

Tiebout Sorting and Local Boundary Reforms: Theory and Evidence from Japan

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- Following pioneering work by Tiebout (1956), a lot of research have studied whether a quasi-market process (“vote with their feet”) can solve the problem with public goods provision
 - Day (1992):
 - ✓ used province-level data in Canada;
 - ✓ examined whether interprovincial migration flows are influenced by government tax and public expenditures;
 - ✓ showed that migration is influenced by provincial government spending

- Rhode and Strumpf (2003):
 - ✓ Heterogeneity in policies and proxies for preferences was decreasing from 1850 – 1990
- Banzhaf and Walsh (2008):
 - ✓ Households do appear to vote with their feet in response to changes in public goods
- McKinnish (2007):
 - ✓ Short-distance moves in welfare-induced migration could be the determinant of migration
- Ariu et al. (2016):
 - ✓ Governance quality promotes positive net in-migration of high-skilled migrants

- Local public goods and governance quality could be a key determinant of migration decisions for citizens

Objective of this study

- Explore whether changes in local government boundaries induce internal migration
- Theory: I developed a theoretical model of residential choice following boundary reforms of jurisdictions
- Empirical study: Theoretical predictions are tested empirically using Japanese municipal-level data
 - ✓ Census Japan in 2015 surveyed municipality-to-municipality in- and out-migration from 2010 to 2015
 - ✓ Net migration data are used as the dependent variable

Contributions

- Large-scale municipality-to-municipality data are used to test local public goods-induced migration
 - The one-to-one migration data at the municipal level cover all internal migrants
 - The size of observation is very large, around 1.8 million
- Empirical strategy of this study builds on drastic and mostly exogenous changes in governmental policies, caused by local boundary reforms
 - Previous studies have not exploited discontinuous changes in local public policies
 - But rather developed a location choice model or simply estimated a migration equation

Conclusions

1. Population and per capita income have a positive impact on net migration, whereas, with a focus on merger impacts, only per capita income positively affects inter-municipal net migration
 - In merged municipalities, non-workers (who are considered as being more responsive to provision of local public services) respond positively to larger population as well as income

Conclusions

2. For merged municipalities, larger amount of spending on welfare and public assistance decreases net migration, whereas spending on youth education increases migration
 - Welfare and public assistance are a kind of “patronage” public goods and do not benefit the majority, while youth education is a kind of “productive” goods from a future productivity of labor viewpoint
 - ✓ Spending on welfare and public assistance has negative effect on net migration of workers but no impact on that of non-workers
 - ✓ Spending on youth education does not affect net migration of workers but increases that of non-workers

Conclusions

3. For merged municipalities, young people positively respond to spending on youth education but do not respond to spending on welfare and public assistance and productive public goods

Older people do not respond to youth education expenses but adversely respond to expenses for productive goods

Residents are likely to migrate in response to provision of local public goods in line with the context of Tiebout sorting

- Voluntary merger of municipalities in Japan
 - The number of municipalities dropped from 3,232 for March 31, 1999, to 1,718 in March 31, 2022
 - Municipal mergers between 2010 and 2015
 - ✓ Annexation: 7

Hypotheses

Population

1. The larger the population in the merged jurisdiction than that in the non-merged, the larger the net migration to the merged jurisdiction

Income

2. The larger the average income in the merged jurisdiction than income in the non-merged, the larger the net migration to the merged jurisdiction

Heterogeneity in preferences

3. The larger the difference in preference for public good and in income between the larger merging jurisdiction and the non-merged, the smaller the net migration to the merged jurisdiction

Hypotheses

- Effects of expenditure and spending items on migration

Productive public goods have negative effect on in-migration

4. The larger the amount of productive public goods in the merged jurisdiction than that in the non-merged, the larger the net migration to the merged jurisdiction

Non-productive public goods have negative effect on in-migration

5. The larger the amount of non-productive public goods in the merged jurisdiction than that in the non-merged, the smaller the net migration to the merged jurisdiction

Econometric model

$$\begin{aligned} M_{ij,2015} - M_{ij,2010} = & \alpha + \delta TREAT_i \\ & + \rho_0(POP_i - POP_j) + \rho_1(POP_i - POP_j) \times TREAT_i \\ & + \eta_0(INC_i - INC_j) + \eta_1(INC_i - INC_j) \times TREAT_i \\ & + \mathbf{X}_{ij}\boldsymbol{\beta}_0 + \mathbf{X}_{ij}\boldsymbol{\beta}_1 \times TREAT_i + c_i + \epsilon_{ij} \quad \text{for } i \neq j \end{aligned}$$

- $M_{ij,year}$: the net migration flow to municipality i from municipality j in the year
- $TREAT_i$: a dummy that takes a value of one if the municipality merged between 2010 and 2015
- POP_i : log of population of municipality i in 2010; INC_i : log of income of municipality i in 2010
- \mathbf{X}_i : the vector of control variables for municipality i in 2010

Econometric model

$$\begin{aligned} M_{ij,2015} - M_{ij,2010} = & \alpha + \delta TREAT_i \\ & + \rho_0(EXP_i - EXP_j) + \rho_1(EXP_i - EXP_j) \times TREAT_i \\ & + \eta_0(TAX_i - TAX_j) + \eta_1(TAX_i - TAX_j) \times TREAT_i \\ & + \mathbf{X}_{ij}\boldsymbol{\beta}_0 + \mathbf{X}_{ij}\boldsymbol{\beta}_1 \times TREAT_i + c_i + \epsilon_{ij} \quad \text{for } i \neq j \end{aligned}$$

- EXP_i : log of per capita expenditure/spending item of municipality i ;
- TAX_i : log of per capita local tax revenue of municipality i

Data

Table 1. Descriptive Statistics

	<i>A. Non-merged municipalities</i>		<i>B. Merged municipalities</i>	
	Mean	SD	Mean	SD
<i>Dependent variables, (unit)</i>				
Net migration, 2010 - 2015	-0.0034284	24.79222	0.7810982	36.0074
Net migration of workers, 2010 - 2015	-0.0027576	12.93839	0.6282799	17.93556
Net migration of non-workers, 2010 - 2015	-0.0006707	14.92242	0.1528183	20.32044
Net migration, 2010 - 2020	-0.0047368	22.57726	1.079203	48.14655
Net migration of population aged 14 or under, 2010 - 2015	-0.0002314	5.631623	0.0527211	8.92576
Net migration of population aged 75 or over, 2010 - 2015	-0.0007054	5.206952	0.1607143	6.964498
<i>Control and fiscal variables</i>				
Diff in population	-0.0070869	1.693576	1.614638	1.293766
Diff in per taxpayer income	0.1283691	0.2221274	0.0768135	0.1815151
Diff in expenditure, pc	-0.1432764	0.4306893	-0.1841217	0.4338411
Diff in local tax revenues, pc	-0.2046476	0.5028923	-0.1423441	0.4661432
Diff in spending on welfare and public assistance, pc	1.200917	1.853642	1.00334	1.558042
Diff in spending on productive public goods,	-0.4629579	2.004144	-0.4635533	1.698755
Diff in spending on youth education, pc	0.3843587	0.8666601	0.6219678	0.8106901
Observations		1,875,524		8,232

Baseline results

Table 2. Estimation of Migration Equation

Dependent variables	Net migration, 2010 - 2015	Net migration, 2010 - 2015, baseline	Net migration of workers, 2010 - 2015	Net migration of workers, 2010 - 2015	Net migration of non-workers, 2010 - 2015	Net migration of non-workers, 2010 - 2015
	(1)	(2)	(3)	(4)	(5)	(6)
Diff in population	0.103*** (0.0207)	0.102*** (0.0208)	0.0414*** (0.0108)	0.0423*** (0.0108)	0.0614*** (0.0125)	0.0594*** (0.0125)
Diff in per taxpayer income	1.958*** (0.210)	1.899*** (0.210)	0.372*** (0.109)	0.342*** (0.110)	1.586*** (0.126)	1.557*** (0.126)
Abs of share of population aged 14 or under	0.0292** (0.0147)	0.0249* (0.0147)	-1.12e-05 (0.00765)	-0.00261 (0.00766)	0.0292*** (0.00881)	0.0275*** (0.00883)
Abs of share of population aged 65 or over	-0.0266*** (0.00533)	-0.0254*** (0.00534)	-0.0139*** (0.00278)	-0.0130*** (0.00278)	-0.0127*** (0.00320)	-0.0124*** (0.00321)
Diff in unemployment rate	-0.0311*** (0.0109)	-0.0327*** (0.0110)	-0.0477*** (0.00570)	-0.0483*** (0.00571)	0.0166** (0.00656)	0.0155** (0.00658)
Diff in average land price	0.189*** (0.0450)	0.186*** (0.0451)	0.00794 (0.0234)	0.00562 (0.0235)	0.181*** (0.0270)	0.180*** (0.0271)
Diff in population density	-0.000113*** (1.03e-05)	-0.000104*** (1.04e-05)	8.33e-05*** (5.38e-06)	8.84e-05*** (5.39e-06)	-0.000196*** (6.20e-06)	-0.000192*** (6.22e-06)

Baseline results

Table 2. *continued*

	(1)	(2)	(3)	(4)	(5)	(6)
Merger dummy		-10.13*** (1.280)		4.084*** (0.667)		-14.22*** (0.769)
Diff in population × Merger dummy		0.184 (0.327)		-0.253 (0.170)		0.436** (0.196)
Diff in per taxpayer income × Merger dummy		15.44*** (3.189)		8.419*** (1.662)		7.024*** (1.915)
Abs of share of population aged 14 or under × Merger dummy		0.950*** (0.258)		0.591*** (0.134)		0.359** (0.155)
Abs of share of population aged 65 or over × Merger dummy		-0.231** (0.0941)		-0.171*** (0.0490)		-0.0607 (0.0565)
Abs of per taxpayer income × Merger dummy		-12.59*** (3.095)		-8.041*** (1.613)		-4.551** (1.859)
Diff in unemployment rate × Merger dummy		0.387** (0.168)		0.150* (0.0873)		0.237** (0.101)
Diff in population density × Merger dummy		-0.00211*** (0.000160)		-0.00116*** (8.32e-05)		-0.000954*** (9.58e-05)
Adjusted R squared	0.004130	0.00426	0.00598	0.00615	0.00772	0.008
Observations	1,883,756	1,883,756	1,883,756	1,883,756	1,883,756	1,883,756

Notes: "Diff" indicates difference; "Abs" is an abbreviation of "Absolute value." Standard errors cluster robust with regard to municipality are in parentheses. * significant at 10%, ** significant at 5%, *** significant at 1%. Constants are abbreviated.

Table 3. Effects of Expenditure and Spending Items on Migration

Dependent variables	Net migration, 2010 - 2015			
	(1)	(2)	(3)	(4)
Merger dummy	-11.45*** (1.128)	-11.50*** (1.133)	-11.96*** (1.122)	-11.34*** (1.125)
Diff in expenditure, pc	-0.679*** (0.0718)			
Diff in expenditure, pc × Merger dummy	-3.829*** (1.141)			
Diff in spending on welfare and public assistance, pc		-0.0721*** (0.0143)		
Diff in spending on welfare and public assistance, pc × Merger dummy		-0.497** (0.217)		
Diff in spending on productive public goods, pc			-0.0895*** (0.0163)	
Diff in spending on productive public goods, pc × Merger dummy			-0.398 (0.251)	
Diff in spending on youth education, pc				0.101** (0.0417)
Diff in spending on youth education, pc × Merger dummy				2.775*** (0.631)

Effects of expenditure and spending items

Table 3. *continued*

Dependent variables	Net migration, workers				Net migration, non workers			
	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Merger dummy	3.201*** (0.588)	3.194*** (0.590)	3.015*** (0.585)	3.211*** (0.586)	-14.65*** (0.677)	-14.70*** (0.680)	-14.97*** (0.674)	-14.55*** (0.676)
Diff in expenditure, pc	0.0475 (0.0374)				-0.727*** (0.0431)			
Diff in expenditure, pc × Merger dummy	-2.112*** (0.595)				-1.717** (0.685)			
Diff in spending on welfare and public assistance, pc		-0.0383*** (0.00746)				-0.0338*** (0.00859)		
Diff in spending on welfare and public assistance, pc × Merger dummy		-0.347*** (0.113)				-0.150 (0.131)		
Diff in spending on productive public goods, pc			0.0396*** (0.00852)				-0.129*** (0.00982)	
Diff in spending on productive public goods, pc × Merger dummy			-0.229* (0.131)				-0.169 (0.151)	
Diff in spending on youth education, pc				0.128*** (0.0217)				-0.0269 (0.0250)
Diff in spending on youth education, pc × Merger dummy				0.585* (0.329)				2.190*** (0.379)

Effects on young and elderly migration

Table 4. Effects of Spending Items on Young and Elderly Migration, 2010 - 2015

Dependent variables	Net migration of population aged 14 or under			Net migration of population aged 75 or over		
	(1)	(2)	(3)	(4)	(5)	(6)
Merger dummy	-2.205*** (0.257)	-2.313*** (0.255)	-2.402*** (0.255)	-3.696*** (0.155)	-3.790*** (0.154)	-3.660*** (0.154)
Diff in spending on welfare and public assistance, pc	-0.0289*** (0.00325)			-0.000352 (0.00196)		
Diff in spending on welfare and public assistance, pc × Merger dummy	-0.0392 (0.0493)			-0.0857*** (0.0298)		
Diff in spending on productive public goods, pc		-0.0709*** (0.00371)			-0.0169*** (0.00224)	
Diff in spending on productive public goods, pc × Merger dummy		-0.0456 (0.0570)			-0.0893*** (0.0344)	
Diff in spending on youth education, pc			-0.203*** (0.00947)			0.0645*** (0.00572)
Diff in spending on youth education, pc × Merger dummy			0.567*** (0.143)			0.128 (0.0864)

Placebo effect tests

Table 5. Placebo Tests, Effects on Migration between 2005 and 2010

Dependent variable	Net migration, 2005 - 2010				
	(1)	(2)	(3)	(4)	(5)
Diff in population × Merger dummy	-620.4 (550.5)				
Diff in per taxpayer income × Merger dummy	2,689 (5,375)				
Diff in expenditure, pc × Merger dummy		106.7 (1,929)			
Diff in spending on welfare and public assistance, pc × Merger dummy			-231.2 (367.4)		
Diff in spending on productive public goods, pc × Merger dummy				-88.67 (424.6)	
Diff in spending on youth education, pc × Merger dummy					-1,238 (1,063)
Adjusted R squared	0.506	0.502	0.502	0.502	0.505
Observations	1,883,756	1,883,756	1,883,756	1,883,756	1,883,756

Conclusions

1. Population and per capita income have a positive impact on net migration, whereas, with a focus on merger impacts, only per capita income positively affects inter-municipal net migration
2. For merged municipalities, larger amount of spending on welfare and public assistance decreases net migration, whereas spending on youth education increases migration
3. For merged municipalities, young people positively respond to spending on youth education but do not respond to spending on welfare and public assistance and productive public goods

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