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Divergent population dynamics: The case of the inner city of Riga

Abstract: Population dynamics shape the spatial landscape of Europe. Although broadly studied, both suburban sprawl and inner-city reurbanisation have often been treated in isolation. Furthermore, these processes manifest distinctively across different local contexts. This research aimed to explore the population dynamics in the inner city of Riga from 2011 to 2021, contrasting them with the bordering municipalities of Riga, and to analyze how these dynamics align with the urban development model. Covering 58 neighborhoods and 7 bordering municipalities of Riga, the analysis revealed a shift in the trajectory of inner-city population dynamics during the latter half of the decade, which was finally characterized by growth. However, suburbanisation continued to outpace reurbanisation, indicating the coexistence of multiple urban development model stages.

Key words: population dynamics, urban development, reurbanisation

Introduction

Urban areas undergo constant transformation influenced by a range of interrelated factors, including changes in economic structures, government policies, and demographic landscape, which is the focus of this study. As the size and composition of a population shifts, spatial changes are inevitable. In the broadest context, urban areas typically progress through stages of initial population growth, urban sprawl, and a likely population return to the city.

Insights on stabilizing and growing inner-city populations in Europe have been explored in studies frequently (Buzar et al. 2007, Haase et al. 2010, Salvati et al. 2018), less commonly within the context of simultaneous suburbanisation. While this has allowed certain generalisations to be made, the context-specific characteristics of this phenomenon make it a worthwhile subject of research,

particularly in urban areas where reurbanisation is in its infancy, but suburbanisation is at its peak.

This study aimed to investigate how the population dynamics in the inner city of Riga changed compared to the bordering municipalities of Riga in the decade between 2011 and 2021, and to analyze how these dynamics fit within the urban development model. The study was based on quantitative analyses of full-scope population data collected by the Central Statistical Bureau of Latvia.

Applicability and flaws of the urban development model

Population dynamics, encompassing growth, decline, or stability, are linked to urban development. Leo van den Berg divided urban development into the following four stages: urbanisation, suburbanisation, disurbanisation, and reurbanisation (van den Berg 1982). The first stage, urbanisation, is characterized by fast population growth in the core. This growth slows down as the second stage, suburbanisation, begins; thus, instead of the core, the ring grows. Then, as the third stage, disurbanisation, starts, both the core and ring populations shrink, but the population grows in small- and medium-sized urban areas around the aforementioned urban area. This is a particularly hard hit on the urban core, negatively affecting both private and public services as the overall demand of the urban population declines. An alternative to the third stage of disurbanisation is the stage of reurbanisation, which, according to van den Berg's model, may or may not naturally replace disurbanisation. It is not predetermined and depends on the internal dynamics of the city and largely on government or municipal measures. If reurbanisation occurs, the ring is expected to shrink while the core grows. Nowadays, reurbanisation is of particular importance as a countermeasure to unsustainable urban sprawl in shrinking cities, including post-socialist cities where population decline has been prevalent following the transition.

The urban development model clearly shows the interconnectedness between its stages, where growth or shrinkage in one zone to a certain extent occurs at the expense of another. Initially, in the model's first two stages, the urban functional region experiences total growth, but in the last two stages, a total decline. Thus, when researching reurbanisation, analysis of the whole area, both the core and the ring, is suggested to understand how reurbanisation affects the demographics of the ring, and vice versa. The model is criticized for its limited ability to capture "wider trends", instead capturing fulfilment of a set of specific conditions. A study across England, France, Germany, and the Netherlands found that the last two stages – disurbanisation and reurbanisation – occurred only when there was no significant nationwide population growth (Dembski et al. 2021). Additionally, various studies (Kabisch, Haase 2009; Haase et al. 2010) suggest that reurbanisation may coincide with suburbanisation and disurbanisation, indicating model's limitations in representing contemporary demographic dynamics accurately; instead of a clear dominance of reurbanisation in Europe, the coexistence of various

stages is anticipated, suggesting a simultaneous occurrence of reurbanizing inner cities alongside persistent suburban sprawl.

Since the urban development model is purely based on population growth or decline, it disregards a set of factors that characterize population composition like age and household structures, ethnicity, occupational status, income, and education. Changes in these, for example, a growing share of Millennials and expatriates, an increase in non-traditional households, and indicators connected to the built environment such as housing costs, renovation and development, and public space (Haase et al. 2008), are also signs of reurbanisation and gentrification, which can help recognize some forthcoming trends of reurbanisation even if the core has not yet reached stability or growth in population. Gentrification, which is typically associated with a more adverse impact, primarily the displacement of less affluent residents due to an influx of wealthier newcomers, causes demographic change, and vice versa. Interestingly, the factors that facilitate gentrification include an underutilized inner city, new consumption patterns, and notably, suburban development (Zukin 1987). Given that suburban growth is connected to a simultaneous inner-city abandonment and subsequent inner-city revitalisation, suburbanisation can be seen as a precursor to reurbanisation.

Urban development and local conditions

The manifestations of reurbanisation and gentrification depend on local conditions – historic, institutional, social, and economic – which in turn influence residential preferences. In post-socialist cities, rental market peculiarities, privatisation, historic shortages of an affluent middle-class, bohemian communities, young professionals, or ethnic minorities favoring inner-city residence have to be considered; this can cause highly selective, façade, and marginal gentrification, such as an influx of students in the inner city, resulting in distinctive forms of gentrification, compared to Western countries (Kubeš, Kovács 2020). These changes can also be government- or foreign-investment-driven, leading to displacement through unjustified increases in rental prices or repurposing apartments for short-term rent (Kubeš, Kovács 2020). Thus, reurbanisation and gentrification case studies in post-socialist context are highly relevant, given the context variations across cities within this space and time-sensitiveness.

There are some general contrasts in the (de-)centralisation tendencies between Eastern and Western Europe. In the former, suburbanisation continues to play a more significant role; in the latter, population recentralisation in cities dominates (Hesse, Siedentop 2018). Before further exploring post-socialist cities, it is worth mentioning that generalisations of this kind are problematic in Western countries as well. For example, in the Netherlands, young affluent families have been observed to continue to choose to eventually move to the suburbs. Therefore, residential preferences remain largely intact after the original inner-city gentrifiers relocate (Booi et al. 2020). At the same time, a recent comprehensive research on gentrification in post-socialist cities concluded that

their inner cities are revitalizing, and their population composition is changing (Kubeš, Kovács 2020). These studies illustrate the difficulty of generalizing the aforementioned observations and support the necessity of new case and comparative studies.

Over the past two decades, post-socialist inner cities have undergone social upgrading. In the inner city of Tallinn, there has been notable social restructuring driven mainly by the market. A rise in socioeconomic status among residents is likely attributable to residents of a lower socioeconomic status being replaced by residents of a higher socioeconomic status, in some places accompanied by a decrease in the average age of the population (Temelová et al. 2016, Marcińczak et al. 2017). Similarly, the inner city of Vilnius has seen a surge in the share of residents with higher socioeconomic status, notably in areas previously characterized by lower socioeconomic status. This shift occurred after a major inner-city population decline in Vilnius until 2011, which was connected to commercialisation, as well as expansion of upscale residential dwellings (Valatka et al. 2015).

The changing consumption patterns, such as transport, cultural and dining preferences, and the aesthetics and character of old neighborhoods combined, have increased the relative attractiveness of the inner city. Residing in the inner city also serves as a means of ascertaining one's identity and social reproduction (Zukin 1987). Additionally, evolving urban lifestyles lead to an increase in non-traditional household structures, e.g., living alone, with a partner or flat-sharing. These trends, along with studentification and revitalisation projects, can disrupt local communities due to disparities in attitudes and values, and escalating socio-spatial inequalities (Fabula et al. 2017). Conversely, gentrifiers are sometimes found to have the potential to initiate positive changes related to social revitalisation that are inclusive and strengthen community ties, which to some extent is attributable to employing bottom-up revitalisation approaches (Grabkowska 2011). Additionally, it is worth noting that social upgrading may also be associated with in-situ change.

Although there are numerous similarities among post-socialist cities, comparative studies reveal differences in the pace of reurbanisation. For instance, when comparing Prague and Tallinn, the inner city of Prague was observed to have a higher degree of demographic stability (Temelová et al. 2016). However, a more recent study characterized Prague's inner city as undergoing a more intensified reurbanisation processes and diversification in residential behavior (Horňáková, Sýkora 2021), highlighting the temporal sensitivity of this research area.

The inner city and the bordering municipalities of Riga

Most post-socialist capitals have three zones – a historic area that developed before socialism, a residential and industrial area that developed under socialism, and a suburban area that developed after socialism (Marcińczak et al. 2017). This is also the case in Riga, the capital of Latvia. Riga has 58 neighborhoods, and it is a shrinking city, with a total population of 621 thousand in 2021, of whom 114

thousand or 18% were inner-city dwellers; although the share of the inner-city population slightly declined between 2011 and 2016, it experienced a modest increase between 2016 and 2021 (Table 1).

Table 1. Population in Riga, its inner city, and its bordering municipalities in 2011, 2016, and 2021 (CSB 2023)

	2011	2016	2021
Total population in Riga and its bordering municipalities	849,838	832,774	829,160
Total population in Riga	658,637	639,357	620,974
Inner-city population (*)	117,783 (17.88)	113,011 (17.68)	113,538 (18.28)
Population in Riga's bordering municipalities (**)	191,201 (22.50)	193,417 (23.23)	208,186 (25.11)

* Inner-city population divided by total population in Riga (%).
** Population of Riga's bordering municipalities divided by total population of Riga and its bordering municipalities (%),

The inner city of Riga consists of nine neighborhoods, separated by the River Daugava. On the left bank – Ķīpsala, Āgenskalns, and Torņakalns, on the right bank – Avoti, Brasa, Centrs, Grīziņkalns, Skanste, and Vecpilsēta. Additionally, Pētersala-Andrejsala, situated on the right bank, was included in this study due to its central location within the city's historical center's protection zone. Among these ten neighborhoods, Āgenskalns and Torņakalns are the only two that significantly extend beyond this protection zone. As of 2021, Centrs, with nearly 31 thousand residents (CSB 2023), was the largest inner-city neighborhood.

The inner-city neighborhoods are a densely built-up area, with 43% to 94% (depending on the neighborhood) of the buildings predating 1945. Buildings erected between 1946 and 2000 dominate in Pētersala-Andrejsala and make up about a half of the housing stock in Āgenskalns and Brasa. Skanste is the only inner-city neighborhood where buildings constructed since 2001 dominate, and a considerable number of new buildings are also present in Ķīpsala and Pētersala-Andrejsala. Additionally, Ķīpsala has the most varied mix of building ages (CSB 2023).

Under socialism, inner cities were left to decay, primarily housing residents of low socioeconomic status, but, in certain areas, also those of middle and upper socioeconomic status (Marcińczak et al. 2017). Since the transition and until 2010, Riga, particularly its inner city, experienced a significant population decline (Treija et al. 2020). During this period, suburbanisation both started and intensified, yet signs of a revival of the inner city were not to become evident before the start of the next decade.

As the decline of the inner-city slowed, indications of selective inner-city socioeconomic upgrading, growing share of non-traditional households, and higher residential mobility than the city average started to emerge (Krišjāne, Bērziņš 2014). The socioeconomic upgrading became even more evident between 2011 and 2021, resulting in a growing gap between the inner and outer city, as well

as within the inner city itself. Noteworthy is the decrease in the average age observed in many inner-city neighborhoods, in a city that is otherwise experiencing an aging population. Certain inner-city neighborhoods, particularly those located on the left side of the river and extending beyond the historical center's protection zone, lagged behind (Balode 2023).

Regarding the bordering municipalities of Riga, the study area includes the city of Jūrmala and six municipalities: Mārupe, Olaine, Ķekava, Salaspils, Ropaži, and Ādaži. In 2021, their combined population was 208 thousand residents, constituting 25% of the total study area population; the absolute population figures have been on a swift upward trajectory, attributed to suburbanisation. Notably, their share has been experiencing a more rapid increase compared to the inner city (Table 1).

Unlike suburbanisation, reurbanisation in Riga remains a relatively new and unexplored phenomenon, which is understandable given the persistent decline in inner-city population observed until recently. Additionally, the dynamics of inner-city population have not been thoroughly examined in the context of ongoing suburbanisation, nor analyzed how these population changes fit within the urban development framework.

Data and methods

The purpose of this research was twofold. Firstly, it aimed to explore the patterns of population dynamics in the inner city of Riga between 2011 and 2021, in comparison to the bordering municipalities of Riga. Secondly, it aimed to analyze how these patterns align with the urban development model. In order to achieve this, the study utilized data on population size across the neighborhoods of Riga (neighborhood-level data) and the bordering municipalities of Riga (municipality-level data). Fig. 1 provides an overview of the study area, which includes the neighborhoods of Riga, with a focus on the inner city, and the bordering municipalities of the city, which were briefly described in the section above.

The data utilized in this study was collected by the Central Statistical Bureau of Latvia and covers the year 2011 and the years from 2016 to 2021. This is a full-scope dataset, with no sampling involved. Furthermore, the dataset relies on geospatial data, ensuring that alterations in administrative boundaries do not compromise its accuracy. The 2011 data originates from a population census, while the data from 2016 to 2021 are population estimates that are based on a combination of more than 10 different national administrative registers and are subjected to a rigorous quality control procedure.

This research employed a quantitative method to observe the changes in population size in the aforementioned areas from 2011 to 2021. This decade was split into two 5-year intervals: 2011–2016 and 2016–2021, to detect demographic shifts efficiently. The key variable in this study was the population growth rate, calculated individually for all neighborhoods, including both inner- and outer-city neighborhoods as well as the bordering municipalities. Additionally, the annual
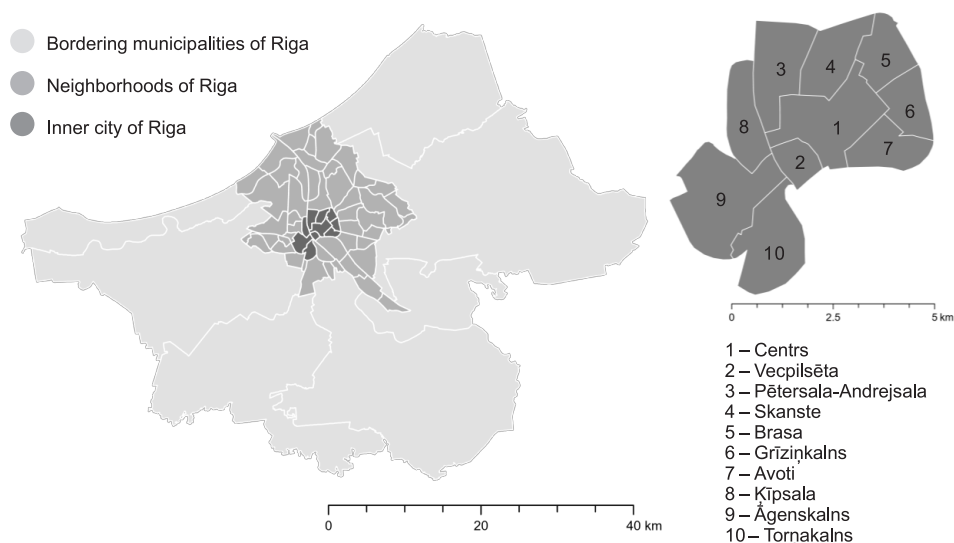
Fig. 1. Study area

population change in Riga between 2016 and 2021 was calculated to uncover any possible heterogeneity within the inner city. In order to identify spatial patterns, all population growth rates were mapped, resulting in three sets of maps. Finally, the overall growth rates were analyzed within the framework of the urban development model.

While straightforward and replicable, this method offers limited insights due to its inability to conduct a more thorough analysis, such as capturing shifts in population composition or policy effects.

Results

The results are summarized in Figs 2–4 (maps), Table 2 and Fig. 5 (findings within the context of the urban development model).

Fig. 2 illustrates the change in the total population in the city of Riga, highlighting the inner city, over the two five-year periods. During the first period, 39 out of 58 neighborhoods had a population decline of over 1%, which decreased to 31 neighborhoods in the second period. Despite the substantial decrease in the number of declining neighborhoods, the city still suffered an overall population decline of 2.9% in both periods, meaning that the population loss became more concentrated.

During the second half of the decade, there was a significant turnaround in the growth of the inner city of Riga. The overall growth rate increased from −4.1% (2011–2016) to 0.5% (2016–2021). The number of growing neighborhoods in the inner city also increased from one to six. The growth was mainly concentrat-
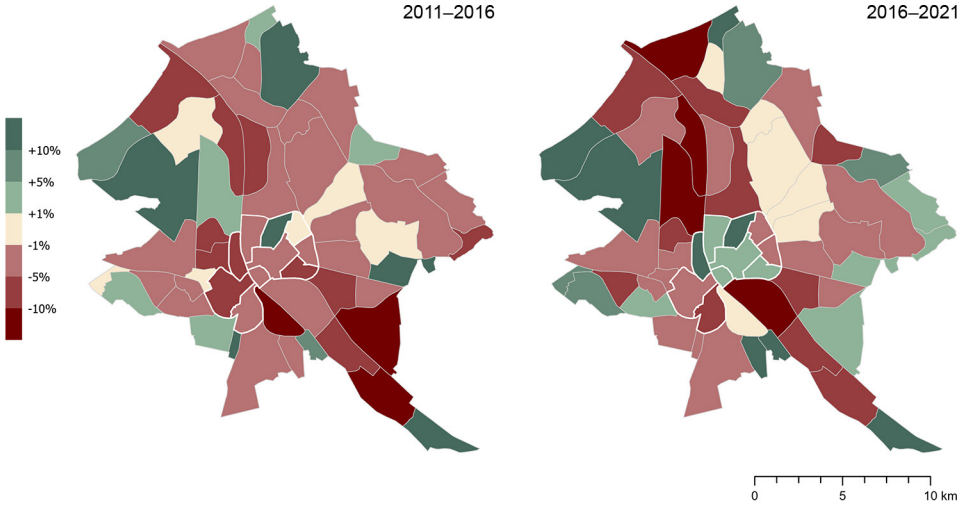
Fig. 2. 5-year population growth rates in neighborhoods of Riga from 2011 to 2016 and
from 2016 to 2021
Source: authors' calculations based on CSB (2023).

ed in the "inner-city core", the area situated on the right bank, forming an integral part of the city's historical center and its protection zone. The high growth in Skanste and Ķīpsala, and to a smaller extent in Pētersala-Andrejsala, can be attributed to the construction of new residential buildings. The rest of the growing neighborhoods were characterized by their central location and affordable rents in case for the more peripheral ones. Overall, the inner city of Riga witnessed a reurbanisation trend in terms of population size, which was also paralleled by upgrades in the socioeconomic status of the inner-city residents (Balode 2023).

Fig. 3 provides a detailed analysis of the inner-city neighborhoods exclusively, focusing on the annual change during the latter half of the studied decade. This analysis reveals fluctuations in growth over the years and more disparities among the inner-city neighborhoods. In particular, year 2021 highlighted a spread of the "red" neighborhoods, primarily affecting those neighborhoods extending beyond the "inner-city core" or facing more socioeconomic challenges (Balode 2023). One plausible explanation for this is also the impact of the COVID-19 pandemic, which may have diminished the appeal of inner-city living. It also suggests that the assumption of homogeneity based solely on distance from the city center is problematic (Dembski et al. 2021). However, it is noteworthy that certain inner-city neighborhoods exhibited stability and continuous growth over all these years, but, in other areas, the growth in some years compensated for decline in others.

Table 2 shows how the share of the population living in each of the inner-city neighborhoods changed between 2011, 2016, and 2021. Neighborhoods that experienced growth or stability are highlighted in bold. Consistent with previous analyses, it is apparent that the "inner-city core" neighborhoods performed bet-

2016–2017

2017–2018

2018–2019

2019–2020

2020–2021

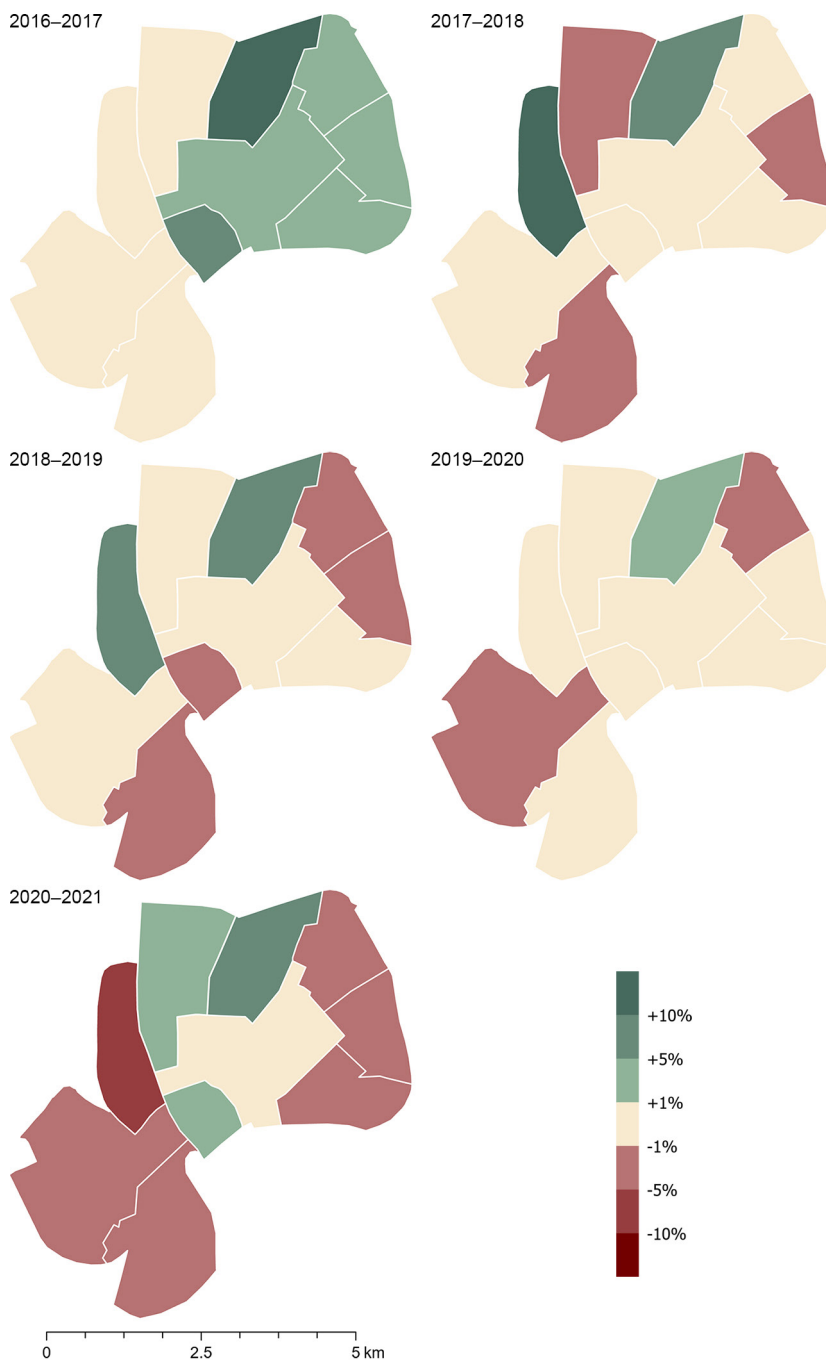|	
	+10%
	+5%
	+1%
	-1%
	-5%
	-10%

0   2.5   5 km

Fig. 3. Annual population growth rates in inner-city neighborhoods of Riga from 2017 to 2021

Source: authors' calculations based on CSB (2023).

Table 2. Share of the population living in the inner-city neighborhoods in 2011, 2016, and 2021

	Total population (2021)	Share (%)		
		2011	2016	2021
Centrs	30,673	4.67	4.58	4.94
Āgenskalns	24,024	4.07	3.94	3.87
Avoti	17,857	2.82	2.73	2.88
Brasa	12,721	2.01	2.05	2.05
Grīziņkalns	12,133	1.95	1.93	1.95
Torņakalns	6341	1.05	1.05	1.02
Pētersala-Andrejsala	5089	0.79	0.78	0.81
Vecpilsēta	1968	0.29	0.29	0.32
Skanste	1863	0.12	0.20	0.30
Ķīpsala	869	0.12	0.11	0.14

Source: CSB (2023).

ter overall; in fact, only two neighborhoods, Āgenskalns and Torņakalns, experienced a decline.

Fig. 4 provides an overview of population change across the entire study area, focusing particularly on the bordering municipalities. During the first half of the decade, some bordering municipalities witnessed a decline in population, while others experienced growth. However, during the latter half of the decade, all administrative areas surrounding the capital saw positive population growth rates, with many experiencing relatively high growth rates, up to a staggering 21%. This surge can be attributed to ongoing suburbanisation activities around Riga, evident also in the outer-city neighborhoods adjacent to the bordering municipalities. The overall population growth rate escalated from 1.2% in the first period to 7.6% in the subsequent period, marking an over six-fold increase.
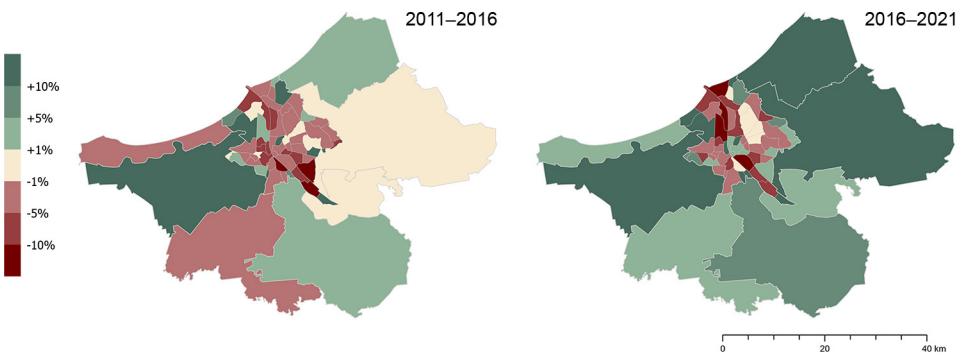

Fig. 4. 5-year population growth rates in neighborhoods of Riga and its bordering municipalities from 2011 to 2016 and from 2016 to 2021
Source: authors' calculations based on CSB (2023).

In general, the suburbanisation rates observed during the study period far surpassed the relatively moderate rates of reurbanisation. These findings also further underscore previous research indicating flaws in the core-ring model, as areas within both the core and the ring can display substantial variations from each other and from the average indicators. This heterogeneity is particularly pronounced in the core, where factors such as location (including being part of the "inner-city core" and the historical center or its protection zone), housing stock, socioeconomic environment, fragmentation, and pace of gentrification likely contribute to significant differences in population growth rates.

In the framework of the urban development model (Fig. 5), there was a significant positive increase in population within the ring during the study period, which theoretically conforms to the suburbanisation stage and total growth. However, despite this pronounced suburbanisation trend, the overall study area was in total decline, associated with either disurbanisation or reurbanisation stage. The model defines reurbanisation as resurgence in the share of the core population within the functional urban region. This can happen when the core declines slower than the ring or when the core grows while the ring simultaneously declines. Neither of these conditions apply in this case; however, there are signs of relative centralisation, marked by a modest increase in the inner-city population share within the study area between 2016 and 2021. Overall, these results suggest that the model indeed reflects specific conditions being met; instead, Riga experienced relative centralisation alongside simultaneous suburban growth. It is essential to note, as discussed earlier, that this unique outcome is a product of local conditions and particularly characteristic of post-socialist cities.
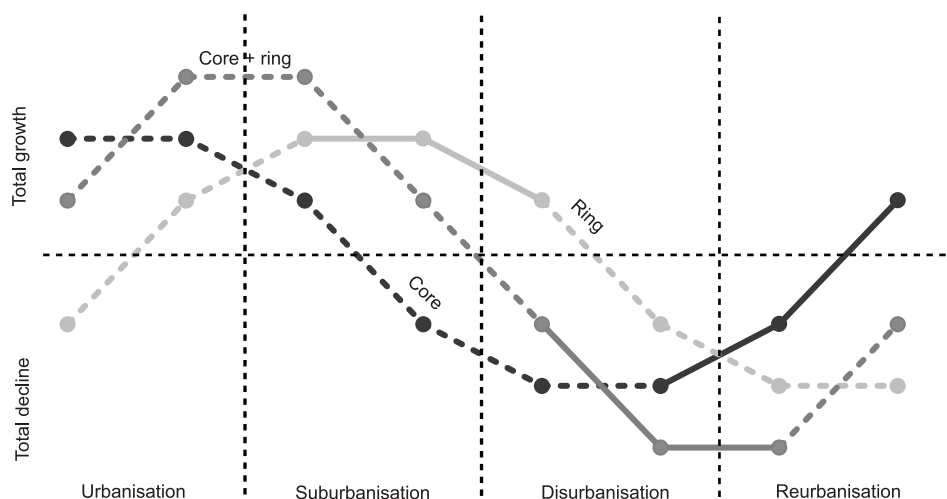

Fig. 5. Urban development model with the corresponding findings in the study area
Source: adapted from van den Berg (1982).

Conclusion and discussion

According to various case studies (Sýkora 2009, Haase et al. 2018), it is generally possible to conclude that, in the 21st century, post-socialist inner cities are experiencing reurbanisation, although it tends to differ from its forms observed in Western countries. One of the shortcomings in this research field has been the lack of investigating inner-city reurbanisation in the context of ongoing suburbanisation.

Analysis of population dynamics in the study area revealed that the inner-city population was growing alongside suburban population. Importantly, the inner-city population started to grow only in the latter half of the decade between 2011 and 2021. In the context of the urban development model, the results indicate a mix of suburbanisation, disurbanisation and reurbanisation stages, challenging the notion of the model's stages taking place sequentially.

This study has provided deeper insights into the current patterns of reurbanisation and suburbanisation processes in the inner city of Riga and its bordering municipalities. Between 2011 and 2021, after a prolonged decline, inner-city population finally experienced relative stability and even slight growth that aligns with urban development model's reurbanisation stage and the previous research on post-socialist cities discussed earlier. Additionally, the study identified heterogeneity within the inner city, with inner neighborhoods consistently outperforming outer neighborhoods. Population growth rates in the bordering municipalities of Riga were notably higher in the study period than those in the inner city, and the persistent suburbanisation trend is also a characteristic of post-socialist cities (Hesse, Siedentop 2018). Despite this, the total population decline observed in the study area suggests the model's closest fitting stage is disurbanisation, although it appears to be more of a mixed or parallel stage scenario.

This analysis contributes to existing research on urban areas in post-socialist contexts, highlighting shortcomings in the urban development model. Specifically, it underscores the potential coexistence of different stages of the model and emphasizes the importance of examining inner-city reurbanisation within a broader context. This broader context should not only include an exploration of demographic processes in outer city and suburban areas but also consider migration data between the inner city and suburbia. Could the growth observed in the inner city be attributable to younger suburbanites arriving, or is it a result of in-migration or international migration? At this moment, it may be premature to draw definitive conclusions, considering the relatively short history of suburbanisation in a post-socialist setting. The gradual increase in the inner-city population share relative to the suburban population presents an intriguing trend to monitor in the future. It remains to be seen whether, or rather when, reurbanisation rates will outpace suburbanisation rates. These are crucial considerations for future research.

Furthermore, conducting a mixed-methods research study on the residential preferences of both current inner-city residents and suburbanites would provide valuable insights. Understanding whether individuals currently fueling reurban-

isation may eventually opt for suburban living, and elucidating the factors influencing their decision-making process would be crucial not only for the inner city of Riga, but also the inner cities of Tallinn, Vilnius, and Budapest, which have also experienced high levels of residential mobility (Valatka et al. 2015, Temelová et al. 2016).

Research on reurbanisation holds significant implications for policymakers. Selective inner-city revitalisation and gentrification may intensify spatial inequalities, disrupt communities, undermine social cohesion, diminish residents' sense of belonging, or even cause displacement. An insight into residential behavior patterns can inform policymakers on how to mitigate spatial inequalities and sustainably facilitate reurbanisation to contain urban sprawl in shrinking cities.

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Dywergencja dynamiki populacji: przypadek centrum Rygi

Zarys treści: Dynamika populacji wpływa na krajobraz przestrzenny Europy. Choć w literaturze podejmuje się badania w tym aspekcie zarówno obszarów podmiejskich, jak i śródmiejskich, to często traktowane są one oddzielnie. Co więcej, procesy te są odmienne w różnych kontekstach lokalnych. Celem opracowania było zbadanie dynamiki populacji w centrum Rygi w latach 2011–2021, porównanie z sąsiadującymi gminami Rygi, a także przeanalizowanie sposobu, w jaki dynamika ta odpowiada modelowi rozwoju obszarów miejskich. Analiza, obejmująca 58 dzielnic Rygi i 7 sąsiadujących gmin, wykazała zmianę trajektorii dynamiki populacji śródmiejskiej w drugiej połowie dekady, która ostatecznie charakteryzowała się wzrostem. Należy podkreślić, że urbanizacja w dalszym ciągu wyprzedzała reurbanizację, co wskazuje na współistnienie wielu etapów modelu rozwoju obszarów miejskich.

Słowa kluczowe: dynamika populacji, rozwój miast, reurbanizacja