DO MUNICIPAL AMALGAMATIONS AFFECT LOCAL GOVERNMENT SPENDING AND TAXATION? EVIDENCE FROM THE NETHERLANDS

Maarten A. Allers (m.a.allers@rug.nl)

J. Bieuwe Geertsema (j.b.geertsema@rug.nl)

University of Groningen, and Center for Research on Local Government Economics (COELO), Groningen, the Netherlands

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Abstract

We study whether municipal amalgamations affect local government spending and taxation in the Netherlands. Our paper differs from previous work in several respects. First, municipal amalgamations in the Netherlands did not follow a "big bang" approach, like in Belgium, Israel or Denmark. In the Netherlands, hardly a year goes by without some municipal amalgamations. This allows us to isolate the effects of amalgamations from the effects of other changes relevant for municipalities. Secondly, we use a dynamic panel data model, taking into account that next year's budget depends for a large part on the current year's budget. Thirdly, we control for fiscal interactions between municipalities. Finally, we distinguish between short term and long term effects. We conclude that municipal amalgamations increase spending before and during amalgamation, and also in the long run. The local tax burden is temporarily reduced just before amalgamation. We find no evidence that amalgamations enable municipalities to better exploit economies of scale. Based on our results, we cannot recommend amalgamating municipalities as an instrument to curb local government spending.

1. Introduction

In almost every country, government is to some extent decentralized. The lowest level of territorial government is often formed by municipalities or local governments. There is a great variation, however, in the size of local governments. Average municipality size is low in continental Europe (in 2007: 5,410 inhabitants in the EU-countries), especially in the Czech Republic (1,640) and France (1,720). Sweden (31,301 in 2007) and Japen (38,800 in 1997) have bigger municipalities, but these are still much smaller than those in Venezuela (78,000 in 1997) and the UK (140,000 in 2005).[1]

There is much debate as to what the optimal size of local government should be. According to Oates' (1972) decentralization theorem, smaller local governments are better able to tailor local public goods to local preferences and costs. The more heterogeneity, the bigger the gain from decentralization. However, the existence of, e.g., spillovers and diseconomies of scale requires a certain minimal size. It is often claimed that the per capita cost of public services is u-shaped, but firm empirical evidence is scarce.

[1] Burki et al. (1999); Hoorens (2008).

Local government size is far from constant. In fact, many amalgamations on a local level have taken place in recent history. For instance, Belgium reduced the number of municipalities 2,359 to 596 in 1977, New Zealand restructured over 230 units of local government into 74 territorial local authorities in 1989, Israel amalgamated 23 out of a total of 264 municipalities into 11 new municipalites in 2003. More recently, during the Danish administrative reform of 2007, 270 municipalities were amalgamated into 98 new municipalities.

Surprisingly, the effects of such drastic measures are not well known. In many cases, amalgamations are primarily aimed at gaining economies of scale. The empirical evidence, however, is weak. In this paper we study the effects of municipal amalgamations in the Netherlands on local expenditures and taxes. The Dutch amalgamations are unique in their timing. In many cases, as mentioned above, amalgamations were part of a national reform that included a vast number of simultaneous amalgamations. The Dutch did not follow a "big bang" approach. Instead, in almost every single year in the last decades, a small number of amalgamations took place. This makes the Dutch case attractive for econometric research.

Our paper differs from previous work in three more respects. First, we use a dynamic panel data model. We investigate effects of amalgamations on municipal spending as well as on local taxation. These variables are strongly influenced by budgets set in the previous year. National regulations and popular expectations oblige municipalities to deliver certain services, as a result of which part of total spending is pre-committed. Another reason is that decisions on tax rates and expenditure levels involve rather complex trade-offs between political priorities. Although the possibilities are endless, the previous year's budget often serves as a point of reference, and only limited changes are made every year (Bennett, 1984). Moreover, the apparatus of government is largely fixed in the short term. Hence, budgetary decision-making is likely to be incremental, with only moderate changes from one year to the next. That calls for the use of dynamic models, which take into account the one year lag of the dependent variable. In the literature on political business cycles, e.g., dynamic models are commonly used. Previous studies of amalgamations did not use dynamic models, however.

Additionally, we also control for spatial interaction effects. A large literature on tax and expenditure mimicking and on yardstick competition shows that budget decisions are not made in isolation. Allers and Elhorst (2005; 2011) found evidence of spatial interactions in both local government expenditures and in local taxation in the Netherlands. Ignoring possible spatial interactions, as previous studies have done, may result in omitted variable bias.

Finally, we distinguish between short term and long term effects. It is conceivable, e.g., that amalgamations increase spending in the short run, as municipal organizations have to be integrated, and as staff cannot be laid off very quickly (at least not in the Netherlands). Cost savings may take a few years to arise. Therefore, we do not use a single amalgamation dummy, but rather a series of dummies: one for every year from two years preceding amalgamation up to four or more years after amalgamation.

We begin with a brief review of the relevant literature in the field of municipal amalgamations (Section 2). Then, we describe municipal finance and amalgamations in the Netherlands (Section 3). Section 4 describes the model and the econometric methods that we deploy. The fifth Section gives an extensive overview of the data and its sources. Section 6 presents the results of our study. Finally, we will draw conclusions and propose ideas for further research in this field.

2. Previous research

Although a number of papers has been published on the subject of municipal amalgamations, the majority takes a different approach then we do. Many focus on either pre or post amalgamation effects, not on both. Two papers, Fox and Gurley (2006) and Holzer (2009), review the literature and present an analysis

of sub-national government amalgamations. Most of the papers reviewed there are case studies; any empirical research uses descriptive statistics at best. Fox and Gurley conclude that there is a large number of aspects to be considered and that it is unclear if amalgamations work. Holzer concludes that governments have achieved only a small portion of the attempted amalgamations, and that the results of those amalgamations that were achieved are mixed.

Considering empirical, econometric research, there exist several papers which study only pre-amalgamation effects. Recent examples are Tyrefors Hinnerich (2009), Jordahl and Liang (2009) and Blom-Hansen (2010), who have studied these effects for the municipal amalgamations of 1969 in Sweden, those of 1952 in Sweden and those of 2007 in Denmark, respectively. All three papers conclude that they find evidence of the so-called common pool effect, where municipalities engage in opportunistic behavior and decide to increase spending and/or accumulate debt in the years preceding the amalgamation. However, a common pool effect is only one possible explanation of rising expenditures or debt preceding amalgamation. Increased spending just before amalgamation might, e.g., reflect temporary costs of merging government offices and harmonizing regulations.

Dollery et al. (2007) have studied both pre- and post-amalgamation effects of the 2003-2004 reforms in Australia, but only by means of descriptive statistics. They conclude, in line with Fox and Gurley (2006), that there are significant costs involved in the amalgamation process, and that with the benefits often being exaggerated, no evidence can be found of a definite positive effect. Two studies focusing on post-amalgamation effects (specifically economies of scale effects) confirm this. Both Lüchinger and Stutzer (2002) and Rouse and Puterill (2005) find that there is no evidence of increased economies of scale after amalgamations in Switzerland (1992-1995) and New Zealand (1982-1997), respectively.

The most recent study of post-amalgamation effects, however, contradicts these results. Reingewertz (2011) has executed a panel-data analysis of Israeli municipal amalgamations in 2003 and concludes that amalgamation reduced expenditures by 9%. Reingewertz uses panel data analysis with fixed effects, which allows controlling for unobserved local characteristics that do not change over time.

Considering amalgamations in the Netherlands, a descriptive analysis has been done in Allers (2010). He finds that average per capita expenditures are not lower, but rather higher the bigger municipalities are. A second finding is that expenditures of amalgamated municipalities increase in the years after amalgamation, at least for the first seven years. Our research extends these preliminary findings by applying panel data analysis and studying both pre- and post-amalgamation effects.

3. Municipalities and amalgamations in the Netherlands

In the Netherlands, there are three territorial layers of government: in addition to the national government, the country is divided into 12 provinces and into 418 municipalities (in 2011)[2]. All three layers cover the entire country. All provinces have more or less the same set of tasks and responsibilities and taxation options, as do all municipalities.

About two thirds of Dutch municipalities' revenues consists of grants from the central government (Allers and Elhorst, 2005). Roughly one third of revenues consists of municipal levies and income from property and market activities. It must be noted that income from property is largely market driven and income from market activities cannot be spent freely because it is largely offset by the costs of these activities. Taxes and levies account for approximately 15 percent of municipal revenues. Most important among these are

[2] For this paper, we do not consider the Caribbean part of the Netherlands, where special municipalities were established per 10 October 2010.

the property tax, the sewer tax and the garbage tax. Municipalities use accual accounting, and local budgets must be balanced.

Figure 1. Number of amalgamations and average municipal population size

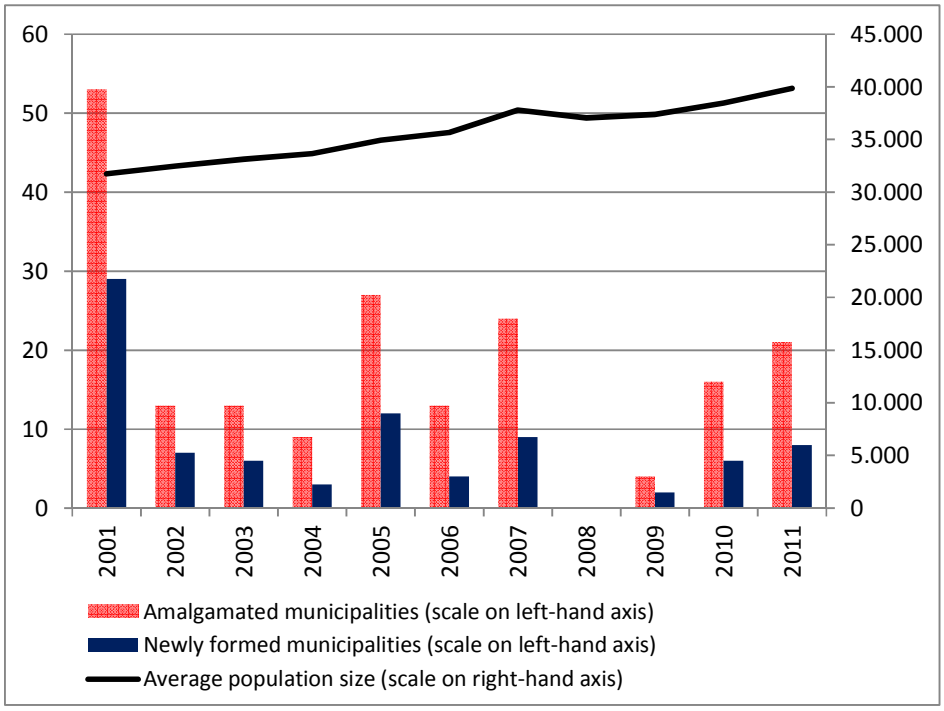
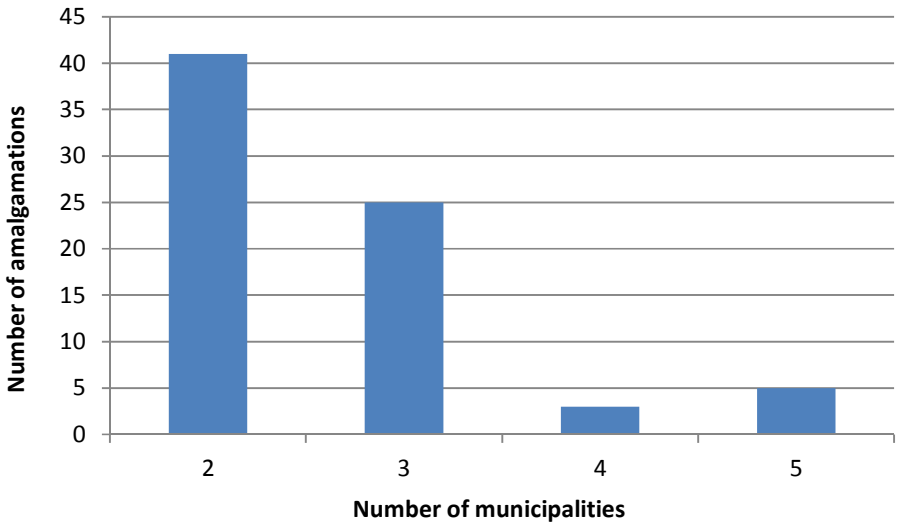
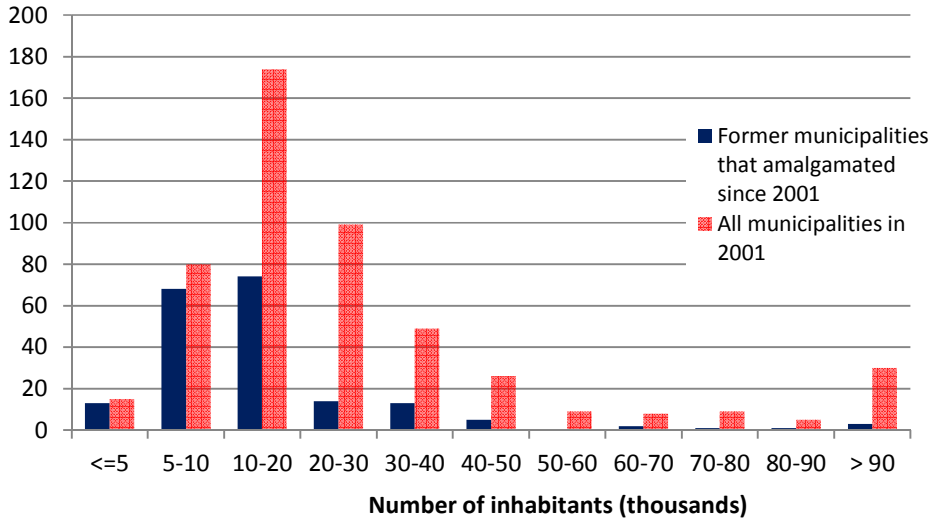


Figure 2. Number of municipalities per amalgamation, 2001-2011



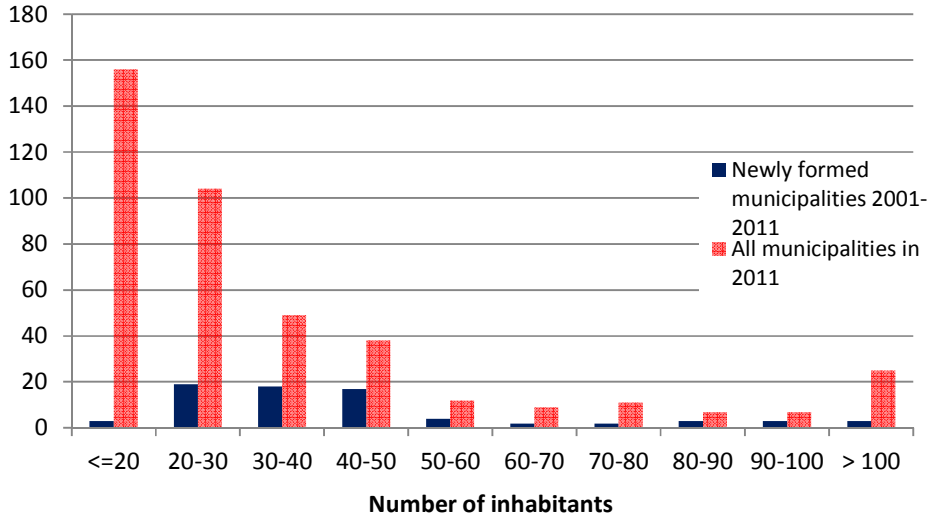
The number of municipalities has been steadily declining for a long time. As a result, Dutch municipalities now have 40,000 inhabitants on average (Figure 1), which makes them relatively big compared with those in many other countries.

Figure 3. Number of amalgamated municipalities by population size



In 2001-2011, 193 municipalities were amalgamated into 74 new ones (Figure 1). Often, two municipalities were merged, but the number of municipalities involved in an amalgamation ranges from two to five (Figure 2). Most municipalities selected for amalgamation had between 5,000 and 20,000 inhabitants (Figure 3). After amalgamation, population size is often in the range 20,000 – 50,000 (Figure 4).

Figure 4. Numer of newly formed municipalities by population size

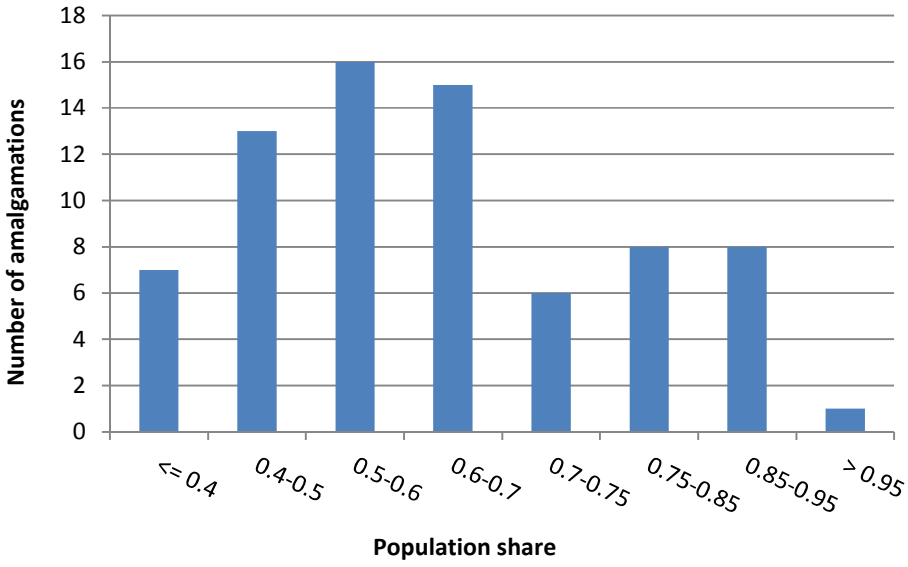


Municipality size may be increased by merging some of them, or by creating a smaller number of new municipalities by changing the boundaries of a group of municipalities. In the period we study, only the first type occurred. Boundary changes that do not reduce the number of municipalities are not included in our study, as these do not affect average local government size. Such changes are relatively small and rare.

Roughly speaking, amalgamations come in two types. The first type involves municipalities which do not differ too much in size. In business, this would be called a “merger of equals”, even if equality does not actually exist. The newly formed municipality is usually given a new name, sometimes comprising the names of the constituent partners separated by a hyphen (like in Sittard-Geleen). The second type of amalgamation is characterized by the absorption of a small municipality into a big neighbor, like Rozenburg (12,489 inhabitants) was absorbed by Rotterdam (590,131 inhabitants). In this case, the newly formed municipality has the name of the biggest amalgamation partner.

The first type, which we will denote simply by “amalgamations”, occurs far more often than the second, denoted as “annexations” from now on (Figure 5). It is not at all clear that both types have the same results on the local budget. For one thing, amalgamations require setting up new organizational structures, whereas annexations do not. The number of annexations is too small for meaningful statistical analysis. Therefore, we focus our analysis on amalgamations without a dominant partner. As a cutoff point we choose a population share of 85 percent for the biggest partner, thus eliminating 9 municipalities from our dataset. As a robustness check, we have ran regressions after lowering this cutoff point to 80 percent (which means eliminating an additional 3 municipalities from the dataset), but this does not change our results.

Figure 5. Population share of largest amalgamation partner, 2001-2011

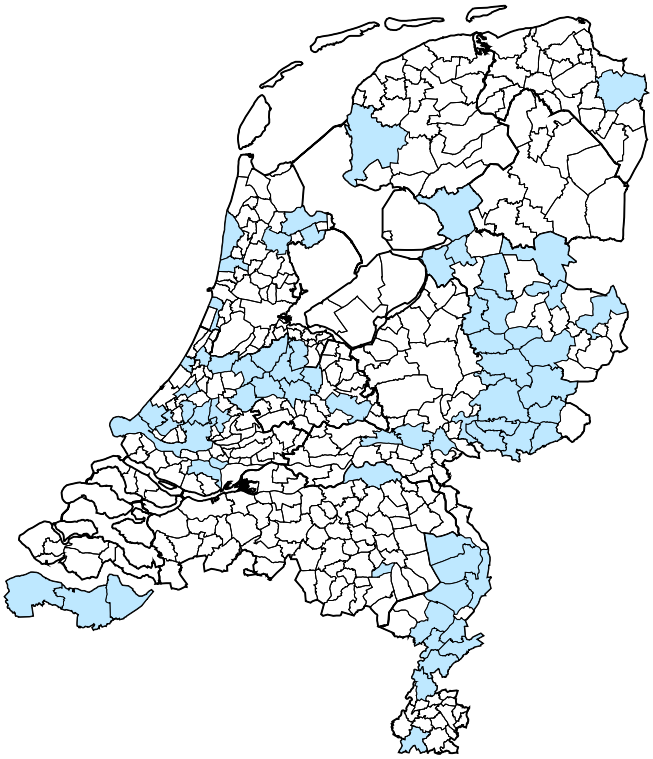


In policy debates in the Netherlands, the most important reason for amalgamation is that the scale of many municipalities is deemed too small for effective administration. The central government has decentralized many public tasks to local governments, a process of which the end is not yet in sight.

Increasingly, small municipalities find it difficult to cope with this stream of new tasks. They lack the necessary manpower, or they become vulnerable because certain tasks can only be performed by one or two specialized officers. Amalgamations may ease such problems. Often, it is assumed that scaling up local government will increase efficiency, because economies of scale can be exploited.

The final decision to amalgamate municipalities is made by the national parliament, usually in the year preceding the amalgamation, which normally is effected on the first day of a calendar year. Of course, several years of debate and preparations precede any amalgamation. Amalgamations may occur at the request of the municipalities concerned, but they can also be against the will of some of them. In many cases, it is hard to say to what extent an amalgamation is voluntary or mandatory. Provinces play an important role here, initializing and coordinating amalgamations. Some provinces are more active in this respect than others. This is one of the reasons why amalgamated municipalities are not spread out evenly across the country (see Figure 6).

Figure 6. Municipalities formed after amalgamations, 2001-2011



Obviously, local issues are important factors influencing the probability of being selected for amalgamation. In an attempt to learn more about the general determinants of amalgamation, we ran a logistic regression on data for 2000.[3] The dependent variable was a dummy that took the value one if the municipality was to be amalgamated in 2001-2011 (annexations were excluded). Not surprisingly, number of inhabitants turned out to be highly significant, with a negative sign. Smaller municipalities are more often selected for amalgamation. A second determinant, also highly significant, is density, measured as

[3] Detailed results are available upon request.

the average number of addresses per square kilometer. Higher density implies a bigger likelihood of amalgamation. Finally, a number of province dummies are significant, as expected.

4. Research setup

Identification strategy

In order to study the effects of amalgamations, we can exploit the fact that some municipalities were amalgamated and others were not, and the fact that amalgamations took place in different years. Policy variation over space and time offers a fruitful opportunity for economic research. However, there exists an important caveat. Often, policy variation does not provide a true natural experiment, because policy is endogenous (Besley and Case, 2000). That is relevant for our study as well. Municipalities that are amalgamated are not selected at random. Thus, we need to control for the forces that drive selection. In theory, this may be done by using an instrumental variables approach. This would require instruments that influence selection for amalgamation, but not budgetary outcomes. It is unlikely that such instruments exist.

An alternative approach is to identify all relevant variables determining the selection of municipalities for amalgamation, and to include them in the budgetary regressions as controls. One can never be sure, however, that all variables that influence both selection and budgetary outcomes have been included. To account for unobserved heterogeneity, we use difference in difference estimation, comparing changes in budgetary items of amalgamated municipalities (the treatment group) with those of a control group of municipalities that were not amalgamated. Difference-in-difference estimation has been aplied to study the effects of amalgamations before by Lüchinger and Stutzer (2002), Tyrefors (2009), Jordahl and Liang (2010) and Reingewertz (2011). A control group should consist of comparable municipalities, i.e., municipalities with budgetary trends similar to those of municipalites that are amalgamated and which respond in the same way to changes in the variables that determine selection for amalgamation.

We use three different control groups. First, we employ the entire sample of amalgamated and non-amalgamated municipalities. This control group is far from perfect, as amalagamated municipalities have different characteristics than non-amalagamated municipalities. For the second control group, we limit the analysis to municipalities with 20,000 – 100,000 inhabitants. This makes amalgamated and non-amalgamated municipalities more comparable in size. Finally, we limit the analysis to municipalities that were amalgamated at one time in 2001-2011. Thus, we use municipalities that were amalgamated, but in a different year, as a control group. This control group resembles the treatment group best: the only difference is in the moment of amalgamation.

Models

Since we were able to compile a dataset containing information on 418 municipalities for a period up to 12 years, we have an opportunity to study amalgamation effects using a panel data model into which we can introduce a number of amalgamation dummies. We first explain our choice of the type of panel data model.

Reingewertz (2011) is the only author we know of who has applied a panel data model with fixed effects in this specific field of research before. However, where he uses a static panel data model, we opt for a dynamic model. The main motivation for this is the nature of our dependent variables, being local expenditures and taxes. While municipal expenditures are partly discretionary and as such can vary from year to year, the majority of budget items are set for the medium to long term. Expenditures and taxation are for a large part determined by the size of last year's expenditures. This leads us to the choice of a

dynamic panel data model with a lagged dependent as one of the right-hand-side variables. In an extension of this model, we aim to control for possible spatial interaction effects as well by extending the model to include spatial lags of the dependent variable.

The shape of our data panel, where the number of studied instances (418) is relatively large whereas the time dimension (T=10 for expenditure data and 12 for taxation data) is rather small, is an important issue to take into account when setting up a research model. It is well known that using dummy variables to estimate individual effects in a dynamic model results in biased estimates in such a case.

Nickel (1981) was the first to publish about this bias. He derived a formula for it, and proved that the bias can safely be ignored when T approaches infinity. This has raised the question how to cope with the bias when using data sets for which this is not the case. Judson and Owen (1999) have compared various estimation methods that have been developed to do this. They consider Anderson and Hsiao (1981) who have made a first step in this field with their first difference estimator. In the same paper, Judson and Owen also study different variations of the Generalized Method of Moments (GMM). Especially the difference GMM and the system GMM (Arellano and Bond, 1991; Arellano and Bover, 1995; Blundell and Bond, 1998) are estimators that are widely used in panel data analysis. Thirdly, Judson and Owen look at an approach known as the Corrected Least Squares Dummy Variable (CLSDV) developed by Kiviet (1995; 1999). Kiviet has developed an approximation of the size of the bias and through that a method to correct the basic Least Squares Dummy Variable (LSDV) estimator. Judson and Owen (1999) have compared these three methods using a Monte Carlo approach, and have found that for panels with a time dimension of less than or equal to 10 observations, the CLSDV method is the preferred method.

In line with this conclusion, we will deploy the CLSDV method, but in a somewhat adapted form.First, Bun and Kiviet (2003) have found that the approximation for the bias correction can be calculated with more simple formulae. Next, Bruno (2005) has adapted this method in order to be able to use it with unbalanced panel data.[4] The method is based on a standard dynamic panel data model:

$$y_{it} = \gamma y_{i,t-1} + X_{it}\beta + \alpha_t I_n + \eta_i + \epsilon_{it}$$

where y_{it} is the dependent variable, X_{it} is the vector of (strictly exogenous) explanatory variables, α_t is a time scalar and I_n is a column vector of ones, η_i is an unobserved individual effect, and ϵ_{it} is an unobserved white noise disturbance. The subscript *i* denotes municipalities ($i = 1 \ldots n$), the subscript *t* denotes years. The initial, biased estimations of γ, β α are obtained employing the Arellano and Bond-estimator (1991). These estimates are then corrected by a bias approximation which corrects any bias in the observed values of γ and β. Standard errors are approximated by a bootstrap algorithm with twenty repetitions. In order to study the effects of amalgamations, we extend this model to include a number of amalgamations dummies, which are defined below.

To control for possible fiscal interactions, we need a dynamic model which is extended to include spatial interaction effects.[5] Again, the short time dimension remains an issue to consider when selecting the right model. Elhorst (2010) compares a number of different dynamic panel models with spatial interaction effects, and specifically evaluates their performance for panels with a short time dimension (T=5). He finds that the bias-corrected LSDV (BCLSDV) method from Yu, De Jong and Lee (2008) roughly decimates the bias that is found when using a standard LSDV method. This bias is reduced even more

[4] We ran our regressions in Stata using the xtlsdvc command.

[5] Spatial analysis exists in two forms. Spatial error models are appropriate when the observed spatial effect results from certain unobserved spatially concentrated characteristics. A spatial lag model is chosen here because we know from Allers and Elhorst (2011) that we should expect direct spatial interactions between municipalities.

when the time dimension of the panel is expanded, as is the case for our dataset. Therefore we will use this model, for which the econometric specification is:

$$y_{it} = \gamma y_{i,t-1} + X_{it}\beta + \lambda W_i y_{it} + \rho W_i y_{it-1} + \alpha_t I_n + \eta_i + \epsilon_{it}$$

In this model, the matrix W_i is introduced, which is an *i* x *i* spatial weights matrix which is non-stochastic and generates the spatial dependence among cross sectional units y_{it}. As each row sum to one, $W_i y_{it}$ is the average of y_{it} in neighboring municipalities. Spatial interaction is included both for the dependent variable in the present year *t* and in the previous year *t-1*. As with the dynamic non-spatial model, we extend this model to include a number of amalgamations dummies, which are defined below.

5. Data

We have budgetary data for the time period 2000-2011. As we need at least one year before and after every amalgamation, this allows us to study amalgamations taking place in 2001-2010. A logical result of amalgamations is a reduction in the number of municipalities during this period. We choose to handle this by rebuilding the dataset in such a way that all the amalgamations are retroactively applied to the data. In other words, we organize our data as if all amalgamations had been implemented by 2000. This allows us to include the data of amalgamated municipalities in a single panel. The downside is that spatial interaction effects between municipalities that were amalgamated later on during the period under study are absorbed in the data of the retroactively formed new municipalities. This could lead to underestimation of these spatial effects, but that is not the main focus of our study.

Amalgamations also occurred before the period we study. We drop municipalities that were created by amalgamations in 1997-2000 from our dataset. Three municipalities were amalgamated twice in 1997-2011. We drop these municipalities as well.

Dependent variables

We have made a selection of three dependent variables to study. First, we will look at total per capita expenditures, to find out if these are significantly influenced by municipal amalgamations. Theory suggests that per capita expenditures should decrease after an amalgamation of small municipalities, due to increased economies of scale. We exclude expenditures on land and land development from total expenditures. In some cases, these form a considerable part of total expenditures, but they are highly volatile from year to year, and they are not relevant for our study.

Secondly, we study per capita expenditures on the administrative organization of the municipality. This variable is the sum of the expenditures on the mayor and aldermen, on the municipal council and its commissions, and on the administrative support of these organizational bodies. The idea is that the per capita costs of the administrative organization cannot be decreased by reducing the local government's output. There is a fixed amount of 'administration' that is demanded by a municipality of a certain size. This means that any per capita reduction of expenditures on these activities must be the result of increased efficiency. This makes it an ideal expenditure category to focus our research on, without having the need to control for the output generated by these expenditures. Moreover, amalgamations are likely to reduce costs of administration, because the number of aldermen and the number of members of the municipal council do not rise proportionally with population size. Also, the newly formed municipality only has one mayor. This is clearly an area where economies of scale could arise.

The final dependent variable we study is the local government tax burden for households. Local taxes in the Netherlands consist mainly of property taxes. Property tax rates can be chosen by local governments

within boundaries set by certain nationally imposed rules.[6] Other local taxes are much less important quantitatively. Apart from taxes, municipalities levy some important user charges. Revenues of user charges may not exceed budgeted costs, but sometimes revenues are much lower. In that case, part of the costs is paid out of tax revenues. In the last decade, many municipalities raised their user charges to cost-covering levels. This allowed them to reduce property tax rates. We measure the local tax burden as the sum of the average property tax paid by a household and the average amount paid for the two user charges every household had to pay (sewer charges and waste disposal charges). By using the sum of these levies, any fluctuations that are caused by shifting revenues between the property tax and user charges are eliminated.

Tax burden data is collected by COELO, an independent research institute of the University of Groningen. Tax data is available for every municipality in every year we study. Data on budgets is provided by Statistics Netherlands, which gathers detailed information about the municipal budgets for the years 2002 through 2011. Unfortunately, budget data is missing for some municipalities in some years. As a result, we have an unbalanced panel. In addition to total expenditures and revenues, the budget data is also split up into 10 categories and even into 120 subcategories. In theory, this creates options for a very detailed study of some very specific expenditures. Unfortunately, the quality of the data does limit the possibilities. The data in this set is provided by the municipalities themselves. Although efforts have been made by Statistics Netherlands and the central government to minimize freedom in categorizing certain expenditures in order to create uniform data from all municipalities, in practice some expenditures are differently categorized among municipalities. Therefore, we refrain from using data from subcategories. Amounts have been deflated using the consumer price index and are expressed in euro's of 2012.

Amalgamation variables

To identify pre- and post-amalgamation effects we introduce seven dummies A_{-2}, A_{-1}, A_0 … A_3, A_{4+} which take the value of 1 in the corresponding years running from two years before the amalgamation to four or more years after. Amalgamations take effect on the 1st of January of a certain year and that year is marked as the amalgamation year where the dummy A_0 takes the value of 1.

Control variables

The matrix X_{it} consists of five control variables. As described above, central government grants constitute a large part of total municipal income. The general, non-earmarked grant is consistently specified in the municipal budget information of Statistics Netherlands and thus easy to retrieve. Data on earmarked intergovernmental grants are only available for 2011. However, a recent study has pointed out that the correlation between the general grant and the total of other intergovernmental grants is very high (Allers, 2011).[7] Therefore, the general grant seems to be an adequate proxy for the total size of central government grants and therefore we will use this as a control variable. The allocation formula of the general grant awards a temporarily higher grant for amalgamated municipalities (in the first four years). This is meant to help them finance the transition costs which follow amalgamation. Inclusion of control variables that are affected by the treatment should normally be avoided. That is because indirect effects of the treatment working through such controls may load on these controls, downwardly biasing the estimates of the treatment effect. In this case, amalgamation raises the grant, as a result of which spending is likely to go up (or taxation may go down). By including the general grant we control for this

[6] In 2006 and 2007, upper limits for property tax rates were set by the national government. In 2008, a 'macro norm' was introduced: if property tax revenues in all municipalities together grow above this norm, the total volume of the municipality fund can be cut. This has not happened yet.

[7] In a regression with other intergovernmental grants as the dependent variable, the coefficient of the general grant, the only independent variable, was 0.86, with an R-squared of 0,98.

indirect effect. Nevertheless, we include the grant variable, because grants are the most important source of municipal revenue. Changes in grants not due to amalgamations should therefore be controlled for.

The second control variable is the number of inhabitants. As we have seen, municipality size is one of the determinants of the selection for amalgamation. For this reason alone we need to control for this variable. A different reason for inclusion is that spending may not grow proportionately to population size. Just like amalgamation, autonomous population growth results in larger municipalities which may lead to economies of scale. Because density also turned out to influence the probability of amalgamation, we include this variable as well. Province dummies also have significants effects on the probability of being selected for amalgamation, but these are superfluous as we include municipal fixed effects.[8]

The fourth control variable is the sum of the number of unemployment benefits and the number of social welfare benefits per capita. This variable is entered for two reasons. Firstly, it gives a good indication of the social structure of the municipality. Secondly, social welfare benefits are paid out of the municipal budget and as such can influence expenditures and taxes.[9]

As a fifth control variable we use the political color of the municipal council. This variable defines ideology on a scale from 0 to 1, with a value of 0 meaning a council with only right wing parties and 1 meaning that the whole council is left wing. It is calculated by counting the number of seats for left wing parties, adding one half of the seats of parties of 'neutral' ideology (e.g. local parties without a clear ideological disposition) and dividing the sum by the total number of council seats.[10] In accordance with partisan theory, we expect government expenditures to increase when left wing parties are in charge and vice versa. Since municipalities are not allowed to run budget deficits, we expect local taxes to show the same pattern.

The sourse of the first four control variables is Statistics Netherlands. Data on the fifth, ideology, is avaliable from COELO. The spatial weight matrix W_i is built on municipal border information from Statistics Netherlands. It is based on queen contiguity, meaning that municipalities are marked as neighbors if they share at least one border point.

Table 1 compares dependent variables and control variables for different control groups.

[8] In the period under study, provincial boundaries were not changed. Every municipality was part of the same province during the entire period under study.

[9] Municipalities receive a grant to cover these costs, but this grant is based on estimated spending need, not actual welfare expenditures.

[10] The national parties PvdA (social democrats), Groen Links (the green left), SP (socialist party), D66 (left wing liberals) and CU (social christians) are counted as left wing parties, whereas VVD (conservative liberals), CDA (christian democrats) and SGP (conservative christians) are counted as right wing parties. Local parties that have a clear right or left wing signature are treated accordingly.

Table 1. Mean values of control variables and dependent variables for different groups of municipalities (2001-2011)

	Amalgamated	Amalgamated without dominant partner	Not amalgamated	Not amalgamated; population 20,000 – 100,000
General grant	797 (8.8)	771 (6.5)	826 (4.0)	812 (4.1)
Population	53,635 (4,197)	38,938 (878)	36,325 (1,117)	38,147 (529)
Density	.92 (.03)	.82 (.02)	1.00 (.01)	1.26 (.02)
Unemployment benefits	.031 (.007)	.022 (.0006)	.028 (.001)	.029 (.0004)
Ideology (left)	.41 (.005)	.40 (.004)	.47 (.002)	.47 (.003)
Total expenditures	1,896 (42)	1,749 (20)	2,052 (14)	2,037 (14)
Expenditures on administration	107 (2.3)	103 (1.8)	122 (1.3)	104 (1.2)
Tax burden	685 (5.0)	688 (5.5)	676 (1.8)	660 (2.4)
Number of observations	430	383	2,891	1,303

Standard errors within parentheses.

6. Results

Before we present regression results, we present our data graphically. This allows us to visualize trends, and to check whether there are pre-existing levels or trends that render the treatment group and the three different control groups incomparable.

Figure 7 compares the local tax burden for amalgamated municipalities with the tax burden in all non-amalgamated municipalities and in non-amalgamated municipalities with a population between 20,000 and 100,000. The three lines show very similar patterns. The tax burden in amalgamated municipalities is at the same level and has the same trend as the burden in these two control groups. No amalgamation effect is apparent in Figure 7.

Figure 8 shows the tax burden for municipalities that amalgamated in different years. Our third control group consists of municipalities that were amalgamated in different years. Because all municipalities in this group were selected for amalgamation, there is no selection bias here. However, identification is based on differences in the timing of amalgamations across municipalities. Figure 8 shows that the level and the trend of the local tax burden is indeed similar, with the exception of the trend in municipalities that amalgamated in 2009.[11] In fact, this concerns only two municipalities. On of these raised the property tax rate much more than other municipalities, as a result of a local problem. Apart from this, the third control group seems rather useful.

[11] Note that Figure 8 does not include a line for 2008, because in that year, no municipalities amalgamated.

Figure 7. Tax burden in different groups of municipalities (euro's of 2012)

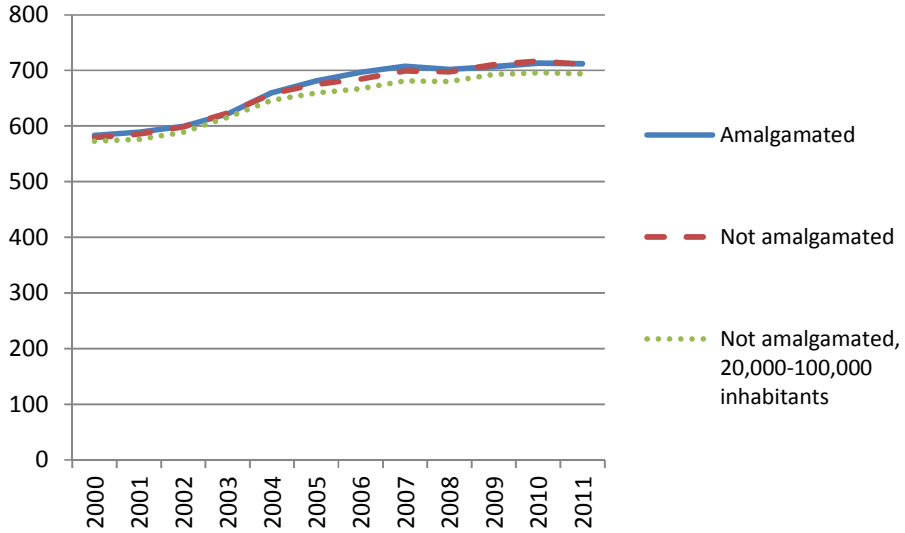


Figure 8. Tax burden in municipalities that amalgamated in different years (euro's of 2012)

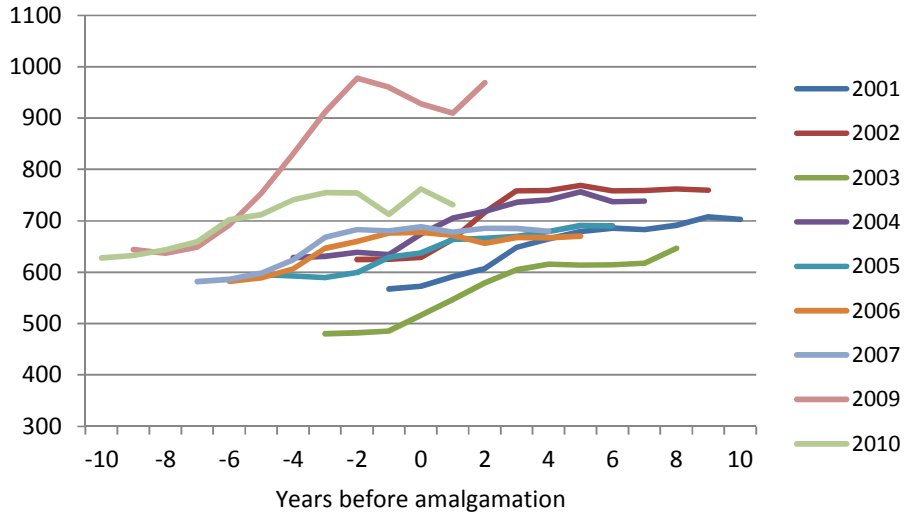
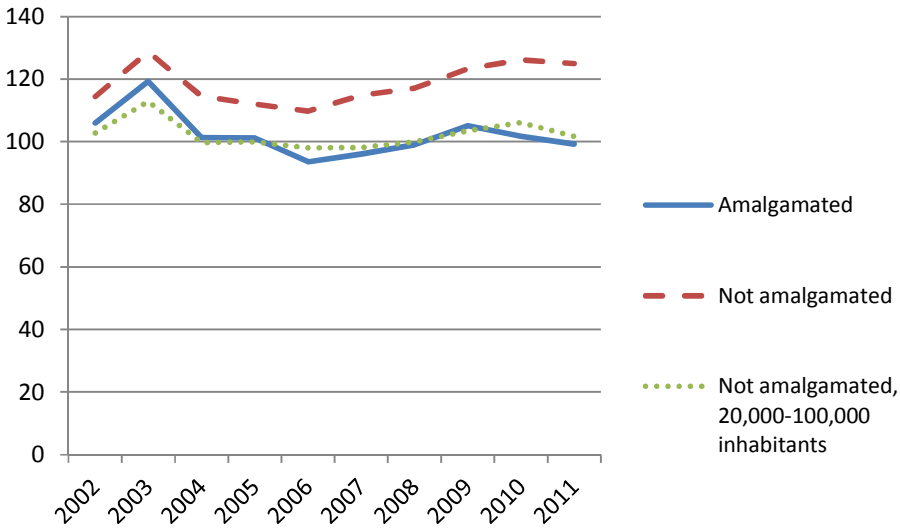


Figure 9 shows per capita municipal spending for the three control groups. Non-amalgamated municipalites with populations between 20,000 and 100,000 show practically the same pattern as the total of unamalgamated municipalities. It seems that amalgamated municipalities started at a lower level, but have been catching up gradually. Figure 10 shows that spending on local administration in amalgamated municipalities does not keep up with administrative spending in non-amalgamated municipalities. However, compared with non-amalgamated municipalities of roughly the same size (between 20,000 and 100,000 inhabitants), this difference disappears.

Figure 9. Total spending in different groups of municipalities (euro's of 2012 per capita)

Unfortunately, we cannot usefully compare total spending or spending on administration in municipalities that amalgamated in different years (like we did in Figure 8 for the tax burden), because of gaps in the data. Recall that our dataset is unbalanced because Statistics Netherlands does not report budgetary data for alle municipalities in all years included. Different points on the same lines would be based on different sets of municipalities. This would cause substantial fluctuations, which would not reflect different trends in municipalities that amalgamated in different years.

Figure 10. Spending on administration in different groups of municipalities (euro's of 2012 per capita)



Econometric analysis

Although figures may be useful to display budgetary patterns, they cannot tell us whether there is a relationship between amalgamation and budgetary outcomes. For that purpose, we need a statistical analysis. Table 2 reports regression results of total expenditures, expenditures on administration, and the tax burden, using the entire sample (but excluding annexations and municipalities that amalgamated in 1997-2000). Different control groups will be introduced in Table 3. The dependent variables and the control variables are expressed in logs. As a result, the coefficients of continuous varibles can be interpreted as elasticities. Before interpretating the coefficient of a dummy variable, one must take the exponent. For example, if the coefficient on a dummy is 0.20, then, when the dummy takes the value 1, the dependent variable is 22 percent larger than otherwise ($e^{0.2} = 1.22$).

All regressions include fixed effects at the municipal level, to control for unobserved time-invariant local characteristics. The first three columns of Table 2 present regression results of the basic static panel analysis of total spending.[12] There is no lagged dependent variable yet, which makes these results more or less comparable with those of Reingewertz (2011). In the first regression we include only amalgamation dummies (and a constant). Remarkably, both before and after amalgamation, total spending is significantly higher. There is no trace of economies of scale. In column 2, we have added control variables. This reduces the coefficients and the significance of the amalgamation dummies, but they keep their positive signs. All control variables are statistically significant. Column 3 adds year dummies that control for nationwide temporal effects, like law changes or national budget cuts that affect the local playing field. This further reduces the coefficients and the significance of the amalgamation dummies. Now, we see higher spending in the year preceding amalgamation (though only significant at the 10 percent confidence level), and also three or more years after amalgamation. This contradicts Reingewertz' (2011) conclusion for Israel, which was that spending was reduced after amalgamation.

As a next step in our analysis, in columns 4-6 of Table 2 we present the results of the dynamic regression model based on the CLSDV for unbalanced panels (Bruno, 2005). Since the CLSDV module provides no information on the goodness of fit of the model, we have rerun all the regressions as a regular LSDV test with fixed effects (including a lagged dependent variable), and provide the R^2 of these estimations. Although these values give no accurate measure of the goodness of fit of the CLSDV model, they do give a good indication of the relative goodness of fit of the various CLSDV regressions. However, they are not comparable with the R^2 values given for the static regressions.

In all regressions, the coefficient of the lagged dependent is highly significant (first row of Table 2). This supports our assumption that expenditures and taxes are highly rigid and a dynamic approach is needed. Like in the static model, inclusion of control variables and year dummies reduces the coefficients of the amalgamation dummies and their significance (columns 4-6 of Table 2). However, the signs remain positive. Both in the two years preceding amalgamation, in the amalgamation year itself, and two or more years after amalgamation, total per capita spending is significantly higher (column 6).

Columns 7-12 of Table 2 report regression results of expenditures on administration. The static model in column 7 includes only amalgamation dummies (and a constant). Column 8 adds control variables and column 9 year dummies. Column 9 shows significantly higher spending on administration in the two pre-amalgamation years, and lower spending two or more years after amalgamation (although mostly only significant at the 10 percent confidence level). Columns 10-12 presents the corresponding results of the dynamic model. The lagged dependent is highly significant, and, in column 12, wipes out the significance of all but one amalgamation coefficient: only in the first year after amalgamation, spending on

[12] Standard errors are clustered by municipality.

administration is affected, with a negative sign. Thus, the estimates of the dynamic model differ considerably from those of the static model.

Columns 13-18 of Table 2 give regressions of the local tax burden. In the static model without control variables or year dummies, all amalgamation coefficients are highly significant, with positive signs (column 13). In the full static model (column 15), however, only the tax burden in the amalgamation year and in the year after are affected (downwardly). Again, the dynamic model gives a different result. Now, the tax burden is lower in the year preceding amalgamation and, at the 10 percent confidence level, in the amalgamation year itself. There is no long term effect.

Using different control groups

We conclude from Table 2 that our preferred model is the dynamic model that includes both year dummies and control variables. In Table 3, we present regression results of this model for the three budgetary variables (total expenditures, expenditures on administration, and tax burden) for three different control groups.

Column 1 of Table 3 replicates column 6 of Table 2. Here, the control group consists of municipalities that are not amalgamated (at least not in the same year). In column 2, the control group consist of municipalities of roughly the same size as amalgamated municipalities (20,000 – 100,000 inhabitants). In column 3, the control group consists of municipalities that were amalgamated, but in a different year. This control group resembles the treatment group best. No matter which control group we use, total per capita spending is higher in the two years preceding amalgamation, and in the amalgamation year itself. In the two years after amalgamation, spending is also higher, but whether this is significant depends on the control group. Three or more years after amalgamation, spending is again significantly higher with every control group. The long run effect is 12 - 15 percent higher spending. Population has a significantly negative coefficient with all three control groups. A growing population does not lead to proportionately higher municipal expenditures.

Expenditures on administration appear to be hardly affected by amalgamation. Only with the first two control groups, administration spending is significantly lower in the first year after amalgamation. With the last control group (amalgamated municipalities), none of the amalgamation coefficients is statistically significant.

Amalgamation significantly reduces the local tax burden in the last year before amalgamation, by about 3 percent. In the amalgamation year itself, the tax burden is also lower, but this is only significant at the 10 percent confidence level. With the amalgamated municipalities as a control group (but not with the other control groups), the tax burden is significantly lower in the second year before amalgamation as well. The fact that ideology does not affect the average local tax burden seems to contradict the predictions of partisan theory. Recall, however, that we lumped together the property tax with two user charges, which are often cost-covering. This may dampen any effect of ideology on the property tax.

Including spatial interaction effects

In addition to the checks on robustness by using different control groups, it is interesting to see wether inclusion of spatial interaction effects affect the outcomes of the dynamic model regressions. For this, we use the estimator of Yu, De Jong and Lee (2008). We have again included control variables, year dummies and municipal fixed effects. Again, no indicator for the goodness of fit is available. We ran the spatial dynamic model for the entire sample only. Reducing the control group to a more limited number of municipalities would results in too many geographical gaps to make spatial analysis useful. Many municipalities would have no or few neighbors included in the analysis.

We have run the regressions including spatial interaction effects for all three dependent variables. However, only the results for total expenditures show evidence of spatial interaction. For expenditures on administration and for the tax burden, spatial interaction apparently does not need to be taken into account. Table 4 presents the results of the dynamic model extended to account for spatial interaction. The first column shows the original results of the dynamic model. Since the estimator including spatial interaction effects only accepts fully balanced panels, we also present the intermediary step of balancing the original data panel and running the dynamic model on that, in the second column. The third column presents the outcomes of the dynamic model with spatial interaction.

We see that the lagged dependent again enters with highly significant and positive coefficients. Also, there is strong evidence of spatial interaction effects for total expenditures. Both total expenditures in neighboring municipalities in the current year and lagged total spending of the neighbors affect a municipality's expenditures. In the second and the third column of Table 4, the signs and significance of the general grant and of the population coefficients persist. The coefficient for density is no longer significant, which appears to be caused by the restriction of the sample rather than by spatial interaction effects. The effect of unemployment benefits becomes highly significant when we balance the data panel, but again insignificant when we introduce spatial interactions.

The effect of amalgamation on total expenditures is similar to the effect found in the dynamic model without spatial interactions, but the coefficients are somewhat lower and less significant. Still, again we find that total spending is higher in the amalgamation year and one or two years before, and also four or more years after amalgamation. When comparing the three columns, we see that the main reason for the loss in significance is to be found in the balancing of the data panel. The effects of introducing spatial lags are limited. The findings as summarized in Table 3 appear to be robust for spatial interactions.

7. Conclusion

We have studied the effects of amalgamations on municipality budgets, first using a static panel model, then a dynamic panel model, and finally a dynamic model with spatial interaction effects. We have concluded that a dynamic model is more appropriate than a static model, as the coefficient of the lagged dependent variable is highly significant in all regressions, and as the results often differ from the results of the corresponding static model. For total spending, the dynamic model should be extended to include spatial interactions when total expenditures are studied. For spending on administration and for the tax burden, we find no spatial interactions. We have used three different control groups, except in our spatial model, where a limited control group results in insufficient geographical coverage to make such a model useful.

Our study results in several consistent findings. First, in the two years preceding amalgamation, and in the amalgamation year itself, total spending is significantly higher. This is the case with all three control groups, and with or without spatial interactions. Also, the tax burden is lower in the year before amalgamation, and probably also in the second year before amalgamation and in the amalgamation year itself. Thus, we cannot refute the hypothesis that there is a common pool effect. Perhaps municipalities increase spending and reduce taxes just before amalgamation in order to let their own inhabitants benefit at the expense of the inhabitants of the amalgamation partners. But other explanations are possible. Perhaps municipalities start early with their task of integrating the different municipal offices, harmonizing local regulations, etcetera. This might raise spending even before amalgamation. This explanation fits better with the higher spending we find in the year of amalgamation, because that can hardly be the result of a common pool effect. A lowering of the tax burden just before amalgamation could be explained by an attempt to reduce popular resentment that often surrounds amalgamations.

Additionally, we find no evidence of economies of scale following amalgamations. The long term effect is an increase of total spending by 8 – 15 percent, depending on the model and the control group. A growing population does lower per capita spending, however. Thus, economies of scale seem to exist only with organic growth, not with administrative changes in jurisdiction size. One area where we would expect economies of scale to arise is administration. Amalgamation reduces the number of councillers and mayors, and thus, presumably, of their staff. However, we see no reduction in spending here, except in the first year after amalgamation, and only with some control groups.

Based on our results, we cannot recommend amalgamating municipalities as an instrument to curb local government spending or taxation.

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Table 2: Results of regressions using the static and dynamic panel data model without spatial effects

Dependent variable	Total expenditures						Expenditures on administration						Tax burden					
Model	Static			Dynamic			Static			Dynamic			Static			Dynamic		
Column	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Lagged dependent				.60*** (20.18)	.39*** (14.32)	.36*** (13.18)				.59*** (21.65)	.57*** (18.88)	.61*** (20.95)				.92*** (78.03)	.94*** (73.97)	.91*** (52.91)
General grant		.34*** (13.63)	.18*** (2.69)		.26*** (10.41)	.19*** (3.91)		.27*** (4.30)	-.08 (0.47)		.23*** (7.54)	.01 (0.06)		.09*** (3.81)	-.002 (0.26)		-.07*** (9.88)	.01 (0.60)
Population		-.84*** (6.16)	-.92*** (7.50)		-.58*** (4.40)	-.69*** (5.58)		-.90* (1.94)	-.14** (2.41)		-.20 (0.76)	-.41 (1.58)		-.11 (0.81)	.09 (1.51)		-.05 (1.42)	-.04 (1.01)
Density		.82*** (7.66)	.37*** (3.25)		.30*** (2.92)	.33*** (2.71)		.54* (1.68)	.62 (1.61)		-.16 (0.82)	.40* (1.88)		.33*** (9.29)	-.04 (0.36)		.04 (1.28)	.004 (0.14)
Unemployment benefits		-.04*** (5.28)	-.01 (1.27)		-.06*** (11.42)	-.02 (1.56)		-.06*** (2.84)	-.02 (0.78)		-.07*** (-5.00)	-.01 (0.76)		.04*** (6.09)	.005 (0.27)		-.01** (2.40)	-.002 (0.78)
Ideology (left)		.04** (2.08)	-.03 (1.42)		.02 (0.98)	-.02 (0.95)		-.04 (0.74)	-.09 (1.47)		-.06 (-1.00)	-.05 (0.80)		.01 (0.59)	.003 (0.24)		.005 (0.63)	-.001 (0.11)
A_{-2}	.10** (2.31)	.08** (1.98)	.05 (1.31)	.10*** (3.21)	.09*** (3.45)	.08*** (2.90)	.12*** (2.69)	.11*** (2.68)	.09** (2.27)	.05 (0.85)	.03 (0.58)	.03 (0.58)	.08*** (5.25)	.04** (2.49)	-.02 (1.26)	-.01 (0.60)	-.004 (0.51)	-.01 (1.23)
A_{-1}	.14*** (2.97)	.10** (2.26)	.08* (1.97)	.11*** (3.51)	.10*** (3.84)	.10*** (3.73)	.12** (2.16)	.09* (1.81)	.09* (1.87)	.04 (0.66)	.03 (0.46)	.04 (0.73)	.07*** (5.37)	.03* (1.77)	-.03** (2.07)	-.02*** (2.66)	-.01** (2.39)	-.02*** (3.59)
A_{0}	.13*** (2.67)	.08 (1.58)	.06 (1.31)	.09*** (2.63)	.07** (2.51)	.07** (2.42)	-.09 (0.77)	-.12 (1.02)	-.11 (0.94)	-.17 (1.47)	-.19* (1.69)	-.16 (1.59)	.08*** (6.15)	.004 (0.26)	-.02* (1.69)	-.02*** (2.81)	-.01 (1.54)	-.01* (1.83)
A_{1}	.09*** (2.62)	.04 (1.32)	.02 (0.74)	.03 (0.59)	.03 (0.63)	.02 (0.53)	-.17** (-2.00)	-.20** (2.29)	-.20** (2.26)	-.21** (1.98)	-.22** (2.12)	-.19** (1.99)	.11*** (7.60)	.01 (0.84)	-.03 (1.52)	-.01 (0.93)	-.001 (0.17)	-.002 (0.43)
A_{2}	.14*** (4.46)	.08*** (2.69)	.05 (1.61)	.12** (2.43)	.10** (2.22)	.07* (1.70)	-.11 (1.53)	-.15* (1.90)	-.15* (1.93)	-.04 (0.52)	-.07 (0.82)	-.04 (0.51)	.13*** (8.00)	.03* (1.71)	-.02 (1.33)	-.002 (0.25)	.003 (0.29)	-.01 (0.81)
A_{3}	.18*** (5.38)	.09*** (2.96)	.07** (2.16)	.13*** (2.71)	.10** (2.36)	.09** (2.12)	-.09 (1.19)	-.15* (1.86)	-.14* (1.84)	-.08 (0.76)	-.11 (1.09)	-.08 (0.84)	.16*** (9.23)	.05** (2.59)	-.02 (1.12)	.01 (0.78)	.01 (1.04)	.003 (0.24)
A_{4+}	.27*** (7.78)	.15*** (4.61)	.10*** (3.31)	.16*** (3.35)	.14*** (3.13)	.11*** (2.62)	-.06 (0.69)	-.13 (1.48)	-.16* (1.76)	-.07 (0.73)	-.10 (1.14)	-.07 (0.90)	.21*** (11.12)	.06*** (2.62)	-.19*** (12.78)	-.01*** (2.64)	-.01 (1.25)	-.01 (0.93)
Year effects	×	×	✓	×	×	✓	×	×	✓	×	×	✓	×	×	✓	×	×	✓
N	3234	3234	3234	2781	2781	2781	3230	3230	3230	2776	2776	2776	4332	3971	3971	3971	3971	3971
R^2 (within)	0.06	0.28	0.37	0.21	0.36	0.40	0.02	0.05	0.08	0.25	0.27	0.30	0.07	0.27	0.60	0.79	0.80	0.82

Absolute t-values (static model) and z-values (dynamic model) between parentheses. Municipality fixed effects included. * denotes significance at the 10 percent confidence level, ** significance at the 5 percent confidence level, and *** significance at the 1 percent confidence level.

Table 3: Results of regressions using the dynamic panel data model without spatial effects for different control groups

Dependent variable	Total expenditures			Expenditures on administration			Tax burden		
Control group	All municipalities (Table 2, col. 6)	20.000 < population < 100.000	Only amalgamated municipalites	All municipalities (Table 2, col. 12)	20.000 < population < 100.000	Only amalgamated municipalites	All municipalities (Table 2, col. 18)	20.000 < population < 100.000	Only amalgamated municipalites
Lagged dependent	.36*** (13.18)	.21*** (5.05)	-.16*** (3.28)	.61*** (20.95)	.49*** (13.01)	.35*** (5.62)	.91*** (52.91)	.92*** (39.35)	.99*** (7.67)
General grant	.19*** (3.91)	.17** (1.98)	-.33 (1.62)	.01 (0.06)	.03 (0.16)	-.05 (0.09)	.01 (0.60)	.02 (0.75)	.003 (0.06)
Population	-.69*** (5.58)	-.56*** (3.23)	-.10** (2.25)	-.41 (1.58)	-.50 (0.97)	-.09 (0.91)	-.04 (1.01)	-.07 (1.50)	-.09 (0.82)
Density	.33*** (2.71)	.36 (1.54)	.04 (0.08)	.40* (1.88)	.36 (0.73)	-.48 (0.42)	.004 (0.14)	.12*** (2.63)	.15 (1.56)
Unemployment benefits	-.02 (1.56)	-.02 (1.13)	.02 (0.38)	-.01 (0.76)	-.01 (0.15)	.02 (0.22)	-.002 (0.78)	-.002 (0.40)	.01 (1.10)
Ideology (left)	-.02 (0.95)	-.01 (0.37)	-.02 (0.23)	-.05 (0.80)	-.05 (1.06)	-.18 (1.41)	-.001 (0.11)	-.003 (0.37)	-.03* (1.70)
A_{-2}	.08*** (2.90)	.09*** (3.36)	.10*** (4.45)	.03 (0.58)	.05 (0.76)	.06 (0.74)	-.01 (1.23)	-.01 (1.32)	-.01** (2.28)
A_{-1}	.10*** (3.73)	.11*** (4.57)	.12*** (3.69)	.04 (0.73)	.06 (1.14)	.09 (1.61)	-.02*** (3.59)	-.02*** (2.92)	-.03*** (3.42)
A_{0}	.07** (2.42)	.08** (2.29)	.12** (2.26)	-.16 (1.59)	-.14 (1.46)	-.11 (1.07)	-.01* (1.83)	-.01* (1.80)	-.02* (1.92)
A_{1}	.02 (0.53)	.04 (1.02)	.08* (1.69)	-.19** (1.99)	-.18** (2.24)	-.15 (1.14)	-.002 (0.43)	-.01 (0.78)	-.01 (0.89)
A_{2}	.07* (1.70)	.08** (2.12)	.09 (1.61)	-.04 (0.51)	-.05 (0.54)	-.09 (0.89)	-.01 (0.81)	-.01 (1.25)	-.02 (1.35)
A_{3}	.09** (2.12)	.10*** (3.43)	.13** (1.99)	-.08 (0.84)	-.07 (0.87)	-.06 (0.54)	.003 (0.24)	.001 (0.13)	-.01 (0.64)
A_{4+}	.11*** (2.62)	.13*** (4.04)	.14** (2.01)	-.07 (0.90)	-.06 (0.78)	-.08 (0.55)	-.01 (0.93)	-.01 (1.23)	-.02 (1.18)
Year effects	✓	✓	✓	✓	✓	✓	✓	✓	✓
N	2781	1405	446	2776	1400	442	3971	2156	682
R^2 (within)	0.40	0.34	0.38	0.30	0.25	0.22	0.82	0.84	0.86

Absolute z-values between parentheses. Municipality fixed effects and year dummies included. * denotes significance at the 10 percent confidence level, ** significance at the 5 percent confidence level, and *** significance at the 1 percent confidence level.

Table 4: Results of regressions using the dynamic panel data model with spatial lag; total expenditures

Sample	Total sample	Only municipalities for which complete data are available	Only municipalities for which complete data are available
Lagged dependent	.36*** (13.18)	.42*** (19.03)	.39*** (17.22)
Spatial lag			.08*** (3.01)
Spatial lag on lagged dependent			.15*** (4.37)
General grant	.19*** (3.91)	.28*** (12.91)	.19*** (3.31)
Population	-.69*** (5.58)	-.37*** (2.81)	-.41*** (3.88)
Density	.33*** (2.71)	-.003 (0.76)	-.003 (0.89)
Unemployment benefits	-.02 (1.56)	-.06*** (5.26)	-.01 (1.32)
Ideology (left)	-.02 (0.95)	.02 (1.38)	-.01 (0.66)
A_{-2}	.08*** (2.90)	.09** (2.38)	.06* (1.71)
A_{-1}	.10*** (3.73)	.08** (2.02)	.08** (2.55)
A_{0}	.07** (2.42)	.07* (1.75)	.07** (2.07)
A_{1}	.02 (0.53)	-.01 (0.15)	-.02 (0.63)
A_{2}	.07* (1.70)	.06 (1.30)	.04 (0.87)
A_{3}	.09** (2.12)	.09 (1.57)	.07 (1.60)
A_{4+}	.11*** (2.62)	.10** (2.39)	.08** (2.24)
Year effects	✓	✓	✓
N	2781	2097	2097
R^2 (within)	0.40	0.28	

Absolute z-values between parentheses. Municipality fixed effects included. * denotes significance at the 10 percent confidence level, ** significance at the 5 percent confidence level, and *** significance at the 1 percent confidence level.