

LONG-TERM SPATIAL POPULATION DATA ANALYSIS IN LATVIA: CHALLENGES POSED BY THE ADMINISTRATIVE-TERRITORIAL REFORMS

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Extended abstract

Introduction

There is a growing interest in research on/about the spatial aspects of demographic trends. When dealing with spatial population data on the long and mid-term timescales, scholars often face challenges associated with data comparability due to shifts in administrative-territorial division. Aim of this study is to provide methodological base for the recalculation and analysis of spatial population data in the framework of changing administrative-territorial division of Latvia. Population census results (1959, 1970, 1979, 1989 and 2000) were recalculated according to the new administrative division. Author discusses applications of recalculated territorial data for the exploratory analysis of population trends.

Several significant administrative rearrangements were conducted in Latvia since the first post-war population census. During the period of 1959 - 1970, 649 Level 2 Local administrative units (LAU2), known as rural councils and cities, were gradually reorganised into 539 parishes, towns, town countryside territories and cities. Those numbers were further reduced to 465 LAU2 by 1989 (Skinkis 1999). After Latvia has regained independence in 1991, model and functions of administrative units have changed (Ramute 2008). They demanded further changes in territorial division and regional policy. Administrative-territorial reform, which was envisaged in 1998 and gradually carried in following years, resulted in the completely new single-level system of the local administrative units by 2009, with only 119 LAUs: 110 municipalities (“*Novadi*” - in Latvian, plural) and 9 republican cities under state jurisdiction (Fig.1).



Figure 1. Administrative division of Latvia before and after the administrative-territorial reform of 1999-2009

Source: Law "Administratīvi teritoriālās reformas likums" of 21.10.1998. Available at: <http://www.likumi.lv/doc.php?id=51528>

Such changes in administrative division creates difficulties to conduct exploratory analysis of the long-term spatial demographic changes, and therefore, underline necessity to perform recalculation of the population figures in accordance with single (preferably – contemporary) frame of reference.

Background and methodology

There are several population territorial data recalculation methods and technical solutions, ranging from the development of geographic information systems (GIS), where population data are first geo-referenced to the points on digitised historical maps and then digitally overlaid layer by layer, while estimating population figures according to territory, number of settlements or specific algorithms (MPIDR 2011), down to the statistical estimations and retrospective projections for regions with missing historical data.

Due to shortage of cartographic information and the scale of territorial rearrangements in Latvia, a combined method has been developed and applied, which uses population census data along with the available archive information in form of documents and maps (if available), in order to trace the boundary and name changes of the territorial units and perform the necessary recalculations. The population census of 2011, carried out after the completion of the administrative-territorial reform, was set as a base for the entire recalculation process. Taking into account the consolidating (merging) nature of administrative

rearrangements in the territorial structure during the entire 1959-2011 period, a backward approach has been used for assembling the population data and tracing name and boundary changes.

In 2000-2011 period, due to the effects of the administrative-territorial reform in Latvia, population data of all territories were recalculated. It was convenient to trace boundary and name changes by using information contained in the annexes to the national Law "On the administrative-territorial reform" (1998). Analogically, the aforementioned list of 558 administrative units from the year 2000 was compared and linked with the data set containing 590 units from the year 1989. The archive data (mostly Decisions of the Supreme Council of Latvian SSR on the territorial rearrangements) and literature sources (e.g. Berze 1997) have been used to determine the name and boundary changes of the units in this period, as well as to find the location and association of the unidentified LAUs. Similar method was used for all the previous periods, digitising the population data from paper sources using Optical Character Recognition (OCR) software and translating local names from Russian to Latvian when necessary. In cases, where LAUs were split over time, the population count in its parts was estimated using the available information on population numbers in its towns and rural areas.

It is important to note, that Central Statistics Bureau of Latvia has recently conducted a similar recalculation for the annual population data in municipalities for the period 1990-2013 using population census results and own estimations (CSB 2013).

Results and discussion

As a result of the process described above, population data for each population census has been traced through time and summed up to fit the new 2011 nomenclature in the form of a single table. The total/subtotal population figures in the country and in its larger regions (e.g. districts) have been used as check-sums for each census year during the recalculation process, in order to ensure that there are no missing and/or overlapping data.

Such recalculation offers new possibilities for analysis and exploration of the historic spatial population trends and may be useful in development and calculation of the socio-economic indicators, as well as long-term regional development forecasting, modelling and policy planning. In Latvia, a thorough quantitative evaluation of the historical population developments on the municipal level may provide recently established local governments with much better understanding of the historical trends of their own population and, as a result, allow them to better adjust and apply national regional support and development initiatives like the current "Regional Policy Development Guidelines until 2020", which specifically underline the role of municipal governments in addressing the mid and long-term regional demographic problems (MEPRD 2012). Lack of reliable and comparable historic regional population data also poses challenges for the development of the national regional development reports and evaluation studies, which often rely on estimated data and cannot provide reliable and comparable population development trends for the periods predating recent territorial reform (SRDA 2012).

By applying statistical methods to data of various available territorial levels (ranging from NUTS3 to LAU2), it becomes possible to identify specific historical socio-economic changes and regional policy instruments related to regional demographic changes. After making population census data comparable by adjusting them to the contemporary territorial boundaries, a population growth rates for each observed territorial unit are calculated for every time interval between the populations censuses.

This makes it possible to analyse the spatial population dynamics in both temporal and spatial cross-sections. Then, by calculation of the country mean population growth rates for the census intervals and applying the statistical confidence interval to the individual territorial data, it becomes possible to identify unusual demographic shifts in population of the specific territories or regions (Table 1). Although, an additional GIS mapping and exploratory cluster analysis of the results is highly recommended for a detailed research (Anselin 1999), such approach is sufficient for the demonstration of general principle of the analysis.

Several patterns are observed in the spatial population dynamics during the entire period under study.

Table 1

Changes in population numbers in selected municipalities in Latvia between population censuses, 1959-2011

Municipality	1959-1970	1970-1979	1979-1989	1989-2000	2000-2011
<i>Aglonas novads</i>	-0,215*	-0,120*	-0,152*	-0,163*	-0,283*
<i>Aizkraukles novads</i>	3,673*	0,344*	0,390*	-0,076	-0,138
<i>Aknīstes novads</i>	-0,074*	-0,111*	-0,135*	0,039*	-0,217*
<i>Alojas novads</i>	0,014*	-0,031	-0,067*	-0,029*	-0,257*
<i>Alsungas novads</i>	0,219	-0,170*	-0,037*	-0,052	-0,292*
<i>Amatas novads</i>	-0,133*	-0,125*	-0,070*	0,026*	-0,186*
<i>Ādažu novads</i>	0,109	0,659*	0,331*	-0,187*	0,449*
<i>Babītes novads</i>	0,232	0,074*	0,218*	-0,025*	0,421*
<i>Baldones novads</i>	0,098	0,078*	0,100*	-0,058	0,115*
<i>Baltinavas novads</i>	-0,247*	-0,227*	-0,270*	-0,103*	-0,303*
...
Country mean:	0,151	0,001	0,035	-0,067	-0,117

Note: *factual data falls outside 95% confidence interval ($\alpha = 0,05$), assuming normal distribution, and requires additional investigation

Source: author's calculations based on historical census data provided by the Central Statistics Bureau of Latvia.

First, a steady population increase in territories adjacent to the capital city - Riga (*Ādažu novads*, *Babītes novads*, *Baldones novads* etc.) with only minor comparative setbacks in the 1989-2000 period are identified. The growth trend can be explained by several factors including, but not limited to the general urbanisation tendency, rapid development of infrastructure and housing, as well as the goal-oriented and city-centric industrial development characteristic to the Soviet economic governance and the resulting inflow of migrant labour from other Soviet republics. It is interesting to note, how closely this general tendency correlates with the findings of studies on territorial differences in age-specific mortality and life expectancy in Latvia during the same period (Krumins 2001).

Secondly, there is a continuous depopulation tendency in many rural areas (e.g. *Aknīstes novads*, *Amatas novads*, *Baltinavas novads* etc.) remote from republican cities and/or regional development centres (defined as certain areas with higher concentration of various resources (SRDA 2012 p.72)), with comparative improvements in the 1989-2000 period. While the long-term depopulation tendency may be explained by the same or similar reasons as the observation discussed above, the unusual rural population increase during 1989-2000 requires additional attention, as it was most likely linked with a whole set of the demographic, social and political processes present after the restoration of independence (Eglite 2010) and require closer evaluation, especially - in light of the growing rural depopulation rate after 2000.

Thirdly, a comparative positive population dynamics effects of the large-scale development projects undertaken during the Soviet occupation era (e.g. construction of the hydroelectric plant in *Aizkraukle*, [ex. *Stučka*] – *Aizkraukles novads*) can be traced even up until 2000-2011 period. This fact presents an interesting material for further discussions in light of the recent studies on the general demographic consequences of the Soviet occupation of Latvia and its regions (e.g. - Zvidrins 2008). This observation also provides a good argument point for the assumption on the persistent spatial inflexibility of labour (Van Ham et al 2001) on the regional level in Latvia.

Lastly, in most territories, it is possible to observe that the general long-term tendencies of the population dynamics are following the same development trends over the whole period under investigation, despite the economic, social and political changes. This observation seems to at least partly support the assumption on the constant nature of the regional demographic development trends in the former Soviet countries in the long time periods (Golc 2004).

Conclusions

It is both technically possible and practically useful to perform a recalculation of the historic population data in accordance with the single frame of reference, even in the countries with noticeable rearrangements in their administrative division. Further exploratory analysis of such standardised data reveals previously unseen patterns and allows discovering various time and place-specific disparities and/or anomalies in population trends. Closer study of these patterns and anomalies in light of the

available socio-economic and demographic theories, as well as historical information leads to better understanding of the long and mid-term processes within the regional demographic development and potentially – to the improvement of current and future policy instruments.

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