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Welfare Benefits and Labor Supply: Evidence from a natural experiment in Japan*

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Abstract

This study employs an instrumental variable approach to identify the effect of the unintended increase in Public Assistance (PA) benefits on the labor supply during a large-scale municipal merger event in Japan. The findings reveal that an exogenous increase in PA benefit levels has a significant impact on the receipt rate among those under 65. Furthermore, this increase in the receipt rate negatively affects the employment rate of individuals aged 55 to 64 living alone, as well as single-parent households, who are prevalent among PA recipients under 65.

Keywords: Public assistance, Labor supply, Natural experiment
JEL classification: H53; J22

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1. Public Assistance and Labor Force Participation

The canonical static labor supply model predicts that increasing the Public Assistance (PA) benefits for non-workers weakens work incentives through income and substitution effects. Since the late 1990s, many developed countries have reformed welfare to strengthen activation strategies. In the U.S., states have significant discretion in setting PA eligibility and benefit levels, prompting studies that utilize cross-state PA program variations (Moffitt, 2002). However, evaluating the impact of these reforms on work incentives is challenging due to overlapping factors, including economic booms, welfare reforms, and concurrent policy changes (Blank, 2002).

Recent studies have begun to address these issues by using a regression discontinuity design to examine the impact of age-based welfare payments on labor outcomes. Lemieux and Milligan (2008) find a reduction in employment among less-educated single men by 3%-5% in Quebec, Canada. Similarly, Bargain and Doorley (2011) find that France's RMI program reduced employment among less-educated single men by 7%-10%. In Uruguay, Bergolo and Cruces (2021) identify a 6% reduction in formal labor force participation among all social assistance beneficiaries and an 8.7% reduction among single mothers. While insightful, these studies are limited to age-based policies, whereas this study focuses on all low-income households in affected municipalities.

In Japan, the guaranteed amount of PA benefits for those with zero income is referred to as the “minimum cost of living” (MCL), which varies by region due to differences in price levels and living standards. Livelihood assistance, making up a significant portion of the MCL, is adjusted based on the recipient’s municipality. In 1978, Japan introduced the “Class-Area System,” classifying municipalities into three class-areas based on their economic conditions, which later expanded to six class-areas by 1987. From FY 1992 to 2012, the disparity between each class area was set at 4.5 %.

Although livelihood assistance and supplemental payments are revised periodically and applied uniformly nationwide, municipal amalgamations with differing benefit levels create variations in the MCL. In 1966, the Social Welfare Bureau, Ministry of Health, Labour and Welfare (MHLW) instructed that when municipalities of different class-areas merge, the highest class-area must apply to the new municipality. This results in an exogenous MCL increase for residents of lower-class areas. Japan’s large-scale municipal mergers, the Great Heisei Amalgamation from 1999 to 2006, provided a unique opportunity to study these exogenous PA benefit changes, reducing municipalities from 3,229 to 1,821.

2. Data

The data for this analysis come from multiple sources. PA recipient counts are aggregated from the Report on Social Welfare Administration and Services by MHLW, providing annual municipal averages of monthly PA recipients. However, data on PA recipients under age 65 are only

available for towns and villages in 14 prefectures, so municipalities from other prefectures are excluded. Additionally, because data are only available until 2009, the year is used as a proxy for 2010. For the demographic and labor market information at the municipal level, we aggregate the microdata from the Population Census from the Statistics Bureau of the Ministry of Internal Affairs and Communications (MIC) for 1995, 2000, and 2010. Class-area designations for each municipality were gathered from the Handbook of Public Assistance.

The Great Heisei Amalgamation spanned from 1999 to 2006, with most mergers occurring in FY 2004–2005. Since employment data are collected every five years, FY 2005 and FY 2010 are considered post-amalgamation periods. However, this analysis focuses on FY 2010 rather than FY 2005 for two reasons: first, many amalgamations happened in FY 2005, so using it would exclude municipalities that merged that year; second, the impact on labor markets likely involved a lag. Therefore, we examine the 2000–2010 period.

We construct municipal panel data by focusing on municipalities that amalgamated between April 1, 2004, and March 31, 2007—a peak period for amalgamations. Our sample is split into two groups: (1) amalgamated municipalities with no change in class-area (control group) and (2) those with a class-area change (treatment group), and only the latter experienced an exogenous increase in the MCL due to the amalgamations. Note that the highest class-area municipalities in the treatment group saw no class-area change. However, the amalgamations fostered inter-municipality mobility, particularly between central cities and peripheral areas (Hatakeyama 2013). Therefore, we consider the merged municipalities that include municipalities with changed class-areas to be "treatment groups". Our final FY 2004–2006 sample includes 171 municipalities: 95 in the control group and 76 in the treatment group.

Table 1 presents descriptive statistics by control and treatment groups. The PA recipient rate for those under 65 is higher in the control group in both 2000 (pre-amalgamation) and 2010 (post-amalgamation), though the gap between groups has narrowed over time, with a difference-in-difference of 0.04% ((0.74%-0.47%)-(0.79%-0.56%)=0.04%). Additionally, while the employment rate of single mothers (a large share of PA recipients) has declined in both groups, the decrease is more pronounced in the treatment group. However, statistically significant differences exist between the groups in working-age population size and public employment share, necessitating outcome verification after controlling for these factors.

Table 1
Descriptive statistics

Variable	Municipalities that amalgamated between FY 2004 and FY 2007: w/o class change (Control)	Municipalities that amalgamated between FY 2004 and FY 2007: w/ class change (Treatment)	t-value
1. Means in 2000			
a. Public assistance rate under 65 years old	0.0056	0.0047	0.718
	(0.009)	(0.006)	
b. Employment rate for single person between 55-64 years old	0.5955	0.6152	-1.604
	(0.092)	(0.061)	
c. Employment rate for single-mother household	0.8437	0.8532	-0.905
	(0.078)	(0.052)	
d. Employment rate for single-father household	0.8870	0.9223	-2.170
	(0.136)	(0.045)	
e. Unemployment rate for prime-age males	0.0361	0.0353	0.401
	(0.014)	(0.011)	
f. Log of a working-age population	9.7160	11.1230	-10.389
	(0.833)	(0.935)	
g. Public employment share	0.0318	0.0270	2.703
	(0.013)	(0.010)	
2. Means in 2010			
a. Public assistance rate under 65 years old	0.0079	0.0074	0.330
	(0.011)	(0.008)	
b. Employment rate for single person between 55-64 years old	0.6089	0.6213	-1.146
	(0.082)	(0.052)	
c. Employment rate for single-mother household	0.8310	0.8191	1.189
	(0.075)	(0.051)	
d. Employment rate for single-father household	0.8666	0.8665	0.003
	(0.111)	(0.073)	
e. Unemployment rate for prime-age males	0.0740	0.0644	2.653
	(0.027)	(0.019)	
f. Log of a working-age population	9.5674	11.0245	-10.267
	(0.880)	(0.973)	
g. Public employment share	0.0311	0.0272	2.181
	(0.013)	(0.010)	
Number of municipalities	95	76	

Note: Standard deviations are in parenthesis. The numbers in the last row represent the sample size of each group. Note, however, that the number of observations for the control group of single-father households differs from the total because data was not available for some municipalities.

3. Instrumental-Variable Estimation

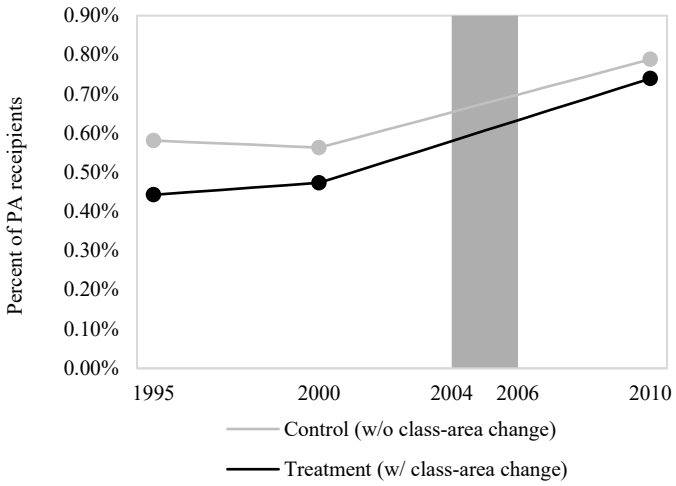
In the treatment group, the exogenous increase in the MCL by the amalgamation is expected

to impact low-wage workers with incomes below the new minimum standard, potentially leading them to exit the labor market. To examine this, we first estimate a first-difference model of the PA recipient rate for those under 65 (the first-stage regression), controlling for pre- and post-treatment differences in the unemployment rates for males aged 25–54, the natural log of the working-age population (ages 15–64), pre-merger public employment share, dummies for the lowest class area among amalgamated municipalities, and residential prefecture. In the second stage, we estimate a first-difference model for the employment rate of a specific group. Here, we focus on the effect of the predicted PA receipt rate (from the first stage instrumental-variable estimation) on employment while controlling for the same exogenous variables as in the first stage.

Figure 1 presents the PA receipt rates for the control and treatment groups across 1995, 2000, and 2010. Differences in outcomes between the two groups are evident both before and after the FY 2004–2006 amalgamations, along with some variation before 2000. To assess this, we also estimate a first-difference model for the 1995–2000 period as a placebo test.

Fig. 1

Changes in the public assistance rate before and after the municipal amalgamations



The first two rows of Table 2 indicate that when merged municipalities include areas with an increased class area, there's an observed 0.13-point average rise in the PA receipt rate among those under 65. Given that the overall PA receipt increase across the 171 municipalities analyzed is 0.24 points, this effect is not negligible. In the second stage estimation, this exogenous PA rate increase negatively impacts the employment rate of single persons aged 55–64 and single-parent families, with significant effects, particularly on single mothers and fathers. Considering that the average treatment

effect on the PA ratio is 0.13 points, the municipal amalgamations in FY 2004-2006, which increased the MCL, reduced the employment rate of mothers and fathers in single-parent households by 2.3 points (0.013*-18.1211 = -0.023) and 5.1 points (0.013*-41.8067 = -0.051), respectively.

The last two columns of Table 2 analyze treatment effects in the pre-merger periods of 1995 and 2000, showing no significant change in the rate of PA receipt between the treatment and control groups, confirming no placebo effect. Furthermore, to ensure the treatment effect is not influenced by variations in amalgamation patterns, we also estimated the model with a dummy variable indicating whether the amalgamation was a consolidation merger, in which multiple municipalities amalgamate to form a new municipality, or an absorption merger, in which an existing municipality absorbs another municipality (results not shown). The treatment dummy was statistically significant in the first stage, and in the second stage, the effect of the PA receipt rate on the employment rate of single-parent mothers and fathers was significant, with a higher coefficient than in Table 2, confirming the robustness of the results.

Our findings suggest that the Great Heisei Amalgamation raised the MCL for some municipalities, increasing the PA recipient rate and thereby suppressing labor supply among low-income earners, such as single-parent households. While this effect is not negligible, data limitations prevent us from accurately estimating labor supply elasticity. Additionally, the impact on labor supply in terms of working hours remains to be clarified in future research.

Table 2
PA recipient rate and employment rate: instrumental variable estimation

	Treatment period: 2000-2010									Placebo period:1995-2000			
	First Stage				Second Stage					First Stage			
	Single 55-64 yrs or Single mother		Single father		Single 55-64 yrs		Single mother		Single father		Single 55-64 yrs or Single mother		Single father	
Δ PA recipient rate					-8.0813		-18.1211	**	-41.8067	***				
					(6.1392)		(8.0914)		(17.7262)					
Treatment dummy	0.0013	***	0.0012	***							0.0006		0.0006	
	(0.0004)		(0.0003)								(0.0003)		(0.0004)	
Δ Unemployment rate for prime-age (25–54) men	0.0412	**	0.0432		-0.9539	**	0.3769		0.4772	*	0.0121		0.0187	
	(0.0202)		(0.0222)		(0.4416)		(0.6030)		(0.9772)		(0.0132)		(0.0171)	
Δ Working-age population	0.0008		-0.0002		-0.0922		-0.0448		-0.1217		-0.0028		-0.0016	
	(0.0027)		(0.0028)		(0.0782)		(0.0987)		(0.1610)		(0.0021)		(0.0023)	
Lag of public employment share	0.0055		0.0042		-0.2636		0.5767	**	0.1157		0.0011		0.0003	
	(0.0067)		(0.0076)		(0.2729)		(0.2512)		(0.2960)		(0.0028)		(0.0029)	
Constant	0.0026	***	0.0024		0.1170	***	-0.0153		0.0398	*	0.0004	*	0.0004	*
	(0.0007)		(0.0009)		(0.0259)		(0.0398)		(0.0813)		(0.0002)		(0.0002)	
Number of observations	171		168		171		171		168		171		168	
R-squared	0.3242		0.3681		0.1413		0.1607		.		0.1809		0.2181	
Kleibergen-Paap rk LM statistic	5.51	**	5.94	**							2.63		2.61	
Kleibergen-Paap rk Wald F statistic	10.65		11.99								2.77		2.75	
Endogeneity test					2.80	*	1.57		3.53	*				

Note: Standard errors in parenthesis are clustered by prefecture. The dependent variable in the first stage is the first difference in public assistance recipient rates in the municipality. The dependent variable in the second stage is the first difference in the employment rate for specific groups in the municipality. Dummies for minimum class-area before amalgamations and prefecture are included to account for region-specific trends. *** p<0.01, ** p<0.05, * p<0.1.

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