OVERCOMING DATA COMPARISON PROBLEMS AFTER ADMINISTRATIVE TERRITORIAL REFORM: CASE OF LATVIA

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Abstract

As the boarders of territories change, administrative territorial reform can cause problems in data comparison over longer time period. The goal of this paper is to offer methodology how to compare data about territories before and after administrative territorial reform. This paper includes both reviews of previous attempts of data comparisons as well as it proposes a couple of principles that could make such a comparison more reliable and easy to use.

The proposed methodology tests on the data of Latvia (for the period from 2001 to 2011) because in 2009 Latvia experienced administrative territorial reform and the structure of municipalities changed significantly. Before there were more than 500 municipalities (called pagasts), later – 119 county municipalities (novads).

To test the accuracy of this method of comparison, it is applied to enable budget expenditure comparison by using panel data fixed effects models. These models evaluate which factors (such as budget revenue, municipality and parliament elections etc.) influence municipality budget expenditures in different years. Calculations are made for full period as well as those periods before and after the reform in such a way analyzing variable influence changes and evaluating their strength and stability. Results prove that two main principles that describes previous data summarizing and proxy variable combinations are applicable and allow extending the period of data analysis.

The main novelty of this research is elaborated simple, easy to use system for territory comparison specific in Latvia before and after administrative territorial reform, but it could be applied also to other countries with similar data problems.

Keywords: Administrative Territorial Reform, Local budgets, Fixed Effects models, Panel Data

Introduction

When a country experiences administrative territorial reform, economic analysis is challenged by changing borders of municipalities leading to break in the data series. If the analysis is done at regional level, it usually covers only period before or after such a reform. There is a need to develop methodology how to capture development trends over a longer period of time and how to overcome data comparison problems.

This paper will focus on the example of Latvia, where in 2009 administrative territorial reform was finished and as a result new regional split was created. Most statistics about municipalities after the reform currently are available for three years (2009-2011), some for four years (till 2012), but that is too little for long term analysis. Furthermore, if one wants to compare the situation before and after the reform, that is inconvenient as the territorial units have changed.

The aim of this research is to offer methods for comparing data about local municipalities before the reform and the county municipalities after the administrative territorial reform in Latvia.

Firstly, based on literature review and specific conditions of Latvian data, principles of data modification are chosen and applied to local municipality data before and after the reform. After that, modified database is used in panel data fixed effect model analysis of local municipality budgets to apply these transformed data and test the stability and goodness of offered data comparison methodology.

The main novelty is elaborated simple system for territory data comparison in Latvia before and after administrative territorial reform which could probably be applied also to other countries.

Research results and discussion

To apprehend the topicality of this question, situation with local municipality data in Latvia will be described, explaining the need for the long term comparison possibilities. Literature analysis is used to note previous studies and to choose the most appropriate principles that could be applied also in the case of Latvia.

Problem description

According to the Law on Municipalities municipality in Latvia is defined as local administration, which through the citizen elected representation and its established institutions and establishments provides execution of the functions granted to them and those undertaken voluntary. In this paper by the name "municipality" it will be referred to local municipalities (called *pagasts*) before administrative territorial reform and later – after the

reform to county municipalities (called *novads*) as well as republic cities, i.e. all will be called in the same name as municipalities. Competencies of municipalities and principles for making their budgets are described in the Law on Administrative Territories and Populated Areas and in Law on Budget and Financial Management, and in particularly in the Law on Budgets of Municipalities.

Before the territorial reform in Latvia competences of counties, district cities and municipalities didn't differ and all of them were called local municipalities. Districts (*rajons*) had regional municipality status, but republic cities in the same time had both competences.

Before the administrative territorial reform territorial division in Latvia was fragmented and it had quite many local municipality types. That was one of the reasons for the administrative territorial reform in Latvia. More about the situation in Latvia is discussed in Vanags & Vilka (2005), Vanags et al. (2005) and Pukis (2010). Also taking into account that the number of local municipalities was quite large (more than 500), local governance was quite expensive. Pukis (2009) notes that the objectives of the reform in Latvia were to create local and regional governments capable of development, as this idea was supported by the belief in scale economy; another thought that was mentioned was comparison to other EU countries, but the author notes that these benefits can be doubted.

Administrative territorial reform in Latvia was a long term project that finished in 2009 as the fully changed municipality structure was formed in July 2009 and newly elected local governments started their work. Minor reforms with some local municipality separation and merging continued, but the base was formed with 118 (later 119) municipalities (including 9 republic cities).

This reform limits the possibility for long term local municipality data analysis as the structure of municipalities changed. Most data before the reform is available at local municipality (*pagasts*) levels, but after – in county level (*novads*).

Small local municipalities allowed their governance to be close to voters and better understand their preferences. Though there might be positive aspects of small municipalities, that meant also that for them it was harder to find finance for fulfilling their functions.

Budgets are the best indicator of the decisions made by politicians. As in the local municipality level information is available both about revenue and expenditure and expenditure positions that gives opportunities to make in depth analysis looking both at overall tendencies, as well as testing results for particular budget positions, for example, social expenditure.

This analysis uses data on municipality basic budgets published by the Treasury in Latvia

and in the reports of State Regional Development Agency of Latvia. Data are available for the period 2001-2011. As the number of observations (local municipalities) is larger than the time period, the short data panel is formed.

During the analysed time frame there have been three local elections (in years 2001, 2005 and 2009) and four Saeima (parliament) elections (in 2002, 2006, 2010 and 2011). Local elections in Latvia usually take place in spring, but Saeima elections in autumn, though there might be exceptions. As the 11th Saeima elections in 2011 was held on the ground of the results of the National Referendum on dissolution of previous parliament and was not from the usual Saeima election cycle, it will be tested separately. In the models there will be included proxy indicating the years of local elections and Saeima elections.

Data about the results of local elections and Saeima elections are from the Central Election Commission of Latvia, information about the structure of government is from The Cabinet of Ministers of the Republic of Latvia information about the history of government structure. As there is no information exactly which parties formed coalitions in each local government in each period, it is assumed that the leading party in local municipality is the same that received the most seats during the local elections. In local elections often winning party is some small regional or local party that does not participate in Saeima elections. After the administrative reform situation changes a bit and more of the parties that win in local elections are also those that are represented in parliament.

There are made separate proxy variable also indicating if the leading party in local government also has positions in central government assuming that this could increase their ability to influence decision making, therefore this influence will be tested. As the share of municipalities with leading parties also in Saeima or government is low, the influence of a particular party statistically cannot be tested.

After the reform several local municipalities are combined in a single county municipality. Not to lose information about the party connections with Saeima and government, in case if the leading party of any of the previous local municipalities is represented in Saeima or government, this combined observation will indicate the connection.

After combination of data on average 41.0% of combined municipalities has at least a partial connection to Saeima parties and 33.8% - some connection to government parties. The share of both of these indicators is increasing with time, for example, in 2001 only 9.2% of combined municipalities had connections in the Saeima, but after the 2011 elections, the share was already 59.7%.

To exclude the influence of inflation, all budget data are deflated (according to the

Consumer Price Index provided by the Central Statistical Bureau) so they are in the same year prices, also logarithms for revenue and expenditure data are used.

Experience in other countries and offered solutions

The structure of new administrative territories is described in the Law on Administrative Territories and Populated Areas. It shows which previous local municipalities form new county municipalities.

There have been researches looking for best principles in data modification in case of the changes and in case some data are missing or are assumed to be faulty. Blum (2006) suggests several rules to select the best value:

1) the majority rule – the selection of the value that most files carry independently;

2) the qualitative file rule – testing file and choosing the variable value from the file that is the most reliable;

3) the corroborated variable rule – selection of values of variables that on empirical tests are confirmed to be true.

Blum (2006) argues that administrative files support data editing and imputation processes. Author notes that detecting possible errors in data file requires the implementation of logical rules within or between data sets. Administrative information can be used to edit data so after this process files are comparable (Barcaroli & D'Aurizio, 1997; Di Zio et al, 2002).

There are elaborated three main mechanisms in administrative record editing and imputation (Blum, 2006):

1) Enrichment of the relevant information (Roos and Roos, 2001),

2) Expansion of the ability to create a relatively accurate reference file,

3) Continuous quality assurance performed throughout the statistical production process.

It is noted that all these editing and imputation processes should be done carefully (Holt and Jones, 1998) and data can be linked with information from other sources if available and if they share common characters and involve the same units (Poulsen 1997). Taking into account these guidelines for data editing, few basic rules are offered for Latvian local municipality data modification, so that they would be comparable to the longer period of time.

First principle: previous data summarizing

According to the manual for creating county municipalities (RAPLM, 2009), budgets of the new municipalities is made by summing up the budgets of previous local municipalities. Based on the structure how local municipalities were combined in new territorial units

(available in the Law on Administrative Territories and Populated Areas), local municipality data for the period before the administrative territorial reform is combined. According to this rule author of this paper offers to sum up also previous' years budgets therefore receiving long term data series that could be used for further analysis.

For example, Jaunpils county (*Jaunpils novads*) was formed from Jaunpils local municipality (*Jaunpils pagasts*) and Viesatu local municipality (*Viesatu pagasts*). From years starting from 2009 there is information about budgets at the level of county municipality. For the years till the administrative territorial reform budgets of Jaunpils and Viesatu local municipalities are combined and analyzed together. This data combination extends the time period available for analysis for 11 years (not just 3 years of data that are after the reform). Similar modifications are made for budget revenue and expenditures also for other municipalities.

Second principle: proxy variable combination

There are some variables that cannot be simply summarized as offered in the first point. First of all, those are not numeric variables. In the case of the example mentioned in this paper, these variables are proxies indicating if the leading party of local municipality is one of those representatives also in Saeima or in government.

There could be several choices how to combine multiple local municipality information in one proxy variable. In this case it is chosen to indicate connection to the parties in Saeima or in government if this connection was at least in one of the local municipalities that formed county municipality. That could make connection variables less pronounced but at least no information would be lost. As for small municipalities before administrative territorial reform only small share had connections to Saeima or government, alternative principle of showing the connections if all local municipalities that form county municipality have these connections, is not reasonable at least for the case of Latvia.

Method application in municipality budget analysis

As after modification data already covers 11 periods, that gives a longer time for analyzing changes in local municipalities' budgets in Latvia. To show the usefulness of this methodology of combining local municipality data into new county level data, panel data fixed effect model describing changes in social expenditures is created. In this article focus is on panel data models described by Greene (2008) and Wooldridge (2010). Methodology of political business cycle theory application in the case of Latvia was previously described in Brauksa (2012).

Data about local municipality budgets comes from reports of Treasury of Latvia. Data are deflated based on consumer price indexes provided by the Central Statistical Bureau of Latvia, so to exclude the effect of inflation. For budget revenue and expenditure logarithms are taken. Results of the calculations are shown in Table 1.

Table 1 Panel data fixed effect model results, impact on budget expenditure.

Description	Variable	Model 1 coefficients	odel 2 coefficients
Budget revenue	ln(revenue)	0.511***	0.511***
Dummy variables for years compared to expenditures in year 2001	year 2002	0.006	0.010
	year 2003	0.002	0.006
	year 2004	0.142***	0.145***
	year 2005	0.155***	0.157***
	year 2006	0.208**	0.211**
	year 2007	0.113	0.116
	year 2008	0.043	0.046
	year 2009	0.525***	0.532***
	year 2010	0.818***	0.822***
	year 2011	0.843***	0.855***
Local municipality effects (coefficient for each municipality)		(included)	(included)
Party represented in parliament		(not included)	-0.044
Party represented in government		(not included)	0.035
Constant	const	4.106**	4.103**
Number of observations		1307	1307
R square		0.81	0.80

Source: *author's calculations based on data on local municipality budgets and elections. Model coefficients statistically significant with (*) 90%, (**) 95% and (***) 99% probability.*

Both models include also constant and fixed effect coefficients for each municipality (they are not shown in the table as there are more than 100 municipalities). Model 2 includes also variables showing if the leading party in the municipality is represented in parliament or in government, though these coefficients are not statistically significant. There are also times fixed coefficients for each year (compared to the year 2001 which is taken as a base). As the coefficient for the year dummy is larger, the larger are social expenditure in a particular year. The results confirm political business cycles in Latvia as before local municipality elections (which in Latvia took place in the years 2001, 2005 and 2009) and parliament elections (in years 2002, 2006, 2010, 2011) social expenditures increase relatively more than in other years. These results are in line with previous findings of similar models (like in Brauksa, 2012) which were calculated based on unmodified data for the period before the administrative territorial reform. Therefore we can conclude that summing up local municipalities' budgets in order to create equivalent of those municipalities that were created after the reform is possible and gives opportunities for longer term analysis.

Conclusion

The two main principles offered for Latvian municipality data comparison before and after administrative territorial reform are (1) previous data summarizing and (2) proxy variable combination. Previous data summarizing are made for budget revenue and expenditure data as similar principle was used in changing region and budget structure. As there are also some variables that cannot be summed (like for example, if the variables are not numeric, but logical), principle of proxy variable combination is offered. Avoiding majority rule which could cause the loss of valuable information, this research offers proxy variable creation if even one of the previous territorial units have particular characteristics.

Results are tested by applying panel data fixed effect models that estimate changes in social expenditures in municipalities depending on budget revenues, year of the expenditure and local municipality effects. Also the effects of local municipalities leading party representation in the parliament and in the government are tested. Results are in line with previous findings of similar models that were made on raw, unmodified data for shorter time periods (before the reform). That allows concluding that offered data modifications allow increasing analysis period and do not cause result distraction. Similar principles as are offered in this paper could be applied also in other countries when analyzing data before and after regional reforms.

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