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Abstract

We analyze free-riding behavior by Finnish municipalities prior to municipal mergers. The merger process creates a temporary common pool problem, which arises because of a delay from the initial merger decision to the actual merger. Using a difference-in-differences strategy, we find large responses to free-riding incentives. Consistent with the "law of 1/*n*", the stronger the free-riding incentive a municipality faced, the more it increased its per capita debt and used up its cash reserves. These funds were spent mostly on investment and current expenditures. The results are somewhat surprising because the mergers were agreed upon voluntarily.

Key words: Common pool, difference-in-differences, free-riding, law of 1/n, municipality mergers

JEL classification numbers: D72, H72, H73, H77

Contents

1. Introduction

The size and number of local governments is a crucial policy decision from the point of view of the efficient provision of local public goods and services (e.g. Miceli 1993; Alesina and Spolaore 1997; Ellingsen 1998). In a number of countries, municipality mergers are seen as an effective way of realizing economies of scale and such reforms are widespread. Major municipal merger reforms have been implemented over time in a number of countries including Canada, Denmark, Germany, Israel, Japan, Sweden and Switzerland (Dafflon, 2012; Hansen, 2012; Hinnerich, 2009; Reingewertz, 2012; Weese, 2013). However, a possible, and somewhat overlooked, cost of municipality mergers is that the merger process itself creates a temporary common pool problem among the municipalities that are about to merge. This problem arises because usually there is a delay (in our case at least one calendar year) from the merger decision to the actual merger. Within this window, a single merging municipality can make autonomous decisions and shift some of the costs of additional expenditures or investments to its merger partners by increasing debt or liquidating assets.

These free-riding incentives are directly related to the "law of 1/*n*" as formalized by Weingast et al. (1981) in the case of multiple identical and geographically distinct jurisdictions.[1] In their model, the total size of the common pool increases in the number of districts (n) that form the common pool, which is an appropriate description of the municipal merger case.[2] Each jurisdiction can propose a project that is always passed (universalism) and funded through generalized taxation on all n jurisdictions. In this model, the tax burden for each municipality is 1/n. Weingast et al. (1981) show that, in this setting, inefficiency increases with n because a single jurisdiction receives all the benefits from its project while the costs are shared amongst all districts. Municipal mergers are a particularly clean case to test the original law of 1/*n* because each municipality can make autonomous decisions during the common pool period. One distinction is that, in the case of a merger, due to the different population sizes of each municipality, the incentives to free-ride (share of costs) are not directly related to the number of municipalities in the upcoming merger, but rather to the size of the participating municipalities relative to the size of the common pool.

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[1] Baron and Ferejohn (1987 and 1989) extend this line of argumentation to situations where decision-makers need to bargain over which projects are carried out. In this context, they show that the common pool creates incentives not only to increase spending in the decision-makers' own jurisdiction, but also to restrain the spending in other jurisdictions. See also Knight (2008) for further results.

[2] Primo and Snyder (2008) present a model where the total population size of the common pool is fixed, and the size of each district diminishes as *n* increases. This model is better suited to analysis of common pool issues related to how many municipalities there are in a country, rather than to free-riding incentives in each municipal merger.

Previous research has found evidence of free-riding behavior when the merger process has been forced upon the municipalities by central government. Hinnerich (2009) and Jordahl and Liang (2010) study Swedish municipality mergers in the 1950's, the 60's and the 70's. Hinnerich (2009) finds that the smaller a merged municipality was compared to its merger partners in terms of population, the more the municipality increased its per capita debt prior to merging. Jordahl and Liang (2010), on the other hand, find that a merger as such (or the creation of a common pool) had an effect on debt accumulation, but the relative size of the merging municipalities did not seem to matter. The latter evidence is somewhat hard to reconcile with free-riding behavior as predicted by the law of $1/n$.[3]

More recently and concerning contemporary mergers, Hansen (2012) analyzed the Danish municipal merger reform of 2007. As in the Swedish case, the reform was implemented by central government, which set forth a minimum population size threshold for the municipalities. The decision on how to reach this minimum size, or with whom to merge, was left to the municipalities. The Danish case is interesting because the Danish central government foresaw the possibility of common pool problems and implemented a number of additional fiscal restrictions on the municipalities during the merger process. Most importantly, central government started to regulate local capital spending and practically froze the amount of local liquid assets (Blom-Hansen 2010). Because of these restrictions, Hansen (2012) analyzes current expenditures and budget overruns and concludes that clear free-riding took place. However, it is not clear why changes in these items can be seen as evidence in favor of free-riding. Free-riding takes place only if some of the costs of increased current expenditure can be shifted to the merger partners and Hansen (2012) does not report debt accumulation or changes in asset positions.

The current state of the literature is such that the evidence of common pool problems related to municipality mergers is somewhat mixed, possibly due to issues in research design and whether a common pool was created in the first place.[4] Furthermore, the evidence thus far concerns only forced municipal mergers. In this paper, we analyze free-riding behavior by Finnish municipalities during a recent wave of municipal mergers. Our institutional setup differs from the Swedish and Danish cases in an important way because the Finnish mergers

[3] This somewhat surprising result may be due to potential endogeneity issues in Jordahl and Liang (2010), because the common trends assumption does not hold in their case as regards the debt levels. Therefore, they resort to analyzing difference-in-differences of changes in debt.

[4] The common pool problem has been analyzed in a number of different contexts and the results from these papers are also somewhat mixed. For example, in the context of local government council size, Baqir (2002) finds that greater districting or more councilors in U.S. city councils leads to more spending. However, MacDonald (2008) extends Baqir's data set to cover more years and finds no effects, while Petterson-Lidbom (2012) finds that increasing the number of councilors in Finnish and Swedish municipal councils actually leads to lower levels of municipal spending.

were decided voluntarily at the local level by municipality councils. It is unclear whether we should expect common pool problems to arise in this setting because one might expect that municipalities can somehow agree not to exploit the common pool or that extensive free-riding would result in a cancellation of the merger.

Somewhat surprisingly, though, using difference-in-differences (DID) methods with a continuous treatment, we find large free-riding effects also among voluntary mergers. Consistent with the law of 1/*n*, the stronger free-riding incentive a municipality faced, the more it increased per capita debt and used up its cash reserves. Unlike the previous papers, we can also follow the money to a certain extent. We find that extra funds from the common pool were spent mostly on investment and on current expenditures. Municipalities did not lower their local income tax rate nor did they hire new employees. Overall, due to free-riding, the merged municipalities accumulated about 250 million euros of debt, corresponding to roughly 20% of their pre-treatment debt stock, and also decreased their cash reserves substantially (140 million euros).

Why do we observe such behavior in voluntary mergers? First, a close examination of the merger agreements reveals that municipalities did foresee a possible common pool problem, at least to a certain extent. Most merger agreements included phrases such as "municipalities should behave responsibly in their economic decision-making prior to merging" or "major investment decisions should be made jointly". However, the agreements do not include any contingency plans for possible breaches or what exactly would constitute a breach.[5]

Second, it might be difficult for merger partners to observe the exact behavior of their future partners because of delays in accounting and official statistics production. Often the final financial statistics from the final pre-merger year are available only after the merger has already taken place. It should also be stressed that the merging municipalities truly stayed autonomous entities prior to the actual merger even when the merger was already agreed upon.

Third, although the mergers were decided on voluntarily, central government was encouraging mergers via a generous merger subsidy scheme.[6] In this sense, merging municipalities differ systematically from those that did not merge, which may confound our results. However, within a given merger the subsidy simply increased the size of the common pool, and thus should not affect the interpretation of our results. This is consistent with the fact that we can replicate

[5] We are unaware of any cases where a merger was cancelled after it was formally accepted by the municipal councils.

[6] The subsidies were paid to the merged municipalities in annual installments over a three year period after the mergers had taken place. Nevertheless, municipalities could spend the subsidy before the merger by accumulating debt.

our results using only merged municipalities in a DID analysis and that explicitly controlling for the amount of subsidy does not alter the results. Furthermore, our estimates suggest that the increases in debt and decreases in cash reserves were in total much larger than the overall amount of central government subsidies granted for mergers.

Finally, local politicians in municipalities with strong free-riding incentives (typically small municipalities) faced relatively low re-election prospects in post-merger elections and, according to Hyytinen, Saarimaa and Tukiainen (2013), they appeared to be aware of this fact. Furthermore, Saarimaa and Tukiainen (2013b) show that after a merger, councilors mainly gained votes from their old constituencies. This means that some councilors were lame ducks facing a term limit (e.g. Besley and Case 1995; Ferraz and Finan 2011), while others needed to please (mostly) their old voters to assure re-election. As suggested by Aidt and Shvets (2012), the common pool problems may be exacerbated because of re-election concerns if voters reward politicians who are able to bring home the bacon.[7]

An alternative explanation for free-riding in the context of voluntary mergers is Coasean-type transfers between merging municipalities (Coase 1960). This case arises when a merger increases the welfare of the merger partners as a whole, but decreases the welfare of some of the individual partners. If the benefits are large enough, the winners can in principle compensate the losers in order buy their approval for the merger. This explanation is, however, unlikely when we look more closely at municipalities with strong free-riding incentives that exploited the common pool. These municipalities are on average poorer than merging municipalities with a weaker free-riding incentive, and thus do not seem to be attractive partners. One would expect that any transfers would go in the other direction. Moreover, Acemoglu (2003) raises some issues as to why such Coasean bargaining is unlikely to occur in a political context. We also show that municipalities that were less keen to merge, proxied by the share of councilors who voted in favor of the merger, do not accumulate more debt relative to more keen municipalities, suggesting that we can safely rule out a major role for Coasean transfers.

Naturally, the fact that the Finnish mergers were decided voluntarily raises issues of non-random selection that may bias our results.[8] Reassuringly, we are able to show long common pre-treatment trends for the control and various treatment groups. We also show that potential changes in the financial situation coinciding

[7] Aidt and Shevts (2012) present theoretical and empirical results in which re-election concerns exacerbate the common pool problem. This link arises in their theoretical model because politicians differ in their ability to bring home the bacon and elections are an *ex post* selection device that voters use to oust politicians who are unable to deliver the goods.

[8] Forced mergers may also be subject to selection due to the behavior of central government politicians, for example.

with increases in per capita debt (taxable income, corporate tax revenue and central government grants) cannot explain our findings. The results are also robust to using alternative control groups, placebo tests and adding control variables.

The rest of the paper is organized as follows. In Section 2, we present a short overview of the institutional setting of Finland and especially the merger process. In Section 3, we describe the empirical approach. We describe our data and present the econometric results in Section 4. Section 5 concludes.

2. The Finnish mergers

Finland has a two-tier system of government consisting of central government and municipalities at the local level. On an international comparison, Finnish municipalities perform extensive tasks. In addition to the usual local public goods and services, municipalities are responsible for providing most social and health care services and primary and secondary education. This makes municipalities of considerable importance to the overall economy. The GDP share of municipality spending is roughly 18 percent and they employ around 20 percent of the total workforce.

In addition to their extensive tasks, Finnish municipalities have extensive fiscal autonomy.[9] Most importantly for our purposes, there are no restrictions on municipal use of debt. Moreover, interest rates do not depend on individual municipality conditions due to a joint liability scheme.[10] Furthermore, central government does not enforce additional restrictions on merging municipalities. Municipalities fund their expenses mostly using own revenue sources. The most important sources are local taxes and operating revenues, such as fees. The most important tax instrument is the local income tax. The tax rate is flat and municipalities can set the level freely. The property tax is of much less importance and municipalities can set property tax rates only within limits set by central government. The corporate income tax is a state level tax, but municipalities receive a share of this tax revenue based on the profits and employment of firms within their borders. In 2012, local income tax accounted for an average of 46 percent of total revenue, while property and corporate taxes accounted for only 3 percent.

There are clear regional tax base and cost disparities, which are offset by a central government grant system. The system is based on estimates of average costs and tax bases, so municipalities have very limited ability to influence the amount of grants that they receive. The grant system covers about 20 percent of total municipal revenues, but this share varies a great deal. The system covers more than 50 percent of all revenues for every fourth municipality.

Due to an expected increase in municipal spending and disparities in revenue bases caused by an aging population, central government initiated a plan in 2005 aimed at reforming the municipal revenue structure and more importantly making the production of statutory municipal services more efficient. The main tool for strengthening the operating environment of municipalities in the government plan was municipality mergers. A provisional law enacted in 2007 clearly states

[9] Under the constitution, Finnish municipalities are self-governing entities, which means that central government cannot assign new tasks to municipalities without passing legislation.

[10] This is organized through Municipality Finance Plc, a credit institution owned by the local government sector.

that municipalities should have strong enough revenue and labor force bases to cope with the production of statutory municipal services. Municipalities were allowed to decide voluntarily whether and with whom to merge. Following the law, there was 1 merger in 2008 and 32 in 2009, 4 in 2010 and 6 in 2011. The number of municipalities involved in a given merger ranged from 2 up to 10 municipalities.

The central government encouraged mergers by granting generous merger subsidies to merged municipalities. The subsidy amount depends on the populations of the pre-merger municipalities, the population of the resulting new municipality, the number of participating municipalities in the merger and the timing of the merger. Mergers in 2008 and 2009 received more subsidies than those in subsequent years, possibly explaining why most mergers took place in 2009. On the one hand, once the merger has been agreed upon the merger subsidy simply increases the size of the common pool. On the other hand, the subsidies pose potential problems for our analysis. For example, it could be that merging municipalities simply spend the subsidy beforehand and we would mistakenly interpret this as free-riding behavior. The first issue is that all the merged municipalities receive subsidies, whereas the other municipalities do not. Clearly, a simple comparison of merged and not-merged municipalities could separate the merger effect from potential effects of the subsidy. However, in our empirical analysis, we can directly control for merging and rely on within-merger differences in free-riding incentives to identify our key results. The second issue is that the size of the subsidy to each merger is highly correlated with our free-riding measure. To alleviate this concern we also control directly for the amount of subsidy in a given merger.

In this paper, in order to have a clean DID setup with respect to treatment timing, we focus on the 32 mergers that came into effect at the start of 2009.[11] The merger process is as follows. The process usually starts with unofficial discussions which may lead to an initial feasibility study that is conducted by an external consultant. Based on the consultant's report, municipal boards make a merger proposal to the municipal councils.[12] This proposal is voted on by the councils. If the proposed merger gains a majority in all the participating councils,

[11] Saarimaa and Tukiainen (2013a) study the determinants of the 2007–2009 mergers at an aggregate merger level and find evidence of association of voter preferences for the location of services, local politics, previous cooperation and fiscal distress in one of the potential merger partner with the mergers. Hyytinen, Saarimaa and Tukiainen (2013) study individual councilors' voting behavior in connection with these mergers and find that politicians' desire to avoid electoral competition is reflected in their decision-making.

[12] Municipal councils are the main seat of power in Finnish municipal decision-making. Finland has a proportional open-list election system. Currently, there are eight parties that dominate municipal politics, but some local lists are prevalent as well. Municipal elections are held every four years on simultaneous election dates. The councils that voted for the mergers under scrutiny were elected in October 2004. The elections in October 2008 already used the new post-merger municipal division, although the merger came to effect at the start of 2009.

the merger goes through. If not, it is cancelled and all the municipalities continue as they were. The mergers we analyze were decided mostly in 2006 and some in 2007. This means that merging municipalities had up to 2 years (for all at least 2008, and for most also 2007) to exploit the common pool. These two years are the treatment period in our DID analysis. Since some of the mergers were decided on in 2006, some of the free-riding could have taken place already during that control period year. We return to this issue in our robustness analysis.

3. Econometric framework

Our identification strategy is based on the difference-in-differences (DID) method, where a control group of municipalities is compared to treated municipalities before and after a treatment has taken place. According to the law of 1/*n*, the free-riding incentive for a municipality should depend on its relative size with respect to its merger partners. In the context of municipality mergers, municipality *i* with a population of pop_i in merger *j* with a total population of *popj* internalizes only pop_i/pop_j of the total marginal costs of funds (Hinnerich 2009).

For municipality i in merger j we define the free-ride treatment variable as

$$freeride_{ij} = 1 - \frac{pop_i}{pop_j}. \qquad (1)$$

Population levels are as measured in 2007. The treatment intensity is high when a municipality is small compared to the merger as a whole. This happens when a municipality is part of a merger involving many municipalities and/or merges with a much larger partner. The treatment is equal to zero for municipalities that did not merge.

We also estimate models where we include a simple dummy indicating whether a municipality decided to merge. The intuition is that the mere creation of a common pool, i.e. the merger decision, leads to free-riding regardless of relative size. Jordahl and Liang (2010) argue that this may be the case if municipalities have limited understanding of all the incentives at work or limited opportunity to exploit the common pool, for example if they can only launch a limited number of investment projects each year. In our case, directly controlling for the merger dummy also alleviates problems related to the merger subsidies.

Since we have municipal-level panel data for multiple years we estimate the following type of models:

$$\begin{aligned} y_{it} &= \mathbf{x}_{it}'\boldsymbol{\beta} + \mu_i + \tau_t \\ &+ \delta_1 \cdot merger_i \cdot d2007_t + \delta_2 \cdot merger_i \cdot d2008_t \\ &+ \alpha_1 \cdot freeride_i \cdot d2007_t + \alpha_2 \cdot freeride_i \cdot d2008_t + u_{it}, \end{aligned} \qquad (2)$$

where y is one of our outcomes of interest. The vector $\mathbf{x}$ includes time-varying control variables, μ is a municipality fixed effect and τ a year fixed effect. The key explanatory variables in this setup are the interaction terms including the merger dummy and the *freeride* measure. The dummy variables *d*2007 and *d*2008 indicate that the observation relates to 2007 or 2008, respectively. We allow the treatment effect to vary between the two treatment years, for three reasons: first, 2007 may be contaminated in the sense that some of the analyzed mergers were decided on only late that year and the municipalities may not have had time to respond in 2007. Second, exploiting the common pool by investing may require some preparation time and may be effective only in 2008. Third, it may be optimal to liquidate assets as late as possible because a certain level of cash reserves is needed to run the day-to-day operations of the municipality.

Alternatively, we can use only the continuous treatment variable. In this case, the model can be written as

$$\begin{aligned} y_{it} &= \mathbf{x}_{it}'\boldsymbol{\beta} + \mu_i + \tau_t \\ &+ \gamma_1 \cdot freeride_i \cdot d2007_t + \gamma_2 \cdot freeride_i \cdot d2008_t + u_{it}. \end{aligned} \tag{3}$$

Since the mergers in our data were decided voluntarily by the municipalities the treatments are not randomly assigned. The main concerns are that the unobservables or the outcomes have different trends. To alleviate these concerns we subject our results to a number of validity and robustness tests.

4. Empirical results

4.1 Data

In presenting our results, we will rely heavily on graphical evidence, but will also provide regression results to confirm that our findings are statistically significant. In the graphical analysis, we divide the municipalities into three groups. The first group consists of municipalities that did not merge. In addition, we divide the merged municipalities into two equally sized groups based on the *freeride* measure. We label the group of municipalities with an above-median value of *freeride* as the "strong incentive" group and the "weak incentive" group consists of the municipalities with a below-median value of *freeride*. The municipalities in the strong incentive group are typically small and/or are involved in mergers with more than two municipalities. Of course, this division is somewhat arbitrary and we will fully exploit the continuity of the treatment variable using regression analysis.

We use three sets of variables in our empirical analysis. First, we test the free-riding hypothesis using the municipality's per capita debt stock and cash reserves. Increasing debt or decreasing liquid funds are the most obvious ways a municipality can shift the costs of current expenditures or investments to future merger partners. Second, we use control variables to capture any changes in a municipality's fiscal situation that may coincide with the merger process. Third, we analyze how municipalities spend the possible extra funds.

Table 1 presents descriptive statistics for our key variables for the groups described above. Overall there were 32 municipal mergers involving 99 municipalities. The number of municipalities in a given merger ranged from 2 up to 10 municipalities. The numbers in Table 1 are for 2005, i.e. just before any of these municipalities had decided to merge. The municipalities in the strong incentive group are on average smaller and were involved in larger mergers both in terms of merger population and number of municipalities in the merger compared to the weak incentive group. In other respects, the groups are quite similar. The municipalities in the strong incentive group are slightly poorer than the weak incentive group in terms of income tax base (taxable income) and corporate tax revenue, but they receive slightly larger grants.

We use operating margin as our measure of municipal expenditures (apart from investment expenditures). Operating margin is an accounting concept which measures annual expenditures net of operating revenue, such as fees. This means that the operating margin equals the revenue deficit that municipalities need to

fill from their own tax revenue and central government grants.[13] Once you add these revenue sources, the resulting amount is available for investment and depreciation or write-offs.

Table 1. Descriptive statistics for municipalities prior to merger decisions (in 2005).

	No merger		**Weak incentives**		**Strong incentives**	
	Mean	SD	Mean	SD	Mean	SD
Number of observations	306		49		50	
Population	12,732	40,029	19,298	23,807	3,455	3,316
Merger population	12,732	40,029	32,434	32,702	44,992	30,111
Merger size (number of municipalities)	1	1	3.06	1.52	4.94	2.74
Merger subsidy (€ per capita)	0	0	381.2	267.0	326.1	180.9
Freeride	0	0	0.43	0.25	0.91	0.05
Debt stock (€ per capita)	1,406	886	1,347	1,102	1,097	894
Cash reserves (€ per capita)	500.7	646.5	496.1	641.8	418.8	586.4
Taxable income (€ per capita)	10,226	2,148	11,368	1,796	10,085	1,443
Corporate income tax (€ per capita)	163.9	96.9	192.7	245.3	138.1	81.8
Central government grants (€ per capita)	1,553	572.0	1,222	566.3	1,404	472.5
Municipal tax rate (%)	18.68	0.64	18.55	0.85	18.69	0.68
Operating margin (€ per capita)	-3,718	427.4	-3,580	417.9	-3,609	404.7
Municipal employees (per capita)	0.060	0.014	0.054	0.013	0.052	0.015
Investment expenses (€ capita)	440.7	363.4	467.2	291.9	487.9	586.7

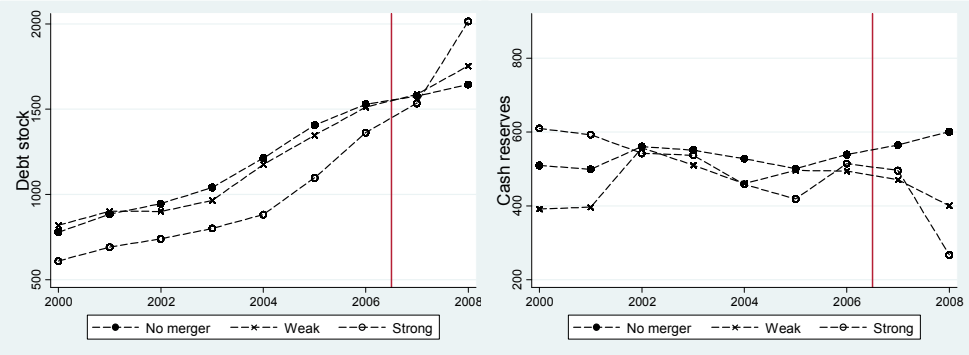
4.2 DID results

Next we move on to our main results. Figure 1 presents the development of the per capita debt stock and cash reserves from 2000 to 2008, which is the last year the merged municipalities existed as independent entities, and therefore the last year that municipal level statistics are available for this group. The vertical red line highlights the beginning of the treatment period. Two observations stand out from the figure. First, both debt stock and cash reserves seem to have common trends in the different groups up to 2006 when most of the merger decisions were made, although the groups differ slightly in terms of cash reserves in 2000 and 2001. Second, group differences emerge in both outcomes after 2006. The debt stock increases much faster in the strong incentive group compared to both the weak incentive and the no-merger group. The weak incentive group also clearly differs from the no-merger group. A similar story is true for cash reserves. Municipalities in both the weak and strong incentive groups use up their cash reserves compared to the control group, although the strong incentive group

[13] Operating margin is the correct measure also because some municipalities produce or sell services to other municipalities. These services show up on the municipality's expenditure side, but they also receive operating revenue from the sale of these services that we need to net-out.

clearly stands out. The evolution of group differences in these outcomes is consistent with free-riding behavior.

Figure 1. Debt stock and cash reserves in different free-rider groups (€ per capita).

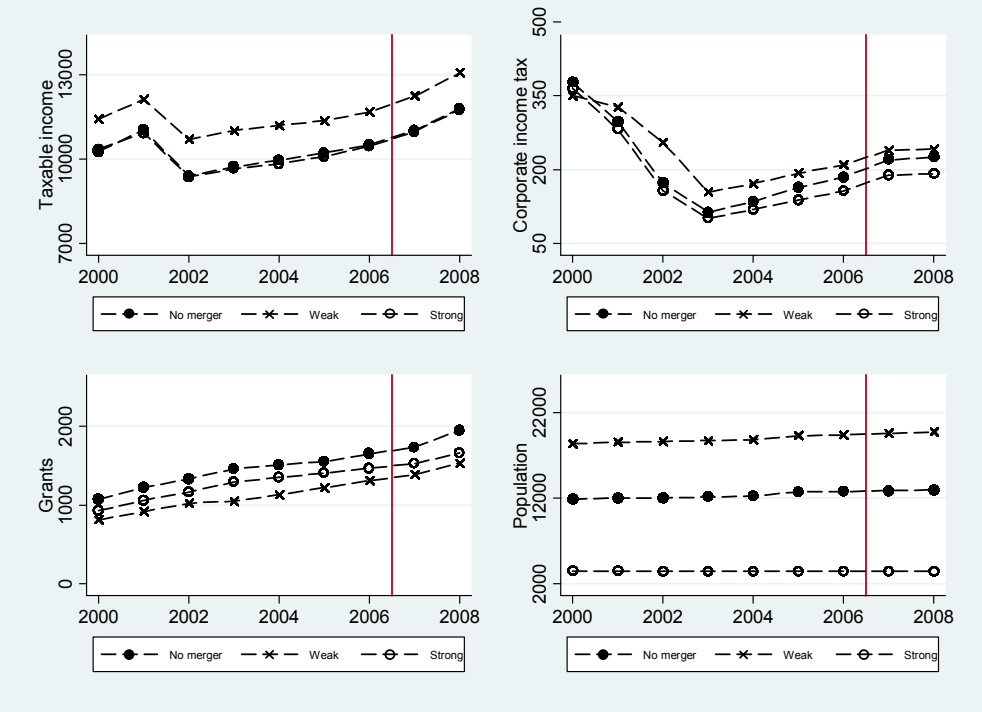


Despite the fact that the groups had similar pre-treatment common trends, a merger decision could coincide with a worsening of municipal finances or population changes. This would mean that increases in per capita debt, for example, are not necessarily driven by free-riding incentives, but instead simply a reaction to simultaneous fiscal distress.

To alleviate these concerns, in Figure 2 we present the development of per capita taxable income, per capita corporate income tax revenue and per capita grants. Together with service fees, these comprise all the relevant municipal income sources.[14] Again, all these variables seem to have clear common pre-treatment trends and, more importantly, the trends or differences in trends do not change during the treatment period. This gives us confidence that the observed increases in debt and decreases in cash reserves are not driven by group-specific changes in fiscal conditions. We also show the development of population levels in different groups to show that the merger decisions did not cause any sorting responses from citizens.

[14] Reliable data on itemized service fees are not available, partly because many of the service fees are channeled through various municipal cooperation organizations and the related accounting practices vary across municipalities.

Figure 2. Income tax base, corporate tax revenue, grants and population in different free-rider groups (monetary amounts in per capita terms).



In Table 2, we report DID results based on Eq. (2) and (3). For each model specification and outcome, we report results both with and without control variables (see Figure 2). We first subject the merger dummy and *freeride* to a horserace and report the results for models where we include both the merger dummy and the *freeride* variable. It is evident from the results that the merger dummy is not statistically significant and that free-riding behavior is tightly connected to free-riding incentives, as predicted by the law of 1/*n*. In Panel A, the results for cash reserves are not very precise, but this is likely to be due to multicollinearity between the merger dummy and the *freeride* variable. As can be seen from Panel B, once we omit the merger dummy the cash reserves results are also highly statistically significant. Adding control variables has very little effect on the point estimates, which is, of course, what one would expect from Figure 2.

Increasing the *freeride* variable from zero to one increases (decreases) the per capita municipal debt stock (cash reserves) on average by 570 (330) euros by the end of 2008. These are substantial amounts compared to the starting level of these variables. Overall, due to free-riding, the merged municipalities accumulated about 250 million euros more debt, corresponding to almost 20% of

their 2006 debt stock. The decrease in cash reserves is also substantial, roughly 140 million euros.[15]

Table 2. DID results for debt stock and cash reserves.

	Panel A: Discrete and continuous treatment			
	Debt stock	Debt stock	Cash reserves	Cash reserves
constant	765.6***	893.6**	517.5***	-795.2**
	[22.89]	[380.1]	[15.53]	[369.09]
*merger** 2007	-88.2	-107.9	54.88	15.48
	[109.1]	[113.2]	[105.0]	[112.5]
*merger** 2008	-183.5	-213.5*	33.27	-4.280
	[124.2]	[127.3]	[128.5]	[134.1]
*freeride** 2007	293.8	303.7	-147.5	-93.63
	[183.4]	[186.9]	[148.8]	[155.4]
*freeride** 2008	807.4***	821.6***	-395.6**	-323.4*
	[224.2]	[225.6]	[177.8]	[186.8]
controls	no	yes	no	yes
N	3,634	3,634	3,717	3,717
R^2	0.42	0.43	0.02	0.05
	Panel B: Continuous treatment			
	Debt stock	Debt stock	Cash reserves	Cash reserves
constant	765.6***	925.4**	517.5***	-796.4**
	[22.90]	[375.9]	[15.53]	[363.8]
*freeride** 2007	189.8*	176.1*	-83.16	-75.46
	[102.7]	[102.3]	[67.86]	[66.83]
*freeride** 2008	591.4***	569.7***	-356.6***	-328.4***
	[132.2]	[131.9]	[80.37]	[83.92]
controls	no	yes	no	yes
N	3,634	3,634	3,717	3,717
R^2	0.42	0.43	0.02	0.05

Notes: All the models include year and municipality fixed effects. The control variables include taxable income, corporate income tax revenue, grants and population. Standard errors are clustered at the municipality level and reported in brackets. ***, ** and * indicate statistical significance at 1, 5 and 10 percent level, respectively.

Finally, we are interested in how municipalities spend the extra money from the common pool. There are a number of ways in which municipalities can spend the money that benefit local taxpayers only. First, municipalities can lower either their municipal tax rates or service fees and fund the normal level of municipal expenditures using debt and liquid assets. Second, municipalities can increase

[15] These estimates are based on the point estimates from the models in Table 2 with the control variables, but without the discrete treatment. The calculation takes account of the fact that the effects are larger in smaller municipalities and that these outcomes are stock variables.

current spending. Third, municipalities can invest the money in local projects. An example would be an investment in local schools or other service facilities serving mostly or only local taxpayers also after the merger.

Figure 3 shows trends in the municipal income tax rate, operating margin per capita, municipal employees per capita and total investment per capita. There is no change in the municipal income tax rate in the treatment period, but the municipalities in the strong incentive group do increase both expenditures (lower operating margin) and investments, although the former is slightly difficult to detect from the figure due to scale differences. Interestingly, the additional expenditure is not directed towards hiring more municipal employees. This result is consistent with free-riding behavior. Hiring new employees does not guarantee that the benefits remain in the old municipality because employees can be easily shuffled around after a merger. All these variables, except for investments, follow clean pre-treatment common trends.

Figure 3. Tax rate, operating margin, municipal employees and investment expenses in different free-rider groups.

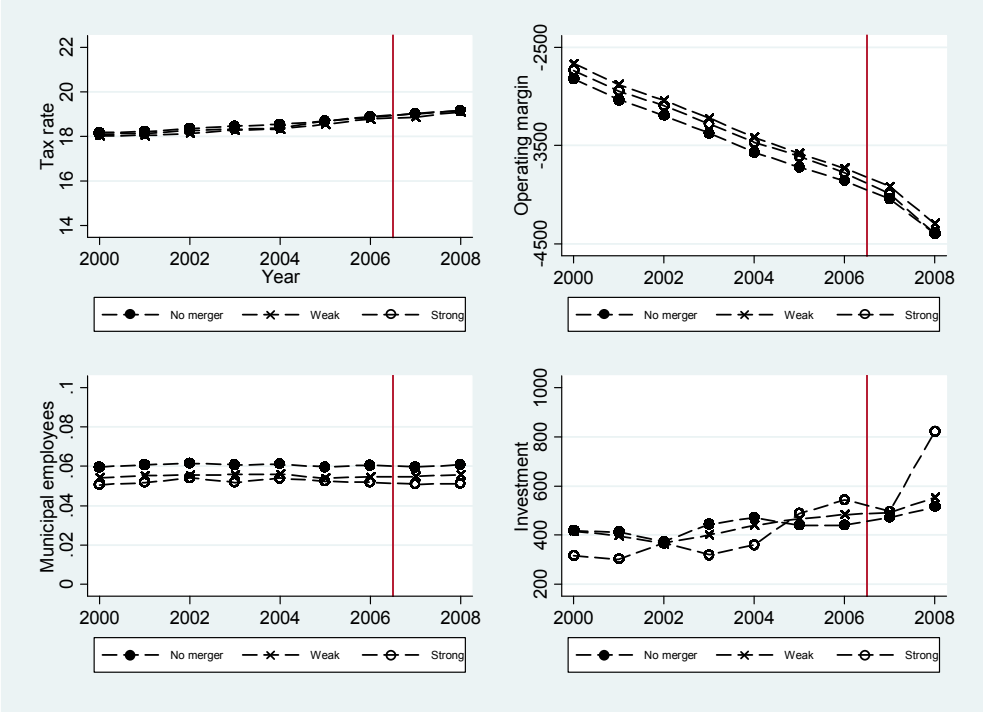


Table 3 confirms that the effects in Figure 3 are also statistically significant. Increasing *freeride* from zero to one increases municipal expenditure flows on average by 70 euros per capita in 2007 and 160 euros in 2008. Investments increase by 315 euros per capita in 2008. Overall, due to free-riding, the merged municipalities spending increased about 100 million euros and invested about

140 million euros more. Therefore, while we can follow some of the money, increases in expenditures and investments only account for about half of what we observe in debt and cash changes.[16]

Table 3. DID results for tax rate, operating margin, municipal employees and investment.

	Tax rate	Tax rate	Operating margin	Operating margin
constant	18.15***	18.70***	-2794***	-2361***
	[0.015]	[0.217]	[6.204]	[112.0]
freeride * 2007	0.072	0.068	-54.62	-67.70**
	[0.053]	[0.053]	[34.55]	[32.33]
freeride * 2008	0.130*	0.128*	-110.4**	-156.4***
	[0.067]	[0.068]	[51.98]	[46.96]
controls	no	yes	no	yes
N	3,727	3,727	3,727	3,727
R^2	0.61	0.61	0.93	0.94
	Municipal employees	Municipal employees	Investment	Investment
constant	0.058***	0.038***	404.1***	588.2***
	[0.000]	[0.006]	[15.43]	[215.7]
freeride * 2007	-0.0004	-0.0009	56.67	53.31
	[0.001]	[0.001]	[70.72]	[71.48]
freeride * 2008	-0.001	-0.001	327.2***	314.77***
	[0.002]	[0.002]	[87.60]	[89.05]
controls	no	yes	no	yes
N	3,727	3,727	3,723	3,723
R^2	0.01	0.03	0.03	0.03

Notes: All the models include year and municipality fixed effects. The control variables include taxable income, corporate income tax revenue, grants and population. Standard errors are clustered at the municipality level and reported in brackets. ***, ** and * indicate statistical significance at 1, 5 and 10 percent level, respectively.

4.3 Robustness checks

The fact that the mergers in our data were not randomized raises the possibility of selection bias. To alleviate these concerns, we subject our results to a number of robustness and validity checks. We start by testing formally for the common pre-trends assumption for our main outcomes of interest using placebo treatment

[16] Our asset data is not detailed enough to track all the money. In public discussion, there has been speculation that municipalities try to protect their assets e.g. by setting up foundations that can be used to distribute benefits to residents of the old municipality even after a merger. This type of asset conversion cannot be detected from our data.

periods. These results are reported in Table 4. To focus the analysis around the placebo treatments, we use only two control and two treatment period years. In each row, we report a parameter estimate for the *freeride* variable from a single regression, while varying the treatment period definition across rows. The placebo regressions largely confirm the common pre-trend assumption. This is not surprising given the trends we observe in Figure 1. The only concern is that some effects seem to take place already in 2006. As mentioned earlier, some mergers were decided already very early on in 2006 and we may be observing real free-riding effects already at the end of 2006.[17] In the last rows of both panels, we also report the real treatment period result with this shorter panel to alleviate potential concerns of statistical inference as raised by Bertrand et al. (2004).

We report the placebo regressions for the operating margin and investment results in Table A1 in the appendix. The results for the operating margin verify the common trends assumption. However, the results concerning investment decisions are more problematic because we observe some statistically significant placebo effects. Thus, the investment results should be addressed with more caution than our main results on debt and cash.

[17] One way to deal with the attenuation bias caused by contamination would be to compare the mergers based on the distance in time before and after each decision date instead of across years. However, the statistics are available on an annual basis only, and therefore the current approach is more attractive.

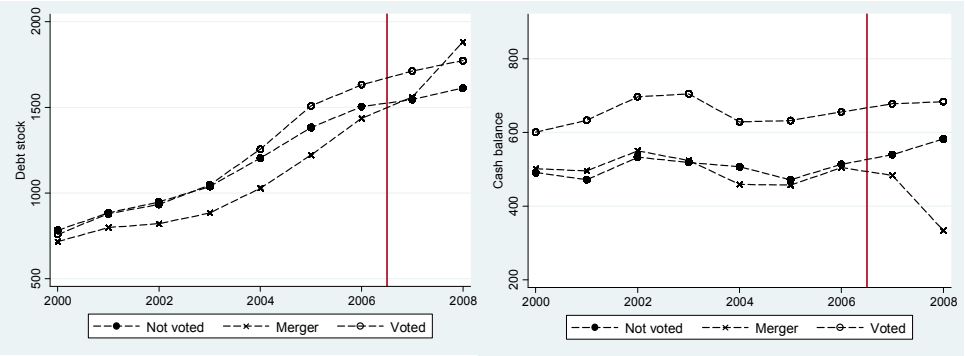
Table 4. Placebo treatments for debt stock and cash reserves.

Analysis period	Treatment	Coeff.	Std. Err.
Panel A: Debt stock			
2000–2003	*freeride* * 2002	-28.47	45.89
	freeride * 2003	-57.39	64.11
2001–2004	*freeride* * 2003	-41.94	44.48
	freeride * 2004	-122.6	76.62
2002–2005	*freeride* * 2004	-97.61*	57.47
	freeride * 2005	-48.40	87.90
2003–2006	*freeride* * 2005	0.541	62.73
	freeride * 2006	157.0	100.1
2004–2007	*freeride* * 2006	177.3**	76.03
	freeride * 2007	248.1***	91.64
2005–2008	*freeride* * 2007	138.4**	61.22
	freeride * 2008	504.3***	108.3
Panel B: Cash reserves			
2000–2003	*freeride* * 2002	-41.99	76.73
	freeride * 2003	-42.26	74.94
2001–2004	*freeride* * 2003	-22.47	48.64
	freeride * 2004	-87.52*	48.81
2002–2005	*freeride* * 2004	-58.39*	34.43
	freeride * 2005	-55.62	39.19
2003–2006	*freeride* * 2005	-15.04	32.95
	freeride * 2006	10.79	43.75
2004–2007	*freeride* * 2006	33.97	41.14
	freeride * 2007	-26.64	74.83
2005–2008	*freeride* * 2007	-50.87	69.88
	freeride * 2008	-286.9***	83.17

Notes: All the models in the table use four years of data with two control period years and two treatment period years. The models include the following control variables: taxable income, corporate income tax revenue, grants and population. Standard errors are clustered at the municipality level. ***, ** and * indicate statistical significance at 1, 5 and 10 percent level, respectively.

Second, we use an alternative control group, which might be more similar to the treatment group (the mergers). In Figure 4, we have divided the non-merged municipalities into those that never considered any particular merger seriously enough to vote on it and those that actually voted for a merger, but the merger did not subsequently take place. The pre-treatment trends in per capita cash reserves look similar, although there are differences in levels. The pre-treatment trends in per capita loan stock for the group that voted look more similar to those of the merger group. However, for both outcomes, only the merger group shows any response to the treatment.

Figure 4. Debt stock and cash reserves in two different non-merger groups compared to all mergers (€ per capita).



Third, we repeat our main analysis using only those municipalities that merged. These results are reported in columns (1) and (8) of Table 5. The results are qualitatively robust. Moreover, the results are almost identical to those in panel A of Table 2, as expected. These results are therefore valid within the merger sample and cannot be driven by sample selection issues related to the merger decision.

In addition, there has been some discussion in the literature on whether *freeride* is the relevant measure when it comes to free-ride incentives in merger situations. For example, Hansen (2012) uses the number of municipalities in a merger as a measure of free-ride incentives. He argues that the relevant measure of free-riding incentives is the number of decision-makers, which in our case is the number of municipalities, not the relative population sizes of municipalities. This is also what the result of Weingast et al. (1981) is indeed about. However, the law of 1/*n* arises because the districts in their model are of equal size, and thus the share of the cost burden for each district follows the law of 1/*n*. When districts or, in our case, municipalities are asymmetric in size within a merger, free-riding incentives, i.e. the share of cost burden, depend on the relative size of the municipalities. Nevertheless, we subject these two measures to a horserace in Table 5.[18] Even though the measures are highly correlated, it becomes evident from columns (2), (5), (9) and (12) that the municipalities respond to the common pool according to their relative size rather than according to the number of partners.

An independent reason to control for the number of municipalities is that municipalities that stand to lose most of their political representation in the post-merger council may want to spend as much as possible when they can still make autonomous spending decisions. This is because in the post-merger council

[18] All the models in Table 5 are estimated only for the subsample of merged municipalities.

bargaining considerations, in the spirit of Baron and Ferejohn (1987) and (1989), start to play a role. Expectations over the relative political power of a pre-merger municipality in the post-merger council are actually increasing in the number of municipalities for a given value of *freeride*.[19] Thus debt accumulation may actually decrease with the number of municipalities in a merger for a given value of *freeride*. Therefore, the results in Table 5 also suggest that expectations over the distribution of post-merger political power do not seem to be a relevant consideration during the pre-merger phase.

Another potential confounder is the merger subsidy. The amount of the subsidy depends on the populations of the pre-merger municipalities, the population of the new municipality and the number of municipalities in the merger. This means that the subsidy amount is correlated with our free-riding measure. Our concern is that municipalities may simply respond to an increase in future income and not to the free-riding incentives, which may create a spurious correlation between our key outcomes and the *freeride* measure. Based on columns (3), (6), (10) and (13) of Table 5, we can overrule this alternative explanation because controlling for the amount of subsidy does not change the point estimates of *freeride*. However, we cannot entirely rule out that the subsidy may play an independent role in decreasing cash reserves. It should also be pointed out that the total amount of subsidies paid to these mergers (217 million euros) was only about half of the total free-riding we observe.

Finally, an alternative explanation for free-riding among voluntary mergers is Coasean transfers between the merging municipalities. However, this explanation does not seem plausible because the municipalities with strong free-riding are on average poorer than merging municipalities with a weaker free-riding incentive, and thus do not seem to be attractive partners. In addition, we tested whether municipalities that were reluctant to merge accumulate more debt. We measured this reluctance using the vote share in favor of the merger in the municipality council merger votes. The vote share does not have a direct effect on debt or cash (columns (4) and (11)) and controlling for it does not change the results concerning free-riding behavior (columns (7) and (14)). Of course, it is extremely difficult to completely rule out transfers with the available data.

[19] In proportional elections, from the point of view of a small municipality, a merger with a single much larger partner and a merger with two municipalities of roughly the same size can be very similar in terms of population shares or *freeride*. However, these mergers can be different when it comes to post-merger political power. Proposal power, coalition formation and bargaining possibilities are very different when councilors from a small pre-merger municipality negotiate with two municipalities of a similar size compared to one much larger municipality.

Table 5. Within-merger group results and test for alternative explanations.

Panel A: Debt stock	(1)	(2)	(3)	(4)	(5)	(6)	(7)
freeride * 2007	292.7				286.6	261.96	305.2
	[184.9]				[224.0]	[188.4]	[187.2]
freeride * 2008	806.4***				712.8**	769.9***	800.6***
	[226.0]				[277.6]	[229.8]	[228.2]
coalition size * 2007		16.57			1.982		
		[22.95]			[27.65]		
coalition size * 2008		67.07**			29.67		
		[31.60]			[36.51]		
subsidy * 2007			0.424			0.393	
			[0.361]			[0.361]	
subsidy * 2008			0.574			0.477	
			[0.432]			[0.427]	
voteshare * 2007				134.7			160.0
				[187.3]			[185.8]
voteshare * 2008				-140.9			-77.71
				[295.4]			[286.7]
N	864	864	864	864	864	864	864
R^2	0.46	0.44	0.44	0.44	0.46	0.46	0.46
Panel B: Cash reserves	(8)	(9)	(10)	(11)	(12)	(13)	(14)
freeride * 2007	-166.6				-119.1	-161.755	-168.8
	[166.0]				[170.8]	[160.317]	[170.2]
freeride * 2008	-409.3**				-360.8	-386.902**	-420.5**
	[197.2]				[228.9]	[192.828]	[198.1]
coalition size * 2007		-19.30			-14.16		
		[13.471]			[12.75]		
coalition size * 2008		-32.01			-14.39		
		[19.28]			[23.21]		
subsidy * 2007			-0.200			-0.193	
			[0.209]			[0.202]	
subsidy * 2008			-0.494**			-0.464**	
			[0.192]			[0.185]	
voteshare * 2007				-10.58			-22.16
				[129.53]			[133.9]
voteshare * 2008				-149.7			-177.0
				[150.5]			[151.9]
N	890	890	890	890	890	890	890
R^2	0.08	0.07	0.08	0.07	0.08	0.09	0.08

Notes: All the models include year and municipality fixed effects. All the models include the following control variables: taxable income, corporate income tax revenue, grants and population. Standard errors are clustered at the municipality level and reported in brackets. ***, ** and * indicate statistical significance at 1, 5 and 10 percent level, respectively.

5. Conclusions

In this paper, we analyze free-riding behavior by Finnish municipalities during a recent wave of municipal mergers. Using DID methods, we find large free-riding effects. Consistent with the law of 1/*n*, the stronger free-riding incentive a municipality faced, the more it increased per capita debt and used up its cash reserves prior to merging. We also find that the funds were spent mostly on new investment and on current expenditures. Municipalities did not lower their local income tax rate nor did they hire new employees.

The results are somewhat surprising because these mergers were decided on voluntarily at the local level by municipality councils. In would seem plausible that municipalities could pre-empt free-riding in their merger agreements or that free-riding would lead to the cancellation of the merger. However, this does not seem to be the case. Although the contents of the formal merger agreements suggest that municipalities were anticipating these issues, they seem to have had only limited ability to observe and contract upon free-riding.

These results show that free-riding is a concern not only in forced (see e.g. Hinnerich 2009), but also in voluntary mergers. Naturally the severity of this problem depends on the institutional details and especially on the extent of fiscal autonomy of local governments. Free-riding is also likely to depend on the time lag between the decision and the actual implementation of a merger. Nonetheless, our results should be of wider interest, because common pool problems are present in many other contexts, such as in bail-outs of (local) governments.

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Appendix. Additional results

Table A1. Placebo treatments for operating margin and investment.

Analysis period	Treatment	Coeff.	Std. Err.
Panel A: Operating margin			
2000–2003	*freeride* * 2002	13.74	15.40
	freeride * 2003	0.829	19.38
2001–2004	*freeride* * 2003	-6.724	17.41
	freeride * 2004	-2.629	21.75
2002–2005	*freeride* * 2004	-0.121	17.89
	freeride * 2005	5.998	27.58
2003–2006	*freeride* * 2005	8.899	23.55
	freeride * 2006	-27.58	27.16
2004–2007	*freeride* * 2006	-32.98	22.49
	freeride * 2007	-69.59**	34.57
2005–2008	*freeride* * 2007	-53.28*	31.42
	freeride * 2008	-135.9***	45.95
Panel B: Investment			
2000–2003	*freeride* * 2002	73.35	74.09
	freeride * 2003	-49.04	48.38
2001–2004	*freeride* * 2003	-75.17	45.95
	freeride * 2004	-64.31	57.16
2002–2005	*freeride* * 2004	-41.26	58.32
	freeride * 2005	119.9*	64.60
2003–2006	*freeride* * 2005	174.8**	69.52
	freeride * 2006	227.5***	78.43
2004–2007	*freeride* * 2006	128.9*	77.95
	freeride * 2007	25.00	89.16
2005–2008	*freeride* * 2007	-62.57	78.62
	freeride * 2008	213.1**	97.59

Notes: All the models in the table use four years of data with two control period years and two treatment period years. The models include the following control variables: taxable income, corporate income tax revenue, grants and population. Standard errors are clustered at the municipality level. ***, ** and * indicate statistical significance at 1, 5 and 10 percent level, respectively.