)
	*1,917.691****	*-4,992.751****	*-321.944****	*597.985*	*-54.066*	*172.662*	
After	-2,810.184***	-789.969***	142.804*	-426.323***	-2,519.713***	1,252.214***	2,325.704***
	(459.637)	(235.290)	(75.914)	(106.982)	(679.982)	(398.160)	(389.441)
	*-734.984****	*-409.622****	*81.973**	*-292.063****	*-1,611.516****	*509.363****	
Constant	-62,027.556***	-31,586.385***	-1,608.080***	3,495.656**	-8,932.042*	-7,162.741**	553.276
	(4,819.241)	(2,491.830)	(353.827)	(1,461.274)	(5,076.820)	(3,201.113)	(3,716.359)
Observations	14,499	14,499	14,499	14,499	14,499	14,499	14,499
R-squared							0.157
F	69.65	191.17	8.7	13.56	15.22	2.14	177.97
Pseudo R2	0.0315	0.0227	0.0009	0.0008	0.0004	0.0001	
Hh. income controls	No	No	No	No	No	No	No
Add. controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region controls	No	No	No	No	No	No	No

NOTE: * Significant at the 1% level; ** Significant at the 5% level; *** Significant at the 10% level

Table 4 Robustness checks: Effects of the reform on household expenditures with controls for confounding factors

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Child-assignable consumption expenditures			Adult-assignable consumption expenditures			Food
	Supplement	Lesson	Recreation goods	Alcohol and tobacco	Social	Luxury goods	
Effect	719.355	622.333	140.858	-34.086	-1,178.070	-1,592.914	-1,167.382
	(1,704.023)	(977.415)	(134.054)	(475.221)	(1,099.470)	(1,036.816)	(1,650.514)
	188.380	*323.162*	*80.842*	*-23.345*	*-753.358*	*-647.509*	
Treatment	7,721.434***	-9,101.285***	-535.590***	721.528	59.221	679.497	1,821.985
	(1,959.455)	(1,078.821)	(159.183)	(625.134)	(1,322.450)	(1,136.964)	(2,001.537)
	*2,022.038***	*-4,726.073***	*-307.388***	*494.164*	*37.871*	*276.211*	
After	-2,981.540***	-881.418***	133.552*	-422.262***	-2,593.360***	1,209.608***	2,185.126***
	(459.981)	(232.290)	(74.211)	(106.576)	(700.366)	(395.687)	(387.338)
	*-780.786***	*-457.699***	*76.649**	*-289.201***	*-1,658.415***	*491.698***	
Constant	-60,143.145***	-33,036.609***	-1,447.022***	5,002.377***	-9,911.515*	-7,718.397**	1,192.297
	(4,909.864)	(2,597.230)	(382.612)	(1,494.066)	(5,739.710)	(3,225.663)	(3,815.854)
Observations	14,499	14,499	14,499	14,499	14,499	14,499	14,499
R-squared							0.177
F	18.05	48.15	4.16	5.81	5.02	0.99	47.51
Pseudo R2	0.0335	0.0248	0.0011	0.0017	0.0008	0.0004	
Hh. income controls	No	No	No	No	No	No	No
Add. controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes

NOTE: * Significant at the 1% level; ** Significant at the 5% level; *** Significant at the 10% level

Table 5 Robustness checks: Effects of the reform on household expenditures using additional controls

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Child-assignable consumption expenditures			Adult-assignable consumption expenditures			
	Supplement	Lesson	Recreation goods	Alcohol and tobacco	Social	Luxury goods	Food
Effect	565.910	702.096	130.887	-91.869	-1,217.441	-1,595.178	-1,267.151
	(1,677.800)	(966.443)	(134.520)	(480.903)	(1,091.372)	(1,063.797)	(1,563.145)
	147.767	*365.149*	*75.113*	*-62.926*	*-777.354*	*-648.617*	
Treatment	-55,322.482***	19,280.594**	412.843	6,119.362	-3,652.208	1,903.544	-382.718
	(14,052.455)	(8,806.722)	(1,225.095)	(4,515.410)	(11,832.184)	(9,593.325)	(13,673.264)
	*-14,445.484***	*10,027.526***	*236.920*	*4,191.466*	*-2,331.988*	*774.001*	
After	-2,969.965***	-849.657***	124.374*	-432.879***	-2,618.505***	1,217.245***	2,222.705***
	(460.195)	(228.415)	(75.251)	(107.959)	(718.355)	(404.403)	(374.620)
	*-775.500***	*-441.893***	*71.375**	*-296.501***	*-1,671.954***	*494.945***	
Log of Hh.	6,714.206***	8,311.402***	662.923***	343.729**	11,291.676***	3,268.817***	19,039.043***
Income	(703.125)	(365.069)	(106.049)	(163.407)	(1,459.381)	(1,268.396)	(599.481)
	*1,753.174***	*4,322.626***	*380.435***	*235.437**	*7,209.900***	*1,329.136***	
Treatment *	9,756.816***	-4,359.964***	-140.719	-829.715	592.205	-203.461	439.560
income	(2,168.721)	(1,376.569)	(189.158)	(675.857)	(1,830.196)	(1,481.314)	(2,115.435)
	*2,547.643***	*-2,267.547***	*-80.755*	*-568.314*	*378.132*	*-82.729*	
Constant	-86,253.880***	-70,423.439***	-4,373.672***	3,362.525**	-58,454.393***	-22,479.502***	-79,996.855***
	(6,085.750)	(3,539.853)	(697.497)	(1,685.979)	(11,630.900)	(7,727.277)	(5,350.793)
Observations	14,109	14,109	14,109	14,109	14,109	14,109	14,109
R-squared							0.250
F	17.48	49.12	4.03	5.6	12.52	1.14	64.49
Pseudo R2	0.0352	0.0285	0.0013	0.0017	0.0026	0.0005	
Hh. income controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Add. controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes

NOTE: * Significant at the 1% level; ** Significant at the 5% level; *** Significant at the 10% level

reduce the positive impact of the treatment effect. Therefore, to accurately explain the labeling effect caused by the CAS reform (Hener, 2017), as shown in Equation (3), we further control for household income ($HhInc_{it}$) and the interaction terms between logarithmic income and the treatment ($HhInc_{it} \times Treated_i$).

$$Exp_{it} = \alpha + \delta(Treated_i \times After_t) + \partial Treated_i + \gamma After_t + \rho HhInc_{it} + \theta(HhInc_{it} \times Treated_i) + \boldsymbol{Z_{it}\eta} + \tau Region_{it} + \varepsilon_{it} \quad (3)$$

Table 5 presents the results of the treatment effect estimated by increasing the other controls for household income. The coefficients are mostly the same as in Table 3 and are never statistically significant. Families with junior high school students who received child allowances did not increase their expenditure on average.

4.3 Income Heterogeneous Effects of the CAS Reform

We analyze the heterogeneity in the effects of CAS reform on consumption expenditures across households with different income groups to improve our understanding of households' consumption behavior. Avoiding child poverty is one of the main objectives of child allowances. In the 2012 Survey on the Use of Child Allowance, respondents were asked about the purpose of child allowance. The results showed that the lower the households' annual income, the higher the proportion of child allowance used for "the daily family expenses not limited to children" and for "children's expenditures and entertainment expenses" because recipients are not allowed to use the limited household income on children. Although we do not depend on a theoretical model in our study, some empirical studies show that the life-cycle/permanent income hypothesis could fail to predict the impact of a predictable change in income (e.g., benefit payment) on household consumption expenditures. In other words, the household spending response to anticipated income changes will change if families face liquidity constraints (Parker et al., 2013; Stephens & Unayama, 2015). Simultaneously, the theoretical hypothesis of "excess sensitivity" in household consumption states that liquidity-constrained families or high-income consumers are sensitive to government transfer payments (Kueng, 2018; Stephens & Unayama, 2019). Following Parker et al. (2013), we use annual household income (before taxes) to identify households that may be disproportionately likely to be liquidity-constrained. After pooling the dataset of the control and treatment groups, we split the sample into five subsamples according to income quintile.

Each panel in Table 6 reports the estimates of the reform by households' annual income quintiles separately. The effects of the CAS reforms vary for the five groups of households with different yearly income amounts. For the results of the lowest quintile group of the income distribution in Panel A, we find a positive and significant treatment effect on each category of child-related consumption

expenditures (but not lesson expenses). Columns (1) and (3) show that the CAS reforms increased expenditures on supplement by 1,358 yen, and on recreational goods by 593 yen. All coefficients are statistically insignificant in the results for adult-related expenditures. For the second group of income distribution, the coefficients lose their significance in each category. In the third group, the empirical results show that the CAS reform does not affect child-related consumer spending but decreases adult-related spending (social expenses). The fourth and highest income distribution group shows the same results as the second group.

The coefficient of food expenses is 7898 in the lowest quintile group of the income distribution, which means that the treatment effect increased food spending by low-income families. Although the result of food expenses was a placebo, we can deduce that child allowances improved children's nutritional status for liquidity-constrained families. The coefficient of food expenditure is 5868 in the third group, which needs to be further explored.

Overall, the results suggest that the CAS reform can significantly increase children's various expenditures and substantially impact children in the lowest quintile group of the income distribution than those in other groups.

4.4 Parallel Trend

The critical identification assumption for the DID strategy is parallel trends. As the main aim of this study is to test the child allowance labeling hypothesis, the parallel trend assumption requires that changes in the average consumption expenditures of households with and without junior high school students follow a common trend before and after the CAS reforms, conditional on the observable characteristics. However, because we have only two periods of data, we cannot test the parallel trend hypothesis directly for changes in average consumption expenditures in the control and treatment groups. The earlier empirical results show that changes in the CAS increased the supplement fees for households with low-income children, so we use the percentage of students attending cram school or private schools, and the private school enrollment rate, which are related to the cost of education, to check for a parallel trend between the treatment and control groups. If an event before the CAS reform affected the cost of education, then there would be no common trend in the data, such as private school enrollment rates, between the two groups. It is reasonable to assume that the treatment and control groups would not violate the counterfactual assumption if they had a common trend prior to the policy intervention.

Fig. 2[9] shows the trends in the percentage of students attending cram schools, using data from the National Assessment of Academic Ability Study. The vertical lines indicate the trends before and after the reform. Until 2010, the trend was that families with only junior high school students and families

[9] Affected by the Great East Japan Earthquake, data for 2011 are missing.

with only children under elementary school would attend cram schools. Figs. 3 and 4 show the same trend in the number of private schools and the private school enrollment rate (private and junior high private schools) using data from the Basic School Survey. We believe that families with children under elementary school-age only are an appropriate control group for families with junior high school students only.

Fig. 2 Trend in percentage of students attending cram school

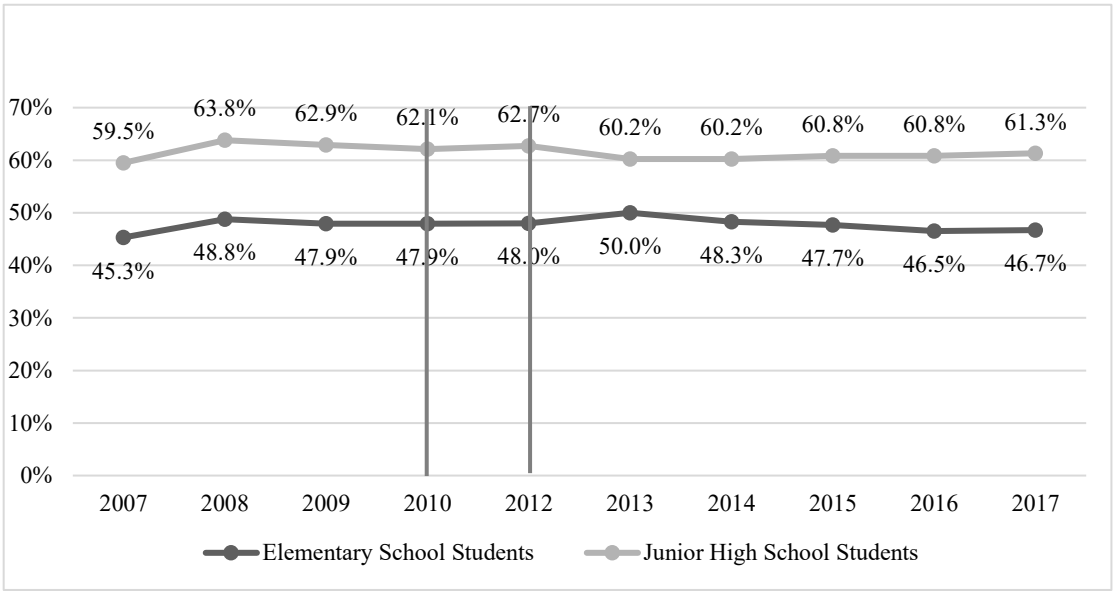


Fig. 3 Trends in number of private school

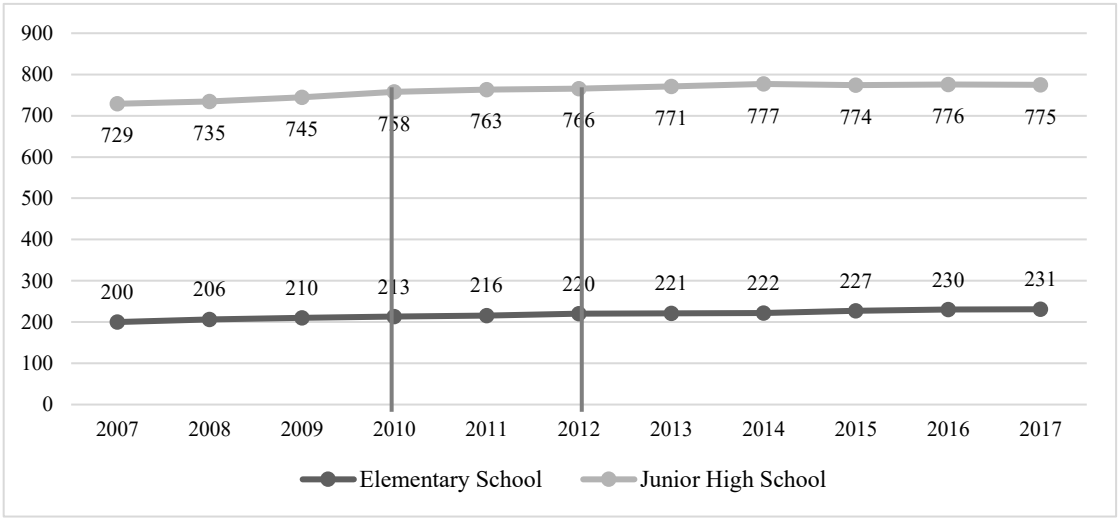
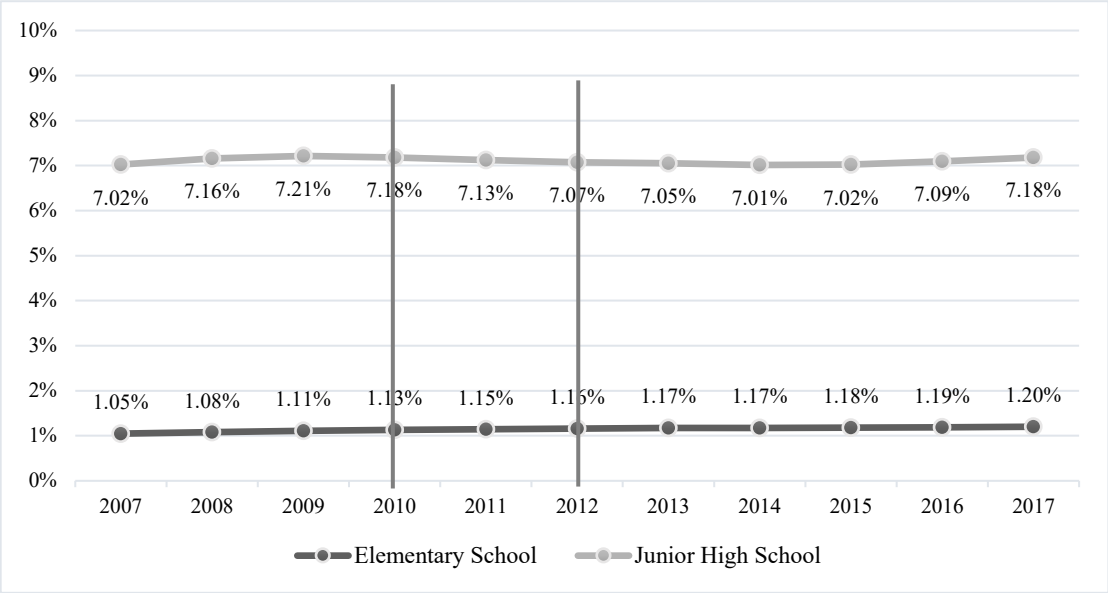


Fig. 4 Trends in private school enrollment rate



5 Conclusion

This study examined the effect of 2010–2012 CAS reform in Japan on household expenditure using nationally representative data (the NSFIE) to reveal whether child allowances have a labeling effect. The 2010–2012 child allowance reform (with the goal of supporting the healthy growth of children and preventing poverty among children) expanded the upper age limit for eligible children from 12 to 15 years, and the child allowance was extended to junior high school students. We exploited the cross-eligible group variation in the rollout of the CAS reform and applied a DID strategy to identify the causal effects of the CAS reform. We found that the 2010–2012 child allowance reform had no significant effect on expenditure on child- and adult-related consumption on average. We also concluded that the treatment effect significantly increased child-related expenditure on supplements and recreational goods in the lowest quintile group of the income distribution.

This study suggests that the child allowance in Japan as a labeled transfer significantly increases the welfare of children, referring specifically to the welfare of children from relatively low-income families. Although the estimated value of the empirical results is rather small, the “labeling effect” characteristic of the “child allowance” cannot be denied. Considering that child-related consumption expenditures with labeling effects are associated with children’s development (Naoi et al., 2021), policymakers can formulate relevant “labeling” policies to target more vulnerable groups, such as children from low-income families, to alleviate child poverty in Japan. In addition, when recipients receive a subsidy in the form of cash, the use of the subsidy is not limited to consumption, and some may choose to save the subsidy (Stephens & Unayama, 2015), but this is beyond the scope of this study and remains for future discussion.

Table 6 Robustness checks: Effects of the reform on household expenditures with additional controls

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Child-assignable consumption expenditures			Adult-assignable consumption expenditures			
	Supplement	Lesson	Recreation goods	Alcohol and tobacco	Social	Luxury goods	Food
	Panel A: Lowest Quintile Group of the Income Distribution						
Effect	8,174.035**	2,391.008	592.626*	-1,068.037	3,581.152	-929.170	7,898.440*
	(3,644.667)	(2,412.272)	(331.507)	(1,445.359)	(2,732.424)	(4,118.530)	(4,168.778)
	*1,357.973***	*792.146*	*332.947**	*-713.096*	*2,376.893*	*-353.984*	
Treatment	-17,375.881	-10,771.884	-170.570	2,145.462	26,020.829	-56,337.048	4,835.444
	(21,573.831)	(24,374.265)	(2,634.900)	(11,391.378)	(18,188.403)	(40,172.247)	(29,928.179)
	-2,886.698	*-3,568.750*	*-95.829*	*1,432.460*	*17,270.621*	*-21,462.577*	
After	-1,877.872***	-1,275.553***	-159.150	-95.926	-1,823.495***	1,953.123	1,657.258**
	(695.719)	(493.367)	(107.141)	(259.158)	(391.585)	(1,611.256)	(719.866)
	*-311.976****	*-422.594****	*-89.413*	*-64.047*	*-1,210.295****	*744.076*	
Log of Hh.	5,486.568***	5,274.841***	135.987	267.244	4,853.916***	4,684.467**	7,596.606***
Income	(1,533.924)	(1,093.153)	(161.588)	(449.145)	(695.321)	(2,239.809)	(1,459.435)
	*911.497****	*1,747.567****	*76.400*	*178.431*	*3,221.656****	*1,784.629***	
Treatment *	3,041.054	715.834	-64.105	-79.724	-4,458.411	9,503.253	8.761
income	(3,678.451)	(4,207.129)	(445.063)	(1,922.933)	(3,103.752)	(6,850.365)	(5,185.054)
	505.218	*237.157*	*-36.015*	*-53.229*	*-2,959.150*	*3,620.429*	
Constant	-56,506.749***	-48,439.615***	-1,582.404*	3,726.213	-19,494.589***	-27,925.681**	-21,017.789**
	(9,763.192)	(6,931.446)	(893.423)	(2,719.241)	(4,392.202)	(11,718.253)	(9,407.699)
Observations	2,723	2,723	2,723	2,723	2,723	2,723	2,723
R-squared							0.172
F	7.46	6.43	2.29	2.01	3.28	0.32	8.56
Pseudo R2	0.0469	0.0284	0.0027	0.0031	0.0046	0.0014	
Hh. income controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Add. controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes

NOTE: * Significant at the 1% level; ** Significant at the 5% level; *** Significant at the 10% level

Table 6 Robustness checks: Effects of the reform on household expenditures with additional controls (continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Child-assignable consumption expenditures			Adult-assignable consumption expenditures			
	Supplement	Lesson	Recreation goods	Alcohol and tobacco	Social	Luxury goods	Food
	Panel B: Second Quintile Group of the Income Distribution						
Effect	-4,836.990	1,449.230	64.909	1,624.163	-555.842	-570.971	-3,437.675
	(3,116.916)	(2,080.417)	(380.241)	(1,734.448)	(1,790.949)	(1,387.479)	(3,731.459)
	-1,074.686	*686.336*	*36.886*	*1,083.640*	*-404.164*	*-241.297*	
Treatment	-67,994.801	71,634.621	153.942	35,288.448	-144,003.586*	50,563.963	224,853.106
	(143,593.386)	(96,507.282)	(14,049.084)	(61,892.897)	(77,780.044)	(60,361.750)	(176,777.805)
	-15,107.130	*33,925.204*	*87.481*	*23,544.411*	*-104,708.032**	*21,368.762*	
After	-1,227.537*	-668.880	179.096	-902.408***	-1,193.254***	1,046.526*	2,028.722***
	(678.214)	(418.637)	(156.142)	(242.468)	(428.578)	(611.901)	(761.927)
	*-272.735**	*-316.773*	*101.775*	*-602.085****	*-867.640****	*442.271**	
Log of Hh.	-3,120.236	6,188.332**	1,124.355	-1,089.339	8,216.521***	-1,367.963	20,195.548***
Income	(4,875.305)	(3,089.376)	(1,167.357)	(1,736.524)	(3,112.901)	(2,981.989)	(5,464.524)
	-693.256	*2,930.712***	*638.938*	*-726.806*	*5,974.405****	*-578.113*	
Treatment *	12,547.080	-12,981.779	-23.670	-5,233.886	23,480.231*	-8,280.147	-36,120.897
income	(23,489.737)	(15,764.300)	(2,264.052)	(10,071.660)	(12,707.581)	(9,826.604)	(28,780.298)
	2,787.719	*-6,147.998*	*-13.451*	*-3,492.043*	*17,072.969**	*-3,499.261*	
Constant	-7,036.982	-57,175.909***	-6,083.165	7,680.504	-41,954.831**	9,375.662	-87,084.221**
	(30,116.447)	(19,323.003)	(6,824.129)	(10,462.138)	(19,071.681)	(17,470.800)	(33,858.677)
Observations	2,902	2,902	2,902	2,902	2,902	2,902	2,902
R-squared							0.141
F	4.8	9.65	1.93	2.34	2.59	0.65	6.83
Pseudo R2	0.0352	0.0233	0.0014	0.0034	0.003	0.0017	
Hh. income controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Add. controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes

NOTE: * Significant at the 1% level; ** Significant at the 5% level; *** Significant at the 10% level

Table 6 Robustness checks: Effects of the reform on household expenditures with additional controls (continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Child-assignable consumption expenditures			Adult-assignable consumption expenditures			
	Supplement	Lesson	Recreation goods	Alcohol and tobacco	Social	Luxury goods	Food
	Panel C: Third Quintile Group of the Income Distribution						
Effect	1,546.210	124.104	-74.343	-516.384	-4,141.319**	-3,184.257	-5,868.484*
	(3,066.023)	(2,106.783)	(196.854)	(912.784)	(2,074.533)	(2,405.230)	(3,124.072)
	410.205	*68.632*	*-47.479*	*-357.805*	*-3,116.407***	*-1,308.308*	
Treatment	-88,816.877	-20,585.064	10,395.407	-42,581.299	-9,474.555	194,984.360	73,615.430
	(170,724.228)	(116,071.029)	(10,452.053)	(45,076.453)	(111,332.293)	(135,493.448)	(157,724.895)
	-23,562.832	*-11,383.915*	*6,639.011*	*-29,504.741*	*-7,129.749*	*80,112.758*	
After	-1,514.785**	-837.273*	-7.793	-203.109	-1,896.545***	782.568	1,919.246**
	(770.205)	(435.723)	(93.517)	(217.364)	(453.445)	(641.072)	(787.579)
	*-401.868***	*-463.027**	*-4.977*	*-140.735*	*-1,427.180****	*321.532*	
Log of Hh.	3,163.645	2,851.816	639.123	2,652.305	13,506.362***	22,416.845*	26,687.708***
Income	(6,390.962)	(3,650.349)	(706.763)	(1,833.069)	(3,747.776)	(12,218.020)	(6,616.464)
	839.305	*1,577.106*	*408.175*	*1,837.792*	*10,163.746****	*9,210.356**	
Treatment *	14,417.789	2,375.236	-1,723.831	6,781.207	1,936.417	-30,676.772	-11,291.596
income	(26,917.200)	(18,329.460)	(1,646.551)	(7,114.041)	(17,514.319)	(21,310.871)	(24,907.506)
	3,824.993	*1,313.549*	*-1,100.922*	*4,698.723*	*1,457.184*	*-12,604.092*	
Constant	-56,632.904	-35,335.747	-5,610.599	-9,407.899	-75,346.561***	-135,480.710*	-102,672.395**
	(40,909.290)	(24,378.307)	(4,882.760)	(11,692.277)	(23,609.779)	(70,559.814)	(42,948.739)
Observations	3,010	3,010	3,010	3,010	3,010	3,010	3,010
R-squared							0.134
F	5.98	17.95	1.95	2.54	2.69	0.44	7.3
Pseudo R2	0.0359	0.0211	0.0018	0.0034	0.0025	0.0016	
Hh. income controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Add. controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes

NOTE: * Significant at the 1% level; ** Significant at the 5% level; *** Significant at the 10% level

Table 6 Robustness checks: Effects of the reform on household expenditures with additional controls (continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Child-assignable consumption expenditures			Adult-assignable consumption expenditures			
	Supplement	Lesson	Recreation goods	Alcohol and tobacco	Social	Luxury goods	Food
	Panel D: Fourth Quintile Group of the Income Distribution						
Effect	1,041.982	821.663	284.813	735.418	-583.310	-1,537.401	2,450.597
	(3,643.531)	(1,874.925)	(334.967)	(1,009.821)	(1,784.628)	(1,116.912)	(3,318.693)
	319.471	*505.221*	*168.363*	*508.002*	*-442.050*	*-737.880*	
Treatment	38,626.371	86,864.646	36,824.859**	20,100.081	-182,437.320**	-59,744.159	-17,936.091
	(199,352.987)	(107,421.468)	(18,565.767)	(59,398.575)	(90,043.562)	(82,441.883)	(185,379.409)
	11,842.820	*53,410.961*	*21,768.512***	*13,884.454*	*-138,256.303***	*-28,674.368*	
After	-6,203.834***	-577.442	123.205	-688.736***	-1,816.052***	940.009***	2,565.771***
	(1,095.805)	(515.376)	(174.696)	(239.819)	(545.975)	(320.241)	(881.989)
	*-1,902.092****	*-355.055*	*72.831*	*-475.756****	*-1,376.257****	*451.160****	
Log of Hh.	8,896.734	5,951.945	1,807.389	1,127.769	14,031.525***	-155.992	34,988.053***
Income	(8,625.715)	(4,236.645)	(1,717.549)	(1,996.449)	(4,384.482)	(2,268.602)	(7,276.247)
	2,727.733	*3,659.707*	*1,068.413*	*779.025*	*10,633.497****	*-74.869*	
Treatment *	-4,955.847	-14,736.973	-5,741.579**	-2,989.558	27,963.741**	9,325.734	3,096.997
income	(30,504.101)	(16,440.153)	(2,866.948)	(9,084.357)	(13,766.151)	(12,705.515)	(28,392.270)
	-1,519.459	*-9,061.407*	*-3,394.056***	*-2,065.085*	*21,191.736***	*4,475.911*	
Constant	-120,421.686**	-60,341.706**	-12,154.714	-6,992.259	-81,182.349***	-5,809.258	-200,242.465***
	(57,369.009)	(28,258.567)	(11,602.280)	(13,113.749)	(29,161.094)	(15,875.806)	(47,784.758)
Observations	2,781	2,781	2,781	2,781	2,781	2,781	2,781
R-squared							0.128
F	4.9	12.31	1.69	1.62	1.99	0.93	6.23
Pseudo R2	0.0312	0.0235	0.0015	0.0021	0.0022	0.0021	
Hh. income controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Add. controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes

NOTE: * Significant at the 1% level; ** Significant at the 5% level; *** Significant at the 10% level

Table 6 Robustness checks: Effects of the reform on household expenditures with additional controls (continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Child-assignable consumption expenditures			Adult-assignable consumption expenditures			
	Supplement	Lesson	Recreation goods	Alcohol and tobacco	Social	Luxury goods	Food
	Panel E: Highest Quintile Group of the Income Distribution						
Effect	100.734	119.896	230.463	-1,315.267	-2,192.523	-135.348	-5,001.591
	(3,649.738)	(2,032.959)	(390.389)	(800.979)	(2,704.120)	(2,683.845)	(3,193.450)
	36.586	*77.017*	*132.212*	*-930.201*	*-1,360.448*	*-56.586*	
Treatment	30,432.041	-28,988.851	-5,498.223	8,430.125	-88,177.559	57,304.922	-22,187.543
	(66,858.344)	(48,401.440)	(8,305.882)	(15,226.585)	(59,565.049)	(67,078.352)	(58,821.211)
	11,052.642	*-18,621.499*	*-3,154.229*	*5,962.066*	*-54,713.687*	*23,957.715*	
After	-2,048.411	-485.834	561.234*	-193.118	-4,846.522*	-418.264	3,037.585***
	(1,264.007)	(588.090)	(297.556)	(252.616)	(2,630.396)	(1,013.404)	(1,052.078)
	-743.964	*-312.084*	*321.970**	*-136.579*	*-3,007.240***	*-174.865*	
Log of Hh.	15,986.780***	8,337.246***	571.790	2,359.290**	13,187.195***	13,371.402	28,214.489***
Income	(4,601.988)	(2,249.692)	(898.754)	(924.193)	(4,057.968)	(8,533.341)	(3,963.832)
	*5,806.254****	*5,355.577****	*328.025*	*1,668.568***	*8,182.582****	*5,590.240*	
Treatment *	-2,235.673	2,666.697	776.740	-1,241.215	12,512.690	-8,362.348	3,798.780
income	(9,766.748)	(7,152.933)	(1,216.480)	(2,231.531)	(8,588.506)	(9,755.972)	(8,585.156)
	-811.976	*1,713.000*	*445.602*	*-877.829*	*7,764.055*	*-3,496.083*	
Constant	-164,924.014***	-76,327.940***	-5,487.859	-9,588.023	-88,862.571***	-99,727.216*	-160,246.109***
	(31,058.564)	(15,120.794)	(6,453.014)	(6,193.751)	(21,481.051)	(54,979.250)	(26,492.677)
Observations	2,693	2,693	2,693	2,693	2,693	2,693	2,693
R-squared							0.154
F	6.42	12.39	1.58	2.02	2.23	0.53	7.44
Pseudo R2	0.0262	0.022	0.0019	0.0028	0.0028	0.0013	
Hh. income controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Add. controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes

NOTE: * Significant at the 1% level; ** Significant at the 5% level; *** Significant at the 10% level

References

Baker, M., Gruber, J., & Milligan, K. (2008). Universal child care, maternal labor supply, and family well-being. *Journal of Political Economy, 116*(4), 709–745. doi:10.1086/591908

Barberis, N., Huang, M., & Thaler, R. H. (2006). Individual preferences, monetary gambles, and stock market participation: A case for narrow framing. *American Economic Review, 96*(4), 1069–1090. doi: 10.1257/aer.96.4.1069

Becker, G. S. (1991). *A treatise on the family*. Cambridge and London: Harvard University Press. ISBN: 0-674-90699-3

Becker, G. S., & Tomes, N. (1976). Child endowments and the quantity and quality of children. *Journal of Political Economy, 84*(4, Part 2), S143–S162. doi: 10.1086/260536

Behrman, J. R., & Knowles, J. C. (1999). Household income and child schooling in Vietnam. *The World Bank Economic Review*, *13*(2), 211–256. doi: 10.1093/wber/13.2.211

Benhassine, N., Devoto, F., Duflo, E., Dupas, P., & Pouliquen, V. (2015). Turning a shove into a nudge? A "labeled cash transfer" for education. *American Economic Journal: Economic Policy, 7*(3), 86–125. doi:10.1257/pol.20130225

Bessho, S.-i. (2018). Child benefit, tax allowances and behavioural responses: The case of Japanese reform, 2010–2011. *The Japanese Economic Review, 69*(4), 478–501. doi:10.1111/jere.12171

Black, S. E., Devereux, P. J., Løken, K. V., & Salvanes, K. G. (2014). Care or cash? The effect of child care subsidies on student performance. *Review of Economics and Statistics, 96*(5), 824–837. doi:10.1162/REST_a_00439

Blow, L., Walker, I., & Zhu, Y. (2012). Who benefits from child benefit? *Economic Inquiry, 50*(1), 153–170. doi:10.1111/j.1465-7295.2010.00348.x

Chi, W., & Qian, X. (2016). Human capital investment in children: An empirical study of household child education expenditure in China, 2007 and 2011. *China Economic Review, 37*, 52–65. doi:https://doi.org/10.1016/j.chieco.2015.11.008

Edmonds, E. (2002). Reconsidering the labeling effect for child benefits: Evidence from a transition economy. *Economics Letters, 76*(3), 303–309. doi: 10.1016/S0165-1765(02)00086-1

Fernald, L. C. H., & Hidrobo, M. (2011). Effect of Ecuador's cash transfer program (Bono de Desarrollo Humano) on child development in infants and toddlers: A randomized effectiveness trial (Bono de desarrollo humano). *Social Science and Medicine, 72*(9), 1437–1446. doi:10.1016/j.socscimed.2011.03.005

González, L. (2013). The effect of a universal child benefit on conceptions, abortions, and early maternal labor supply. *American Economic Journal: Economic Policy*, *5*(3), 160–188. doi: 10.1257/pol.5.3.160

Gustafsson, B., & Li, S. (2004). Expenditures on education and health care and poverty in rural China.

China Economic Review, 15(3), 292–301. doi:10.1016/j.chieco.2003.07.004

Havnes, T., & Mogstad, M. (2011). Money for nothing? Universal child care and maternal employment. *Journal of Public Economics, 95*(11–12), 1455–1465. doi:10.1016/j.jpubeco.2011.05.016

Hener, T. (2017). Effects of labeled child benefits on family savings. *Review of Economics of the Household, 15*(3), 759–777. doi:10.1007/s11150-015-9291-z

Jacoby, H. G. (2002). Is there an intrahousehold "flypaper effect"? Evidence from a school feeding programme. *Economic Journal, 112*(476), 196–221. doi:10.1111/1468-0297.0j679

Kobayashi, Y. (2011). The household expenditure effects of a child allowance [in Japanese]. *The Quarterly of Social Security Research, 47*(1), 67–80

Kooreman, P. (2000). The labeling effect of a child benefit system. *American Economic Review, 90*(3), 571–583. doi: 10.1257/aer.90.3.571

Kubota, K. (2016). Effects of Japanese compulsory educational reforms on household educational expenditure. *Journal of the Japanese and International Economies, 42*, 47–60. doi:10.1016/j.jjie.2016.10.003

Kueng, L. (2018). Excess sensitivity of high-income consumers. *The Quarterly Journal of Economics, 133*(4), 1693–1751. doi: 10.1093/qje/qjy014

Milligan, K. (2005). Subsidizing the stork: New evidence on tax incentives and fertility. *Review of Economics and Statistics*, *87*(3), 539–555. doi:10.1162/0034653054638382

Milligan, K., & Stablie, M. (2009). Child benefits, maternal employment, and children's health: Evidence from Canadian child benefit expansions. *American Economic Review, 99*(2), 128–132. doi:10.1257/aer.99.2.128

Ministry of Health, Labour and Welfare (2019). *Survey on the Use of Child Allowance in 2012* (2019 revision). URL: https://www.mhlw.go.jp/content/11906000/000581578.pdf

Naoi, M., Akabayashi, H., Nakamura, R., Nozaki, K., Sano, S., Senoh, W., & Shikishima, C. (2021). Causal effects of family income on educational investment and child outcomes: Evidence from a policy reform in Japan. *Journal of the Japanese and International Economies, 60*, 1–13. doi: 10.1016/j.jjie.2021.101122

Niki, M. (2014). Summary of anonymous data from the Japan National Survey of Family Income and Expenditure–how to use the Kuma and variable correspondence tables [in Japanese]. *Graduate school of economics Kobe University Working Paper No.308*.Graduate school of economics Kobe University. URL: http://www.econ.kobe-u.ac.jp/activity/graduate/pdf/308.pdf

Parker, J. A., Souleles, N. S., Johnson, D. S., & McClelland, R. (2013). Consumer spending and the economic stimulus payments of 2008. *American Economic Review, 103*(6), 2530–2553. doi: 10.1257/aer.103.6.2530

Ponce, J., & Bedi, A. S. (2010). The impact of a cash transfer program on cognitive achievement: The

Bono de Desarrollo Humano of Ecuador. *Economics of Education Review, 29*(1), 116–125. doi:10.1016/j.econedurev.2009.07.005

Rabin, M., & Weizsäcker, G. (2009). Narrow bracketing and dominated choices. *American Economic Review, 99*(4), 1508–1543. doi: 10.1257/aer.99.4.1508

Reo, T. (2015). Effects of child allowance on the psychological health of parents: Evidence from lower- and medium-income households [in Japanese]. *The Quarterly of Social Security Research, 50*(4), 433–445. https://ci.nii.ac.jp/naid/40020415861

Sahn, D. E., & Gerstle, A. (2004). Child allowances and allocative decisions in Romanian households. *Applied Economics, 36*(14), 1513–1521. doi:10.1080/0003684042000217986

Stephens, M., & Unayama, T. (2015). Child benefit payments and household wealth accumulation. *Japanese Economic Review, 66*(4), 447–465. doi:10.1111/jere.12078

Stephens, M., & Unayama, T. (2019). Estimating the impacts of program benefits: Using instrumental variables with underreported and imputed data. *The Review of Economics and Statistics, 101*(3), 468–475. doi: 10.1162/rest_a_00769

Tang, C., Zhao, L., & Zhao, Z. (2020). Does free education help combat child labor? The effect of a free compulsory education reform in Rural China. *Journal of Population Economics, 33*(2), 601–631. doi:10.1007/s00148-019-00741-w

Tobin, J. (1958). Estimation of relationships for limited dependent variables. *Econometrica,* 26(1). doi:10.2307/1907382

Unayama, T. (2011). Consumption responses to the child allowance [in Japanese]. *RIETI discussion paper series, 11-J–021.* Research Institute of Economy, Trade and Industry. URL: https://www.rieti.go.jp/en/publications/summary/11030012.html

Declarations

Funding

This study was supported by JSPS KAKENHI under Grant Number JP18K12796.

Availability of data and material

The individual data of the *Japan National Survey of Family Income and Expenditure* used in this study may be obtained through the Statistics Bureau of the Ministry of Internal Affairs and Communications for research purposes.

Code availability

The Stata code used in this study can be provided upon request to the corresponding author.

Conflicts of interest/Competing interests

The authors have no conflicts of interest to declare that are relevant to the content of this article.

Authors' contributions

All authors contributed to the study conception and design. Material preparation, data collection, and analysis were performed by Ms. Huihui LI and Ms. Minae NIKI. The first draft of the manuscript was written by Ms. Huihui LI and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

Appendix 1 CAS Income cap

Number of dependent relatives (Examples in parentheses)	Income cap	
	After-tax income threshold（JPY, Thousand）	Pre-tax income threshold（JPY, Thousand）
0（for families with no child born at the end of the previous year, etc.）	6220	8333
1（for families with one child, etc.）	6600	8756
2（for families with a parent and one child, etc.）	6980	9178
3（for families with a parent and two children, etc.）	7360	9600
4（for families with a parent and three children, etc.）	7740	10021
5（for families with a parent and four children, etc.）	8120	10421

Note: 1. “Parent” in the “Number of dependent relatives” column refers to spouses with an annual pre-tax income of 1,030 thousand yen or less. 2. The maximum number of dependent relatives is five in our dataset, so we show up to five dependents.