

Background and Objective

BACKGROUND: Eastern part of Latvia - Latgale was isolated from the rest of territory inhabited by consolidated Latvian nation almost three centuries. During the development of the Hanseatic League Latgale started to lag behind neighboring region Vidzeme with capital city Riga and Kurzeme (Courland) in the West. Inherited socio-economic differences continued during the time of independence (1918-1940) and during the Soviet period. On the eve of integration of three Baltic countries into the EU (2004), regional GDP per capita (PPS) constituted in Latgale less than 12 per cent of the EU average, which was the lowest indicator among 20 regions of the three Baltic countries.

OBJECTIVE: To study regional inequalities of mortality between the East and West crossing territory of Latvia.

Data and Methods

Regional vital statistics tabulations. Data from the Health surveys. Calculations of SMR, life expectancies and healthy life years. Exploratory spatial analysis of the socio-demographic data on the municipal level, time-series analysis of historical population trends in the local municipalities, geographically-weighted regression models.

Table 1. Life expectancy (LE) at birth for both sexes by regions in Latvia (years)

Years	Latvia total	Riga (city) region	Pieriga region	Vidzeme region NORTH	Kurzeme region WEST	Zemgale region SOUTH	Latgale region EAST
1935	58.9	61.1	-	60.7	60.0	59.5	56.2
1978-1979	69.1	69.8	68.5	69.3	69.3	68.8	68.0
1988-1989	70.8	71.7	70.6	70.5	70.8	70.4	69.9
1998-2001	70.0	70.7	70.5	70.2	70.1	69.9	68.1

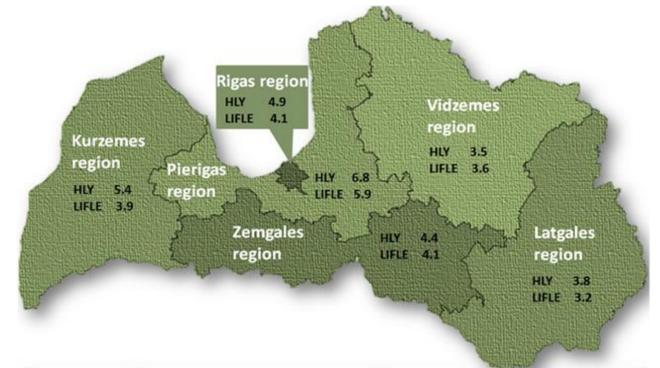
Findings

East-West divide in LE since 1930-s till the end of 20th century has diminished (Table 1). Recent data proof that divide has not disappeared (Fig.1). 65 years aged women in Latgale can expect to live 1.4 years less than women in Riga (LE is 0.9 years below country total). HLY and LEFLE indicators are significantly below country total as well (Fig.2). SMR demonstrate spatial autocorrelation. In order to factor the spatial spillovers between the municipalities into the econometric analysis, one needs to quantify the spatial relations by using some form of the spatial weights matrix (W). To measure the SMR spatial autocorrelation and account for the spatial context factors in the model-based analysis, authors employ square spatial connectivity weights matrix (Dahs, 2016). The role of municipality's spatial location and the overall spatial autocorrelation of SMR in Latgale region and the rest of Latvia is measured using a local Moran's test (Fig.3). The Spatially Lagged Model is appropriate when there is a reason to believe that the values of y in one unit i are directly influenced by the values of y found in i 's "neighbours" and that this influence is above and beyond other covariates specific to i . Basic representation of such model is:

$$y_i = \beta x_i + p \sum_{i=1}^n w_i y + \varepsilon_i$$

where y_i on the left-hand side of the equation denotes the indicator under study, β is a classical regression parameter, x_i stands for the factor, whose effects are being assessed, p is the model parameter associated with the spatial lag, w_i denotes the connectivity vector (i.e., row i from square spatial weights matrix showing spatial relations between the observation i and other territorial units) and y on the right-hand side represents the values of the indicator under study in all other territories except for i . ε_i stands for the classical error term. (Voss et al, 2006).

By studying the model-based assessment results (Table 2) it is possible to make conclusions concerning SMR reactions to the external socio-economic and policy factors in Latgale region and the rest of the country.



	Latvia	Riga region	Pieriga region	Vidzeme region	Kurzeme region	Zemgale region	Latgale region
LE 65+ women	18.7	19.2	18.9	18.7	18.3	17.8	17.8
LE 65+ men	13.4	14.2	14.1	13.0	12.9	12.7	12.2

Figure 2. LE for women and men, Healthy life years without activity limitation (HLY) and healthy life years without chronic morbidity (LIFLE - long-lasting illness free life expectancy) for both sexes at age 65 in regions of Latvia (health data from SILC 2011), 2011

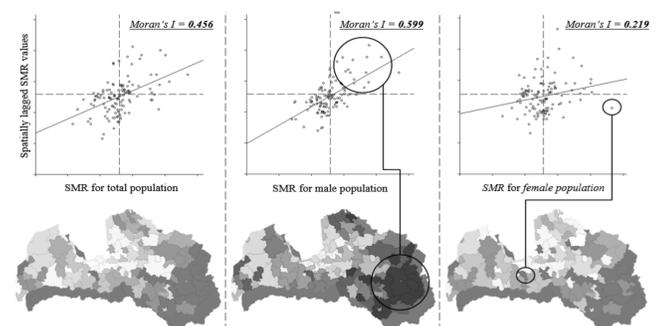


Figure 3. Moran's scatter plots of the SMR values in Latvian municipalities in 2008-2013. Source: Authors' calculations, CSB data.

Table 2. SLM estimation results: Effects of regional socio-economic and policy factors on SMR in the municipalities of Latvia, 2009-2013 (Standard error values - in brackets)

Parameter	Standardised mortality rate (%)					
	Latgale region			Rest of Latvia		
	Total population	Male population	Female population	Total population	Male population	Female population
Collected income tax per capita	-0.04665 *** (0.01667)	-0.04491 * (0.02166)	-0.04811 ** (0.01872)	-0.00659 *** (0.00163)	-0.00816 *** (0.00189)	-0.00436 * (0.00199)
Government support to municipality via Financial Equalisation Fund (% of municipal budget)	-0.19352 * (0.10809)	-0.16991 (0.14077)	-0.22415 * (0.12116)	-0.00378 (0.03675)	0.02111 (0.04227)	-0.03546 (0.04606)
Municipal social support policy spending per capita	-0.00157 (0.02192)	0.00046 (0.02877)	-0.00213 (0.02427)	-0.00692 (0.00966)	0.00613 (0.01110)	-0.01495 (0.01212)
Number of persons living in low income households per 1000 inhabitants	-0.04129 (0.09150)	-0.05747 (0.11963)	-0.03734 (0.10275)	0.07560 * (0.04254)	0.05520 (0.04887)	0.09459 * (0.05338)
Local unemployment rate	0.16548 * (0.16548)	0.29198 ** (0.11548)	0.07131 (0.09599)	-0.03920 (0.07694)	-0.07546 (0.08840)	0.00345 (0.09643)
Number of firms and active economic units per 1000 inhabitants	-0.03458 * (0.01419)	-0.02740 (0.01831)	-0.03722 * (0.01586)	-0.00289 (0.00742)	-0.01015 (0.00857)	-0.00010 (0.00928)
p (spatially lagged SMR)	-0.19495	-0.04605	-0.12460	0.06734	0.21290	0.00625
R^2	0.61000	0.61629	0.42193	0.47244	0.54382	0.20908

Significance codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1.

Conclusions

East-West divide in mortality and life expectancy in Latvia has diminished but not disappeared. Personal income and employment remain the key determinants for regional differences in mortality. These determinants in conjunction with the spatial effects are more relevant for males than females, indicating men's higher vulnerability to socio-economic risk factors and their pre-existing spatial spillovers.

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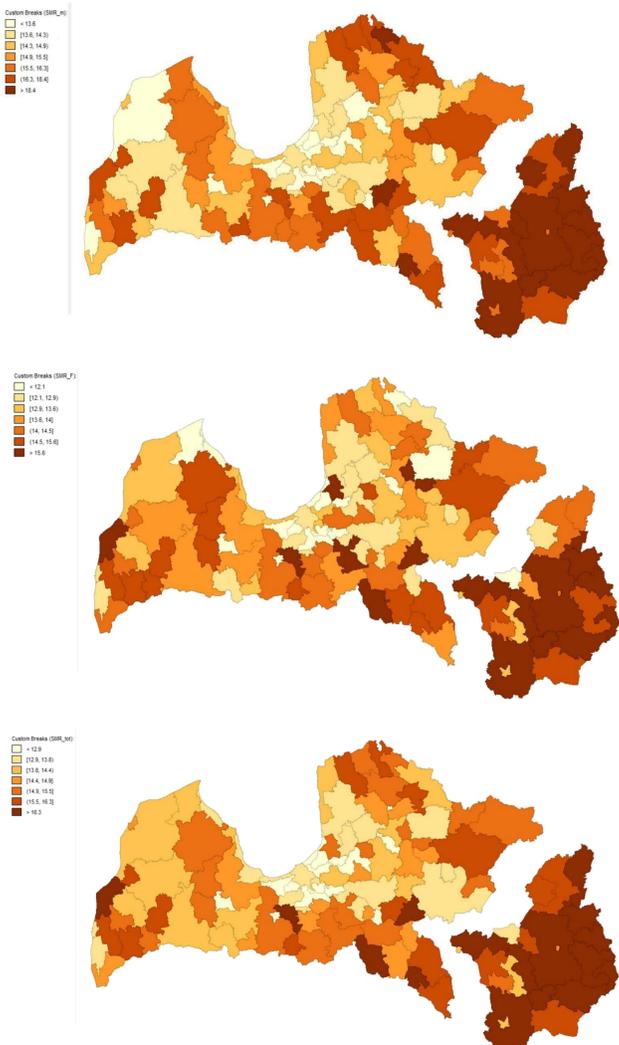


Figure 1. Geographical distribution of SMR for the Eastern part of Latvia – Latgale (right) and rest of the country (left), 2008–2013. Top – Males; Middle – Females; Bottom – Both sexes.

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