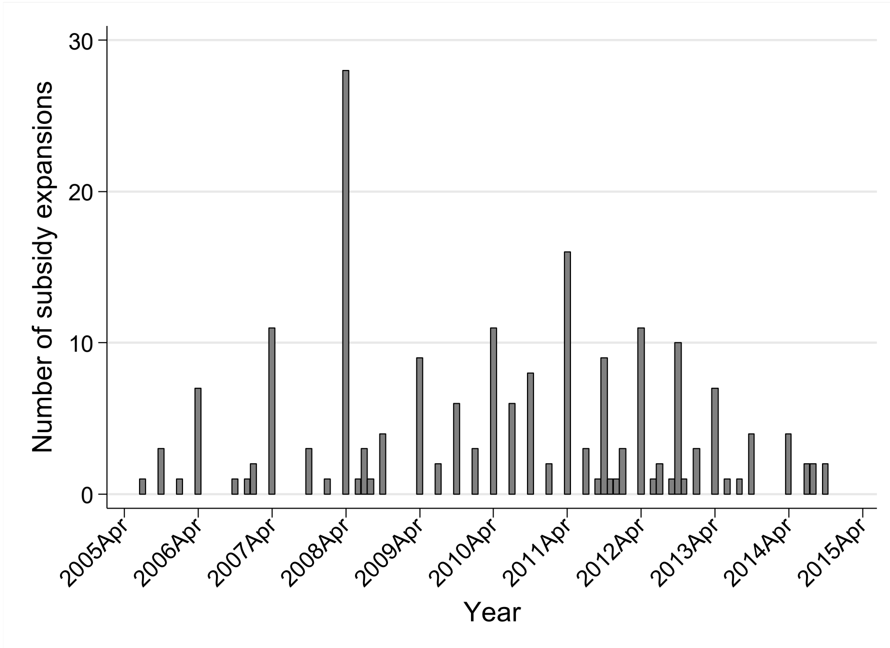
Online Appendix

(Not for Publication)

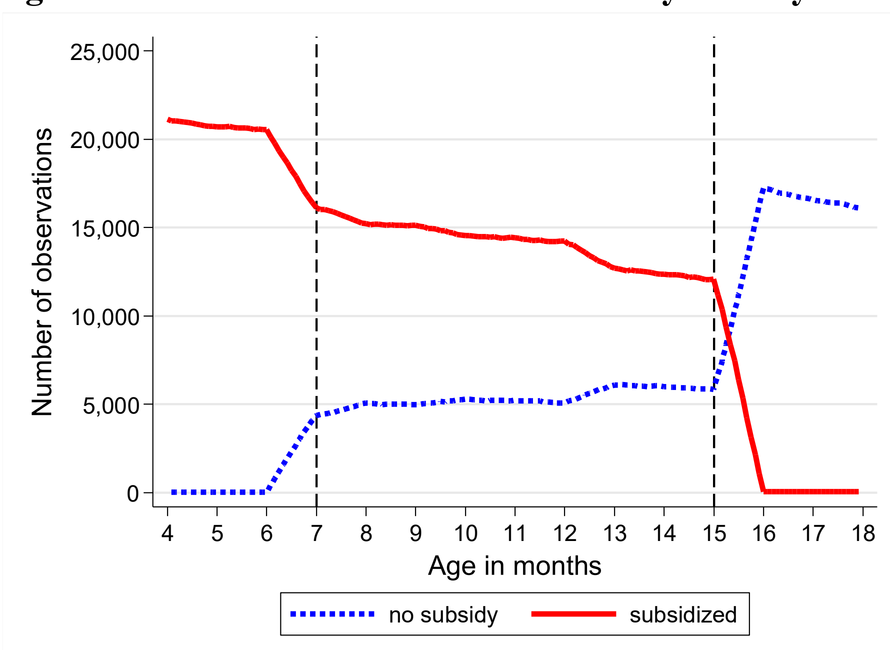
Appendix A: Additional figures and tables

Figure A-1: Timing of the subsidy expansions



Notes: The main sample is used. The total number of municipalities is 165. The data spans from April 2005 to March 2015 (10 years). There are total of 201 expansions of a child healthcare subsidy.

Figure A-2: The number of observations by subsidy status



Notes: The main sample is used. The two vertical dotted lines indicate the ages of children focused in this study since we do not have many observations without subsidy below age 7 years and with subsidy above age 15 years. This is because the majority of municipalities (81.3%) already provided the subsidy until the age of 6 years (start of primary school) at the beginning of our sample period (April 2005), and most municipalities do not provide subsidy beyond age 15 years (end of junior high school) at the end of our sample period (March 2015).

Table A-1: Complete list of changes in cost-sharing

		Mun-time-age cell		Year-month	
Before change	*After* change	N	%	N	%
30%	0%	3,623	*30.6%*	15,472	*39.7%*
0%	30%	2,790	*23.6%*	11,814	*30.3%*
500 JPY/visit	30%	1,029	*8.7%*	2,516	*6.5%*
30%	200 JPY/visit	855	*7.2%*	1,502	*3.9%*
30%	500 JPY/visit	706	*6.0%*	1,556	*4.0%*
200 JPY/visit	0%	535	*4.5%*	1,050	*2.7%*
200 JPY/visit	20%	475	*4.0%*	981	*2.5%*
200 JPY/visit	30%	331	*2.8%*	460	*1.2%*
300 JPY/visit	30%	260	*2.2%*	482	*1.2%*
10%	30%	249	*2.1%*	712	*1.8%*
30%	300 JPY/visit	166	*1.4%*	319	*0.8%*
10%	0%	162	*1.4%*	445	*1.1%*
300 JPY/visit	200 JPY/visit	126	*1.1%*	281	*0.7%*
0%	10%	125	*1.1%*	425	*1.1%*
30%	10%	124	*1.0%*	264	*0.7%*
15%	0%	51	*0.4%*	218	*0.6%*
0%	20%	51	*0.4%*	66	*0.2%*
30%	20%	39	*0.3%*	49	*0.1%*
15%	30%	37	*0.3%*	106	*0.3%*
30%	15%	35	*0.3%*	154	*0.4%*
0%	200 JPY/visit	28	*0.2%*	31	*0.1%*
0%	15%	17	*0.1%*	33	*0.1%*
200 JPY/visit	300 JPY/visit	14	*0.1%*	14	*0.0%*
500 JPY/visit	20%	12	*0.1%*	13	*0.0%*
20%	0%	1	*0.0%*	1	*0.0%*
300 JPY/visit	0%	1	*0.0%*	1	*0.0%*
Total		11,205	*100%*	36,923	*100%*

Notes: The full sample is used. This table lists all combinations of transitions in price cost-sharing. In this study, we mainly focus on the first two transitions. 200, 300 and 500 JPY are approximately USD2, 3, and 5, respectively.

Table A-2: Sample selection

Variable	*Main* sample (1)	Not in *main* sample (2)	*Dif* (3)=(1)-(2)
Characteristics			
Female	0.49	0.49	0.00
	[0.50]	[0.50]	(0.01)
Age (in years)	11.83	12.06	-0.23
	[2.86]	[2.71]	(0.15)
Utilization			
Outpatient dummy	0.32	0.32	0.01
	[0.47]	[0.46]	(0.01)
Outpatient spending	4.47	4.20	0.27
	[21.56]	[16.40]	(0.20)
N of outpatient visits	0.62	0.57	0.05***
	[1.26]	[1.17]	(0.01)
Inpatient dummy (×1000)	2.39	2.65	-0.26
	[48.81]	[51.42]	(0.26)
Inpatient spending	0.98	1.28	-0.30
	[33.26]	[40.22]	(0.22)
Death (×1000)	0.04	0.02	0.02
	[6.03]	[4.46]	(0.01)
N	660,697	301,005	
N of individuals	24,429	11,846	

Notes: The full sample is used and the sample is further limited to person-month observations *without* subsidy. The main sample in column (1) limits to 165 municipalities which only have either 0% (full subsidy) or 30% (no subsidy) patient cost-sharing during our sample period. Columns (1) and (2) report the means of variables in the far-left column in main sample and not in main sample, respectively. The standard deviations are in brackets. Column (3) reports the difference in means between columns (1) and (2) with standard errors clustered at the municipality in parentheses. Outpatient and inpatient spending are measured in 1000 JPY (approximately 10USD). Significance levels: *** $p<0.01$, ** $p<0.05$, * $p<0.10$

Table A-3: List of diagnosis group and ICD10

	ICD10	Share
A. Broad Category		
Diseases of the respiratory system	J00 – J99	31.4%
Diseases of the skin and subcutaneous tissue	L00 – L99	13.2%
Diseases of the eye and adnexa	H00 – H59	13.0%
Certain infectious and parasitic diseases	A00 – B99	10.0%
Diseases of the ear and mastoid process	H60 – H95	6.5%
Injury, poisoning and external causes	V01 – Y98	6.4%
B. ICD10 4digit (Top 10)		
Allergic rhinitis, unspecified	J304	9.5%
Acute bronchitis, unspecified	J209	4.9%
Asthma, unspecified	J459	4.8%
Acute atopic conjunctivitis	H101	4.1%
Acute sinusitis, unspecified	J019	3.6%
Acute laryngopharyngitis	J060	3.5%
Astigmatism	H522	3.1%
Acute pharyngitis, unspecified	J029	2.5%
Dermatitis, unspecified	L309	2.5%
Diarrhea and gastroenteritis of infectious origin	A09-	2.5%

Notes: The main sample is used.

Table A-4: Selected studies on price elasticities among the nonelderly

Papers	Age	Country	Arc elasticity	Semi-arc elasticity
Iizuka and Shigeoka (2018)	Ages 7-14	Japan	[–0.07, –0.12]	[–0.49, –0.63]
RAND HIE	Nonelderly	US	[–0.17, –0.31]	[–2.11, –2.26]
Han *et al.* (2016)	Age 3	Taiwan	[–0.08, –0.12]	
Nilsson and Paul (2018)	Ages 7, 20	Sweden		[–0.36, –0.42]

Notes: The semi-arc elasticity for RAND HIE is based on Brot-Goldberg et al. (2017)

References:

Brot-Goldberg, Zarek C., Amitabh Chandra, Benjamin R. Handel, and Jonathan T. Kolstad. (2017) "What does a Deductible Do? The Impact of Cost-Sharing on Health Care Prices, Quantities, and Spending Dynamics." *Quarterly Journal of Economics* 132(3): 1261–1318.

Han, Hsing-Wen, Hsien-Ming Lien, and Tzu-Ting Yang. (2016) "Patient Cost Sharing and Healthcare Utilization in Early Childhood: Evidence from a Regression Discontinuity Design." *Unpublished manuscript*.

Nilsson, Anton, and Alexander Paul. (2018) "Patient cost-sharing, socioeconomic status, and children's health care utilization." *Journal of Health Economics* 59: 109–124.

Appendix B: Elasticities

B.1 Semi-*arc* elasticity (*main* sample)

For our basic estimate that does not distinguish the asymmetry of price changes, the arc-elasticity is the natural candidate to report the price responsiveness. Our basic estimation equation [3] from the main text is repeated here as follows:

$$Y_{iamt} = \alpha + \sum_{A=7}^{14} \beta_A \{subsidized_{iamt} \times 1(Age\ A)\} + \gamma X'_{mt} + \delta_a + \pi_t + \theta_i + \varepsilon_{iamt} \quad \text{–[B1]}$$

Then, the arc-elasticity for each age in year A is defined by

$$\textit{arc-elasticity}_A = \left(\frac{dQ}{Q}\right) / \left(\frac{dP}{P}\right) = \left(\frac{Q_{1A}-Q_{0A}}{(Q_{0A}+Q_{1A})/2}\right) / \left(\frac{P_{1A}-P_{0A}}{(P_{1A}+P_{0A})/2}\right) = \left(\frac{\beta_A}{Q_{0A}+Q_{1A}}\right) / \left(\frac{0-0.3}{0.3+0}\right) = -\frac{\beta_A}{Q_{0A}+Q_{1A}} \quad \text{–[B2]}$$

where Q_{1A}, Q_{0A} are quantity of healthcare utilization with subsidy (denoted by 1), and without subsidy (denoted by 0), and P_{1A}, P_{0A} are defined in the same way for prices. β_A are the estimates from the equation [B1] above.

However, one can make an argument that when the starting price is zero, as in our case, arc-elasticity may not be well defined. This is because the arc-elasticity reflects only the changes in quantity but not the changes in price. Hence, instead, we report the *semi-arc* elasticity, which is defined by

$$\textit{semi-arc elasticity}_A = \left(\frac{dQ}{Q}\right) / dP = \left(\frac{Q_{1A}-Q_{0A}}{(Q_{0A}+Q_{1A})/2}\right) / (P_{1A} - P_{0A}) = \left(\frac{\beta_A}{Q_{0A}+Q_{1A}}\right) / \left(\frac{0-0.3}{2}\right) = \textit{arc-elasticity}_A / 0.15 \quad \text{–[B3]}$$

Thus, in our case, *semi-arc* elasticity is simply arc-elasticity divided by 0.15. For example, *semi-arc* elasticities are reported in Brot-Goldberg *et al.* (2017), and Nilsson and Paul (2018). Nonetheless, we also report the arc-elasticity because it is widely used and comparable to the estimate from RAND HIE, in which the largest plan was also the free care plan.

B.2 Semi-*point* elasticity (*main* sample)

For the analysis of asymmetric price responses, we instead report semi-*point* elasticity instead of semi-*arc* elasticity, as we exactly know the starting quantity, and also the direction of the price changes. Again, the equation [4] from the main text is repeated here:

$$Y_{iamt} = \alpha + \sum_{A=7}^{14} \beta_A^{better} \{subsidized_{iamt} \times better_{iamt} \times 1(Age\ A)\} + \sum_{A=7}^{14} \beta_A^{worse} \{subsidized_{iamt} \times worse_{iamt} \times 1(Age\ A)\} + \gamma X'_{mt} + \delta_a + \pi_t + \theta_i + \varepsilon_{iamt} \quad \text{–[B4]}$$

where "better" indicates the subsidy expansion which lowers the price of healthcare from 30% to 0%, and "worse" indicates subsidy expiration that raises the price from 0% to 30%. Then, the semi-point elasticity for each direction of price changes are defined as:

$$\textit{semi-point elasticity}_A^{better} = \left(\frac{dQ}{Q}\right) / dP = \left(\frac{Q_{1A}-Q_{0A}}{Q_{0A}}\right) / (P_{1A} - P_{0A}) = -\left(\frac{\beta_A^{better}}{Q_{0A}}\right) / 0.3 \quad \text{–[B5]}$$

$$\textit{semi-point elasticity}_A^{worse} = \left(\frac{dQ}{Q}\right) / dP = \left(\frac{Q_{0A}-Q_{1A}}{Q_{1A}}\right) / (P_{0A} - P_{1A}) = \left(\frac{\beta_A^{worse}}{Q_{1A}}\right) / 0.3 \quad \text{–[B6]}$$

where β_A^{better} and β_A^{worse} are estimates from equation [B4] above.

B.3 Semi-arc elasticity (*full* sample)

Finally, when we utilize all the observations (full sample) and all the price variations to examine the effect of small copayment, the estimation equation [5] in the main text is repeated as:

$$Y_{iamt} = \alpha + \sum_C \sum_{A=7}^{14} \beta_A^C \{1(price = C) \times subsidized_{iamt} \times 1(Age\ A)\} + \gamma X'_{mt} + \delta_a + \pi_t + \theta_i + \varepsilon_{iamt} \quad \text{–[B7]}$$

where C is each price level. Then, the semi-arc elasticities for each price C (age A is suppressed) are written as:

$$\varepsilon^C = \left(\frac{Q^C - Q^0}{(Q^0 + Q^C)/2}\right) / (P^C - P^0) = \left(\frac{2\beta^C}{Q^0 + Q^C}\right) / P^C \quad \text{–[B8]}$$

where Q^0 is the average outcome at free care (C=0%), which is common across all the price levels, and Q^C is the average outcome at each price C. In similar vein, P^C are the fraction of out-of-pocket at each price C. P^0 is zero. β^C (age A is suppressed) are estimates from equation [B7] above.

For all the elasticities, the standard errors clustered at municipality are obtained by bootstrapping with 200 repetitions.

References:

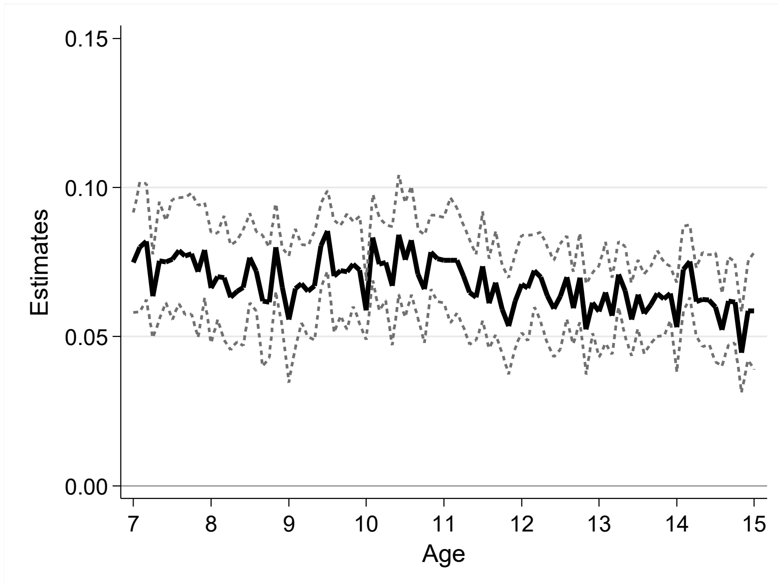
Brot-Goldberg, Zarek C., Amitabh Chandra, Benjamin R. Handel, and Jonathan T. Kolstad. (2017) "What does a Deductible Do? The Impact of Cost-Sharing on Health Care Prices, Quantities, and Spending Dynamics." *Quarterly Journal of Economics* 132(3): 1261–1318.

Nilsson, Anton, and Alexander Paul. (2018) "Patient cost-sharing, socioeconomic status, and children's health care utilization." *Journal of Health Economics* 59: 109–124.

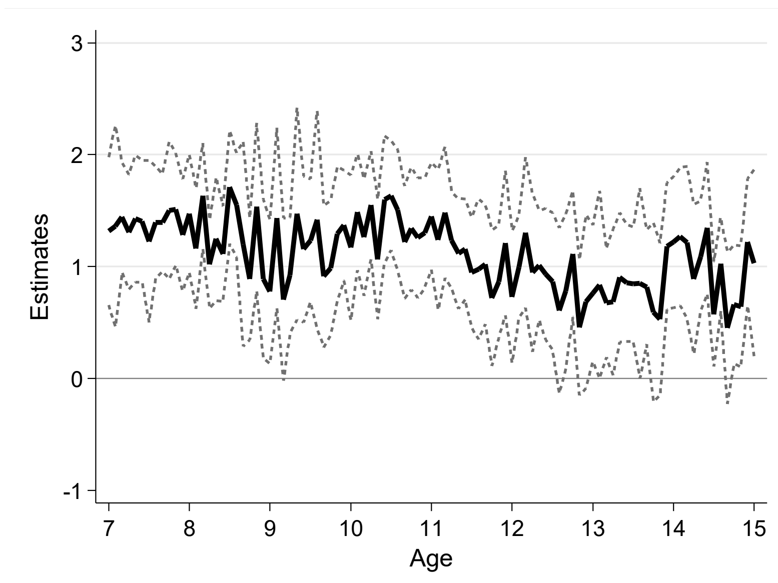
Appendix C: Basic results

Figure C-1: Basic results (monthly)

A. Outpatient dummy



B. **Outpatient spending** (in 1000 JPY)



Notes: The main sample is used. An outpatient dummy takes one if there is at least one outpatient visit per month, and outpatient spending is the monthly spending on outpatient care measured in 1000 JPY (approximately 10 USD). The estimates β_a (where a is age in months) are plotted. The dotted lines are the 95th confidence intervals and the standard errors clustered at municipality level are used to construct them. The observations within 2 months from the price changes are excluded from the sample to account for anticipatory utilization.

Table C-1: Basic results

	A. Outpatient dummy				B. Outpatient spending (in 1000 JPY)			
	(1)		(2)		(3)		(4)	
	Estimate	(SE)	*Semi-arc elasticity*	[SE]	Estimate	(SE)	*Semi-arc elasticity*	[SE]
Subsidized ×								
Age7	0.075***	(0.006)	*-0.550****	[0.027]	1.376***	(0.236)	*-0.739****	[0.050]
Age8	0.068***	(0.006)	*-0.521****	[0.026]	1.278***	(0.179)	*-0.715****	[0.058]
Age9	0.070***	(0.005)	*-0.574****	[0.027]	1.131***	(0.171)	*-0.662****	[0.057]
Age10	0.073***	(0.005)	*-0.629****	[0.028]	1.350***	(0.221)	*-0.835****	[0.057]
Age11	0.066***	(0.006)	*-0.600****	[0.029]	1.113***	(0.211)	*-0.708****	[0.065]
Age12	0.064***	(0.004)	*-0.614****	[0.032]	0.872***	(0.223)	*-0.548****	[0.071]
Age13	0.062***	(0.004)	*-0.612****	[0.029]	0.811***	(0.218)	*-0.503****	[0.070]
Age14	0.060***	(0.004)	*-0.613****	[0.034]	0.998***	(0.134)	*-0.633****	[0.077]
In-kind	0.047***	(0.014)			0.440	(0.388)		
Income restriction	-0.020**	(0.009)			-0.561	(0.372)		
R-squared	0.23				0.51			
N	2,205,647				2,205,647			
N of individuals	63,530				63,530			
Mean wo subsidy	0.32				4.49			

Notes: This table corresponds to Figure 5 in the main text. The main sample is used. An outpatient dummy in Panel A takes one if an individual makes at least one outpatient visit per month and zero otherwise. Outpatient spending in Panel B is total monthly spending on outpatient care measured in 1000 JPY (approximately 10USD). The estimates β_A from estimating equation [3], and the corresponding semi-arc elasticity for each age (A=7–14) are reported. See Appendix B for details on derivation of semi-arc elasticity. All the regressions include age (in months) FE, time (in month) FE, and individual FE. In-kind is a dummy that takes one if the municipality offers the subsidy in the form of in-kind instead of refund, and income restriction is a dummy that takes one if the municipality imposes income restriction for subsidy eligibility. For the estimates, the standard errors clustered at the municipality level are reported in parenthesis. For the semi-arc elasticity, the bootstrapped standard errors with 200 repetitions clustered at municipality level are reported in brackets. The observations within 2 months from the price changes are excluded from the sample to account for anticipatory utilization. Significance levels: *** p<0.01, ** p<0.05, * p<0.10

Appendix D: Robustness checks

We subject the main results in Figure 5 to a series of robustness checks. Critically, these results on the causal effects of patient cost-sharing to be robust across all specifications and models considered.

Figure D-1 plots the estimates of key robustness checks together with our baseline estimates from Figure 5. The corresponding results are summarized in Table D-1. For the ease the comparison, column (1) repeats the baseline estimates from column (1) of Table C-1.

First, we address the potential concern that our control group—namely municipalities without changes in subsidy—exhibits a different time trend than municipalities with subsidy. For example, if municipalities in better fiscal situations are more likely to implement the subsidy expansion, while income effects simply increase utilization, our estimates may be upward biased. This does not seem to be a serious concern since the estimates in event-study before T=0 seems to be reasonably smooth and close to zero. Nonetheless, we conduct several robustness checks to address this concern. We first add the municipality-specific time trend in column (2) and time-by-municipality FEs (where time is measured in months) in column (3) to account for the time-varying municipality characteristics that are correlated with both the expansion of the subsidy and healthcare utilization. The latter specification is especially stringent, as these fixed effects capture any municipality-specific policy change (e.g., income transfer or other subsidies) or event (outbreak of influenza) in a particular month. We are reassured that row (i) in Figure D-1 shows very similar results.

Second, another way to account for the potential endogeneity of subsidy expansion is to restrict the sample to only children who experienced at least one change in subsidy status, thereby, dropping children which remain either subsidized or unsubsidized throughout the sample period. Importantly, this identification strategy exploits only the *timing* of the changes in subsidy status. In this way, we can to some extent mitigate the concern that individuals in the treatment and control groups are different. Row (ii) in Figure D-1 shows that the estimates are somewhat noisier owing to the smaller sample but are qualitatively similar.

Third, we collapse the data at municipality-age-time cells, which is the level of variation, to partially account for zero spending at the person-month level. Then, we run cell regression analogous to equation [3] where the number of observations in each cell is used as a weight. Row (iii) in Figure D-1 shows that the estimates from the cell level analysis yields almost identical results to those from underlying individual micro data.

As a separate exercise, Figure D-2 and Table D-2 presents the sensitivity of our estimates to the size of the "donut-hole." The estimates and hence elasticities are barely affected after excluding 2 months from both sides of T=0.

Finally, we also run the alternative models for outpatient spending. In particular, we run two non-linear models (one-part and two-part GLM models) to account for highly skewed distribution of outpatient spending with the large mass at zero (e.g., Mullahy 1998; Blough et al. 1999).[1] For two-part models, we use the logit model for the first part, and the GLM model with a log link and a gamma distribution family for the second part.[2] For one-part GLM, we also

[1] Another widely used but rather ad-hoc approach is to take the logarithm of spending variable after adding an arbitrary small constant to account for zero spending (e.g., Aron-Dine *et al.* 2015; Brot-Goldberg *et al.* 2017). However, with a large number of zero observations, this model is very sensitive to the choice of small constant added to zero, and thus we do not take such an approach here (results are available upon request).

[2] The choices of a link function and a distribution family for two-part model are conducted as follows. First, Box-Cox test indicates that the estimated coefficient is close to zero (–0.033), leading to the choice of the log link. Second, a modified Park test, which

choose the log link and gamma distribution. Figure D-3 shows that estimates from these alternative models are qualitatively very similar to the OLS estimates.[3] To ease the computational burden for estimating the bootstrapped standard errors for our elasticity measures, we report the OLS estimates throughout the study.

References:

Aron-Dine, Aviva, Liran Einav, Amy Finkelstein, and Mark Cullen. (2015) "Moral Hazard in Health Insurance: Do Dynamic Incentives Matter?" *Review of Economics and Statistics* 97(4): 725–741.

Blough David K., Carolyn W. Madden, and Mark C. Hornbrook. (1999) "Modeling risk using generalized linear models." *Journal of Health Economics* 18: 153–171.

Brot-Goldberg, Zarek C., Amitabh Chandra, Benjamin R. Handel, and Jonathan T. Kolstad. (2017) "What does a Deductible Do? The Impact of Cost-Sharing on Health Care Prices, Quantities, and Spending Dynamics." *Quarterly Journal of Economics* 132(3): 1261–1318.

Buntin, Melinda Beeuwkes, and Alan M. Zaslavsky. (2004) "Too much ado about two-part models and transformation?: Comparing methods of modeling Medicare expenditures." *Journal of Health Economics* 23(3): 525–542.

Deb, Partha, and Edward C. Norton. (2018) "Modeling Health Care Expenditures and Use." *Annual Review of Public Health* 39: 489–505.

Mullahy, John. (1998) "Much ado about two: reconsidering retransformation and the two-part model in health econometrics" *Journal of Health Economics* 17(3): 247–281.

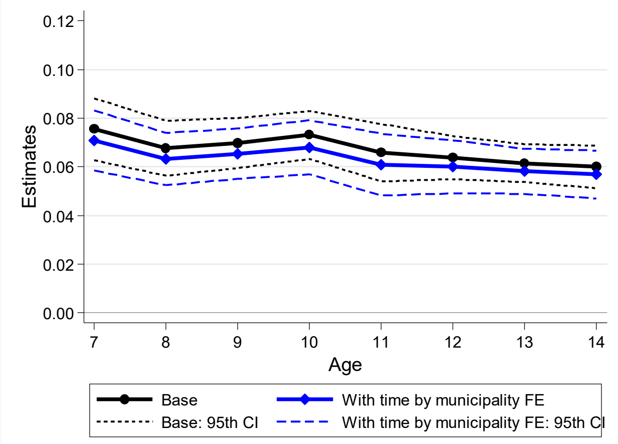
empirically tests the relationship between the mean and the variance, turns out to be close to two (2.27), suggesting that a gamma family is appropriate. See for example, Buntin and Zaslavsky (2004) and Deb and Norton (2018) for details on these procedures.

[3] Here, we report the estimates from a variant of the main specification [3] where individual FE is replaced by municipality FEs to ease the computation burden of GLM models. The margin command in Stata14 is used to obtain the treatment effects.

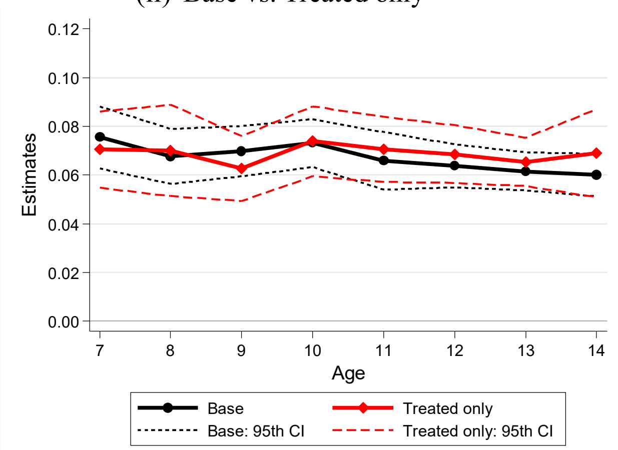
Figure D-1: Robustness checks (Estimates only)

A. Outpatient dummy

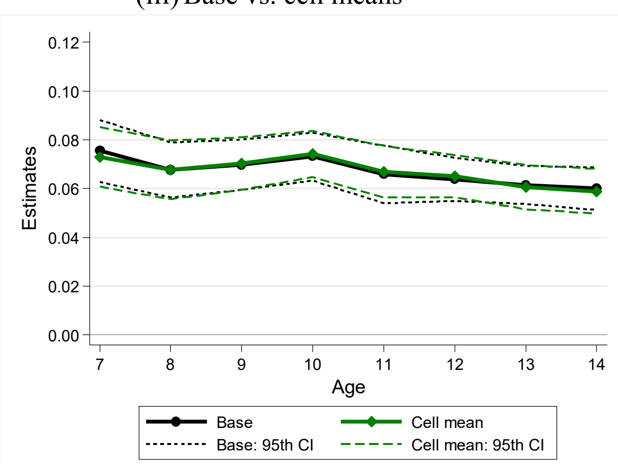
(i) Base vs. With time by municipality FE



(ii) Base vs. Treated only

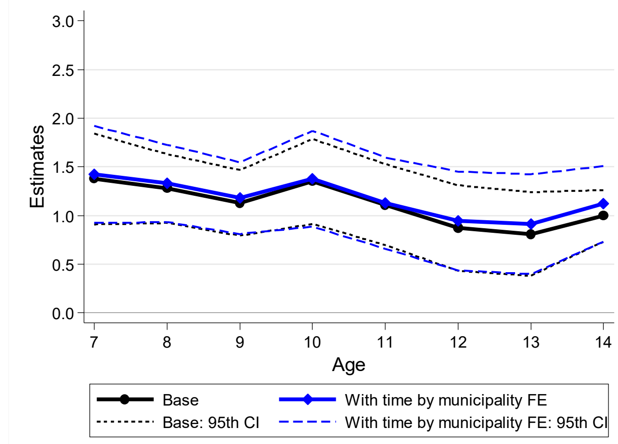


(iii) Base vs. cell means

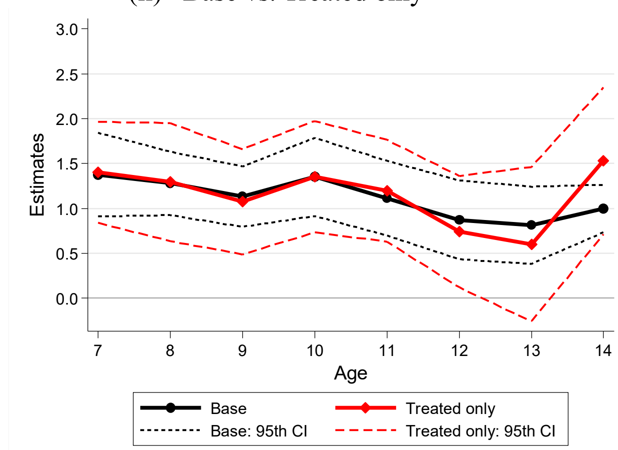


B. Outpatient spending (in 1000 JPY)

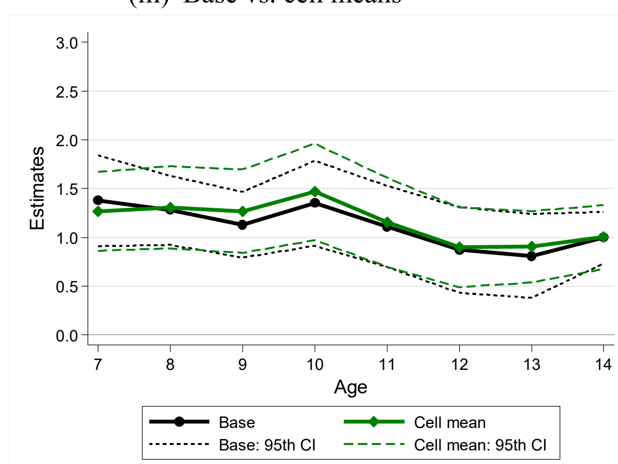
(i) Base vs. With time by municipality FE



(ii) Base vs. Treated only



(iii) Base vs. cell means

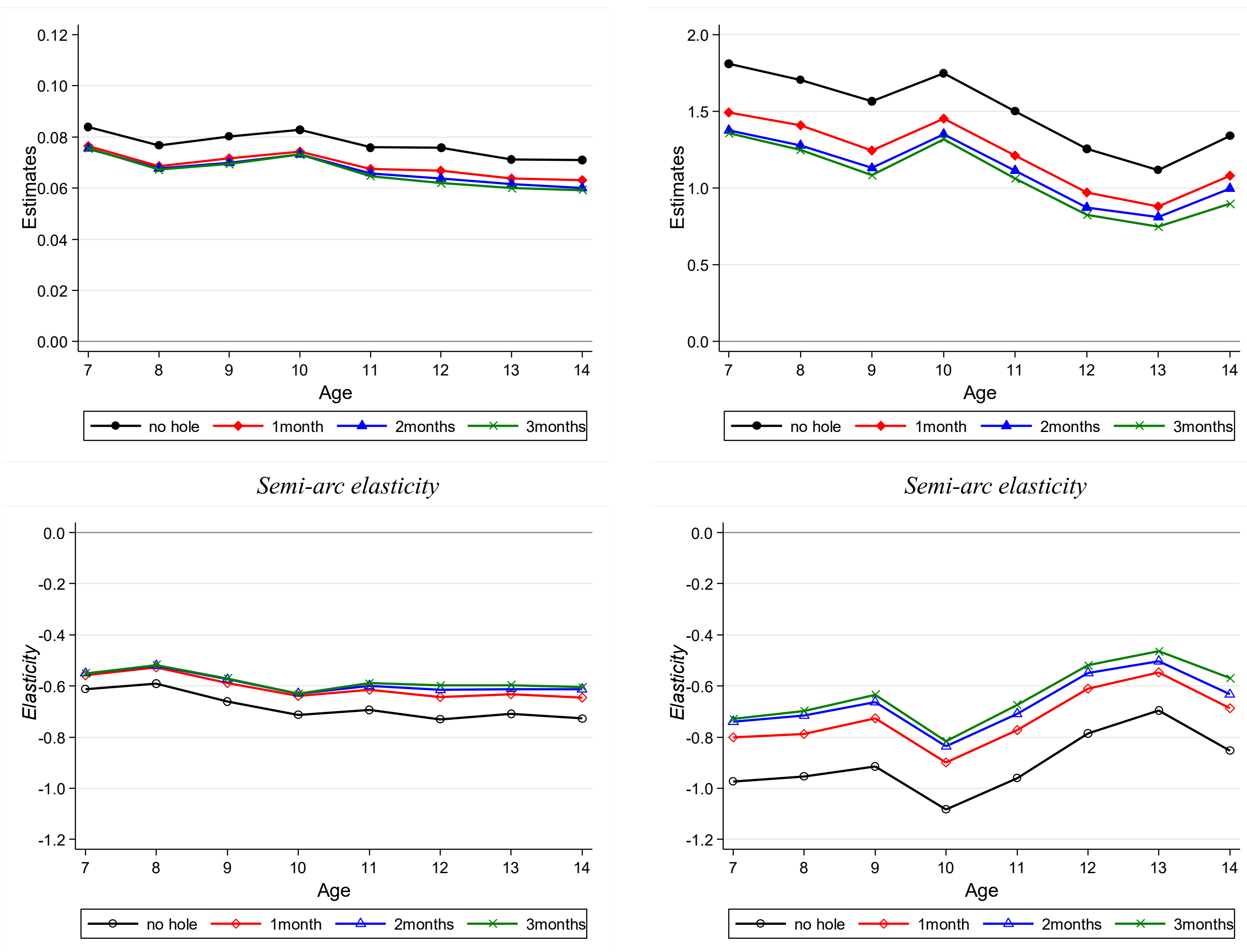


Notes: The main sample is used. An outpatient dummy takes one if there is at least one outpatient visit per month, and outpatient spending is the monthly spending on outpatient care measured in 1000 JPY (approximately 10 USD). The estimates β_A for each age (A=7–14) from estimating equation [3] are reported. The dotted lines are the 95th confidence intervals derived from standard errors clustered at municipality level except for 2) where standard errors clustered at individual level. The observations within 2 months from the price changes are excluded from the sample to account for anticipatory utilization. Along with our baseline estimates, (i) reports the estimates which include time-by-municipality FE, (ii) reports the estimates from the sample limited to those individuals which experienced at least one change in subsidy status, and (iii) reports the estimates from cell means where the cell is defined by municipality-age-time and the number of observations in each cell is used as a weight.

Figure D-2: Sizes of "donut" holes and the estimates/elasticities

A. Outpatient dummy — Estimate

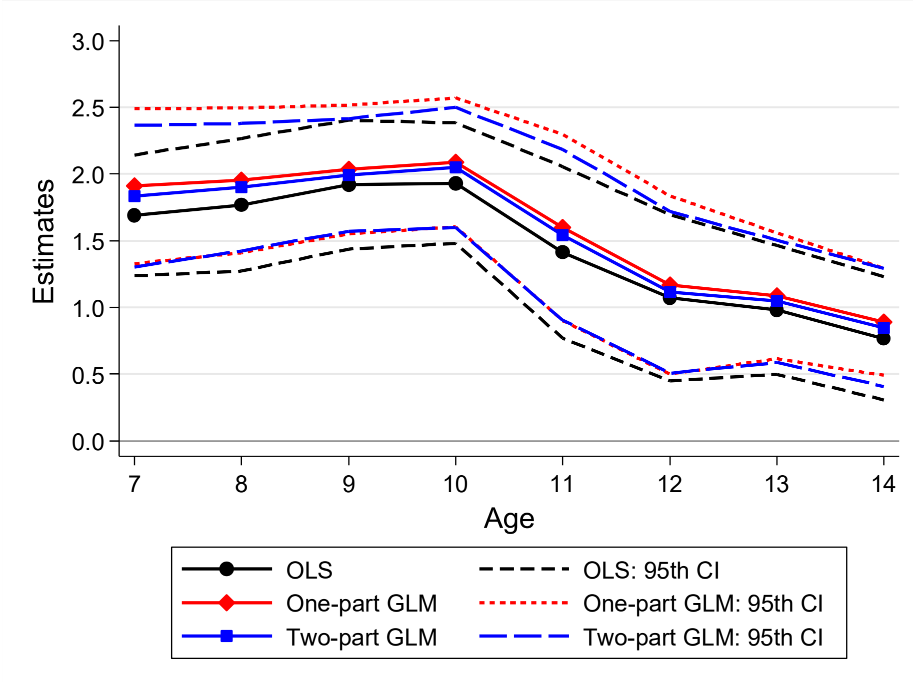
B. Outpatient spending (in 1000 JPY) — Estimate



Notes: The main sample is used. An outpatient dummy in Panel A takes one if there is at least one outpatient visit per month, and outpatient spending in Panel B is the monthly spending on outpatient care measured in 1000 JPY (approximately 10 USD). The upper half plots β_A for each age (A=7–14) from estimating equation [3], and the bottom half plots the corresponding semi-arc elasticity. See Appendix B for derivation of semi-arc elasticity. Each line plots the estimates from the sample where the observations within 1, 2, and 3 months from price changes are excluded along with the estimates of no exclusion ("no hole").

Figure D-3: Different models (Estimates only)

Outcome: Outpatient spending (in 1000 JPY)



Notes: The main sample is used. Outpatient spending is the monthly spending on outpatient care measured in 1000 JPY (approximately 10 USD). The observations within 2 months from the price changes are excluded from the sample to account for anticipatory utilization. The graph plots the estimates β_A for each age (A=7–14) with three separate models (OLS, one-part GLM, and two-part GLM). For two-part GLM, we use the logit model for the first part, and the GLM model with a log link and a gamma distribution family for the second part. For one-part GLM, we also choose the log link and gamma distribution. Here, we report the estimates from a variant of the main specification [3] where individual FE is replaced by municipality FEs to ease the computational burden of GLM models. The margin command in Stata14 is used to obtain the treatment effects.

Table D-1: Robustness checks

(i) Outcome: Outpatient dummy

	Baseline (Col. 1 Table C-1)		With municipality-specific trend		With time-by-municipality FE		Among only treated		Cell	
	Estimate	(SE)	Estimate	(SE)	Estimate	(SE)	Estimate	(SE)	Estimate	(SE)
	(1)		(2)		(3)		(4)		(5)	
Subsidized ×										
Age7	0.075***	(0.006)	0.070***	(0.006)	0.071***	(0.006)	0.070***	(0.008)	0.073***	(0.006)
Age8	0.068***	(0.006)	0.064***	(0.005)	0.063***	(0.005)	0.070***	(0.009)	0.068***	(0.006)
Age9	0.070***	(0.005)	0.066***	(0.005)	0.065***	(0.005)	0.063***	(0.007)	0.070***	(0.005)
Age10	0.073***	(0.005)	0.070***	(0.005)	0.068***	(0.006)	0.074***	(0.007)	0.074***	(0.005)
Age11	0.066***	(0.006)	0.063***	(0.006)	0.061***	(0.006)	0.071***	(0.007)	0.067***	(0.005)
Age12	0.064***	(0.004)	0.062***	(0.005)	0.060***	(0.006)	0.069***	(0.006)	0.065***	(0.004)
Age13	0.062***	(0.004)	0.061***	(0.004)	0.058***	(0.005)	0.065***	(0.005)	0.061***	(0.005)
Age14	0.060***	(0.004)	0.060***	(0.005)	0.057***	(0.005)	0.069***	(0.009)	0.059***	(0.005)
In-kind	0.047***	(0.014)	0.054***	(0.019)	0.017	(0.031)	0.040**	(0.019)	0.054***	(0.016)
Income restriction	-0.020**	(0.009)	-0.015*	(0.008)	-0.014	(0.009)	-0.017*	(0.009)	-0.017**	(0.008)
R-squared	0.23		0.23		0.24		0.19		0.30	
N	2,205,647		2,205,647		2,204,496		862,211		465,241	
N of individuals	63,530		63,530		63,502		13,892		-	
Age FE	X		X		X		X		X	
Time FE	X		X		X		X		X	
Individual FE	X		X		X		X		-	
Municipality-specific trend			X							
Time-by-municipality FE					X					

Notes: The main sample is used. An outpatient dummy takes one if there is at least one outpatient visit per month. The estimates β_A from estimating equation [3] are reported. For ease of comparison, Column (1) replicates the estimates from Column (1) in Table C-1. Columns (2) and (3) add municipality-specific time trend and time-by-municipality (time is measured in months) FE, respectively. Column (4) reports the estimates from the sample limited to those individuals which experienced at least one change in subsidy status. Column (5) reports the estimates from cell means where the cell is defined by municipality-age-time and the number of observations in each cell is used as a weight. The standard errors clustered at the municipality level are reported in parenthesis. The observations within 2 months from the price changes are excluded from the sample to account for anticipatory utilization. *** $p<0.01$, ** $p<0.05$, * $p<0.10$

(ii) Outcome: Outpatient spending (in 1000 JPY)

	Baseline (Col. 3 Table C-1)		With municipality-specific trend		With time-by-municipality FE		Among only treated		Cell	
	Estimate	(SE)	Estimate	(SE)	Estimate	(SE)	Estimate	(SE)	Estimate	(SE)
	(1)		(2)		(3)		(4)		(5)	
Subsidized ×										
Age7	1.376***	(0.236)	1.452***	(0.216)	1.422***	(0.253)	1.401***	(0.285)	1.267***	(0.204)
Age8	1.278***	(0.179)	1.366***	(0.172)	1.331***	(0.201)	1.293***	(0.333)	1.310***	(0.213)
Age9	1.131***	(0.171)	1.215***	(0.147)	1.180***	(0.186)	1.073***	(0.297)	1.269***	(0.216)
Age10	1.350***	(0.221)	1.430***	(0.189)	1.378***	(0.249)	1.353***	(0.315)	1.468***	(0.251)
Age11	1.113***	(0.211)	1.184***	(0.191)	1.128***	(0.237)	1.196***	(0.287)	1.157***	(0.231)
Age12	0.872***	(0.223)	0.943***	(0.212)	0.944***	(0.257)	0.741**	(0.314)	0.900***	(0.208)
Age13	0.811***	(0.218)	0.889***	(0.196)	0.912***	(0.260)	0.602	(0.435)	0.907***	(0.186)
Age14	0.998***	(0.134)	1.069***	(0.124)	1.120***	(0.197)	1.531***	(0.414)	1.006***	(0.167)
In-kind	0.440	(0.388)	0.815***	(0.305)	0.405	(0.792)	0.097	(0.336)	0.399	(0.363)
Income restriction	-0.561	(0.372)	-0.519*	(0.269)	-0.366	(0.288)	-0.501	(0.439)	-0.297	(0.617)
R-squared	0.51		0.51		0.51		0.54		0.56	
N	2,205,647		2,205,647		2,204,496		862,211		465,241	
N of individuals	63,530		63,530		63,502		13,892		-	
Age FE	X		X		X		X		X	
Time FE	X		X		X		X		X	
Individual FE	X		X		X		X		-	
Municipality-specific trend			X							
Time-by-municipality FE					X					

Notes: The main sample is used. Outpatient spending is the monthly spending on outpatient care measured in 1000 JPY (approximately 10 USD). The estimates β_A from estimating equation [3] are reported. For ease of comparison, Column (1) replicates the estimates from Column (1) in Table C-1. Columns (2) and (3) add municipality-specific time trend and time-by-municipality (time is measured in months) FE, respectively. Column (4) reports the estimates from the sample limited to those individuals which experienced at least one change in subsidy status. Column (5) reports the estimates from cell means where the cell is defined by municipality-age-time and the number of observations in each cell is used as a weight. The standard errors clustered at the municipality level are reported in parenthesis. The observations within 2 months from the price changes are excluded from the sample to account for anticipatory utilization. *** p<0.01, ** p<0.05, * p<0.10

Table D-2: The size of "donut" holes and corresponding estimates/elasticities

(i) Outcome: Outpatient dummy

	No exclusion		±1month excluded		±2months excluded		±3months excluded		No exclusion	±1month excluded	±2months excluded	±3months excluded
	Estimate	(SE)	Estimate	(SE)	Estimate	(SE)	Estimate	(SE)	*Semi-arc elasticity*			
	(1)		(2)		(3)		(4)		(5)	(6)	(7)	(8)
Subsidized ×												
Age7	0.084***	(0.005)	0.077***	(0.006)	0.075***	(0.006)	0.076***	(0.007)	*-0.612*	*-0.558*	*-0.550*	*-0.551*
Age8	0.077***	(0.004)	0.069***	(0.005)	0.068***	(0.006)	0.067***	(0.007)	*-0.590*	*-0.527*	*-0.521*	*-0.518*
Age9	0.080***	(0.004)	0.072***	(0.005)	0.070***	(0.005)	0.069***	(0.006)	*-0.660*	*-0.589*	*-0.574*	*-0.570*
Age10	0.083***	(0.005)	0.074***	(0.005)	0.073***	(0.005)	0.073***	(0.005)	*-0.714*	*-0.639*	*-0.629*	*-0.630*
Age11	0.076***	(0.005)	0.067***	(0.006)	0.066***	(0.006)	0.065***	(0.006)	*-0.693*	*-0.615*	*-0.600*	*-0.589*
Age12	0.076***	(0.004)	0.067***	(0.004)	0.064***	(0.004)	0.062***	(0.005)	*-0.731*	*-0.643*	*-0.614*	*-0.597*
Age13	0.071***	(0.004)	0.064***	(0.004)	0.062***	(0.004)	0.060***	(0.004)	*-0.708*	*-0.633*	*-0.612*	*-0.596*
Age14	0.071***	(0.004)	0.063***	(0.004)	0.060***	(0.004)	0.059***	(0.005)	*-0.727*	*-0.646*	*-0.613*	*-0.604*
In-kind	0.041***	(0.013)	0.042***	(0.013)	0.047***	(0.014)	0.051***	(0.014)				
Income restriction	-0.021***	(0.008)	-0.018**	(0.008)	-0.020**	(0.009)	-0.017	(0.011)				
R-squared	0.51		0.51		0.51		0.51					
N	2,303,335		2,253,851		2,205,647		2,158,881					
N of individuals	63,590		63,570		63,530		63,362					

Notes: The main sample is used. An outpatient dummy takes one if there is at least one outpatient visit per month. The estimates β_A from estimating equation [3], and the corresponding semi-arc elasticity for each age (A=7–14) are reported. See Appendix B for details on derivation of semi-arc elasticity. All the regressions include age (in months) FE, time (in month) FE, and individual FE. In-kind is a dummy that takes one if the municipality offers the subsidy in the form of in-kind instead of refund, and income restriction is a dummy that takes one if the municipality imposes income restriction for subsidy eligibility. The standard errors clustered at the municipality level are reported in parenthesis. Column (1) does not exclude any observations, while columns (2)–(4) exclude the observations within one, two, and three months from the both sides of price changes to account for anticipatory utilization. Columns (5)–(8) report the semi-arc elasticities that correspond to estimates from columns (1)–(4). Significance levels: *** $p<0.01$, ** $p<0.05$, * $p<0.10$

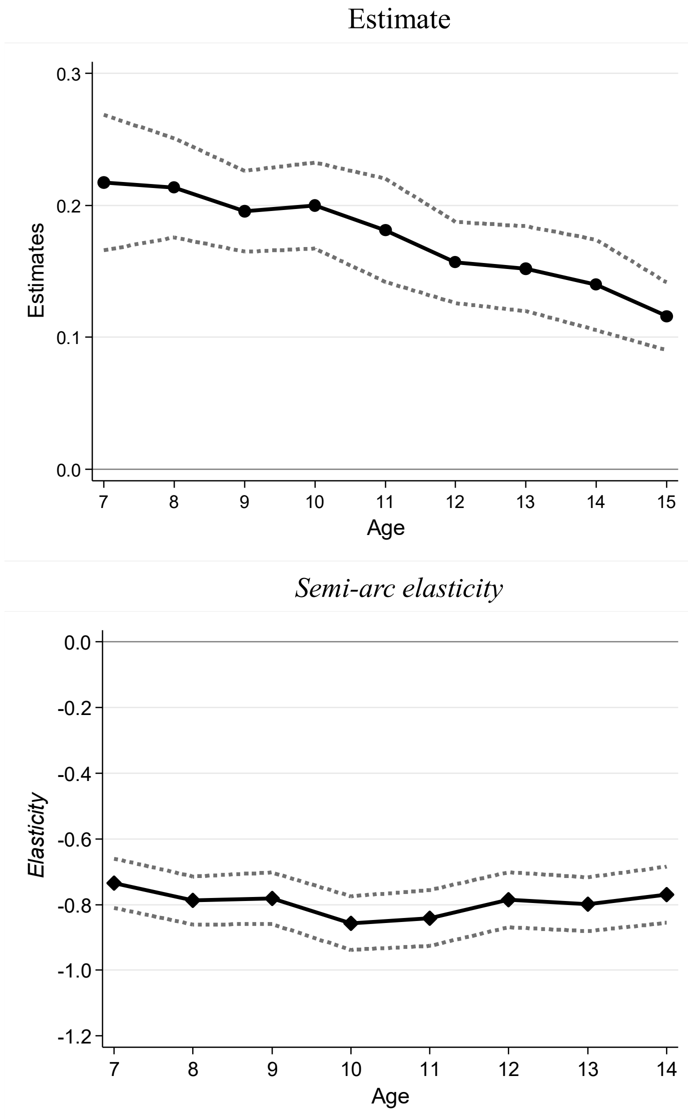
(ii) Outcome: Outpatient spending (in 1000 JPY)

	No exclusion		±1month excluded		±2months excluded		±3months excluded		No exclusion	±1month excluded	±2months excluded	±3months excluded
	Estimate	(SE)	Estimate	(SE)	Estimate	(SE)	Estimate	(SE)	*Semi-arc elasticity*			
	(1)		(2)		(3)		(4)		(5)	(6)	(7)	(8)
Subsidized ×												
Age7	1.812***	(0.192)	1.493***	(0.221)	1.376***	(0.236)	1.357***	(0.270)	*-0.974*	*-0.801*	*-0.739*	*-0.729*
Age8	1.705***	(0.164)	1.410***	(0.175)	1.278***	(0.179)	1.249***	(0.199)	*-0.954*	*-0.788*	*-0.715*	*-0.697*
Age9	1.565***	(0.155)	1.243***	(0.163)	1.131***	(0.171)	1.083***	(0.196)	*-0.915*	*-0.727*	*-0.662*	*-0.634*
Age10	1.749***	(0.200)	1.453***	(0.217)	1.350***	(0.221)	1.319***	(0.246)	*-1.083*	*-0.899*	*-0.835*	*-0.815*
Age11	1.502***	(0.192)	1.214***	(0.208)	1.113***	(0.211)	1.062***	(0.229)	*-0.960*	*-0.773*	*-0.708*	*-0.673*
Age12	1.255***	(0.186)	0.970***	(0.201)	0.872***	(0.223)	0.824***	(0.253)	*-0.785*	*-0.610*	*-0.548*	*-0.519*
Age13	1.117***	(0.192)	0.881***	(0.205)	0.811***	(0.218)	0.748***	(0.240)	*-0.696*	*-0.548*	*-0.503*	*-0.463*
Age14	1.341***	(0.112)	1.080***	(0.117)	0.998***	(0.134)	0.899***	(0.166)	*-0.853*	*-0.686*	*-0.633*	*-0.569*
In-kind	-0.385	(0.661)	0.422	(0.354)	0.440	(0.388)	0.470	(0.435)				
Income restriction	-0.564*	(0.317)	-0.553	(0.356)	-0.561	(0.372)	-0.626	(0.401)				
R-squared	0.51		0.51		0.51		0.51					
N	2,303,335		2,253,851		2,205,647		2,158,881					
N of individuals	63,590		63,570		63,530		63,362					

Notes: The main sample is used. Outpatient spending is the monthly spending on outpatient care measured in 1000 JPY (approximately 10 USD). The estimates β_A from estimating equation [3], and the corresponding semi-arc elasticity for each age (A=7–14) are reported. See Appendix B for details on derivation of semi-arc elasticity. All the regressions include age (in months) FE, time (in month) FE, and individual FE. In-kind is a dummy that takes one if the municipality offers the subsidy in the form of in-kind instead of refund, and income restriction is a dummy that takes one if the municipality imposes income restriction for subsidy eligibility. The standard errors clustered at the municipality level are reported in parenthesis. Column (1) does not exclude any observations, while columns (2)–(4) exclude the observations within one, two, and three months from price changes to account for anticipatory utilization. Columns (5)–(8) report the semi-arc elasticities that correspond to estimates from columns (1)–(4). Significance levels: *** $p<0.01$, ** $p<0.05$, * $p<0.10$

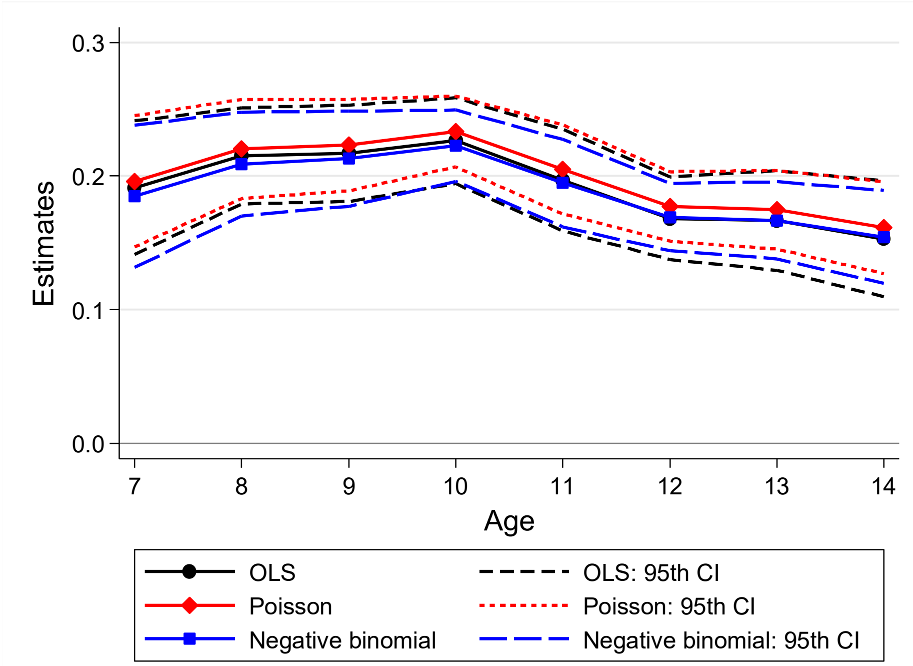
Appendix E: Other outcomes

Figure E-1: Frequency of outpatient visits



Notes: The main sample is used. The frequency of outpatient visits is the number of outpatient visits per month. The estimates β_A for each age (*A*=7–14) from estimating equation [3] are reported. The dotted lines are the 95th confidence intervals. The standard errors clustered at municipality level are used for estimates, and the bootstrapped standard errors clustered at municipality with 200 repetitions are used for the semi-arc elasticity. The observations within 2 months from the price changes are excluded from the sample to account for anticipatory utilization.

Figure E-2: Different models for frequency of outpatient visits

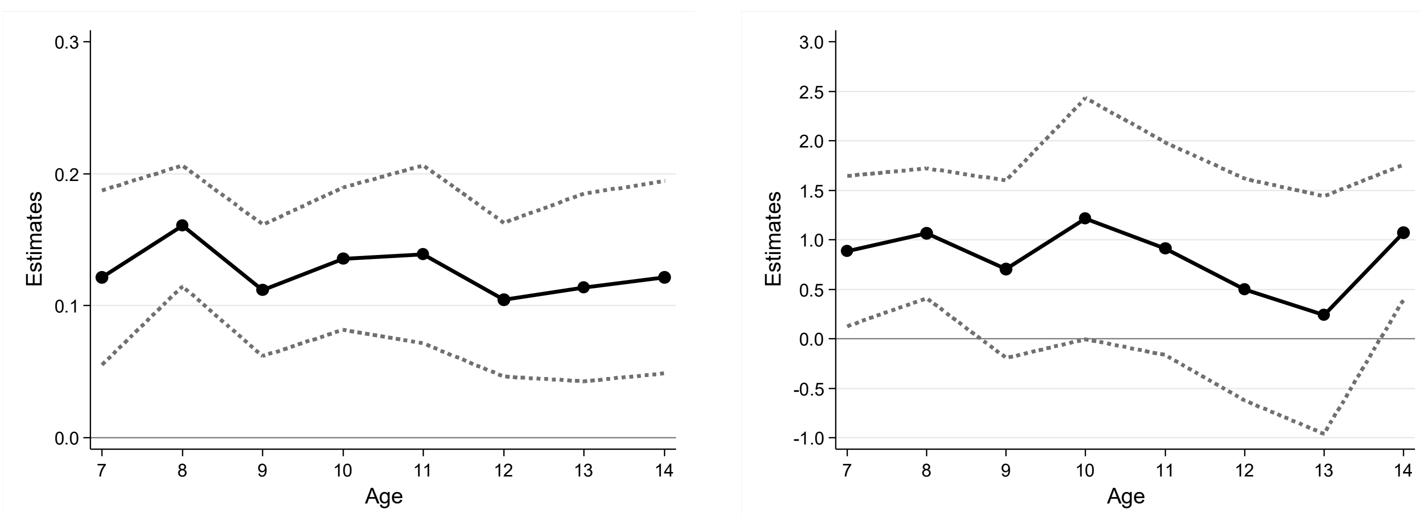


Notes: The main sample is used. The frequency of outpatient visits is the number of outpatient visits per month. The observations within 2 months from the price changes are excluded from the sample to account for anticipatory utilization. The graph plots the estimates β_A for each age (A=7–14) with three separate models (OLS, Poisson, and negative binominal). Here, we report the estimates from a variant of the main specification [3] where individual FE is replaced by municipality FEs to ease the computational burden of count models. The margin command in Stata14 is used to obtain the treatment effects.

Figure E-3: *Conditional on* positive spending (intensive margin)

A. Frequency of outpatient visits (outpatient spending>0)

B. Outpatient spending (outpatient spending>0)



Notes: The main sample is used where the sample is further limited to observations with positive spending (N= 891,829). The frequency of outpatient visits is the number of outpatient visits per month, and outpatient spending is the monthly spending on outpatient care measured in 1000 JPY (approximately 10 USD). The estimates β_A for each age (A=7–14) from estimating equation [3] are reported. The dotted lines are the 95th confidence intervals derived from standard errors clustered at municipality level. The observations within 2 months from the price changes are excluded from the sample to account for anticipatory utilization.

Table E-1: Frequency of outpatient visits

	(1)		(2)	
	Estimate	(SE)	*Semi-arc elasticity*	[SE]
Subsidized ×				
Age7	0.217***	(0.026)	*-0.735****	[0.038]
Age8	0.213***	(0.019)	*-0.788****	[0.037]
Age9	0.196***	(0.016)	*-0.781****	[0.040]
Age10	0.200***	(0.016)	*-0.856****	[0.042]
Age11	0.181***	(0.020)	*-0.841****	[0.043]
Age12	0.157***	(0.016)	*-0.785****	[0.043]
Age13	0.152***	(0.016)	*-0.799****	[0.042]
Age14	0.140***	(0.017)	*-0.770****	[0.044]
In-kind	0.072	(0.051)		
Income restriction	-0.083***	(0.026)		
R-squared	0.28			
N	2,205,647			
N of individuals	63,530			
Mean wo subsidy	0.62			

Notes: The main sample is used. The frequency of outpatient visits is the number of outpatient visits per month. The estimates β_A from estimating equation [3], and the corresponding semi-arc elasticity for each age (A=7–14) are reported. See Appendix B for details on derivation of semi-arc elasticity. All the regressions include age (in months) FE, time (in month) FE, and individual FE. In-kind is a dummy that takes one if the municipality offers the subsidy in the form of in-kind instead of refund, and income restriction is a dummy that takes one if the municipality imposes income restriction for subsidy eligibility. For the estimates, the standard errors clustered at the municipality level are reported in parenthesis. For the semi-arc elasticity, the bootstrapped standard errors with 200 repetitions clustered at municipality level are reported in brackets. The observations within 2 months from the price changes are excluded from the sample to account for anticipatory utilization. Significance levels: *** $p<0.01$, ** $p<0.05$, * $p<0.10$

Table E-2: *Conditional on* positive spending (intensive margin)

	A. Frequency of outpatient visits (outpatient spending >0)		B. Outpatient spending (outpatient spending >0)	
	(1)		(2)	
	Estimate	(SE)	Estimate	(SE)
Subsidized ×				
Age7	0.120***	(0.033)	0.870**	(0.377)
Age8	0.160***	(0.023)	1.014***	(0.325)
Age9	0.112***	(0.025)	0.700	(0.440)
Age10	0.134***	(0.027)	1.206**	(0.607)
Age11	0.140***	(0.035)	0.962*	(0.543)
Age12	0.103***	(0.029)	0.605	(0.582)
Age13	0.113***	(0.036)	0.293	(0.623)
Age14	0.121***	(0.037)	1.148***	(0.357)
In-kind	-0.078	(0.097)	-0.078	-0.531
Income restriction	-0.052	(0.039)	-0.052	-0.326
R-squared	0.25		0.63	
N	901,070		901,070	
Mean	1.93		13.90	

Notes: The main sample is used where the sample is further limited to observations with positive spending (N= 891,829). The frequency of outpatient visits is the number of outpatient visits per month, and outpatient spending is the monthly spending on outpatient care measured in 1000 JPY (approximately 10 USD). The estimates β_A from estimating equation [3] for each age (A=7–14) are reported. All the regressions include age (in months) FE, time (in month) FE, and individual FE. In-kind is a dummy that takes one if the municipality offers the subsidy in the form of in-kind instead of refund, and income restriction is a dummy that takes one if the municipality imposes income restriction for subsidy eligibility. The standard errors clustered at the municipality level are reported in parenthesis. The observations within 2 months from the price changes are excluded from the sample to account for anticipatory utilization. Significance levels: *** p<0.01, ** p<0.05, * p<0.10

Appendix F: By service categories

Given that we find the substantial increases in outpatient utilization, it is natural to ask which types of medical services are driving the results. To do so, we group the medical services into six broad categories: medication, consultation fees, laboratory tests, non-surgical procedure, surgical procedure, and others. The last row in Table I-1 shows that the medication is by far the largest share in outpatient spending that accounts more than half (54.1%). Note here that medication includes fees not only for medicine itself but also those related to prescribing and dispensing medications, including fees at the pharmacy. Consultation fees (18.4%), laboratory tests (17.2%), and non-surgical procedures (5.3%) are next three categories, and combined with medication, these four categories account for 95% of total outpatient spending. The remaining categories are "others" (3.4%) and "surgical procedure" (1.6%). Thus, in what follows, we focus on these four main service categories.

Figure F-1 plots the event study separately for these four service categories on outpatient spending. As expected, we see the abrupt changes in utilization at the time of price changes for all service categories examined. In addition, as consistent with intuition, the magnitudes of anticipatory spending seem to be large in mediation and laboratory tests, suggesting that these medical services can be more easily timed (stockpiled) than other services such as non-surgical procedure.

Figure F-2 provides the graphical presentation of our difference-in-difference estimates from equation [3]. Table F-1 is the corresponding table. The consultation fees—which are charged in each visit and thus, is closely related to the frequency—are least price sensitive. On the other hand, the medical services related to the treatment intensity such as laboratory tests and non-surgical procedures, are more price sensitive. Laboratory test includes imaging, which is often identified as having unproven medical value (e.g., Lee and Levy 2012). When imaging is separately examined, we also find the statistically significant increase as well (results are available upon request).

These results are consistent with our finding that the spending conditional on positive spending also increases. Interestingly, the medication is not as price sensitive as other service categories are.

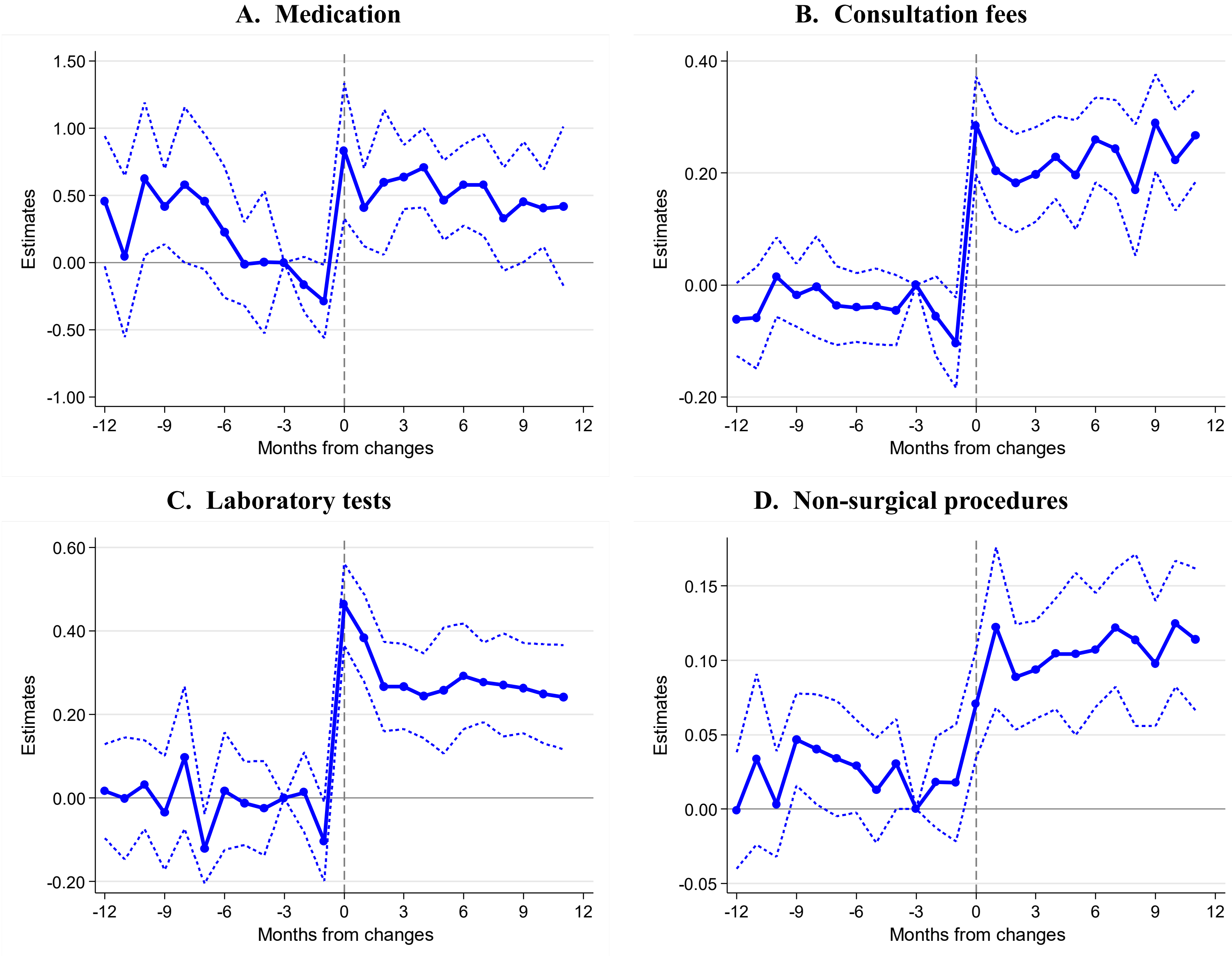
References:

Lee, David, and Frank Levy. (2012) "The Sharp Slowdown in Growth of Medical Imaging: An Early Analysis Suggests Combination of Policies Was the Cause." *Health Affairs* 31(8): 1–9.

Figure F-1: Event study by service categories

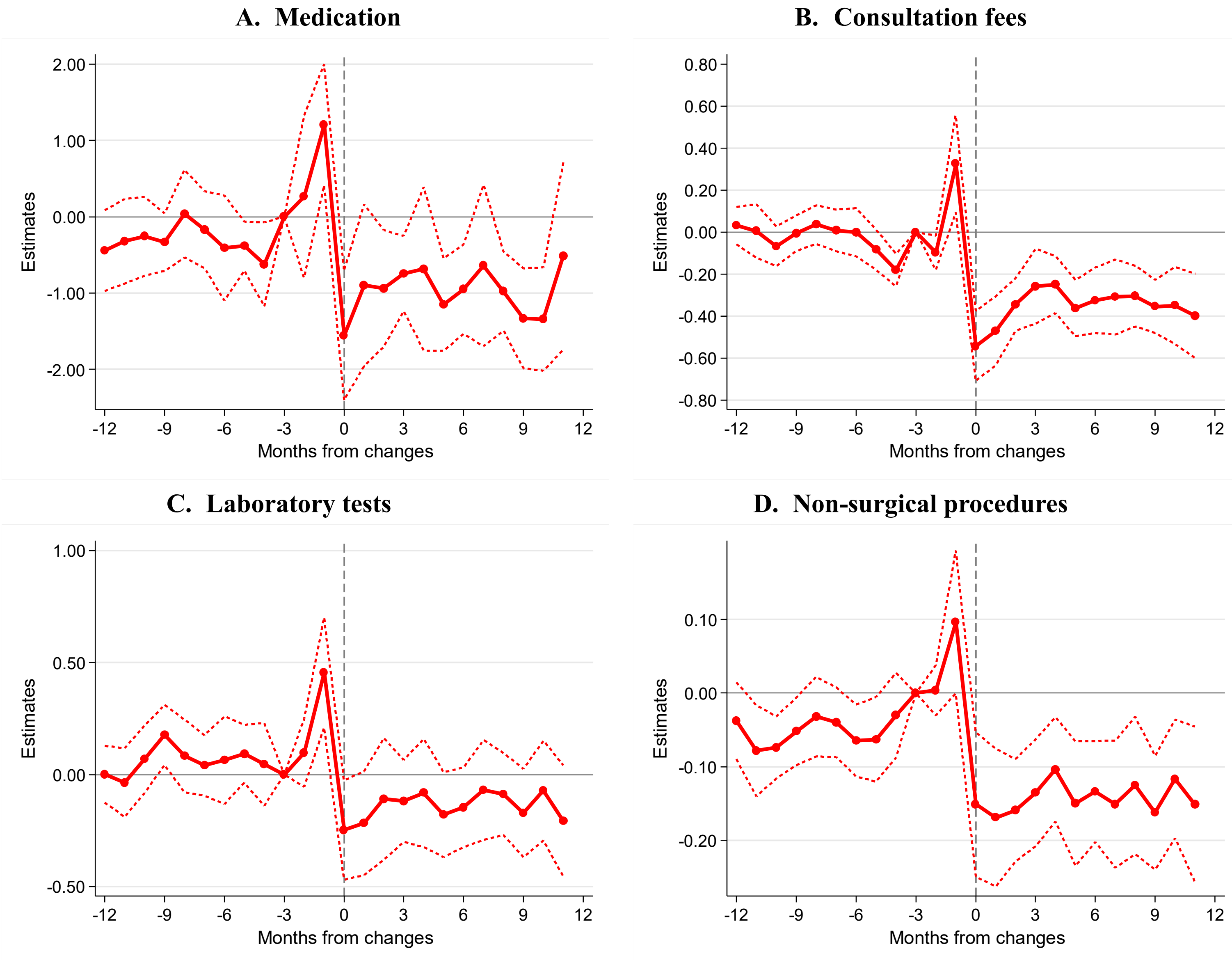
Outcome: Outpatient spending (in 1000 JPY)

(i) Better (subsidy expansion)



Notes: The main sample is used. Outpatient spending is the monthly spending on outpatient care measured in 1000 JPY (approximately 10 USD). "Better" indicates the subsidy expansion which lowers the price of healthcare from 30% to 0%. The solid lines plot the estimates from a variant of estimation equation [3] where the subsidized dummy is replaced by the interaction of belonging to the treatment group (i.e., experiencing the change in subsidy status) and a series of dummies for each month, ranging from 12 months prior to the change in subsidy status to 12 months after the change (T= –12 to +11, where T=0 is the change in subsidy status). The dotted lines are the 95th confidence interval derived from standard errors clustered at municipality level. The reference month is 3 months before the price changes (T= –3).

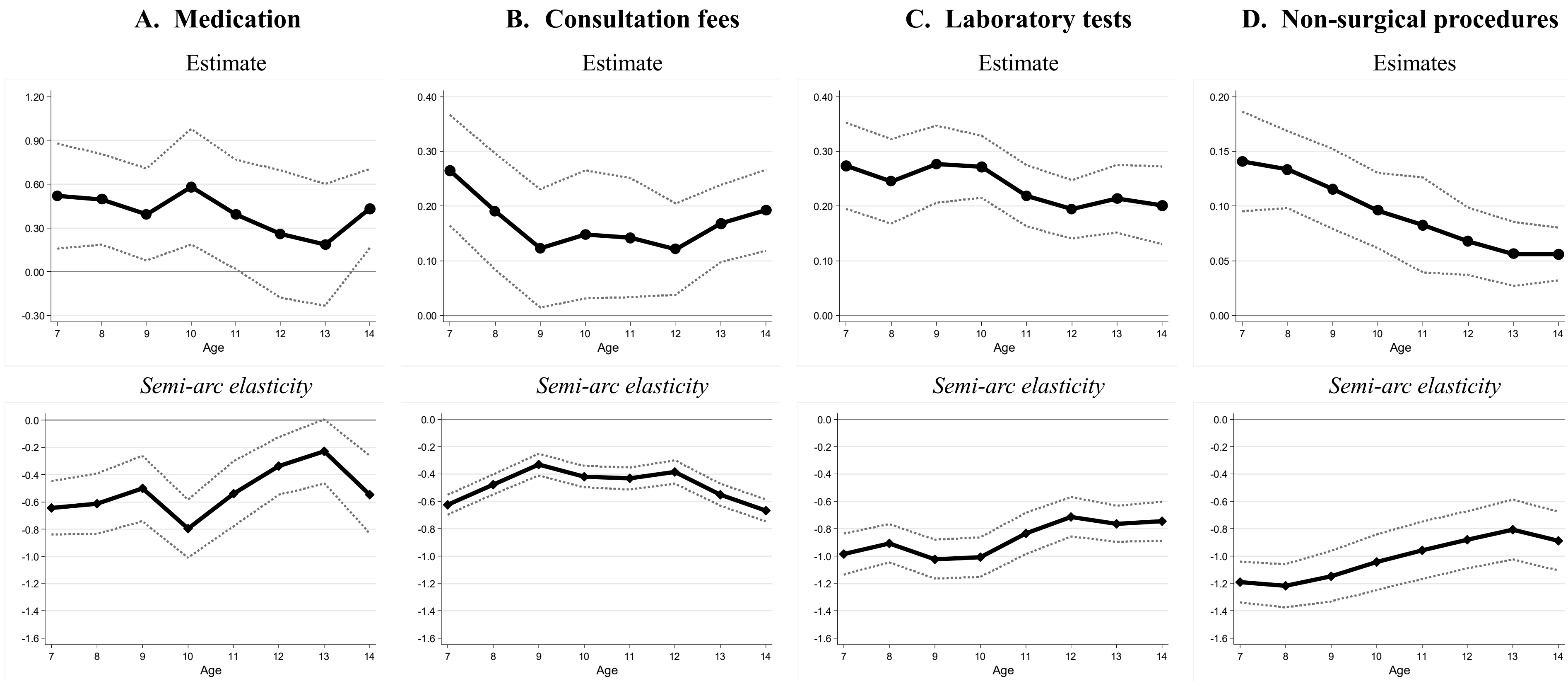
(ii) Worse (subsidy expiration)



Notes: The main sample is used. Outpatient spending is the monthly spending on outpatient care measured in 1000 JPY (approximately 10 USD). "Worse" indicates subsidy expiration that raises the price from 0% to 30%. The solid lines plot the estimates from a variant of estimation equation [3] where the subsidized dummy is replaced by the interaction of belonging to the treatment group (i.e., experiencing the change in subsidy status) and a series of dummies for each month, ranging from 12 months prior to the change in subsidy status to 12 months after the change ($T = -12$ to $+11$, where $T=0$ is the change in subsidy status). The dotted lines are the 95th confidence interval derived from standard errors clustered at municipality level. The reference month is 3 months before the price changes ($T = -3$).

Figure F-2: By service categories

Outcome: Outpatient spending (in 1000 JPY)



Notes: The main sample is used. Outpatient spending is the monthly spending on outpatient care measured in 1000 JPY (approximately 10 USD). The estimates β_A for each age (A=7–14) from estimating equation [3] are plotted. The dotted lines are the 95th confidence intervals. The standard errors clustered at municipality level are used for estimates, and the bootstrapped standard errors clustered at municipality with 200 repetitions are used for the semi-arc elasticity. See Appendix B for derivation of semi-arc elasticity. The observations within 2 months from the price changes are excluded from the sample to account for anticipatory utilization. The scales of *y*-axis on the bottom half are set the same so that elasticities across service categories are visually comparable.

Table F-1: By service categories

Outcome: Outpatient spending (in 1000 JPY)

	A. Medication		B. Consultation fees		C. Laboratory tests		D. Non-surgical procedures	
	Estimate	*Semi-arc elasticity*	Estimate	*Semi-arc elasticity*	Estimate	*Semi-arc elasticity*	Estimate	*Semi-arc elasticity*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Subsidized ×								
Age7	0.518***	*-0.642****	0.265***	*-0.624****	0.274***	*-0.985****	0.141***	*-1.190****
	(0.182)	[0.099]	(0.051)	[0.037]	(0.040)	[0.076]	(0.023)	[0.076]
Age8	0.496***	*-0.613****	0.190***	*-0.476****	0.245***	*-0.906****	0.133***	*-1.217****
	(0.157)	[0.113]	(0.054)	[0.037]	(0.039)	[0.071]	(0.018)	[0.081]
Age9	0.392**	*-0.501****	0.123**	*-0.331****	0.277***	*-1.022****	0.116***	*-1.147****
	(0.160)	[0.122]	(0.055)	[0.041]	(0.036)	[0.073]	(0.019)	[0.094]
Age10	0.582***	*-0.796****	0.148**	*-0.418****	0.272***	*-1.008****	0.096***	*-1.045****
	(0.201)	[0.109]	(0.059)	[0.040]	(0.029)	[0.074]	(0.017)	[0.104]
Age11	0.392**	*-0.540****	0.142**	*-0.433****	0.219***	*-0.835****	0.083***	*-0.958****
	(0.190)	[0.122]	(0.055)	[0.041]	(0.028)	[0.077]	(0.022)	[0.107]
Age12	0.258	*-0.335****	0.121***	*-0.385****	0.194***	*-0.712****	0.068***	*-0.88****
	(0.221)	[0.108]	(0.042)	[0.043]	(0.027)	[0.074]	(0.016)	[0.107]
Age13	0.184	*-0.229**	0.168***	*-0.552****	0.213***	*-0.764****	0.056***	*-0.806****
	(0.211)	[0.120]	(0.036)	[0.041]	(0.031)	[0.067]	(0.015)	[0.112]
Age14	0.434***	*-0.546****	0.192***	*-0.666****	0.201***	*-0.745****	0.056***	*-0.89****
	(0.137)	[0.145]	(0.037)	[0.041]	(0.036)	[0.073]	(0.012)	[0.110]
In-kind	0.239		0.152**		0.014		0.068	
	(0.279)		(0.076)		(0.071)		(0.043)	
Income restriction	-0.165		-0.030		-0.123***		-0.103***	
	(0.269)		(0.100)		(0.044)		(0.025)	
R-squared	0.53		0.24		0.12		0.17	
N	2,205,647		2,205,647		2,205,647		2,205,647	
N of individuals	63,530		63,530		63,530		63,530	
Mean wo subsidy	2.13		0.72		0.68		0.21	
Share	55.0%		18.7%		17.5%		5.4%	

Notes: The main sample is used. Outpatient spending is total monthly spending on outpatient care measured in 1000 JPY (approximately 10USD). The estimates β_A from estimating equation [3], and the corresponding semi-arc elasticity for each age (A=7–14) are reported. See Appendix B for details on derivation of semi-arc elasticity. All the regressions include age (in months) FE, time (in month) FE, and individual FE. In-kind is a dummy that takes one if the municipality offers the subsidy in the form of in-kind instead of refund, and income restriction is a dummy that takes one if the municipality imposes income restriction for subsidy eligibility. For the estimates, the standard errors clustered at the municipality level are reported in parenthesis. For the semi-arc elasticity, the bootstrapped standard errors with 200 repetitions clustered at municipality level are reported in brackets. The observations within 2 months from the price changes are excluded from the sample to account for anticipatory utilization. The remaining service categories are "Other" (3.4%), and "Surgery" (1.6%). Significance levels: *** p<0.01, ** p<0.05, * p<0.10

Appendix G: Price responsiveness by health status

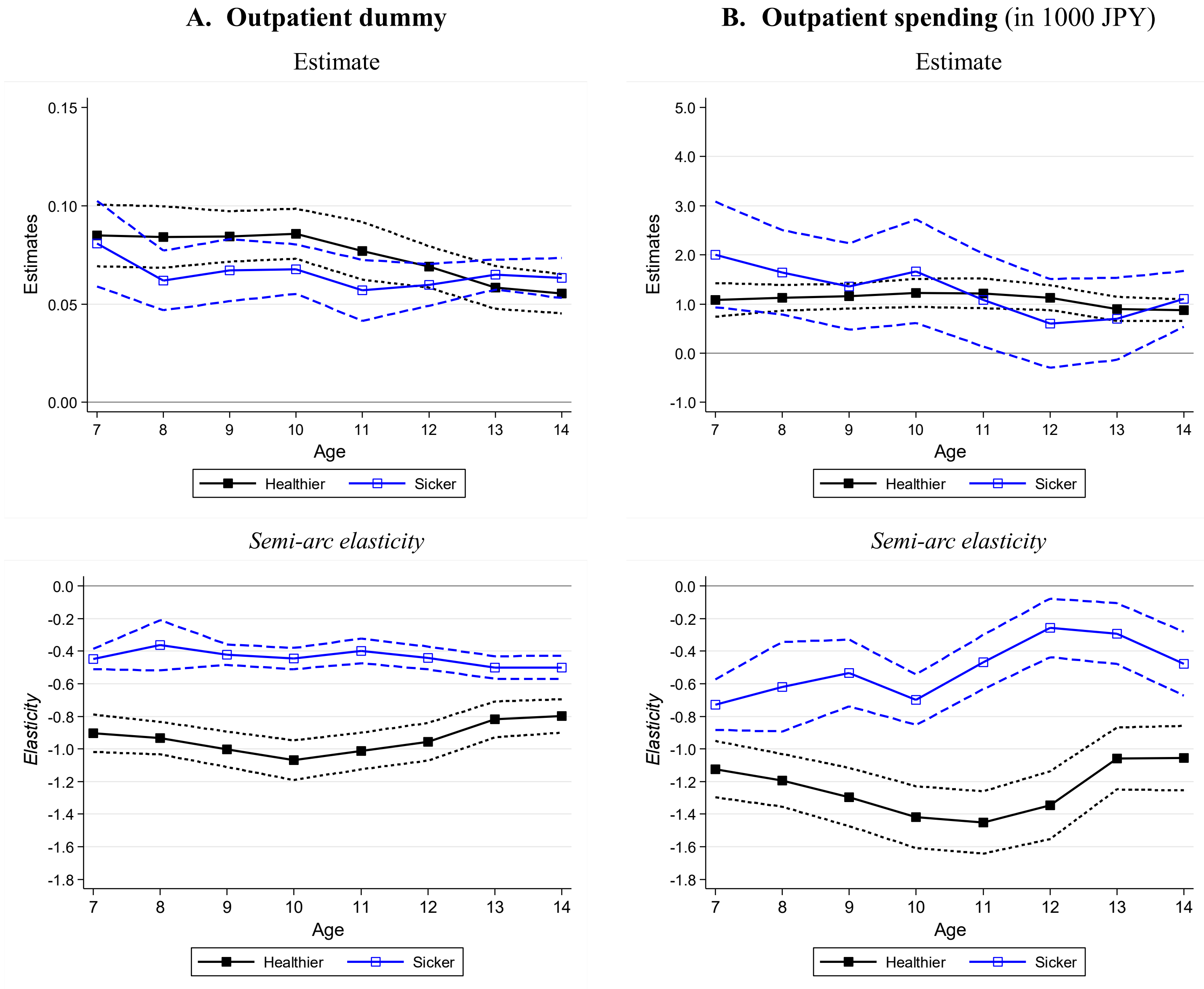
We determine each child's health status by the outpatient spending in the first 6 months, since each child is observed in the claims data at different times. Then, we divide children into two types (i.e., sicker or healthier) by the median spending in each cell: (age in years)×(with or without subsidy) at the first 6 months of observations. There are two main complications in defining the patient health status by using the initial spending. First, each child shows up in the claims data at different ages. Second, the subsidy status may change during these months. To avoid the second issue, we focus on the individuals whose subsidy status does not change during the spell. For the first issue, we calculate the average spending separately for each age and subsidy status combination (10 years of ages groups × 2 subsidy statuses). Then, we define those above the median of corresponding age and subsidy status as "sick" and those less than median as "healthy".

Table G-1 shows that without the subsidy, the probability of having at least one outpatient visit in a month is 44% for the sick, which is substantially higher than that for the healthy (20%), as expected. Similarly, the sicker children spend on average 6.89 thousand JPY per month, which is more than three times higher than that of the healthy children (2.04 thousand JPY per month). We estimate the model separately for each type.

Figure G-1 shows that healthier children are much more price sensitive than sicker children are. For an outpatient dummy, while the semi-arc elasticities for the sick range from –0.36 to –0.50, those for the healthy range from –0.80 to –1.07, which is considerably larger in magnitude than that for the sick at any age. While it is slightly noisier, the same observation holds for outpatient spending.

We also experiment with different windows (X= 9, and 12) to determine each child's health status. The benefit of taking longer spell is that we may be able to capture the health status with more accuracy while the cost is that we may lose more observations as we impose the restriction that the subsidy status does not change during the spell (at X= 6, we still maintain 90% of the total observations). Figure G-2 shows that the semi-arc elasticities are qualitatively similar across different Xs.

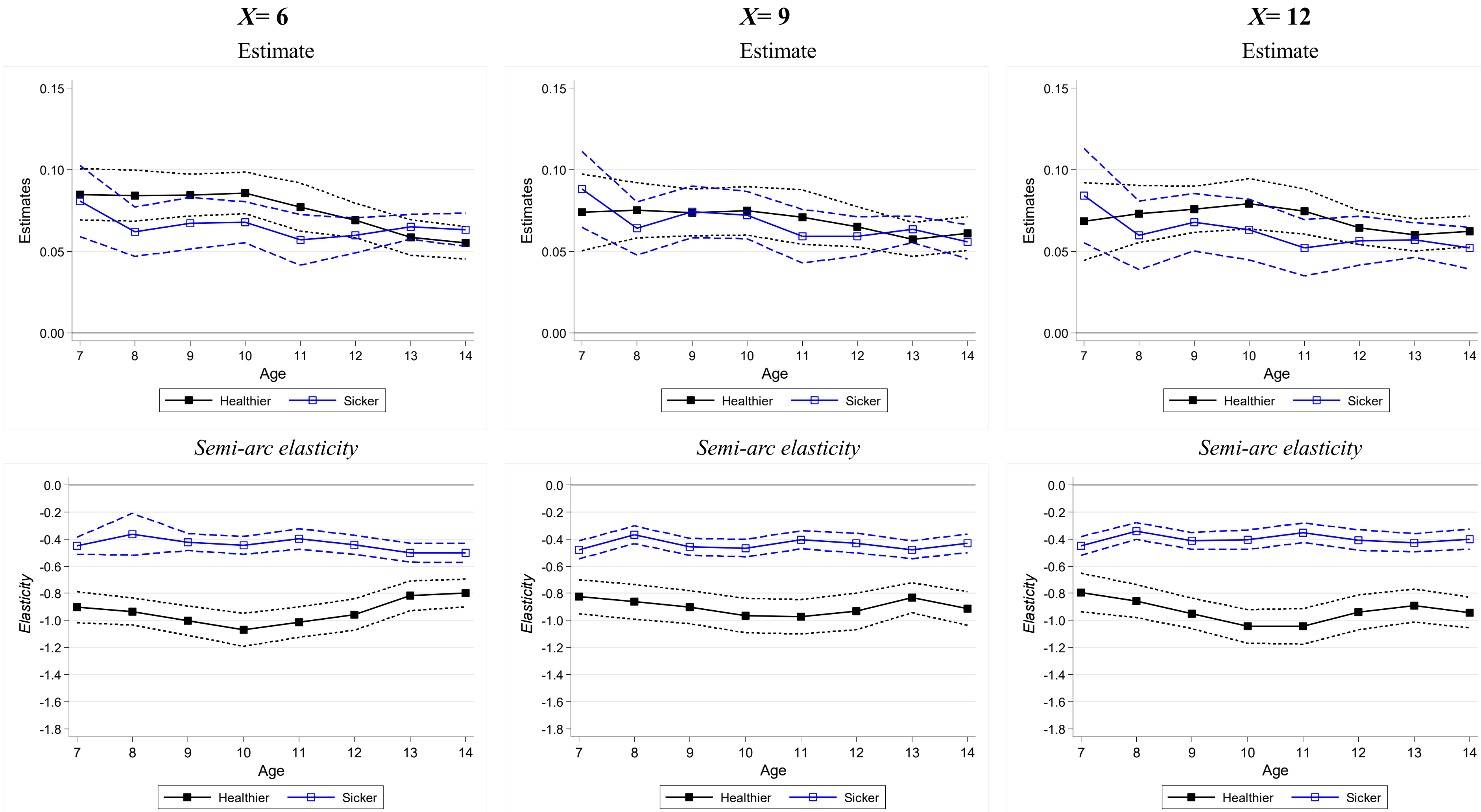
Figure G-1: Price responsiveness by health status



Notes: The main sample is used. An outpatient dummy in Panel A takes one if there is at least one outpatient visit per month, and outpatient spending in Panel B is the monthly spending on outpatient care measured in 1000 JPY (approximately 10 USD). The upper half plots β_A for each age (A=7–14) from estimating equation [3], and the bottom half plots the corresponding semi-arc elasticities, separately for two types of children grouped by initial health status. See Online Appendix B for details on derivation of semi-arc elasticity. We determine each child's health status by the outpatient spending in the first 6 months, since each child is observed in the claims data at different times. Then, we divide children into two types (i.e., sicker or healthier) by the median spending in each cell: (age in years)×(with or without subsidy) at the first 6 months of observations. The dotted lines are the 95th confidence intervals. The standard errors clustered at municipality level are used for estimates, and the bootstrapped standard errors clustered at municipality with 200 repetitions are used for the semi-arc elasticity. The observations within 2 months from the price changes are excluded from the sample to account for anticipatory utilization. The corresponding table is found in Online Appendix Table G-1.

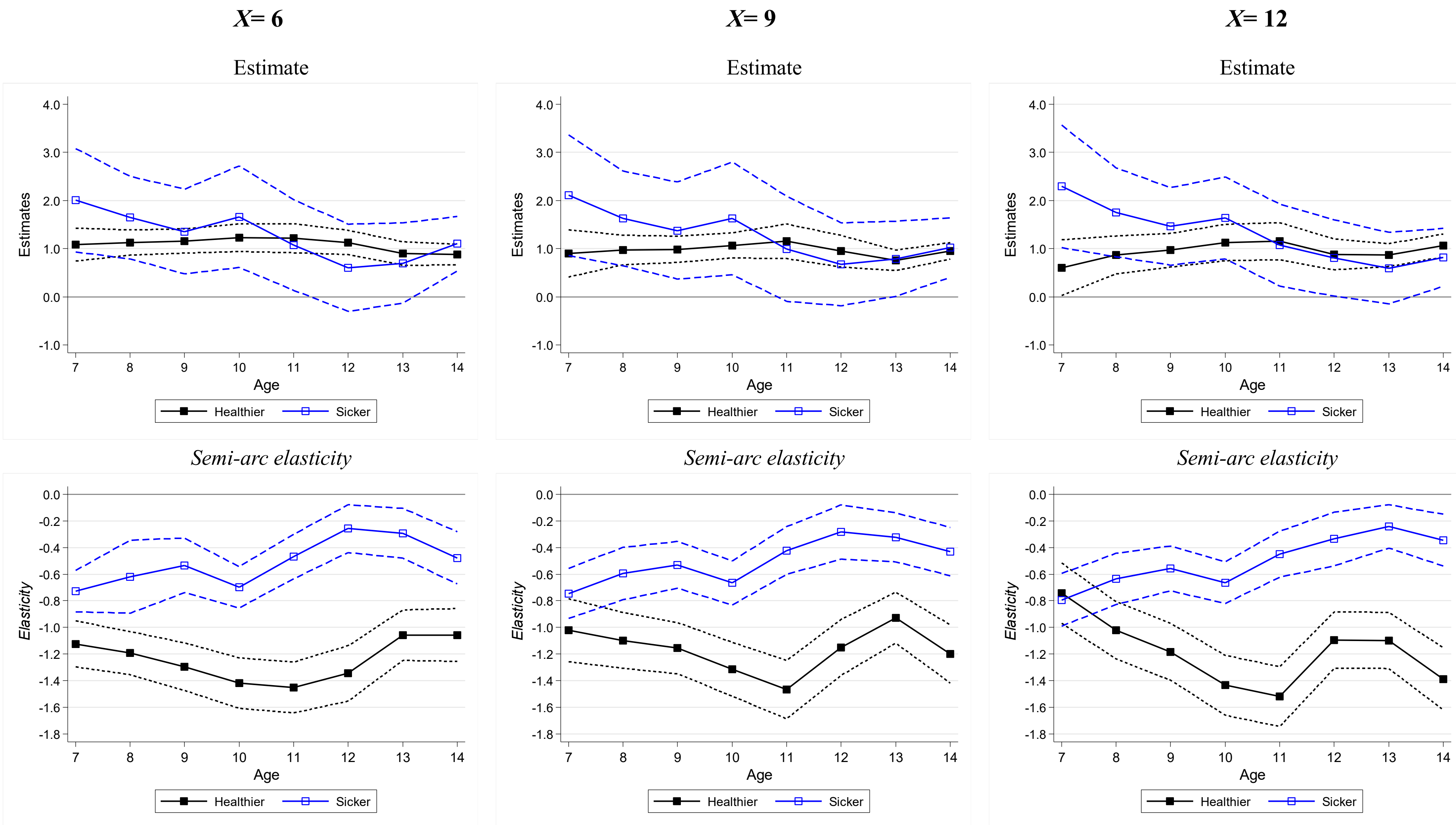
Figure G-2: Price responsiveness by health status

(i) Outpatient dummy



Notes: The main sample is used. An outpatient dummy takes one if there is at least one outpatient visit per month. The upper half plots β_A for each age (A=7–14) from estimating equation [3], and the bottom half plots the corresponding semi-arc elasticities, separately for two types of children grouped by initial health status. See Online Appendix B for details on derivation of semi-arc elasticity. We determine each child's health status by outpatient spending in the first X months (X=6, 9, and 12), since each child is observed in the claims data at different times. Then, we divide children into two types (i.e., sicker or healthier) by the median spending in each cell: (age in years)×(with or without subsidy) at the first X months of observations. The standard errors clustered at municipality level are used for estimate, and the bootstrapped standard errors clustered at municipality with 200 repetitions are used for the semi-arc elasticity. The observations within 2 months from the price changes are excluded from the sample to account for anticipatory utilization. The scales of y-axis on the semi-arc elasticities are set the same so that they are visually comparable.

(ii) Outpatient spending (in 1000 JPY)



Notes: The main sample is used. Outpatient spending is the monthly spending on outpatient care measured in 1000 JPY (approximately 10 USD). The upper half plots β_A for each age (A=7–14) from estimating equation [3], and the bottom half plots the corresponding semi-arc elasticities, separately for two types of children grouped by initial health status. See Online Appendix B for details on derivation of semi-arc elasticity. We determine each child's health status by outpatient spending in the first X months (X=6, 9, and 12), since each child is observed in the claims data at different times. Then, we divide children into two types (i.e., sicker or healthier) by the median spending in each cell: (age in years)×(with or without subsidy) at the first X months of observations. The standard errors clustered at municipality level are used for estimate, and the bootstrapped standard errors clustered at municipality with 200 repetitions are used for the semi-arc elasticity. The observations within 2 months from the price changes are excluded from the sample to account for anticipatory utilization. The scales of y-axis on the semi-arc elasticities are set the same so that they are visually comparable.

Table G-1: Price responsiveness by health status

(i) Outpatient dummy

	Healthier				Sicker			
	(1)		(2)		(3)		(4)	
	Estimate	(SE)	*Semi-arc elasticity*	[SE]	Estimate	(SE)	*Semi-arc elasticity*	[SE]
Subsidized ×								
Age7	0.085***	(0.008)	*-0.904****	[0.009]	0.081***	(0.011)	*-0.449****	[0.005]
Age8	0.084***	(0.008)	*-0.934****	[0.008]	0.062***	(0.008)	*-0.364****	[0.012]
Age9	0.084***	(0.006)	*-1.003****	[0.008]	0.067***	(0.008)	*-0.422****	[0.005]
Age10	0.086***	(0.006)	*-1.070****	[0.009]	0.068***	(0.006)	*-0.446****	[0.005]
Age11	0.077***	(0.007)	*-1.013****	[0.009]	0.057***	(0.008)	*-0.398****	[0.006]
Age12	0.069***	(0.005)	*-0.957****	[0.009]	0.060***	(0.005)	*-0.442****	[0.005]
Age13	0.058***	(0.006)	*-0.819****	[0.008]	0.065***	(0.004)	*-0.500****	[0.005]
Age14	0.055***	(0.005)	*-0.798****	[0.008]	0.063***	(0.005)	*-0.501****	[0.005]
In-kind	0.029	(0.034)			0.052***	(0.016)		
Income restriction	-0.021**	(0.010)			-0.006	(0.015)		
R-squared	0.15				0.22			
N	998,107				994,982			
N of individuals	26,097				26,076			
Mean wo subsidy	0.20				0.44			
Mean w subsidy	0.32				0.56			

Notes: The main sample is used. An outpatient dummy takes one if an individual makes at least one outpatient visit per month and zero otherwise. The estimates β_A from estimating equation [3], and the corresponding semi-arc elasticities for each age (A=7–14) are reported separately for two types of children grouped by health status. See Online Appendix B for details on derivation of semi-arc elasticity. We determine each child's health status by the outpatient spending in the first 6 months, since each child is observed in the claims data at different times. Then, we divide children into two types (i.e., sicker or healthier) by the median spending in each cell: (age in years)×(with or without subsidy) at the first 6 months of observations. All the regressions include age (in months) FE, time (in month) FE, and individual FE. In-kind is a dummy that takes one if the municipality offers the subsidy in the form of in-kind instead of refund, and income restriction is a dummy that takes one if the municipality imposes income restriction for subsidy eligibility. For the estimates, the standard errors clustered at the municipality level are reported in parenthesis. For the semi-arc elasticity, the bootstrapped standard errors with 200 repetitions clustered at municipality level are reported in brackets. The observations within 2 months from the price changes are excluded from the sample to account for anticipatory utilization. Significance levels: *** p<0.01, ** p<0.05, * p<0.10

(ii) Outpatient spending (in 1000 JPY)

	Healthier				**Sicker**			
	(1)		(2)		(3)		(4)	
	Estimate	(SE)	*Semi-arc elasticity*	[SE]	Estimate	(SE)	*Semi-arc elasticity*	[SE]
Subsidized ×								
Age7	1.085***	(0.173)	*-1.124****	[0.013]	2.007***	(0.544)	*-0.728****	[0.012]
Age8	1.128***	(0.132)	*-1.193****	[0.012]	1.645***	(0.434)	*-0.619****	[0.021]
Age9	1.160***	(0.127)	*-1.296****	[0.014]	1.357***	(0.444)	*-0.534****	[0.016]
Age10	1.228***	(0.145)	*-1.419****	[0.015]	1.665***	(0.534)	*-0.698****	[0.012]
Age11	1.219***	(0.153)	*-1.452****	[0.015]	1.078**	(0.477)	*-0.468****	[0.013]
Age12	1.130***	(0.128)	*-1.346****	[0.016]	0.606	(0.458)	*-0.258****	[0.014]
Age13	0.902***	(0.123)	*-1.059****	[0.015]	0.700*	(0.423)	*-0.293****	[0.014]
Age14	0.877***	(0.109)	*-1.057****	[0.015]	1.105***	(0.286)	*-0.477****	[0.015]
In-kind	0.521	(0.589)			0.371	(0.656)		
Income restriction	-0.444	(0.381)			-0.629	(0.565)		
R-squared	0.28				0.52			
N	998,107				994,982			
N of individuals	26,097				26,076			
Mean wo subsidy	2.04				6.89			
Mean w subsidy	3.70				9.85			

Notes: The main sample is used. Outpatient spending is total monthly spending on outpatient care measured in 1000 JPY (approximately 10USD). The estimates β_A from estimating equation [3], and the corresponding semi-arc elasticities for each age (A=7–14) are reported separately for two types of children grouped by health status. See Online Appendix B for details on derivation of semi-arc elasticity. We determine each child's health status by the outpatient spending in the first 6 months, since each child is observed in the claims data at different times. Then, we divide children into two types (i.e., sicker or healthier) by the median spending in each cell: (age in years)×(with or without subsidy) at the first 6 months of observations. All the regressions include age (in months) FE, time (in month) FE, and individual FE. In-kind is a dummy that takes one if the municipality offers the subsidy in the form of in-kind instead of refund, and income restriction is a dummy that takes one if the municipality imposes income restriction for subsidy eligibility. For the estimates, the standard errors clustered at the municipality level are reported in parenthesis. For the semi-arc elasticity, the bootstrapped standard errors with 200 repetitions clustered at municipality level are reported in brackets. The observations within 2 months from the price changes are excluded from the sample to account for anticipatory utilization. Significance levels: *** $p<0.01$, ** $p<0.05$, * $p<0.10$

Appendix H: Asymmetric price responses

Table H-1: Asymmetric price responses

	A. Outpatient dummy				**B. Outpatient spending** (in 1000 JPY)			
	(1)		(2)		(3)		(4)	
	Estimate	(SE)	*Semi-point elasticity*	[SE]	Estimate	(SE)	*Semi-point elasticity*	[SE]
Subsidized ×								
Age7 × Better	0.060***	(0.009)	*-0.513****	[0.053]	1.064***	(0.291)	*-0.623****	[0.112]
Age8 × Better	0.069***	(0.008)	*-0.609****	[0.048]	1.106***	(0.278)	*-0.760****	[0.109]
Age9 × Better	0.060***	(0.006)	*-0.584****	[0.050]	0.925***	(0.244)	*-0.706****	[0.105]
Age10 × Better	0.067***	(0.007)	*-0.677****	[0.042]	1.056***	(0.283)	*-0.840****	[0.109]
Age11 × Better	0.072***	(0.007)	*-0.764****	[0.038]	1.135***	(0.257)	*-0.881****	[0.102]
Age12 × Better	0.069***	(0.006)	*-0.778****	[0.041]	0.936***	(0.269)	*-0.698****	[0.092]
Age13 × Better	0.066***	(0.005)	*-0.764****	[0.043]	0.809**	(0.325)	*-0.579****	[0.091]
Age14 × Better	0.067***	(0.006)	*-0.784****	[0.040]	0.724**	(0.315)	*-0.520****	[0.094]
Subsidized ×								
Age7 × Worse	-0.070***	(0.008)	*-0.450****	[0.033]	-1.633***	(0.333)	*-0.772****	[0.062]
Age8 × Worse	-0.068***	(0.008)	*-0.466****	[0.039]	-1.633***	(0.340)	*-0.801****	[0.082]
Age9 × Worse	-0.066***	(0.009)	*-0.478****	[0.049]	-1.493***	(0.326)	*-0.763****	[0.079]
Age10 × Worse	-0.062***	(0.008)	*-0.464****	[0.042]	-1.601***	(0.274)	*-0.849****	[0.082]
Age11 × Worse	-0.066***	(0.007)	*-0.528****	[0.042]	-1.551***	(0.222)	*-0.871****	[0.081]
Age12 × Worse	-0.061***	(0.007)	*-0.511****	[0.042]	-1.416***	(0.274)	*-0.808****	[0.080]
Age13 × Worse	-0.058***	(0.005)	*-0.508****	[0.044]	-1.157***	(0.214)	*-0.669****	[0.085]
Age14 × Worse	-0.061***	(0.005)	*-0.548****	[0.045]	-1.155***	(0.200)	*-0.687****	[0.084]
In-kind	0.050***	(0.014)			0.452	(0.395)		
Income restriction	-0.020**	(0.009)			-0.731**	(0.346)		
R-squared	0.23				0.51			
N	2,144,756				2,144,756			
N of individuals	62,609				62,609			
Mean wo subsidy	0.32				4.49			

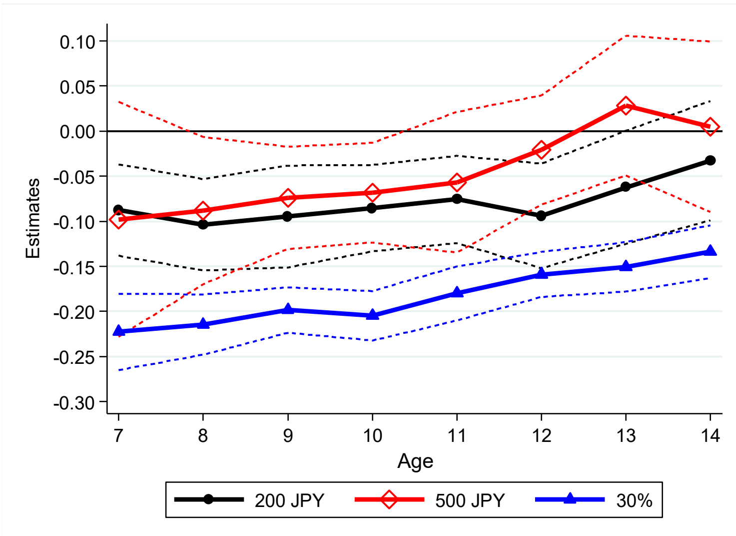
Notes: This table corresponds to Figure 6 in the main text. The main sample is used. An outpatient dummy in Panel A takes one if an individual makes at least one outpatient visit per month and zero otherwise. Outpatient spending in Panel B is total monthly spending on outpatient care measured in 1000 JPY (approximately 10USD). "Better" indicates the subsidy expansion which lowers the price of healthcare from 30% to 0%, and "Worse" indicates subsidy expiration that raises the price from 0% to 30%. The estimates β_A^{better} and β_A^{worse} from estimating equation [4], and the corresponding semi-*point* elasticity for each age (A=7–14) are reported. See Appendix B for details on derivation of semi-point elasticity. All the regressions include age (in months) FE, time (in month) FE, and individual FE. In-kind is a dummy that takes one if the municipality offers the subsidy in the form of in-kind instead of refund, and income restriction is a dummy that takes one if the municipality imposes income restriction for subsidy eligibility. For the estimate, the standard errors clustered at the municipality level are reported in parenthesis. For the semi-point elasticity, the bootstrapped standard errors with 200 repetitions clustered at municipality level are reported in brackets. The observations within 2 months from the price changes are excluded from the sample to account for anticipatory utilization. Significance levels: *** $p<0.01$, ** $p<0.05$, * $p<0.10$

Appendix I: Effect of small copayment

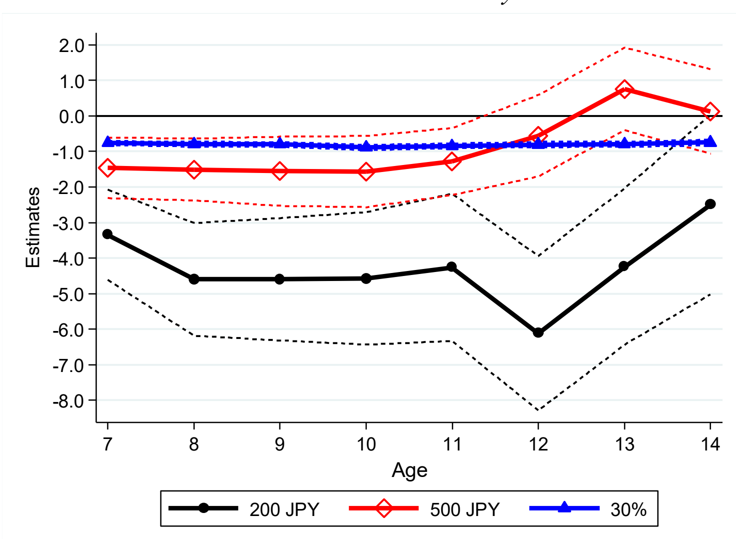
Figure I-1: Effect of small copayment

A. Frequency of outpatient visits

Estimate

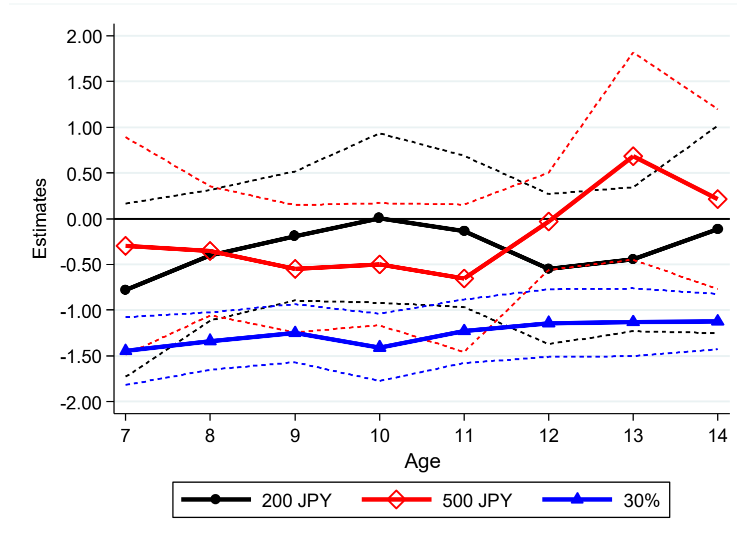


Semi-arc elasticity

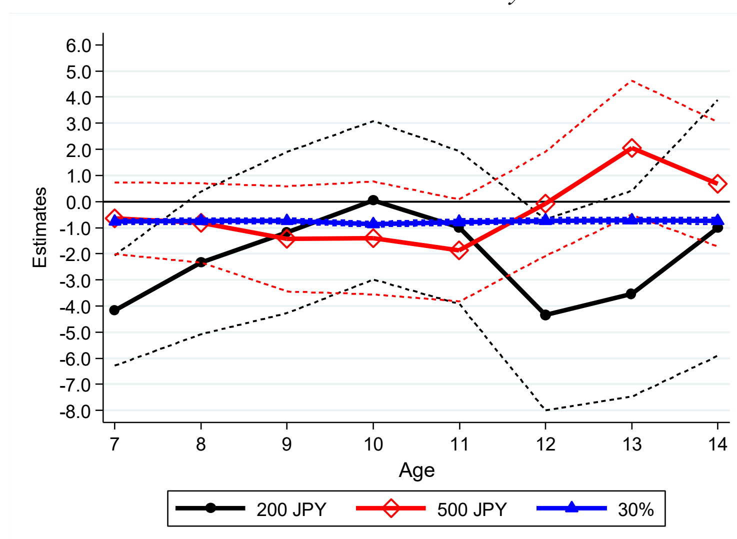


B. Outpatient spending (in 1000 JPY)

Estimate



Semi-arc elasticity

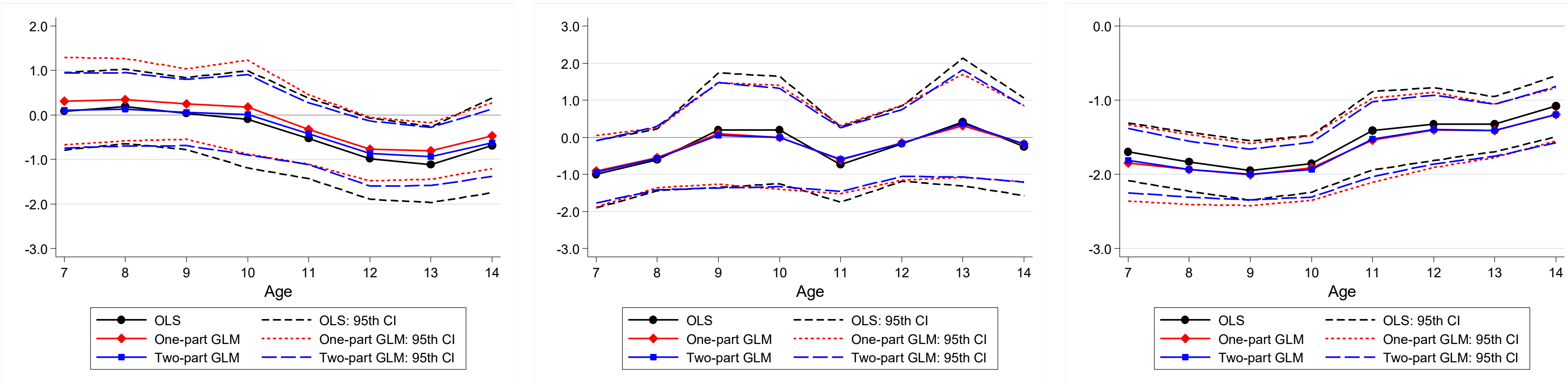


Notes: The full sample is used. The frequency of outpatient visits in Panel A is the number of outpatient visits per month, and Outpatient spending in Panel B is the monthly spending on outpatient care measured in 1000 JPY (approximately 10 USD). The upper half plots β_A^C for each age (A=7–14) and three price levels (C= 200 JPY/visit, 500 JPY/visit, 30%) from estimating equation [5], and the bottom half plots the corresponding semi-arc elasticity. See Appendix B for details on derivation of semi-arc elasticity. The control group is the individuals who live in municipality with free care (C= 0%). The dotted lines are the 95th confidence intervals. The standard errors clustered at municipality level are used for the estimate, and the bootstrapped standard errors clustered at municipality with 200 repetitions are used for the semi-arc elasticity. The observations within 2 months from the price changes are excluded from the sample to account for anticipatory utilization.

Figure I-2: Effect of small copayment by different models (estimates only)

Outcome: Outpatient spending (in 1000 JPY)

C **= 200 JPY/visit** ***C*** **= 500 JPY/visit** ***C*** **= 30%**



Notes: The full sample is used. Outpatient spending is the monthly spending on outpatient care measured in 1000 JPY (approximately 10 USD). The observations within 2 months from the price changes are excluded from the sample to account for anticipatory utilization. For each price level (*C*), the estimates from three separate models (OLS, one-part GLM, and two-part GLM) are reported. For two-part GLM, we use the logit model for the first part, and the GLM model with a log link and a gamma distribution family for the second part. For one-part GLM, we also choose the log link and gamma distribution. Here, we report the estimates from a variant of the main specification [3] where individual FE is replaced by municipality FEs to ease the computational burden of GLM models. The margin command in Stata14 is used to obtain the treatment effects.

Table I-1: Effect of small copayment

(i) Outcome: Outpatient dummy

	Estimate (β_A^C)			Out-of-pocket share (P_A^C)			*Semi-arc elasticity* (ε_A^C)		
	200 JPY	500 JPY	30%	200 JPY	500 JPY	30%	200 JPY	500 JPY	30%
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Subsidized ×									
Age7	-0.021***	-0.044***	-0.073***	0.026	0.069	0.3	*-1.682****	*-1.367****	*-0.535****
	(0.007)	(0.016)	(0.005)				[0.551]	[0.280]	[0.021]
Age8	-0.028***	-0.039***	-0.066***	0.024	0.063	0.3	*-2.487****	*-1.362****	*-0.513****
	(0.009)	(0.012)	(0.005)				[0.618]	[0.328]	[0.024]
Age9	-0.027***	-0.042***	-0.068***	0.024	0.055	0.3	*-2.622****	*-1.789****	*-0.559****
	(0.009)	(0.009)	(0.004)				[0.646]	[0.356]	[0.023]
Age10	-0.031***	-0.030***	-0.071***	0.023	0.053	0.3	*-3.258****	*-1.360****	*-0.614****
	(0.008)	(0.010)	(0.004)				[0.668]	[0.357]	[0.024]
Age11	-0.024***	-0.033**	-0.066***	0.024	0.059	0.3	*-2.590****	*-1.485****	*-0.598****
	(0.008)	(0.013)	(0.005)				[0.721]	[0.356]	[0.026]
Age12	-0.040***	-0.023**	-0.065***	0.023	0.054	0.3	*-4.875****	*-1.178****	*-0.628****
	(0.009)	(0.009)	(0.004)				[0.757]	[0.401]	[0.025]
Age13	-0.032***	-0.019	-0.063***	0.023	0.053	0.3	*-4.019****	*-0.979***	*-0.628****
	(0.009)	(0.013)	(0.003)				[0.849]	[0.453]	[0.025]
Age14	-0.023**	-0.026**	-0.060***	0.021	0.056	0.3	*-3.121****	*-1.338****	*-0.613****
	(0.011)	(0.011)	(0.004)				[0.901]	[0.425]	[0.028]
In-kind	0.024***								
	(0.005)								
Income restriction	-0.016**								
	(0.007)								
R-squared	0.23								
N	3,023,407								
N of individuals	90,257								

Notes: This table corresponds to Figure 7 in the main text. The full sample is used. An outpatient dummy takes one if an individual makes at least one outpatient visit per month and zero otherwise. All the regressions include age (in months) FE, time (in month) FE, and individual FE. In-kind is a dummy that takes one if the municipality offers the subsidy in the form of in-kind instead of refund, and income restriction is a dummy that takes one if the municipality imposes income restriction for subsidy eligibility. β_A^C for each three price levels (C= 200 JPY/visit, 500 JPY/visit, 30%) from estimating equation [5], and the corresponding semi-arc elasticity for each age (A=7–14) are reported. See Appendix B for derivation of semi-arc elasticity. The control group is the individuals who live in municipality with free care (C= 0%). P^C in columns (4) and (5) are obtained by dividing out-of-pocket expenditure (the number of visits per month times the copayment (200 or 500 JPY)) by total monthly outpatient spending. P_A^C in column (6) is fixed at 30%. For the estimates in columns (1)–(3), the standard errors clustered at the municipality level are reported in parenthesis. For the semi-arc elasticity in columns (7)–(9), the bootstrapped standard errors with 200 repetitions clustered at municipality level are reported in brackets. The observations within 2 months from the price changes are excluded from the sample to account for anticipatory utilization. Significance levels: *** p<0.01, ** p<0.05, * p<0.10

(ii) Outcome: Frequency of outpatient visits

	Estimate (β_A^C)			**Out-of-pocket share (P_A^C)**			***Semi-arc elasticity* (ε_A^C)**		
	200 JPY	500 JPY	30%	200 JPY	500 JPY	30%	200 JPY	500 JPY	30%
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Subsidized ×									
Age7	-0.087***	-0.098	-0.223***	0.026	0.069	0.3	*-3.345****	*-1.460****	*-0.762****
	(0.026)	(0.066)	(0.021)				[0.649]	[0.436]	[0.030]
Age8	-0.104***	-0.088**	-0.214***	0.024	0.063	0.3	*-4.600****	*-1.508****	*-0.798****
	(0.026)	(0.041)	(0.017)				[0.809]	[0.444]	[0.035]
Age9	-0.095***	-0.074**	-0.198***	0.024	0.055	0.3	*-4.597****	*-1.558****	*-0.800****
	(0.029)	(0.029)	(0.013)				[0.878]	[0.496]	[0.035]
Age10	-0.085***	-0.068**	-0.205***	0.023	0.053	0.3	*-4.571****	*-1.567****	*-0.888****
	(0.024)	(0.028)	(0.014)				[0.952]	[0.511]	[0.037]
Age11	-0.076***	-0.057	-0.180***	0.024	0.059	0.3	*-4.263****	*-1.284****	*-0.843****
	(0.025)	(0.040)	(0.015)				[1.056]	[0.481]	[0.034]
Age12	-0.094***	-0.021	-0.159***	0.023	0.054	0.3	*-6.117****	*-0.560*	*-0.803****
	(0.029)	(0.031)	(0.013)				[1.109]	[0.584]	[0.038]
Age13	-0.062*	0.028	-0.151***	0.023	0.053	0.3	*-4.245****	*0.761*	*-0.799****
	(0.032)	(0.039)	(0.014)				[1.123]	[0.593]	[0.037]
Age14	-0.033	0.005	-0.134***	0.021	0.056	0.3	*-2.495**	*0.130*	*-0.748****
	(0.034)	(0.048)	(0.015)				[1.287]	[0.606]	[0.040]
In-kind	0.071***								
	(0.017)								
Income restriction	-0.064***								
	(0.021)								
R-squared	0.28								
N	3,023,407								
N of individuals	90,257								

Notes: The full sample is used. The frequency of outpatient visits is the number of outpatient visits per month. All the regressions include age (in months) FE, time (in month) FE, and individual FE. In-kind is a dummy that takes one if the municipality offers the subsidy in the form of in-kind instead of refund, and income restriction is a dummy that takes one if the municipality imposes income restriction for subsidy eligibility. β_A^C for each three price levels (C= 200 JPY/visit, 500 JPY/visit, 30%) from estimating equation [5], and the corresponding semi-arc elasticity for each age (A=7–14) are reported. See Appendix B for derivation of semi-arc elasticity. The control group is the individuals who live in municipality with free care (C= 0%). P^C in columns (4) and (5) are obtained by dividing out-of-pocket expenditure (the number of visits per month times the copayment (200 or 500 JPY)) by total monthly outpatient spending. P_A^C in column (6) is fixed at 30%. For the estimates in columns (1)–(3), the standard errors clustered at the municipality level are reported in parenthesis. For the semi-arc elasticity in columns (7)–(9), the bootstrapped standard errors with 200 repetitions clustered at municipality level are reported in brackets. The observations within 2 months from the price changes are excluded from the sample to account for anticipatory utilization. Significance levels: *** p<0.01, ** p<0.05, * p<0.10

(iii) Outcome: Outpatient spending (in 1000 JPY)

	Estimate (β_A^C)			Out-of-pocket share (P_A^C)			*Semi-arc elasticity* (ε_A^C)		
	200 JPY	500 JPY	30%	200 JPY	500 JPY	30%	200 JPY	500 JPY	30%
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Subsidized ×									
Age7	-0.783	-0.298	-1.446***	0.026	0.069	0.3	*-4.169****	*-0.638*	*-0.770****
	(0.481)	(0.604)	(0.188)				[1.079]	[0.700]	[0.045]
Age8	-0.399	-0.352	-1.337***	0.024	0.063	0.3	*-2.345**	*-0.820*	*-0.749****
	(0.363)	(0.358)	(0.160)				[1.395]	[0.775]	[0.054]
Age9	-0.189	-0.547	-1.251***	0.024	0.055	0.3	*-1.181*	*-1.429*	*-0.737****
	(0.358)	(0.353)	(0.161)				[1.575]	[1.029]	[0.051]
Age10	0.007	-0.498	-1.407***	0.023	0.053	0.3	*0.050*	*-1.394*	*-0.869****
	(0.471)	(0.339)	(0.187)				[1.548]	[1.102]	[0.048]
Age11	-0.138	-0.652	-1.230***	0.024	0.059	0.3	*-0.994*	*-1.873**	*-0.782****
	(0.420)	(0.409)	(0.177)				[1.495]	[0.996]	[0.053]
Age12	-0.551	-0.028	-1.141***	0.023	0.054	0.3	*-4.340***	*-0.087*	*-0.734****
	(0.417)	(0.270)	(0.188)				[1.863]	[1.017]	[0.054]
Age13	-0.442	0.685	-1.133***	0.023	0.053	0.3	*-3.532**	*2.061*	*-0.724****
	(0.400)	(0.577)	(0.188)				[2.012]	[1.31]	[0.058]
Age14	-0.117	0.213	-1.125***	0.021	0.056	0.3	*-1.007*	*0.668*	*-0.738****
	(0.576)	(0.499)	(0.153)				[2.499]	[1.216]	[0.061]
In-kind	0.600*								
	(0.305)								
Income restriction	-0.315								
	(0.253)								
R-squared	0.49								
N	3,023,407								
N of individuals	90,257								

Notes: The full sample is used. Outpatient spending is the monthly spending on outpatient care measured in 1000 JPY (approximately 10 USD). All the regressions include age (in months) FE, time (in month) FE, and individual FE. In-kind is a dummy that takes one if the municipality offers the subsidy in the form of in-kind instead of refund, and income restriction is a dummy that takes one if the municipality imposes income restriction for subsidy eligibility. β_A^C for each three price levels (*C*= 200 JPY/visit, 500 JPY/visit, 30%) from estimating equation [5], and the corresponding semi-arc elasticity for each age (*A*=7–14) are reported. See Appendix B for derivation of semi-arc elasticity. The control group is the individuals who live in municipality with free care (*C*= 0%). P^C in columns (4) and (5) are obtained by dividing out-of-pocket expenditure (the number of visits per month times the copayment (200 or 500 JPY)) by total monthly outpatient spending. P_A^C in column (6) is fixed at 30%. For the estimates in columns (1)–(3), the standard errors clustered at the municipality level are reported in parenthesis. For the semi-arc elasticity in columns (7)–(9), the bootstrapped standard errors with 200 repetitions clustered at municipality level are reported in brackets. The observations within 2 months from the price changes are excluded from the sample to account for anticipatory utilization. Significance levels: *** p<0.01, ** p<0.05, * p<0.10

Appendix J: Ambulatory Care Sensitive Conditions (ACSC)

Table J-1: List of ACSC

ACSC categories	Uncond. (N=2,205,647) Mean	Cond. on visit (N=901,070) Mean	*Share*	ICD-10
Congenital syphilis	0.000	0.000	*0.0%*	A50.0-A50.9
Immunization preventable conditions	0.002	0.005	*1.0%*	A35, A36, A37, A80, G00
Grand mal status and other epileptic convulsions	0.005	0.012	*2.4%*	G40, G41
Convulsions "A" & "B"	0.001	0.004	*0.7%*	R56
Severe ENT infections	0.114	0.280	*56.9%*	H66, H67, J02, J03, J06, J31.2
Bacterial pneumonia	0.003	0.007	*1.5%*	J13, J14, J15.3, J15.4, J15.7, J15.9, J16.8, J18, J18.1
Asthma	0.063	0.155	*31.5%*	J45, J46
Tuberculosis	0.000	0.000	*0.0%*	A15, A16, A17, A18, A19
Cellulitis	0.005	0.013	*2.6%*	L03 L04 L08.0 L08.8 L08.9 L88 L98.0
Diabetes "A", "B", "C"	0.000	0.001	*0.1%*	E10.0-E10.8, E11.0-E11.8, E12.0-E12.8, E13.0-E13.8, E14.0-E14.8
Hypoglycemia	0.000	0.001	*0.2%*	E16.2
Gastroenteritis	0.001	0.001	*0.3%*	K52.2, K52.8, K52.9
Kidney/urinary infection	0.000	0.001	*0.2%*	N10, N11, N12, N13.6
Dehydration-volume depletion	0.003	0.008	*1.5%*	E86
Iron deficiency anemia	0.002	0.005	*0.9%*	D50.1, D50.8, D50.9
Nutritional deficiencies	0.000	0.001	*0.2%*	E40, E41, E42, E43, E55.0, E64.3
Failure to thrive	0.000	0.000	*0.0%*	R629
Any ACSC	0.166	0.407	*100%*	

Notes: "Unconditional" includes observations (person-month) with no outpatient visits in a month, and "Conditional" limits to observations with at least one outpatient visit per month. We convert the ICD9-CM listed in Gadomski *et al*. (1998) to ICD10.

References:

Gadomski, Anne, Paul Jenkins, and Melissa Nichols. (1998) "Impact of a Medicaid primary care provider and preventive care on pediatric hospitalization." *Pediatrics* 101(3).

Table J-2: Ambulatory Care Sensitive Conditions (ACSC)

	A. Any ACSC				B. ENT				C. Asthma			
	(1)		(2)		(3)		(4)		(5)		(6)	
	Outpatient dummy		*Inpatient* dummy (×1000)		*Outpatient* dummy		*Inpatient* dummy (×1000)		*Outpatient* dummy		*Inpatient* dummy (×1000)	
	Estimate	(SE)	Estimate	(SE)	Estimate	(SE)	Estimate	(SE)	Estimate	(SE)	Estimate	(SE)
Subsidized ×												
Age7	0.038***	(0.004)	1.586***	(0.533)	0.027***	(0.004)	0.599**	(0.275)	0.022***	(0.003)	0.892***	(0.182)
Age8	0.034***	(0.005)	0.702	(0.477)	0.024***	(0.004)	0.152	(0.259)	0.020***	(0.003)	0.562***	(0.162)
Age9	0.031***	(0.005)	0.774*	(0.442)	0.023***	(0.004)	0.297	(0.203)	0.015***	(0.002)	0.451***	(0.144)
Age10	0.032***	(0.004)	0.506	(0.526)	0.024***	(0.004)	0.246	(0.201)	0.015***	(0.002)	0.380***	(0.125)
Age11	0.026***	(0.003)	0.329	(0.420)	0.020***	(0.003)	0.301	(0.219)	0.010***	(0.002)	0.250	(0.155)
Age12	0.024***	(0.003)	-0.016	(0.721)	0.017***	(0.002)	0.353	(0.238)	0.009***	(0.002)	0.349**	(0.150)
Age13	0.022***	(0.003)	0.564	(0.436)	0.015***	(0.003)	0.536***	(0.203)	0.009***	(0.002)	0.467***	(0.157)
Age14	0.022***	(0.003)	0.263	(0.430)	0.016***	(0.002)	0.428**	(0.191)	0.008***	(0.002)	0.382***	(0.131)
In-kind	0.030**	(0.014)	1.803*	(0.945)	0.021***	(0.005)	0.527***	(0.169)	0.010	(0.014)	0.579**	(0.248)
Income restriction	-0.009	(0.008)	-1.852***	(0.590)	-0.012*	(0.007)	-0.600**	(0.271)	0.000	(0.004)	-0.787**	(0.345)
R-squared	0.24		0.15		0.16		0.06		0.35		0.16	
N	2,287,289		2,287,289		2,287,289		2,287,289		2,287,289		2,287,289	
N of individuals	66,048		66,048		66,048		66,048		66,048		66,048	
Mean wo subsidy	0.114		1.03		0.078		0.32		0.036		0.24	

Notes: This table corresponds to Figure 8 in the main text. The main sample is used. An outpatient dummy takes one if there is at least one outpatient visit per month, and an inpatient dummy takes one if there is at least one hospitalization per month (×1000). The estimates β_A from estimating equation [3] for each age (A=7–14) are reported. All the regressions include age (in months) FE, time (in month) FE, and individual FE. In-kind is a dummy that takes one if the municipality offers the subsidy in the form of in-kind instead of refund, and income restriction is a dummy that takes one if the municipality imposes income restriction for subsidy eligibility. For even-numbered columns, we also control for a dummy that takes one if the municipality also offers subsidy for inpatient care. The observations within 2 months from the price changes are excluded from the sample to account for anticipatory utilization. ENT stands for Ear, Nose, and Throat. Significance levels: *** p<0.01, ** p<0.05, * p<0.10

Appendix K: Offset effects

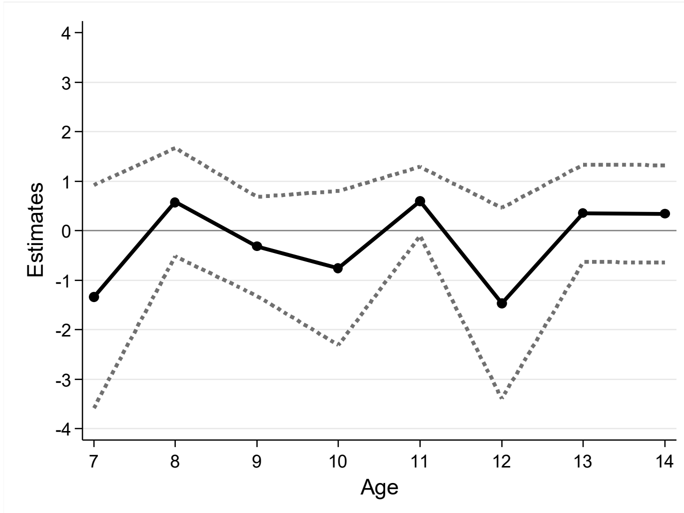
Table K-1: Offset effects

	***Inpatient* dummy (×1000)**		***Inpatient* spending** (in 1000 JPY)	
	(1)		(2)	
	Estimate	(SE)	Estimate	(SE)
Subsidized ×				
Age7	2.365**	(1.026)	0.814	(0.599)
Age8	0.958	(0.879)	0.761	(0.618)
Age9	1.023	(0.918)	0.147	(0.564)
Age10	0.721	(0.812)	0.009	(0.510)
Age11	0.104	(1.191)	-0.151	(0.792)
Age12	0.160	(1.001)	-0.094	(0.692)
Age13	0.974	(0.730)	0.098	(0.481)
Age14	0.193	(0.857)	0.116	(0.497)
In-kind	2.984***	(1.109)	0.316	(0.539)
Income restriction	-2.423***	(0.757)	-1.306***	(0.453)
R-squared	0.12		0.20	
N	2,205,647		2,205,647	
N of individuals	63,530		63,530	
Mean	2.41		1.00	

Notes: This table corresponds to Figure 9 in the main text. The main sample is used. An inpatient dummy takes one if there is at least one hospitalization per month (×1000), and inpatient spending is the monthly spending on inpatient care measured in 1000 JPY (approximately 10 USD). The estimates β_A from estimating equation [3] for each age (A=7–14) are reported. All the regressions include age (in months) FE, time (in month) FE, and individual FE. In-kind is a dummy that takes one if the municipality offers the subsidy in the form of in-kind instead of refund, and income restriction is a dummy that takes one if the municipality imposes income restriction for subsidy eligibility. We also control for a dummy that takes one if the municipality also offers subsidy for inpatient care. The standard errors clustered at the municipality level are reported in parenthesis. The observations within 2 months from the price changes are excluded from the sample to account for anticipatory utilization. Significance levels: *** p<0.01, ** p<0.05, * p<0.10

Appendix L: Short-term mortality

Figure L-1: Short-term mortality



Notes: The main sample is used. The estimates come from complementary log-log regression model (equation [6]) where the baseline hazard is the log in age in months. The dotted lines are the 95th confidence intervals derived from standard errors clustered at municipality level. The observations within 2 months from the price changes are excluded from the sample to account for anticipatory utilization.

Table L-1: Short-term mortality

Baseline hazard	*Log in age in months*		*Linear in age in months*		*Each dummy for age in years*	
	Estimate	(SE)	Estimate	(SE)	Estimate	(SE)
	(1)		(2)		(3)	
Subsidized ×						
Age7	-1.336	(1.149)	-1.312	(1.132)	-1.433	(1.129)
Age8	0.576	(0.559)	0.613	(0.570)	0.195	(0.628)
Age9	-0.317	(0.510)	-0.275	(0.539)	-0.150	(0.541)
Age10	-0.757	(0.795)	-0.716	(0.799)	0.210	(0.923)
Age11	0.591*	(0.356)	0.624*	(0.364)	0.694	(0.506)
Age12	-1.469	(0.984)	-1.448	(0.984)	-1.582*	(0.916)
Age13	0.348	(0.502)	0.353	(0.504)	0.420	(0.675)
Age14	0.342	(0.500)	0.327	(0.498)	0.568	(0.566)
N	2,205,647		2,205,647		2,205,647	
N of individuals	63,530		63,530		63,530	
N of deaths	68		68		68	

Notes: The main sample is used. The estimates come from complementary log-log regression models (equation [6]) with different baseline hazard indicated at the first rows. The standard errors clustered at the municipality level are reported in parenthesis. *** p<0.01, ** p<0.05, * p<0.10

Appendix M: Pediatric complex chronic conditions

Table M-1: List of pediatric complex chronic conditions (CCCs)

CCC categories	Mean	*Share*
Neurologic and neuromuscular	0.0093	*8.2%*
Cardiovascular	0.0315	*27.7%*
Respiratory	0.0003	*0.2%*
Renal and urologic	0.0037	*3.2%*
Gastrointestinal	0.0050	*4.3%*
Hematologic or immunologic	0.0059	*5.2%*
Metabolic	0.0143	*12.5%*
Other congenital or Genetic defect	0.0126	*11.1%*
Malignancy	0.0307	*27.0%*
Premature and neonatal	0.0001	*0.1%*
Technology dependence	0.0004	*0.4%*
Transplantation	0.0000	*0.0%*
Any CCC	0.086	*100%*

Notes: There are 7,069 individuals. The means of a dummy that takes one if an individual is diagnosed with ICD10 in each CCC category during the 12 months are reported. See Feudtner et al. (2014) for corresponding ICD10, as well as Feudtner et al. (2000) for original list in ICD9.

References:

Feudtner *et al.* (2014) "Pediatric complex chronic conditions classification system version 2: updated for ICD-10 and complex medical technology dependence and transplantation." *BMC Pediatrics* 14:199.

Feudtner *et al.* (2000) "Pediatric Deaths Attributable to Complex Chronic Conditions: A Population-Based Study of Washington State, 1980–1997" *Pediatrics* 106: 205-209.

Appendix N: By time of visits

Table N-1: List of billing codes for after-hours and midnight/holiday visits

Billing code #	Type of visit	Timing of visit	Additional fee charged (in 1000 JPY)	Number of times charged (frequency)
After-hours visits				
111000570	first visit	after-hours	0.85	4,329
111000870	first visit	after-hours (*)	2.30	5,527
111012470	first visit	night/early morning	0.50	53,083
111700870	first visit	after-hours (*)	2.30	5
112001110	revisit	after-hours	0.65	2,411
112001410	revisit	after-hours (*)	1.80	70
112006470	revisit	after-hours	0.65	256
112006770	revisit	after-hours (*)	1.80	1,986
112015570	revisit	night/early morning	0.50	62,423
Midnight/Holiday visits				
111000670	first visit	holiday	2.50	16,406
111000770	first visit	midnight	4.80	2,343
112001210	revisit	holiday	1.90	930
112001310	revisit	midnight	4.20	59
112006570	revisit	holiday	1.90	1,143
112006670	revisit	midnight	4.20	506

Notes: The fees listed on the second to far right are the fees charged additionally to the fees for regular-hour visits. As a benchmark, the fees for regular-hour visits during the sample period are approximately 2.8 for first visit, and 0.7 for revisits measured in 1000 JPY (approximately 10 USD). (*) is applied to specific medical institutions. The unit of additional fee is measured in 1000 JPY.
Source: From Japan Federation of Democratic Medical Institutions (2015)

References:

Japan Federation of Democratic Medical Institutions. (2015) https://www.min-iren.gr.jp/hokoku/data/hokoku_h27dpc/160429_48.pdf (last accessed on October 26, 2017).

Table N-2: By time of visits

(i) Outcome: Frequency of outpatient visits

	A. Regular-hour visits				B. After-hours visits				C. Midnight/Holiday visits			
	(1)		(2)		(3)		(4)		(5)		(6)	
	Estimate	(SE)	*Semi-arc elasticity*	[SE]	Estimate	(SE)	*Semi-arc elasticity*	[SE]	Estimate	(SE)	*Semi-arc elasticity*	[SE]
Subsidized ×												
Age7	0.169***	(0.028)	*-0.769****	[0.045]	0.008	(0.006)	*-0.505****	[0.112]	0.001	(0.001)	*-0.358**	[0.199]
Age8	0.148***	(0.030)	*-0.719****	[0.042]	0.004	(0.006)	*-0.288***	[0.116]	0.001	(0.001)	*-0.188*	[0.223]
Age9	0.115***	(0.027)	*-0.605****	[0.047]	0.008*	(0.005)	*-0.542****	[0.129]	-0.001	(0.001)	*0.199*	[0.245]
Age10	0.110***	(0.031)	*-0.614****	[0.047]	0.013***	(0.004)	*-0.820****	[0.121]	-0.000	(0.001)	*0.048*	[0.241]
Age11	0.096***	(0.026)	*-0.586****	[0.050]	0.017***	(0.004)	*-1.090****	[0.125]	-0.000	(0.001)	*0.113*	[0.257]
Age12	0.079***	(0.023)	*-0.517****	[0.049]	0.016***	(0.003)	*-0.975****	[0.118]	-0.001	(0.001)	*0.433**	[0.235]
Age13	0.082***	(0.020)	*-0.568****	[0.049]	0.024***	(0.004)	*-1.325****	[0.110]	-0.000	(0.001)	*0.099*	[0.248]
Age14	0.096***	(0.018)	*-0.694****	[0.048]	0.021***	(0.004)	*-1.227****	[0.118]	0.000	(0.001)	*-0.196*	[0.270]
In-kind	0.035	(0.053)			0.031	(0.019)			-0.001	(0.004)		
Income restriction	-0.051	(0.032)			-0.005	(0.010)			-0.001	(0.002)		
R-squared	0.28				0.14				0.04			
N	2,205,647				2,205,647				2,205,647			
N of individuals	63,530				63,530				63,530			
Mean wo subsidy	0.401				0.023				0.006			
Share	89.1%				8.4%				2.5%			
Typical fees per visit (1K JPY)	2.8 (first visit) 0.7(revisit)				+0.85 (first visit) +0.65 (revisit)				+4.8/+2.5(first visit) +4.2/+1.9 (revisit)			

Notes: This table corresponds to Figure 11 in the main text. The main sample is used. The frequency of outpatient visits is the number of outpatient visits per month. See Table N-1 which provides the list of billing codes for after-hours visits and midnight/holiday visits, and corresponding fees that are additionally charged on top of fees for regular-hour visits. The estimates β_A from estimating equation [3], and the corresponding semi-arc elasticity for each age (A=7–14) are reported. See Appendix B for details on derivation of semi-arc elasticity. All the regressions include age (in months) FE, time (in month) FE, and individual FE. In-kind is a dummy that takes one if the municipality offers the subsidy in the form of in-kind instead of refund, and income restriction is a dummy that takes one if the municipality imposes income restriction for subsidy eligibility. For the estimates, the standard errors clustered at the municipality level are reported in parenthesis. For the semi-arc elasticity, the bootstrapped standard errors with 200 repetitions clustered at municipality level are reported in brackets. The observations within 2 months from the price changes are excluded from the sample to account for anticipatory utilization. Significance levels: *** p<0.01, ** p<0.05, * p<0.10

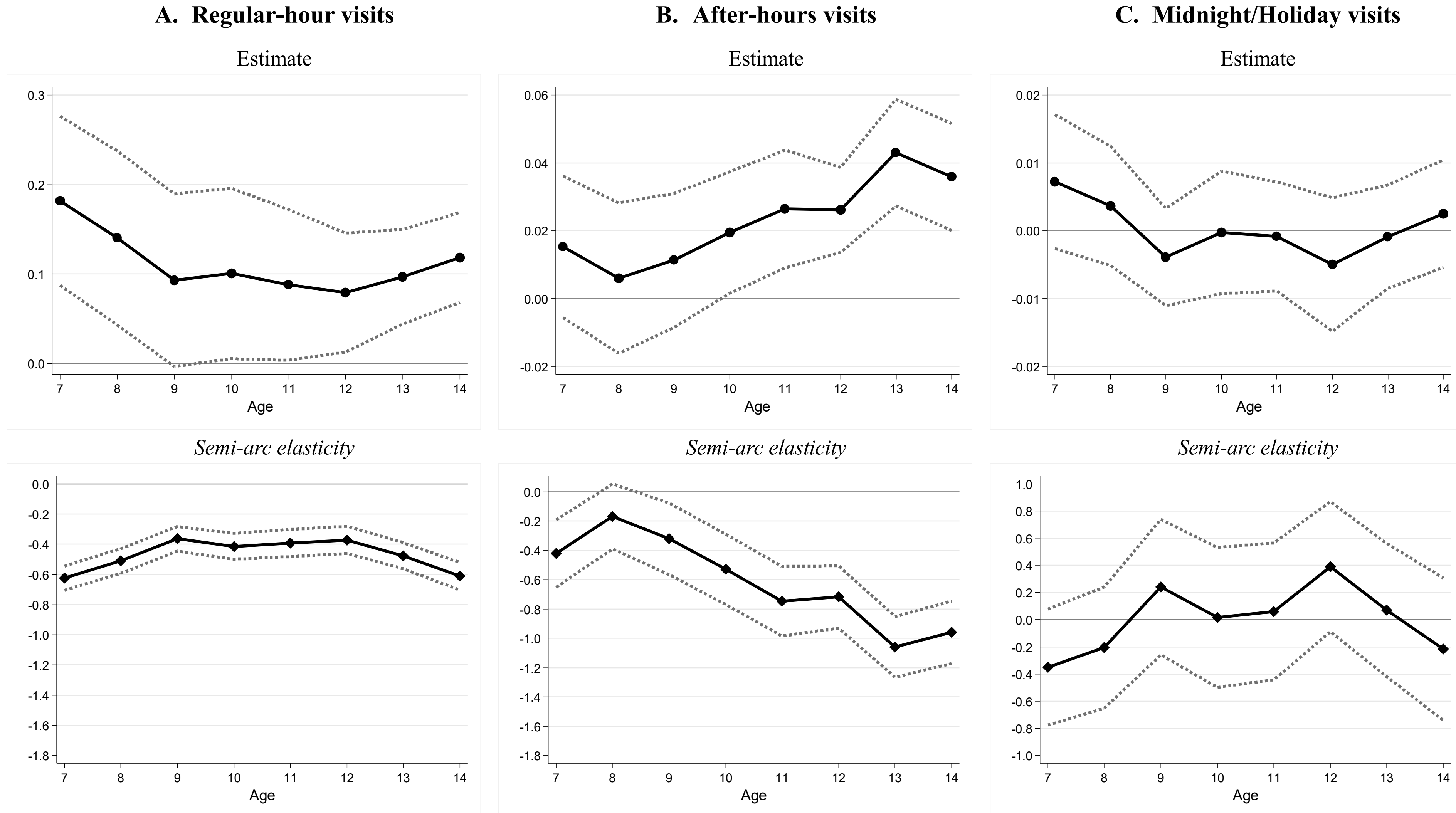
(ii) Outcome: Outpatient spending (in 1000 JPY)

	A. Regular-hour visits				B. After-hours visits				C. Midnight/Holiday visits			
	(1)		(2)		(3)		(4)		(5)		(6)	
	Estimate	(SE)	*Semi-arc elasticity*	[SE]	Estimate	(SE)	*Semi-arc elasticity*	[SE]	Estimate	(SE)	*Semi-arc elasticity*	[SE]
Subsidized ×												
Age7	0.182***	(0.048)	-0.624***	[0.041]	0.015	(0.011)	-0.422***	[0.117]	0.007	(0.005)	-0.350	[0.218]
Age8	0.140***	(0.049)	-0.511***	[0.042]	0.006	(0.011)	-0.168	[0.113]	0.004	(0.004)	-0.205	[0.228]
Age9	0.093*	(0.049)	-0.364***	[0.042]	0.011	(0.010)	-0.321**	[0.125]	-0.004	(0.004)	0.240	[0.255]
Age10	0.101**	(0.048)	-0.414***	[0.044]	0.019**	(0.009)	-0.529***	[0.122]	-0.000	(0.005)	0.017	[0.263]
Age11	0.088**	(0.043)	-0.392***	[0.046]	0.026***	(0.009)	-0.748***	[0.121]	-0.001	(0.004)	0.061	[0.257]
Age12	0.079**	(0.034)	-0.371***	[0.046]	0.026***	(0.006)	-0.718***	[0.109]	-0.005	(0.005)	0.391	[0.244]
Age13	0.097***	(0.027)	-0.476***	[0.044]	0.043***	(0.008)	-1.059***	[0.106]	-0.001	(0.004)	0.071	[0.250]
Age14	0.118***	(0.025)	-0.612***	[0.046]	0.036***	(0.008)	-0.959***	[0.109]	0.003	(0.004)	-0.217	[0.268]
In-kind	0.080	(0.057)			0.052	(0.032)			-0.004	(0.019)		
Income restriction	-0.029	(0.055)			-0.008	(0.020)			-0.002	(0.009)		
R-squared	0.21				0.10				0.04			
N	2,205,647				2,205,647				2,205,647			
N of individuals	63,530				63,530				63,530			
Mean wo subsidy	0.509				0.057				0.032			
Share	85.1%				9.5%				5.4%			
Typical fees per visit (1K JPY)	2.8 (first visit) 0.7 (revisit)				+0.85 (first visit) +0.65 (revisit)				+4.8/+2.5(first visit) +4.2/+1.9 (revisit)			

Notes: The main sample is used. Outpatient spending is the monthly spending on outpatient care measured in 1000 JPY (approximately 10 USD). See Table N-1 which provides the list of billing codes for after-hours visits and midnight/holiday visits, and corresponding fees that are additionally charged on top of fees for regular-hour visits. The estimates β_A from estimating equation [3], and the corresponding semi-arc elasticity for each age (A=7–14) are reported. See Appendix B for details on derivation of semi-arc elasticity. All the regressions include age (in months) FE, time (in month) FE, and individual FE. In-kind is a dummy that takes one if the municipality offers the subsidy in the form of in-kind instead of refund, and income restriction is a dummy that takes one if the municipality imposes income restriction for subsidy eligibility. For the estimates, the standard errors clustered at the municipality level are reported in parenthesis. For the semi-arc elasticity, the bootstrapped standard errors with 200 repetitions clustered at municipality level are reported in brackets. The observations within 2 months from the price changes are excluded from the sample to account for anticipatory utilization. Significance levels: *** $p<0.01$, ** $p<0.05$, * $p<0.10$

Figure N-1: By time of visits

Outcome: Outpatient spending (in 1000 JPY)



Notes: The main sample is used. Outpatient spending is the monthly spending on outpatient care measured in 1000 JPY (approximately 10 USD). See Table N-1 which provides the list of billing codes for after-hours visits and midnight/holiday visits, and corresponding fees that are additionally charged on top of fees for regular-hour visits. The estimates β_A from estimating equation [3], and the corresponding semi-arc elasticity for each age (A=7–14) are reported. See Appendix B for details on derivation of semi-arc elasticity. The dotted lines are the 95th confidence intervals. The standard errors clustered at municipality level are used for estimates, and the bootstrapped standard errors clustered at municipality with 200 repetitions are used for the semi-arc elasticity. The observations within 2 months from the price changes are excluded from the sample to account for anticipatory utilization.

Appendix O: Inappropriate use of antibiotics

Fleming-Dutra *et al.* (2016) divide the diagnoses (with corresponding ICD9-CM) into three tiers by the degree of appropriateness of antibiotic use. Specifically, Tiers 1, 2, and 3 are diagnostic categories where antibiotic use is always indicated, is occasionally indicated, and not indicated at all, respectively. For example, antibiotic prescription is considered appropriate for pneumonia because the diagnosis almost always warrants antibiotic therapy (Tier 1), while antibiotic prescription for bronchitis and asthma are considered inappropriate because children with these conditions should not receive antibiotics (Tier 3).

In this study, we focus on Tier 3 children who should not receive any antibiotics. When a patient has multiple diagnoses in a month, a priority is given to Tier 1 diagnoses, then Tier 2 diagnoses, then finally Tier 3 diagnoses so that a patient at each month is assigned to mutually exclusive tiers. Specifically, we assign a patient to Tier 1 when the patient has any diagnosis in Tier 1 in the month and to Tier 2 when the patient has any diagnosis in Tier 2 but not Tier 1, and the rest to Tier 3. In this way, Tier 3 only includes the patients for whom antibiotics should not be recommended at all since none of the diagnoses include the ones in Tiers 1 and 2. Table O-1 presents the list of Tier 3 diagnoses with corresponding ICD10 (which we convert from ICD9-CM) as well as summary statistics of antibiotic usage. The summary statistics for Tiers 1 and 2 children are available upon request.

References:
Fleming-Dutra *et al.* (2016) "Prevalence of inappropriate antibiotic prescriptions among US ambulatory care visits, 2010-2011." *JAMA* 315(17): 1864–1873.

Table O-1: Summary statistics of inappropriate antibiotic use

Name of diagnosis	ICD 10	Fraction of the diagnosis (1)	Unconditional: Antibiotics use (dummy) (2)	Unconditional: Spending on antibiotics (in 1000 JPY) (3)	Unconditional: Freq. of antibiotics prescriptions (4)	Conditional on having the diagnosis: Antibiotics use (dummy) (5) = (2)/(1)	Conditional on having the diagnosis: Spending on antibiotics (in 1000 JPY) (6) = (3)/(1)	Conditional on having the diagnosis: Freq. of antibiotics prescriptions (7) = (4)/(1)
All		**0.219**	**0.042**	**0.053**	**0.207**	**0.19**	**0.24**	**0.94**
By diagnosis:								
Asthma, allergy	J30, J44, J45, T784	0.058	0.016	0.021	0.085	0.27	0.36	1.46
Bronchitis, bronchiolitis	J20, J21, J40	0.036	0.023	0.032	0.120	0.66	0.90	3.36
Influenza	J09, J10, J11	0.019	0.007	0.009	0.034	0.37	0.48	1.78
Non-suppurative otitis media	H65, H68, H69	0.002	0.001	0.001	0.004	0.27	0.39	1.72
Viral pneumonia	J12	0.000	0.000	0.000	0.000	0.33	0.50	2.34
Viral upper respiratory infection	J00, J04, J05, J06, R05	0.033	0.018	0.022	0.088	0.53	0.67	2.62
Other respiratory conditions	All remaining respiratory conditions (J00-J99) not coded above and R060-R064, R068-R069, R042, R048, R049, R093	0.000	0.000	0.000	0.000	0.25	0.31	1.65
All other codes not listed elsewhere	All other codes not listed elsewhere	0.168	0.019	0.024	0.096	0.11	0.14	0.57

Notes: The spending on antibiotics is measured in 1000 JPY (approximately 10 USD). The list of ICD10 codes comes from Fleming-Dutra *et al.* (2016) eTable "2. Diagnostic categories by tier with corresponding ICD-9CM code."

Table O-2: Inappropriate use of antibiotics

	A. Outpatient spending on antibiotics (in 1000 JPY)		B. Frequency of antibiotic prescriptions	
	(1)		(2)	
	Estimate	(SE)	Estimate	(SE)
Subsidized ×				
Age7	0.013***	(0.005)	0.039***	(0.014)
Age8	0.015***	(0.003)	0.051***	(0.012)
Age9	0.014***	(0.003)	0.054***	(0.013)
Age10	0.020***	(0.004)	0.070***	(0.015)
Age11	0.016***	(0.003)	0.063***	(0.009)
Age12	0.016***	(0.003)	0.066***	(0.011)
Age13	0.011***	(0.003)	0.045***	(0.010)
Age14	0.009***	(0.002)	0.042***	(0.006)
In-kind	0.018**	(0.009)	0.087*	(0.052)
Income restriction	-0.006	(0.005)	-0.029*	(0.017)
R-squared	0.08		0.09	
N	2,205,647		2,205,647	
N of individuals	63,530		63,530	
Mean	0.052		0.193	

Notes: The main sample is used. The outcome is monthly outpatient spending on antibiotics measured in 1000 JPY (approximately 10 USD) in Panel A and the number of antibiotic prescriptions per month in Panel B. The estimates β_A from estimating equation [3] for each age (A=7–14) are reported. All the regressions include age (in months) FE, time (in month) FE, and individual FE. In-kind is a dummy that takes one if the municipality offers the subsidy in the form of in-kind instead of refund, and income restriction is a dummy that takes one if the municipality imposes income restriction for subsidy eligibility. The standard errors clustered at the municipality level are reported in parenthesis. The observations within 2 months from the price changes are excluded from the sample to account for anticipatory utilization. Significance levels: *** p<0.01, ** p<0.05, * p<0.10

Appendix P: Inter-municipality migration

In the main text, we focus on the children who do not move across municipalities, as there are only 1,079 such children which account for only 1.7% of total children (63,530 vs. 64,609). The migration rate in our sample is lower than actual migration, since intra-municipality migration is not counted as migration, as the subsidy level is the same. However, if a family with very sick children is more likely to move to more generous municipality, our estimates—which may fail to control for the time-varying unobserved health conditions—can be potentially biased. We think that this is very unlikely for a couple of reasons. First, the migration rate is declining function of age of children and is already low by age 7 as parents tend to move before their children enter primary school. Second, there may be many other municipality characteristics than subsidy generosity for child healthcare that may affect the migration decision such as quality of school, availability of daycare, and other childrearing support in the districts. Nonetheless, we include those who move across municipalities into the sample and re-estimate the equation [3]. Figure P-1 compares the estimates with and without movers. It is reassuring that estimates are very similar.

More direct way to test *selective* migration is to examine 1) whether children who move are more likely to choose more generous municipality, and 2) particularly whether sicker children are more likely to move to more generous municipality. To investigate such possibilities, we estimate a location choice model, limiting our sample to a month when children move across municipalities. For the first question, we estimate the following equation of the conditional logit model:

$$Pr(Y_{iat} = m) = F(\sum_{A=7}^{14} \beta_A \{subsidized_{amt} \times 1(Age\ A)\} + \delta_m + \varepsilon_{iat}) \quad \text{–[P1]}$$

where $Pr(Y_{iat} = m)$ is the locational choice of municipality m among M municipalities by a child i whose age is a at time t, and $subsidized_{amt}$ is a dummy which takes one if the municipality m provides subsidy for age a at time t. We also control for municipality of choice fixed effects δ_m to control for time-invariant municipality characteristics that may attract (families of) children. Our coefficients of interest are series of β_A (A= 7–14) where $\beta_A > 0$ indicates that children are more likely to choose the municipality which provides the subsidy for her/his age a in time t. The standard errors are clustered at individual level.

For the second question, we further interact the series of subsidy dummies with the proxy for health status—the average outpatient spending for the six months just before the month of move (denoted by $prior\ spending_{iat-1}$ below) [4]:

$$Pr(Y_{iat} = m) = F(\sum_{A=7}^{14} \beta_A \{subsidized_{amt} \times 1(Age\ A)\} + \sum_{A=7}^{14} \gamma_A \{subsidized_{amt} \times 1(Age\ A) \times prior\ spending_{iat-1}\} + \delta_m + \varepsilon_{iat}) \quad \text{–[P2]}$$

where $\gamma_A > 0$ indicates that the sickly children are more likely to choose the municipality with subsidy. Note that in both regressions, only the children who moved across the 165 municipalities are included in the sample.

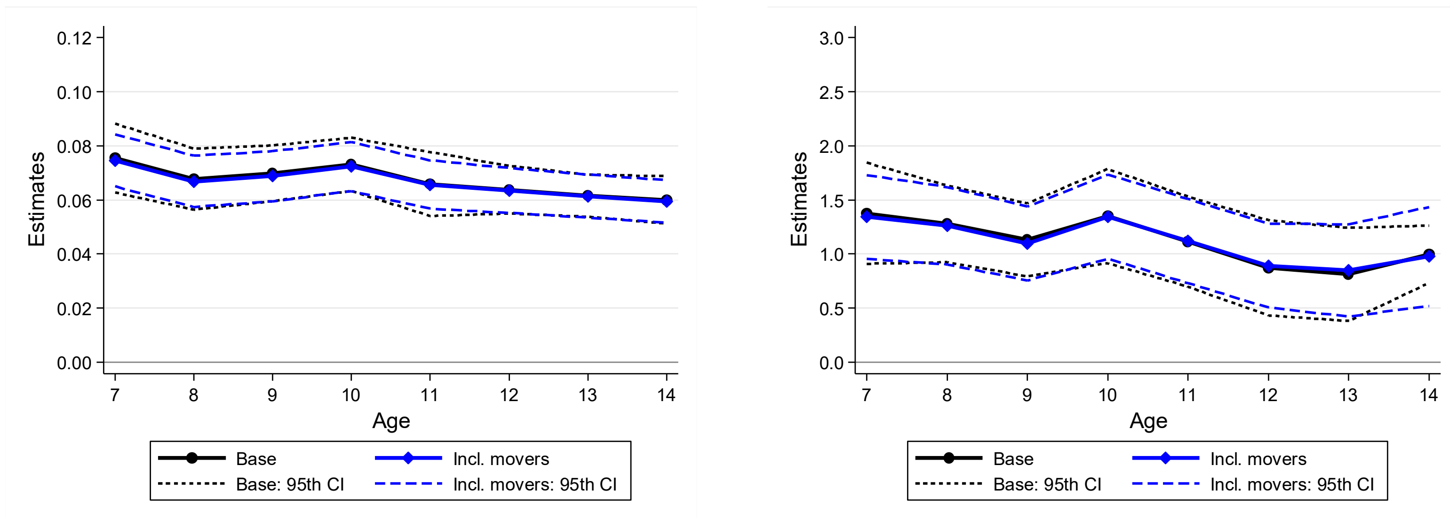
The graph on the left in Figure P-2 demonstrates the graphical presentation of estimating equation [P1] which plots β_A for each age (A=7–14). Even though the estimates are quite noisy, β_A are mostly negative and are not statistically significant at the conventional level (See Table P-2 for the estimates). Thus, these results at least do not support that children are more likely to choose the municipality with the subsidy for her/his age.

[4] We experiment the length of prior months to calculate the average prior spending from X months (X= 3, 6, 9 and 12) but the estimates are very similar. The benefit of taking longer span to compute the average spending is that we may be able to capture the health status with more accuracy while the cost is that we lose individual who move within the first X months from the start of the data.

The graph on the right in Figure P-2 demonstrates the graphical presentation of estimating equation [P2] which plots β_A in the upper half, and γ_A in the lower half. Again, β_A are not statistically significant and mostly negative. Furthermore, γ_A are close to zero, and far from statistically significant, suggesting that sickly children are no more likely to choose the municipality with subsidy. Taken together, we do not find any evidence of selective inter-municipality migration at least in the current setting.

Figure P-1: Baseline vs. including movers

A. Outpatient dummy **B. Outpatient spending** (in 1000 JPY)

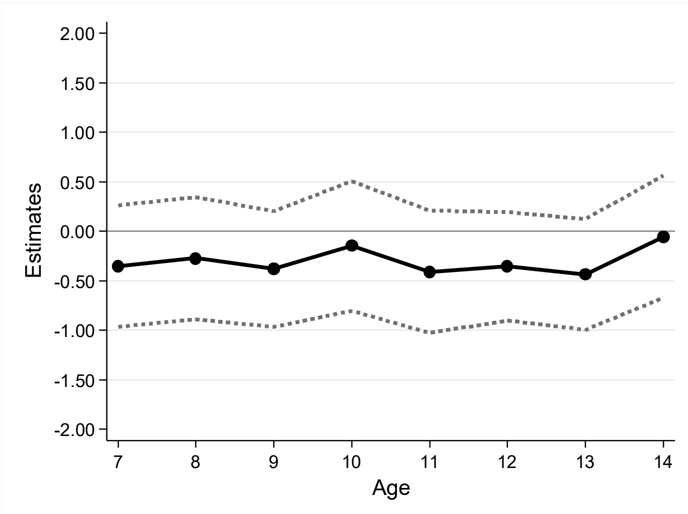


Notes: The main sample is used. An outpatient dummy takes one if there is at least one outpatient visit per month, and outpatient spending is the monthly spending on outpatient care measured in 1000 JPY (approximately 10 USD). The estimates β_A for each age (A=7–14) from estimating equation [3] are plotted. The dotted lines are the 95th confidence intervals derived from standard errors clustered at individual level. The observations within 2 months from the price changes are excluded from the sample to account for anticipatory utilization. Along with our baseline estimates from the sample without movers, we report estimates from the sample that include inter-municipality movers (1.7%).

Figure P-2: Selective inter-municipality migration

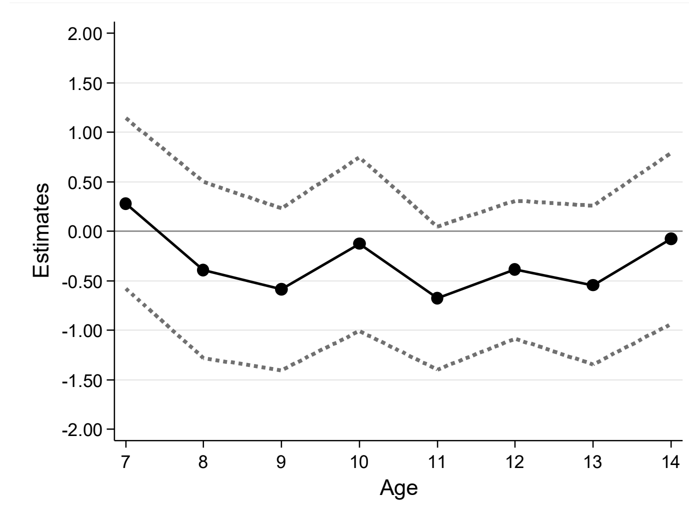
Equation [P1]

Plot of β_A

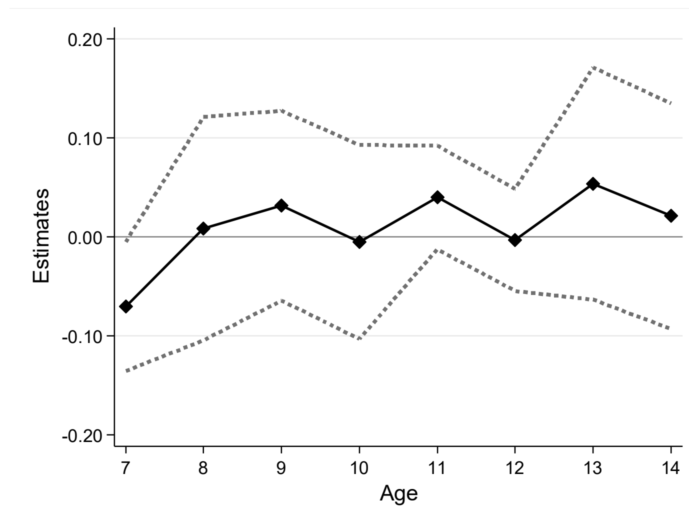


Equation [P2]

Plot of β_A



Plot of γ_A



Notes: The estimates from conditional logit model are plotted. The dotted lines are the 95th confidence intervals derived from standard errors clustered at individual level. The graph on the left plots β_A from estimating equation [P1] while the graphs on the right plot β_A in the upper half, and γ_A in the lower half from estimating equation [P2].

Table P-1: Base vs. including movers

	A. Outpatient dummy				B. Outpatient spending (in 1000 JPY)			
	Baseline (Col. 3 Table 2)		Including movers		Baseline (Col. 3 Table 2)		Including movers	
	Estimate	(SE)	Estimate	(SE)	Estimate	(SE)	Estimate	(SE)
	(1)		(2)		(3)		(4)	
Subsidized ×								
Age7	0.075***	(0.006)	0.075***	(0.005)	1.376***	(0.236)	1.342***	(0.198)
Age8	0.068***	(0.006)	0.067***	(0.005)	1.278***	(0.179)	1.261***	(0.182)
Age9	0.070***	(0.005)	0.069***	(0.005)	1.131***	(0.171)	1.098***	(0.175)
Age10	0.073***	(0.005)	0.072***	(0.005)	1.350***	(0.221)	1.346***	(0.199)
Age11	0.066***	(0.006)	0.066***	(0.005)	1.113***	(0.211)	1.119***	(0.198)
Age12	0.064***	(0.004)	0.063***	(0.004)	0.872***	(0.223)	0.892***	(0.198)
Age13	0.062***	(0.004)	0.061***	(0.004)	0.811***	(0.218)	0.848***	(0.218)
Age14	0.060***	(0.004)	0.059***	(0.004)	0.998***	(0.134)	0.978***	(0.233)
In-kind	0.047***	(0.014)	0.049***	(0.018)	0.440	(0.388)	0.493	(0.329)
Income restriction	-0.020**	(0.009)	-0.021***	(0.008)	-0.561	(0.372)	-0.725**	(0.301)
R-squared	0.23		0.23		0.51		0.51	
N	2,205,647		2,252,600		2,205,647		2,252,600	
N of individuals	63,530		64,609		63,530		64,609	

Notes: The main sample is used. An outpatient dummy in Panel A takes one if there is at least one outpatient visit per month, and outpatient spending in Panel B is the monthly spending on outpatient care measured in 1000 JPY (approximately 10 USD). The estimates β_A from estimating equation [3] for each age (A=7–14) are reported. For ease of comparison, columns (1) and (3) replicate the estimates from columns (1) and (3) in Table C-1. Columns (2) and (4) report estimates from the sample that include inter-municipality movers (1.7%). The standard errors clustered at the municipality level are reported in parenthesis. *** p<0.01, ** p<0.05, * p<0.10

Table P-2: Selective inter-municipality migration

	No interaction with prior spending	Interaction with prior spending
	(1)	(2)
Subsidized ×		
Age7	-0.352	0.281
	(0.313)	(0.439)
Age8	-0.273	-0.391
	(0.315)	(0.455)
Age9	-0.382	-0.587
	(0.298)	(0.417)
Age10	-0.150	-0.131
	(0.334)	(0.448)
Age11	-0.410	-0.675*
	(0.316)	(0.369)
Age12	-0.354	-0.388
	(0.279)	(0.355)
Age13	-0.437	-0.544
	(0.285)	(0.409)
Age14	-0.055	-0.074
	(0.315)	(0.440)
Age7 × Prior spending		-0.070**
		(0.033)
Age8 × Prior spending		0.008
		(0.058)
Age9 × Prior spending		0.032
		(0.049)
Age10 × Prior spending		-0.005
		(0.050)
Age11 × Prior spending		0.040
		(0.027)
Age12 × Prior spending		-0.003
		(0.026)
Age13 × Prior spending		0.054
		(0.060)
Age14 × Prior spending		0.021
		(0.058)
In-kind	2.597***	-0.891
	(0.451)	(0.755)
Income restriction	-0.484***	-0.188
	(0.164)	(0.318)
N	161,703	126,344
N of move	1,179	920
N of individuals	1,052	816

Notes: The estimates from conditional logit model are reported. Column (1) reports the results from estimating equation [P1] while column (2) reports the results from estimating equation [P2]. The standard errors clustered at individual level are reported in parentheses. "Prior spending" is the average outpatient spending for the six months just before the month of move. The sample is limited to a month when children moves across municipalities. The number of moves is slightly larger here as the observations within 2 months from the price changes are not excluded.