



Original article

Understanding the sociodemographic component of urban shrinkage exemplified by mono-industrial towns in Latvia

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ABSTRACT

This study examined the demographic and socioeconomic transformations of Latvia's mono-industrial towns, focusing on the interplay between geographic location, demographic structure, and socioeconomic change in shaping their resilience and decline. This exploratory study aimed to characterise the demographic and socioeconomic patterns associated with these divergent trajectories over the past two decades, including depopulation, economic restructuring, and population ageing, rather than establishing the causal mechanisms behind them. This study conducted an analysis and comparison of 13 mono-industrial towns, categorising them based on a range of demographic and socioeconomic variables. We employed an exploratory quantitative approach, applying Pearson's bivariate correlation analysis to census data (2000 and 2021) to examine the associations among population change, ageing, out-migration, and economic inactivity. Given the small number of towns analysed, these associations are interpreted as descriptive rather than causal and are contextualised by the authors' field knowledge of the settlements. The results reveal regional disparities: towns within the capital city of Riga's metropolitan region benefit from suburbanisation and retain younger populations, whereas non-metropolitan peripheral mono-industrial towns face compounded disadvantages, including accelerated ageing and severe economic stagnation. The observed trajectories are primarily associated with geographic proximity to the capital and the varying degrees of functional and industrial transformations that these towns have undergone since 1991. This study contributes to the broader discourse on post-socialist urban shrinkage by highlighting the heterogeneous pathways of mono-industrial towns. Furthermore, it informs targeted policy interventions, suggesting that while proximal towns require infrastructure management, peripheral towns may require adaptive social support, and where demographic decline appears entrenched, carefully managed adaptation rather than growth-oriented strategies. These insights are critical for fostering sustainable development in shrinking industrial towns across Central and Eastern Europe.

KEY WORDS: urban shrinkage, mono-industrial towns, regional disparities, demographic change, socioeconomic restructuring

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1. Introduction

The post-Soviet urban landscape has undergone profound transformations marked by demographic shifts, economic restructuring, and spatial polarisation (TSENKOVA, 2006; LANG ET AL., 2022). Monofunctional, mono-industrial towns – commonly termed “monotowns” and understood throughout this article as settlements economically dependent on a single dominant industry – were strategically established

during the Soviet era to integrate peripheral regions into centralised industrial systems and are among the most affected (ANDRUSZ ET AL., 1996). These towns, once engines of regional development, now face acute challenges of population decline, ageing, and economic stagnation, reflecting broader patterns of urban shrinkage across post-socialist Eastern Europe (BRADE ET AL., 2006). Latvia, with its legacy of Soviet industrial planning, provides a compelling case study for examining these dynamics, particularly

the divergent trajectories of monotowns based on their geographic proximity to the capital, Riga, and their adaptability to post-industrial economies.

The socioeconomic decline of mono-industrial towns is not merely a local phenomenon but part of a larger narrative of post-socialist urban transition. Previous research has documented how the collapse of centralised planning has led to uneven development, with capital cities like Riga absorbing economic and demographic resources at the expense of peripheral regions (MUSIL, 1993). Spatial inequality is further aggravated by the selective migration of working-age individuals, resulting in communities with an ageing demographic and weakened labour markets (SÝKORA & BOUZAROVSKI, 2012). In Latvia, these patterns are especially noticeable because of the country's small geographic size and concentrated economic activities within the metropolitan region of the capital city of Riga, making it an ideal setting for analysing the relationship between geographic, demographic, and socioeconomic factors in urban decline. Demographically, this decline reflects the combined effect of the two components of population change: negative natural increase, driven by sustained sub-replacement fertility and rising mortality in increasingly aged communities, and net out-migration, whose relative weight differs markedly between metropolitan and peripheral towns and therefore provides the analytical starting point for the present study.

This study examined how Latvia's mono-industrial towns have navigated post-Soviet transitions, focusing on two critical determinants of resilience: demographic change and socioeconomic performance, including proximity to Riga. We expected that monotowns situated within or near metropolitan regions will benefit from suburbanisation and economic spillovers, whereas non-metropolitan, remote monotowns with inflexible industrial structures will experience accelerated decline. Rather than testing a formal causal model, we adopted an exploratory design: drawing on census data from 2000 and 2021, we first described the components of population change (natural increase and net migration), and then examined the statistical associations between demographic ageing and a set of socioeconomic and locational indicators. Our approach builds on previous studies examining post-socialist urban shrinkage (WOLFF & WIECHMANN, 2018).

The importance of this study is underscored by its dual contribution to both academic and policy discussions. First, it enhances the understanding of

urban shrinkage in post-socialist contexts by emphasising the diversity of monotown trajectories and questioning the uniform narratives of decline. Second, it identifies practical policy mechanisms, such as targeted infrastructure investments and industrial diversification, to alleviate shrinkage in vulnerable towns. These findings are pertinent not only to Latvia but also to other post-Soviet states facing similar challenges (GRAZULEVICIUTE-VILENISKE & URBONAS, 2014).

Building on these debates, this study addresses a specific gap: while existing research documents general patterns of post-socialist urban shrinkage, few studies have systematically examined the interplay of spatial, demographic, and economic factors across a national set of mono-industrial towns. Accordingly, this article aims to describe how geographic proximity to Riga and industrial adaptability are associated with the divergent trajectories of Latvia's mono-industrial towns. Using an exploratory quantitative analysis informed by the authors' field knowledge of the settlements, we have sought to reconcile macro-level trends with local realities, to question deterministic narratives of uniform decline, and to identify openings for targeted, place-sensitive interventions.

The remainder of this article is organised as follows: Section 2 offers a comprehensive review of the literature on post-socialist urban transformation and the decline of mono-industrial towns. Section 3 delineates the study area and towns selected for the analysis. The materials and methods used in this study are detailed in Section 4. Section 5 presents the results, emphasising the notable disparities between monotowns located near Riga and those situated at greater distances. Section 6 discusses the implications of these findings for urban resilience theory and policy and concludes with recommendations for future research.

2. Literature review

The study of post-Soviet urban shrinkage, particularly in mono-industrial towns, intersects with broader debates on de-industrialisation, spatial inequality and resilience in transitional economies. Monotowns emerged as a distinct urban form under Soviet industrialisation policies, which were designed to integrate peripheral regions into a centralised economic system (CINIS ET AL., 2008). These towns are often characterised by a single dominant industry, rigid planning, and

populations heavily dependent on state employment, making them uniquely vulnerable to post-socialist economic shocks (CRAWFORD, 2018). The collapse of the Soviet Union precipitated widespread de-industrialisation, leaving many monotowns struggling with unemployment, out-migration, and infrastructural decay (CROWLEY, 2016).

Recent scholarship has highlighted the variegated trajectories of post-socialist cities, challenging the simplistic narratives of uniform decline. While some mono-industrial towns have managed to adapt through diversification or proximity to capital cities, others have stagnated because of geographic isolation and industrial inflexibility (ROHNER, 2021; SGIBNEV & TURAeva, 2023). This heterogeneity is particularly evident in the Baltic States, where capital-centric growth exacerbates regional disparities (LANG ET AL., 2022). For example, Riga's economic dominance has drawn labour and investment from peripheral regions, reinforcing a centre-periphery divide that mirrors the broader European trends of urban polarisation (DIJKSTRA ET AL., 2020).

Demographic decline is a defining feature of post-socialist urban shrinkage, driven by the selective outmigration of younger skilled workers and declining birth rates. Studies in Latvia and neighbouring Lithuania have documented the "hollowing out" of working-age populations, leaving behind ageing communities and imbalanced demographic structures (POCIŪTĒ-SEREIKIENĒ ET AL., 2014; DZENOVSKA, 2018). These trends are compounded by economic inactivity, as former industrial workers face limited opportunities in restructured labour markets (ROUND & WILLIAMS, 2010). The resulting socio-spatial inequalities are not merely economic but also reflect deeper cultural and political disconnects between urban and peripheral areas (HINCKS & POWELL, 2022).

The resilience of mono-industrial towns is increasingly framed in terms of their ability to leverage endogenous resources and adapt to post-industrial economies. Case studies from Russia and Kazakhstan demonstrate that local agencies and institutional flexibility can mitigate decline, even in the absence of large-scale external investments (GUNKO ET AL., 2021). For instance, some towns have repurposed Soviet-era infrastructure for tourism or small-scale manufacturing, while others have capitalised on transnational labour migration to sustain local economies (ROHNER, 2021). These adaptive strategies challenge the notion of monotowns as inherently "failed" spaces, instead highlighting their potential for reinvention (MORRIS, 2015).

However, this adaptive capacity is unevenly distributed: industrial path dependence and sectoral lock-in can tie a town to a declining specialisation long after it has ceased to generate growth, so that the historical industrial structure continues to condition present-day trajectories (RODRÍGUEZ-POSE, 2018).

Comparative research on post-socialist urban shrinkage underscores the need for context-sensitive policy intervention. While EU cohesion policies have sought to address regional disparities, their impact has been uneven, often favouring the metropolitan regions of capital cities over non-metropolitan peripheral towns (PIKE ET AL., 2017). In Latvia, this has led to calls for more place-sensitive approaches that account for the unique challenges of monotowns, such as targeted infrastructure upgrades and support for small- and medium-sized enterprises (KULE, 2014). Such measures could help bridge the gap between declining industrial towns and growing urban centres, fostering more balanced regional development (LINTZ ET AL., 2007).

This study builds on these insights by examining how geographic proximity to Riga and industrial adaptability shape the trajectories of Latvia's mono-industrial towns. While existing research documents general patterns of post-socialist urban shrinkage, few studies have systematically analysed the interplay between spatial and economic factors in monotown resilience. Our predominantly quantitative approach, supplemented by qualitative field observations, addresses this gap. By reconciling macro-level trends with local realities, we demonstrate that monotown trajectories are shaped by a complex interplay of geographic, demographic, and socioeconomic factors, challenging deterministic narratives of decline and opening avenues for targeted, place-sensitive interventions.

3. Study area

In Latvia, the development of planned mono-industrial towns has been predominantly small-scale. Historically, most of these industrial 'urban type settlements' were designated by 1979. Our study encompassed 13 towns and settlements that primarily operated as mono-industrial, facilitating a comprehensive analysis. Their establishment aimed to integrate the Latvian economy within the Soviet industrial system and mitigate spatial imbalances between urban and rural areas (KULE, 2014). These 13 urban and urban type settlements demonstrated

industrial specialisations in sectors such as manufacturing, the chemical industry, hydro-energy, peat extraction, and forestry. Having reached their population peak around 1989, they subsequently experienced demographic decline due to post-socialist de-industrialisation and pronounced spatial polarisation affecting the country's peripheral regions over the past three decades (LANG ET AL., 2022). Presently, these settlements form part of a dense network of small towns distributed across the country, characterised by a strongly monocentric national pattern with significant demographic and economic concentrations in the capital city of Riga and its metropolitan region. Since 1991, their developmental trajectories have varied, with some experiencing complete de-industrialisation and irreversible demographic decline, others maintaining an active industrial economy, and a few transforming into residential satellites of larger cities.

Latvian mono-industrial towns exemplify the mixed history of Soviet industrialised urbanisation and postwar urban transformation, characterised

by pronounced depopulation, ageing, outmigration, social deprivation, deterioration of the urban fabric, and gradual removal of public services. These former manufacturing centres have suffered profound shocks to their economy and society, caused by deindustrialisation and multidimensional processes of transition to a market economy. While old industrial urban areas are widespread across Europe, in Central and Eastern Europe (CEE) and in the Baltic States, de-industrialisation processes have occurred more sharply and in a more compressed period of time due to their rapid transition from state socialism and subsequent marketisation (LINTZ ET AL., 2007; DZENOVSKA, 2018). In Latvia, planned mono-industrial towns were of a very small scale and often designed as “semi-urban settlements” (*pilsetciemats*) (Fig. 1). Their creation can be seen through the lens of aggressive rural space transformation, which also produced the collectivisation of agriculture in the 1940s and the rationale of reducing spatial imbalances between urban and rural areas (KULE, 2014).

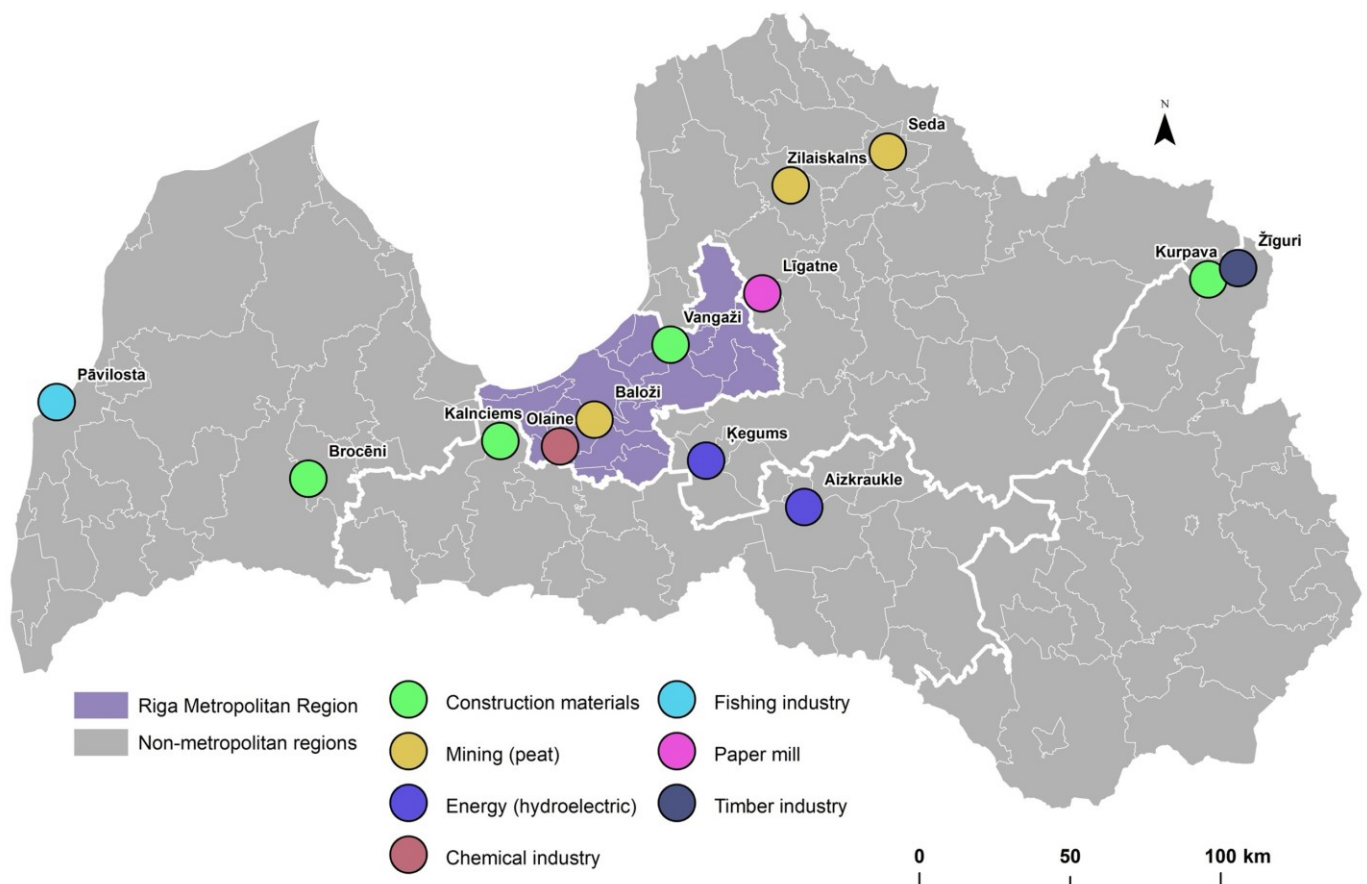


Fig. 1. Predominant industry and geographical distribution of mono-industrial towns in Latvia (Source: authors' elaboration based on data from the Central Statistical Bureau of Latvia)

Geography is an essential aspect of studying these issues, as the manifestations of social and cultural change, demographic change, and labour and housing markets vary across regions and the country's urban system. Latvian mono-industrial towns are particularly hard hit by population shrinkage, ageing, out-migration, peripheralisation, and marginalisation. This leads to public discontent and a loss of confidence in governmental institutions among a growing part of society, as people can no longer integrate into society (through the labour market, affordable housing, provision of essential public services, etc.). Latvia's mono-industrial towns have always varied greatly in terms of population size. In 1979, the Latvian mono-industrial 'semi-urban settlements' had a population ranging from less than 1,000 to 13,000 inhabitants. The same applies to their industrial specialisations, ranging from construction, manufacture of paper and pharmaceuticals, to generation of hydro-energy, peat extraction, and forestry. These settlements experienced population growth until approximately 1989, after which they began to decline in population, in keeping with the national trend of independent Latvia and due to the sharp spatial polarisation, that affected peripheral regions of the country in the last three decades. The 13 settlements of Seda, Kuprava, Pāvilosta, Olaine, Aizkraukle, Vangaži, Kalnciems, Ķegums, Žiguri, Brocēni, Zilaiskalns, Līgatne, and Baloži were selected as they encompass the entire category of mono-industrial 'urban-type settlements' identified during the Soviet era in Latvia. This exhaustive examination of the entire population mitigated selection bias. These settlements are geographically dispersed across all regions of the country and demonstrate considerable variation in size, from peripheral areas with fewer than one thousand residents to industrial centres with populations nearing ten thousand. Notably, Baloži, Vangaži, and Olaine are located within the Riga Metropolitan Region, whereas most are situated in non-metropolitan regions. This distinction is essential for understanding subsequent developmental trajectories.

4. Materials and methods

This study employed a predominantly quantitative and exploratory research design, to analyse the sociodemographic and socioeconomic transformations of Latvia's post-Soviet mono-industrial towns which was informed by the authors' field knowledge of

the towns. The methodological framework integrates a quantitative analysis of census data, allowing for a descriptive assessment of urban shrinkage dynamics. This approach is grounded in spatial demography and economic geography, with particular attention on the roles of geographic proximity and industrial adaptability in shaping mono-industrial town trajectories.

The primary dataset consists of Latvian census records from 2000 and 2021, obtained from the Central Statistical Bureau of Latvia (CENTRAL STATISTICAL BUREAU OF LATVIA, 2024). These data provide detailed demographic and socioeconomic indicators for 13 mono-industrial towns identified through historical industrial classifications (CINIS ET AL., 2008). The quantitative component focuses on two sets of variables: demographic and socio-economic. The demographic variables included median age, ageing index (ratio of population aged 65+ to those under 15), share of young adults (20–44 years), single-person elderly households (65+), and out-migration rates (2017–2021). Socioeconomic variables included distance to Riga, educational attainment (primary education completion), economic activity status, unemployment rates, monthly net salary, and occupational structure (elementary occupations). Table 1 summarizes the key characteristics of all variables used in the study.

The descriptive statistics for these variables offer a comprehensive overview of their distributions across the studied mono-industrial towns and the macro-scale patterns of urban shrinkage in Latvia. Bivariate correlation analysis, which utilises Pearson's coefficients, examines the relationships between demographic and socioeconomic indicators at specific significance thresholds. This analysis tested the hypothesis that proximity to Riga and location within the metropolitan region are negatively correlated with ageing and positively correlated with economic activity. The research design facilitates further insights from the findings, with quantitative results informing and aiding the interpretation of statistical correlations for subsequent, in-depth field studies and ethnographic research.

The variable set was chosen to capture both the demographic expression of shrinkage and its socioeconomic and locational correlations. Several of the demographic indicators – median age, the ageing index, the share of young adults, and single-person elderly households – are different facets of the same underlying ageing process and are therefore expected to be strongly inter-correlated; they are

retained because each is interpretable in its own right and is reported separately in the planning and policy literature. The two components of population change are treated asymmetrically: net out-migration (2017–2021) is included as a variable, whereas natural increase is not modelled as a separate predictor because, at this small territorial scale, annual births and deaths are few and statistically unstable. Natural change is described qualitatively alongside population pyramids. Because the analysis covers the complete set of 13 towns rather than a

sample, and because this number is too small to support stable multivariate regression, we deliberately restricted the analysis to bivariate Pearson correlations. These coefficients identify the strength and direction of associations but cannot establish causal direction; therefore, the results are interpreted as exploratory and descriptive. The authors' field knowledge of the towns is used only to contextualise and sense-check these statistical patterns and does not constitute a separate, systematically coded qualitative dataset.

Table 1. Descriptive statistics for study demographic and socio-economic variables (Source: authors' calculations based on data from the Central Statistical Bureau of Latvia)

Variables	Mean	Minimum	Maximum
Demographic variables			
Median age	46.3	36	57
Ageing index	178.5	47	396
Share of young adults (20-44)	22.5%	15.8%	28.5%
Single-person elderly (65+)	9.4%	3.5%	16.1%
Out-migration rate (2017-21)	204.5	144.0	299.0
Socio-economic variables			
Distance to Riga (km)	107.2	13.5	256.8
Primary educated (%)	21.2%	10.5%	30.8%
Economically non-active (%)	44.5%	27.6%	60.8%
Unemployed (%)	4.8%	3.0%	9.0%
Monthly net salary (EUR)	635	501	878
Elementary occupations (%)	15.4%	9.2%	22.6%

5. Results

The findings reveal stark disparities in the trajectories of Latvia's mono-industrial towns, shaped by demographic decline, geographic proximity to Riga, and socioeconomic factors. The following sub-sections present these results, highlighting the divergent outcomes between towns that have adapted to post-socialist urban transitions and those that have faced persistent decline.

5.1. Ageing and demographic decline

Since the early 1990s, Latvia, along with other nations in the Central and Eastern European (CEE) region, has experienced rapid and concurrent transformations in key demographic processes, including fertility, mortality, and migration patterns. These changes have led to significant depopulation, urban contraction, and population ageing, representing

some of the most profound societal shifts in the country. The radical demographic transition was marked by increased life expectancy, low fertility rates, greater diversity in family structures, and the growing significance of migration (KRISJANE ET AL., 2021). In Latvia's mono-industrial towns, population ageing is evident in the rising proportion of the elderly (75+) and a particularly pronounced decline in the young working-age population (Fig. 2).

Almost all mono-industrial towns are currently experiencing a notable decline in their populations. The most severe shrinkage occurred in former industrial hubs like Olaine, where the population has fallen by 32% since 2000. This aligns with the broader post-socialist urban shrinkage patterns observed in the WOLFF & WIECHMANN study (2018), but with sharper declines in mono-industrial contexts. Population pyramids (Fig. 2) illustrate structural demographic shifts between 2000 and 2021, highlighting age-selective out-migration and

ageing trends. To allow comparison, the pyramids are expressed as the percentage share of the total population falling in the respective gender-age group, rather than as absolute counts. It is important to highlight a significant exception to the prevailing trend: the town of Baloži, located within the Riga metropolitan region, has undergone a notable transformation into a suburban residential zone as a direct result of urban sprawl and suburbanisation. Over the past two decades, the population of this

settlement has increased by approximately 40%. In contrast, other mono-industrial towns across the country have continued to experience a steady decline in population, a trend that is particularly evident in smaller, more peripheral settlements. For instance, mono-industrial towns such as Kuprava, Žiguri, and Seda in the North Vidzeme region have experienced population decreases of 60%, 45%, and 40%, respectively, since 2000.

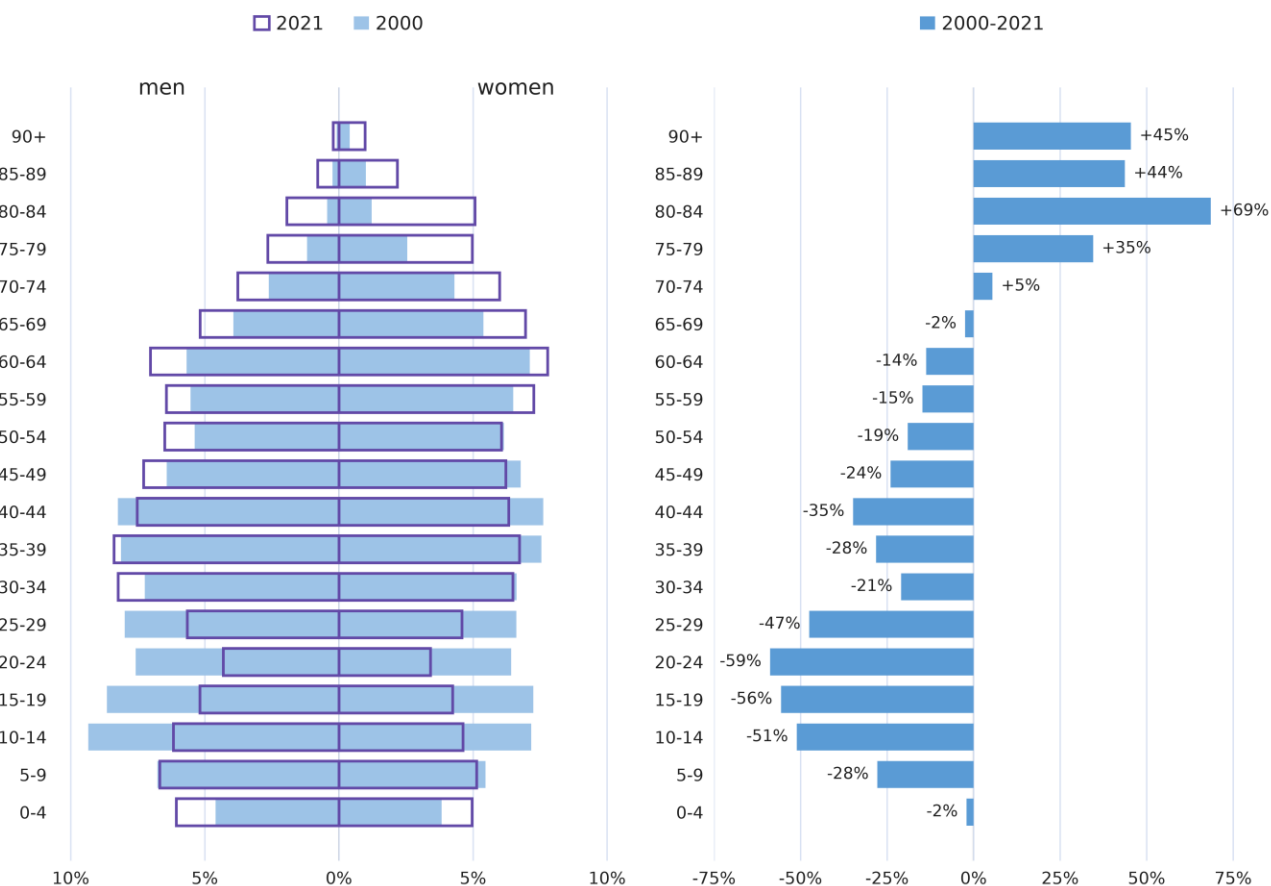


Fig 2. Gender age structure of Latvia's mono-industrial towns and its changes over the past twenty years, expressed as percentage shares and change (Source: authors' calculations based on data from the Central Statistical Bureau of Latvia)

Upon closer examination of the demographic structure of mono-industrial towns in recent decades, it becomes apparent that population ageing is a prevailing trend. The mean age has experienced an upward trajectory across all selected mono-industrial towns and has exhibited a more pronounced increase than the national average and other urban areas in Latvia. Furthermore, the rise in the proportion of the elderly (75+) and the concomitant decrease in the proportion of young adults serve as

additional indicators of the ageing phenomenon (Table 2).

The analysis reveals pronounced demographic ageing across Latvia's mono-industrial towns, with the median age increasing by +3.0 to +13.2 years between 2000 and 2021. Non-metropolitan peripheral mono-industrial towns experienced the steepest increases, exemplified by Kuprava (+13.2 years), whereas suburban Baloži showed a slight decrease (-0.2 years). Suburbanisation effects were most evident in Baloži, where the population increase

since 2000 contrasted sharply with the declines elsewhere. The town's median age (36 years) is the lowest in Latvia. This divergence reflects the selective outmigration of working-age cohorts, leaving behind an imbalanced age structure, as shown in Figure 2. The share of elderly (75+) households grew by up to +11.6%, while that of young adults (20–39) declined by -10.9% in the most affected towns. Over the past two decades, a noteworthy trend within the population of Latvia's mono-industrial towns has been dwindling and ageing. This phenomenon has been particularly significant and consequential, given that fertility rates in all regions of

the country have remained below the replacement level for a prolonged period, leading to a natural decline in the population. Furthermore, the ongoing and persistent increase in life expectancy has contributed to the surge in the number of elderly individuals. The only areas that have witnessed population growth are the suburbs in the Riga metropolitan region, driven primarily by in-migration from the core city and all non-metropolitan regions. This unprecedented demographic transition has exerted a considerable and profoundly impacted the size and composition of the overall settlement system.

Table 2. Key demographic changes across the mono-industrial towns in Latvia (Source: authors' calculations based on data from the Central Statistical Bureau of Latvia)

	Mean age of population			Share of old age (75+)			Share of young adults (20-39)		
	2000	2021	Change	2000	2021	Change	2000	2021	Change
Seda	41.2	49.6	+8.4	5.0	16.6	+11.6	26.7	15.8	-10.9
Kuprava	38.0	51.2	+13.2	2.5	13.9	+11.4	25.4	17.9	-7.5
Pāvilosta	38.3	49.3	+11.0	6.9	17.3	+10.4	23.8	21.7	-2.1
Olaine	36.1	44.1	+8.0	2.2	10.4	+8.2	32.6	22.8	-9.8
Aizkraukle	36.1	44.3	+8.2	2.9	10.7	+7.8	29.2	22.6	-6.6
Vangaži	35.1	42.4	+7.3	2.1	9.2	+7.1	29.9	23.4	-6.5
Kalnciems	39.6	45.4	+5.8	6.1	11.7	+5.6	26.0	21.3	-4.7
Ķegums	36.3	42.7	+6.4	4.9	9.8	+4.9	27.5	25.4	-2.1
Žiguri	39.7	45.7	+6.0	6.2	9.1	+2.9	25.2	22.1	-3.1
Brocēni	38.5	42.4	+3.9	5.8	10.4	+4.6	26.4	22.6	-3.8
Zilaiskalns	37.6	41.4	+3.8	3.5	11.1	+7.6	27.8	24.7	-3.1
Līgatne	42.0	45.0	+3.0	8.9	14.2	+5.3	23.7	24.3	0.6
Baloži	36.0	35.8	-0.2	3.3	4.1	0.8	28.5	28.5	0.0

5.2. Demographic and socioeconomic correlations

Bivariate correlation analysis (Table 3) revealed statistically significant relationships between the demographic and socioeconomic characteristics of Latvia's mono-industrial towns, indicating a coherent pattern of interlinked disadvantages.

The strongest associations involve the share of the economically inactive population, which correlates positively with the median age (+.884, $p<0.01$), ageing index (+.819, $p<0.01$), and single-person elderly households (+.930, $p<0.01$), while exhibiting a strong inverse relationship with the proportion of young adults (-.903, $p<0.01$). This cluster of correlations underscores a fundamental dynamic: as the working-age population contracts through outmigration and ageing, economic inactivity deepens, creating a self-

reinforcing cycle of decline. The negative correlation between economic inactivity and out-migration (-.511, $p<0.05$) likely reflects a selection effect: towns that have already lost their mobile population primarily retain the elderly or those less inclined to relocate.

Distance from Riga emerged as a powerful structuring variable, significantly correlated with median age (+.693, $p<0.01$), ageing index (+.748, $p<0.01$), and single-person elderly households (+.557, $p<0.05$), and inversely correlated with young adults (-.564, $p<0.05$). These findings confirm the pronounced centre-periphery gradient characterising Latvia's settlement system (LANG ET AL., 2022). Peripheral mono-industrial towns face compounding disadvantages: distance from labour markets and services accelerates the selective out-migration of younger residents.

Table 3. Summary of Bivariate Correlation Analysis (Pearson's correlation coefficients) indicating relationship between the study variables

Variables	Median age	Ageing index	Young adults (%)	1-person elderly households (%)	Out-migration rate (2017-21)
Distance (km) to Riga	+.693**	+.748**	-.564*	+.557*	-.066
Primary educated (%)	+.551*	+.457*	-.670*	+.697**	-.393
Economically non-active (%)	+.884**	+.819**	-.903**	+.930**	-.511*
Unemployed (%)	+.659*	+.634*	-.649*	+.597*	-.512*
Monthly net salary (EUR)	-.811**	-.760**	+.738**	-.689**	+.386
Elementary occupations (%)	+.109	+.101	-.281	+.422	-.422

**Correlation is significant at the 0.01 level (two-tailed)

*Correlation is significant at the 0.05 level (two-tailed)

The monthly net salary displayed a similar pattern. Higher wages are associated with a lower median age (-.811, $p < 0.01$), a lower ageing index (-.760, $p < 0.01$), more young adults (+.738, $p < 0.01$), and fewer elderly households (-.689, $p < 0.01$). Mono-industrial towns that retain better-paying jobs, typically those closer to Riga or those that have successfully transitioned their industrial bases, also exhibit more favourable demographic profiles. The share of primary-educated residents and unemployment follow a consistent pattern, both positively associated with ageing and negatively with young adults. Notably, the share of elementary occupations does not significantly correlate with any demographic variable, suggesting that the occupational structure alone is less indicative of demographic vitality than wages, economic activity, and geography.

Socioeconomic correlations indicate that the distance to Riga functions as more than mere geography; it structures access to systems of opportunities. Peripheral mono-industrial towns face compounded disadvantages, including fewer employment opportunities, lower wages, and limited policy resources. Although certain industrial legacies offer temporary buffers, the analysis suggests that, in the absence of targeted interventions, spatial inequalities are likely to intensify through positive feedback loops of decline. A summary of the correlation analysis reveals that structural socio-economic disadvantage – characterised by economic inactivity, lower educational attainment, higher unemployment, lower wages, and greater distance from the national capital – is systematically associated with more advanced population ageing. The comparatively weaker and less consistent

associations with out-migration imply that migratory dynamics may be influenced by a more complex set of factors that are not fully captured by the bivariate relationships examined here, necessitating further multivariate investigations.

Two further descriptive patterns are relevant to the questions of the industrial profile and town size. First, the type of dominant industry appears to matter less than its location and wage level: the weak, non-significant correlations between elementary occupations and the demographic indicators suggest that what distinguishes resilient from declining towns is not the sector as such, but whether that sector still supports comparatively well-paid employment within the commuting range of Riga. Towns built on a single low-wage extractive or processing activity in the periphery, for example, peat extraction and forestry in Kuprava and Žiguri, show the steepest decline, whereas chemical and energy towns closer to the capital, such as Olaine and Aizkraukle, have retained more of their population and a younger age structure. Second, population size and metropolitan position are correlated because the larger towns in the set tend to be metropolitan; therefore, the apparent advantage of size is difficult to disentangle from the advantage of proximity. These observations are descriptive and rest on a small number of cases and would need to be confirmed with town-level multivariate data before any independent effect of the industrial sector or settlement size could be claimed.

6. Discussion and conclusions

Theoretically, this study advances the understanding of post-socialist urban shrinkage by demonstrating how Soviet-era industrial mono-

industrial towns interact with demographic, socio-economic, and geographic positions to produce divergent trajectories. The strong correlation between the distance to Riga and demographic ageing challenges the assumptions of homogeneous decline, instead highlighting a centre-periphery gradient that aligns with core-periphery models in economic geography (DUARTE & PASCARIU, 2017). However, the persistence of industrial path dependence in some remote towns, such as Kuprava's continued reliance on wood processing, complicates the straightforward spatial determinism. This suggests that theories of urban shrinkage must account for both geographic and sectoral lock-in effects, as proposed by RODRÍGUEZ-POSE (2018).

The spatial analysis underscores how Latvia's monocentric urban system, accelerated by EU integration, created a suburban ring of opportunity and decline. While the Riga metropolitan region benefits from economic spillovers, non-metropolitan peripheral monotowns face the compounded disadvantages of distance, ageing, and industrial obsolescence. This challenges the notion of a uniform post-socialist transition, revealing a landscape in which geographic position mediates access to recovery pathways.

On a practical level, the findings offer tentative insights for policymakers addressing regional inequalities, although they should be read with consideration of the exploratory and correlational nature of the analysis. The pronounced disparities in economic inactivity (27.6% vs. 60.8% between suburban and peripheral monotowns) suggest that uniform, blanket approaches to regional development may be poorly suited to the diversity of monotown situations, and that targeted interventions reflecting the distinct challenges of different monotown typologies are likely to be more appropriate. For suburban monotowns such as Baloži, policies might focus on improving transport links to Riga and managing suburban sprawl. More distant monotowns might benefit from diversification programs that build on existing industrial assets, while the most peripheral monotowns may require more far-reaching support, potentially including measures such as relocation assistance or enhanced elderly care services, where in-place revitalisation appears unlikely. The uneven pattern of regional development also points to a possible role for capacity-building programs that help remote towns compete for resources, echoing the recommendations of PIKE ET AL. (2017). These suggestions are offered as directions for discussion

and further evaluation, rather than as prescriptive recommendations.

Several methodological limitations should be acknowledged. While comprehensive, reliance on census data may obscure nuanced local dynamics that qualitative methods could capture more fully. The 21-year timeframe (2000–2021) provides a robust longitudinal perspective but excludes the immediate post-Soviet transition period, potentially missing critical, early adaptation patterns. Furthermore, the focus on monotowns necessarily overlooks interactions with surrounding rural areas, which may play an important role in regional systems of decline and resilience, as noted by KULE (2014). These limitations suggest that the correlations identified, while statistically significant, may not fully capture the causal mechanisms.

Future research should explore several promising directions. First, comparative studies across post-socialist states could test whether Latvia's patterns hold in other contexts with different industrial legacies and urban systems. Second, micro-level analyses of household decision-making could illuminate why some working-age residents choose to stay in declining towns while others leave, a question that is only partially addressed by our field observations. Third, the gendered dimensions of shrinkage, evidenced by women comprising 58% of the elderly population, merit deeper investigation into caregiving burdens and gender-specific migration patterns. Finally, experimental policy evaluations can assess the effectiveness of different intervention strategies across monotown typologies, building on the framework proposed by GUNKO ET AL. (2021).

One implication of this study concerns the conventional narratives of urban growth and decline. Rather than viewing urban shrinkage as purely negative, the findings are consistent with the possibility that for some monotowns, carefully managed adaptation may be a more realistic policy orientation than growth-oriented revitalisation. This perspective resonates with the emerging paradigms of 'smart shrinkage' noted by WOLFF & WIECHMANN (2018), though it requires careful adaptation to Latvia's specific post-socialist context. However, it should be stressed that the cross-sectional and correlational evidence presented here cannot demonstrate that the decline is irreversible; this interpretation is therefore offered cautiously, as a hypothesis for further longitudinal research rather than as a firm conclusion. Where revitalisation prospects appear weak, prioritising the wellbeing

of remaining residents may nonetheless help avoid both the exacerbation of spatial inequalities and the commitment of scarce resources to unrealistic expectations.

Ultimately, this research underscores that the fates of Latvia's monotowns are neither predetermined nor uniform; they exhibit heterogeneous trajectories of sociodemographic and socioeconomic change. Further development will depend on how well policies and practices acknowledge the complex interplay of geography, history, and industrial structure, which this study has highlighted. The challenge for researchers and policymakers alike is to develop frameworks that recognise these multidimensional dynamics while remaining flexible enough to address each town's distinct circumstances and possibilities.

This study contributes to the broader debate on urban resilience by highlighting how historical industrial legacies interact with contemporary spatial inequalities. Future studies should explore the micro-level mechanisms of household decision-making in shrinking towns and conduct comparative analyses across other post-socialist contexts. Policy interventions must account for these place-specific dynamics, balancing targeted support for peripheral communities with planning for carefully managed adaptation, where in-place growth appears unlikely. By elucidating the complex interplay between geography and industrial structure, this study provides a foundation for more nuanced approaches to sustainable development in shrinking industrial towns.

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